GDS Associates, Inc.
Engineers and Consultants

MICHIGAN ELECTRIC AND NATURAL GAS ENERGY EFFICIENCY POTENTIAL STUDY

FINAL REPORT

Prepared for:

MICHIGAN PUBLIC SERVICE COMMISSION

Consumers Energy
Count on Us

DTE Energy

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1 EXECUTIVE SUMMARY

1.1 BACKGROUND

The Michigan Public Service Commission, DTE Energy and Consumers Energy worked together to complete this 2013 study of energy efficiency potential in the state of Michigan. This energy efficiency potential study provides a roadmap for policy makers and identifies the energy efficiency measures having the greatest potential savings and the measures that are the most cost effective. In addition to technical and economic potential estimates, the development of achievable potential estimates for a range of feasible energy efficiency measures is useful for program planning and modification purposes. Unlike achievable potential estimates, technical and economic potential estimates do not include customer acceptance considerations for energy efficiency measures, which are often among the most important factors when estimating the likely customer response to new programs. For this study, GDS Associates, the consulting firm retained to conduct this study, produced the following estimates of energy efficiency potential:

- Technical potential
- Economic potential
- Achievable potential

Definitions of the types of energy efficiency potential are provided below.

1. **TECHNICAL POTENTIAL** is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end-users to adopt the efficiency measures. It is often estimated as a "snapshot" in time assuming immediate implementation of all technologically feasible energy saving measures, with additional efficiency opportunities assumed as they arise from activities such as new construction.
2. **ECONOMIC POTENTIAL** refers to the subset of the technical potential that is economically cost-effective as compared to conventional supply-side energy resources. Both technical and economic potential are theoretical numbers that assume immediate implementation of efficiency measures, with no regard for the gradual "ramping up" process of real-life programs. In addition, they ignore market barriers to ensuring actual implementation of efficiency. Finally, they only consider the costs of efficiency measures themselves, ignoring any programmatic costs (e.g., marketing, analysis, administration) that would be necessary to capture them.
3. **ACHIEVABLE POTENTIAL** is the amount of energy use that efficiency can realistically be expected to displace assuming different market penetration scenarios for cost effective energy efficiency measures. An aggressive scenario, for example, could, provide program participants with payments for the entire incremental cost of more energy efficient equipment). This is often referred to as "maximum achievable potential". Achievable potential takes into account real-world barriers to convincing end-users to adopt cost effective energy efficiency measures, the non-measure costs of delivering programs (for administration, marketing, tracking systems, monitoring and evaluation, etc.), and the capability of programs and administrators to ramp up program activity over time.[1] Achievable savings potential savings is a subset of economic potential.

This potential study evaluates three achievable potential scenarios:

1) **Scenario #1**: For the first scenario, achievable potential represents the amount of energy use that efficiency can realistically be expected to displace assuming incentives equal to 50% of the

[1] These definitions are from the November 2007 National Action Plan for Energy Efficiency "Guide for Conducting Energy Efficiency Potential Studies"

incremental measure cost and no spending cap. Cost effectiveness of measures was determined with the Utility Cost Test.

2) **Scenario #2**: For the second scenario, achievable potential is based on measure cost effectiveness screening using the Total Resource Cost Test with utility incentives again equal to 50% of measure costs.
3) **Scenario #3**: The third scenario is a subset of Achievable Scenario #1(based on UCT). While scenario #1 assumed no spending cap on efficiency measures, Achievable Scenario #3 assumed a spending cap of approximately 2% of annual utility revenues. The third scenario assumes a spending cap of 2% of annual utility revenue in order to align the scenario with the existing legislation in the state of Michigan. According to Public Act 295 of 2008, gas and electric utilities are not permitted (without specific approval from the Commission) to spend more than 2.0% of retail sales in attempting to comply with the energy optimization performance standard.

The purpose of this energy efficiency potential study is to provide a foundation for the continuation of utility-administered energy efficiency programs in Michigan and to determine the remaining opportunities for cost effective electricity and natural gas energy efficiency savings for the state of Michigan. This detailed report presents results of the technical, economic, and achievable potential for electric and natural gas efficiency measures in Michigan for two time periods:

- The five-year period from January 1, 2014 through December 31, 2018
- The ten-year period from January 1, 2014 through December 31, 2023

All results were developed using customized residential, commercial and industrial sector-level potential assessment analytic models and Michigan-specific cost effectiveness criteria including the most recent Michigan-specific avoided cost projections for electricity and natural gas. To help inform these energy efficiency potential models, up-to-date energy efficiency measure data were primarily obtained from the following recent studies and reports:

1) Michigan Energy Measures Database (MEMD)
2) Energy efficiency baseline studies conducted by DTE Energy and Consumers Energy
3) 2009 EIA Residential Energy Consumption Survey (RECS)
4) 2007 American Housing Survey (AHS)
5) 2003 EIA Commercial Building Energy Consumption Survey (CBECS)[2]

The above data sources provided valuable information regarding the current saturation, costs, savings and useful lives of electric and natural gas energy efficiency measures considered in this study.

The results of this study provide detailed information on energy efficiency measures that are the most cost effective and have the greatest potential electric and natural gas savings for the State of Michigan. The data used for this report were the best available at the time this analysis was developed. As building and appliance codes and energy efficiency standards change, and as energy prices fluctuate, additional opportunities for energy efficiency may occur while current practices may become outdated.

1.2 STUDY SCOPE

The study examines the potential to reduce electric consumption and peak demand and natural gas consumption through the implementation of energy efficiency technologies and practices in residential, commercial, and industrial facilities in Michigan. This study assesses electric and natural gas energy efficiency potential in Michigan over ten years, from 2014 through 2023.

The study had the following main objectives:

[2] This is the latest publicly available CBECS data released by the Energy Information Administration (EIA).

- Evaluate the electric and natural gas energy efficiency technical, economic and achievable potential savings in the State of Michigan;
- Calculate the economic and achievable potential energy efficiency savings based upon cost effectiveness screening with both the TRC and UCT benefit/cost ratios.

As noted above, the scope of this study distinguishes among three types of energy efficiency potential; (1) technical, (2) economic, and (3) achievable potential. The definitions used in this study for energy efficiency potential estimates were obtained directly from a 2007 National Action Plan for Energy Efficiency (NAPEE) report. Figure 1-1 below provides a graphical representation of the relationship of the various definitions of energy efficiency potential.

Figure 1-1: Types of Energy Efficiency Potential[3]

Not Technically Feasable	Technical Potential		
Not Technically Feasable	Not Cost Effective	Economic Potential	
Not Technically Feasable	Not Cost Effective	Market & Adoption Barriers	Achievable Potential

Limitations to the scope of study: As with any assessment of energy efficiency potential, this study necessarily builds on a large number of assumptions and data sources, including the following:

- Energy efficiency measure lives, measure savings and measure costs
- The discount rate for determining the net present value of future savings
- Projected penetration rates for energy efficiency measures
- Projections of Michigan specific electric and natural gas avoided costs
- Future changes to current energy efficiency codes and standards for buildings and equipment

While the GDS Team has sought to use the best and most current available data, there are many assumptions where there may be reasonable alternative assumptions that would yield somewhat different results. Furthermore, while the lists of energy efficiency measures examined in this study represent most commercially available measures, these measure lists are not exhaustive.

With respect to non-energy benefits of energy efficiency programs, GDS did include an adder of $9.25 per ton of carbon for reduced emissions of CO2. This is the expected value for reduced carbon emissions based upon equal weighting of a scenario with no carbon taxes and a scenario where a carbon tax of $18.50 per ton is implemented in the future.

Finally there was no attempt to place a dollar value on some difficult to quantify benefits arising from installation of some measures, such as increased comfort or increased safety, which may in turn support some personal choices to implement particular measures that may otherwise not be cost-effective or only marginally so.

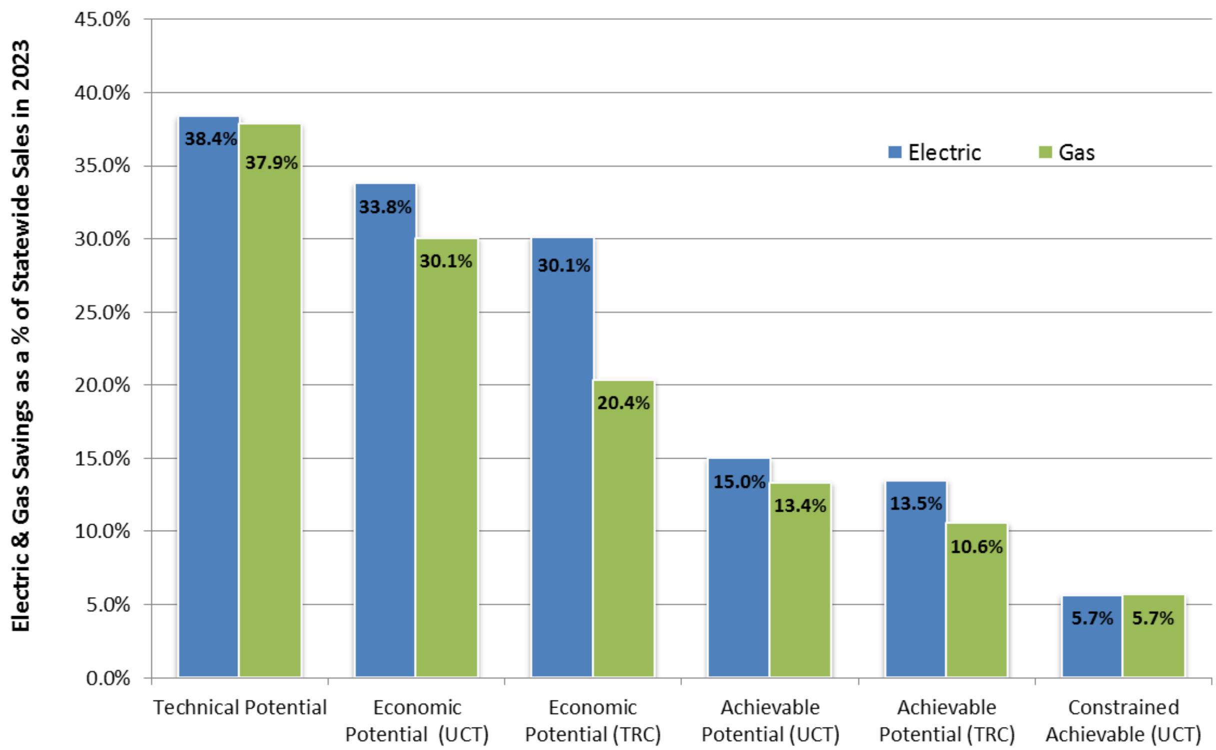
1.3 SUMMARY OF RESULTS

This study examined 1,417 electric energy efficiency measures and 922 natural gas measures in the residential, commercial and industrial sectors combined.

[3] Reproduced from "Guide to Resource Planning with Energy Efficiency" November 2007. US EPA. Figure 2-1.

Figure 1-2 below shows that cost effective electric energy efficiency resources can play a significantly expanded role in Michigan's energy resource mix over the next five and ten years. For the State of Michigan overall, the achievable potential for electricity savings based on the UCT in 2023 is 15.0% of forecast kWh sales for 2023. For the State overall, the achievable potential for natural gas savings based on the UCT in 2023 is also 13.4% of forecast MMBtu sales for 2023.

Figure 1-2: Electric & Gas Energy Efficiency Potential Savings Summary



Tables 1-1 and 1-2 present additional detail, providing the energy efficiency savings potential for all scenarios over a period of 5 and 10 years, respectively.

Table 1-1: Summary of Technical, Economic and Achievable Electric and Gas Energy Savings for 2018

END USE	TECHNICAL POTENTIAL	ECONOMIC POTENTIAL (UCT)	ECONOMIC POTENTIAL (TRC)	ACHIEVABLE POTENTIAL (UCT)	ACHIEVABLE POTENTIAL (TRC)	CONSTRAINED ACHIEVABLE (UCT)
Electric Sales MWh						
Savings % - Residential	45.8%	41.3%	39.8%	10.7%	10.5%	4.3%
Savings % - Commercial	48.5%	44.9%	37.4%	12.2%	10.5%	3.1%
Savings % - Industrial	27.0%	21.0%	19.3%	4.9%	4.5%	2.3%
Savings % - Total	**40.7%**	**36.1%**	**32.4%**	**9.4%**	**8.6%**	**3.2%**
Savings mWh - Residential	15,481,730	13,967,946	13,466,463	3,622,394	3,549,596	1,465,036
Savings mWh -	18,525,217	17,186,647	14,282,862	4,651,994	4,004,548	1,188,821

END USE	TECHNICAL POTENTIAL	ECONOMIC POTENTIAL (UCT)	ECONOMIC POTENTIAL (TRC)	ACHIEVABLE POTENTIAL (UCT)	ACHIEVABLE POTENTIAL (TRC)	CONSTRAINED ACHIEVABLE (UCT)
Commercial						
Savings mWh - Industrial	9,180,717	7,133,458	6,568,017	1,674,490	1,537,639	785,903
Savings mWh - Total	**43,187,664**	**38,288,051**	**34,317,341**	**9,948,878**	**9,091,783**	**3,439,760**
Electric Demand MW						
Savings % - Residential	42.7%	38.9%	41.0%	8.4%	8.9%	3.4%
Savings % - Commercial	53.8%	49.9%	42.3%	12.2%	10.6%	3.1%
Savings % - Industrial	40.6%	30.8%	27.4%	6.7%	6.3%	3.1%
Savings % - Total	**47.0%**	**42.1%**	**39.2%**	**9.7%**	**9.2%**	**3.2%**
Savings MW - Residential	4,274	3,895	4,106	839	892	340
Savings MW - Commercial	5,715	5,300	4,496	1,292	1,127	334
Savings MW - Industrial	1,790	1,360	1210	296	278.5	138
Savings MW - Total	**11,779**	**10,555**	**9,812**	**2,426**	**2,298**	**812**
Natural Gas Sales MMBtu						
Savings % - Residential	45.9%	34.8%	19.4%	9.4%	7.1%	3.8%
Savings % - Commercial	34.6%	29.8%	24.2%	6.1%	5.4%	3.1%
Savings % - Industrial	16.1%	13.0%	12.1%	2.7%	2.5%	0.7%
Savings % - Total	**35.2%**	**27.8%**	**18.8%**	**6.8%**	**5.5%**	**2.8%**
Savings MMBtu - Residential	136,706,666	103,587,007	57,885,592	27,930,065	21,296,093	11,332,060
Savings MMBtu - Commercial	58,904,392	50,760,002	41,188,176	10,382,936	9,274,379	5,309,780
Savings MMBtu - Industrial	26,183,022	21,190,526	19,611,597	4,451,220	3,986,192	1,070,312
Savings MMBtu - Total	**221,794,080**	**175,537,535**	**118,685,365**	**42,764,221**	**34,556,665**	**17,712,153**

Table 1-2: Summary of Technical, Economic and Achievable Electric and Gas Energy Savings for 2023

END USE	TECHNICAL POTENTIAL	ECONOMIC POTENTIAL (UCT)	ECONOMIC POTENTIAL (TRC)	ACHIEVABLE POTENTIAL (UCT)	ACHIEVABLE POTENTIAL (TRC)	CONSTRAINED ACHIEVABLE (UCT)
Electric Sales MWh						
Savings % - Residential	39.7%	35.2%	33.7%	14.7%	14.3%	5.9%
Savings % - Commercial	48.0%	44.5%	37.0%	20.8%	17.6%	6.0%
Savings % - Industrial	26.4%	20.5%	18.9%	8.9%	8.1%	5.0%
Savings % - Total	**38.4%**	**33.8%**	**30.1%**	**15.0%**	**13.5%**	**5.7%**
Savings mWh - Residential	13,697,929	12,146,247	11,644,006	5,070,834	4,946,942	2,044,561
Savings mWh - Commercial	18,601,147	17,251,862	14,344,326	8,057,699	6,835,102	2,326,054
Savings mWh - Industrial	9,180,717	7,133,458	6,568,017	3,087,742	2,816,429	1,735,830
Savings mWh - Total	**41,479,793**	**36,531,567**	**32,556,350**	**16,216,275**	**14,598,473**	**6,106,445**
Electric Demand MW						
Savings % - Residential	40.5%	36.7%	38.9%	13.1%	14.1%	5.3%
Savings % - Commercial	53.2%	49.3%	41.9%	22.6%	19.7%	6.8%
Savings % - Industrial	39.7%	30.2%	26.9%	12.7%	12.0%	7.4%
Savings % - Total	**45.7%**	**40.9%**	**38.0%**	**17.0%**	**16.1%**	**6.3%**
Savings MW - Residential	4,138	3,758	3,980	1,338	1,447	540
Savings MW - Commercial	5,741	5,325	4,519	2,433	2,128	737
Savings MW - Industrial	1,790	1,360	1210	571	539.2	335
Savings MW - Total	**11,669**	**10,442**	**9,709**	**4,342**	**4,114**	**1,613**
Natural Gas Sales MMBtu						
Savings % - Residential	51.0%	38.9%	22.1%	18.9%	14.0%	7.7%
Savings % - Commercial	34.9%	30.1%	24.4%	12.3%	11.0%	6.3%
Savings % - Industrial	17.1%	13.8%	12.8%	4.4%	3.9%	1.3%
Savings % - Total	**37.9%**	**30.1%**	**20.4%**	**13.4%**	**10.6%**	**5.7%**
Savings MMBtu - Residential	143,271,591	109,298,652	62,091,152	53,178,705	39,326,470	21,495,414
Savings MMBtu - Commercial	59,047,573	50,950,115	41,298,436	20,766,093	18,548,759	10,743,415
Savings MMBtu -	26,183,022	21,190,526	19,611,597	6,677,438	6,013,211	2,038,818

END USE	TECHNICAL POTENTIAL	ECONOMIC POTENTIAL (UCT)	ECONOMIC POTENTIAL (TRC)	ACHIEVABLE POTENTIAL (UCT)	ACHIEVABLE POTENTIAL (TRC)	CONSTRAINED ACHIEVABLE (UCT)
Industrial						
Savings MMBtu - Total	**228,502,186**	**181,439,293**	**123,001,185**	**80,622,236**	**63,888,440**	**34,277,647**

Last, the five-year and ten-year budgets and acquisition costs for the achievable potential scenarios for electric and natural gas energy efficiency savings are shown in Table 1-3 and 1-4.

GDS is providing the information on the projected acquisition per first year unit of energy saved in order to provide program planners and decision-makers with the expected cost to utilities to acquire the electric and natural gas savings for the three achievable potential scenarios examined in this report. It is important for program planners and other decision-makers to have a good understanding of the cost to utilities to acquire these levels of energy efficiency savings.

Table 1-3: Achievable Potential Scenarios; Budgets and Acquisition Costs Per Unit of Energy Saved – Electric Savings (Budgets Are Not in Present Value Dollars)

ALL SECTORS COMBINED	5 - YEAR EE BUDGET	10-YEAR EE BUDGET	ACQUISITION COST PER FIRST YEAR KWH SAVED - 5 YEARS	ACQUISITION COST PER FIRST YEAR KWH SAVED - 10 YEARS
Achievable UCT	$2,644,861,311	$5,019,681,110	$0.24	$0.22
Achievable TRC	$1,678,655,015	$3,285,131,139	$0.16	$0.16
Constrained UCT	$860,355,319	$1,774,960,027	$0.22	$0.20

Table 1-4: Achievable Potential Scenarios; Budgets and Acquisition Costs Per Unit of Energy Saved – Natural Gas Savings (Budgets Are Not in Present Value Dollars)

ALL SECTORS COMBINED	5 - YEAR EE BUDGET	10-YEAR EE BUDGET	ACQUISITION COST PER FIRST YEAR MMBTU SAVED - 5 YEARS	ACQUISITION COST PER FIRST YEAR MMBTU SAVED - 10 YEARS
Achievable UCT	$1,256,502,449	$2,506,262,004	$26.37	$25.57
Achievable TRC	$698,817,669	$1,395,301,521	$17.56	$16.86
Constrained UCT	$506,943,484	$1,031,893,201	$25.87	$24.92

Table 1-5 presents the sum of the utility energy efficiency budgets (not present valued) for five and ten years for each achievable potential scenario for electric and natural gas measures combined. The net present value budgets for five and ten years are provided in Tables 1-9 and 1-10.

Table 1-5: Achievable Potential Scenarios; Total Budgets for Electric and Natural Gas Savings Combined (Budgets Are Not in Present Value Dollars)

ALL SECTORS COMBINED	5 - YEAR EE BUDGET	10-YEAR EE BUDGET
Achievable UCT	$3,901,363,759	$7,525,943,114
Achievable TRC	$2,377,472,684	$4,680,432,660
Constrained UCT	$1,367,298,803	$2,806,853,228

Tables 1-6, 1-7 and 1-8 present the annual utility budgets in total and by sector required to achieve the savings levels in each achievable potential scenario. These tables also present annual information on the percent of annual utility revenues needed each year to fund acquiring the energy savings levels for each achievable potential scenario.

Table 1-6: Annual Program Budgets Associated with the Achievable UCT Scenario (in millions)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Residential	$310.3	$335.5	$339.7	$343.3	$344.6	$345.8	$345.6	$346.9	$346.1	$345.3
Commercial	$299.8	$363.6	$367.5	$367.6	$311.8	$318.5	$293.3	$298.1	$308.0	$307.0
Industrial	$72.4	$107.8	$125.1	$124.5	$87.7	$88.0	$69.4	$69.5	$70.4	$72.8
Total Budgets	***$682.5***	***$807.0***	***$832.4***	***$835.4***	***$744.1***	***$752.2***	**$708.3**	**$714.5**	**$724.5**	**$725.1**
% of Annual Revenue	*5.1%*	*6.0%*	*6.1%*	*6.1%*	*5.3%*	*5.3%*	*5.0%*	*5.0%*	*5.0%*	*4.9%*

Table 1-7: Annual Program Budgets Associated with the Achievable TRC Scenario (in millions)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Residential	$211.2	$236.4	$239.8	$242.6	$243.1	$243.7	$243.0	$243.8	$242.7	$241.7
Commercial	$138.8	$182.3	$198.1	$198.2	$162.8	$168.9	$152.9	$157.3	$166.2	$166.3
Industrial	$50.4	$66.2	$74.2	$74.3	$59.1	$59.6	$55.5	$52.0	$53.1	$56.2
Total Budgets	***$400.4***	***$484.9***	***$512.1***	***$515.0***	***$465.0***	***$472.2***	**$451.3**	**$453.1**	**$462.1**	**$464.2**
% of Annual Revenue	*3.0%*	*3.6%*	*3.8%*	*3.7%*	*3.3%*	*3.4%*	*3.2%*	*3.1%*	*3.2%*	*3.2%*

Table 1-8: Annual Program Budgets Associated with the Constrained UCT Scenario (in millions)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Residential	$136.3	$135.2	$135.5	$136.3	$137.0	$137.8	$138.6	$139.4	$140.2	$141.0
Commercial	$92.8	$93.7	$95.4	$96.9	$98.4	$100.0	$101.6	$103.2	$104.9	$106.5
Industrial	$40.7	$41.2	$42.0	$42.7	$43.2	$43.9	$44.5	$45.2	$46.0	$46.7
Total Budgets	***$269.8***	***$270.1***	***$272.9***	***$275.8***	***$278.7***	***$281.7***	**$284.7**	**$287.8**	**$291.0**	**$294.2**
% of Annual Revenue	*2.0%*	*2.0%*	*2.0%*	*2.0%*	*2.0%*	*2.0%*	*2.0%*	*2.0%*	*2.0%*	*2.0%*

1.4 Energy Efficiency Potential Savings Detail By Sector

Note that Sections 6, 7 and 8 of this report include additional detail about the electric and natural gas energy efficiency savings potential in Michigan by 2023.

1.5 Cost Effectiveness Findings

This study examines economic potential scenarios using the Total Resource Cost (TRC) test and the Utility Cost Test (UCT). This energy efficiency potential study concludes that significant cost effective electric and natural gas energy efficiency potential remains in in Michigan. Tables 1-9 and 1-10 show the preliminary present value benefits, costs and benefit-cost ratios for the Achievable Potential scenarios examined in this study.

Table 1-9: Benefit-Cost Ratios for Achievable Potential Scenarios For 2014 to 2018 Time Period

ACHIEVABLE POTENTIAL SCENARIOS	NPV $ BENEFITS	NPV $ COSTS	BENEFIT/COST RATIO	NET BENEFITS
Achievable UCT	$8,819,456,909	$3,452,121,731	2.55	$5,367,335,178
Achievable TRC	$9,090,916,601	$3,542,860,326	2.57	$5,548,056,275
Constrained UCT	$3,134,114,985	$1,212,231,599	2.59	$1,921,883,386

Table 1-10: Benefit-Cost Ratios for Achievable Potential Scenarios For 2014 to 2023 Time Period

ACHIEVABLE POTENTIAL SCENARIOS	NPV $ BENEFITS	NPV $ COSTS	BENEFIT/COST RATIO	NET BENEFITS
Achievable UCT	$15,854,685,097	$5,807,771,171	2.73	$10,046,913,925
Achievable TRC	$16,434,033,885	$6,063,428,268	2.71	$10,370,605,616
Constrained UCT	$5,996,092,253	$2,145,524,086	2.79	$3,850,568,167

In addition, GDS did calculate TRC and UCT benefit/cost ratios for each individual energy efficiency measure considered in this study. Only measures that had a benefit/cost ratio greater than or equal to 1.0 were retained in the economic and achievable potential savings estimates. It is important to note that energy efficiency measures for low income households do not need to be cost effective in Michigan. However, for consistency in this report, GDS has excluded all non-cost effective measures from estimates of economic and achievable potential energy efficiency savings.

1.6 REPORT ORGANIZATION

The remainder of this report is organized as follows:

Section 2: Glossary of Terms defines key terminology used in the report.

Section 3: Introduction highlights the purpose of this study and the importance of energy efficiency.

Section 4: Characterization of Electric and Natural Gas Energy Consumption in Michigan provides an overview of the economic/demographic characteristics of Michigan and a brief discussion of the historical and forecasted electric and natural gas energy sales by sector as well as electric peak demand.

Section 5: Potential Study Methodology details the approach used to develop the estimates of technical, economic and achievable potential savings for electric and natural gas energy efficiency savings.

Section 6: Residential Electric and Natural Gas Energy Efficiency Potential Estimates (2013-2022) provides a breakdown of the technical, economic, and achievable energy efficiency savings potential in the residential sector.

Section 7: Commercial Sector Electric and Natural Gas Energy Efficiency Potential Estimates (2014-2023) provides a breakdown of the technical, economic, and achievable energy efficiency savings potential in the commercial sector.

Section 8: Industrial Sector Electric and Natural Gas Energy Efficiency Potential Estimates (2014-2023) provides a breakdown of the technical, economic, and achievable energy efficiency savings potential in the industrial sector.

2 GLOSSARY OF TERMS[4]

The following list defines many of the key energy efficiency terms used throughout this energy efficiency potential study.

ACHIEVABLE POTENTIAL: The November 2007 National Action Plan for Energy Efficiency "Guide for Conducting Energy Efficiency Potential Studies" defines achievable potential as the amount of energy use that energy efficiency can realistically be expected to displace assuming the most aggressive program scenario possible (*e.g.*, providing end-users with payments for the entire incremental cost of more efficient equipment). This is often referred to as maximum achievable potential. Achievable potential takes into account real-world barriers to convincing end-users to adopt efficiency measures, the non-measure costs of delivering programs (for administration, marketing, tracking systems, monitoring and evaluation, etc.), and the capability of programs and administrators to ramp up program activity over time.

APPLICABILITY FACTOR: The fraction of the applicable housing units or businesses that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install CFLs in all light sockets in a home because the CFLs may not fit in every socket in a home).

AVOIDED COSTS: For purposes of this report, the electric avoided costs are defined as the generation, transmission and distribution costs that can be avoided in the future if the consumption of electricity or natural gas can be reduced with energy efficiency or demand response programs. For a natural gas utility, the avoided costs include the cost of the natural gas commodity and any other natural gas infrastructure costs that can be reduced with energy efficiency programs.

BASE ACHIEVABLE POTENTIAL: For purposes of this study, an achievable potential scenario which assumes incentives are set to 50% of the incremental or full measure cost.

BASE CASE EQUIPMENT END-USE INTENSITY: The electricity or natural gas used per customer per year by each base-case technology in each market segment. This is the consumption of the electric or natural gas energy using equipment that the efficient technology replaces or affects. For example, if the efficient measure is a high efficiency light bulb (CFL), the base end-use intensity would be the annual kWh use per bulb per household associated with an incandescent or halogen light bulb that provides equivalent lumens to the CFL.

BASE CASE FACTOR: The fraction of the market that is applicable for the efficient technology in a given market segment. For example, for the residential electric clothes washer measure, this would be the fraction of all residential customers that have an electric clothes washer in their household.

CAPITAL RECOVERY RATE (CRR): The return of invested capital expressed as an annual rate; often applied in a physical sense to wasting assets with a finite economic life.[5]

COINCIDENCE FACTOR: The fraction of connected load expected to be "on" and using electricity coincident with the electric system peak period.

CONSTRAINED ACHIEVABLE: An achievable potential scenario which assumes a lower level of incentives or lower annual program budgets than in the base case scenario.

[4] Potential definitions taken from National Action Plan for Energy Efficiency (2007). "Guide for Conducting Energy Efficiency Potential Studies." Prepared by Philip Mosenthal and Jeffrey Loiter, Optimal Energy, Inc.
[5] Accuval. http://www.accuval.net/insights/glossary/

COST-EFFECTIVENESS: A measure of the relevant economic effects resulting from the implementation of an energy efficiency measure or program. If the benefits are greater than the costs, the measure is said to be cost-effective.

CUMULATIVE ANNUAL: Refers to the overall annual savings occurring in a given year from both new participants and annual savings continuing to result from past participation with energy efficiency measures that are still in place. Cumulative annual does not always equal the sum of all prior year incremental values as some energy efficiency measures have relatively short lives and, as a result, their savings drop off over time.

COMMERCIAL SECTOR: Comprised of non-manufacturing premises typically used to sell a product or provide a service, where electricity is consumed primarily for lighting, space cooling and heating, office equipment, refrigeration and other end uses. Business types are included in Section 5 – Methodology.

DEMAND RESPONSE: Refers to electric demand resources involving dynamic hourly load response to market conditions, such as curtailment or load control programs.

EARLY REPLACEMENT: Refers to an energy efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with higher-efficiency units.

ECONOMIC POTENTIAL: The November 2007 National Action Plan for Energy Efficiency "Guide for Conducting Energy Efficiency Potential Studies" refers to the subset of the technical potential that is economically cost-effective as compared to conventional supply-side energy resources as economic potential. Both technical and economic potential are theoretical numbers that assume immediate implementation of efficiency measures, with no regard for the gradual "ramping up" process of real-life programs. In addition, they ignore market barriers to ensuring actual implementation of efficiency. Finally, they only consider the costs of efficiency measures themselves, ignoring any programmatic costs (e.g., marketing, analysis, administration, evaluation) that would be necessary to capture them.

END-USE: A category of equipment or service that consumes energy (*e.g.*, lighting, refrigeration, heating, process heat, cooling).

ENERGY EFFICIENCY: Using less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way. Sometimes "conservation" is used as a synonym, but that term is usually taken to mean using less of a resource even if this results in a lower service level (*e.g.*, setting a thermostat lower or reducing lighting levels).

ENERGY USE INTENSITY (EUI): A unit of measurement that describes a building's energy use. EUI represents the energy consumed by a building relative to its size.[6]

FREE DRIVER: Individuals or businesses that adopt an energy efficient product or service because of an energy efficiency program, but are difficult to identify either because they do not receive an incentive or are not aware of the program.

FREE RIDER: Participants in an energy efficiency program who would have adopted an energy efficiency technology or improvement in the absence of a program or financial incentive.

[6] See http://www.energystar.gov/index.cfm?fuseaction=buildingcontest.eui

GROSS SAVINGS: Gross energy (or demand) savings are the change in energy consumption or demand that results directly from program-promoted actions (e.g., installing energy-efficient lighting) taken by program participants regardless of the extent or nature of program influence on their actions.

INCENTIVE COSTS: A rebate or some form of payment used to encourage people to implement a given demand-side management (DSM) technology.

INCREMENTAL: Savings or costs in a given year associated only with new installations of energy efficiency or demand response measures happening in that specific year.

INDUSTRIAL SECTOR: Comprised of manufacturing premises typically used for producing and processing goods, where electricity is consumed primarily for operating motors, process cooling and heating, and space heating, ventilation, and air conditioning (HVAC). Business types are included in section 5 – Methodology.

MAXIMUM (OR MAX) ACHIEVABLE: An achievable potential scenario which assumes incentives for program participants are equal to 100% of measure incremental or full costs.

MEASURE: Any action taken to increase energy efficiency, whether through changes in equipment, changes to a building shell, implementation of control strategies, or changes in consumer behavior. Examples are higher-efficiency central air conditioners, occupancy sensor control of lighting, and retro-commissioning. In some cases, bundles of technologies or practices may be modeled as single measures. For example, an ENERGY STAR® ™ home package may be treated as a single measure.

MMBTU: A measure of power, used in this report to refer to consumption and savings associated with natural gas consuming equipment. One British thermal unit (symbol Btu or sometimes BTU) is a traditional unit of energy equal to about 1055 joules. It is the amount of energy needed to heat one pound of water by one degree Fahrenheit. MMBtu is defined as one million BTUs.

MW: A unit of electrical output, equal to one million watts or one thousand kilowatts. It is typically used to refer to the output of a power plant.

MWH: One thousand kilowatt-hours, or one million watt-hours. One MWh is equal to the use of 1,000,000 watts of power in one hour.

NET-TO-GROSS RATIO: A factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts

NET SAVINGS: Net energy or demand savings refer to the portion of gross savings that is attributable to the program. This involves separating out the impacts that are a result of other influences, such as consumer self-motivation. Given the range of influences on consumers' energy consumption, attributing changes to one cause (i.e., a particular program) or another can be quite complex.

NON INCENTIVE COST: Costs incurred by the utility that do not include incentives paid to the customer (i.e.: program administrative costs, program marketing costs, data tracking and reporting, program evaluation, etc.)

NONPARTICIPANT SPILLOVER: Savings from efficiency projects implemented by those who did not directly participate in a program, but which nonetheless occurred due to the influence of the program.

PARTICIPANT COST: The cost to the participant to participate in an energy efficiency program.

PARTICIPANT SPILLOVER: Additional energy efficiency actions taken by program participants as a result of program influence, but actions that go beyond those directly subsidized or required by the program.[7]

PORTFOLIO: Either a collection of similar programs addressing the same market, technology, or mechanisms; or the set of all programs conducted by one energy efficiency organization or utility.

PROGRAM: A mechanism for encouraging energy efficiency that may be funded by a variety of sources and pursued by a wide range of approaches (typically includes multiple energy efficiency measures).

PROGRAM POTENTIAL: The November 2007 National Action Plan for Energy Efficiency 'Guide for Conducting Energy Efficiency Potential Studies" refers to the efficiency potential possible given specific program funding levels and designs as program potential. Often, program potential studies are referred to as "achievable" in contrast to "maximum achievable." In effect, they estimate the achievable potential from a given set of programs and funding. Program potential studies can consider scenarios ranging from a single program to a full portfolio of programs. A typical potential study may report a range of results based on different program funding levels.

REMAINING FACTOR: The fraction of applicable units that have not yet been converted to the electric or natural gas energy efficiency measure; that is, one minus the fraction of units that already have the energy efficiency measure installed.

REPLACE-ON-BURNOUT: An energy efficiency measure is not implemented until the existing technology it is replacing fails or burns out. An example would be an energy efficient water heater being purchased after the failure of the existing water heater at the end of its useful life.

RESOURCE ACQUISITION COSTS: The cost of energy savings associated with energy efficiency programs, generally expressed in costs per first year or per lifetime MWH saved ($/MWh), kWh ($/kWh), or MMBtu ($/MMBtu) in this report.

RETROFIT: Refers to an efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with higher-efficiency units (also called "early retirement") or the installation of additional controls, equipment, or materials in existing facilities for purposes of reducing energy consumption (e.g., increased insulation, low flow devices, lighting occupancy controls, economizer ventilation systems).

SAVINGS FACTOR: The percentage reduction in electricity or natural gas consumption resulting from application of the efficient technology. The savings factor is used in the formulas to calculate energy efficiency potential.

SOCIETAL COST TEST: Measures the net benefits of the energy efficiency program for a region or service area as a whole. Costs included in the SCT are costs to purchase and install the energy efficiency measure and overhead costs of running the energy efficiency program. The SCT may also include non-energy costs, such as reduced customer comfort levels. The benefits included are the avoided costs of energy and capacity, plus environmental and other non-energy benefits that are not currently valued by the market.

TECHNICAL POTENTIAL: The theoretical maximum amount of energy use that could be displaced by energy efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end-users to adopt the energy efficiency measures. It is often estimated as a "snapshot" in

[7] The definitions of participant and nonparticipant spillover were obtained from the National Action Plan for Energy Efficiency Report titled "Model Energy Efficiency Program Impact Evaluation Guide", November 2007, page ES-4.

time assuming immediate implementation of all technologically feasible energy saving measures, with additional efficiency opportunities assumed as they arise from activities such as new construction.

TOTAL RESOURCE COST TEST: The TRC measures the net benefits of the energy efficiency program for a region or service area as a whole from the combined perspective of the utility and program participants. Costs included in the TRC are costs to purchase and install the energy efficiency measure and overhead costs of running the energy efficiency program. Costs include all costs for the utility and the participants. The benefits included are the avoided costs of energy and capacity plus any quantifiable non-energy benefits (such as reduced emissions of carbon dioxide).

UTILITY COST TEST: The UCT measures the net benefits of the energy efficiency program for a region or service area as a whole from the utility's perspective. Costs included in the UCT are the utility's costs to design, implement and evaluate a program. The benefits included are the avoided costs of energy and capacity.

3 INTRODUCTION

This report assesses the potential for electric and natural gas energy efficiency programs to assist Michigan in meeting future energy service needs. This section of the report provides the following information:

- Defines the term "energy efficiency";
- Describes the general benefits of energy efficiency programs;
- Provides results of similar energy efficiency potential studies conducted in other states; and,
- Describes contents of the Sections of this report.

The purpose of this energy efficiency potential study is to provide a detailed assessment of the technical, economic and achievable potential for electric and natural gas energy efficiency Michigan. This study has examined a full array of energy efficiency technologies and energy efficient building practices that are technically achievable. The results of this study can be used to develop energy efficiency goals for Michigan in the short and long-term. The strategies that will be developed based on this potential study will guide direction and scope of utility administered energy efficiency programs in reducing electric and natural gas energy consumption in Michigan.

3.1 INTRODUCTION TO ENERGY EFFICIENCY

Efficient energy use, often referred to as energy efficiency, is using less energy to provide the same level of energy service. An example would be insulating a home or business in order to use less heating and cooling energy to achieve the same inside temperature. Another example would be installing fluorescent lighting in place of less efficient halogen or incandescent lights to attain the same level of illumination. Energy efficiency can be achieved through more efficient technologies and/or processes as well as through changes in individual behavior.

3.1.1 General Benefits of Energy Efficiency

There are a number of benefits that accrue to the State of Michigan due to electric and natural gas energy efficiency programs. These benefits include avoided cost savings, non-electric benefits such as water and fossil fuel savings, environmental benefits, economic stimulus, job creation, risk reduction, and energy security.

Avoided electric energy and capacity costs are based upon the costs an electric utility would incur to construct and operate new electric power plants or to purchase power from another source. These avoided costs of electricity include both fixed and variable costs that can be directly avoided through a reduction in electricity usage. The energy component includes the costs associated with the production of electricity, while the capacity component includes costs associated with the capability to deliver electric energy during peak periods. Capacity costs consist primarily of the costs associated with building peaking generation facilities. The forecasts of electric energy and capacity avoided costs and natural gas avoided costs used in this study were provided to GDS by the Michigan Public Service Commission. Avoided costs for natural gas include the avoided costs of the natural gas commodity and any other savings on the natural gas distribution system for operations and maintenance expenses or natural gas infrastructure expenditures.

At the consumer level, energy efficient products often cost more than their standard efficiency counterparts, but this additional cost is balanced by lower energy consumption and lower energy bills. Over time, the money saved from energy efficient products will pay consumers back for their initial investment as well as save them money on their electric and natural gas bills. Although some energy efficient technologies are complex and expensive, such as installing new high efficiency windows or a high efficiency boiler, many are simple and inexpensive. Installing compact fluorescent lighting or low-flow water devices, for example, can be done by most individuals.

Although the reduction in electric and natural gas costs is the primary benefit to be gained from investments in energy efficiency, the electric and natural gas utilities in Michigan, their consumers, and society as a whole can also benefit in other ways. Many electric efficiency measures also deliver non-energy benefits. For example, low-flow water devices and efficient clothes washers also reduce water consumption.[8] Similarly, weatherization measures that improve the building shell not only save on air conditioning costs in the summer, but also can save the customer money on space heating fuels, such as natural gas or propane. Reducing electricity consumption also reduces harmful emissions from power plants, such as SO_X, NO_X, CO_2 and particulates into the environment.[9]

Energy efficiency programs create both direct and indirect jobs. The manufacture and installation of energy efficiency products involves the manufacturing sector as well as research and development, service, and installation of jobs. These are skilled positions that are not easily outsourced to other states and countries. The creation of indirect jobs is more difficult to quantify, but result from households and businesses experiencing increased discretionary income from reduced energy bills. These savings produce multiplier effects, such as increased investment in other goods and services driving job creation in other markets.

Energy efficiency reduces risks associated with fuel price volatility, unanticipated capital cost increases, environmental regulations, supply shortages, and energy security. Aggressive energy efficiency programs can help eliminate or postpone the risk associated with committing to large investments for generation facilities a decade or more before they are needed. Energy efficiency is also not subject to the same supply and transportation constraints that impact fossil fuels. Finally, energy efficiency reduces competition between states and utilities for fuels, and reduces dependence on fuels imported from other states or countries to support electricity production. Energy efficiency can help meet future demand increases and reduce dependence on out-of-state or overseas resources.

3.2 THE MICHIGAN CONTEXT

3.2.1 Continuing Customer Growth

The annual kWh sales and electric system peak load for the State of Michigan is projected to increase over the next decade. From 2002 to 2011, the number of residential electric utility customers in Michigan remained fairly constant, growing at a rate of approximately 0.1% annually.[10] The electric load forecasts for Michigan developed by GDS indicates that the number of electric consumers in Michigan will continue to increase at a rate of 0.34% per year from 2014 through 2023 (the timeframe for this study) creating further growth in system electricity sales and peak demand. Natural gas sales, however, are projected to decrease slightly at a rate of -0.88% per year from 2014 to 2023. This report assesses the potential for electric and natural gas energy efficiency programs to assist the State of Michigan in meeting future electric and natural gas energy service needs.

3.2.2 Energy Efficiency Activity

Making homes and buildings more energy efficient is seen as a key strategy for addressing energy security, reducing reliance on fossil fuels from other countries, assisting consumers to lower energy bills, and addressing concerns about climate change. Faced with rapidly increasing energy prices, constraints in

[8] The ENERGY STAR web site (www.energystar.gov) states that "ENERGY STAR qualified clothes washers use about 37% less energy and use over 50% less water than regular washers".
[9] The 2012 ENERGY STAR Annual Report states that 18,000 organizations across the US partnered with the US Environmental Protection Administration to improve energy efficiency while also realizing significant environmental and financial benefits. These EPA partners and individuals helped achieve energy savings while preventing more than 1.8 billion metric tons of GHG and saving over $230 billion on utility bills. Consumers and businesses that also partnered with ENERGY STAR also reduced their utility bills by $24 billion. With the help of ENERGY STAR, Americans were able to prevent 242 million metric tons of GHG during 2012, providing over $5.8 billion in benefits to society.
[10] This is the compound average annual growth rate for residential electric customers in Michigan.

energy supply and demand, and energy reliability concerns, states are turning to energy efficiency as the most reliable, cost-effective, and quickest resource to deploy.[11]

3.2.3 Recent Energy Efficiency Potential Studies

Table 3-1 below provides the results from a GDS review of recent energy efficiency potential studies conducted throughout the United States. It is useful to examine these results to understand if they are similar to this latest study for Michigan.

Table 3-1: Results of Recent Energy Efficiency Potential Studies in the US

STATE	STUDY YEAR	AUTHOR	STUDY PERIOD	# OF YEARS	ACHIEVABLE POTENTIAL
Missouri	2011	ACEEE (1)	2011-2020	10	6.4%
District of Columbia	2013	GDS (2)	2014-2023	10	29%
New Hampshire	2009	GDS (3)	2009-2018	10	20.5%
Rhode Island	2008	KEMA (4)	2009-2018	10	9.0%
Vermont	2011	GDS/Cadmus (5)	2012-2021	10	14.3%
New York City	2010	Global Energy Partners (6)	2011-2018	8	15%
USA	2009	McKinsey & Company (7)	2011-2020	10	23.0%
Pennsylvania	2012	Statewide Evaluator (8)	2013-2023	10	17.3%
Note 1: The ACEEE energy efficiency potential study builds on several energy efficiency potential studies conducted in Missouri from 2008 through 2011 and analyzes a specific suite of energy efficiency policies and programs.					
Note 2: The July 2013 District of Columbia potential study evaluated the maximum achievable potential scenario where incentives equaled 100% of measure incremental costs.					
Note 3: The 2009 New Hampshire potential study figure presented here is maximum achievable potential. Maximum Achievable potential is defined in this study as the maximum penetration of an efficient measure that would be adopted absent consideration of cost or customer behavior.					
Note 4: This 2010 KEMA report titled "Opportunity for Energy Efficiency That Is Cheaper Than Supply In Rhode Island" examined technical, economic and achievable potential for electric energy efficiency savings. Here is the definition of achievable potential used in that report: "Achievable program potential refers to the amount of cost-effective savings that are estimated to occur in response to a specific funded set of program activities. Achievable potential reflects *net* savings — in other words incremental savings over and above those projected to occur naturally from future changes in codes and standards or from other market activities outside of National Grid's efficiency program interventions and efforts. Achievable potential is estimated at the program level – namely groups of measures are bundled into program offerings					
Note 5: The 2011 Vermont study figure presented here is maximum achievable potential. Achievable potential in this study is defined as the amount of energy use that efficiency can realistically be expected to displace assuming the most aggressive program scenario possible (e.g., providing end-users with payments for the entire incremental cost of more efficiency equipment).					
Note 6: The 2010 New York City potential study figure provided here is maximum achievable potential.					
Note 7: The 2009 McKinsey & Company potential study only includes energy efficiency measures that can be hard-wired and excludes the impacts of all behavior-based programs.					
Note 8: The 2012 Pennsylvania potential study figure provided here is maximum achievable potential.					

A 2012 report by the American Council for an Energy Efficient Economy (ACEEE) offers information regarding the current savings and spending related to energy efficiency by state.[12] Based on self-reported

[11] The December 2008 National Action Plan for Energy Efficiency (NAPEE) "Vision for 2025: A Framework for Change" states that "the long-term aspirational goal for the Action Plan is to achieve all cost-effective energy efficiency by the year 2025. Based on studies, the efficiency resource available may be able to meet 50% or more of the expected load growth over this time frame, similar to meeting 20% of electricity consumption and 10 percent of natural gas consumption. The benefits from achieving this magnitude of energy efficiency nationally can be estimated to be more than $100 billion in lower energy bills in 2025 than would otherwise occur, over $500 billion in net savings, and substantial reductions in greenhouse gas emissions."

[12] American Council for an Energy Efficient Economy, "The 2010 State Energy Efficiency Scorecard", Report #E107, October 2010.

data, the eleven states annually spent more than 2% of electric sales revenue on electric energy efficiency programs in 2011. GDS has also examined actual energy efficiency savings data for 2010 and 2011 from the US Energy Information Administration (EIA) on the top twenty energy efficiency electric utilities. These top twenty utilities saved over 2% of annual kWh sales in 2010 with their energy efficiency programs, and 3.8% of annual kWh sales in 2011. These percentage savings are attributable to energy efficiency measures installed in a one-year time frame and demonstrate what can be accomplished with full-scale and aggressive implementation of programs.

3.3 COST-EFFECTIVENESS FINDINGS

The Total Resource Cost Test and Utility Cost Test calculations in this study follow the prescribed methodology detailed in the latest version of the California Standard Practice Manual (CA SPM). The California Standard Practice Manual establishes standard procedures for cost-effectiveness evaluations for utility-sponsored or public benefits programs and is generally considered to be an authoritative source for defining cost-effectiveness criteria and methodology. This manual is often referenced by many other states and utilities.

The GDS cost effectiveness screening tool used for this study quantifies all of the benefits and costs included in these two tests (TRC and UCT tests). For purposes of this study, quantified benefits of the TRC Test include electric energy and capacity avoided supply costs, avoided electric transmission and distribution avoided costs, and alternative fuel and water savings. GDS has also included a risk adjusted value for reduced carbon emissions valued at $9.25 per ton of carbon emissions avoided.[13] Costs include the specified measure cost (incremental or full cost, as applicable), any increase in supply costs (electric or fossil fuel), as well as operation and maintenance costs. In addition, the GDS screening tool is capable of evaluation of cost-effectiveness based on various market replacement approaches, including replace-on-burnout, retrofit, and early retirement.

The forecast of electric and natural gas avoided costs of energy and generation capacity were obtained from the Michigan PSC. The value for electric T&D avoided costs were obtained from a report from the New York Public Service Commission based on the upstate New York region.

This energy efficiency potential study concludes that there remains significant achievable cost effective potential for electric and natural gas energy efficiency measures and programs in Michigan. Tables 3-2, 3-3 and 3-4 show benefit-cost ratios for the three scenarios examined in this study for the five and ten-year implementation periods starting in 2014.

Table 3-2: Scenario #1: Utility Cost Test Benefit-Cost Ratios for the Achievable Potential Scenario Based on UCT Screening (50% Incentives) For 5-Year and 10-Year Implementation Periods

ACHIEVABLE POTENTIAL SCENARIOS	UCT $ BENEFITS	UCT $ COSTS	UCT BENEFIT/COST RATIO
5-yr period	$8,819,456,909	$3,452,121,731	2.55
10-yr period	$15,854,685,097	$5,807,771,171	2.73

13 This value represents the expected value for reduced carbon emissions based on an equal weighting of a scenario with no carbon taxes and a scenario where carbon is valued at $18.50 per ton of reduced emissions. The $18.50 per ton figure was obtained from a recent filing by Commonwealth Edison in Illinois.

Table 3-3: Scenario #2: TRC Test Benefit-Cost Ratios for the Achievable Potential Scenario Based on TRC Screening For 5-Year and 10-Year Implementation Periods

ACHIEVABLE POTENTIAL SCENARIOS	TRC $ BENEFITS	TRC $ COSTS	TRC BENEFIT/COST RATIO
5-yr period	$9,090,916,601	$3,542,860,326	2.57
10-yr period	$16,434,033,885	$6,063,428,268	2.71

Table 3-4: Scenario #3: Benefit-Cost Ratios for the Constrained Achievable Potential Scenario Based on the UCT Test for 5-Year and 10-Year Implementation Periods

ACHIEVABLE POTENTIAL SCENARIOS	UCT $ BENEFITS	UCT $ COSTS	UCT BENEFIT/COST RATIO
5-yr period	$3,134,114,985	$1,212,231,599	2.59
10-yr period	$5,996,092,253	$2,145,524,086	2.79

4 CHARACTERIZATION OF ELECTRICITY AND NATURAL GAS CONSUMPTION IN MICHIGAN

This chapter provides up-to-date historical and forecast information on electricity and natural gas consumption, consumption by market segment and by energy end use, and electric and natural gas customers in the State of Michigan. This chapter also provides an overview of the number of households and housing units in Michigan. Developing this information is a fundamental part of any energy efficiency potential study. It is necessary to understand how energy is consumed in a state or region before one can assess the energy efficiency savings potential that remains to be tapped.

4.1 MICHIGAN ELECTRIC AND NATURAL GAS UTILITIES

There are multiple utilities that provide electric and natural gas to Michigan customers. According to data from the Michigan Public Service Commission, Michigan has 8 investor-owned electric utilities, 41 municipal electric utilities, and 10 electric distribution cooperatives. There are 6 utilities in Michigan that provide piped natural gas to consumers. The two largest electric utilities are DTE Energy Company (DTE) and Consumers Energy. These two utilities provide approximately 92% of electric energy sales in the State.

Figure 4-1 shows the service areas for electric distribution utilities in Michigan, with the largest two companies, DTE and Consumers Energy taking up much of the geographic region of the state. Note that the size of utility service areas varies greatly. Figure 4-2 displays the service areas of the utilities that distribute piped natural gas throughout the state.

Figure 4-1: Michigan Electric Utility Service Territories

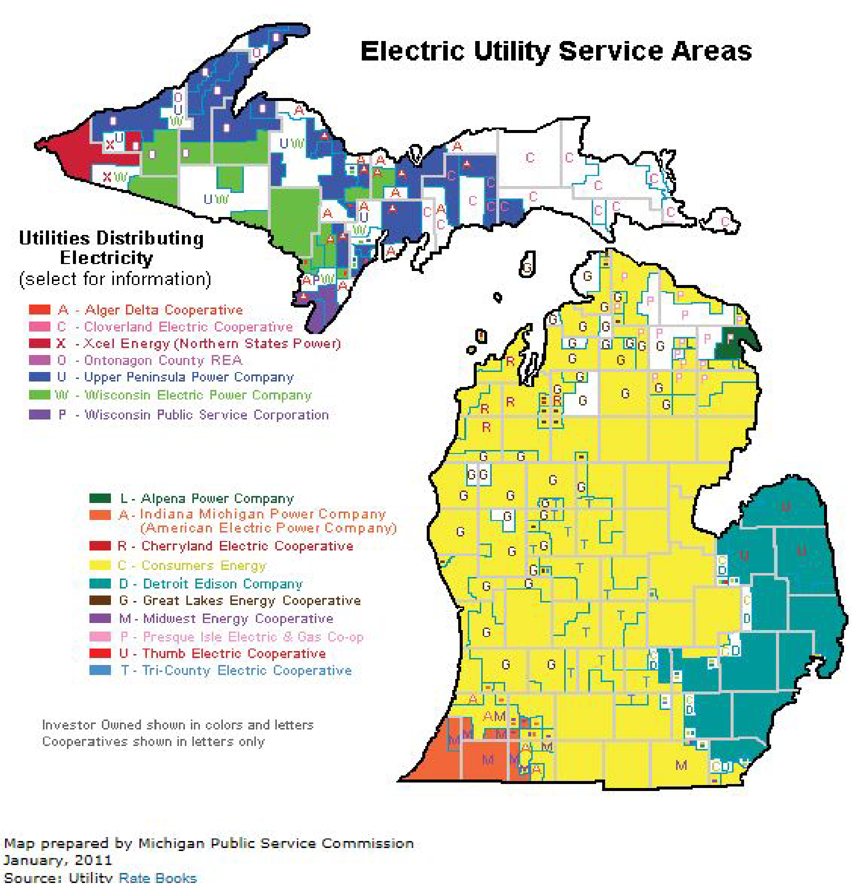
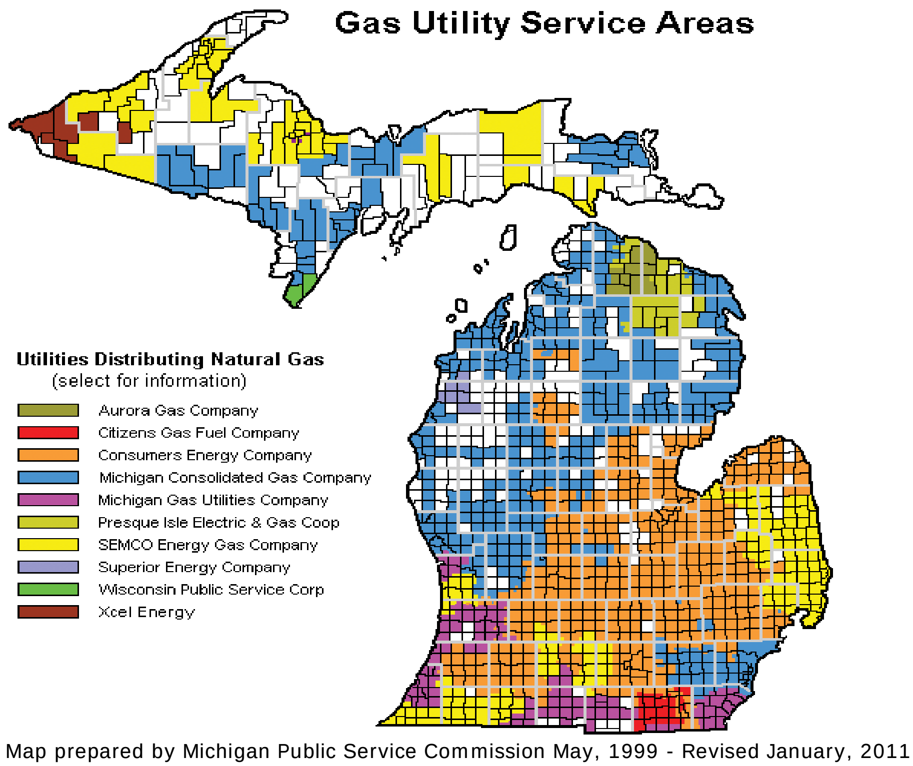


Figure 4-2: Michigan Natural Gas Utility Service Territories



4.1.1 Detroit Edison Energy Company (DTE)

The DTE Energy provides electricity mainly in southeastern Michigan and provides natural gas services throughout the state of Michigan. DTE supplies electricity and natural gas to 2.1 million and 1.2 million customers respectively throughout the entire state.

4.1.2 Consumers Energy

Consumers Energy is one of the largest combined utilities (electric and natural gas) in the country, providing services to a population of 6.8 million of the 10 million citizens in the states.

4.2 ECONOMIC/DEMOGRAPHIC CHARACTERISTIC

Michigan is located in the Great Lakes and the Midwestern region of the United States. It is the 11th largest state. It borders Wisconsin, Ohio, Indiana, Minnesota, and Canada. Michigan is 96,810 square miles, bordering four of the Great Lakes: Lake Michigan, Lake Superior, Lake Huron, and Lake Erie. Michigan's population is 9,883,635 residents[14], ranking Michigan as the 8th most populated state in the country.

According to an estimate done by the Census Bureau, during the year 2012, there were about 175 people per square mile in the state of Michigan. The state's population distribution by age is as follows:

- Under 5 – 7.6%
- Ages 5-19 – 22.6%
- Ages 19-65 - 46.8%
- Above 65 – 23%

[14] U.S. Department of Commerce, Bureau of the Census, at www.census .gov on October 7, 2013.

The estimated number of Michigan housing units from the 2010 census was 4,532,233. Table 4-1 and Table 4-2 provides historical and forecast data for the number of electric and natural gas customers by sector in Michigan.

Table 4-1: Number of Electric Customers by Market Sector

Year	Residential Electric Customers	Commercial Electric Customers	Industrial Electric Customers	Total Electric Customers
2003	4,216,573	483,168	14,224	**4,713,965**
2004	4,248,920	504,754	14,322	**4,767,996**
2005	4,284,083	509,964	13,390	**4,807,437**
2006	4,299,273	514,049	13,317	**4,826,639**
2007	4,298,455	518,058	13,227	**4,829,740**
2008	4,290,313	518,776	12,776	**4,821,865**
2009	4,253,786	520,551	13,065	**4,787,402**
2010	4,245,158	520,233	12,827	**4,778,218**
2011	4,249,136	521,322	12,961	**4,783,419**
2012	4,249,100	520,674	12,829	**4,782,603**
2013	4,251,335	522,599	13,070	**4,787,004**
2014	4,258,028	524,034	13,108	**4,795,170**
2015	4,266,512	525,411	13,127	**4,805,050**
2016	4,277,366	526,820	13,139	**4,817,325**
2017	4,289,689	528,188	13,146	**4,831,023**
2018	4,305,113	529,714	13,153	**4,847,980**
2019	4,321,703	531,212	13,160	**4,866,075**
2020	4,338,945	532,660	13,166	**4,884,771**
2021	4,356,733	534,067	13,171	**4,903,971**
2022	4,375,466	535,463	13,177	**4,924,106**
2023	4,395,035	536,848	13,183	**4,945,066**
2024	4,415,254	535,425	13,189	**4,963,868**

Table 4-2: Number of Natural Gas Customers by Market Sector

Year	Residential Natural Gas Customers	Commercial Natural Gas Customers	Industrial Natural Gas Customers	Total Natural Gas Customers
2002	3,110,743	247,818	10,468	**3,369,029**
2003	3,140,021	246,123	10,378	**3,396,522**
2004	3,161,370	246,991	10,088	**3,418,449**
2005	3,187,583	253,415	10,049	**3,451,047**
2006	3,193,920	254,923	9,885	**3,458,728**
2007	3,188,152	253,139	9,728	**3,451,019**
2008	3,172,623	252,382	10,563	**3,435,568**
2009	3,169,026	252,017	18,186	**3,439,229**

YEAR	RESIDENTIAL NATURAL GAS CUSTOMERS	COMMERCIAL NATURAL GAS CUSTOMERS	INDUSTRIAL NATURAL GAS CUSTOMERS	TOTAL NATURAL GAS CUSTOMERS
2010	3,152,468	249,309	9,332	**3,411,109**
2011	3,153,895	249,456	9,088	**3,412,439**
2012	3,163,925	249,850	8,833	**3,422,609**
2013	3,173,955	250,245	8,579	**3,432,779**
2014	3,183,986	250,639	8,324	**3,442,949**
2015	3,197,789	251,082	8,287	**3,457,158**
2016	3,213,198	251,775	8,250	**3,473,222**
2017	3,228,297	251,653	8,212	**3,488,162**
2018	3,243,686	253,195	8,175	**3,505,055**
2019	3,258,606	253,389	8,152	**3,520,147**
2020	3,273,842	253,972	8,120	**3,535,934**
2021	3,289,150	254,559	8,087	**3,551,796**
2022	3,304,524	255,350	8,064	**3,567,938**
2023	3,319,876	255,751	8,035	**3,583,663**
2024	3,335,417	256,451	8,005	**3,599,873**

4.3 COMMERCIAL AND INDUSTRIAL SECTOR BASELINE SEGMENTATION FINDINGS

This section provides detailed information on the breakdown of commercial and industrial electricity and natural gas sales in Michigan by market segment and end use.

4.3.1 Electricity Sales by Sector, by EDC

Figure 4-3 and Table 4-3 show historical and forecast electricity sales by sector (in millions of kWh) for the State of Michigan for the period 2002 to 2024. Both DTE Energy and Consumers Energy do not have electric sales and peak load forecasts that exclude all impacts of their current energy efficiency programs. As a result, the forecast of annual electric sales for Michigan shown below do reflect the impacts of current energy efficiency programs.

Figure 4-3: Michigan Annual Electric Sales

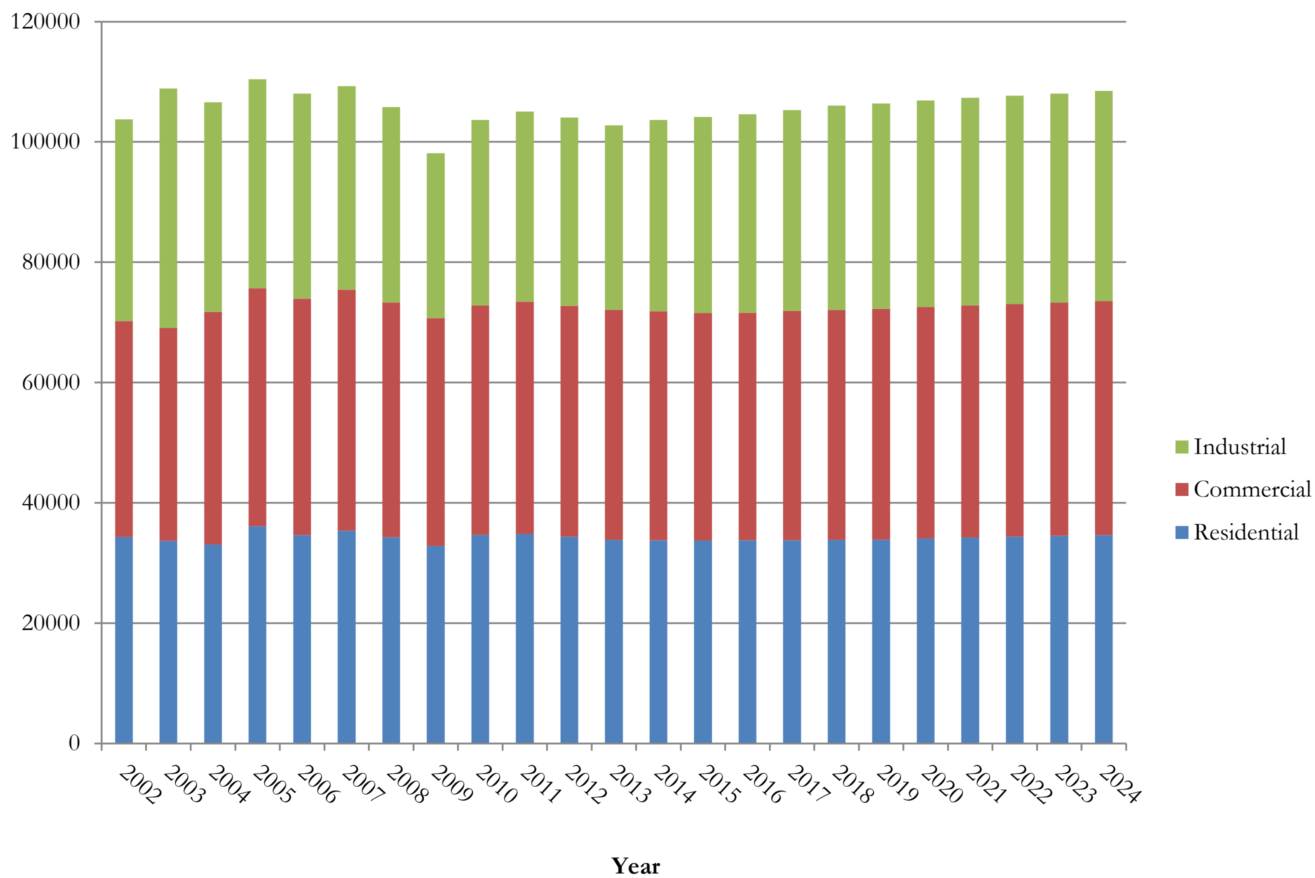


Table 4-3: Michigan Actual and Projected Electric GWh Sales by Sector

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TOTAL
2002	34,336	35,880	33,537	**103,753**
2003	33,669	35,391	39,813	**108,873**
2004	33,104	38,632	34,867	**106,603**
2005	36,095	39,600	34,745	**110,440**
2006	34,622	39,299	34,093	**108,014**
2007	35,366	40,047	33,879	**109,292**
2008	34,297	38,974	32,505	**105,776**
2009	32,854	37,870	27,391	**98,115**
2010	34,681	38,123	30,841	**103,645**
2011	34,811	38,613	31,624	**105,048**
2012	34,400	38,367	31,305	**104,072**
2013	33,812	38,289	30,669	**102,770**
2014	33,775	38,075	31,795	**103,645**
2015	33,726	37,822	32,582	**104,130**
2016	33,797	37,807	32,987	**104,591**
2017	33,780	38,114	33,380	**105,274**

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TOTAL
2018	33,804	38,236	34,022	**106,062**
2019	33,903	38,349	34,149	**106,401**
2020	34,073	38,458	34,370	**106,901**
2021	34,239	38,561	34,548	**107,348**
2022	34,390	38,660	34,637	**107,687**
2023	34,503	38,789	34,746	**108,038**
2024	34,612	38,947	34,928	**108,487**

4.3.2 Natural Gas Sales by Sector, by EDC

Figure 4-4 presents historical and forecast natural gas sales by sector for the State of Michigan (in MMbtu) for the period 2002 to 2022. The commercial sector is the largest sector of natural gas sales, followed by residential and industrial. Table 4-4 presents historical and forecast data in numerical format for natural gas sales in Michigan by sector for the period 2002 to 2024. Both DTE Energy and Consumers Energy do not have natural gas sales forecasts that exclude all impacts of their current energy efficiency programs. As a result, the forecast of annual natural gas sales for Michigan shown below do reflect the impacts of current energy efficiency programs. GDS also points out that the forecast of natural gas sales for Michigan does not include natural gas used for electric generation.

Figure 4-4: Michigan Natural Gas Sales Forecast (MMBtu)

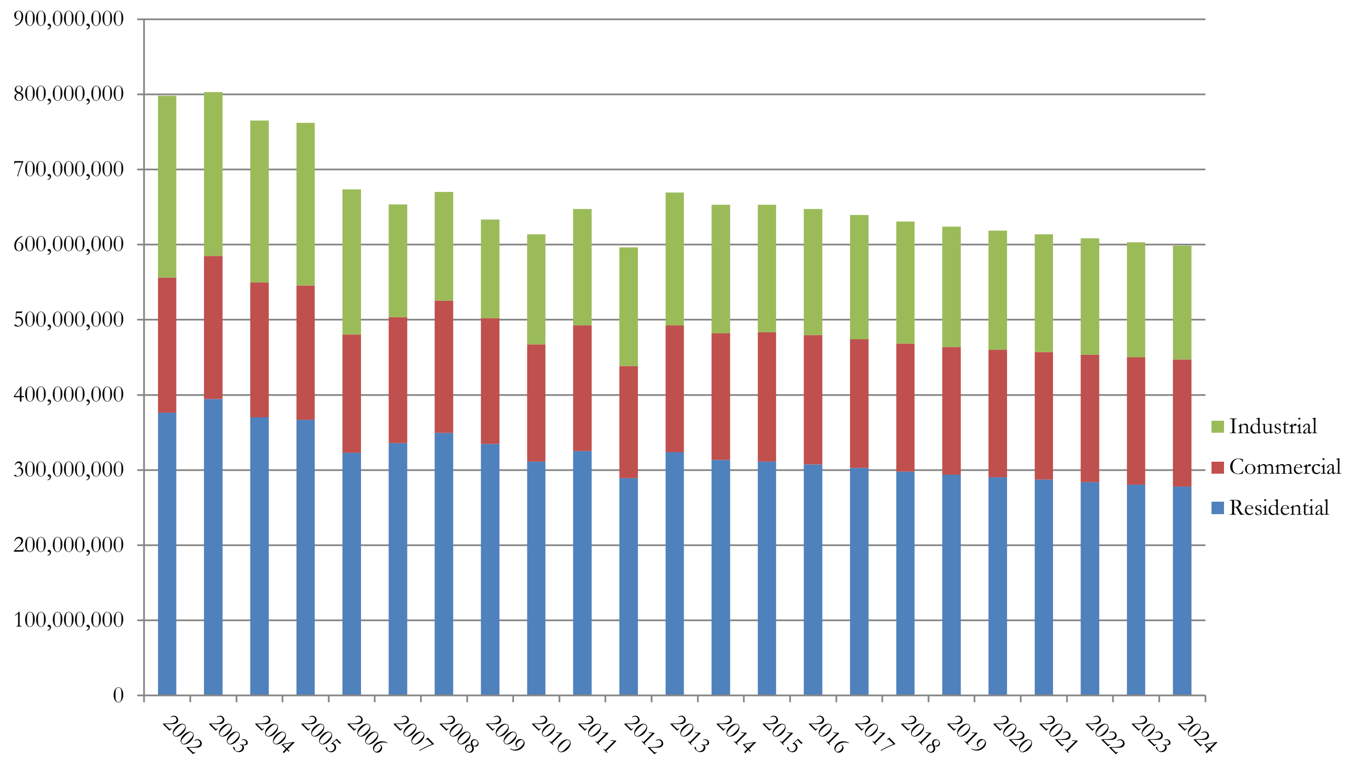


Table 4-4: Michigan Actual and Projected Natural Gas Sales by Sector (MMBtu)

YEAR	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	TOTAL
2002	376,223,595	180,058,230	241,564,059	**797,845,884**
2003	394,436,064	190,409,967	218,156,796	**803,002,827**
2004	370,350,552	179,219,370	215,342,523	**764,912,445**
2005	366,871,329	178,641,375	216,404,397	**761,917,101**
2006	323,031,687	157,435,608	192,843,684	**673,310,979**
2007	335,985,936	167,506,020	149,956,455	**653,448,411**
2008	349,614,342	176,066,484	144,429,186	**670,110,012**
2009	334,636,599	167,447,709	131,459,592	**633,543,900**
2010	311,329,590	155,854,050	146,648,073	**613,831,713**
2011	325,318,092	167,329,041	154,557,909	**647,205,042**
2012	289,473,172	149,024,502	157,851,969	**596,349,643**
2013	323,647,940	169,062,257	176,487,735	**669,197,931**
2014	313,567,812	168,397,349	170,990,963	**652,956,125**
2015	311,401,049	171,899,663	169,809,411	**653,110,123**
2016	307,589,232	172,012,348	167,730,797	**647,332,377**
2017	302,872,404	171,290,048	165,158,674	**639,321,127**
2018	297,889,970	170,273,089	162,441,714	**630,604,773**
2019	293,841,544	169,924,537	160,234,076	**624,000,158**
2020	290,497,097	169,632,911	158,410,323	**618,540,331**
2021	287,348,809	169,585,551	156,693,537	**613,627,897**
2022	284,092,085	169,475,200	154,917,620	**608,484,904**
2023	280,795,642	169,324,020	153,120,044	**603,239,706**
2024	277,777,232	169,401,943	151,474,082	**598,653,258**

4.3.3 Electricity Consumption by Market Segment

Figure 4-5 shows the breakdown of electricity consumption by building type for the commercial sector. Figure 4-6 shows a similar breakdown of sales by industrial market segment for the industrial sector. The Office market sector (29%) consumes the largest share of commercial electricity consumption, followed by Other (21%) and Retail (11%). In the industrial sector, Transportation Equipment (25% of annual industrial electricity sales) is the largest sector, followed by Primary Metals (20%) and Chemistry (10%).

Figure 4-5: 2014 Commercial Electricity Consumption by Market Segment

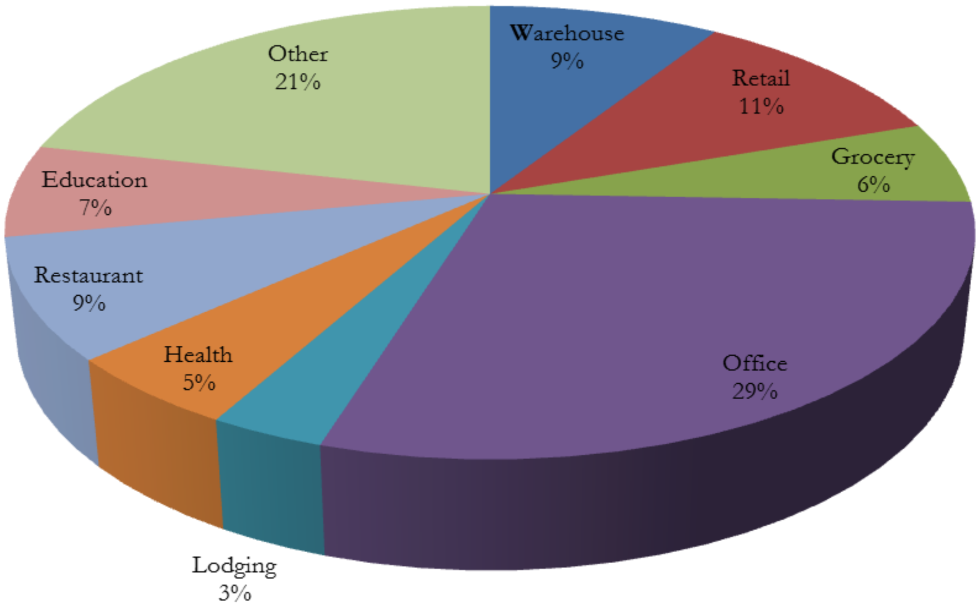


Figure 4-6: 2014 Electric Industrial Energy Consumption by Market Segment

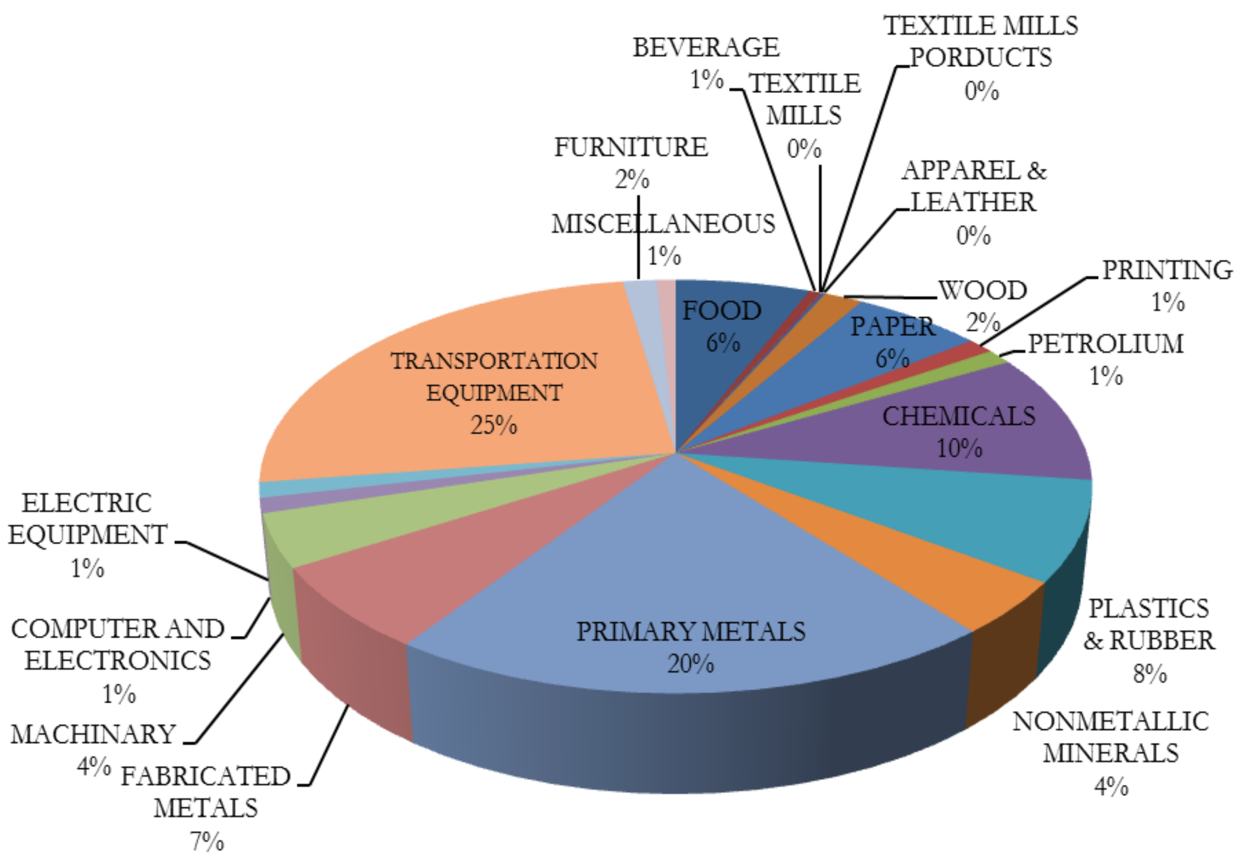


Table 4-5: 2014 Electric Industrial Energy Consumption by Segment

SEGMENT	CONSUMPTION (MWH)	ELECTRICITY SHARE
Food	1,944,291	6%
Beverage	171,696	1%
Textile Mills	3,070	0%
Textile Mill Products	51,185	0%
Apparel & Leather	19,863	0%
Wood	551,294	2%
Paper	1,871,906	6%
Printing	383,711	1%
Petroleum	378,873	1%
Chemicals	3,238,019	10%
Plastics & Rubber	2,481,706	8%
Nonmetallic Minerals	1,342,118	4%
Primary Metals	6,515,086	20%
Fabricated Metals	2,102,667	7%
Machinery	1,321,084	4%
Computer & Electronics	368,783	1%
Electric Equipment	380,700	1%
Transportation Equipment	7,904,144	25%
Furniture	492,726	2%
Miscellaneous	271,813	1%
Total	**31,794,736**	**100%**

4.3.4 Electric Consumption by End-Use

Table 4-6 shows the breakdown of electric energy consumption by commercial market segment by end use. Tables 4-7, 4-8, and 4-9 show the same breakdown for the industrial sector by market segment. Lighting is the largest end use for the commercial sector (37% of commercial sector electricity consumption), followed by cooling (14%), and then by ventilation (13%). As for the industrial sector, machine drives represent the largest end use, followed by process heating and facility HVAC.

Table 4-6: Breakdown of Michigan Commercial Electricity Sales by Market Segment and End-Use

	WAREHOUSE	RETAIL	GROCERY	OFFICE	LODGING	HEALTH	RESTAURANT	EDUCATION	OTHER	TOTAL
Lighting	54%	42%	22%	39%	54%	42%	19%	31%	32%	**37%**
Cooling	6%	15%	6%	14%	10%	14%	13%	21%	17%	**14%**
Ventilation	8%	9%	3%	9%	6%	16%	11%	22%	24%	**13%**
Water Heating	1%	5%	1%	1%	4%	1%	5%	3%	1%	**2%**
Refrigeration	14%	7%	55%	5%	4%	3%	32%	5%	9%	**12%**
Space Heating	1%	8%	3%	5%	6%	3%	5%	4%	4%	**4%**
Office Equipment	3%	2%	3%	15%	3%	5%	2%	9%	2%	**7%**
Miscellaneous	13%	12%	6%	13%	12%	15%	13%	6%	11%	**12%**
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-7: Electric Industrial Energy Consumption by End Use (Table 1 of 3)

	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER
Conventional Boiler Use	3%	2%	1%	1%	1%	1%	2%
Process Heating	5%	6%	7%	9%	6%	6%	3%
Process Cooling and Refrigeration	28%	26%	9%	6%	4%	1%	1%
Machine Drive	43%	34%	54%	47%	36%	72%	75%
Electro-Chemical Processes	0%	0%	1%	1%	1%	1%	1%
Other Process Use	1%	2%	3%	1%	2%	1%	4%
Facility HVAC (g)	8%	10%	12%	16%	26%	6%	4%
Facility Lighting	8%	8%	8%	15%	16%	8%	4%
Other Facility Support	2%	2%	2%	3%	4%	2%	1%
Onsite Transportation	0%	0%	0%	0%	0%	0%	0%
Other Non-process Use	0%	0%	0%	0%	0%	1%	0%
End Use Not Reported	2%	9%	3%	1%	4%	2%	4%
Total Industrial	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-8: Electric Industrial Energy Consumption by End Use (Table 2 of 3)

	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBERS	NONMETALLIC MINERAL	PRIMARY METALS
Conventional Boiler Use	1%	1%	1%	1%	0%	0%
Process Heating	4%	0%	4%	18%	26%	32%
Process Cooling and Refrigeration	5%	5%	8%	11%	3%	1%
Machine Drive	46%	83%	59%	43%	54%	28%
Electro-Chemical Processes	1%	0%	15%	0%	1%	26%
Other Process Use	1%	2%	1%	3%	2%	3%
Facility HVAC (g)	24%	4%	6%	10%	6%	4%
Facility Lighting	9%	3%	4%	8%	5%	3%
Other Facility Support	3%	1%	1%	2%	1%	1%
Onsite Transportation	0%	0%	0%	0%	0%	0%
Other Non-process Use	1%	0%	0%	0%	0%	0%
End Use Not Reported	4%	2%	1%	2%	1%	0%
Total Industrial	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-9: Electric Industrial Energy Consumption by End Use (Table 3 of 3)

	Fabricated Metals	Machinery	Computers & Electronics	Elec. Equip.	Trans Equip.	Furniture	Misc.	Total Industrial
Conventional Boiler Use	0%	1%	1%	1%	1%	1%	1%	**277,716**
Process Heating	21%	11%	10%	15%	11%	5%	11%	**4,816,452**
Process Cooling and Refrigeration	3%	3%	9%	4%	5%	1%	5%	**1,868,622**
Machine Drive	41%	40%	23%	37%	36%	47%	30%	**13,500,396**
Electro-Chemical Processes	3%	0%	2%	5%	2%	1%	5%	**2,521,134**
Other Process Use	3%	3%	5%	4%	4%	2%	3%	**889,721**
Facility HVAC (g)	9%	20%	30%	15%	19%	18%	25%	**3,445,271**
Facility Lighting	11%	15%	12%	10%	15%	17%	14%	**2,754,603**
Other Facility Support	2%	4%	5%	7%	3%	4%	4%	**716,870**
Onsite Transportation	0%	0%	0%	0%	1%	1%	0%	**93,715**
Other Non-process Use	0%	1%	1%	0%	1%	1%	0%	**175,298**
End Use Not Reported	6%	1%	4%	0%	3%	4%	1%	**734,938**
Total Industrial	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**31,794,736**

4.3.5 Natural Gas Consumption by Market Segment

Figure 4-7 shows the breakdown of Michigan natural gas sales by commercial market segment. Figure 4-8 and Table 4-10 show a similar breakdown for the industrial market segment. The Other segment (23%) consumes the largest share of the commercial sector natural gas consumption, followed by the Office (21%) and Education (15%) market segments. In the industrial sector, the Chemicals (21%) market segment consumes the largest amount of natural gas, followed by Transportation Equipment (19%) and Primary Metals (13%). 2010 EIA MECS End Use Data was used to obtain end use percentage breakdowns of electricity and natural gas use for each major industrial NAICS category at the national level. 2011 Census data for each major industrial NAICS category was used to obtain electricity use and fuel consumption as well as value of product shipments for each category. This was used to generate MWh of electricity per dollar of product shipped and MMBtu of natural gas per dollar of product shipped for each NAICS category, and these ratios were multiplied by the Michigan-specific values of product shipped per NAICS category to obtain estimated 2011 MWh of electricity consumption and MMBtu of natural gas consumption per NAICS category in Michigan and percent of total industrial electricity and natural gas consumption represented by each NAICS category. These NAICS category percentages were then multiplied by forecasted Michigan Industrial electricity and gas consumption for 2014 and 2023 to assign the forecasted consumption to each NAICS category. The end use percentage breakdowns were then applied to forecast total consumption for each SIC category to obtain estimated electricity and natural gas consumption for each end use in each Industrial NAICS category for 2014 and 2023.

Figure 4-7: Natural Gas Commercial Energy Consumption by Market Segment

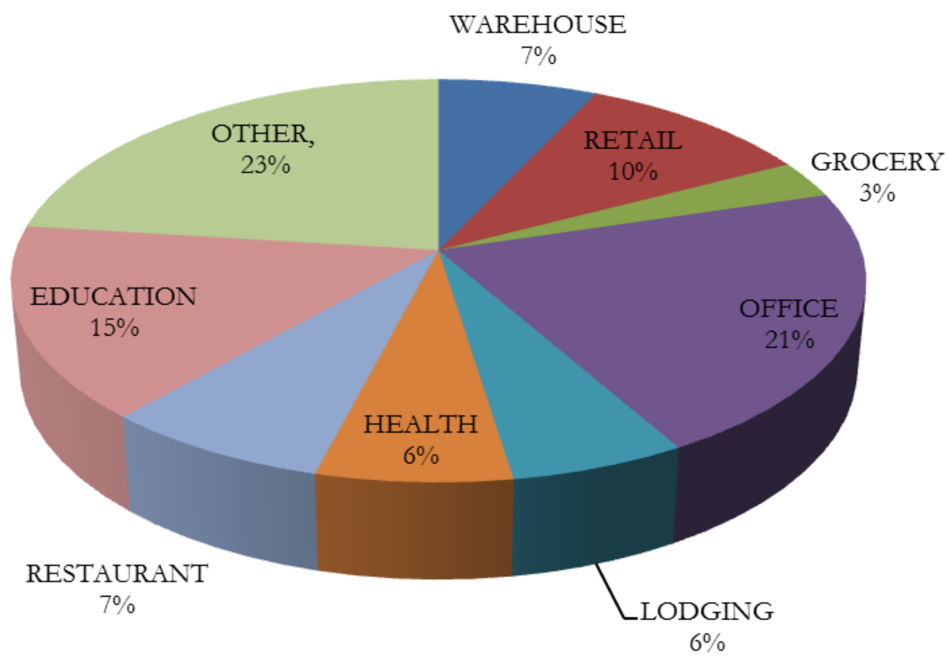


Figure 4-8: Natural Gas Industrial Energy Consumption by Market Segment

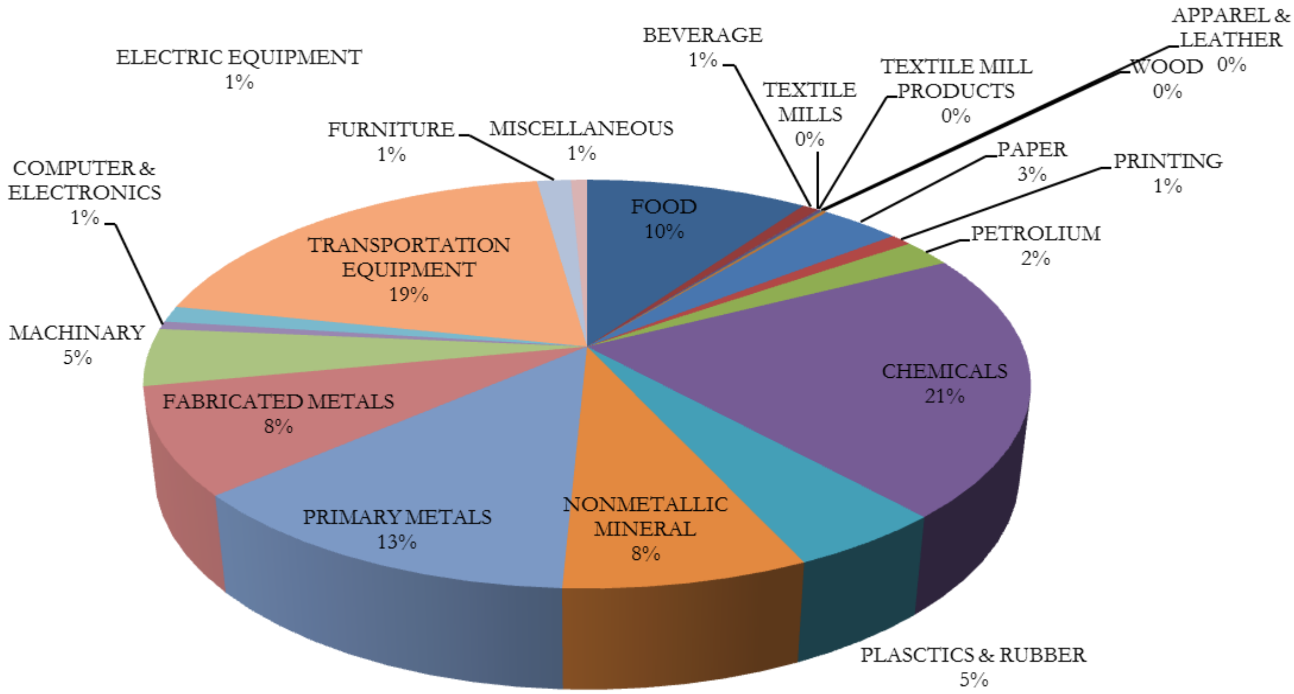


Table 4-10: Natural Gas Industrial Energy Consumption by Market Segment

SEGMENT	CONSUMPTION (MWH)	ELECTRICITY SHARE
Food	16,642,808	10%
Beverage	1,224,421	1%
Textile Mills	13,049	0%
Textile Mill Products	274,779	0%
Apparel & Leather	104,123	0%
Wood	331,865	0%
Paper	5,978,556	3%
Printing	1,635,620	1%
Petroleum	3,749,816	2%
Chemicals	36,124,119	21%
Plastics & Rubber	8,302,233	5%
Nonmetallic Minerals	12,978,192	8%
Primary Metals	21,883,749	13%
Fabricated Metals	14,532,992	8%
Machinery	7,828,921	5%
Computer & Electronics	1,082,742	1%
Electric Equipment	2,198,993	1%
Transportation Equipment	33,526,892	19%
Furniture	2,534,560	1%
Miscellaneous	1,212,561	1%

SEGMENT	CONSUMPTION (MWH)	ELECTRICITY SHARE
Total	**172,160,990**	**100%**

4.3.6 Natural Gas Consumption by End-Use

Table 4-11 shows the breakdown of natural gas consumption by commercial market segment by end use. Tables 4-12, 4-13, and 4-14 show the same breakdown for the industrial sector. The largest natural gas end use in the commercial sector is space heating, followed by water heating and cooking. In the industrial sector, the largest end use is process heating.

Table 4-11: Natural Gas Commercial Energy Consumption by End-Use

	WAREHOUSE	RETAIL	GROCERY	OFFICE	LODGING	HEALTH	RESTAURANT	EDUCATION	OTHER
Space Heating	84%	71%	69%	86%	30%	56%	27%	77%	85%
Water Heating	3%	7%	5%	5%	58%	30%	23%	14%	4%
Cooking	0%	9%	21%	1%	7%	4%	45%	2%	8%
Other	13%	13%	5%	9%	6%	9%	6%	7%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**98%**

Table 4-12: Natural Gas Industrial Energy Consumption by End-Use (Table 1 of 3)

	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER
Conventional Boiler Use	28%	24%	26%	25%	25%	6%	13%
Process Heating	30%	24%	35%	38%	25%	62%	30%
CHP and/or Cogeneration Process	29%	41%	29%	25%	25%	18%	48%
Facility HVAC (g)	6%	11%	6%	13%	25%	12%	4%
Process Cooling and Refrigeration	0%	0%	0%	0%	0%	0%	0%
Machine Drive	1%	0%	0%	0%	0%	3%	3%
Other Process Use	1%	0%	0%	0%	0%	0%	1%
End Use Not Reported	1%	0%	3%	0%	0%	0%	2%
Other Facility Support	3%	0%	0%	0%	0%	0%	0%
Other Non-process Use	0%	0%	0%	0%	0%	0%	0%
Total Industrial	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-13: Natural Gas Industrial Energy Consumption by End-Use (Table 2 of 3)

	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBERS	NONMETALLIC MINERALS	PRIMARY METALS
Conventional Boiler Use	10%	12%	17%	19%	1%	4%
Process Heating	45%	56%	35%	35%	87%	75%
CHP and/or Cogeneration Process	13%	22%	39%	24%	3%	8%
Facility HVAC (g)	29%	0%	1%	22%	6%	7%
Process Cooling and Refrigeration	0%	1%	0%	0%	0%	1%
Machine Drive	3%	2%	4%	0%	1%	2%
Other Process Use	0%	3%	3%	0%	0%	3%
End Use Not Reported	0%	4%	0%	0%	2%	0%
Other Facility Support	0%	0%	0%	1%	0%	1%
Other Non-process Use	0%	0%	0%	0%	0%	0%
Total Industrial	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 4-14: Natural Gas Industrial Energy Consumption by End-Use (Table 3 of 3)

	FABRICATED METALS	MACHINERY	COMPUTERS & ELECTRONICS	ELEC. EQUIP.	TRANS EQUIP.	FURNITURE	MISC.	TOTAL INDUSTRIAL
Conventional Boiler Use	8%	4%	27%	11%	11%	0%	13%	**20,759,627**
Process Heating	63%	41%	12%	54%	35%	46%	27%	**79,914,353**
CHP and/or Cogeneration Process	7%	4%	7%	9%	14%	8%	20%	**33,762,602**
Facility HVAC (g)	20%	48%	44%	20%	33%	46%	40%	**26,638,960**
Process Cooling and Refrigeration	0%	0%	0%	0%	0%	0%	0%	**362,627**
Machine Drive	1%	1%	0%	0%	0%	0%	0%	**2,515,680**
Other Process Use	1%	0%	2%	0%	6%	0%	0%	**4,008,079**
End Use Not Reported	0%	0%	5%	3%	1%	0%	0%	**1,165,518**
Other Facility Support	1%	1%	2%	3%	2%	0%	0%	**1,754,341**
Other Non-process Use	0%	0%	0%	0%	0%	0%	0%	**109,175**
Total Industrial	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**170,990,963**

4.4 CURRENT MICHIGAN EDC ENERGY EFFICIENCY PROGRAMS

4.4.1 Current DTE Energy Efficiency Programs

DTE Energy provides several energy efficiency programs to Michigan electric and natural gas customers in the residential, commercial and industrial markets.

4.4.1.1 Residential Programs

Residential Energy Efficiency Program (Electric)

DTE offers energy audit discounts and rebates for the installation of energy efficiency improvements. Eligible measures and equipment includes: programmable thermostats, energy audits, insulation, central ac systems, appliance recycling, and air sealing.

Residential Energy Efficiency Program (Gas)

Rebate levels vary according to whether the customer receives MichCon gas, DTE electric service, or both. Eligible measures and equipment include the following high efficiency appliances: clothes washers, dehumidifiers, programmable thermostats, energy audits, insulation, high efficiency room air conditioners, appliance recycling, furnaces, boilers, air sealing, and energy audit. Rebate amounts can also vary based on equipment size and efficiency level. Participation is first come-first serve, and an energy audit should be completed prior to equipment installations.

4.4.1.2 Commercial/ Industrial Programs

Commercial and Industrial Energy Efficiency Program (Electric)

DTE Energy's commercial 'Your Energy Savings Program' provides incentives to commercial and industrial customers who utilize energy efficiency upgrades in their facilities. Some energy efficient technologies eligible for this program include refrigerators, heat pumps, programmable thermostats, vending machine controls, and LED lighting. Custom incentives are based on estimated annual energy savings. Final applications are to be received within 60 days after project completion or by November 30 of the program's year, whichever comes first.

Commercial and Industrial Energy Efficiency Program (Gas)

DTE Energy's commercial 'Your Energy Savings Program' provides prescriptive incentives, mainly on a per unit basis. Some energy efficient technologies eligible for this program include water heaters, equipment insulations, boilers, tankless water heaters, steam system upgrades, windows/roofs, and several other pieces of equipment. Custom incentives are based on annual energy savings and apply to all energy efficiency improvement measures that are not eligible for a prescriptive incentive. The New Construction and Remodeling Program provide assistance in design and incentives for more efficient buildings that purchase and install energy-efficiency equipment.

Participants qualifying for energy efficiency measures in the DTE's service area can participate in the program only by having these measures installed in a business facility. This energy program will only pay incentives for energy saved in facilities in the DTE service areas. Final applications received within 60 days after project completion or by December 15 of the program year, whichever comes first.

Commercial New Construction Energy Efficiency Program

New construction and remodeling projects must entail a facility improvement that verifiable electrical savings (kWh) and/or natural gas energy savings (MCF). This utility rebate program provides incentives for comprehensive measures/whole buildings applicable in commercial, industrial, and construction sectors. Some incentives include: 10% - 20% energy savings: $0.08 per kWh and $4.00 per MCF, 20% - 30% energy savings: $0.10 per kWh and $6.00 per MCF, 30% or more energy savings: $0.12 per kWh and $8.00 per MCF. All non-prescriptive measures must pass a Total Resource Cost (TRC) Test.

4.4.1.3 Solar Programs

Solar Current Programs

Incentives through the Solar Currents program are offered to electric customers that install photovoltaic systems that have capacities within the range 1kW-20kW. For residential customers, the program offers both an up-front rebate of $0.20 per DC watt and a production incentive of $0.03 per kilowatt-hour (kWh) for the renewable energy credits (RECs) until August 31, 2029. Non-residential customers are eligible for incentives for photovoltaic equipment that are $0.13/Watt upfront and $0.02/Watt for the payment of Renewable Energy Credits (RECs).

This program is being offered as part of DTE Energy's compliance plan under the state Renewable Portfolio Standard. Funding for this will be in four rounds, with 500 kW of installations expected per round. Pricing is reviewed after each offering. For the first round of offerings, 1.5 MW is reserved for residential systems, and 0.5 MW is reserved for non-residential. The four application periods will open according to the following dates, respectively: 01/07/2013, 06/24/2013, 01/2014, and 06/2014.

4.4.2 Current Consumers Energy Efficiency Programs

Consumer Energy provides several energy efficiency programs regarding electric and gas for both commercial and residential markets.

4.4.2.1 Residential Programs

Residential Energy Efficiency Program (Electric)

Customers must install equipment in the Consumers Energy service area and receive electric service from Consumers Energy for the appliance purchased in order to apply for rebates. Heat pumps, central air conditioners, building insulation, and clothes washers are just several eligible pieces of equipment that can receive incentives.

Residential Energy Efficiency Program (Gas)

High efficiency furnaces, boilers, water heating units, insulation, windows, doors, energy audits and comprehensive improvements are eligible under this program. Residential Gas customers will be eligible to apply for a range of rebates.

4.4.2.2 Commercial Programs

Commercial Energy and Efficiency (Electric)

Incentives are available for energy efficiency equipment upgrades and are paid based on quantity, size, and efficiency of the equipment. Incentives are available for projects where the payback period is within 1 to 10 years. A bonus incentive of 15% may be available to customers who purchase equipment manufactured in Michigan.

Commercial Energy and Efficiency (Gas)

Incentives are available for energy efficiency equipment upgrades and are paid based on the quantity, size and efficiency of the equipment. Energy efficiency projects that have a payback year between 1-10 years may receive an incentive. A bonus incentive of 15% may be available to customers who purchase equipment manufactured in Michigan. Equipment measures not available for incentives are as follows: fuel switching, projects that involve peak-seeking, and changes in operational and/or maintenance practices.

5 POTENTIAL STUDY METHODOLOGY

This section describes the overall methodology that was utilized by GDS to develop the energy efficiency potential study for the State of Michigan. The main objective of this energy efficiency potential study is to quantify the technical, economic and achievable potential for electric and natural gas energy efficiency savings in Michigan. This report provides estimates of the potential kWh and kW electric savings and MMBtu gas savings for each level (technical, economic and achievable potential) of energy efficiency potential. This document describes the general steps and methods that were used at each stage of the analytical process necessary to produce the various estimates of energy efficiency potential. GDS did not examine delivery approaches for energy efficiency programs as this task was not included in the scope of work for this study.

Energy efficiency potential studies involve a number of analytical steps to produce estimates of each type of energy efficiency potential: technical, economic, and achievable. This study utilizes benefit/cost screening tools for the residential and non-residential sectors to assess the cost effectiveness of energy efficiency measures. These cost effectiveness screening tools are Excel-based models that integrate technology-specific impacts and costs, customer characteristics, utility avoided cost forecasts and more. Excel was used as the modeling platform to provide transparency to the estimation process and allow for simple customization based on Michigan's unique characteristics and the availability of specific model input data. The major analytical steps and an overview of the potential savings are summarized below, and specific changes in methodology from one sector to another have been noted throughout this section.

- Measure List Development
- Measure Characterization
- Load Forecast Development and Disaggregation
- Potential Savings Overview
- Technical Potential
- Measure Cost-Effectiveness Screening
- Economic Potential
- Achievable Potential

5.1 MEASURE LIST DEVELOPMENT

The energy efficiency measures included in this study cover energy efficiency measures included in the Michigan energy measures database (MEMD), additional measures suggested by interested stakeholders, as well as other measures based on the GDS Team's existing knowledge and current databases of electric and natural gas end-use technologies and energy efficiency measures. The study scope includes measures and practices that are currently commercially available as well as emerging technologies. The commercially available measures are of the most immediate interest to DSM program planners in Michigan. However, a small number of well documented emerging technologies were considered for each sector. Emerging technology research was focused on measures that are commercially available but may not be widely accepted at the current time. In June 2013, the GDS Team provided the energy efficiency measure lists for each sector to interested stakeholders for review and comment. These measure lists were then reviewed, discussed and updated as necessary. A complete listing of the energy efficiency measures included in this study is provided in the Appendices of this report.

In addition, this study includes measures that could be relatively easily substituted for, or applied to, existing technologies on a retrofit or replace-on-burnout basis. Replace-on-burnout applies to equipment replacements that are made normally in the market when a piece of equipment is at the end of its useful life. A retrofit measure is eligible to be replaced at any time in the life of the equipment or building. Replace-on-burnout measures are generally characterized by incremental measure costs and savings (*e.g.* the costs and savings of a high-efficiency versus standard efficiency air conditioner); whereas retrofit measures are generally characterized by full costs and savings (e.g. the full costs and savings associated with adding ceiling insulation into an existing attic). For new construction, energy efficiency measures can be implemented when each new home or building is constructed, thus the rate of availability is a direct function of the rate of new construction.

5.2 MEASURE CHARACTERIZATION

A significant amount of data is needed to estimate the kWh, kW and MMBtu savings potential for individual energy efficiency and demand response measures or programs across the entire existing residential and non-residential sectors in Michigan. GDS used Michigan specific data wherever it was available and up-to-date. Considerable effort was expended to identify, review, and document all available data sources.[15] This review has allowed the development of reasonable and supportable assumptions regarding: measure lives; measure installed incremental or full costs (as appropriate); and electric and natural gas savings and saturations for each energy efficiency measure included in the final list of measures in this study.

Costs and savings for new construction and replace on burnout measures are calculated as the incremental difference between the code minimum equipment and the energy efficiency measure. This approach is utilized because the consumer must select an efficiency level that is at least the code minimum equipment. The incremental cost is calculated as the difference between the cost of high efficiency and standard (code compliant) equipment. However, for retrofit measures, the measure cost was considered to be the "full" cost of the measure, as the baseline scenario assumes the consumer would do nothing. In general, the savings for retrofit measures are calculated as the difference between the energy use of the removed equipment and the energy use of the new high efficiency equipment (until the removed equipment would have reached the end of its useful life).

Savings: Estimates of annual measure savings as a percentage of base equipment usage were developed from a variety of sources, including:

- Michigan Energy Measures Database
- Secondary sources such as the American Council for an Energy-Efficient Economy ("ACEEE"), Department of Energy ("DOE"), Energy Information Administration ("EIA"), ENERGY STAR, Air Conditioning Contractors of America ("ACCA") and other technical potential studies and Technical Reference Manuals

Measure Costs: Measure costs represent either incremental or full costs, and typically include the incremental cost of measure installation. For purposes of this study, nominal measures costs were held constant over time. This general assumption is being made due to the fact that historically many measure costs (e.g., CFL bulbs, Energy Star appliances, etc.) have declined over time, while some measure costs have increased over time (e.g., fiberglass insulation). The one exception to this general assumption was that LED bulb costs were assumed to decline over time. This exception was included as directed by the Public Staff of the Michigan Public Service Commission (MPSC), and is grounded by the observation of rapidly declining LED bulb costs over the last several years, as well as the relatively high contribution of LED bulbs to the overall estimates of savings potential. Cost estimates were obtained from the following types of data sources:

- Michigan Energy Measures Database
- Secondary sources such as ACEEE, ENERGY STAR, NREL, NEEP Incremental Cost Study Report, and other technical potential studies and Technical Reference Manuals
- Retail store pricing (such as web sites of Home Depot and Lowe's) and industry experts

[15] The appendices and supporting databases to this report provide the data sources used by GDS to obtain up-to-date data on energy efficiency measure costs, savings, useful lives and saturations.

Measure Life: Represents the number of years that energy-using equipment is expected to operate. Useful life estimates have been obtained from the following data sources:

- Michigan Energy Measures Database
- Manufacturer data
- Savings calculators and life-cycle cost analyses
- Secondary sources such as ACEEE, ENERGY STAR, and other technical potential studies
- The California Database for Energy Efficient Resources ("DEER") database
- Evaluation reports
- GDS and other consultant research or technical reports

Baseline and Efficient Technology Saturations: In order to assess the amount of electric and natural gas energy efficiency savings still available, estimates of the current saturation of baseline equipment and energy efficiency measures, or for the non-residential sector the amount of energy use that is associated with a specific end use (such as HVAC) and percent of that energy use that is associated with energy efficient equipment are necessary. Up-to-date measure saturation data were primarily obtained from the following recent studies:

- 2011 Michigan Residential Baseline Study conducted by the MPSC
- Energy efficiency baseline studies conducted by DTE Energy and Consumers Energy
- 2011 Michigan Commercial Baseline Study conducted by the MPSC
- 2009 EIA Residential Energy Consumption Survey (RECS)
- 2007 American Housing Survey (AHS)
- 2010 EIA Manufacturing Energy Consumption Survey (MECS)
- 2003 EIA Commercial Building Energy Consumption Survey (CBECS)

Further detail regarding the development of measure assumptions for energy efficiency in the residential and non-residential sectors are provided in this report in later sections. Additionally, as noted above, the appendices of the report provide a comprehensive listing of all energy efficiency measure assumptions and data sources.

5.3 FORECAST DISAGGREGATION FOR THE COMMERCIAL AND INDUSTRIAL SECTORS

For the commercial sector, the baseline electric and natural gas load forecasts were disaggregated by combining sales breakdowns by business type provided by DTE Energy with regional energy use estimates by business type available from the U.S. Energy Information Administration (EIA)[16] The forecasts were then further disaggregated by end use based on end use consumption estimates for the East North Central Region (Michigan, Wisconsin, Ohio, Indiana, Illinois). The disaggregated electric and natural gas sales forecasts provide the foundation for the development of energy efficiency potential estimates for the commercial sector. It was not necessary to develop a disaggregated residential sales forecast because a bottom-up approach was used for the residential sector.

For the industrial sector, the baseline electric and natural gas demand forecasts were disaggregated by industry type and then by end use. The industry type breakdowns are based on Michigan value of shipments data and U.S. energy intensity data (consumption per $ of value shipped) by industry from the U.S. Census Bureau's Annual Survey of Manufacturers. Further dis-aggregation by end use is based on data from the EIA's 2010 Manufacturing Energy Consumption Survey (MECS) The disaggregated forecast data provides the foundation for the development of energy efficiency potential estimates for the industrial sector.

[16] 2003 EIA Commercial Building Energy Consumption Survey (CBECS), East North Central and Midwest Regions.

5.4 ROLE OF NATURALLY OCCURRING CONSERVATION

Naturally occurring conservation exists through government intervention, improved manufacturing efficiencies, building energy codes, market demand, and increased energy efficiency implementation by early adopters, who will implement measures without explicit monetary incentives. The impacts of new Federal government mandated energy efficiency standards have already been reflected in the baseline data for equipment unit energy consumption being used for this potential study. These new government standards, such as the new standards included in the Federal government's December 2007 Energy Independence and Security Act (EISA)[17], can significantly increase naturally occurring potential through tax incentives, stimulus funding or stricter manufacturing standards. These forces cause certain sector end-use energy consumption values to improve across the baseline forecast. It is important to account for these forces as thoroughly as possible to ensure the energy efficiency potential is not double-counted, by over-stating the potential that could occur for end-uses where codes and standards are reducing baseline unit energy consumption. In addition, GDS has reflected the impacts of new EISA lighting standards that went into effect starting in 2012, as well as changes to other federal baseline standards across a variety of end uses. These adjustments reduce energy efficiency potential starting in the years these standards come into effect, and in subsequent years.

5.5 POTENTIAL SAVINGS OVERVIEW

Potential studies often distinguish between several types of energy efficiency potential: technical, economic, and achievable. However, because there are often important definitional issues between studies, it is important to understand the definition and scope of each potential estimate as it applies to this analysis. The first two types of potential, technical and economic, provide a theoretical upper bound for energy savings from energy efficiency measures. Still, even the best designed portfolio of programs is unlikely to capture 100 percent of the technical or economic potential. Therefore, achievable potential attempts to estimate what may realistically be achieved, when it can be captured, and how much it would cost to do so. Figure 5-1 below illustrates the three most common types of energy efficiency potential.

Figure 5-1: Types of Energy Efficiency Potential[18]

Not Technically Feasable	Technical Potential		
Not Technically Feasable	Not Cost Effective	Economic Potential	
Not Technically Feasable	Not Cost Effective	Market & Adoption Barriers	Achievable Potential

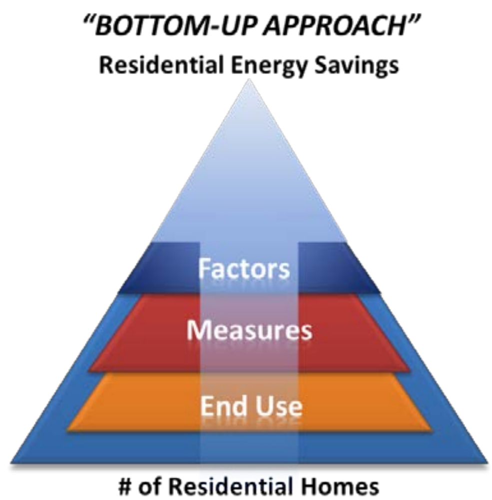
5.6 TECHNICAL POTENTIAL

The GDS Team has used the energy efficiency potential definitions included on pages 2-4 of the November 2007 National Action Plan for Energy Efficiency (NAPEE) Guide for Conducting Energy Efficiency Potential Studies. Technical potential is the theoretical maximum amount of energy use that could be displaced by efficiency, disregarding all non-engineering constraints such as cost-effectiveness and the willingness of end-users to adopt the efficiency measures. It is often estimated as a "snapshot" in time assuming immediate implementation of all technologically feasible energy saving measures, with additional efficiency opportunities assumed as they arise from activities such as new construction.[19]

[17] PUBLIC LAW 110–140—DEC. 19, 2007. Energy Independence and Security Act of 2007
[18] Reproduced from "Guide to Resource Planning with Energy Efficiency" November 2007. US EPA. Figure 2-1.
[19] National Action Plan for Energy Efficiency, "Guide for Conducting Energy Efficiency Potential Studies", page 2-4

In general, this study utilizes a "bottom-up" approach in the residential sector to calculate the potential of an energy efficiency measure or set of measures as illustrated in Figure 5-2 below. A bottom-up approach was used for the residential sector due to the amount of data available for this sector from DTE Energy and Consumers Energy, from Federal government surveys and research done in nearby states. A bottom-up approach first starts with the savings and costs associated with replacing one piece of equipment with its high efficiency counterpart, and then multiplies these values by the number of measures available to be installed throughout the life of the program. The bottom-up approach is applicable in the residential sector because of better secondary data availability and greater homogeneity of the building and equipment stock to which measures are applied, compared to the non-residential sector. However, this methodology was not utilized in the non-residential sector. For the non-residential sector, a "top-down" approach was used for developing the technical potential estimates. The "top down" approach builds an energy use profile based on estimates of kWh sales by business segment and end use. Savings factors for energy efficiency measures are then applied to applicable end use energy estimates after assumptions are made regarding the fraction of sales that are associated with inefficient equipment and the technical/engineering feasibility of each energy efficiency measure.

Figure 5-2: Residential Sector Savings Methodology - Bottom Up Approach



As shown in Figure 5-2, the methodology starts at the bottom based on the number of residential customers (splitting them into single-family, multi-family and manufactured housing types as well as existing homes vs. new construction). From that point, estimates of the size of the eligible market in Michigan were developed for each energy efficiency measure. For example, energy efficiency measures that affect electric space heating are only applicable to those homes in Michigan that have electric space heating.

As noted previously, to obtain up-to-date appliance and end-use saturation data, the study made extensive use of the energy efficiency baseline studies provided by the MPSC, DTE Energy and Consumers Energy. The study relied primarily on the statewide baseline studies completed by Cadmus in 2011 for the commercial and residential sectors. The DTE and Consumers Energy baseline studies for the residential sector were used in a few instances because the utility baseline studies contained some details lacking in the statewide residential study. The surveys collected detailed data on the current saturation of electricity and natural gas consuming equipment in the DTE Energy and Consumers Energy service areas and the energy efficiency level of HVAC equipment, appliances, and building shell characteristics. Estimates of energy efficient equipment saturations were based on several sources, including data collected from the 2009 RECS and the baseline studies provided by the Michigan utilities.

The goal of the approach is to determine how many households that a specific measure applies to (base case factor), then of that group, the fraction of households/buildings which do not have the energy efficient version of the measure being installed (remaining factor). In instances where technical reasons do not permit the installation of the efficient equipment in all eligible households an applicability factor is used to limit the potential. Alternative water heating technologies (efficient water heater tanks, heat pump water heaters or solar water heating systems) are then utilized to meet the remaining market potential. The last factor to be applied is the savings factor, which is the percentage savings achieved from installing the efficient measure over a standard measure.

In developing the overall potential electricity savings, the analysis accounts for the interactive effects of measures designed to impact the same end-use. For instance, if a home were to properly seal all ductwork, the overall space heating and cooling consumption in that home would decrease. As a result, the remaining potential for energy savings derived from a heating/cooling equipment upgrade would be reduced. In instances where there are two (or more) competing technologies for the same electrical (or natural gas) end use, such as heat pump water heaters, water heater efficiency measures and high-efficiency electric storage water heaters, in most cases an equal percentage of the available population is assigned to each measure using the applicability factor[20]. In the event that one of the competing measures is not found to be cost-effective, the homes/buildings assigned to that measure are transitioned over any of the remaining cost effective alternatives.

The savings estimates per base unit are determined by comparing the high-efficiency equipment to current installed equipment for existing construction retrofits or to current equipment code standards for replace-on-burnout and new construction scenarios.

5.7 CORE EQUATION FOR THE RESIDENTIAL SECTOR

The core equation used in the residential sector energy efficiency technical potential analysis for each individual efficiency measure is shown below in Equation 5-1 below.

Equation 5-1: Core Equation for Residential Sector Technical Potential

$$\text{Technical Potential of Efficient Measure} = \text{Total Number of Households} \times \text{Base Case Equipment End Use Intensity} \times \text{Saturation Share} \times \text{Applicability Factor} \times \text{Savings Factor}$$

Where:

- **Total Number of Households** = the number of households in the market segment (e.g. the number of households living in detached single-family buildings)
- **Base Case Equipment End-use Intensity** = annual energy consumption (kWh or MMBtu) used per customer, per year, by each base-case technology in each market segment. This is the consumption of energy using equipment that efficient technology replaces or affects. This variable fully accounts for any known building characteristics in the service area, such as average square footage of homes in Michigan.
- **Saturation Share** = this variable has two parts: the first is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for natural gas residential water heating, this would be the fraction of all residential gas customers that have gas water heating in their household; the second is the share of the end use gas energy that is applicable for the efficient technology that has not yet been converted to an efficient technology.

[20] GDS used its professional judgment in some cases to assign unequal applicability factors to attempt to avoid overstating or understating the potential of the set of competing technologies.

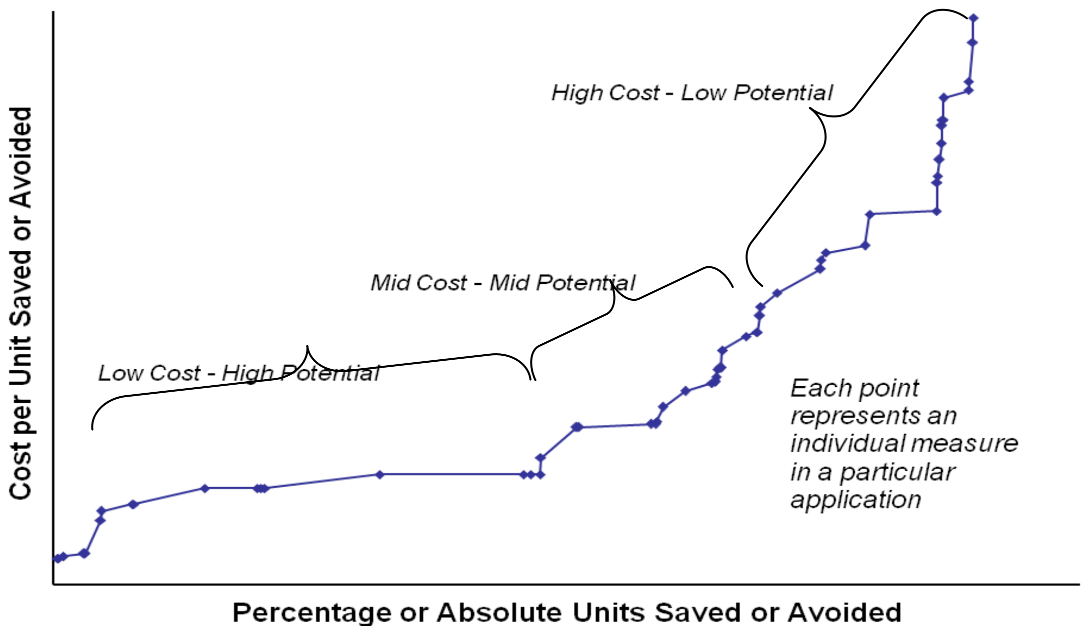
- **Applicability Factor** = this factor ensures that a household cannot receive two of the same type of measure. For example, if we assume there are two tiers of efficient natural gas furnaces, one which yields 10% savings and another which yields 20% savings, a household that needs to replace its inefficient natural gas furnace could either receive the unit which yields 10% savings or the unit which yields 20% savings, but could not receive both units. In general, GDS applies an even distribution to the same type of measure across eligible households when applying this factor. GDS may, in some cases, assign unbalanced applicability factors, if it believes an even distribution is inappropriate[21]. The applicability factor also captures the fraction of applicable units technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to add wall insulation in all homes because the original construction of some homes does not allow for wall insulation to be installed without requiring major reconstruction of the house, which would be an additional cost that does not yield any energy benefits).
- **Savings Factor** = the percentage of energy consumption reduction resulting from application of the efficient technology. The savings factor is a general term used to illustrate the calculation of a measure's technical potential. The Excel-based model GDS uses fully integrates the necessary assumptions to determine the measure-level savings, given the **Base Case Equipment End-use Intensity**, and the expected savings of each technology.

Technical energy efficiency potential in the residential sector is calculated in two steps. In the first step, all measures are treated *independently*; that is, the savings of each measure are not reduced or otherwise adjusted for overlap between competing or interacting measures. By analyzing measures independently, no assumptions are made about the combinations or order in which they might be installed in customer buildings. However, the cumulative technical potential cannot be estimated by adding the savings from the individual savings estimates because some savings would be double-counted. For example, the savings from a measure that reduces heat loss from a building, such as insulation, are partially dependent on other measures that affect the efficiency of the system being used to heat the building, such as a high-efficiency furnace; the more efficient the furnace, the less energy saved from the installation of the insulation. In the second step, adjustments are made to account for such interactive effects. The adjustments for interactive effects were made by upgrading the baseline conditions while holding the savings percentages constant. The upgraded baseline conditions vary by measure and assume some measures (such as weatherization measures) are installed to increase the building efficiency prior to the installation of the measure that is subject to the baseline adjustment (ex. high efficiency furnaces).

Finally, the GDS Team has developed a supply curve to show the amount of energy efficiency savings available at different cost levels. The residential sector supply curve is included in an appendix of this report. A generic example of a supply curve is shown in Figure 5-3. As shown in the figure, a supply curve typically consists of two axes; one that captures the cost per unit of saving a resource (e.g., dollars per lifetime kWh or MMBtu saved) and another that shows the amount of savings that could be achieved at each level of cost. The curve is typically built up across individual measures that are applied to specific base-case practices or technologies by market segment. Savings measures are sorted based on a metric of cost. Total savings available at various levels of cost are calculated incrementally with respect to measures that precede them. Supply curves typically, but not always, end up reflecting diminishing returns, i.e., costs increase rapidly and savings decrease significantly at the end of the curve.

[21] For example, if historical data indicates a technology has been able to garner a large share of the market GDS may assign a higher applicability factor to this technology in order to properly reflect this knowledge.

Figure 5-3: Generic Example of a Supply Curve



As noted above, the cost portion of this energy efficiency supply curve is represented in dollars per unit of lifetime energy savings. Costs are annualized (often referred to as levelized) in supply curves. For example, electric energy efficiency supply curves usually present levelized costs per lifetime kWh saved by multiplying the initial investment in an efficient technology or program by the capital recovery rate (CRR), and then dividing that amount by annual kWh savings:

Therefore,

Levelized Cost per lifetime kWh Saved = Initial Cost x CRR/Annual kWh Savings

5.8 CORE EQUATION FOR THE COMMERCIAL SECTOR

The core equation utilized in the commercial sector technical potential analysis for each individual efficiency measure is shown below in Equation 5-2.

Equation 5-2: Core Equation for Commercial Sector Technical Potential

Technical Potential of Efficient Measure = Total End Use Sales by Industry Type × Base Case Factor × Remaining Factor × Convertible Factor × Savings Factor

Where:

- **Total end-use kWh or natural gas sales by commercial sector and by building type** = the forecasted electric or natural gas sales level for a given end use (e.g., space heating) in a commercial or industrial industry type (e.g., office buildings or fabricated metals).
- **Base Case factor** = the fraction of end-use energy applicable for the efficient technology in a given commercial sector type. For example, with fluorescent lighting, this would be the fraction of all lighting kWh in a given industry type that is associated with fluorescent fixtures.

- **Remaining factor** = the fraction of applicable kWh or natural gas sales associated with equipment not yet converted to the electric or natural gas energy efficiency measure; that is, one minus the fraction of the industry type with energy efficiency measures already installed.
- **Convertible factor** = the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install variable-frequency drives (VFDs) on all motors.
- **Savings factor** = the fraction of electric or natural gas consumption reduced by application of the efficient technology.

For the commercial sector, the development of the energy efficiency technical potential estimate begins with a disaggregated energy sales forecast over the ten year forecast horizon (2013 to 2022). The commercial sector energy sales forecast is broken down by building type, then by electric or natural gas end use. Then a savings factor is applied to end use electricity or natural gas sales to determine the potential electricity or natural gas savings for each end use. The commercial sector, as defined in this analysis, is comprised of the following business segments:

- Warehouse
- Retail
- Grocery
- Office
- Lodging
- Healthcare
- Restaurant
- Institutional, including education
- Other

Similar to the residential sector, technical electric or natural gas energy efficiency savings potential in the commercial sector is calculated in two steps. In the first step, all measures are treated *independently*; that is, the savings of each measure are not reduced or otherwise adjusted for overlap between competing or synergistic measures. By treating measures independently, their relative economics are analyzed without making assumptions about the order or combinations in which they might be implemented in customer buildings. However, the total technical potential across measures cannot be estimated by summing the individual measure potentials directly because some savings would be double-counted. For example, the savings from a weatherization measure, such as low-e ENERGY STAR windows, are partially dependent on other measures that affect the efficiency of the system being used to cool or heat the building, such as high-efficiency space heating equipment or high-efficiency air conditioning systems; the more efficient the space heating equipment or electric air conditioner, the less energy saved from the installation of low-e ENERGY STAR windows. Accordingly, the second step is to rank the measures based on a metric of cost-effectiveness (using the Total Resource Cost test and Utility Cost Test cost effectiveness tests) and adjust savings for interactive effects so that total savings are calculated incrementally with respect to measures that precede them.

5.9 CORE EQUATION FOR THE INDUSTRIAL SECTOR

Estimating energy efficiency potential for the industrial sector can be more challenging than it is for the residential and commercial sectors because of the significant differences in the way energy is used across manufacturing industries (or market segments). How the auto industry uses energy is very different from how a plastics manufacturer does. Further, even within a particular industrial segment, energy use is influenced by the particular processes utilized, past investments in energy efficiency, the age of the facility, and the corporate operating philosophy.

Recognizing the variability of energy use across industry types and the significance of process energy use in the industrial sector, GDS employed a top-down approach that constructed an energy profile based on local economic data, national energy consumption surveys and any available Michigan studies related to industrial energy consumption.

5.10 INDUSTRIAL SECTOR SEGMENTATION & END USE BREAKDOWN

Estimates of energy efficiency potential were developed employing a top-down approach using economic data for key industrial segments (Primarily 3 digit NAICS codes) in Michigan to develop industry-specific energy use estimates based on national energy intensities for each industry. Value of shipments data for Michigan is available from the U.S. Census Bureau. This economic data was used in conjunction with energy use estimates from the 2010 Manufacturing Energy Consumption Survey[22] which is produced by the Energy Information Administration (EIA), to develop estimates of industrial electric and natural gas energy use by industry type and end use.

Industrial baseline energy consumption data was advanced to 2013 and future years based upon the observed historical trend in Michigan's industrial consumption and EIA's industrial electricity and natural gas consumption forecast for the U.S. (i.e., Annual Energy Outlook 2013).

End use electric and natural gas energy consumption estimates were calculated for the following end use categories for specific manufacturing segments:

- **Indirect Uses – Boilers**
  - Conventional boiler use
- **Direct Uses - Process**
  - Process heating (e.g., kilns, furnaces, ovens, strip heaters)
  - Process cooling & refrigeration
  - Machine drive
  - Electro-chemical processes
  - Other direct process use
- **Direct Uses – Non-process**
  - Facility heating, ventilation and air conditioning
  - Facility lighting
  - Other facility support (e.g., cooking, water heating, office equipment)
- **Other Non-process Use**

5.11 DEVELOPMENT OF POTENTIAL ESTIMATES

Estimates of industrial energy use by industry type and end use served as the foundation upon which energy efficiency potential estimates were calculated. The basic equation for determining technical potential is shown below.

The core equation for estimating technical potential in the industrial sector analysis for each measure is provided below:

Technical Potential of Efficient Measure = Total End Use Sales by Industry Type × Base Case Factor × Remaining Factor × Convertible Factor × Savings Factor

Where:

[22] http://www.eia.gov/emeu/mecs/contents.html

- Total end-use sales by industry type = the forecasted electric or natural gas sales level for a given end use (e.g., space heating) by industrial industry type (e.g., fabricated metals, automobile manufacturing, paper and allied products, etc.).
- Base Case factor = the fraction of end-use energy applicable for the efficient technology in a given industry type. For example, with fluorescent lighting, this would be the fraction of all lighting kWh in a given industry type that is associated with fluorescent fixtures.
- Remaining factor = the fraction of applicable sales associated with equipment not yet converted to the electric energy-efficiency measure; that is, one minus the fraction of the industry type with energy-efficiency measures already installed.
- Convertible factor = the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install variable-frequency drives (VFDs) on all motors.
- Savings factor = the fraction of energy consumption reduced by application of the efficient technology.

5.12 ECONOMIC POTENTIAL

Economic potential refers to the subset of the technical potential that is economically cost-effective (based on screening with the cost effectiveness tests utilized for this Michigan study) as compared to conventional supply-side energy resources. GDS has calculated the benefit/cost ratios for this study according to the cost effectiveness test definitions provided in the November 2008 National Action Plan for Energy Efficiency (NAPEE) guide titled "Understanding Cost Effectiveness of Energy Efficiency Programs". Both technical and economic potential are theoretical numbers that assume immediate implementation of energy efficiency measures, with no regard for the gradual "ramping up" process of real-life programs. In addition, they ignore market barriers to ensuring actual implementation of energy efficiency. *Finally, they typically only consider the costs of efficiency measures themselves, ignoring any programmatic costs (e.g., marketing, analysis, administration, program evaluation, etc.) that would be necessary to capture them.*

Furthermore, all measures that were not found to be cost-effective based on the results of the measure-level cost effectiveness screening were excluded from the economic and achievable potential. Then allocation factors were re-adjusted and applied to the remaining measures that were cost effective.

5.13 DETERMINING COST-EFFECTIVENESS

GDS Team examined measure cost effectiveness scenarios based on the Total Resource Cost (TRC) test and the Utility Cost Test.

Total Resource Cost Test[23]

The TRC measures the net benefits of the energy efficiency program for the region as a whole. Costs included in the TRC are costs to purchase and install the energy efficiency measure and overhead costs of running the energy efficiency program, regardless of who pays these costs. The benefits included are the avoided costs of energy (as with the Utility Cost Test and the Rate Impact Measure Test) as well as non-energy benefits. GDS did include a benefit of $9.25 per ton of reduced carbon emission. This risk adjusted value represents the expected value of a scenario with no carbon taxes and a scenario with carbon taxes of $18.50 per ton.

The primary purpose of the TRC test is to evaluate the net benefits of energy efficiency measures to the region or State as a whole. Unlike the Utility Cost Test, the Rate Impact Measure (RIM) test or the Participant Cost Test (PCT), the TRC does not take the view of individual stakeholders. It does not

[23] It is important to note that the Michigan PSC staff, GDS Associates and staff from DTE Energy and Consumers Energy decided not to include any unquantifiable non-energy benefits in the calculation of the TRC Test (beyond savings water, avoided carbon emissions, and O&M savings). While other non-energy benefits may be present, they have not been quantified in the state of Michigan and were not available for inclusion in this study.

include bill savings and incentive payments, as they yield an intra-regional transfer of zero ("benefits" to customers and "costs" to the utility that cancel each other on a regional level). For some utilities, the region considered may be limited strictly to its own service territory, ignoring benefits (and costs) to neighboring areas (a distribution-only utility may, for example, consider only the impacts to its distribution system). In other cases, the region is defined as the state as a whole, allowing the TRC to include benefits to other stakeholders (e.g., other utilities, water utilities, local communities). The TRC is useful for jurisdictions wishing to value energy efficiency as a resource not just for the utility, but for the entire region. Thus the TRC is the most frequently used primary test in the United States. The TRC may be considered the sum of the PCT and RIM, that is, the participant and non-participant cost-effectiveness tests. The TRC is also useful when energy efficiency might fall through the cracks taken from the perspective of individual stakeholders, but would yield benefits on a wider regional level

Utility Cost Test

The Utility Cost Test (UCT) examines the costs and benefits of an energy efficiency program from the perspective of the entity implementing the program (utility, government agency, nonprofit, or other third party). GDS set incentives at 50% of measure costs when calculating the UCT. When conducting screening at the measure level, GDS only included utility costs relating to the equipment cost. For program or portfolio screening, GDS included all costs incurred by the utility. Overhead costs include the utility's administration, marketing, research and development, evaluation, and measurement and verification costs. Incentive costs are payments made to the utility's customers to offset purchase or installations costs. The benefits from the utility perspective are the savings derived from not delivering the energy to customers. Depending on the jurisdiction and type of utility, the "avoided costs" can include avoided or reduced wholesale electricity or natural gas purchases, generation costs, power plant construction, transmission and distribution facilities, ancillary service and system operating costs, and other components.

Table 5-1 below shows the key assumptions used by GDS in the development of the economic and achievable potential estimates based upon cost effectiveness screening using the Total Resource Cost (TRC) test and the Utility Cost test (UCT):

Table 5-1: Key Assumptions Used by GDS in the Development of Measure-Level Screening

KEY ASSUMPTION	USED IN UCT SCREENING	USED IN TRC SCREENING
Utility weighted average cost of capital for the discount rate	Yes	Yes
Forecasts of electric and natural gas energy and capacity avoided costs provided to GDS by the staff of the Michigan Public Service Commission	Yes	Yes
Forecast of electric T&D avoided costs per kW/year based on 2009 study by the New York Public Service Commission	Yes	Yes
Average line losses provided by Michigan utilities	Yes	Yes
MISO planning reserve margin	Yes	Yes
Electricity and natural gas savings benefits both valued in the cost effectiveness test for electric or natural gas energy efficiency programs	Yes	Yes
Value of avoided bulb purchases for high efficiency light bulbs	No	Yes
Water savings where applicable	No	Yes

KEY ASSUMPTION	USED IN UCT SCREENING	USED IN TRC SCREENING
Tax credits	No	Yes
Non-energy benefits (adder of $9.25 per ton of carbon emissions avoided)	No	Yes

Based on discussions with DTE Energy, Consumers Energy and staff of the Michigan Public Service Commission during October 2013, GDS has used average line losses to adjust kWh and kW savings at the customer meter to the generation level of the electric grid. DTE Energy and Consumers Energy recognize that in theory it would be appropriate to use marginal line losses instead of average line losses for this adjustment of savings. Because no studies or data exist at DTE Energy or Consumers Energy relating to marginal line losses on the Michigan electric grid, the study Team decided to use average line losses.

Financial Incentives for Program Participants

There are several reasons why an incentive level of 50% of measure costs (and not 100% of measure costs) was assumed for the three achievable potential scenarios examined for this study:

1. First, an incentive level of 50% of measure costs assumed in this study for the three achievable potential scenarios is a reasonable target based on the current financial incentive levels for program participants used by DTE Energy and Consumers Energy for their existing energy efficiency programs.

2. Second, GDS has reviewed other energy efficiency potential studies conducted in the US. The incentive levels used in several studies reviewed by GDS as well as actual experience with incentive levels in other states confirm that an incentive level assumption of 50% or below is commonly used.[24] Also, the majority of energy efficiency programs offered by NYSERDA offer no incentives to consumers. In addition, the NYSERDA electric energy efficiency achievable potential study completed by Optimal Energy in 2006 assumed incentive levels in the range of 20% to 50%.

3. Third, and most important, the highly recognized 2004 National Energy Efficiency Best Practices Study concluded that use of an incentive level of 100% of measure costs is not recommended as a program strategy.[25] This national best practices study concluded that it is very important to limit incentives to participants so that they do not exceed a pre-determined portion of average or customer-specific incremental cost estimates. The report states that this step is critical to avoid grossly overpaying for energy savings. This best practices report also notes that if incentives are set too high, free-ridership problems will increase significantly. Free riders dilute the market impact of program dollars.
4. Fourth, financial incentives are only one of many important programmatic marketing tools. Program designs and program logic models also need to make use of other education, training and marketing tools to maximize consumer awareness and understanding of energy efficient products. A program manager can ramp up or down expenditures for the mix of marketing tools to maximize program participation and savings. The February 2010 National Action Plan for Energy Efficiency Report titled "Customer Incentives for Energy Efficiency Through Program

[24] GDS Associates October 25, 2013 survey of financial incentives used in energy efficiency programs implemented by Consumers Energy, DTE Energy, Ameren-Illinois, Efficiency Maine, Wisconsin Focus on Energy, and Xcel Energy (Minnesota).
[25] See "National Energy Efficiency Best Practices Study, Volume NR5, Non-Residential Large Comprehensive Incentive Programs Best Practices Report", prepared by Quantum Consulting for Pacific Gas and Electric Company, December 2004, page NR5-51.

Offerings" states on page 1 that "Incentives can be used in conjunction with other program strategies to achieve market transformation, whereby there is a lasting change in the availability and demand for energy-efficient goods and services." On page 11 of this report it is stated that "Well-designed incentives address the key market barriers in the target market. Financial incentives are designed to be just high enough to gain the desired level of program participation. In some cases, financial incentives can be bundled with financing, information, or technical services to reach program participation and energy savings goals at lower total program cost than using financial incentives alone."

5.14 ACHIEVABLE POTENTIAL

Achievable potential was determined as the amount of energy and demand that can realistically be saved assuming an aggressive program marketing strategy and with three scenarios. Achievable potential takes into account barriers that hinder consumer adoption of energy efficiency measures such as financial, political and regulatory barriers, and the capability of programs and administrators to ramp up activity over time. This potential study evaluates three achievable potential scenarios:

4) **Scenario #1**: For the first scenario, achievable potential represents the amount of energy use that efficiency can realistically be expected to displace assuming incentives equal to 50% of the incremental measure cost and no spending cap. Cost effectiveness of measures was determined with the Utility Cost Test. The long-term market penetration for Scenario #1 was estimated based on the utilities paying incentives equal to 50% of measure costs. Year-by-year estimates of achievable potential for the period 2014 to 2023 were estimated by applying market penetration curves to this long-term penetration rate estimate. In general, these curves were developed based on willingness to pay data collected through survey research. Although this simplifies what an adoption curve would look like in practice, it succeeds in providing a concise method for estimating achievable savings potential over a specified period of time.

5) **Scenario #2**: For the second scenario, achievable potential is based on measure cost effectiveness screening using the Total Resource Cost Test with utility incentives again equal to 50% of measure costs. GDS calculated the savings and costs associated with the 50% incentive level. Year-by-year estimates of achievable potential for the period 2014 to 2023 were estimated by applying market penetration curves to this long-term penetration rate estimate. Any differences between Achievable Scenario #1 and Achievable Scenario #2 result from the varied measures that pass the Utility Cost Test compared to the Total Resource Cost Test

6) **Scenario #3**: The third scenario is a subset of Achievable Scenario #1(based on UCT). While scenario #1 assumed no spending cap on efficiency measures, Achievable Scenario #3 assumed a spending cap of approximately 2% of utility revenues. Revenues are apportioned across each customer sector to prevent cross-subsidization of energy efficiency savings. GDS has not attempted to define specific program plans. Instead the market adoption assumptions from Achievable Scenario #1 have been scaled down to fit within the spending parameters.

While many different incentive scenarios could be modeled, the number of achievable potential scenarios that could be developed was limited to three scenarios due to the available budget for this potential study[26].

For new construction, energy efficiency measures can be implemented when each new home or building is constructed, thus the rate of availability is a direct function of the rate of new construction. For existing buildings, determining the annual rate of availability of savings is more complex. Energy

[26] None of the three scenarios is considered a "maximum" achievable scenario. Maximum achievable scenarios assume 100% incentives. The three scenarios included in the report assume 50% incentives. This approach approximates the level incentives currently offered by Michigan utilities.

efficiency potential in the existing stock of buildings can be captured over time through two principal processes:

1) As equipment replacements are made normally in the market when a piece of equipment is at the end of its effective useful life (referred to as "replace-on-burnout")
2) At any time in the life of the equipment or building (referred to as "retrofit")

For the replace-on-burnout measures, existing equipment is assumed to be replaced with high-efficiency equipment at the time a consumer is shopping for a new appliance or other energy consuming equipment, or if the consumer is in the process of building or remodeling. Using this approach, only equipment that needs to be replaced in a given year is eligible to be upgraded to energy efficient equipment. For the retrofit measures, savings can theoretically be captured at any time; however, in practice, it takes many years to retrofit an entire stock of buildings, even with the most aggressive of energy efficiency programs.

5.15 MARKET PENETRATION METHODOLOGY

GDS assessed achievable potential on a measure-by-measure basis. In addition to accounting for the natural replacement cycle of equipment in the achievable potential scenario, GDS estimated measure specific maximum adoption rates that reflect the presence of possible market barriers and associated difficulties in achieving the 100% market adoption assumed in the technical and economic scenarios. The methodology utilized to forecast participation within each customer sector is described below.

RESIDENTIAL

As noted earlier in the report, there are approximately 1,900 residential measures included in this study. Due to the wide variety of measures across multiple end-uses, GDS employed varied, measures-specific maximum adoption rates versus a singular universal market adoption curve. These long-term market adoption estimates were based on publicly available DSM research including market adoption rate surveys and other utility program benchmarking.[27] GDS acknowledges that reliance on additional studies and alternate methods could produce different estimates of achievable potential.

For the majority of residential measures, the analysis assumes that increased incentives and reduced participant costs will also reduce the simple payback period of energy efficiency measures. As incentives increase and payback periods decline, maximum market adoption rates will increase. Based on available market adoption surveys with program administrators in the Northeast, GDS assigned end-use specific market adoption curves to the residential measures included in this analysis.[28] Examples of the impact of incentives on payback and maximum market adoption rates are demonstrated in the table below. These curves reflect measures that have significant gas and electric achievable potential over the next 10 years.[29]

Once the long-term market adoption rate was determined, GDS estimated the time interval required to reach the ultimate maximum adoption rate. In general, measures that required less up-front cost from

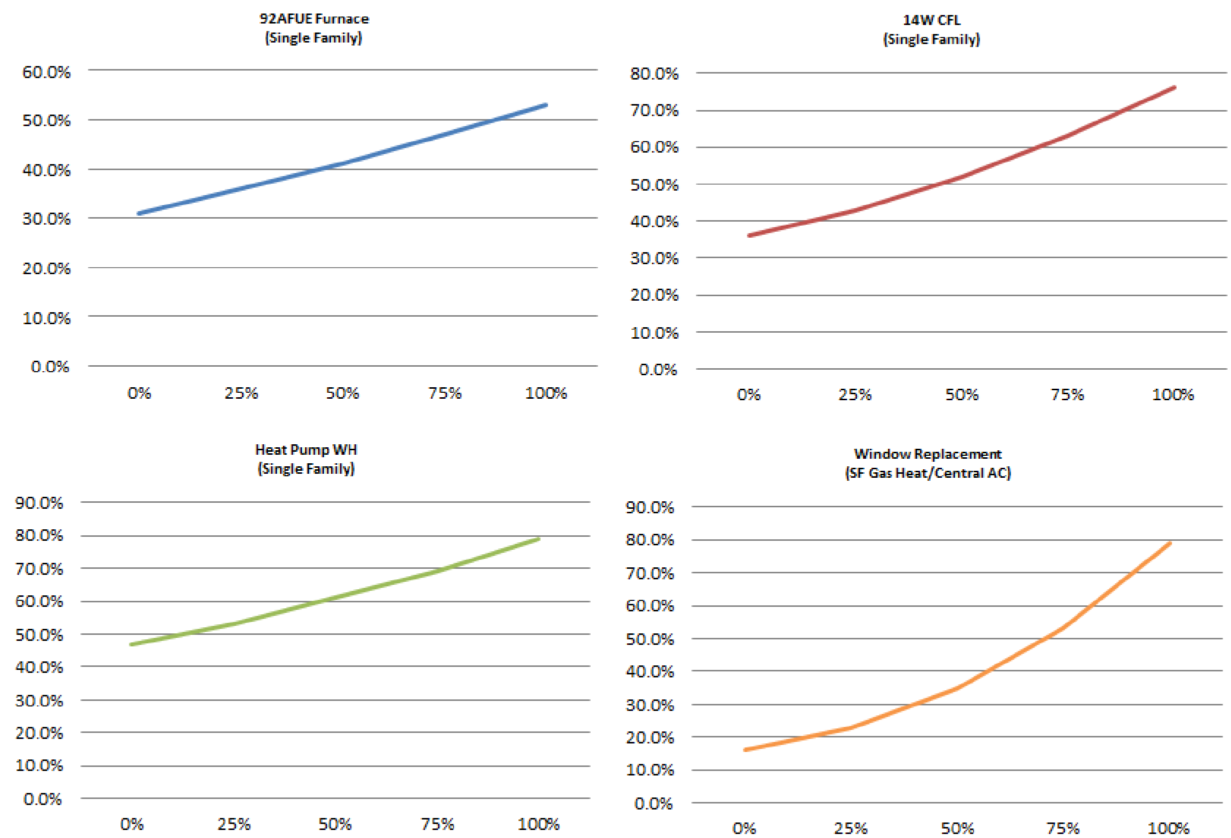
[27] Massachusetts Multifamily Market Characterization and Potential Study Volume I. May 2012. Cadmus Group. & Appliance Recycling Program Process Evaluation and Market Characterization. Volume I. CALMAC Study ID# SCE0337.01. September 2012. Cadmus.

[28] Massachusetts Multifamily Market Characterization and Potential Study Volume I. May 2012. Cadmus Group. This study presents market adoption curves based on the perspective of both multifamily property managers as well as utility energy efficiency program administrators. Both groups of study participants provide support for the contention that increased incentives/reduced payback result in higher maximum adoption rates. GDS selected the adoption curves based on the feedback of program administrators…. GDS encourages Michigan to conduct similar research with program participants and program administrators to refine these market adoption estimates in future analyses.

[29] Where current energy efficiency saturation data exceeded the estimated maximum market adoption, GDS assumed future efficiency installations would occur at the current EE saturation percentage so that the long-term market saturation of energy efficiency measures would not decrease over the study time-frame.

the participant reached their maximum adoption rate over a period of 2-3 years, and continued at the maximum rate for the remainder of the study. Measures with a more substantial cost to the participant required more time to ramp-up, and would not reach their maximum adoption rate until later in the study period. GDS exercised its professional judgment in estimating the time to reach the ultimate market adoption rate.

Figure 5-4: Example Residential Maximum Adoption Rates – Based on Incentive



One caveat to this approach is that the ultimate long-term adoption rate is generally a simple function of incentive levels and payback. There are many other possible elements that may influence a customer's willingness to purchase an energy efficiency measure. For example, increased marketing and education programs can have a critical impact on the success of energy efficiency programs. Additionally, other perceived measure benefits, such as increased comfort or safety as well as reduced maintenance costs could also factor into a customer's decision to purchase and install energy efficiency measures. Although these additional elements are not explicitly accounted for under this incentive/payback analysis, the estimated adoption rates and penetration curves provide a concise method for estimating achievable savings potential over a specified period of time.

The market penetration of residential lighting was also strategically adjusted to account for the expected decline in LED bulbs costs over the next decade and an anticipated shift in market adoption from CFL bulbs to LED bulbs. Because LED bulb prices are expected to decline significantly over the next several years, decreasing to typical CFL bulb incremental cost levels, GDS assumed the maximum adoption rate for LED bulbs to be similar to those used for CFL bulbs. Additionally, GDS relied on future unit penetration rates for various lighting sources to model the long term shift towards increased market penetration of LED bulbs compared to CFL bulbs.[30] The table below shows the year-by-year shifting market penetration of CFL and LED bulbs estimated in this analysis. By 2018, LED bulbs are expected to be installed at a greater rate than their CFL counterparts.

[30] Fox, Jamie. Does LED Lighting Have a Tipping Point? IMS Research. April 2012.

Table 5-2. CFL vs. LED Market Penetration Share of Anticipated High Efficiency Residential Lighting Installations

	2014	2015	2106	2017	2018	2019	2020	2021	2022	2023
CFL	32%	39%	45%	50%	53%	58%	64%	66%	68%	70%
LED	68%	61%	55%	50%	47%	42%	36%	34%	32%	30%

Last, for appliance recycling measures GDS compared the harvest rate (total number of recycled appliances relative to the total residential population) of several utility appliance recycling programs nationwide. Based on each utilities most successful reported year, an average harvest rate for various appliance recycling measures was estimated. GDS then calculated a long-term market adoption rate for the appliance recycling measures that would create a similar harvest rate for Michigan's appliance recycling programs. Because appliance recycling programs do not require any participants costs and require customer willingness to remove secondary, operational equipment from their homes, this approach was selected in favor of the incentive/payback curves utilized for the more traditional rebated measures included in the analysis.

NON-RESIDENTIAL

The non-residential approach for estimating market adoption rates is very similar to the residential sector approach. GDS employed varied, measures-specific maximum adoption rates versus a singular universal market adoption curve. These long-term market adoption estimates were based on the following survey results reported in the 2010 DTE Electric and Natural Gas Potential Study.[31] That study reported the following results:[32]

Table 5-3. Adoption Factors by Equipment and Incentive Level

EQUIPMENT TYPE	0%	50%	75%	100%
Lighting	54%	66%	70%	75%
AC / HVAC	49%	63%	68%	74%
Motors	58%	69%	73%	77%
Variable Speed	47%	66%	67%	69%
Refrigeration	57%	65%	71%	76%
Energy Mgmt System	44%	59%	67%	74%
Food Service	49%	66%	69%	73%
Process Measures	57%	65%	67%	69%
Water Heating	56%	67%	74%	80%
Overall	**52%**	**65%**	**69%**	**74%**

GDS used the data shown above to estimate long term market penetration for commercial and industrial (process) measures based on the assumed incentive level stated as a percent of incremental cost. GDS assumed two different paths to achieving long term market penetration, one for full cost measures such as insulation and another for incremental cost measures such as energy efficient fluorescent lighting. Those paths are shown below in Table 5-4.

Table 5-4: Path to Achieving Long Term Market Penetration (% of Long Term Market Potential)

[31] Assessment of Nonresidential Electric and Natural Gas Energy Efficiency Potential (2010–2029), Prepared for DTE Energy by The Cadmus Group, Inc.
[32] Ibid., p. 35.

YEAR	1	2	3	4	5	6	7	8	9	10
Full Cost Measure	5%	15%	20%	20%	10%	10%	5%	5%	5%	5%
Incremental Cost Measure	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

As with the residential approach, the non-residential market penetration methodology uses the relationship between incentives and program participation as a concise quantitative method for estimating achievable savings potential over a specified period of time. While there are many other elements that may influence a business customer's willingness to install an energy efficiency measure, such as access to capital, corporate policy or reduced maintenance costs, these factors are difficult to quantify and fit into a forecasting approach.

6 RESIDENTIAL ELECTRIC AND NATURAL GAS ENERGY EFFICIENCY POTENTIAL ESTIMATES

This section provides electric and natural gas energy efficiency potential estimates for the residential sector in Michigan which includes all residential buildings. Estimates of technical, economic and achievable potential are provided. Electric and natural gas potential are presented as separate sections, but interactive effects and measures that yield both electric and natural gas savings are fully accounted for in the analysis.

6.1 RESIDENTIAL ELECTRIC POTENTIAL

According to 2011 historical sales data, the residential sector accounts for approximately 89% of total customers and 33% of total energy sales. The average residential consumer uses approximately 7,900 kWh per year. From 2002-2011, the residential sector sales and customers have experienced minimal growth. This analysis assumes residential MWh sales increase at roughly 0.25% annually based upon the based on Michigan utility load forecasts. The residential electric potential calculations are based upon these approximate consumption values and sales forecast figures over the time horizon covered by the study. The potential is calculated for the entire residential sector and includes breakdowns of the potential associated with each end use.

6.1.1 Energy Efficiency Measures Examined

For the residential sector, there were 1119 total electric savings measures included in the potential energy savings analysis[33]. Table 6-1 provides a brief description of the types of measures included for each end use in the residential model. The list of measures was developed based on a review of the Michigan Energy Measure Database (MEMD) and measures found in other residential potential studies and TRMs from the Midwest. Measure data includes incremental costs, electricity energy and demand savings, gas and water savings, and measure life.

Table 6-1: Measures and Programs Included in the Electric Residential Sector Analysis

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
HVAC Envelope	Building Envelope Upgrades	• Air/duct Sealing • Duct Insulation • Improved Insulation (Wall, Ceiling, and Floor) • Efficient Windows • Window Film • ENERGY STAR Doors • Cool Roofs • Low Income Weatherization Package
HVAC Equipment	Heating/Cooling/Ventilation Equipment	• Existing Central AC Tune-Up • Efficient Air-Source Heat Pump • Dual Fuel Heat Pumps • Geothermal Heat Pumps • Ductless Mini-split Systems • Efficient Central AC Systems • Programmable Thermostats • Efficient Room Air Conditioners • Room Air Conditioner Recycling

33 This total represents the number of unique electric energy efficiency measures and all permutations of these unique measures. For example, there are 76 permutations of the "Improved Duct Sealing" measure to account for the various housing types, heating/cooling combinations, and construction types.

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
		• Whole House Fans • Efficient Chillers • Chiller Controls • Efficient Furnace Fans
Water Heating	Domestic Hot Water	• Heat Pump Water Heater • Solar Water Heater • Low Flow Showerhead/Faucet Aerator • Gravity Film Heat Exchangers • Pipe Wrap • Tank Wrap
Lighting	Interior/Exterior Lighting	• Specialty CFLs • Standard CFLs • LED Lighting • Efficient Exterior Lighting • Efficient Torchiere Lamps • Efficient Fluorescent Tube Lighting • LED Night Lights • Occupancy Sensors • Holiday Lighting • Efficient Multifamily Common Area Lighting
Appliances	High-Efficiency Appliances / Retirement of Inefficient Appliances	• ENERGY STAR Clothes Washers • ENERGY STAR Refrigerator • ENERGY STAR Freezers • ENERGY STAR Dishwashers • ENERGY STAR Dehumidifiers • Heat Pump Dryers • Secondary Refrigerator/Freezer Turn-In • 2nd Dehumidifier Turn-In
Electronics	High Efficiency Consumer Electronics	• Controlled Power Strips • Efficient Set-Top Boxes • ENERGY STAR Desktops • Efficient Laptops • Efficient Televisions • LCD Monitors
Behavioral	Consumer Response to Feedback from Utility	• Direct (Real-Time) Feedback • Indirect Feedback
Other	Efficient Pool Equipment	• Efficient Pool Pump Motors

6.1.2 Overview of Residential Electric Energy Efficiency Potential

This section presents estimates for electric technical, economic, and achievable potential for the residential sector. Each of the tables in the technical, economic and achievable sections present the respective potential for efficiency savings expressed as cumulative annual energy savings (MWh), percentage of savings by end use, and savings as a percentage of forecast sales. Data is provided on a 5-year and 10-year time horizon for Michigan.

This energy efficiency potential study considers the impacts of the Energy and Independence and Security Act (EISA) as an improving code standard for the residential sector. The EISA improves the baseline efficiency of several types of lighting products, including CFL or LED bulbs. Other known increases to federal minimum efficiency standards over the time period studied have also been accounted for in the analysis. These included changes to the efficiency standards central air conditioners, electric water heaters, and appliances.

There are a variety of factors which contribute to uncertainty surrounding the savings estimates produced by this energy efficiency potential study. These factors can include the following:

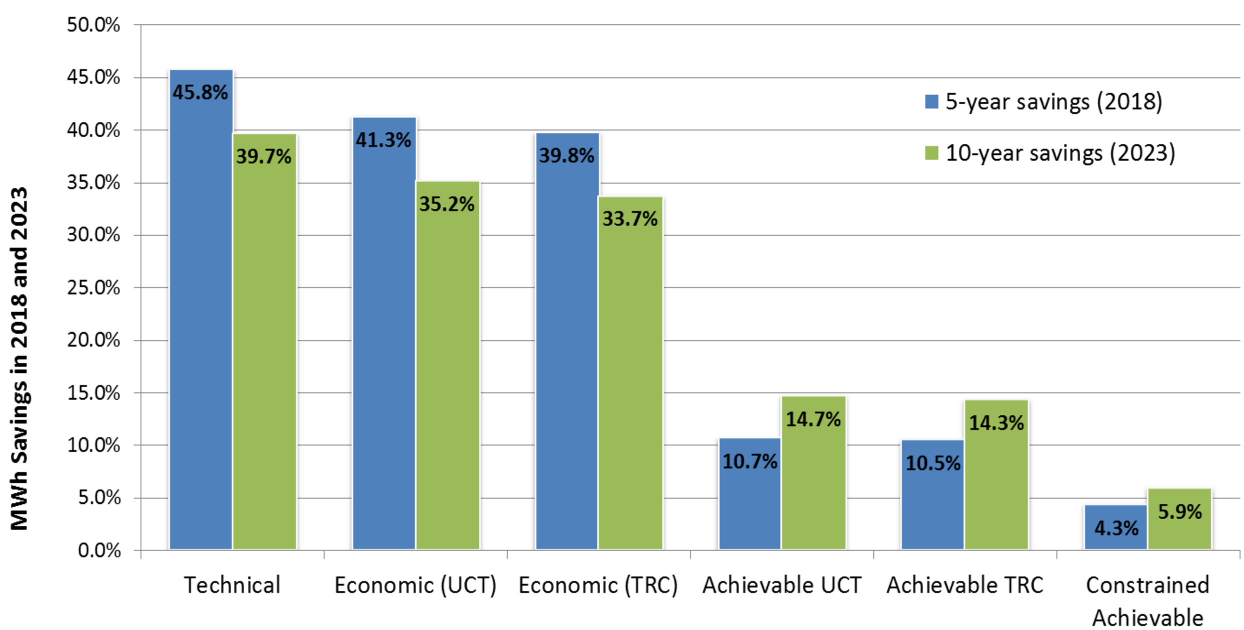
- Uncertainty about economic and fuel price forecasts used as inputs to the electric and natural gas sales forecasts
- The accuracy of results generated by building energy simulation modeling software
- The lack of availability of up-to-date efficiency saturation data for Michigan
- Changes to codes and standards in the future which cannot be anticipated at the present time, and
- Uncertainty regarding the future adoption of energy efficiency technologies which have minimal market share at the present time, such as LED lighting.

GDS has addressed the areas of uncertainty as robustly as possible given the time and budget constraints of this project. For example, GDS assumes increasing market adoption of LEDs over the life of the study because LED costs are expected to decrease over time. GDS also assimilated baseline study data into the estimates of weather sensitive measure savings where possible to adjust values acquired from the MEMD. These adjustments apply to measures such as insulation, for which savings are provided on a square footage basis in the MEMD. Weather-sensitive measure savings estimates from the MEMD were also adjusted to account for known changes to federal standards.

SUMMARY OF FINDINGS

Figure 6-1 illustrates the estimated savings potential for each of the scenarios included in this study.

Figure 6-1: Summary of Residential Electric Energy Efficiency Potential as a % of 2018 and 2023 Sales Forecasts



The potential estimates are expressed as cumulative 5-year and 10-year savings, as percentages of the respective 2018 and 2023 sector sales. The technical potential is 45.8% in 2018 and 39.7% in 2023.[34] The 5-year and 10-year economic potential is 41.3% and 35.2% based on the Utility Cost Test (UCT) screen, assuming an incentive level equal to 50% of the measure cost. Based on a measure-level screen using the TRC Test, the economic potential is 39.8% in 2018 and 33.7% in 2023. The slight drop from technical potential to economic potential indicates that most measures are cost-effective, particularly when screening based on the UCT.

The 5-year and 10-year achievable potential savings are: 10.7% and 14.7% for the Achievable UCT scenario; 10.5% and 14.3% for the Achievable TRC scenario; and 4.3% and 5.9% for the Constrained Achievable scenario. The Achievable UCT scenario assumes 50% incentives and includes measures that passed the UCT Test. The Achievable TRC scenario also assumes 50% incentives but includes only measures that passed the cost-effectiveness screen based on the TRC Test. Last, the Constrained Achievable scenario is a subset of Achievable UCT scenario, assuming a spending cap on DSM approximately equal to 2% of future annual residential revenue from electric and gas retail sales.

TECHNICAL POTENTIAL

Technical potential represents the quantification of savings that can be realized if all technologically available energy-efficiency measures are immediately adopted in all feasible instances, regardless of cost. Table 6-2 shows that it is technically feasible to save nearly 15.5 million MWh in the residential sector between 2014 to 2018, as well as approximately 13.7 million MWh during the 10 year period from 2014 to 2023 statewide, representing 45.8% of 5-year residential sales, and 39.7% of 10-year residential sales.[35] Lighting represents the greatest contributor to the potential at 42-33% of savings, while Appliances, Electronics, and HVAC Equipment end uses each contribute 9-21% of the savings. Table 6-3 shows the demand savings potential in 2018 and 2023. The five and ten year summer peak demand savings potential is 4,274 MW and 4,138 MW, respectively, which is 42.7% and 40.5% of the peak forecast.

Table 6-2: Residential Sector Technical Potential Energy Savings by End Use

END USE	2018 ENERGY (MWH)	% OF 2018 SAVINGS	2023 ENERGY (MWH)	% OF 2023 SAVINGS
Appliances	1,915,506	12%	1,931,055	14%
Electronics	1,354,281	9%	1,392,980	10%
Lighting	6,561,055	42%	4,567,580	33%
Water Heating	1,350,089	9%	1,393,193	10%
Other	178,956	1%	182,695	1%
HVAC (Envelope)	888,701	6%	914,396	7%
HVAC (Equipment)	2,806,002	18%	2,879,504	21%
Behavioral Programs	427,140	3%	436,525	3%
Total	**15,481,730**	**100%**	**13,697,929**	**100%**
% of Annual Sales Forecast	*45.8%*		*39.7%*	

[34] Technical and Economic Potential may decrease in 2023, relative to 2018, due to the expected impacts of EISA and a 2020 provision that is expected to make CFL bulbs, or technology of similar efficacy, the baseline. As a result, all savings associated with CFL bulbs replacing general service incandescent were modeled to decrease to 0 kWh by 2021.

[35] Technical potential represents the potential for all inefficient measures to be implemented "over-night." The only growth in potential over the 5 and 10 year time period is related to new construction. As noted in the prior footnote, CFLs were expected to become the baseline after 2020. As a result, lighting potential decreases between 2018 and 2023.

Table 6-3: Residential Sector Technical Potential Demand Savings

SUMMER PEAK DEMAND		
	2018	2023
Summer	**MW**	**MW**
Total	**4,274**	**4,138**
% of Peak	*42.7%*	*40.5%*

ECONOMIC POTENTIAL

Economic potential is a subset of technical potential, which only accounts for measures that are cost-effective. This analysis includes two estimates of economic potential. One cost-effectiveness screen is based on the UCT and a second economic potential scenario was screened using the TRC Test. In both scenarios, the utility incentive was assumed to be equal to 50% of the measure incremental cost. The UCT was used for this study because it is mandated in Michigan to be the primary cost-effectiveness test used when considering energy efficiency programs. Because the TRC includes participant costs, it goes beyond utility resource acquisition and looks at the measure/program from a more broad perspective. 79% of all measures that were included in the electric potential analysis passed the UCT and 68% of all measures passed the TRC Test.

Table 6-4 indicates that the economic potential based on the UCT screen is nearly 14.0 million MWh during the 5 year period from 2014 to 2018, and the economic potential more than 12.1 million MWh during the 10 year period from 2014 to 2023. This represents 41.3% and 35.2% of residential sales across the respective 5-year and 10-year timeframes. Similar to the technical potential scenario, lighting represents the greatest contributor to the potential at 43-33% of savings, while the HVAC Equipment, appliances, electronics, and water heating end uses each contribute between 9-20% of the savings. Table 6-5 shows the demand savings potential in 2018 and 2023. The five and ten year summer peak demand savings potential is 3,895 MW and 3,758 MW, respectively, which is 38.9% and 36.7% of the peak forecast.

Table 6-4: Residential Sector Economic Potential (UCT) Energy Savings by End Use

END USE	2018 ENERGY (MWH)	% OF 2018 SAVINGS	2023 ENERGY (MWH)	% OF 2023 SAVINGS
Appliances	1,786,674	13%	1,796,237	15%
Electronics	1,287,615	9%	1,325,226	11%
Lighting	6,049,085	43%	4,043,252	33%
Water Heating	1,346,481	10%	1,390,609	11%
Other	178,956	1%	182,695	2%
HVAC (Envelope)	585,197	4%	597,812	5%
HVAC (Equipment)	2,306,799	17%	2,373,890	20%
Behavioral Programs	427,140	3%	436,525	4%
Total	**13,967,946**	**100%**	**12,146,247**	**100%**
% of Annual Sales Forecast	*41.3%*		*35.2%*	

Table 6-5: Residential Sector Economic Potential (UCT) Demand Savings

Summer Peak Demand		
	2018	2023
Summary	MW	MW
Total	3,895	3,758
% of Peak	*38.9%*	*36.7%*

Table 6-6 demonstrates that the economic potential based on the TRC screen is lower than the economic potential based on the UCT screen. In 2023, economic potential based on the TRC cost-effectiveness screening is approximately 500,000 MWh lower than the economic potential based on the UCT. The biggest decline in economic potential between the two screens occurred in the HVAC (Equipment) end-use where measure costs are high and incentive amounts can significantly impact cost-effectiveness.

Table 6-6: Residential Sector Economic Potential (TRC) Energy Savings by End Use

End Use	2018 Energy (MWh)	% of 2018 Savings	2023 Energy (MWh)	% of 2023 Savings
Appliances	1,786,674	13%	1,796,237	15%
Electronics	1,287,615	10%	1,325,226	11%
Lighting	5,944,376	44%	3,938,543	34%
Water Heating	1,346,481	10%	1,390,609	12%
Other	178,956	1%	182,695	2%
HVAC (Envelope)	502,389	4%	511,252	4%
HVAC (Equipment)	2,021,744	15%	2,092,466	18%
Behavioral Programs	398,228	3%	406,978	3%
Total	13,466,463	100%	11,644,006	100%
% of Annual Sales Forecast	*39.8%*		*33.7%*	

Table 6-7: Residential Sector Economic Potential (TRC) Demand Savings

Summer Peak Demand		
	2018	2023
Summary	MW	MW
Total	4,106	3,980
% of Peak	*41.0%*	*38.9%*

6.1.1 Achievable Electric Potential Savings in the Residential Sector

Achievable potential is a refinement of economic potential that takes into account the estimated market adoption of energy efficiency measures based on the incentive level and measure payback, the natural replacement cycle of equipment, and the capabilities of programs and administrators to ramp up program activity over time. Achievable potential also takes into account the non-measure costs of delivering programs (for administration, marketing, monitoring and evaluation, etc.). For purposes of this analysis, administrative costs were assumed to be equivalent to 20% of incremental measures costs.

This is based on a published review of typical program administrator costs of several utility energy efficiency programs nationwide.[36]

This study estimated achievable potential for three scenarios. The Achievable UCT Scenario determines the achievable potential of all measures that passed the UCT economic screening assuming incentives equal to 50% of the measure cost.[37] The second scenario, Achievable TRC, also assumes incentives set at 50% of the measure incremental cost, but only includes measures that passed the TRC Test economic screening. The third scenario, Constrained UCT, assumes a spending cap equal to 2% of utility revenues, thereby limiting utilities from reaching the ultimate potential estimated in the Achievable UCT scenario.

6.1.1.1 Achievable UCT vs. Achievable TRC

Tables 6-8 through Table 6-11 show the estimated savings for the Achievable UCT and Achievable TRC scenarios over 5 and 10 year time horizons. As noted above, both scenarios assume an incentive level approximately equal to 50% of the incremental measure cost and include an estimate 10-year market adoption rates based on incentive levels and equipment replacement cycles. However, because more measures pass the UCT relative to the TRC Test, the Achievable UCT scenario is able to include additional measures that would result in greater savings potential over the next five and ten years. Overall the Achievable UCT scenario results in an achievable potential that is roughly 125,000 MWh greater, over the next decade, than the achievable TRC scenario.

Table 6-8: Residential Achievable UCT Potential Electric Energy Savings by End Use

END USE	2018 ENERGY (MWH)	% OF 2018 SAVINGS	2023 ENERGY (MWH)	% OF 2023 SAVINGS
Appliances	366,811	10%	673,510	13%
Electronics	749,078	21%	854,883	17%
Lighting	1,386,345	38%	1,493,016	29%
Water Heating	262,683	7%	594,697	12%
Other	43,585	1%	96,303	2%
HVAC (Envelope)	196,173	5%	395,204	8%
HVAC (Equipment)	344,252	10%	679,549	13%
Behavioral Programs	273,467	8%	283,672	6%
Total	**3,622,394**	100%	**5,070,834**	**100%**
% of Annual Sales Forecast	*10.7%*		*14.7%*	

Table 6-9: Residential Achievable UCT Potential Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**839**	**1,338**
% of Peak	*8.4%*	*13.1%*

[36] PacifiCorp Assessment of Long-Term, System-Wide Potential for Demand-Side and Other Supplemental Resources. Volume II. Prepared by Cadmus. March 2013. Appendix B-4.

[37] Traditional low income measures associated with Michigan's Weatherization Assistance Program were evaluated using 100% incentives across all three achievable potential scenarios. All other measures were evaluated at the 50% incentive level.

Table 6-10: Residential Achievable TRC Potential Electric Energy Savings by End Use

END USE	2018 ENERGY (MWH)	% OF 2018 SAVINGS	2023 ENERGY (MWH)	% OF 2023 SAVINGS
Appliances	366,811	10%	673,510	14%
Electronics	749,078	21%	854,883	17%
Lighting	1,353,255	38%	1,440,074	29%
Water Heating	262,683	7%	594,697	12%
Other	43,585	1%	96,303	2%
HVAC (Envelope)	170,658	5%	344,028	7%
HVAC (Equipment)	339,401	10%	670,349	14%
Behavioral Programs	264,123	7%	273,098	6%
Total	**3,549,596**	**100%**	**4,946,942**	**100%**
% of Annual Sales Forecast	*10.5%*		*14.3%*	

Table 6-11: Residential Achievable TRC Potential Demand Savings

SUMMER PEAK DEMAND		
	2018	**2023**
Summary	**MW**	**MW**
Total	**892**	**1,447**
% of Peak	*8.9%*	*14.1%*

The 5-year and 10-year Achievable UCT potential savings estimates are approximately 3.62 million MWh and 5.07 million MWh. This equates to 10.7% and 14.7% of sector sales in 2018 and 2023. By comparison, the respective 5-year and 10-year Achievable TRC potential savings estimates are approximately 3.55 million MWh and 4.95 million MWh. This equates to 10.5% and 14.7% of sector sales in 2018 and 2023. The five and ten year demand savings estimates in the Achievable UCT and Achievable TRC scenarios are depicted in Tables 6-9 and 6-11, respectively.

6.1.1.1 Achievable UCT vs. Constrained UCT

Although the Achievable UCT assumes incentives are set and capped at 50% of the incremental measure cost, and that measures are typically replaced at the end of their useful life, the Achievable UCT scenario also assumes no DSM spending cap to reach all potential participants. In the constrained UCT scenario, the analysis assumes a spending cap roughly equal to 2% of Michigan utility revenue.

Table 6-12 shows the estimated savings for the Constrained UCT scenario over 5 and 10 year time horizon. The 5-year and 10-year Achievable UCT potential savings estimates are approximately 1.5 million MWh and 2.04 million MWh. This equates to 4.3% and 5.9% of sector sales in 2018 and 2023. The five and ten year demand savings estimates in the Constrained UCT scenario are depicted in Table 6-13.

Table 6-12: Residential Constrained Achievable Savings Potential Energy Savings by End Use

END USE	2018 ENERGY (MWH)	% OF 2018 SAVINGS	2023 ENERGY (MWH)	% OF 2023 SAVINGS
End Use	**Energy (MWh)**	**Savings**	**Energy (MWh)**	**Savings**
Appliances	148,073	10%	270,375	13.2%

END USE	2018 ENERGY (MWH)	% OF 2018 SAVINGS	2023 ENERGY (MWH)	% OF 2023 SAVINGS
Electronics	302,513	21%	344,280	16.8%
Lighting	561,760	38%	600,765	29.4%
Water Heating	106,457	7%	240,207	11.7%
Other	17,662	1%	38,902	1.9%
HVAC (Envelope)	79,846	5%	160,036	7.8%
HVAC (Equipment)	139,962	10%	274,607	13.4%
Behavioral Programs	108,763	7%	115,389	5.6%
Total	**1,465,036**	**100%**	**2,044,561**	**100.0%**
% of Annual Sales Forecast	*4.3%*		*5.9%*	

Table 6-13: Residential Constrained Achievable Potential Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**340**	**540**
% of Peak	*3.4%*	*5.3%*

Figure 6-2 shows the percentage of electric savings by each end use for the Constrained UCT scenario. The lighting end use shows the largest potential for savings with 29.4% of total electric savings, followed by the appliances and HVAC Equipment end uses at 16.8% and 13.4%, respectively.

Figure 6-2: Residential Sector 2023 Constrained UCT Electric Potential Savings, by End Use

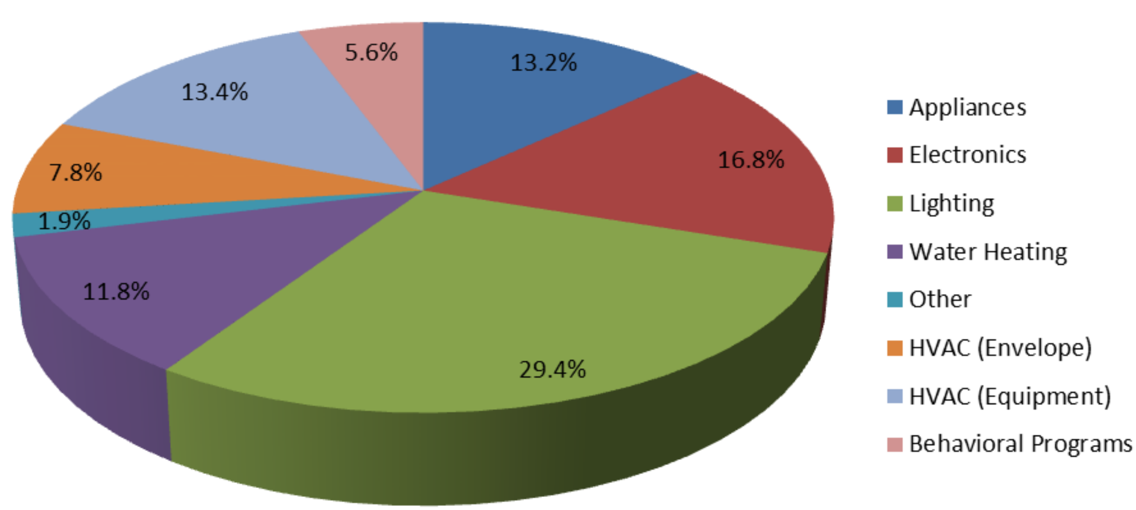
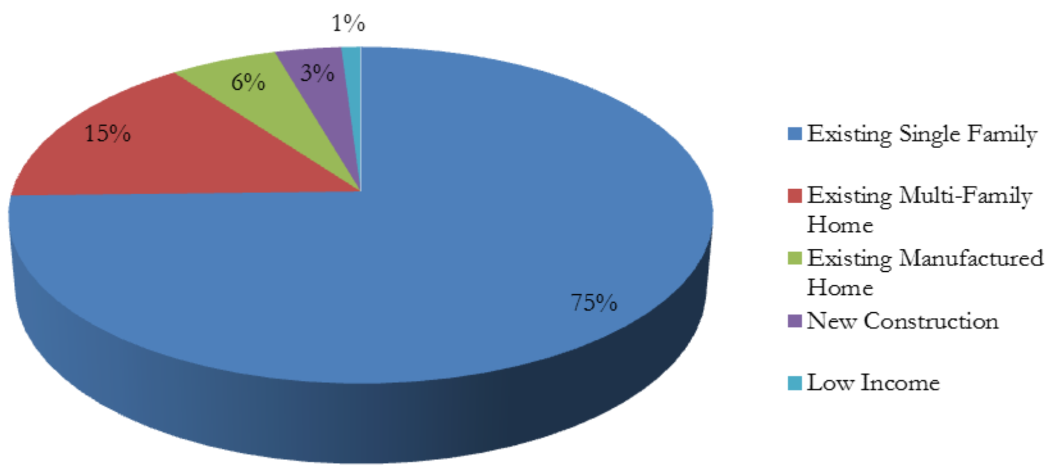


Figure 6-3 shows the breakdown of estimated savings in 2023 by housing type, low-income designation and new construction measures, for the Achievable UCT potential scenario. The savings are largely coming from existing/turnover measures, meaning energy efficient equipment is installed in replacement of existing equipment that has failed. The existing single-family housing and existing multi-family housing types lead the way with 75% of savings and 15% savings, respectively, followed by and 6%

coming from existing manufactured homes. New construction measures account for 3% of total savings and low-income measures account for 1% of total savings. The low-income measures represent only those measures typically included in the Michigan Weatherization Assistance Program to low-income households, and do not represent the combined "low-income potential" in Michigan. There is also low-income potential that is subsumed by the other 99% of the savings associated with the "non-low-income" measures. For example, low income households could realize additional LED lighting and/or behavioral program energy efficiency savings, even though they may not be offered under the traditional umbrella of low-income programs.

Figure 6-3: Residential Constrained Achievable Savings in 2023, by Housing Type, Low-Income Designation and New Construction Measures



6.1.2 Annual Achievable Electric Savings Potential

Table 6-14, Table 6-15 and Table 6-16 shows cumulative annual energy savings (MWh) for all three achievable potential scenarios for each year across the 10-year time horizon for the study, broken out by end use. The year by year associated incentive and administrative costs to achieve these savings are shown later, in Section 6.3. Table 6-17, Table 6-18 and Table 6-19 shows cumulative annual demand (MW) savings for all three achievable potential scenarios for each year across the 10-year time horizon for the study, broken out by end use. The year by year associated incentive and administrative costs to achieve these savings are shown later, in Section 6.3.

Table 6-14: Cumulative Annual Residential Energy Savings in the Achievable UCT Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	42,168	121,659	202,452	284,548	366,811	449,136	531,497	613,886	661,226	673,510
Electronics	122,694	286,807	451,582	616,766	749,078	830,288	849,138	851,396	853,258	854,883
Lighting	216,439	517,636	810,134	1,098,793	1,386,345	1,668,918	1,944,916	1,247,934	1,411,284	1,493,016
Water Heating	41,463	89,732	142,629	200,126	262,683	329,925	396,279	462,138	528,285	594,697
Other	6,869	14,716	23,561	33,393	43,585	54,095	64,621	75,160	85,721	96,303
HVAC (Envelope)	38,831	77,884	117,126	156,545	196,173	235,906	275,673	315,469	355,316	395,204
HVAC (Equipment)	64,568	131,910	201,006	272,172	344,252	412,858	481,800	551,056	620,301	679,549
Behavioral Programs	97,238	192,172	225,558	254,177	273,467	283,188	283,367	283,463	283,567	283,672
Total	**630,268**	**1,432,515**	**2,174,047**	**2,916,521**	**3,622,394**	**4,264,314**	**4,827,291**	**4,400,502**	**4,798,958**	**5,070,834**
% of Annual Forecast Sales	*1.9%*	*4.2%*	*6.4%*	*8.6%*	*10.7%*	*12.6%*	*14.2%*	*12.9%*	*14.0%*	*14.7%*

Table 6-15: Cumulative Annual Residential Energy Savings in the Achievable TRC Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	42,168	121,659	202,452	284,548	366,811	449,136	531,497	613,886	661,226	673,510
Electronics	122,694	286,807	451,582	616,766	749,078	830,288	849,138	851,396	853,258	854,883
Lighting	209,821	504,401	790,281	1,072,322	1,353,255	1,629,211	1,898,592	1,194,991	1,358,341	1,440,074
Water Heating	41,463	89,732	142,629	200,126	262,683	329,925	396,279	462,138	528,285	594,697
Other	6,869	14,716	23,561	33,393	43,585	54,095	64,621	75,160	85,721	96,303
HVAC (Envelope)	33,749	67,712	101,852	136,158	170,658	205,263	239,901	274,566	309,277	344,028
HVAC (Equipment)	62,694	128,578	196,755	267,562	339,401	407,578	475,809	544,059	612,183	670,349
Behavioral Programs	98,489	193,009	222,067	247,183	264,123	272,657	272,818	272,905	273,001	273,098
Total	**617,947**	**1,406,612**	**2,131,178**	**2,858,058**	**3,549,596**	**4,178,152**	**4,728,653**	**4,289,102**	**4,681,294**	**4,946,942**
% of Annual Forecast Sales	*1.8%*	*4.2%*	*6.3%*	*8.5%*	*10.5%*	*12.3%*	*13.9%*	*12.5%*	*13.6%*	*14.3%*

Table 6-16: Cumulative Annual Residential Energy Savings in the Constrained UCT Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	18,519	50,537	82,767	115,359	148,073	180,880	213,908	247,006	264,976	270,375
Electronics	53,883	119,986	185,719	251,295	302,513	333,331	338,776	339,966	341,858	344,280
Lighting	95,053	216,372	332,853	447,415	561,760	674,378	785,076	503,705	569,614	600,765
Water Heating	18,209	37,651	58,753	81,579	106,457	133,253	159,820	186,276	213,074	240,207
Other	3,017	6,177	9,706	13,609	17,662	21,851	26,071	30,305	34,582	38,902
HVAC (Envelope)	17,053	32,784	48,438	64,087	79,846	95,680	111,627	127,614	143,751	160,036
HVAC (Equipment)	28,356	55,481	83,045	111,297	139,962	167,136	194,776	222,610	250,681	274,607
Behavioral Programs	42,704	77,924	90,646	101,108	108,763	112,752	113,383	113,707	114,526	115,389
Total	**276,794**	**596,912**	**891,927**	**1,185,749**	**1,465,036**	**1,719,262**	**1,943,438**	**1,771,191**	**1,933,063**	**2,044,561**
% of Annual Forecast Sales	*0.8%*	*1.8%*	*2.6%*	*3.5%*	*4.3%*	*5.1%*	*5.7%*	*5.2%*	*5.6%*	*5.9%*

Table 6-17: Cumulative Annual Residential Demand Savings in the Achievable UCT Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	6	17	28	39	51	63	74	86	98	98
Electronics	23	52	82	111	139	158	163	164	164	164
Lighting	25	60	94	128	162	194	227	135	161	161
Water Heating	6	13	21	29	39	48	57	64	80	80
Other	4	9	15	21	27	34	41	47	61	61
HVAC (Envelope)	32	65	97	130	163	196	228	261	327	327
HVAC (Equipment)	42	84	128	172	217	255	292	329	403	403
Behavioral Programs	16	30	35	39	41	43	43	43	43	43
Total	**154**	**331**	**499**	**670**	**839**	**991**	**1,124**	**1,129**	**1,338**	**1,338**
% of Annual Forecast Sales	*1.5%*	*3.3%*	*5.0%*	*6.7%*	*8.4%*	*9.9%*	*11.1%*	*11.1%*	*13.1%*	*13.1%*

Table 6-18: Cumulative Annual Residential Demand Savings in the Achievable TRC Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	6	17	28	39	51	63	74	86	94	98
Electronics	23	52	82	111	139	158	163	164	164	164
Lighting	25	60	94	128	162	194	227	135	153	161
Water Heating	6	13	21	29	39	48	57	64	72	80
Other	4	9	15	21	27	34	41	47	54	61
HVAC (Envelope)	30	60	90	120	151	181	211	242	272	303
HVAC (Equipment)	54	109	166	225	284	335	386	437	487	538
Behavioral Programs	16	31	35	39	41	42	42	42	42	42
Total	**165**	**352**	**531**	**712**	**892**	**1,056**	**1,201**	**1,217**	**1,339**	**1,447**
% of Annual Forecast Sales	*1.6%*	*3.5%*	*5.3%*	*7.1%*	*8.9%*	*10.5%*	*11.9%*	*12.0%*	*13.1%*	*14.1%*

Table 6-19: Cumulative Annual Residential Demand Savings in the Constrained UCT Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	3	7	11	16	21	25	30	34	38	40
Electronics	10	22	34	45	56	64	65	65	66	66
Lighting	11	25	39	52	65	79	91	55	62	65
Water Heating	3	6	9	12	16	19	23	26	29	32
Other	2	4	6	9	11	14	16	19	22	24
HVAC (Envelope)	14	27	40	53	66	79	92	106	119	132
HVAC (Equipment)	18	35	53	70	88	103	118	133	148	163
Behavioral Programs	7	12	14	15	16	17	17	17	17	17
Total	**68**	**138**	**206**	**273**	**340**	**400**	**453**	**455**	**500**	**540**
% of Annual Forecast Sales	*0.7%*	*1.4%*	*2.0%*	*2.7%*	*3.4%*	*4.0%*	*4.5%*	*4.5%*	*4.9%*	*5.3%*

6.1.3 Residential Electric Savings Summary by Measure Group

Table 6-20 provides an end-use breakdown of the residential electric savings potential estimates for technical and economic potential, and each of the three achievable potential scenarios. The table indicates how the savings potential decreases systematically from the technical potential scenario to the Constrained UCT potential scenario as additional limiting factors such as cost-effectiveness requirements and anticipated market adoption at given funding levels are introduced.

Table 6-20: Breakdown of Residential Cumulative Annual Electric Savings Potential for Technical, Economic and Achievable Potential, by End Use for Michigan

End Use	Technical Potential (MWh)	Economic Potential -UCT- (MWh)	Economic Potential -TRC- (MWh)	Achievable Potential -UCT- (MWh)	Achievable Potential -TRC- (MWh)	Constrained Achievable –UCT-(MWh)
Appliances						
ENERGY STAR Refrigerators	177,216	177,216	177,216	35,527	35,527	14,321
ENERGY STAR Freezers	68,256	68,256	68,256	20,772	20,772	8,377
ENERGY STAR Clothes Washers	36,910	0	0	0	0	0
ENERGY STAR Dishwashers	33,314	0	0	0	0	0
ENERGY STAR Dehumidifiers	115,083	115,083	115,083	55,602	55,602	22,468
Heat Pump Dryer	64,594	0	0	0	0	0
2nd Refrigerator Turn-In	1,338,562	1,338,562	1,338,562	523,648	523,648	209,987
2nd Freezer Turn-In	94,465	94,465	94,465	36,956	36,956	14,820
2nd Dehumidifier Turn-In	2,654	2,654	2,654	1,004	1,004	403
Electronics						
Controlled Power Strips	99,152	0	0	0	0	0
Efficient Set Top Box	184,053	184,053	184,053	114,535	114,535	46,146
Efficient Desktop PCs	325,626	325,626	325,626	178,022	178,022	71,920
Efficient Laptop PCs	49,906	81,304	81,304	35,185	35,185	14,215
Efficient Televisions	617,351	617,351	617,351	447,761	447,761	180,017
Efficient Computer Monitors	116,891	116,891	116,891	79,380	79,380	31,982
Lighting						
Specialty CFL Bulbs	1,697,182	1,697,182	1,697,182	632,114	632,114	253,403
Standard Screw-In CFL Bulbs	74,338	74,338	74,338	33,798	33,798	13,499
LED Screw-In Bulbs	505,347	505,347	505,347	261,450	261,450	105,624
Specialty LED Bulbs	810,552	810,552	810,552	136,979	136,979	55,304
Exterior Lighting - CFL Bulbs	0	0	0	0	0	0
Exterior Lighting - LED Bulbs	358,353	358,353	358,353	210,558	210,558	84,985
Efficient Torchiere Floor Lamps	421,159	421,159	421,159	117,308	117,308	47,380
Efficient Fluorescent Tube	181,345	0	0	0	0	0

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE –UCT-(MWH)
Lighting						
LED Night Lights	27,001	27,001	27,001	15,178	15,178	6,124
Occupancy Sensors	212,086	0	0	0	0	0
Holiday Lights	97,240	0	0	0	0	0
Multifamily Common Areas	182,976	149,320	44,611	85,632	32,689	34,445
Water Heating						
Heat Pump Water Heater	575,030	1,150,060	1,150,060	415,300	415,300	167,673
Solar Water Heating	450,528	0	0	0	0	0
Gravity Film Heat Exchanger	127,171	0	0	0	0	0
Pipe Wrap	15,019	15,019	15,019	10,714	10,714	0
Low Flow Showerheads	93,813	93,813	93,813	71,455	71,455	4,307
Shower Starters (with LF Showerheads)	25,983	25,983	25,983	17,834	17,834	28,899
Low Flow Faucet Aerators	105,649	105,733	105,733	79,394	79,394	7,212
Other						
Efficient Pool Pump Motors	182,695	182,695	182,695	96,303	96,303	38,902
HVAC (Envelope)						
Ceiling/Attic Insulation	87,119	68,141	60,096	53,344	47,041	21,604
Wall Insulation	63,858	16,044	7,950	9,892	5,844	4,004
Floor Insulation	(33,946)	437	25	101	6	41
Basement Wall Insulation	(7,331)	7,049	1,535	4,932	1,087	1,997
Crawlspace Wall Insulation	(1,220)	4,146	418	1,220	102	494
Air Sealing	50,656	35,864	37,192	26,851	27,996	10,867
Duct Sealing	16,540	17,273	14,747	12,450	10,331	5,039
Duct Insulation	7,465	8,203	8,757	5,798	6,235	2,344
Duct Location (move into conditioned space)	30,081	40,917	17,712	16,967	5,934	6,867
ENERGY STAR Windows	263,771	270,538	306,702	177,032	201,379	71,698
Window Film	122,980	118,769	49,196	78,143	32,367	31,648
ENERGY STAR Doors	65,374	0	0	0	0	0
Cool Roof	95,434	462	462	68	68	27
Low Income Weatherization Package	155,032	11,385	7,876	8,998	6,230	3,644
Steam Pipe Insulation	(1,417)	(1,417)	(1,417)	(591)	(591)	(238)
HVAC (Equipment)						
ENERGY STAR Air Source Heat Pumps	38,547	40,843	40,595	9,444	9,449	3,820

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE –UCT-(MWH)
ENERGY STAR Dual Fuel Heat Pumps	29,542	29,542	30,259	7,348	7,599	2,971
Geothermal Heat Pumps	16,061	0	0	0	0	0
ENERGY STAR Central Air Conditioners	1,045,448	1,045,448	1,050,054	203,190	204,230	82,278
ENERGY STAR Room Air Conditioners	60,860	60,860	60,860	11,537	11,537	4,664
Room Air Conditioner Recycling	13,412	13,412	13,412	4,937	4,937	1,980
Central AC Tune-Up	82,810	82,810	81,905	21,261	24,153	8,566
Ductless Mini-Split Systems	215,552	15,740	17,044	4,166	4,533	1,684
Thermostat setback strategies	230,904	210,221	210,221	109,911	109,911	44,099
Whole House Fans	264,362	0	0	0	0	0
Efficient Chillers	44,659	44,659	44,659	11,791	11,791	4,730
Chiller Controls	679	679	679	364	364	147
Efficient Furnaces	775,125	762,124	0	249,211	0	100,908
Efficient Furnace Fans	112,094	136,841	614,917	67,086	303,764	27,139
Efficient Boilers	(49,097)	(67,818)	(69,788)	(19,940)	(20,744)	(8,073)
Boiler Controls	(1,452)	(1,472)	(2,351)	(758)	(1,174)	(307)
Behavioral Programs						
Direct Feedback (In-Home Energy Display)	229,932	229,932	191,825	129,116	112,531	52,290
Indirect Feedback (Monthly Energy Use Reports)	206,593	206,593	215,153	154,556	160,568	63,099
Total	**13,697,929**	**12,146,247**	**11,644,006**	**5,070,834**	**4,946,942**	**2,044,561**
% of Annual 2022 Sales Forecast	*39.7%*	*35.2%*	*33.7%*	*14.7%*	*14.3%*	*5.9%*
Note: Measures in the above Table with "0" achievable potential are ones that did not pass the Economic screening						

Table 6-21 provides a list of the Top 10 residential electric savings measures for the Achievable UCT scenario. The table provides the measures ranked according to the electric savings potential. The column to the far right shows the results of the measure level cost-effectiveness screening test using the UCT to screen the measures. The measures in the table are representative of a group of comparable measures falling under the umbrella of the measure categories provided in the table. This means that there are a range of UCT ratios for measure iterations that fall into a single measure category. For example, "Specialty LED Bulbs" is a measure category which consists of several measure iterations to account for bulb type and wattage and housing type. The table presents an average of the UCT ratios for all measures which are part of the measure categories in the Top 10.

The Top 10 measures combine to yield an estimated 3.3 million MWh savings. This accounts for nearly 65% of the total residential electric savings in the Achievable UCT scenario.

Table 6-21: Top 10 Residential Electric Savings Measures in the Achievable UCT Scenario

MEASURE		2023 ENERGY (MWH)	% OF SECTOR SAVINGS	UCT RATIO
1	Specialty CFL Bulbs	632,114	12.5%	3.78
2	2nd Refrigerator Turn-In	523,648	10.3%	5.56
3	Efficient Televisions	447,761	8.8%	114.97
4	Heat Pump Water Heater	415,300	8.2%	5.43
5	LED Screw-In Bulbs	251,464	5.0%	2.92
6	Efficient Furnaces (Furnace Fans)	249,211	4.9%	21.32
7	Exterior Lighting - LED Bulbs	210,558	4.1%	8.11
8	ENERGY STAR Central Air Conditioners	203,190	4.0%	2.72
9	Efficient Desktop PCs	178,022	3.5%	4.00
10	ENERGY STAR Windows	177,032	3.5%	2.12
Total		3,288,300	64.8%	

6.2 RESIDENTIAL NATURAL GAS POTENTIAL

Natural gas consumption forecasts for the residential, commercial and institutional segments of the Michigan economy indicate that natural gas demand will decrease from nearly 653 million MMBTu in 2014 to 603 million MMBTu in 2023 (representing a compound average annual rate of growth of -0.9%)[38]. The residential sector is expected to decline more rapidly compared to the state as a whole, with a forecasted average annual growth rate for 2014 to 2023 of -1.2%. The residential gas potential calculations are based upon these approximate consumption values and sales forecast figures over the time horizon covered by the study. The potential is calculated for the entire residential sector and includes breakdowns of the potential associated with each end use.

6.2.1 Energy Efficiency Measures Examined

For the residential sector, there were 791 natural gas savings measures included in the potential gas savings analysis[39]. Table 6-22 provides a brief description of the types of measures included for each end use in the residential model. The list of measures was developed based on a review of the MEMD and measures found in other residential potential studies and TRMs in the Midwest. Measure data includes incremental costs, electricity energy and demand savings, gas and water savings, and measure life.

Table 6-22: Measures and Programs Included in the Gas Residential Sector Analysis

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
HVAC Envelope	Building Envelope Upgrades	• Air/duct Sealing • Duct Insulation • Improved Insulation (Wall, Ceiling, and Floor) • Efficient Windows • Window film • ENERGY STAR doors • Cool Roofs • Low Income Weatherization Package

[38] Estimated for statewide sales based on Michigan utility load forecast data and historical sales.

[39] This total represents the number of unique energy efficiency measures and all permutations of these unique measures. For example, there are 15 permutations of the "Setback Thermostat" measure to account for the various housing types, heating/cooling combinations, and construction types.

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
HVAC Equipment	Heating/Cooling/Ventilation Equipment	• Existing Gas Furnace/Boiler Tune-up • Efficient Gas Furnaces • Efficient Gas Boilers • Boiler Controls • Set Back Thermostats
Water Heating	Domestic Hot Water	• Efficient Gas Storage Tank WH • Tankless Gas WH • Low Flow Showerhead/Faucet Aerator • Pipe Wrap • Gravity Film Heat Exchangers
Appliances	High-Efficiency Appliances / Retirement of Inefficient Appliances	• ENERGY STAR Clothes Washers • ENERGY STAR Dishwashers
Behavioral	Consumer Response to Feedback from Utility	• Direct (Real-Time) Feedback • Indirect Feedback

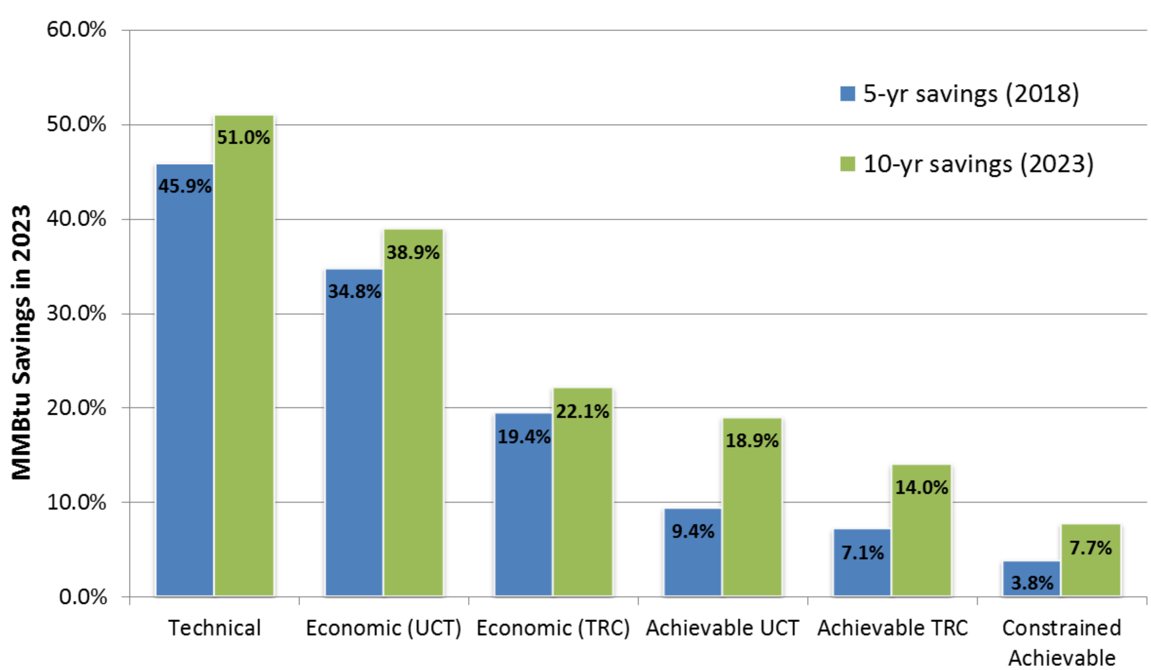
6.2.2 Overview of Residential Natural Gas Energy Efficiency Potential

This section presents estimates for gas technical, economic, and achievable potential for the residential sector. Each of the tables in the technical, economic and achievable sections present the respective potential for efficiency savings expressed as cumulative annual energy savings (MMBtu), percentage of savings by end use, and savings as a percentage of forecast sales. Data is provided on a 5-year and 10-year time horizon for Michigan.

SUMMARY OF FINDINGS

Figure 6-4 illustrates the estimated savings potential for each of the scenarios included in this study.

Figure 6-4: Summary of Residential Energy Efficiency Potential as a % of 2018 and 2023 Sales Forecasts



The potential estimates are expressed as cumulative 5-year and 10-year savings, as percentages of the respective 2018 and 2023 sector sales. The technical potential is 45.9% in 2018 and 51.0% in 2023. The

5-year and 10-year economic potential is 34.8% and 38.9% based on the Utility Cost Test (UCT) screen, assuming an incentive level equal to 50% of the measure cost. Based on a measure-level screen using the TRC Test, the economic potential is 19.4% in 2018 and 22.1% in 2023. The significant drop from technical between the two economic potential scenarios indicates that most measures are cost-effective when screening based on the UCT, but fall below the threshold of cost-effectiveness when screening based on the TRC Test.

The 5-year and 10-year achievable potential savings are: 9.4% and 18.9% for the Achievable UCT scenario; 7.1% and 14.0% for the Achievable TRC scenario; and 3.8% and 7.7% for the Constrained Achievable scenario. The Achievable UCT scenario assumes 50% incentives and includes measures that passed the UCT Test. The Achievable TRC scenario also assumes 50% incentives but includes only measures that passed the cost-effectiveness screen based on the TRC Test. Last, the Constrained Achievable scenario is a subset of Achievable UCT scenario, assuming a spending cap on DSM approximately equal to 2% of future annual residential revenue.

TECHNICAL POTENTIAL

Technical potential represents the quantification of savings that can be realized if all technologically available energy-efficiency measures are immediately adopted in all feasible instances, regardless of cost. Table 6-23 shows that it is technically feasible to save about 136.7 million MMBtu in the residential sector between 2014 and 2018 and approximately 143.3 million MMBtu during the 10 year period from 2014 to 2023 across Michigan, representing 45.9% of 2018 residential sales, and 51.0% of 2023 residential sales. The HVAC Envelope end use represents the greatest contributor to the potential at 44% of 10-yr savings, while the HVAC Equipment end use contributes 40% of the 10-yr savings, and the Water Heating end use contributes 19% of the 10-yr savings. Conversely, the lighting end use yields a 5% gain in consumption. While there is significant potential for electric savings in the lighting end use, this potential would produce a negative impact on natural gas potential, due to increased heating requirements associated with efficiency lighting.[40] Other measures such as efficient air conditioners and efficient electric water heaters also increase heating requirements due to the minor reductions in heat losses associated with these measures.

Table 6-23: Residential Sector Technical Potential MMBtu Savings by End Use

END USE	2018 SAVINGS (MMBTU)	% OF 2018 SAVINGS	2023 SAVINGS (MMBTU)	% OF 2023 SAVINGS
Appliances	1,338,540	1%	1,370,972	1%
Electronics	0	0%	0	0%
Lighting	-10,132,368	-7%	-7,413,995	-5%
Water Heating	25,653,133	19%	26,569,703	19%
Other	0	0%	0	0%
HVAC (Envelope)	61,077,744	45%	62,401,101	44%
HVAC (Equipment)	55,510,229	41%	57,012,809	40%
Behavioral Programs	3,259,386	2%	3,331,000	2%
Total	**136,706,666**	**100%**	**143,271,591**	**100%**
% of Annual Sales Forecast	*45.9%*		*51.0%*	

[40] High efficiency lighting reduces the amount of waste heat that is released during hours of lighting operation. The reduction in waste heat places a greater burden on heating equipment (electric and gas) to meet the winter heating load requirements.

ECONOMIC POTENTIAL

Economic potential is a subset of technical potential, which only accounts for measures that are cost-effective. This analysis includes two estimates of economic potential. One cost-effectiveness screen is based on the UCT and a second economic potential scenario was screened using the TRC Test. In both scenarios, the utility incentive was assumed to be equal to 50% of the measure incremental cost. The UCT was used for this study because it is mandated in Michigan to be the primary cost-effectiveness test used when considering energy efficiency programs. Because the TRC includes participant costs, it goes beyond utility resource acquisition and looks at the measure/program from a more broad perspective. 77% of all measures that were included in the electric potential analysis passed the UCT and 62% of all measures passed the TRC Test.

Table 6-24 indicates that the economic potential based on the UCT screen is nearly 103.4 million MMBtu during the 5 year period from 2014 to 2018. The economic potential increases to nearly 109.3 million MMBtu during the 10 year period from 2014 to 2023. This represents 34.8% and 38.9% of residential sales across the respective 2018 and 2023 sales. The HVAC Equipment end use represents the greatest contributor to the potential at 52% of the 10-yr savings, while the HVAC Envelope and Water Heating end use contributes 31% and 20% of the 10-yr savings.

Table 6-24: Statewide Residential Sector Economic Potential (UCT) MMBtu Savings by End Use

END USE	2018 SAVINGS (MMBTU)	% OF 2018 SAVINGS	2023 SAVINGS (MMBTU)	% OF 2023 SAVINGS
Appliances	0	0%	0	0%
Electronics	0	0%	0	0%
Lighting	-8,860,565	-9%	-6,116,785	-6%
Water Heating	21,196,030	20%	21,902,671	20%
Other	0	0%	0	0%
HVAC (Envelope)	32,652,145	32%	33,635,009	31%
HVAC (Equipment)	55,340,011	53%	56,546,757	52%
Behavioral Programs	3,259,386	3%	3,331,000	3%
Total	**103,587,007**	**100%**	**109,298,652**	**100%**
% of Annual Sales Forecast	*34.8%*		*38.9%*	

Table 6-25 demonstrates that the economic potential based on the TRC screen is lower than the economic potential based on the UCT screen. In 2023, economic potential based on the TRC cost-effectiveness screening is approximately 47 million MMBtu lower than the economic potential based on the UCT. The biggest decline in economic potential between the two screens occurred in the HVAC (Equipment) end-use where measure costs are high and incentive amounts can significantly impact cost-effectiveness.

Table 6-25: Statewide Residential Sector Economic Potential (TRC) MMBtu Savings by End Use

END USE	2018 SAVINGS (MMBTU)	% OF 2018 SAVINGS	2023 SAVINGS (MMBTU)	% OF 2023 SAVINGS
Appliances	0	0%	0	0%
Electronics	0	0%	0	0%
Lighting	-8,684,361	-15%	-5,940,582	-10%

END USE	2018 SAVINGS (MMBTU)	% OF 2018 SAVINGS	2023 SAVINGS (MMBTU)	% OF 2023 SAVINGS
Water Heating	8,100,414	14%	8,425,883	14%
Other	0	0%	0	0%
HVAC (Envelope)	28,284,493	49%	28,933,758	47%
HVAC (Equipment)	27,188,515	47%	27,609,723	44%
Behavioral Programs	2,996,531	5%	3,062,371	5%
Total	**57,885,592**	**100%**	**62,091,152**	**100%**
% of Annual Sales Forecast	*19.4%*		*22.1%*	

6.2.3 Achievable Natural Gas Potential Savings in the Residential Sector

Achievable potential is a refinement of economic potential that takes into account the estimated market adoption of energy efficiency measures based on the incentive level and measure payback, the natural replacement cycle of equipment, and the capabilities of programs and administrators to ramp up program activity over time. Achievable potential also takes into account the non-measure costs of delivering programs (for administration, marketing, monitoring and evaluation, etc.). As noted in Section 6.1.3, administrative costs were assumed to be equivalent to 20% of incremental measures costs.

This study estimated achievable potential for three scenarios. The Achievable UCT Scenario determines the achievable potential of all measures that passed the UCT economic screening assuming incentives equal to 50% of the measure cost. The second scenario, Achievable TRC, also assumes incentives set at 50% of the measure incremental cost, but only includes measures that passed the TRC Test economic screening. The third scenario, Constrained UCT, assumes a spending cap equal to 2% of utility revenues, thereby limiting utilities from reaching the ultimate potential estimated in the Achievable UCT scenario.

6.2.3.1 Achievable UCT vs. Achievable TRC

Tables 6-26 and 6-27 show the estimated savings for the Achievable UCT and Achievable TRC scenarios over 5 and 10 year time horizons. As noted above, both scenarios assume an incentive level approximately equal to 50% of the incremental measure cost and include estimated 10-year market adoption rates based on incentive levels and equipment replacement cycles. However, because more measures pass the UCT relative to the TRC Test, the Achievable UCT scenario is able to include additional measures that would result in greater savings potential over the next five and ten years. Overall the Achievable UCT scenario results in an achievable potential that is 13.8 million MMBTu greater, over the next decade, than the achievable TRC scenario.

Table 6-26: Residential Achievable UCT Natural Gas Potential Savings by End Use

END USE	2018 ENERGY (MMBTU)	% OF 2018 SAVINGS	2023 ENERGY (MMBTU)	% OF 2023 SAVINGS
Appliances	0	0%	0	0%
Electronics	0	0%	0	0%
Lighting	-2,078,125	-7%	-2,129,625	-4%
Water Heating	5,487,630	20%	9,244,933	17%
Other	0	0%	0	0%
HVAC (Envelope)	10,288,230	37%	20,959,241	39%

END USE	2018 ENERGY (MMBTU)	% OF 2018 SAVINGS	2023 ENERGY (MMBTU)	% OF 2023 SAVINGS
HVAC (Equipment)	12,193,400	44%	22,978,405	43%
Behavioral Programs	2,038,931	7%	2,125,751	4%
Total	**27,930,065**	**100%**	**53,178,705**	**100%**
% of Annual Sales Forecast	*9.4%*		*18.9%*	

Table 6-27: Residential Achievable TRC Potential Natural Gas Savings by End Use

END USE	2018 ENERGY (MMBTU)	% OF 2018 SAVINGS	2023 ENERGY (MMBTU)	% OF 2023 SAVINGS
Appliances	0	0%	0	0%
Electronics	0	0%	0	0%
Lighting	-2,022,443	-9%	-2,040,534	-5%
Water Heating	4,218,934	20%	6,659,203	17%
Other	0	0%	0	0%
HVAC (Envelope)	9,276,023	44%	18,911,780	48%
HVAC (Equipment)	7,875,910	37%	13,772,046	35%
Behavioral Programs	1,947,669	9%	2,023,974	5%
Total	**21,296,093**	**100%**	**39,326,470**	**100%**
% of Annual Sales Forecast	*7.1%*		*14.0%*	

The 5-year and 10-year Achievable UCT potential savings estimates are approximately 27.9 million MMBtu and 53.2 million MMBtu. This equates to 9.4% and 18.9% of sector sales in 2018 and 2023. By comparison, the respective 5-year and 10-year Achievable TRC potential savings estimates are approximately 21.3 million MMBtu and 39.3 million MMBtu. This equates to 7.1% and 14.0% of sector sales in 2018 and 2023.

6.2.3.2 Achievable UCT vs. Constrained UCT

Although the Achievable UCT assumes incentives are set and capped at 50% of the incremental measure cost, and that measures are typically replaced at the end of their useful life, the Achievable UCT scenario also assumes no DSM spending cap to reach all potential participants. In the constrained UCT scenario, the analysis assumes a spending cap roughly equal to 2% of Michigan utility revenue.

Table 6-28 shows the estimated savings for the Constrained UCT scenario over 5 and 10 year time horizons. The 5-year and 10-year Achievable UCT potential savings estimates are approximately 11.4 million MMBTu and 21.5 million MMBTu. This equates to 3.8% and 7.7% of sector sales in 2018 and 2023.

Table 6-28: Residential Constrained Achievable Potential Natural Gas Savings by End Use

END USE	2018 ENERGY (MMBTU)	% OF 2018 SAVINGS	2023 ENERGY (MMBTU)	% OF 2023 SAVINGS
Appliances	0	0%	0	0%
Electronics	0	0%	0	0%

END USE	2018 ENERGY (MMBTU)	% OF 2018 SAVINGS	2023 ENERGY (MMBTU)	% OF 2023 SAVINGS
Lighting	-842,158	-7%	-856,494	-4%
Water Heating	2,226,078	20%	3,733,128	17%
Other	0	0%	0	0%
HVAC (Envelope)	4,184,483	37%	8,483,866	39%
HVAC (Equipment)	4,952,718	44%	9,270,666	43%
Behavioral Programs	810,938	7%	864,248	4%
Total	**11,332,060**	**100%**	**21,495,414**	**100%**
% of Annual Sales Forecast	*3.8%*		*7.7%*	

Figure 6-5 shows the estimated 10-year cumulative efficiency savings for the Constrained UCT Achievable potential scenario, broken out by end use across the entire residential sector. The HVAC Equipment end use shows the largest potential for savings at nearly 9.3 million MMBtu, or 43% of total savings. This figure also illustrates the negative impact on natural gas potential, due to increased heating requirements associated with efficiency lighting.

Figure 6-5: Residential Sector 2023 Achievable Potential Savings for the Constrained UCT Scenario, by End Use

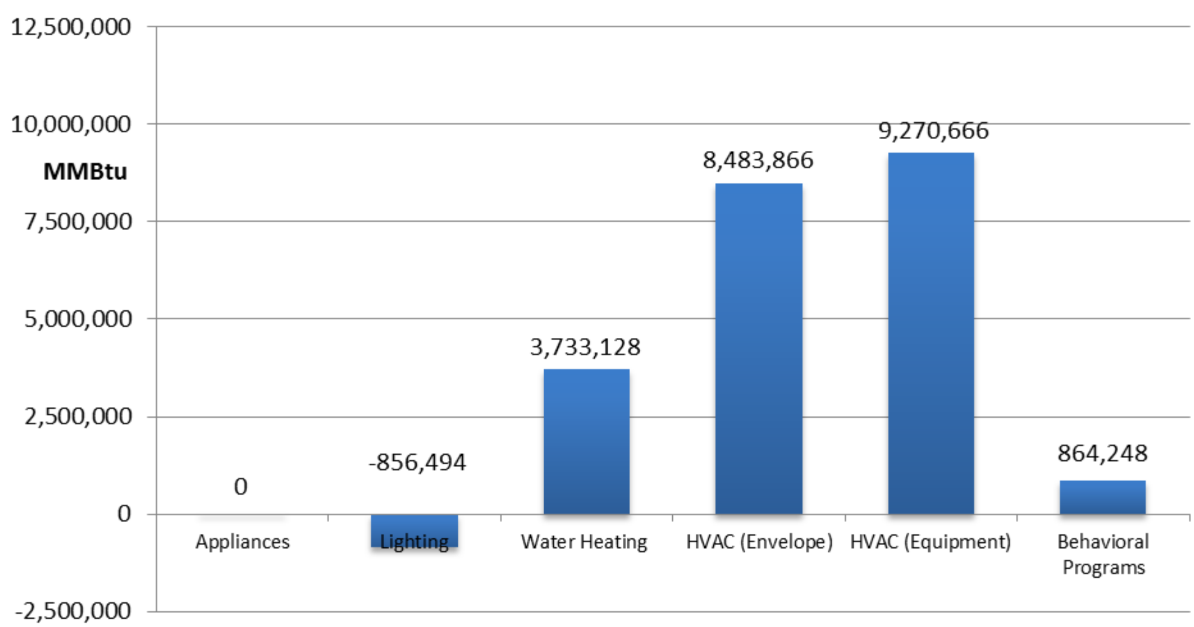
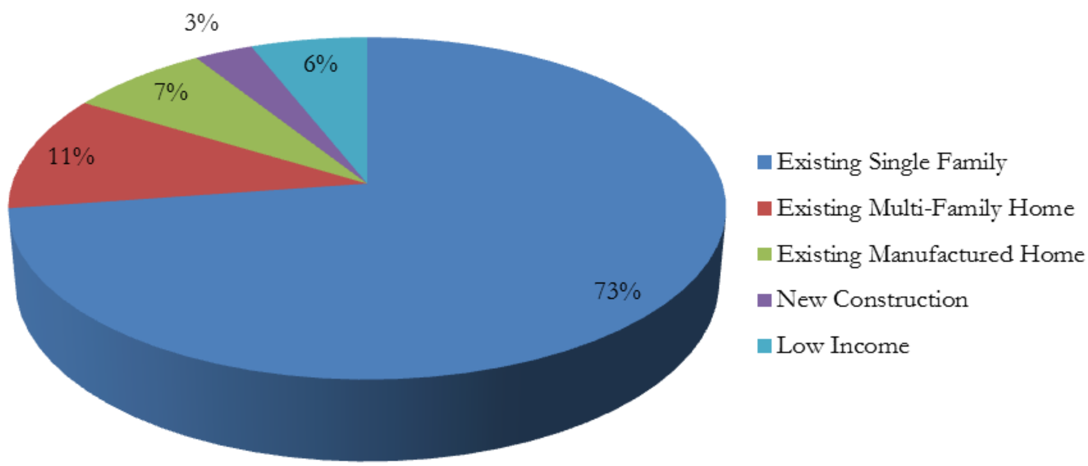


Figure 6-6 shows the breakdown of estimated savings in 2023 by housing type, low-income designation and new construction measures, for the Base Achievable potential scenario. The savings are largely coming from existing/turnover measures, meaning energy efficient equipment is installed in replacement of existing equipment that has failed. The existing single-family housing and existing multi-family housing types lead the way with 73% of savings and 11% savings, respectively, followed by and 7% coming from manufactured. New construction measures account for 3% of total savings and low-income measures account for 6% of total savings. As noted in the electric potential portion of this section, the low-income measures represent only those measures typically included in the Michigan Weatherization Assistance Program to low-income households, and do not represent the combined "low-income potential" in Michigan. There is also low-income potential that is subsumed by the other 93% of the savings associated with the "non-low-income" measures. For example, low income households could realize additional behavioral program energy efficiency savings, even though they may not be offered under the traditional umbrella of low-income programs.

Figure 6-6: Residential Constrained UCT Achievable Savings in 2023, by Housing Type, Low-Income Designation and New Construction Measures



6.2.4 Annual Achievable Natural Gas Savings Potential

Table 6-29, Table 6-30 and Table 6-31 shows cumulative annual energy savings for all three achievable potential scenarios for each year across the 10-year time horizon for the study, broken out by end use. The year by year associated incentive and administrative costs to achieve these savings are shown later, in Section 1.3.

Table 6-29: Cumulative Annual Residential Energy Savings in the Achievable UCT Potential Scenario, by End Use for Michigan

END-USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	0	0	0	0	0	0	0	0	0	0
Electronics	0	0	0	0	0	0	0	0	0	0
Lighting	-327,250	-780,489	-1,218,481	-1,649,639	-2,078,125	-2,498,033	-2,906,848	-1,797,661	-2,031,566	-2,129,625
Water Heating	898,853	2,041,306	3,187,584	4,335,557	5,487,630	6,636,700	7,446,562	8,044,718	8,644,039	9,244,933
Other	0	0	0	0	0	0	0	0	0	0
HVAC (Envelope)	1,967,707	3,987,284	6,053,543	8,164,559	10,288,230	12,416,866	14,548,080	16,681,552	18,818,770	20,959,241
HVAC (Equipment)	2,402,498	4,942,165	7,495,237	9,836,729	12,193,400	14,506,779	16,828,641	19,159,724	21,496,017	22,978,405
Behavioral Programs	671,261	1,345,436	1,630,274	1,874,486	2,038,931	2,121,830	2,123,319	2,124,095	2,124,911	2,125,751
Total	**5,613,070**	**11,535,702**	**17,148,156**	**22,561,693**	**27,930,065**	**33,184,142**	**38,039,753**	**44,212,427**	**49,052,171**	**53,178,705**
% of Annual Forecast Sales	*1.8%*	*3.7%*	*5.6%*	*7.4%*	*9.4%*	*11.3%*	*13.1%*	*15.4%*	*17.3%*	*18.9%*

Table 6-30: Cumulative Annual Residential Energy Savings in the Achievable TRC Potential Scenario, by End Use for Michigan

END-USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	0	0	0	0	0	0	0	0	0	0
Electronics	0	0	0	0	0	0	0	0	0	0
Lighting	-316,113	-758,216	-1,185,072	-1,605,093	-2,022,443	-2,431,214	-2,828,893	-1,708,570	-1,942,475	-2,040,534
Water Heating	651,832	1,544,678	2,437,437	3,327,692	4,218,934	5,106,002	5,653,199	5,988,148	6,323,308	6,659,203
Other	0	0	0	0	0	0	0	0	0	0
HVAC (Envelope)	1,768,472	3,587,495	5,451,406	7,358,198	9,276,023	11,198,197	13,122,719	15,049,208	16,979,017	18,911,780
HVAC (Equipment)	1,589,392	3,322,981	5,064,813	6,472,775	7,875,910	9,223,907	10,572,720	11,922,919	13,275,612	13,772,046
Behavioral Programs	675,726	1,341,107	1,588,993	1,803,290	1,947,669	2,020,431	2,021,757	2,022,455	2,023,207	2,023,974
Total	**4,369,309**	**9,038,046**	**13,357,577**	**17,356,862**	**21,296,093**	**25,117,323**	**28,541,502**	**33,274,160**	**36,658,669**	**39,326,470**
% of Annual Forecast Sales	*1.4%*	*2.9%*	*4.3%*	*5.7%*	*7.1%*	*8.5%*	*9.8%*	*11.6%*	*12.9%*	*14.0%*

Table 6-31: Cumulative Annual Residential Energy Savings in the Constrained UCT Potential Scenario, by End Use for Michigan

END-USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances	0	0	0	0	0	0	0	0	0	0
Electronics	0	0	0	0	0	0	0	0	0	0
Lighting	-143,718	-326,278	-500,661	-671,771	-842,158	-1,009,511	-1,173,483	-725,824	-820,140	-856,494
Water Heating	394,748	854,916	1,312,192	1,767,926	2,226,078	2,683,996	2,995,732	3,235,446	3,481,515	3,733,128
Other	0	0	0	0	0	0	0	0	0	0
HVAC (Envelope)	864,155	1,677,619	2,501,897	3,339,949	4,184,483	5,032,763	5,887,408	6,744,497	7,609,997	8,483,866
HVAC (Equipment)	1,055,101	2,078,052	3,096,531	4,016,679	4,952,718	5,872,321	6,804,229	7,741,775	8,689,787	9,270,666
Behavioral Programs	294,797	546,360	656,042	745,878	810,938	844,711	849,338	851,874	857,876	864,248
Total	**2,465,083**	**4,830,669**	**7,066,001**	**9,198,660**	**11,332,060**	**13,424,280**	**15,363,223**	**17,847,768**	**19,819,035**	**21,495,414**
% of Annual Forecast Sales	*0.8%*	*1.6%*	*2.3%*	*3.0%*	*3.8%*	*4.6%*	*5.3%*	*6.2%*	*7.0%*	*7.7%*

6.2.5 Residential Gas Savings Summary by Measure Group

Table 6-32 provides an end-use breakdown of the residential natural gas savings potential estimates for technical and economic potential, and each of the three achievable potential scenarios. The table indicates how the savings potential decreases systematically from the technical potential scenario to the Constrained Achievable potential scenario as additional limiting factors such as cost-effectiveness requirements and anticipated market adoption at given funding levels are introduced.

Table 6-32: Breakdown of Residential Cumulative Annual Gas Savings Potential for Technical, Economic and Achievable Potential, by End Use for Michigan

End Use	Technical Potential (MMBtu)	Economic Potential -UCT- (MMBtu)	Economic Potential -TRC- (MMBtu)	Achievable Potential -UCT- (MMBtu)	Achievable Potential -TRC- (MMBtu)	Constrained Achievable –UCT- (MMBtu)
Appliances						
ENERGY STAR Clothes Washers	1,234,592	0	0	0	0	0
ENERGY STAR Dishwashers	136,380	0	0	0	0	0
Lighting						
Specialty CFL Bulbs	(2,818,389)	(2,818,389)	(2,818,389)	(1,049,706)	(1,049,706)	(420,809)
Standard Screw-In CFL Bulbs	(123,447)	(123,447)	(123,447)	(56,126)	(56,126)	(22,416)
LED Screw-In Bulbs	(839,194)	(839,194)	(839,194)	(434,171)	(434,171)	(175,402)
Specialty LED Bulbs	(1,346,026)	(1,346,026)	(1,346,026)	(227,472)	(227,472)	(91,839)
Efficient Torchiere Floor Lamps	0	0	0	0	0	0
LED Night Lights	0	0	0	0	0	0
Occupancy Sensors	(699,389)	(699,389)	(699,389)	(194,805)	(194,805)	(78,681)
Multifamily Common Areas	0	0	0	0	0	0
Water Heating						
Heat Pump Water Heater	(937,885)	(1,875,770)	(1,875,770)	(677,363)	(677,363)	(273,478)
Solar Water Heating	6,308,684	0	0	0	0	0
Efficient Gas Tank Water Heater	2,390,659	4,710,334	0	903,474	0	365,775
Instant Gas Water Heater	4,449,282	8,766,454	0	1,682,256	0	681,066
Gravity Film Heat Exchanger	3,654,347	0	0	0	0	0
Tank Wrap	402,962	0	0	0	0	0
Pipe Wrap	4,490,184	4,490,184	4,490,184	3,379,323	3,379,323	1,358,602
Low Flow Showerheads	2,420,283	2,420,283	2,420,283	1,710,710	1,710,710	692,048

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE –UCT- (MMBTU)
Shower Starters (with LF Showerheads)	670,558	670,558	670,558	381,890	381,890	154,602
Low Flow Faucet Aerators	2,720,628	2,720,628	2,720,628	1,864,643	1,864,643	754,513
HVAC (Envelope)						
Ceiling/Attic Insulation	8,793,191	6,531,553	6,285,828	5,116,847	4,934,267	2,072,302
Wall Insulation	6,478,320	1,467,957	967,501	897,835	741,842	363,387
Floor Insulation	4,180,390	58,371	3,271	13,434	763	5,438
Basement Wall Insulation	4,848,933	521,801	0	370,467	0	150,040
Crawlspace Wall Insulation	732,748	234,277	131,712	69,809	39,036	28,272
Air Sealing	5,055,511	3,890,293	4,134,004	2,912,164	3,106,999	1,178,685
Duct Sealing	926,669	917,545	798,866	673,328	575,709	272,468
Duct Insulation	1,283,485	817,873	499,623	515,340	264,091	208,544
Duct Location (move into conditioned space)	2,731,764	5,070,233	494,952	2,206,441	109,957	893,602
ENERGY STAR Windows	11,391,071	11,315,653	11,593,836	7,423,076	7,606,883	3,006,358
Window Film	(2,734,062)	(2,490,902)	(1,066,129)	(1,638,868)	(701,410)	(663,746)
ENERGY STAR Doors	4,684,290	0	0	0	0	0
Cool Roof	(1,606,570)	(3,109)	(3,109)	(455)	(455)	(183)
Low Income Weatherization Package	10,740,502	408,605	198,543	322,703	156,977	130,695
Steam Pipe Insulation	4,894,860	4,894,860	4,894,860	2,077,121	2,077,121	838,004
HVAC (Equipment)						
ENERGY STAR Dual Fuel Heat Pumps	133,965	133,965	148,237	37,007	41,211	14,956
Geothermal Heat Pumps	5	0	0	0	0	0
ENERGY STAR Central Air Conditioners	(2,285,365)	(2,285,365)	(2,256,845)	(445,214)	(440,955)	(180,282)
Thermostat setback strategies	18,747,726	17,176,758	17,176,758	9,046,475	9,046,475	3,629,645
Whole House Fans	(73,794)	0	0	0	0	0
Efficient Furnaces	30,685,133	29,858,475	0	9,799,103	0	3,968,134
Efficient Furnace Fans	(145,631)	(186,675)	(825,900)	(91,255)	(407,667)	(36,913)

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE –UCT- (MMBTU)
Furnace Tune-Up	1,314,898	1,333,155	1,979,372	677,252	1,057,878	274,277
Efficient Boilers	5,018,901	6,941,197	6,728,478	2,129,003	2,098,723	862,039
Boiler Tune-up	1,708,874	1,872,413	2,353,522	934,724	1,174,224	377,984
Boiler Controls	1,908,098	1,702,834	2,306,100	891,310	1,202,157	360,825
Behavioral Programs						
Direct Feedback (In-Home Energy Display)	1,962,884	1,962,884	1,637,568	1,102,241	960,653	446,393
Indirect Feedback (Monthly Energy Use Reports)	1,368,116	1,368,116	1,424,803	1,023,510	1,063,321	417,855
Total	**143,271,591**	**109,298,652**	**62,091,152**	**53,178,705**	**39,326,470**	**21,495,414**
% of Annual 2022 Sales Forecast	*51.0%*	*38.9%*	*22.1%*	*18.9%*	*14.0%*	*7.7%*
Note: Measures in the above table with "0" potential are ones that did not pass the economic screen.						

Table 6-33 provides a list of the Top 10 residential gas savings measures for the Achievable UCT scenario. The table provides the measures ranked according to the gas savings potential. The column to the far right shows the results of the measure level cost-effectiveness screening test using the UCT to screen the measures. The measures in the table are representative of a group of comparable measures falling under the umbrella of the measure categories provided in the table. This means that there are a range of UCT ratios for measure iterations that fall into a single measure category. For example, "ENERGY STAR Windows" is a measure category which consists of several measure iterations to account for various types of efficient windows options and housing types. The table presents an average of the UCT ratios for all measures which are part of the measure categories in the Top 10.

The Top 10 measures combine to yield an estimated 46 million MMBtu savings. This accounts for more than 85% of the total residential gas savings in the Achievable UCT scenario.

Table 6-33: Top 10 Residential Gas Savings Measures in the Achievable UCT Scenario

MEASURE		2023 ENERGY (MMBTU)	% OF SECTOR SAVINGS	UCT RATIO
1	**Efficient Furnaces**	9,799,103	18.4%	1.13
2	**Thermostat setback strategies**	9,046,475	17.0%	21.98
3	**ENERGY STAR Windows**	7,423,076	14.0%	2.12
4	**Ceiling/Attic Insulation**	5,116,847	9.6%	4.68
5	**Pipe Wrap**	3,379,323	6.4%	15.68
6	**Air Sealing**	2,912,164	5.5%	6.77
7	**Duct Location (move into conditioned space)**	2,206,441	4.1%	2.15
8	**Efficient Boilers**	2,129,003	4.0%	1.59
9	**Steam Pipe Insulation**	2,077,121	3.9%	2.80

MEASURE		2023 ENERGY (MMBTU)	% OF SECTOR SAVINGS	UCT RATIO
10	Low Flow Faucet Aerators	1,864,643	3.5%	12.71
Total		**45,954,196**	**86.4%**	

6.3 ACHIEVABLE POTENTIAL BENEFITS & COSTS

The tables below provide the net present value (NPV) benefits and costs associated with the three achievable potential scenarios for the residential sector at the 5-year and 10-year periods. Table 6-34 and Table 6-35 compares the NPV benefits and costs associated with the Achievable UCT and Achievable TRC Scenarios. Both the UCT and TRC scenario benefits include avoided energy supply and demand costs, while the Achievable TRC scenario benefits also include O&M benefits, tax credits, water benefits and a carbon tax adder. The NPV costs in the Achievable UCT scenario includes only program administrator costs (incentives paid, staff labor, marketing, etc.) whereas the Achievable TRC scenario costs include both participant and program administrator costs.

Table 6-34: 5-Year Benefit-Cost Ratios for Achievable UCT vs. Achievable TRC Scenarios – Residential Sector Only

5-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$3,432,366,723	$1,479,443,493	2.32	$1,952,923,230
Achievable TRC	$3,914,509,646	$1,721,305,829	2.27	$2,193,203,817

Table 6-35: 10-Year Benefit-Cost Ratios for Achievable UCT vs. Achievable TRC Scenarios – Residential Sector Only

10-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$6,258,559,134	$2,603,870,491	2.40	$3,654,688,643
Achievable TRC	$7,166,982,222	$3,032,912,928	2.36	$4,134,069,295

Table 6-36 and Table 6-37 compares the NPV benefits and costs associated with the Achievable UCT and Constrained UCT Scenarios. Both scenarios compared the benefits and costs based on the UCT. However the constrained scenario's 2% of revenue spending cap on DSM results in reduced program participation and overall NPV benefits.

Table 6-36: 5-Year Benefit-Cost Ratios for Achievable UCT vs. Constrained UCT Scenarios – Residential Sector Only

5-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$3,432,366,723	$1,479,443,493	2.32	$1,952,923,230
Constrained UCT	$1,397,166,850	$603,003,744	2.32	$794,163,107

Table 6-37: 10-Year Benefit-Cost Ratios for Achievable UCT vs. Constrained UCT Scenarios– Residential Sector Only

10-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$6,258,559,134	$2,603,870,491	2.40	$3,654,688,643
Constrained UCT	$2,535,305,373	$1,055,704,104	2.40	$1,479,601,269

Year by year budgets for all three scenarios, broken out by incentive and administrative costs are depicted in Tables 6-38 through 6-40. Table 6-41 shows the revenue requirements for each scenario as a percentage of forecasted sector sales.

Table 6-38: Annual Program Budgets Associated with the Achievable UCT Scenario (in millions)

ACHIEVABLE UCT	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incentives	$222.9	$241.4	$244.4	$247.0	$247.9	$248.8	$248.6	$249.6	$249.0	$248.4
Admin.	$87.3	$94.1	$95.3	$96.3	$96.7	$97.0	$97.0	$97.4	$97.1	$96.9
Total Costs	$310.3	$335.5	$339.7	$343.3	$344.6	$345.8	$345.6	$346.9	$346.1	$345.3

Table 6-39: Annual Program Budgets Associated with the Achievable TRC Scenario (in millions)

ACHIEVABLE TRC	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incentives	$171.0	$173.5	$175.4	$175.8	$176.2	$175.7	$176.3	$175.6	$174.8	$171.0
Admin.	$65.4	$66.3	$67.1	$67.3	$67.4	$67.2	$67.5	$67.2	$66.9	$65.4
Total Costs	$236.4	$239.8	$242.6	$243.1	$243.7	$243.0	$243.8	$242.7	$241.7	$236.4

Table 6-40: Annual Program Budgets Associated with the Constrained UCT Scenario (in millions)

CONSTRAINED UCT	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incentives	$97.3	$97.5	$98.1	$98.6	$99.1	$99.7	$100.3	$100.8	$101.4	$97.3
Admin.	$37.9	$38.0	$38.2	$38.4	$38.7	$38.9	$39.1	$39.3	$39.6	$37.9
Total Costs	$135.2	$135.5	$136.3	$137.0	$137.8	$138.6	$139.4	$140.2	$141.0	$135.2

Table 6-41: Annual Achievable Scenario Budgets as a % of Annual Sector Revenue

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Achievable UCT	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	4.9%	4.9%	5.0%
Achievable TRC	3.5%	3.5%	3.6%	3.5%	3.5%	3.5%	3.5%	3.5%	3.4%	3.5%
Constrained UCT	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

7 COMMERCIAL ELECTRIC AND NATURAL GAS ENERGY EFFICIENCY POTENTIAL ESTIMATES

This section provides electric and natural gas energy efficiency potential estimates for the commercial sector in Michigan. Estimates of technical, economic and achievable potential are provided in separate sections for electric and natural gas.

7.1 COMMERCIAL ELECTRIC ENERGY EFFICIENCY POTENTIAL

According to 2012 historical sales data[41], the commercial sector accounts for approximately 37% of retail electric sales in Michigan, but only 11% of the total retail customers. The average commercial electric customer in Michigan consumes roughly 74,000 kWh annually. Comparatively, the average residential consumer in Michigan uses approximately 8,200 kWh per year. Commercial kWh sales over the period 2002 to 2012 have increased by a total of 6.9%, peaking at 40,047 million kWh in 2007 and then declining to a 2012 level of 38,367 million kWh. For this study, commercial electric sales are estimated to remain relatively stable at their 2012 level over the 10 year study period of 2014 – 2023.[42]

7.1.1 Electric Energy Efficiency Measures Examined

For the commercial sector, there were 182 unique energy efficiency measures included in the electric energy savings potential analysis. Table 7-1 provides a brief description of the types of measures included for each end use in the commercial sector. The list of measures was developed based on a review of the Michigan Energy Measures Database (MEMD), measures found in other Technical Reference Manuals (TRMs) and measures included in other commercial energy efficiency potential studies. For each measure, the analysis considered incremental costs, energy and demand savings, and measure useful lives.

Table 7-1: Types of Electric Energy Efficiency Measures Included in the Commercial Sector Analysis

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
Appliances, Computers & Office Equipment	Office Equipment Improvements	• Appliances • High Efficiency Office Equipment • Smart Power Strips • Computer Energy Management Controls
Compressed Air	Compressor Equipment	• Efficient Air Compressors • Automatic Drains • Cycling and High Efficiency Dryers • Low Pressure Drop-Filters • Air-Entraining Air Nozzles • Receiver Capacity Addition • Compressed Air Audits, Leak Repair, and Flow Control • Barrel Wraps
Cooking	Cooking Equipment Improvements	• Efficient Cooking Equipment
Envelope	Space Heating and Space Cooling	• Building Envelope Improvements • Cool Roofing • Integrated Building Design
HVAC Controls	Space Cooling and Space Heating	• Programmable Thermostats • EMS Installation/Optimization • Hotel Guest Room Occupancy Control System • Retrocommissioning & Commissioning

[41] U.S. Energy Information Administration
[42] GDS forecast based on kWh sales forecasts provided by DTE Energy and Consumers Energy (CE) and historical commercial kWh sales trends for the state as a whole.

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
Lighting	Lighting Improvements	• Efficient Lighting Equipment • Fixture Retrofits • Ballast Replacement • Premium Efficiency T8 and T5 • High Bay Lighting Equipment • LED Bulbs and Fixtures • Light Tube • CFL Retrofits • Lighting Controls • Efficient Design for New Construction
Other	Transformer Equipment Other	• Efficient Transformers • Vending Miser for Non-Refrig Equip • Optimized Snow and Ice Melt Controls • EC Plug Fans in Data Centers • Engine Block Heater Timer • NEMA Premium Efficiency Motors
Pools	Pool Equipment	• Efficient Equipment and Controls • Heat Pump Pool Heaters • Solar Water Heating
Refrigeration	Refrigeration Improvements	• Vending Misers • Refrigerated Case Covers • Economizers • Efficient Refrigeration • Upgrades Motors and Controls • Door Heater Controls • Efficient Compressors and Controls • Door Gaskets and Door Retrofits • Refrigerant Charging Correction • Ice-Makers
Space Cooling	Cooling System Upgrades	• Efficient Chillers • Efficient Cooling Equipment • Ground/Water Source Heat Pump • Chiller Tune-up/Diagnostics • High Efficiency Pumps
Space Heating	Heating System Improvements	• Efficient Heating Equipment • Ground/Water Source Heat Pump • Efficient Heating Pumps, Motors, and Controls
Ventilation	Ventilation Equipment	• Enthalpy Economizer • Variable Speed Drive Controls • Improved Duct Sealing • Electronically-Commutated Permanent Magnet Motors • Destratification Fans • Controlled Ventilation Optimization • Demand Controlled Ventilation • High Performance Air Filters
Water Heating	Water Heating Improvements	• Efficient Equipment • High Efficiency HW Appliances • Ozone Laundry System • Low Flow Equipment • Pipe and Tank Insulation • Heat Recovery Systems • Efficient HW Pump and Controls • Solar Water Heating System

7.1.2 Technical and Economic Potential Electric Savings

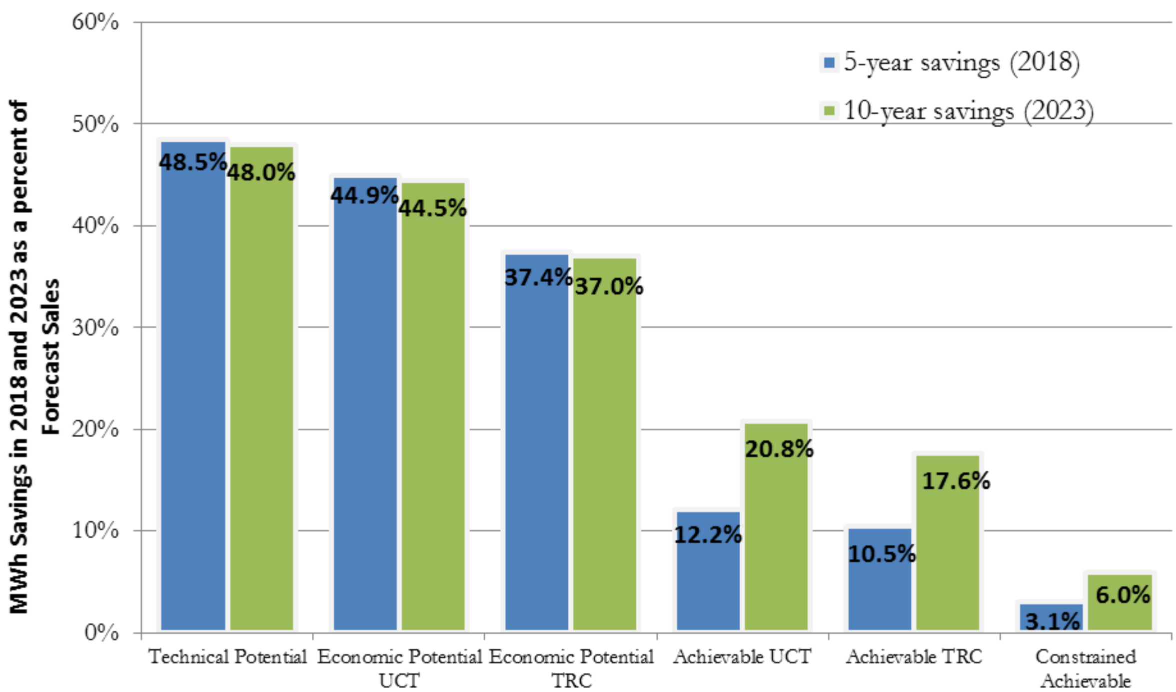
This section presents estimates for electric technical, economic, and achievable savings potential for the commercial sector. Each of the tables in the technical, economic and achievable sections present the respective potential for efficiency savings expressed as cumulative annual savings (MWh) and percentage of commercial sector forecast annual MWh sales. Data is provided for a 5 and 10-year horizon for Michigan

This energy efficiency potential study considers the impacts of the December 2007 Energy and Independence and Security Act (EISA) as an improving code standard for the commercial sector. EISA improves the baseline efficiency of compact fluorescent lamps (CFL), general service fluorescent lamps (GSFL), high intensity discharge (HID) lamps and ballasts and motors, all applicable in the commercial sector.

SUMMARY OF FINDINGS

Figure 7-1 illustrates the estimated energy efficiency savings potential in Michigan for each of the scenarios included in this study.

Figure 7-1: Summary of Commercial Electric Energy Efficiency Potential as a % of Sales Forecasts



The potential savings estimates are expressed as cumulative annual 5-year and 10-year savings, as percentages of the respective 2018 and 2023 commercial sector sales forecasts. The technical potential is 48.5% in 2018 and 48.0% in 2023. The 5-year and 10-year economic potential is 44.9% and 44.5% based on the Utility Cost Test (UCT) screen, assuming an incentive level equal to 50% of the measure cost. Based on a measure-level screen using the TRC Test, the economic potential is 37.4% in 2018 and 37.0% in 2023. The slight drop from technical potential to economic potential indicates that most measures are cost-effective.

The 5-year and 10-year achievable potential savings are: 12.2% and 20.8% for the Achievable UCT scenario; 10.5% and 17.6% for the Achievable TRC scenario; and 3.1% and 6.0% for the Constrained Achievable scenario. The Achievable UCT scenario assumes 50% incentives and includes measures that passed the UCT Test. The Achievable TRC scenario also assumes 50% incentives but includes only measures that passed the cost-effectiveness screen based on the TRC Test. Last, the Constrained Achievable scenario is a subset of the Achievable UCT scenario, assuming a spending cap on non-residential DSM approximately equal to 2% of future annual commercial and industrial revenue. The percent of the non-residential spending cap allocated to the commercial sector is based on the percentage of total non-residential UCT savings that the commercial sector represents. This presumes that the total non-residential spending cap will be allocated at the sector level based on where the savings opportunities are found.

TECHNICAL POTENTIAL

Technical potential represents the quantification of savings that can be realized if energy-efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost. Table 7-2 shows that it is technically feasible to save approximately 18.5 million MWh annually in the commercial sector by 2018, and approximately 18.6 million MWh annually by 2023 across Michigan, representing 48.5% of the commercial sales forecast in 2018, and 48.0% of the commercial sales forecast in 2023. Lighting represents the majority of the energy efficiency savings potential at over 40% of 10-yr savings, followed by Refrigeration and Ventilation at over 10% each, while cooking, pools, and space heating represent the smallest shares, each with 1 percent or less of 10-yr savings. Table 7-3 shows the demand savings potential in 2018 and 2023. The five and ten year summer peak demand savings technical potential is 5,715 MW and 5,741 MW, respectively, which is 53.8% and 53.2% of the peak forecasts for 2018 and 2023 respectively.

Table 7-2: Commercial Sector Technical Potential Electric Energy Savings by End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Appliances, Computers, Office Equipment	928,899	5%	933,013	5%
Compressed Air	621,671	3%	621,671	3%
Cooking	128,779	1%	129,374	1%
Envelope	500,791	3%	512,810	3%
HVAC Controls	464,362	3%	465,570	3%
Lighting	7,967,141	43%	7,995,560	43%
Other	646,701	3%	649,564	3%
Pools	25,847	0%	25,946	0%
Refrigeration	3,466,859	19%	3,478,837	19%
Space Cooling	425,425	2%	426,706	2%
Space Heating	256,066	1%	256,850	1%
Ventilation	2,741,339	15%	2,752,763	15%
Water Heating	351,337	2%	352,481	2%
Total	**18,525,217**	**100%**	**18,601,147**	**100%**
% of Annual Sales Forecast	*48.5%*		*48.0%*	

Table 7-3: Commercial Sector Technical Potential Electric Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**5,715**	**5,741**
% of Forecast Peak	*53.8%*	*53.2%*

ECONOMIC POTENTIAL

Economic potential is a subset of technical potential and only includes measures that are cost-effective. This analysis includes two estimates of economic potential. One cost-effectiveness screen is based on the UCT and a second economic potential scenario was screened using the TRC Test. In both scenarios, the utility incentive was assumed to be equal to 50% of the measure incremental cost. The UCT was used for this study because it is mandated in Michigan to be the primary cost-effectiveness test used when considering energy efficiency programs. The TRC Test was also included because it also considers the cost assumed by the participant as well as all utility costs. Eighty seven percent of all measures that were included in the electric potential analysis passed the UCT and 76% of all measures passed the TRC Test.

Table 7-4 indicates that the economic potential based on the UCT screen is approximately 17.2 million MWh annually by 2018, and the economic potential increases to 17.3 million MWh annually by 2023. This represents 44.9% and 44.5% of commercial sales in 2018 and 2023. Lighting, refrigeration, and ventilation make up a majority of the savings. Table 7-5 shows the peak demand savings economic potential in 2018 and 2023. The five and ten year summer peak demand savings economic potential is 5,300 MW and 5,325 MW, respectively, which is 49.9% and 49.3% of the peak forecasts in 2018 and 2013 respectively.

Table 7-4: Commercial Sector Economic Potential (UCT) Electric Energy Savings by End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Appliances, Computers, Office Equipment	712,442	4%	715,598	4%
Compressed Air	620,398	4%	620,398	4%
Cooking	122,452	1%	123,019	1%
Envelope	221,331	1%	226,643	1%
HVAC Controls	464,362	3%	465,570	3%
Lighting	7,706,402	45%	7,733,891	45%
Other	646,701	4%	649,564	4%
Pools	25,847	0%	25,946	0%
Refrigeration	3,418,820	20%	3,430,632	20%
Space Cooling	277,063	2%	277,898	2%
Space Heating	175,846	1%	176,384	1%
Ventilation	2,453,815	14%	2,464,040	14%
Water Heating	341,168	2%	342,278	2%
Total	**17,186,647**	**100%**	**17,251,862**	**100%**
% of Annual Sales Forecast	*44.9%*		*44.5%*	

Table 7-5: Commercial Sector Economic Potential (UCT) Electric Demand Savings

	Summer Peak Demand	
	2018	2023
Summary	MW	MW
Total	5,300	5,325
% of Peak	*49.9%*	*49.3%*

Table 7-6 shows that the economic potential based on the TRC screen is nearly 14.3 million MWh annually by 2018, and the economic potential increases less than 100,000 MWh by 2023. This represents 37.4% of the commercial MWh sales forecast for 2018 and 37.0% for 2023. As with UCT economic potential, lighting, refrigeration, and ventilation again make up a majority of the economic TRC savings potential. Table 7-7 shows the economic demand savings potential in 2018 and 2023. The five and ten year summer peak demand savings potential is 4,496 MW and 4,519 MW, respectively, which is 42.3% and 41.9% of the peak forecasts for the commercial sector for those years.

Table 7-6: Commercial Sector Economic Potential (TRC) Electric Savings by End Use

End Use	2018 Energy Savings (MWh)	% of 2018 Total	2023 Energy Savings (MWh)	% of 2023 Total
Appliances, Computers, Office Equipment	693,228	5%	696,295	5%
Compressed Air	620,398	4%	620,398	4%
Cooking	108,343	1%	108,844	1%
Envelope	108,078	1%	113,390	1%
HVAC Controls	464,362	3%	465,570	3%
Lighting	5,389,648	38%	5,414,894	38%
Other	619,740	4%	622,524	4%
Pools	25,847	0%	25,946	0%
Refrigeration	3,376,105	24%	3,387,734	24%
Space Cooling	276,636	2%	277,469	2%
Space Heating	54,889	0%	55,480	0%
Ventilation	2,208,697	15%	2,217,793	15%
Water Heating	336,890	2%	337,989	2%
Total	14,282,862	100%	14,344,326	100%
% of Annual Sales Forecast	*37.4%*		*37.0%*	

Table 7-7: Commercial Sector Economic Potential Electric Demand Savings

	Summer Peak Demand	
	2018	2023
Summary	MW	MW
Total	4,496	4,519
% of Peak	*42.3%*	*41.9%*

7.1.3 Achievable Potential Savings in the Commercial Sector

Achievable potential is an estimate of energy savings that can feasibly be achieved given market barriers and equipment replacement cycles. This study estimated achievable potential for three scenarios. The Achievable UCT Scenario determines the achievable potential of all measures that passed the UCT economic screening assuming incentives equal to 50% of the measure cost. Unlike the economic potential, the commercial achievable potential takes into account the estimated market adoption of energy efficiency measures based on the incentive level and the natural replacement cycle of equipment. The second scenario, Achievable TRC, also assumes incentives set at 50% of the measure incremental cost, but only includes measures that passed the TRC Test economic screening. The third scenario, Constrained UCT, assumes a spending cap equal to 2% of annual utility revenues, thereby limiting utilities from reaching the ultimate potential estimated in the Achievable UCT scenario.

7.1.3.1 UCT vs. TRC

Tables 7-8 through 7-11 show the estimated cumulative annual savings for the Achievable UCT and Achievable TRC scenarios over 5 and 10 year time horizons. As noted above, both scenarios assume an incentive level approximately equal to 50% of the incremental measure cost and include estimated 10-year market adoption rates based on incentive levels and equipment replacement cycles. However, because more measures pass the UCT relative to the TRC Test, the Achievable UCT scenario is able to include additional measures that would result in greater savings potential over the next five and ten years. Overall the Achievable UCT scenario results in an achievable potential that is approximately 1 million MWh greater over the next decade, than the achievable TRC scenario.

Table 7-8: Commercial Achievable UCT Potential Electric Energy Savings by End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Appliances, Computers, Office Equipment	185,083	4%	355,308	4%
Compressed Air	221,662	5%	329,391	4%
Cooking	32,946	1%	65,892	1%
Envelope	13,634	0%	20,618	0%
HVAC Controls	194,726	4%	278,618	3%
Lighting	1,850,030	40%	3,511,776	44%
Other	101,445	2%	185,126	2%
Pools	9,231	0%	15,656	0%
Refrigeration	1,242,660	27%	1,958,394	24%
Space Cooling	73,050	2%	112,157	1%
Space Heating	61,225	1%	89,739	1%
Ventilation	554,381	12%	963,128	12%
Water Heating	111,923	2%	171,896	2%
Total	**4,651,994**	**100%**	**8,057,699**	**100%**
% of Annual Sales Forecast	***12.2%***		***20.8%***	

Table 7-9: Commercial Achievable UCT Potential Electric Demand Savings

	Summer Peak Demand	
	2018	**2023**
Summary	**MW**	**MW**
Total	**1,292**	**2,433**
% of Peak	*12.2%*	*22.6%*

Table 7-10: Commercial Achievable TRC Potential Electric Energy Savings by End Use

End Use	2018 Energy Savings (MWh)	% of 2018 Total	2023 Energy Savings (MWh)	% of 2023 Total
Appliances, Computers, Office Equipment	183,669	5%	352,481	5%
Compressed Air	221,662	6%	329,391	5%
Cooking	29,293	1%	58,586	1%
Envelope	10,967	0%	16,213	0%
HVAC Controls	194,726	5%	278,618	4%
Lighting	1,328,909	33%	2,503,571	37%
Other	89,843	2%	168,312	2%
Pools	9,231	0%	15,656	0%
Refrigeration	1,229,658	31%	1,934,311	28%
Space Cooling	72,972	2%	112,002	2%
Space Heating	12,378	0%	19,957	0%
Ventilation	511,177	13%	876,720	13%
Water Heating	110,063	3%	169,284	2%
Total	**4,004,548**	**100%**	**6,835,102**	**100%**
% of Annual Sales Forecast	*10.5%*		*17.6%*	

Table 7-11: Commercial Achievable TRC Potential Electric Demand Savings

	Summer Peak Demand	
	2018	**2023**
Summary	**MW**	**MW**
Total	**1,127**	**2,128**
% of Peak	*10.6%*	*19.7%*

7.1.3.2 Achievable UCT vs. Constrained UCT

Although the Achievable UCT assumes incentives are set and capped at 50% of the incremental measure cost, and that measures are typically replaced at the end of their useful life, the Achievable UCT scenario also assumes no DSM spending cap to reach all potential participants. In the Constrained UCT scenario, the analysis assumes a utility spending cap approximately equal to 2% of Michigan annual utility revenues. The percent of the non-residential spending cap allocated to the commercial sector is based on the percentage of total non-residential UCT savings that the commercial sector represents. This presumes that the total non-residential spending cap will be allocated at the sector level based on where the savings opportunities are found. To model the impact of a spending cap the market penetration of all cost effective measures was reduced by the ratio of capped spending to uncapped spending that would be required to achieve the Achievable UCT scenario savings potential.

Tables 7-12 and 7-13 show the estimated savings for the Constrained UCT scenario over 5 and 10 year time horizons. The 5-year and 10-year Constrained UCT potential cumulative annual savings estimates are nearly 1.2 million MWh and just over 2.3 million MWh respectively. This equates to 3.1% and 6.0% of sector sales in 2018 and 2023. The five and ten year demand savings estimates in the Constrained UCT scenario are presented in Table 7-13.

Table 7-12: Commercial Constrained Achievable Electric Energy Efficiency Savings by End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Appliances, Computers, Office Equipment	25,948	2%	53,848	2%
Compressed Air	48,550	4%	77,566	3%
Cooking	141,079	12%	272,520	12%
Envelope	15,300	1%	24,241	1%
HVAC Controls	313,066	26%	567,974	24%
Lighting	47,828	4%	114,952	5%
Other	3,418	0%	5,612	0%
Pools	28,098	2%	47,084	2%
Refrigeration	8,522	1%	18,977	1%
Space Cooling	477,777	40%	1,009,373	43%
Space Heating	2,342	0%	4,371	0%
Ventilation	58,556	5%	98,082	4%
Water Heating	18,338	2%	31,455	1%
Total	**1,188,821**	**100%**	**2,326,054**	**100%**
% of Annual Sales Forecast	***3.1%***		***6.0%***	

Table 7-13: Commercial Constrained Achievable Electric Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**334**	**737**
% of Peak	***3.1%***	***6.8%***

Figure 7-2 shows the estimated 10-year cumulative annual energy efficiency savings potential broken out by end use across the entire commercial sector for the Constrained UCT scenario. The space cooling end use shows the largest potential for energy efficiency savings by a wide margin at nearly 1,010,000 MWh annually, or 43% of total savings, in the Constrained UCT scenario, with HVAC Controls and Cooking end uses accounting for 24% and 12% respectively.

Figure 7-2: Commercial Sector 2023 Constrained UCT Potential Savings by End Use

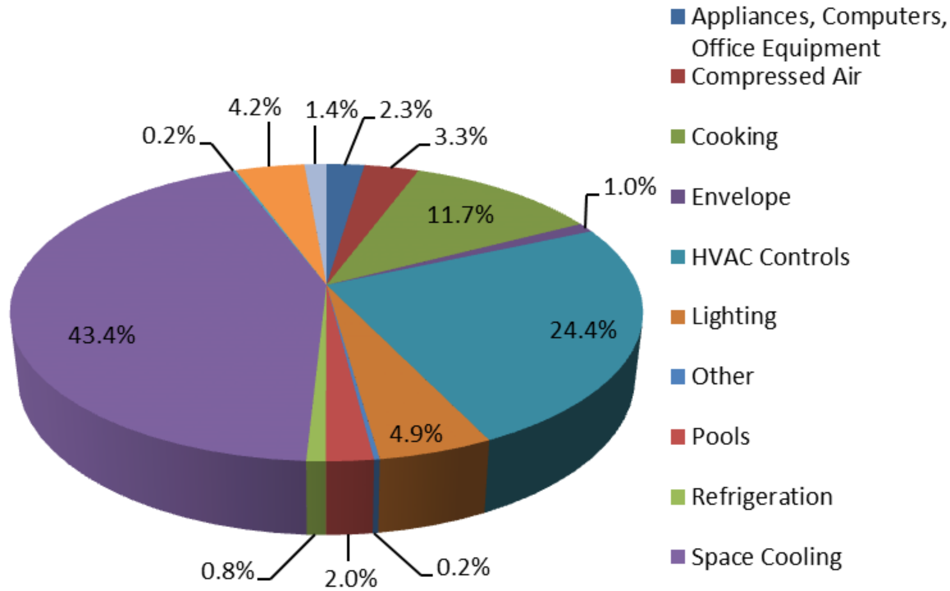
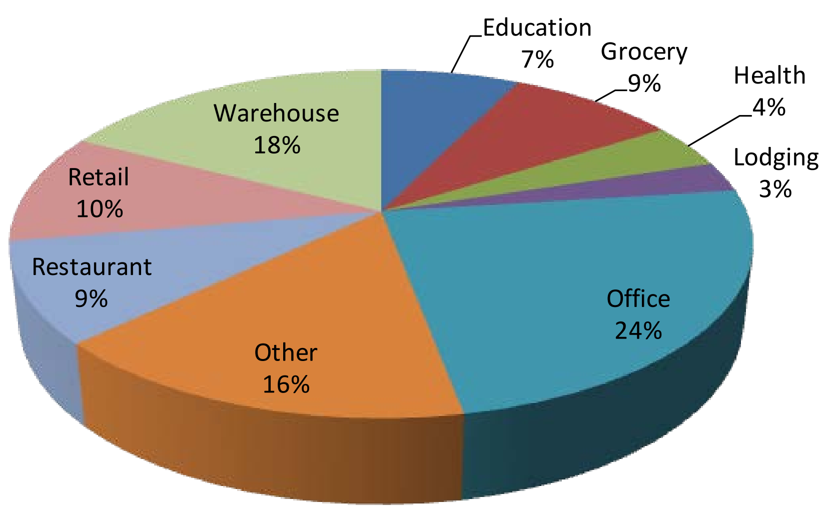


Figure 7-3 shows the breakdown of estimated savings in 2023 by building type for the Constrained UCT scenario. The vast majority of savings come from existing/turnover measures, meaning energy efficient equipment is installed to replace existing equipment that has failed, with less than 1% of savings potential coming from new construction. Approximately 24% of the potential savings are found in Offices, followed by 18% in Warehouses and 16% in Other building types.

Figure 7-3: Commercial Constrained UCT Savings in 2023 by Building Type



7.1.4 Cumulative Annual Achievable Electric Savings Potential

Tables 7-14, Table 7-15 and Table 7-16 show cumulative annual electric energy savings for all achievable scenarios for each year across the 10-year horizon for the study, broken out by end use. Table 7-17, Table 7-18 and Table 7-19 shows cumulative annual demand (MW) savings for all three achievable potential scenarios for each year across the 10-year time horizon for the study, broken out by end use.

Table 7-14: Cumulative Annual Commercial Sector Electric Energy Savings in the Achievable UCT Potential Scenario by End Use (MWH)

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances, Computers, Office Equipment	33,674	71,062	110,307	149,552	185,083	220,613	254,287	287,961	321,634	355,308
Compressed Air	18,698	65,878	127,300	188,723	221,662	254,601	273,298	291,996	310,694	329,391
Cooking	6,589	13,178	19,768	26,357	32,946	39,535	46,124	52,714	59,303	65,892
Envelope	1,230	4,124	7,848	11,573	13,634	15,696	16,927	18,157	19,388	20,618
HVAC Controls	14,007	55,724	111,294	166,865	194,726	222,588	236,596	250,603	264,611	278,618
Lighting	365,551	757,358	1,130,550	1,503,418	1,850,030	2,196,642	2,530,126	2,857,343	3,184,560	3,511,776
Other	16,292	37,025	59,979	82,932	101,445	119,957	136,249	152,541	168,834	185,126
Pools	1,215	3,131	5,398	7,665	9,231	10,797	12,011	13,226	14,441	15,656
Refrigeration	129,974	391,679	719,250	1,046,820	1,242,660	1,438,499	1,568,473	1,698,447	1,828,420	1,958,394
Space Cooling	6,973	22,431	42,133	61,834	73,050	84,265	91,238	98,211	105,184	112,157
Space Heating	4,885	17,948	35,099	52,251	61,225	70,199	75,084	79,969	84,854	89,739
Ventilation	78,109	192,626	325,347	458,068	554,381	650,694	728,802	806,911	885,019	963,128
Water Heating	10,696	34,379	64,556	94,733	111,923	129,112	139,808	150,504	161,200	171,896
Total	**687,893**	**1,666,542**	**2,758,829**	**3,850,790**	**4,651,994**	**5,453,199**	**6,109,024**	**6,758,582**	**7,408,141**	**8,057,699**
% of Annual Sales Forecast	*1.8%*	*4.4%*	*7.3%*	*10.1%*	*12.2%*	*14.2%*	*15.9%*	*17.5%*	*19.2%*	*20.8%*

Table 7-15: Cumulative Annual Commercial Sector Electric Energy Savings in the Achievable TRC Potential Scenario by End Use (MWH)

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances, Computers, Office Equipment	33,391	70,496	109,458	148,421	183,669	218,917	252,308	285,699	319,090	352,481
Compressed Air	18,698	65,878	127,300	188,723	221,662	254,601	273,298	291,996	310,694	329,391
Cooking	5,859	11,717	17,576	23,435	29,293	35,152	41,011	46,869	52,728	58,586
Envelope	906	3,243	6,294	9,346	10,967	12,588	13,495	14,401	15,307	16,213
HVAC Controls	14,007	55,724	111,294	166,865	194,726	222,588	236,596	250,603	264,611	278,618
Lighting	251,108	528,472	804,297	1,079,731	1,328,909	1,578,087	1,814,138	2,043,949	2,273,760	2,503,571
Other	15,409	33,662	53,337	73,012	89,843	106,675	122,084	137,493	152,903	168,312
Pools	1,215	3,131	5,398	7,665	9,231	10,797	12,011	13,226	14,441	15,656
Refrigeration	127,805	386,862	711,545	1,036,227	1,229,658	1,423,089	1,550,895	1,678,700	1,806,506	1,934,311
Space Cooling	6,957	22,400	42,086	61,772	72,972	84,172	91,130	98,087	105,045	112,002
Space Heating	1,396	3,991	7,187	10,382	12,378	14,373	15,769	17,165	18,561	19,957
Ventilation	69,468	175,344	299,424	423,505	511,177	598,849	668,316	737,784	807,252	876,720
Water Heating	10,573	33,857	63,496	93,135	110,063	126,991	137,564	148,137	158,711	169,284
Total	**556,793**	**1,394,779**	**2,358,693**	**3,322,217**	**4,004,548**	**4,686,880**	**5,228,615**	**5,764,110**	**6,299,606**	**6,835,102**
% of Annual Sales Forecast	*1.5%*	*3.7%*	*6.2%*	*8.7%*	*10.5%*	*12.2%*	*13.6%*	*14.9%*	*16.3%*	*17.6%*

Table 7-16: Cumulative Annual Commercial Sector Electric Energy Savings in Constrained UCT Potential Scenario by End Use (MWH)

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances, Computers, Office Equipment	9,670	18,462	27,764	37,212	47,828	60,243	74,541	88,791	101,390	114,952
Compressed Air	5,370	16,203	30,799	45,736	58,556	68,009	77,522	84,729	91,117	98,082
Cooking	1,892	3,442	5,004	6,590	8,522	10,439	12,574	14,718	16,825	18,977
Envelope	353	1,034	1,917	2,813	3,418	4,018	4,416	4,817	5,210	5,612
HVAC Controls	4,023	13,832	27,004	40,382	48,550	56,659	61,197	65,909	71,427	77,566
Lighting	104,979	197,115	284,957	374,791	477,777	579,870	689,041	796,729	901,243	1,009,373
Other	4,679	9,554	14,995	20,521	25,948	31,346	37,014	42,774	48,401	53,848
Pools	349	800	1,337	1,883	2,342	2,797	3,191	3,586	3,975	4,371
Refrigeration	37,326	98,867	176,504	255,365	313,066	374,510	425,146	475,781	520,452	567,974
Space Cooling	2,002	5,638	10,307	15,050	18,338	21,602	23,862	26,130	28,442	31,455
Space Heating	1,403	4,475	8,540	12,669	15,300	17,912	19,494	21,084	22,646	24,241
Ventilation	22,431	49,361	80,819	112,477	141,079	169,450	195,809	221,625	246,969	272,520
Water Heating	3,072	8,641	15,794	23,058	28,098	33,101	36,597	40,118	43,579	47,084
Total	**197,549**	**427,423**	**685,739**	**948,548**	**1,188,821**	**1,429,958**	**1,660,405**	**1,886,791**	**2,101,676**	**2,326,054**
% of Annual Sales Forecast	*0.5%*	*1.1%*	*1.8%*	*2.5%*	*3.1%*	*3.7%*	*4.3%*	*4.9%*	*5.4%*	*6.0%*

Table 7-17: Cumulative Annual Commercial Sector Electric Demand Savings in the Achievable UCT Potential Scenario by End Use (MW)

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances, Computers, Office Equipment	99	199	298	398	497	597	696	796	895	994
Compressed Air	4	14	27	41	48	55	58	62	66	69
Cooking	2	5	7	9	11	14	16	18	21	23
Envelope	1	2	3	5	6	7	7	8	8	9
HVAC Controls	0	1	1	1	2	2	2	2	2	3
Lighting	74	156	233	310	380	450	516	581	645	710
Other	7	14	21	28	34	41	48	55	62	69
Pools	1	2	3	4	5	6	6	7	8	9
Refrigeration	13	39	71	102	122	141	155	168	182	195
Space Cooling	2	4	6	8	10	11	13	15	17	19
Space Heating	2	8	15	22	25	29	31	33	36	38
Ventilation	27	55	82	109	136	164	191	218	245	273
Water Heating	2	5	9	13	15	18	19	21	23	24
Total	**234**	**501**	**775**	**1,050**	**1,292**	**1,534**	**1,760**	**1,984**	**2,209**	**2,433**
% of Annual Demand Forecast	*2.2%*	*4.7%*	*7.3%*	*9.9%*	*12.2%*	*14.4%*	*16.5%*	*18.5%*	*20.6%*	*22.6%*

Table 7-18: Cumulative Annual Commercial Sector Electric Demand Savings in the Achievable TRC Potential Scenario by End Use (MW)

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances, Computers, Office Equipment	99	199	298	398	497	597	696	795	895	994
Compressed Air	4	14	27	41	48	55	58	62	66	69
Cooking	2	4	6	8	11	13	15	17	19	21
Envelope	0	1	3	4	5	5	6	6	6	7
HVAC Controls	0	1	1	1	2	2	2	2	2	3
Lighting	52	111	171	230	282	334	382	429	476	523
Other	7	14	21	28	34	41	48	55	62	69
Pools	1	2	3	4	5	6	6	7	8	9
Refrigeration	13	38	70	101	120	140	153	166	179	192
Space Cooling	2	4	6	8	10	11	13	15	17	18
Space Heating	1	1	2	2	3	3	4	4	5	5
Ventilation	19	39	58	78	97	117	136	155	175	194
Water Heating	2	5	9	13	15	17	19	20	22	24
Total	**202**	**432**	**674**	**915**	**1,127**	**1,340**	**1,538**	**1,735**	**1,931**	**2,128**
% of Annual Demand Forecast	*1.9%*	*4.1%*	*6.4%*	*8.6%*	*10.6%*	*12.6%*	*14.4%*	*16.2%*	*18.0%*	*19.7%*

Table 7-19: Cumulative Annual Commercial Sector Electric Demand Savings in Constrained UCT Potential Scenario by End Use (MW)

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Appliances, Computers, Office Equipment	29	52	76	100	129	164	205	245	282	322
Compressed Air	1	3	7	10	12	14	16	18	19	20
Cooking	1	1	2	2	3	4	4	5	6	7
Envelope	0	0	1	1	1	2	2	2	2	2
HVAC Controls	0	0	0	0	0	1	1	1	1	1
Lighting	21	41	59	77	98	119	141	163	183	205
Other	2	4	5	7	9	11	13	16	18	21
Pools	0	0	1	1	1	1	2	2	2	2
Refrigeration	4	10	17	25	31	37	42	47	52	57
Space Cooling	1	1	1	2	2	3	4	4	5	5
Space Heating	1	2	4	5	6	7	8	9	10	10
Ventilation	8	14	21	27	35	43	52	61	70	79
Water Heating	0	1	2	3	4	5	5	6	6	7
Total	**67**	**130**	**195**	**261**	**334**	**411**	**495**	**578**	**656**	**737**
% of Annual Demand Forecast	*0.6%*	*1.2%*	*1.8%*	*2.5%*	*3.1%*	*3.8%*	*4.6%*	*5.4%*	*6.1%*	*6.8%*

7.1.5 Commercial Electric Savings Summary by Measure Group

Table 7-20 below provides an end-use breakdown of the commercial electric savings potential estimates for technical and economic potential, and each of the three achievable potential scenarios. The table indicates how the savings potential decreases systematically from the technical potential scenario to the Constrained UCT potential scenario as additional limiting factors such as cost-effectiveness requirements and anticipated market adoption at given funding levels are introduced.

Table 7-20: Commercial Sector Cumulative Annual Electric Savings Potential by End-Use and Measure by 2023

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC UCT (MWH)	ECONOMIC TRC (MWH)	ACHIEVABLE UCT (MWH)	ACHIEVABLE TRC (MWH)	CONSTRAINED ACHIEVABLE (MWH)
Appliances, Computers, Office Equipment						
Office Equipment / Appliances	640,360	640,360	621,057	318,165	315,337	102,909
PC Network Energy Management Controls replacing no central control	75,238	75,238	75,238	37,143	37,143	12,044
"Smart" Power Strip/Monitor Power Management Software/UPS	217,415	0	0	0	0	0
Compressed Air						
Barrel Wraps Inj Mold and Extruders	93,709	93,709	93,709	44,716	44,716	14,252
Compressed Air Audits & Leak Repair	155,844	155,844	155,844	100,609	100,609	32,850
Dryers/Receiver Capacity/Outdoor Air Intake	32,774	31,501	31,501	14,387	14,387	4,066
Efficient Air Compressors	81,772	81,772	81,772	26,103	26,103	7,518
Nozzles / Automatic Drains/Drop Filters/Flow Control	256,562	256,562	256,562	143,119	143,119	39,274
Variable Displacement Air Compressor	1,011	1,011	1,011	457	457	123
Cooking						
HE Fryer	6,356	0	0	0	0	0
HE Griddle	11,074	11,074	0	5,620	0	1,619
HE Holding Cabinet	37,962	37,962	37,962	19,850	19,850	5,717
HE Oven	12,717	12,717	9,617	6,914	5,228	1,991
HE Steamer	57,242	57,242	57,242	31,122	31,122	8,963
Induction Cooktops	4,024	4,024	4,024	2,386	2,386	687
Envelope						
Integrated Building Design	10,624	10,624	10,624	1,911	1,911	550
Windows, Insulation, Cool Roofing	502,187	216,019	102,766	18,708	14,302	5,062
HVAC Controls						
EMS Installation / Optimization	239,210	239,210	239,210	147,259	147,259	39,523
Hotel Guest Room Occupancy Control System	2,546	2,546	2,546	1,531	1,531	460

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC UCT (MWH)	ECONOMIC TRC (MWH)	ACHIEVABLE UCT (MWH)	ACHIEVABLE TRC (MWH)	CONSTRAINED ACHIEVABLE (MWH)
Programmable Thermostats	92,486	92,486	92,486	48,493	48,493	13,110
Retrocommissioning / Commissioning	131,328	131,328	131,328	81,335	81,335	24,473
Lighting						
CFL Lighting Efficiency	400,586	400,586	400,549	216,558	216,558	65,913
Fluorescent Tube Lighting Efficiency	2,541,825	2,541,825	970,283	802,591	222,908	229,439
LED Lighting Efficiency	809,494	567,337	550,531	255,499	244,584	74,053
Lighting Controls and Design	3,999,642	3,980,129	3,492,753	2,125,176	1,819,521	607,726
Other Lighting Efficiency	244,014	244,014	778	111,953	0	32,242
Other						
Commercial Clothes washers - Non-Water Heating Savings	2,227	2,227	0	842	0	260
EC Plug Fans	16,065	16,065	16,065	6,914	6,914	1,991
Engine Block Heater Timer	30,710	30,710	30,710	19,825	19,825	6,291
NEMA Premium Transformer	531,700	531,700	531,700	113,135	113,135	32,582
Optimized Snow and Ice Melt Controls	44,049	44,049	44,049	28,437	28,437	7,632
Vendor Miser for Non-Refrig Equipment	24,813	24,813	0	15,971	0	5,090
Pools						
Energy Efficient Pool Pump with controls	14,857	14,857	14,857	8,513	8,513	2,452
Heat Pump Pool Heater	6,978	6,978	6,978	4,505	4,505	1,209
High efficiency spas/hot tubs	222	222	222	127	127	37
Solar Pool Heating	3,889	3,889	3,889	2,511	2,511	674
Refrigeration						
Commercial Ice-makers	26,532	0	0	0	0	0
Commercial Refrigerators/Freezers	93,160	93,160	58,023	51,181	31,879	14,740
Door Heater Controls	358,316	358,316	358,316	201,090	201,090	53,970
Efficient compressors/condensers	41,764	39,296	39,296	15,810	15,810	4,553
Fan motors & controls	1,073,482	1,068,494	1,060,703	588,324	583,523	162,134

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC UCT (MWH)	ECONOMIC TRC (MWH)	ACHIEVABLE UCT (MWH)	ACHIEVABLE TRC (MWH)	CONSTRAINED ACHIEVABLE (MWH)
Floating Head Pressure Control	79,686	79,686	79,686	52,245	52,245	14,022
Refrigerated Case Covers	22,698	22,698	22,698	14,993	14,993	4,861
Refrigeration Economizer, Refrigerant charging correction	15,932	1,715	1,745	1,133	1,152	366
Refrigeration Savings due to Lighting Savings	14,624	14,624	14,624	8,050	8,050	2,318
Refrigerator/Freezer Door Modifications	1,537,397	1,537,397	1,537,397	883,813	883,813	272,963
Vending Miser for Soft Drink Vending Machines	215,245	215,245	215,245	141,757	141,757	38,046
Space Cooling						
Air-Cooled and Water-Cooled Chillers	72,219	72,219	72,219	15,502	15,502	4,465
Chilled Hot Water Reset	122,109	122,109	122,109	75,171	75,171	20,993
Ductless/GSHP/PTAC/WLHP	154,077	5,269	4,840	1,902	1,747	548
High Efficiency AC - Unitary & Split Systems	27,415	27,415	27,415	9,897	9,897	2,850
High Efficiency Pumps	50,886	50,886	50,886	9,685	9,685	2,599
Space Heating						
Ductless/ASHP / GSHP/PTAC/WLHP Systems	226,055	145,590	24,686	77,347	7,565	20,907
ECM motors on furnaces	8,496	8,496	8,496	1,617	1,617	434
High Efficiency Pumps / VFD's on Pumps	22,298	22,298	22,298	10,775	10,775	2,900
Ventilation						
Controlled Ventilation Optimization, Enthalpy Economizer, Improved Duct Sealing	1,395,267	1,134,696	888,449	466,907	380,498	134,467
Destratification Fan	28,152	0	0	0	0	0
Electronically-Commutated Permanent Magnet Motors (ECPMs)	170,724	170,724	170,724	68,995	68,995	19,870
High Performance Air Filters	554,183	554,183	554,183	63,142	63,142	20,467
Variable Speed Drive Control	604,438	604,438	604,438	364,084	364,084	97,716
Water Heating						
Booster Water Heater	6,783	0	0	0	0	0
Clothes Washer/Ozone Commercial Laundry	2,969	1,055	1,711	462	898	142
Dishwasher	3,509	3,509	3,509	1,289	1,289	371

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC UCT (MWH)	ECONOMIC TRC (MWH)	ACHIEVABLE UCT (MWH)	ACHIEVABLE TRC (MWH)	CONSTRAINED ACHIEVABLE (MWH)
Efficient Hot Water Pump	30,449	30,449	30,449	9,553	9,553	2,564
Heat Pump Water Heater	69,588	69,588	69,588	30,662	30,662	8,830
Drainwater / Heat Recovery	4,946	4,946	0	3,048	0	824
High Efficiency Electric Water Heater	18,579	18,579	18,579	9,428	9,428	2,715
Insulation	128,833	128,833	128,833	84,797	84,797	22,758
Low Flow Measures	77,391	77,391	77,391	28,186	28,186	7,679
Hot Water Circulation Pump Time-Clock	443	443	443	205	205	55
Point of Use Water Heating	1,506	0	0	0	0	0
Solar Water Heating System	7,486	7,486	7,486	4,267	4,267	1,145
Total	**18,601,147**	**17,251,862**	**14,344,326**	**8,057,699**	**6,835,102**	**2,326,054**
% of Annual Sales Forecast	**47.95%**	**44.48%**	**36.98%**	**20.77%**	**17.62%**	**6.00%**
Note: Measures in the above Table with "0" achievable potential are ones that did not pass the SCT Test.						

Table 7-21 provides a list of the Top 10 commercial electric savings measures for the Achievable UCT scenario. The table provides the measures ranked according to the electric savings potential. The column to the far right shows the results of the measure level cost-effectiveness screening test using the UCT to screen the measures. The measures in the table are representative of a group of comparable measures falling under the umbrella of the measure categories provided in the table. This means that there are a range of UCT ratios for measure iterations that fall into a single measure category. For example, "Specialty LED Bulbs" is a measure category which consists of several measure iterations to account for bulb type and wattage and housing type. The table presents an average of the UCT ratios for all measures which are part of the measure categories in the Top 10.

The Top 10 commercial sector energy efficiency measures combine to yield an estimated 6.2 million MWh savings. This accounts for 77% of the total commercial electric savings in the Achievable UCT scenario.

Table 7-21: Top 10 Commercial Sector Electric Savings Measures in the Achievable UCT Scenario by 2023

MEASURE	2023 ENERGY (MWH)	% OF SECTOR SAVINGS	UCT RATIO
Lighting Controls and Design	2,125,176	26.4%	9.2
Refrigerator/Freezer Door Modifications	883,813	11.0%	4.0
Fluorescent Tube Lighting Efficiency	802,591	10.0%	2.3
Fan motors & controls	588,324	7.3%	6.9
Controlled Ventilation Optimization, Enthalpy Economizer, Improved Duct Sealing	466,907	5.8%	1.8
Variable Speed Drive Control	364,084	4.5%	2.6
Office Equipment / Appliances	318,165	3.9%	10.7
LED Lighting Efficiency	255,499	3.2%	5.4
CFL Lighting Efficiency	216,558	2.7%	16.6
Door Heater Controls	201,090	2.5%	4.8
Total	**6,222,205**	**77.2%**	**6.5**

7.2 COMMERCIAL SECTOR NATURAL GAS ENERGY EFFICIENCY POTENTIAL

The GDS Associates natural gas consumption forecasts for the residential, commercial and industrial segments of the Michigan economy indicates that annual natural gas use will decrease by about 10% from 669.2 trillion BTU in 2013 to 603.2 trillion BTU in 2023.[43] Over that same period commercial natural gas use is expected to remain relatively stable varying annually between a range of 168.4 trillion BTU and 172.0 trillion BTU.

7.2.1 Natural Gas Energy Efficiency Measures Examined

For the commercial sector, there were 86 unique natural gas energy efficiency measures included in the potential gas savings analysis. Table 7-22 provides a brief description of the types of natural gas energy efficiency measures included for each end use in the commercial sector. The list of measures was developed based on a review of the Michigan Energy Measures Database (MEMD), and measures found in other Technical Reference Manuals (TRMs) and measures listed in other commercial sector energy efficiency

[43] GDS applied a forecast trends to actual deliveries by customer classes as reported by the U.S. Energy Information Administration (EIA). The annual sales forecast trends are based the EAI's Long term Reference Case forecast of natural gas consumption for the East North Central Region (Illinois, Indiana, Michigan, Ohio, and Wisconsin) as reported in the EIA 2013 Annual Energy Outlook.

potential studies. For each measure, the analysis considered incremental costs, energy and demand savings, and useful measure life.

Table 7-22: Natural Gas Energy Efficiency Measures and Programs Included in the Commercial Sector Analysis

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
Building Envelope	Space Heating	• Building Envelope Improvements • Integrated Building Design
Cooking	Cooking Equipment Improvements	• Efficient Cooking Equipment
HVAC Controls	Space Heating	• EMS Installation/Optimization • Zoning • Commissioning & Retrocommissioning • Programmable Thermostats
Space Heating	Heating System Improvements	• Efficient Heating Equipment • Improved Duct Sealing • Pipe and Tank Insulation • Heating System Controls & Tune-up • Boiler Upgrades • Steam Trap Repair • Destratification Fans • Ventilation Controls • Heat Recovery • Thermostat Upgrades and Controls • Energy Recovery Ventilator
Space & Water Heating	Equipment Improvements	• High Efficiency Combined Space and Water Heating Equipment
Water Heating	Water Heating Improvements	• Efficient Water Heating Equipment • Heat Recovery Systems • Pipe Insulation & Pool Covers • Low Flow Equipment • Water Heater Controls & Tune-ups • Solar Water Heating System • Ozone Laundry System • Efficient Pool Heaters • Solar Pool Water Heater • Efficient HW Appliances

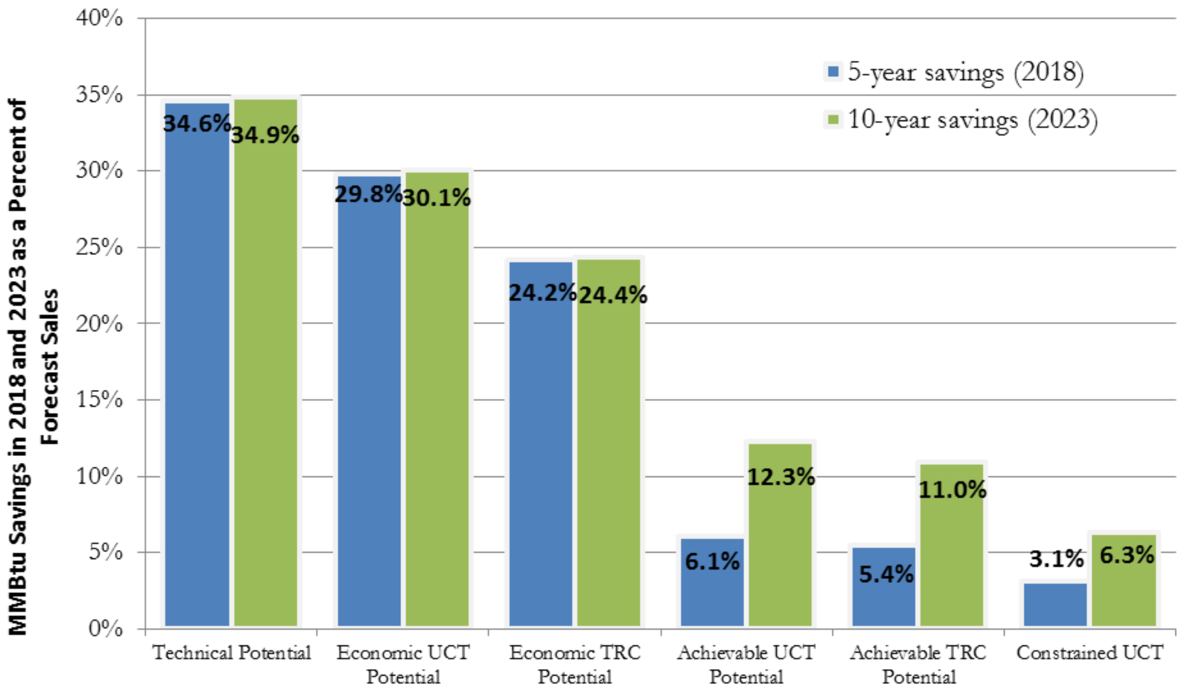
7.2.2 Technical and Economic Potential Natural Gas Savings

This section presents estimates for natural gas energy efficiency technical, economic, and achievable potential for the commercial sector (commercial and institutional combined). Each of the tables in the technical, economic and achievable sections present the respective potential for energy efficiency savings expressed as cumulative annual savings (MMBtu) and percentage of forecast annual natural gas sales for the commercial sector. Data is provided for a 5 and 10-year horizon for Michigan.

SUMMARY OF FINDINGS

Figure 7-4 illustrates the estimated energy efficiency savings potential for each of all the scenarios included in this study.

Figure 7-4: Summary of Commercial Natural Gas Energy Efficiency Potential as a % Sales Forecasts



The potential estimates are expressed as cumulative annual 5-year and 10-year savings, as percentages of the respective 2018 and 2023 commercial sector natural gas sales forecasts. The technical potential is 34.6% in 2018 and 34.9% in 2023. The 5-year and 10-year economic potential is 29.8% and 30.1% based on the Utility Cost Test (UCT) screen, assuming an incentive level equal to 50% of the measure cost. Based on a measure-level screen using the TRC Test, the economic potential is 24.2% in 2018 and 24.4% in 2023. The slight drop from technical potential to economic potential indicates that most measures are cost-effective.

The 5-year and 10-year achievable potential savings are: 6.1% and 12.3% for the Achievable UCT scenario; 5.4% and 11.0% for the Achievable TRC scenario; and 3.1% and 6.3% for the Constrained Achievable scenario. The Achievable UCT scenario assumes 50% incentives and includes measures that passed the UCT Test. The Achievable TRC scenario also assumes 50% incentives but includes only measures that passed the cost-effectiveness screen based on the TRC Test. Last, the Constrained Achievable scenario is a subset of Achievable UCT scenario, assuming a spending cap on non-residential DSM approximately equal to 2% of future annual commercial and industrial revenue. The percent of the non-residential spending cap allocated to the commercial sector is based on the percentage of total non-residential UCT savings that the commercial sector represents. This presumes that the total non-residential spending cap will be allocated at the sector level based on where the savings opportunities are found.

TECHNICAL POTENTIAL

Technical potential represents the quantification of savings that can be realized if energy-efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost or cost effectiveness. Table 7-23 shows that it is technically feasible to save nearly 58.9 million MMBtu (on a cumulative annual basis) in the commercial sector between 2014 and 2018 and approximately 59 million MMBtu during the 10 year period from 2014 to 2023 across Michigan, representing approximately 34.6% of the commercial sales forecast for 2018, and 34.9% of 10-year commercial sales forecast. HVAC Controls and Space Heating energy efficiency measures represent the majority of the potential at 36% and 27% of 10-yr savings, respectively, while cooking and space and water heating energy efficiency measures represent the smallest share each with 6% and 0.1% of 10-yr savings respectively.

Table 7-23: Commercial Sector Natural Gas Technical Potential MMBtu Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space Heating	15,624,610	27%	15,667,637	27%
Building Envelope	8,008,290	14%	8,008,290	14%
Water Heating	10,914,990	19%	10,945,006	19%
HVAC Controls	21,055,539	36%	21,116,594	36%
Space & Water Heating	49,645	0.1%	49,781	0.1%
Cooking	3,261,157	6%	3,270,105	6%
Lighting	-9,838	0.0%	-9,840	0.0%
Total	**58,904,392**	**100%**	**59,047,573**	**100%**
Percent of Annual Sales Forecast	*34.6%*		*34.9%*	

ECONOMIC POTENTIAL

Economic potential is a subset of technical potential only includes measures that are cost-effective. This analysis includes two estimates of economic potential. One cost-effectiveness screen is based on the UCT and a second economic potential scenario was screened using the TRC Test. In both scenarios, the utility incentive was assumed to be equal to 50% of the measure incremental cost. The UCT was used for this study because it is mandated in Michigan to be the primary cost-effectiveness test used when considering energy efficiency programs. Because the TRC includes participant costs as well as all utility costs, it goes beyond utility resource acquisition and looks at the measure/program from a broader perspective. 75% of all measures that were included in the natural gas potential analysis passed the UCT and 63% of all measures passed the TRC Test.

Table 7-24 indicates that the economic potential based on the UCT screen is more than 50.7 million MMBtu by 2018, and the economic potential increases to 50.9 million MMBtu by 2023. This represents 29.8% and 30.1% of commercial sales across the respective 5-year and 10-year timeframes. The HVAC Controls measures make up a majority of the savings, followed by Space Heating.

Table 7-24: Commercial Sector Economic Natural Gas UCT Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space Heating	13,752,800	27%	13,790,393	27%
Building Envelope	5,636,708	11%	5,710,915	11%
Water Heating	7,883,447	16%	7,905,197	16%
HVAC Controls	20,675,963	41%	20,724,787	41%
Space & Water Heating	49,645	0%	49,781	0%
Cooking	2,770,955	5%	2,778,558	5%
Lighting	-9,516	0%	-9,518	0%
Total	**50,760,002**	**100%**	**50,950,115**	**100%**
Percent of Annual Sales Forecast	*29.8%*		*30.1%*	

Table 7-25 shows that the economic potential based on the TRC screen is more than 41.1 million MMBtu during the 5 year period from 2014 to 2018, and the economic potential increases slightly to 41.3 million MMBtu during the 10 year period from 2014 to 2023. This represents 24.2% and 24.4% of commercial sales across the respective 5-year and 10-year timeframes. Again Space Heating and HVAC Controls make up the majority of the Economic TRC savings with HVAC Controls representing the largest economic TRC potential.

Table 7-25: Commercial Sector Economic Natural Gas TRC Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space Heating	13,287,678	32%	13,324,269	32%
Building Envelope	2,098,196	5%	2,098,196	5%
Water Heating	6,219,338	15%	6,236,441	15%
HVAC Controls	18,088,560	44%	18,141,011	44%
Space & Water Heating	49,645	0%	49,781	0%
Cooking	1,450,344	4%	1,454,324	4%
Lighting	-5,585	0%	-5,587	0%
Total	**41,188,176**	**100%**	**41,298,436**	**100%**
Percent of Annual Sales Forecast	*24.2%*		*24.4%*	

7.2.3 Achievable Potential Savings in the Commercial Sector

Achievable potential is an estimate of energy savings that can feasibly be achieved given market barriers and equipment replacement cycles. This study estimated achievable potential for three scenarios. The Achievable UCT Scenario determines the achievable potential of all measures that passed the UCT economic screening assuming incentives equal to 50% of the measure cost. Unlike the economic potential, the commercial achievable potential takes into account the estimated market adoption of energy efficiency measures based on the incentive level and the natural replacement cycle of equipment. The second scenario, Achievable TRC, also assumes incentives set at 50% of the measure incremental cost, but only includes measures that passed the TRC Test economic screening. The third scenario, Constrained UCT, assumes a spending cap equal to 2% of utility revenues, thereby limiting utilities from reaching the ultimate potential estimated in the Achievable UCT scenario.

7.2.3.1 UCT vs. TRC

Tables 7-26 and 7-27 show the estimated savings for the Achievable UCT and Achievable TRC scenarios over 5 and 10 year time horizons. As noted above, both scenarios assume an incentive level approximately equal to 50% of the incremental measure cost and include an estimate 10-year market adoption rates based on incentive levels and equipment replacement cycles. However, because more measures pass the UCT relative to the TRC Test, the Achievable UCT scenario is able to include additional measures that would result in greater savings potential over the next five and ten years. Overall the Achievable UCT scenario results in an achievable potential that is 2.2 MMBtu greater, over the next decade, than the achievable TRC scenario.

Table 7-26: Commercial Achievable UCT Natural Gas Potential Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space Heating	2,527,332	24%	5,083,771	24%
Building Envelope	235,323	2%	470,646	2%
Water Heating	1,409,729	14%	2,812,285	14%
HVAC Controls	5,438,920	52%	10,848,733	52%

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space & Water Heating	12,262	0%	24,525	0%
Cooking	760,904	7%	1,528,979	7%
Lighting	-1,533	0%	-2,846	0%
Total	**10,382,936**	**100%**	**20,766,093**	**100%**
Percent of Annual Sales Forecast	*6.1%*		*12.3%*	

Table 7-27: Commercial Achievable TRC Natural Gas Potential Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space Heating	2,397,548	26%	4,795,096	26%
Building Envelope	81,778	1%	163,556	1%
Water Heating	1,131,606	12%	2,263,213	12%
HVAC Controls	5,260,279	57%	10,520,558	57%
Space & Water Heating	12,262	0%	24,525	0%
Cooking	391,666	4%	783,332	4%
Lighting	-760	0%	-1,520	0%
Total	**9,274,379**	**100%**	**18,548,759**	**100%**
Percent of Annual Sales Forecast	*5.4%*		*11.0%*	

7.2.3.2 Achievable UCT vs. Constrained UCT

Although the Achievable UCT assumes incentives are set and capped at 50% of the incremental measure cost, and that measures are typically replaced at the end of their useful life, the Achievable UCT scenario also assumes no DSM spending cap to reach all potential participants. In the Constrained UCT scenario, the analysis assumes a spending cap roughly equal to 2% of Michigan annual natural gas utility revenue. The percent of the non-residential spending cap allocated to the commercial sector is based on the percentage of total non-residential UCT savings that the commercial sector represents. This presumes that the total non-residential spending cap will be allocated at the sector level based on where the savings opportunities are found. To model the impact of a spending cap the market penetration of all cost effective measures was reduced by the ratio of capped spending to uncapped spending that would be required to achieve the Achievable UCT scenario savings potential.

Table 7-28 shows the estimated savings for the Constrained UCT scenario over 5 and 10 year time horizons. The 5-year and 10-year Constrained UCT potential savings estimates are approximately 5.3 million MMBtu and 10.7 million MMBtu. This equates to 3.1% and 6.3% of commercial sector natural gas sales in 2018 and 2023.

Table 7-28: Commercial Constrained UCT Natural Gas Achievable Energy Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Space Heating	1,292,370	24%	2,613,597	24%
Building Envelope	120,334	2%	243,240	2%
Water Heating	720,875	14%	1,457,290	14%
HVAC Controls	2,781,233	52%	5,630,643	52%
Space & Water Heating	6,270	0%	12,675	0%
Cooking	389,094	7%	786,784	7%
Lighting	-397	0%	-814	0%
Total	**5,309,780**	**100%**	**10,743,415**	**100%**
Percent of Annual Sales Forecast	*3.1%*		*6.3%*	

Figure 7-5 shows the estimated 10-year cumulative natural gas energy efficiency savings potential broken out by end use across the entire commercial sector. HVAC Controls show the largest potential for savings at 5.6 million MMBtu, or 52% of total savings, in the Constrained UCT Achievable scenario.

Figure 7-5: Commercial Sector 2023 Constrained UCT Achievable Potential Natural Gas Savings by End Use

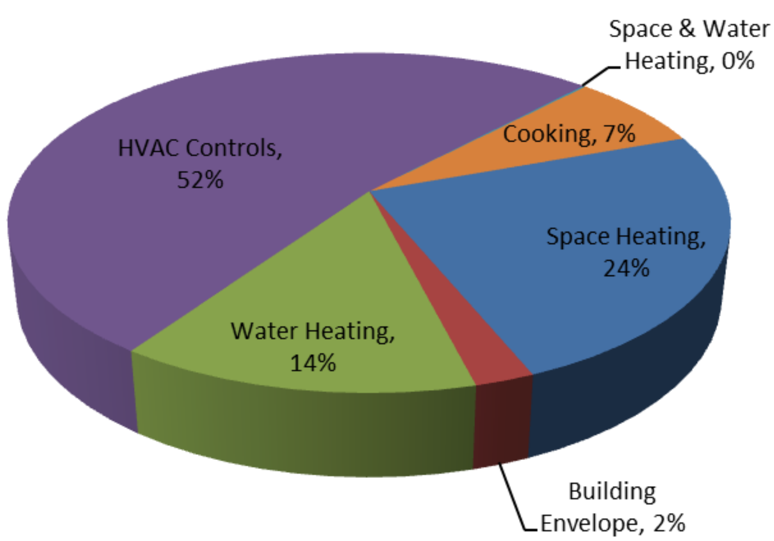
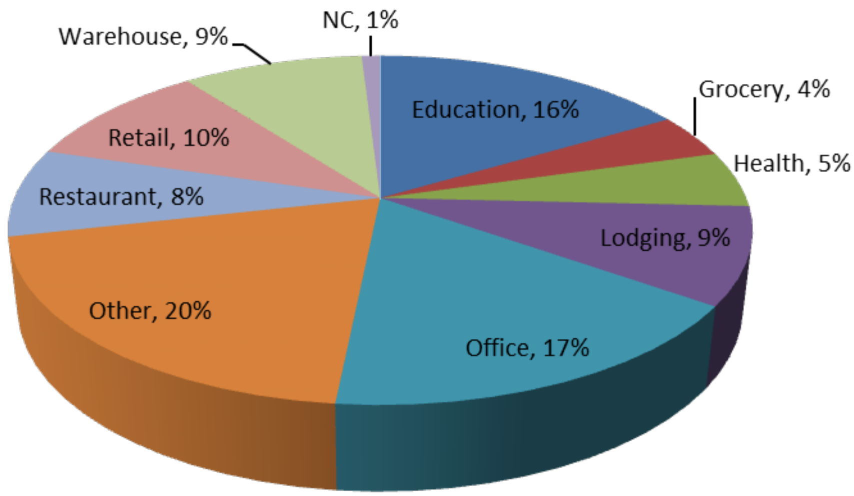


Figure 7-6 shows the breakdown of estimated natural gas savings in 2023 by building type for the Constrained UCT Achievable scenario. The vast majority of savings come from existing/turnover measures, meaning energy efficient equipment is installed in replacement of existing equipment that has failed, with about 1% of savings potential coming from new construction. The 'Offices' and 'Other' categories represent the largest potential savings at 17% and 20% respectively.

Figure 7-6: Commercial Constrained UCT Achievable Natural gas Potential Savings in 2023 by Building Type



7.2.4 Annual Achievable Natural Gas Savings Potential

Tables 7-29, Table 7-30 and Table 7-31 show cumulative energy savings for all achievable scenarios for each year across the 10-year horizon for the study, broken out by end use.

Table 7-29: Cumulative Annual Commercial Natural Gas Savings in the Achievable UCT Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Space Heating	505,466	1,010,933	1,516,399	2,021,866	2,527,332	3,032,798	3,538,265	4,043,731	4,549,198	5,054,664
Building Envelope	47,065	94,129	141,194	188,258	235,323	282,387	329,452	376,516	423,581	470,646
Water Heating	281,946	563,891	845,837	1,127,783	1,409,729	1,691,674	1,973,620	2,255,566	2,537,511	2,819,457
HVAC Controls	1,087,784	2,175,568	3,263,352	4,351,136	5,438,920	6,526,704	7,614,488	8,702,272	9,790,056	10,877,840
Space & Water Heating	2,452	4,905	7,357	9,810	12,262	14,715	17,167	19,620	22,072	24,525
Cooking	152,181	304,361	456,542	608,723	760,904	913,084	1,065,265	1,217,446	1,369,627	1,521,807
Lighting	-373	-746	-1,008	-1,271	-1,533	-1,796	-2,059	-2,321	-2,584	-2,846
Total	**2,076,521**	**4,153,042**	**6,229,673**	**8,306,305**	**10,382,936**	**12,459,567**	**14,536,199**	**16,612,830**	**18,689,461**	**20,766,093**
% of Annual Sales Forecast	*1.2%*	*2.4%*	*3.6%*	*4.8%*	*6.1%*	*7.3%*	*8.6%*	*9.8%*	*11.0%*	*12.3%*

Table 7-30: Cumulative Annual Commercial Natural Gas Savings in the Achievable TRC Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Space Heating	479,510	959,019	1,438,529	1,918,038	2,397,548	2,877,057	3,356,567	3,836,076	4,315,586	4,795,096
Building Envelope	16,356	32,711	49,067	65,422	81,778	98,133	114,489	130,845	147,200	163,556
Water Heating	226,321	452,643	678,964	905,285	1,131,606	1,357,928	1,584,249	1,810,570	2,036,891	2,263,213
HVAC Controls	1,052,056	2,104,112	3,156,167	4,208,223	5,260,279	6,312,335	7,364,390	8,416,446	9,468,502	10,520,558
Space & Water Heating	2,452	4,905	7,357	9,810	12,262	14,715	17,167	19,620	22,072	24,525
Cooking	78,333	156,666	235,000	313,333	391,666	469,999	548,333	626,666	704,999	783,332
Lighting	-152	-304	-456	-608	-760	-912	-1,064	-1,216	-1,368	-1,520
Total	**1,854,876**	**3,709,752**	**5,564,628**	**7,419,504**	**9,274,379**	**11,129,255**	**12,984,131**	**14,839,007**	**16,693,883**	**18,548,759**
% of Annual Sales Forecast	*1.1%*	*2.2%*	*3.2%*	*4.3%*	*5.4%*	*6.5%*	*7.7%*	*8.8%*	*9.9%*	*11.0%*

Table 7-31: Cumulative Annual Commercial Natural Gas Savings in Constrained Achievable Potential Scenario by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2018	2019	2020	2021	2023
Space Heating	256,489	510,744	767,133	1,027,653	1,292,370	1,560,633	1,833,429	2,095,955	2,354,082	2,613,597
Building Envelope	23,882	47,556	71,429	95,686	120,334	145,277	170,622	195,048	219,082	243,240
Water Heating	143,068	284,890	427,901	573,218	720,875	870,354	1,022,272	1,168,626	1,312,597	1,457,290
HVAC Controls	551,975	1,099,142	1,650,900	2,211,550	2,781,233	3,357,730	3,943,517	4,511,471	5,069,239	5,630,643
Space & Water Heating	1,244	2,478	3,722	4,986	6,270	7,570	8,891	10,164	11,416	12,675
Cooking	77,221	153,770	230,961	309,395	389,094	469,746	551,697	630,805	708,605	786,784
Lighting	-107	-195	-257	-320	-397	-474	-559	-644	-728	-814
Total	**1,053,773**	**2,098,385**	**3,151,789**	**4,222,167**	**5,309,780**	**6,410,836**	**7,529,869**	**8,611,423**	**9,674,293**	**10,743,415**
% of Annual Sales Forecast	*0.6%*	*1.2%*	*1.8%*	*2.5%*	*3.1%*	*3.8%*	*4.4%*	*5.1%*	*5.7%*	*6.3%*

7.2.5 Commercial Savings Summary

Table 7-32 provides an end-use breakdown of the commercial natural gas savings potential estimates for technical and economic potential, and each of the three achievable potential scenarios. The table indicates how the savings potential decreases systematically from the technical potential scenario to the Constrained Achievable potential scenario as additional limiting factors such as cost-effectiveness requirements and anticipated market adoption at given funding levels are introduced.

Table 7-32: Cumulative Annual Natural Gas Potential by End-Use and Measure by 2023

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE –UCT- (MMBTU)
Building Envelope						
Energy Efficient Windows	2,527,092	2,606,377	0	65,610	0	33,909
Greenhouse Curtains/Film	2,134,571	157,031	157,031	0	0	0
Insulation Upgrades	2,860,091	2,799,094	1,941,166	313,101	163,556	161,817
Integrated Building Design	148,413	148,413	0	91,935	0	47,514
Truck Loading Dock Seals	338,123	0	0	0	0	0
Space Heating						
Boiler Modifications/Controls	2,024,237	1,289,152	1,204,178	501,466	478,001	260,085
Condensing Boiler & Efficiency Improvements	968,985	0	0	0	0	0
Demand Controlled Ventilation	5,798,651	5,798,651	5,798,651	2,345,939	2,345,939	1,212,432
Destratification Fans	2,030,198	2,030,198	2,030,198	799,636	799,636	413,269
Gas Furnace	1,003,319	1,003,319	1,003,319	373,864	373,864	193,221
Gas Unit Heater	534,530	534,530	534,530	162,375	162,375	83,919
Guest Room Energy Management	414,392	381,149	0	236,103	0	122,342
Heat Recovery/ERV	139,932	0	0	0	0	0
Infrared Heater	107,083	107,083	107,083	18,120	18,120	9,365
Makeup Air	1,215,491	1,215,491	1,215,491	332,415	332,415	171,799
Pipe Insulation/Duct Sealing	1,261,180	1,261,180	1,261,180	284,746	284,746	147,163
Tune-up/Steam Trap Repair	169,638	169,638	169,638	0	0	0
HVAC Controls						
Commissioning/Retrocommissioning	4,766,120	4,766,147	4,773,400	2,952,390	2,956,883	1,533,321
EMS Install/Optimization	9,627,692	9,235,859	9,235,859	5,382,715	5,382,715	2,781,905
Programmable Thermostat	4,131,752	4,131,752	4,131,752	2,180,960	2,180,960	1,128,444
Zoning	2,591,030	2,591,030	0	361,775	0	186,973

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE –UCT- (MMBTU)
Cooking						
High Efficiency Fryer	876,851	719,773	0	476,733	0	246,386
High Efficiency Gas Broiler	93,600	69,879	0	50,889	0	26,301
High Efficiency Gas Ovens	588,015	266,094	109,725	161,582	61,761	83,509
High Efficiency Gas Griddle	214,275	0	0	0	0	0
High Efficiency Gas Steamer	1,327,180	1,327,180	1,327,180	721,571	721,571	372,924
Power Burner Range	170,183	142,194	0	111,031	0	57,664
Water Heating						
Circulation Pump Time Clocks	749,404	749,404	749,404	346,537	346,537	179,098
Clothes Washer ENERGY STAR	306,521	0	100,427	0	60,087	0
Stand Alone Commercial Water Heaters	541,885	159,327	159,327	63,436	63,436	32,785
ES Dishwasher	489,713	489,713	489,713	179,857	179,857	92,954
Heat Recovery Water Heater/GFX	1,537,068	1,537,068	909,492	620,335	408,781	320,603
Indirect Water Heaters	451,984	451,984	0	174,093	0	89,975
Low Flow Aerators/Showerheads/Nozzles	973,772	973,772	973,772	73,273	73,273	38,002
On-Demand, Tankless Water Heater	1,901,498	933,988	726,976	310,415	241,614	160,429
Ozone Laundry System/Generator	776,210	776,210	776,210	344,634	344,634	178,114
Pipe wrap/Tune-up	714,609	219,165	219,165	71,576	71,576	36,992
Pool Measures (including Solar)	1,131,955	1,131,955	1,131,955	473,418	473,418	244,673
Solar Water Heating	887,777	0	0	0	0	0
Wastewater, Filtration/Reclamation	482,611	482,611	0	161,884	0	83,665
Space & Water Heating						
Combination Water Heater/Boiler	45,063	45,063	45,063	24,525	24,525	12,675
Combination Water Heater/Furnace	4,718	4,718	4,718	0	0	0

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE –UCT- (MMBTU)
Lighting						
Lighting	-9,840	-9,518	-5,587	-2,846	-1,520	-814
Total	**59,047,573**	**50,950,115**	**41,298,436**	**20,766,093**	**18,548,759**	**10,743,415**
% of Annual Sales Forecast	**34.9%**	**30.1%**	**24.4%**	**12.3%**	**11.0%**	**6.3%**
Note: Measures in the Table with "0" in the Economic or Achievable Potentials are ones that did not pass the TRC or UCT.						

Table 7-33 provides a list of the Top 10 commercial natural gas savings measures for the Achievable UCT scenario. The table provides the measures ranked highest to lowest according to the cumulative annual natural gas savings potential. The column to the far right shows the results of the measure level cost-effectiveness screening test using the UCT to screen the measures. The measures in the table are representative of a group of comparable measures falling under the umbrella of the measure categories provided in the table. This means that there are a range of UCT ratios for measure iterations that fall into a single measure category. For example, "Heat Recovery Water Heater/GFX" is a measure category which consists of water heater recovery systems including gray water heat exchangers. The table presents an average of the UCT ratios for all measures which are part of the measure categories in the Top 10.

The Top 10 measures combine to yield an estimated 16,400,000 MMBtu savings. This accounts for 79.2% of the total commercial gas savings in the Achievable UCT scenario.

Table 7-33: Top 10 Commercial Natural Gas Savings Measures in the Achievable UCT Scenario

MEASURE	2023 ENERGY (MMBTU)	% OF SECTOR SAVINGS	UCT RATIO
EMS install/Optimization	5,382,715	25.9%	42.6
Commissioning/Retrocommissioning	2,952,390	14.2%	8.1
Demand Controlled Ventilation	2,345,939	11.3%	24.7
Programmable Thermostat	2,180,960	10.5%	33.7
Destratification Fans	799,636	3.9%	2.3
High Efficiency Gas Steamer	721,571	3.5%	2.7
Heat Recovery Water Heater/GFX	620,335	3.0%	3.4
Boiler Modifications/Controls	501,466	2.4%	2.1
High Efficiency Fryer	476,733	2.3%	1.3
Pool Measures (including Solar)	473,418	2.3%	4.0
Total	**16,455,163**	**79.2%**	**12.5**

7.3 ACHIEVABLE POTENTIAL BENEFITS & COSTS

The tables below provide the net present value (NPV) benefits and costs associated with the three achievable potential scenarios for the commercial sector at the 5-year and 10-year periods. Tables 7-34 and 7-35 compare the 5 and 10 year NPV benefits and costs associated with the Achievable UCT and Achievable TRC Scenarios. Both the UCT and TRC scenario benefits include avoided energy supply and demand costs, while the Achievable TRC scenario benefits also include water savings benefits, and carbon tax adder. The NPV costs in the Achievable UCT scenario includes only program administrator costs (incentives paid, staff labor, marketing, etc.) whereas the Achievable TRC scenario costs include both participant and program administrator costs.

Table 7-34: 5-Year Benefit-Cost Ratios for Achievable Potential Scenarios – Commercial Sector Only

5-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$3,926,211,328	$1,514,585,402	2.59	$ 2,411,625,926
Achievable TRC	$3,590,040,097	$1,331,359,508	2.70	$ 2,258,680,589

Table 7-35: 10-Year Benefit-Cost Ratios for Achievable Potential Scenarios– Commercial Sector Only

10-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$7,120,951,471	$2,506,173,980	2.84	$ 4,614,777,491
Achievable TRC	$6,556,350,912	$2,235,299,451	2.93	$ 4,321,051,461

Tables 7-36 and 7-37 compare the NPV benefits and costs associated with the Achievable UCT and Constrained UCT Scenarios. Both scenarios compared the benefits and costs based the UCT. However the constrained scenario's 2% of revenue spending cap on DSM results in reduced program participation and overall NPV benefits.

Table 7-36: 5-Year Benefit-Cost Ratios for Achievable Potential Scenarios – Commercial Sector Only

5-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$3,926,211,328	$1,514,585,402	2.59	$ 2,411,625,926
Constrained UCT	$1,111,987,608	$422,340,965	2.63	$ 689,646,644

Table 7-37: 10-Year Benefit-Cost Ratios for Achievable Potential Scenarios– Commercial Sector Only

10-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$7,120,951,471	$2,506,173,980	2.84	$ 4,614,777,491
Constrained UCT	$2,196,078,237	$757,273,804	2.90	$ 1,438,804,433

Year by year budgets for all three scenarios, broken out by incentive and administrative costs are presented in Tables 7-38 through 7-40. Table 7-41 shows the revenue requirements for each scenario as a percentage of forecasted sector sales.

Table 7-38: Year By Year Budgets for Achievable Potential TRC Scenarios– Commercial Sector Only (Millions of Dollars)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Admin	$ 39.7	$ 52.1	$ 56.6	$ 56.6	$ 46.5	$ 48.3	$ 43.7	$ 45.0	$ 47.5	$ 47.5
Incentive	$ 99.2	$130.2	$141.5	$141.6	$116.3	$120.7	$109.2	$112.4	$118.7	$118.8
Total	$138.8	$182.3	$198.1	$198.2	$162.8	$168.9	$152.9	$157.3	$166.2	$166.3

Table 7-39: Year By Year Budgets for Achievable Potential UCT Scenarios– Commercial Sector Only (Millions of Dollars)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Admin	$ 85.7	$103.9	$105.0	$105.0	$ 89.1	$ 91.0	$ 83.8	$ 85.2	$ 88.0	$ 87.7
Incentive	$214.2	$259.7	$262.5	$262.6	$222.7	$227.5	$209.5	$212.9	$220.0	$219.3
Total	$299.8	$363.6	$367.5	$367.6	$311.8	$318.5	$293.3	$298.1	$308.0	$307.0

Table 7-40: Year By Year Budgets for Cost Constrained UCT Scenarios– Commercial Sector Only (Millions of Dollars)

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Admin	$ 26.5	$ 26.8	$ 27.2	$ 27.7	$ 28.1	$ 28.6	$ 29.0	$ 29.5	$ 30.0	$ 30.4
Incentive	$ 66.3	$ 66.9	$ 68.1	$ 69.2	$ 70.3	$ 71.4	$ 72.6	$ 73.7	$ 74.9	$ 76.1
Total	$ 92.8	$ 93.7	$ 95.4	$ 96.9	$ 98.4	$ 100.0	$101.6	$103.2	$104.9	$106.5

Table 7-41: Utility Energy Efficiency Budgets per Scenario as a % of Sector Revenues

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Achievable UCT	6.5%	7.9%	7.8%	7.7%	6.4%	6.4%	5.8%	5.8%	5.9%	5.8%
Achievable TRC	3.0%	3.9%	4.2%	4.1%	3.3%	3.4%	3.0%	3.1%	3.2%	3.2%
Constrained UCT	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

8 INDUSTRIAL SECTOR ELECTRIC AND NATURAL GAS ENERGY EFFICIENCY POTENTIAL ESTIMATES

This section provides electric and natural gas energy efficiency potential estimates for the industrial sector in Michigan. Estimates of technical, economic and achievable potential are provided in separate sections for electric and natural gas.

8.1 INDUSTRIAL ELECTRIC ENERGY EFFICIENCY POTENTIAL

According to 2012 historical sales data[44], the industrial sector accounts for approximately 30% of retail electric sales in Michigan. This sector is dominated by the transportation equipment industry which represents almost 25% of industrial electric retail sales. Other key industrial sectors are primary metals and chemicals. Industrial kWh sales over the period 2002 to 2012 reached their highest level in 2003 of almost 40,000 GWh and their lowest level in 2009 of about 27,000 GWh. Since 2009 Industrial sales have rebounded, increasing by 14% to 31,306 GWh in 2012. For this study, industrial electric sales are forecast to continue to increase reaching a level of almost 35,000 GWh in 2023, which represents a compound annual growth rate of slightly less than 1%.[45]

8.1.1 Electric Energy Efficiency Measures Examined

For the industrial sector, there were 116 unique energy efficiency measures included in the energy savings potential analysis. Table 8-1 provides a brief description of the types of measures included for each end use in the industrial sector. The list of measures was developed based on a review of the Michigan Energy Measures Database (MEMD), and measures found in other Technical Reference Manuals (TRMs) and industrial potential studies. For each measure, the analysis considered incremental costs, energy and demand savings, and measure useful measure lives.

Table 8-1: Types of Electric Measures Included in the Industrial Sector Analysis

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
Building Envelope	Building Envelope Improvements	• Wall Insulation R-7.5 to R13 • Below Grade Insulation • Ceiling Insulation R-11 to R-42 • Roof Insulation R-11 to R-24 • Cool Roofing • Energy Efficient Windows
Computers & Office Equipment	Equipment Improvements	• Energy Star Office equipment including computers, monitors, copiers, multi-function machines • PC Network Energy Management Controls replacing no central control • Energy Star Compliant Single Door Refrigerator • Energy Efficient "Smart" Power Strip for PC/Monitor/Printer • EZ Save Monitor Power Management System • Energy Star UPS
Lighting	Lighting Improvements	• CFL Screw in Specialty (& Standard) • CFL Screw-in, Fixtures, and Floods • LED Exit Sign • LED Pin Based Lamp & LED Screw-Ins • Daylight Dimming

[44] U.S. Energy Information Administration
[45] GDS forecast based on sales forecasts provided by DTE and CE and historical industrial sales trends for the state as a whole.

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
		• HID Fixture Upgrade - Pulse Start Metal Halide • Central Lighting Control • High Intensity Fluorescent Fixture (replacing HID) • Stairwell Bi-Level Control • LED Wallpacks • LED Downlights • Remote Mounted Occupancy Sensor • Switching Controls for Multilevel Lighting (Non-HID) • LED Replacing Halogen Incandescent • Controls for H.I.F. • Controls for HID (Hi/Lo) • New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T12) • Induction Fluorescent • Fluorescent Fixture with Reflectors • Lamp & Ballast Retrofit (HPT8 Replacing T12) • Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8) • CFL Exterior Lighting • LED Outdoor Area Fixture (Parking Light or Street Light) • LED Specialty • LED Screw-in • T5 HP replacing T12 • Switch Mounted Occupancy Sensor • Illuminated Signs to LED • CFL Fixture • CFL Flood • 42W 8 lamp Hi Bay CFL • Light Tube • LED Exterior Flood and Spotlight • Fluorescent Fixture with Reflectors • Lamp & Ballast Retrofit (HPT8 Replacing Standard T8) • Lamp & Ballast Retrofit (HPT8 Replacing Standard 12) • New Fluorescent Fixtures T5/HP T8 (replacing T8)
Machine Drive	Machine Drive Improvements	• Compressed Air - Advanced Compressor Controls • Advanced Lubricants • Compressed Air System Management • Pump System Efficiency Improvements • Motor System Optimization (Including ASD) • Electric Supply System Improvements • Sensors & Controls • Fan System Improvements • Advanced Efficient Motors • Industrial Motor Management • Energy Information System
Other		• NEMA Premium Transformer, three-phase • NEMA Premium Transformer, single-phase • Optimized Snow and Ice Melt Controls • Engine Block Heat Timer

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
		• Electrically Commutated Plug Fans in Data Centers • Vendor Miser for Non-Refrigerated Equipment
Process Cooling and Refrigeration	Process Cooling and Refrigeration Improvements	• Improved Refrigeration • Electric Supply System Improvements • Sensors & Controls • Energy Information System
Process Heating	Heating Improvements	• Electric Supply System Improvements • Sensors & Controls • Energy Information System
HVAC Controls	HVAC Control Improvements	• EMS Optimization • EMS install • Programmable Thermostats
Space Cooling - Chillers	Cooling System Upgrades	• Efficient Chilled water Pump • Chilled Hot Water Reset • Water-Cooled Screw Chiller > 300 ton • Air-Cooled Recip Chiller • Water-Cooled Centrifugal Chiller > 300 ton • Air-Cooled Screw Chiller • Water-Cooled Screw Chiller 150 – 300 ton • Water-Cooled Centrifugal Chiller 150 – 300 ton • Water-Cooled Screw Chiller < 150 ton • Water-Cooled Centrifugal Chiller < 150 ton • High Efficiency Pumps
Space Cooling – Unitary and Split AC	Cooling System Upgrades	• Water Loop Heat Pump (WLHP) – Cooling • High Efficiency AC – Unitary & Split Systems • Ductless (mini split) – Cooling • Ground Source Heat Pump - Cooling
Space Heating	Heating System Improvements	• VFD Pump • High Efficiency Pumps • ECM Motors on Furnaces • Water Loop Heat Pump (WLHP) - Heating • Ground Source Heat Pump – Heating • High Efficiency Heat Pump • Ductless (mini split) – Heating
Ventilation	Ventilation Equipment	• Electronically-Commutated Permanent Magnet Motors (ECPMs) • Demand-Controlled Ventilation • High Performance Air Filters • Variable Speed Drive Control, 15 HP • Variable Speed Drive Control, 5 HP • Variable Speed Drive Control, 40 HP • Controlled Ventilation Optimization • Improved Duct Sealing • Enthalpy Economizer • Destratification Fan
Water Heating	Water Heating Improvements	• Low Flow Faucet Aerator • Tank Insulation (electric) • Heat Pump Water Heater • Efficient Hot Water Pump • Hot Water Circulation Pump Time-Clock • Hot Water (DHW) Pipe Insulation • High Efficiency Electric Water Heater • Solar Water Heating System

END USE TYPE	END USE DESCRIPTION	MEASURES INCLUDED
		• Drain Water Heat Recovery Water Heater • Point of Use Water Heating

8.1.2 Technical and Economic Potential Electric Savings

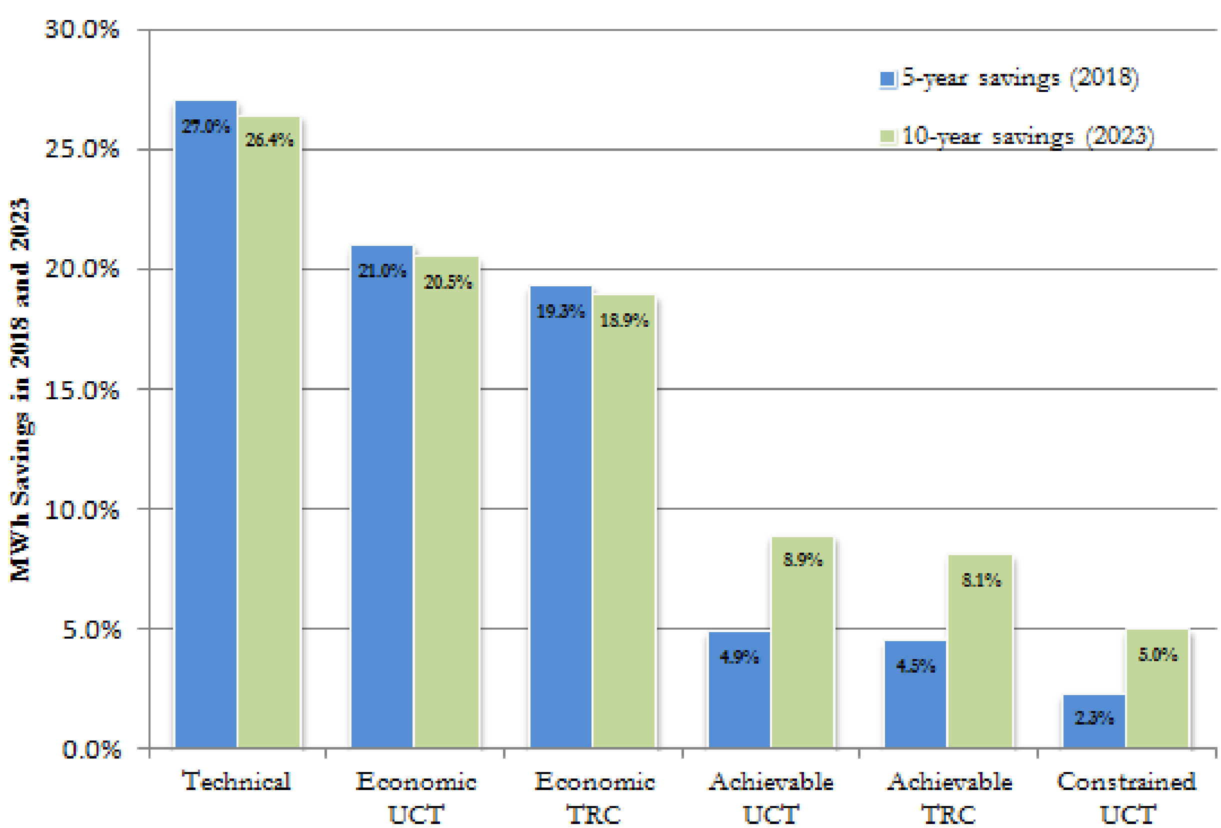
This section presents estimates for electric technical, economic, and achievable savings potential for the industrial sector. Each of the tables in the technical, economic and achievable sections present the respective potential for energy efficiency savings expressed as cumulative annual savings (MWh) and percentage of annual kWh sales. Data is provided for a 5 and 10-year horizon for Michigan

This energy efficiency potential study considers the impacts of the December 2007 Energy and Independence and Security Act (EISA) as an improving code standard for the industrial sector. EISA improves the baseline efficiency of compact fluorescent lamps (CFL), general service fluorescent lamps (GSFL), high intensity discharge (HID) lamps and ballasts and motors, all applicable in the industrial sector.

SUMMARY OF FINDINGS

Figure 8-1 illustrates the estimated savings potential in Michigan for each of the scenarios included in this study.

Figure 8-1: Summary of Industrial Electric Energy Efficiency Potential as a % of Sales Forecasts



The potential estimates are expressed as cumulative annual 5-year and 10-year savings, as percentages of the respective 2018 and 2023 forecasts for industrial sector sales. The technical potential is 27.0% in 2018 and 26.4% in 2023. The 5-year and 10-year economic potential is: 21% and 20.5% based on the Utility Cost Test (UCT) screen, assuming an incentive level equal to 50% of the measure cost. Based on a measure-level screen using the TRC Test, the economic potential is 19.3% in 2018 and 18.9% in 2023. The slight drop from technical potential to economic potential indicates that most measures are cost-effective.

The 5-year and 10-year achievable potential savings are: 4.9% and 8.9% for the Achievable UCT scenario; 4.5% and 8.1% for the Achievable TRC scenario; and 2.3% and 5.0% for the Constrained Achievable scenario. The Achievable UCT scenario assumes 50% incentives and includes measures that passed the UCT Test. The Achievable TRC scenario also assumes 50% incentives but includes only measures that passed the cost-effectiveness screen based on the TRC Test. Last, the Constrained Achievable scenario is a subset of Achievable UCT scenario, assuming a spending cap on non-residential DSM approximately equal to 2% of future annual industrial revenue. The percent of the non-residential spending cap allocated to the industrial sector is based on the percentage of total non-residential UCT savings that the industrial sector represents. This presumes that the total non-residential spending cap will allocated at the sector level based on where the savings opportunities are found.

TECHNICAL POTENTIAL

Technical potential represents the quantification of savings that can be realized if energy-efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost. Table 8-2 shows that the technical potential is more than 9.1 million MWh annually in the industrial sector during the 10 year period from 2014 to 2023 across Michigan, representing 27.0% of 2018 forecast industrial sales and 26.4% of 2023 industrial sales. Machine Drive represents the majority of the potential at 36% of 10-yr savings, while water heating, space heating and office equipment represent the smallest shares, each with less than 2 percent of 10-yr savings. Table 8-3 shows the annual (summer) peak demand savings potential in 2018 and 2023. The ten year summer peak demand savings potential is 1,790 MW, which is 40.6% of the 5-year peak forecast and 39.7% of the 10-year peak forecast.

Table 8-2: Industrial Sector Technical Potential Savings By End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Machine Drive	3,344,311	36%	3,344,311	36%
Ventilation	1,720,439	19%	1,720,439	19%
Lighting	1,663,985	18%	1,663,985	18%
HVAC Controls	364,007	4%	364,007	4%
Process	571,628	6%	571,628	6%
Space Cooling - Chillers	540,901	6%	540,901	6%
Appliances, Computers, Office Equipment	79,561	1%	79,561	1%
Envelope	527,313	6%	527,313	6%
Water Heating	64,490	1%	64,490	1%
Other	108,263	1%	108,263	1%
Space Heating	195,819	2%	195,819	2%
Total	**9,180,717**	**100%**	**9,180,717**	**100%**
% of Annual Sales Forecast	*27.0%*		*26.4%*	

Table 8-3: Industrial Sector Technical Potential Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**1,790**	**1,790**
% of Peak	*40.6%*	*39.7%*

ECONOMIC POTENTIAL

Economic potential is a subset of technical potential, which only accounts for measures that are cost-effective. This analysis includes two estimates of economic potential. One cost-effectiveness screen is based on the UCT and a second economic potential scenario was screened using the TRC Test. In both scenarios, the utility incentive was assumed to be equal to 50% of the measure incremental cost. The UCT was used for this study because it is mandated in Michigan to be the primary cost-effectiveness test used when considering energy efficiency programs. The TRC Test was also included because it also considers the cost assumed by the participant. 86% of all measures that were included in the electric potential analysis passed the UCT and 73% of all measures passed the TRC Test.

Table 8-4 indicates that the economic potential based on the UCT screen is slightly more than 7.1 million MWh during the 10 year period from 2014 to 2023. This represents 21.0% and 20.5% of industrial sales across the respective 5-year and 10-year timeframes. Machine drive, lighting and process end uses make up a majority of the savings. Table 8-5 shows the economic demand savings potential in 2018 and 2023. The five and ten year summer peak demand savings potential is 1,360 MW, respectively, which is 30.8% and 30.2% of the 5-year and 10-year peak forecasts.

Table 8-4: Industrial Sector Economic Potential (UCT) Savings By End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Machine Drive	3,344,311	47%	3,344,311	47%
Lighting	1,585,959	22%	1,585,959	22%
Ventilation	801,060	11%	801,060	11%
Process	571,628	8%	571,628	8%
HVAC Controls	364,007	5%	364,007	5%
Space Cooling	227,400	2%	227,400	2%
Space Heating	108,263	1%	108,263	1%
Other	162,932	1%	162,932	1%
Appliances, Computers, Office Equipment	70,706	1%	70,706	1%
Water Heating	64,468	1%	64,468	1%
Envelope	32,801	1%	32,801	1%
Total	**7,133,458**	**100%**	**7,133,458**	**100%**

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
% of Annual Sales Forecast	*21.0%*		*20.5%*	

Table 8-5: Industrial Sector Economic Potential (UCT) Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**1,360**	**1,360**
% of Peak	*30.8%*	*30.2%*

Table 8-6 shows that the economic potential based on the TRC screen is over 6.5 million MWh during the 10 year period from 2014 to 2023. This represents 19.3% and 18.9% of industrial sales in 2018 and 2023 respectively. As with UCT machine drive, lighting and process again make up a majority of the economic TRC savings potential. Table 8-7 shows the demand savings potential in 2018 and 2023. The five and ten year summer peak demand savings potential is 1,210 MW, which is 27.5% and 26.9% of the 5-year and 10-year peak forecasts.

Table 8-6: Industrial Sector Economic Potential (TRC) Savings By End Use

END USE	2018 ENERGY SAVINGS (MWH)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MWH)	% OF 2023 TOTAL
Machine Drive	3,344,311	51%	3,344,311	51%
Lighting	1,164,015	18%	1,164,015	18%
Ventilation	672,929	10%	672,929	10%
Process	571,628	9%	571,628	9%
HVAC Controls	364,007	6%	364,007	6%
Space Cooling	165,956	2%	165,956	2%
Envelope	32,838	0%	32,838	0%
Other	107,408	2%	107,408	2%
Appliances, Computers, Office Equipment	68,628	1%	68,628	1%
Water Heating	53,484	1%	53,484	1%
Space Heating	22,812	0%	22,812	0%
Total	**6,568,017**	**100%**	**6,568,017**	**100%**
% of Annual Sales Forecast	*19.3%*		*18.9%*	

Table 8-7: Industrial Sector Economic Potential Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**

Total	**1,210**	**1,210**
% of Peak	*27.5%*	*26.9%*

8.1.3 Achievable Potential Savings in the Industrial Sector

Achievable potential is an estimate of energy savings that can feasibly be achieved given market barriers and equipment replacement cycles. This study estimated achievable potential for three scenarios. The Achievable UCT Scenario determines the achievable potential of all measures that passed the UCT economic screening assuming incentives equal to 50% of the measure cost. Unlike the economic potential, the industrial achievable potential takes into account the estimated market adoption of energy efficiency measures based on the incentive level and the natural replacement cycle of equipment. The second scenario, Achievable TRC, also assumes incentives set at 50% of the measure incremental cost, but only includes measures that passed the TRC Test economic screening. The third scenario, Constrained UCT, assumes a spending cap equal to 2% of utility revenues, thereby limiting utilities from reaching the ultimate potential estimated in the Achievable UCT scenario.

8.1.3.1 UCT vs. TRC

Tables 8-8 through 8-11 show the estimated savings for the Achievable UCT and Achievable TRC scenarios over 5 and 10 year time horizons. As noted above, both scenarios assume an incentive level approximately equal to 50% of the incremental measure cost and include an estimate 10-year market adoption rates based on incentive levels and equipment replacement cycles. However, because more measures pass the UCT relative to the TRC Test, the Achievable UCT scenario is able to include additional measures that would result in greater savings potential over the next five and ten years. Overall the Achievable UCT scenario results in an achievable potential that is 0.27 million MWh greater, over the next decade, than the achievable TRC scenario.

Table 8-8: Industrial Achievable UCT Potential Electric Energy Savings by End Use

	2018	% OF 2018	2023	% OF 2023
Machine Drive	672,522	40%	1,345,044	44%
Lighting	433,232	26%	798,405	26%
Ventilation	212,221	13%	354,445	11%
HVAC Controls	151,334	9%	216,191	7%
Process	101,464	6%	202,927	4%
Space Cooling	43,943	3%	66,723	2%
Space Heating	7,166	1%	10,789	0%
Other	14,279	1%	27,129	1%
Appliances, Computers, Office Equipment	18,255	0%	35,045	1%
Water Heating	18,555	1%	28,881	1%
Envelope	1,520	0%	2,172	0%
Total	1,674,490	100%	3,087,742	100%
% of Annual Sales Forecast	*4.9%*		*8.9%*	

Table 8-9: Industrial Achievable UCT Potential Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**

	SUMMER PEAK DEMAND	
Summary	**MW**	**MW**
Total	**295.8**	**571.1**
% of Peak	*6.7%*	*12.7%*

Table 8-10: Industrial Achievable TRC Potential Electric Energy Savings by End Use

	2018	% OF 2018	2023	% OF 2023
Machine Drive	672,522	44%	1,345,044	48%
Lighting	332,748	22%	597,430	21%
Ventilation	183,798	12%	296,042	11%
HVAC Controls	148,907	10%	212,894	8%
Process	101,464	7%	202,927	7%
Space Cooling	42,949	3%	65,132	2%
Office Equip	18,103	1%	34,741	1%
Space Heat	6,352	0%	9,161	0%
Other	13,893	1%	26,576	1%
Water Heating	14,277	1%	22,728	1%
Envelope	2,628	0%	3,754	0%
Total	1,537,639	100%	2,816,429	100%
% of Annual Sales Forecast	*4.5%*		*8.1%*	

Table 8-11: Industrial Achievable TRC Potential Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**278.5**	**539.2**
% of Peak	*6.3%*	*12.0%*

8.1.3.2 Achievable UCT vs. Constrained UCT

Although the Achievable UCT assumes incentives are set and capped at 50% of the incremental measure cost, and that measures are typically replaced at the end of their useful life, the Achievable UCT scenario also assumes no DSM spending cap to reach all potential participants. In the Constrained UCT scenario, the analysis assumes a spending cap roughly equal to 2% of Michigan annual utility revenues. The percent of the non-residential spending cap allocated to the industrial sector is based on the percentage of total non-residential UCT savings that the industrial sector represents. This presumes that the total non-residential spending cap will be allocated at the sector level based on where the savings opportunities are found. To model the impact of a spending cap the market penetration of all cost effective measures was reduced by the ratio of capped spending to uncapped spending that would be required to achieve the Achievable UCT scenario savings potential.

Tables 8-12 and 8-13 show the estimated savings for the Constrained UCT scenario over 5 and 10 year time horizons. The 5-year and 10-year Constrained UCT potential savings estimates are approximately 786 thousand MWh and 1.7 million MWh. This equates to 2.3% and 5.0% of sector sales in 2018 and 2023. The five and ten year summer demand savings estimates in the Constrained UCT scenario are 138.1 MW and 334.9 MW, respectively, which is 3.1% and 7.4% of the peak forecast in 2018 and 2023.

Table 8-12: Industrial Constrained Achievable Energy Savings by End Use

	2018	% of 2018	2023	% of 2023
End Use	**Energy (MWh)**	**Savings**	**Energy (MWh)**	**Savings**
Machine Drive	326,294	41%	785,827	45%
Lighting	204,780	26%	450,985	26%
Ventilation	95,201	12%	187,716	11%
HVAC Controls	65,900	8%	107,366	6%
Process	47,335	6%	113,998	7%
Space Cooling	19,350	2%	34,036	2%
Computers & Office Equipment	8,437	1%	19,449	1%
Building Envelope	662	0%	1,097	0%
Water Heating	8,209	1%	14,884	1%
Other	2,474	1%	15,007	1%
Space Heating	3,151	0%	5,484	0%
Total	**785,903**	**100%**	**1,735,830**	**100%**
% of Annual Sales Forecast	*2.3%*		*5.0%*	

Table 8-13: Industrial Constrained Achievable Demand Savings

	SUMMER PEAK DEMAND	
	2018	**2023**
Summary	**MW**	**MW**
Total	**138.1**	**334.9**
% of Peak	*3.1%*	*7.4%*

Figure 8-2 shows the estimated 10-year cumulative annual efficiency savings potential broken out by end use across the entire industrial sector for the Constrained UCT scenario. The Machine Drive end use shows the largest potential for savings at just over 0.78 million MWh, or 45% of total savings, in the Constrained UCT scenario. Lighting is second at just over 0.45 million MWh, or 26% of total savings.

Figure 8-2: Industrial Sector 2023 Constrained UCT Potential Savings by End Use

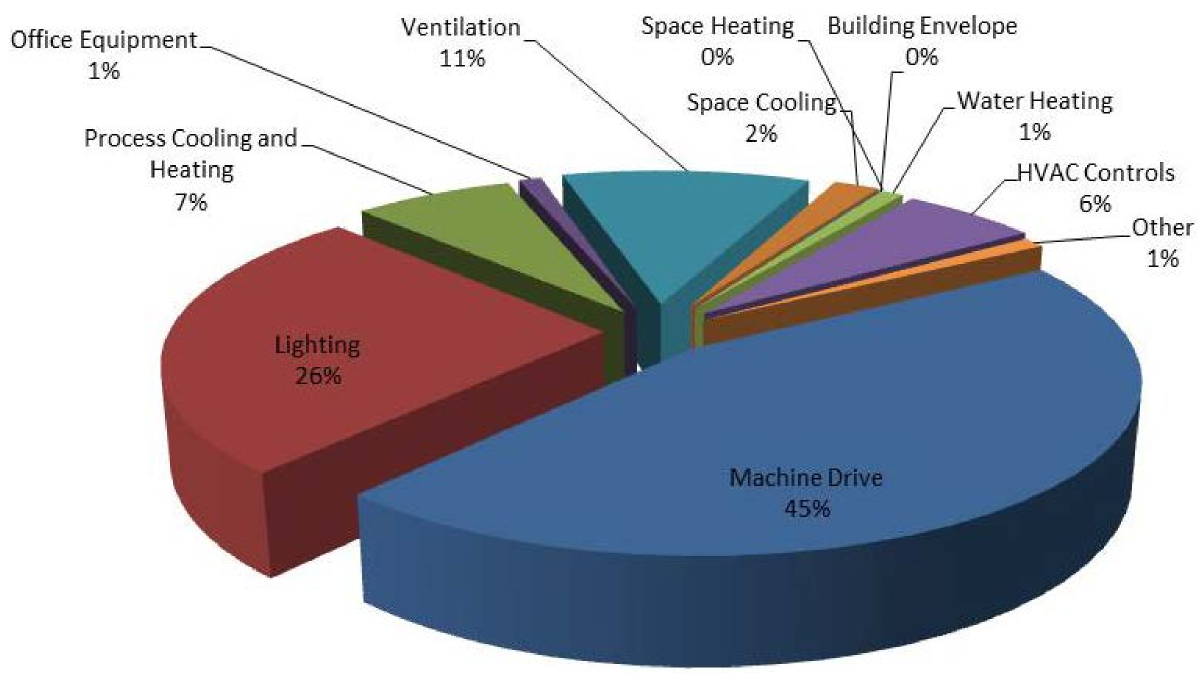
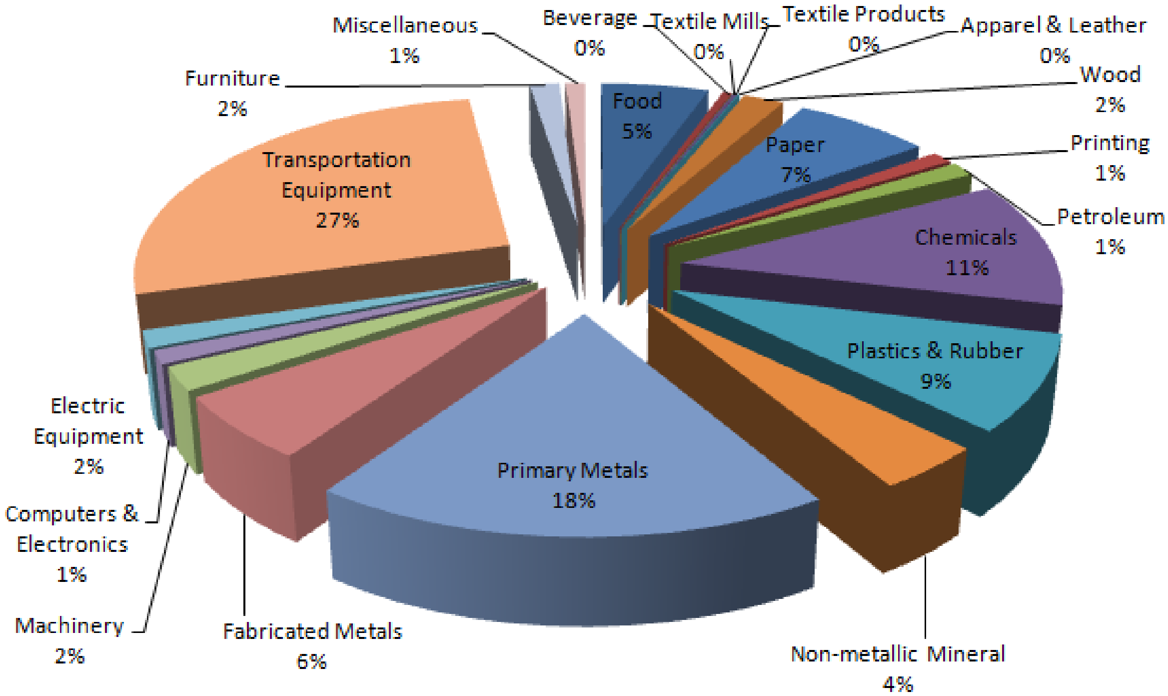


Figure 8-3 shows the breakdown of estimated savings in 2023 by building type for the Constrained UCT scenario. The vast majority of savings come from the transportation equipment, primary metals, chemicals, plastics and rubber, fabricated metals, paper, and food industries; with the other SIC codes accounting for less than 20% of total savings.

Figure 8-3: Industrial Constrained UCT Savings in 2023 by Industry



8.1.4 Annual Achievable Electric Savings Potential

Tables 8-14, Table 8-15 and Table 8-16 show cumulative energy savings for all achievable scenarios for each year across the 10-year horizon for the study, broken out by end use.

Table 8-14: Cumulative Annual Industrial Energy Savings in the Achievable UCT Potential Scenario by End Use

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Machine Drive	134,504	269,009	403,513	538,017	672,522	807,026	941,530	1,076,035	1,210,539	1,345,044
Lighting	73,540	162,764	258,175	353,546	433,232	512,918	584,761	655,973	727,185	798,405
Ventilation	26,695	70,889	123,833	176,776	212,221	247,665	274,360	301,055	327,750	354,445
HVAC Controls	10,810	43,238	86,476	129,714	151,334	172,953	183,762	194,572	205,381	216,191
Process	20,293	40,585	60,878	81,171	101,464	121,756	1420,49	162,342	182,635	202,927
Space Cooling	4,027	13,345	25,308	37,271	43,943	50,616	54,643	58,669	62,696	66,723
Office Equip	3321	7009	10,880	14,750	18,255	21,759	25,081	28,402	31,724	35,045
Space Heat	636	2,158	4,123	6,087	7,166	8,245	8,881	9,517	10,153	10,789
Other	2534	5426	8496	11566	14279	16992	19526	22060	24594	27129
Water Heat	1,860	5,776	10,721	15,666	18,555	21,443	23,302	25,162	27,021	28,881
Envelope	109	434	869	1,303	1,520	1,738	1,846	1,955	2,064	2,172
Total	**278,327**	**620,633**	**993,271**	**1,365,870**	**1,674,490**	**1,983,110**	**2,259,741**	**2,535,741**	**2,811,742**	**3,087,742**
% of Annual Sales Forecast	*0.9%*	*1.9%*	*3.0%*	*4.1%*	*4.9%*	*5.8%*	*6.6%*	*7.3%*	*8.1%*	*8.9%*

Table 8-15: Cumulative Annual Industrial Energy Savings in the Achievable TRC Potential Scenario by End Use

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Machine Drive	134,504	269,009	403,513	538,017	672,522	807,026	941,530	1,076,035	1,210,539	1,345,044
Lighting	53,443	122,571	197,885	273,159	332,748	392,337	444,084	495,199	546,315	597,430
Ventilation	20,660	59,208	106,701	154,194	183,798	213,402	234,062	254,722	275,382	296,042
HVAC Controls	10,674	42,579	85,098	127,617	148,907	170,196	180,870	191,545	202,219	212,894
Process	20,293	40,585	60,878	81,171	101,464	121,756	142,049	162,342	182,635	202,927
Space Cooling	3,917	13,026	24,731	36,436	42,949	49,462	53,380	57,297	61,215	65,132
Office Equip	3,291	6,948	10,788	14,629	18,103	21,577	24,868	28,159	31,450	34,741
Space Heat	473	1,832	3,634	5,436	6,352	7,268	7,741	8,214	8,688	9,161
Other	2,507	5,315	8,275	11,235	13,893	16,550	19,057	21,563	24,070	26,576
Water Heat	1,545	4,546	8,275	12,004	14,277	16,549	18,094	19,639	21,183	22,728

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Envelope	188	751	1,502	2,253	2,628	3,003	3,191	3,379	3,567	3,754
Total	**251,495**	**566,371**	**911,280**	**1,256,150**	**1,537,639**	**1,819,128**	**2,068,926**	**2,318,094**	**2,567,261**	**2,816,429**
% of Annual Sales Forecast	*0.8%*	*1.7%*	*2.8%*	*3.8%*	*4.5%*	*5.3%*	*6.0%*	*6.7%*	*7.4%*	*8.1%*

Table 8-16: Cumulative Annual Industrial Energy Savings in Constrained UCT Potential Scenario by End Use

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Machine Drive	80,205	140,224	194,641	250,427	326,294	403,355	498,013	594,477	691,256	785,827
Ventilation	43,430	82,862	121,091	160,266	204,780	249,995	300,069	350,650	401,396	450,985
Lighting	15,306	34,268	54,864	75,978	95,201	114,727	132,791	151,200	169,669	187,716
HVAC Controls	6,198	20,112	36,932	54,175	65,900	77,810	85,125	92,579	100,058	107,366
Process	11,635	20,342	28,236	36,329	47,335	58,514	72,246	86,239	100,279	113,998
Space Cooling	2,309	6,307	10,961	15,732	19,350	23,026	25,751	28,528	31,314	34,036
Computers & Office Equipment	1,904	3,487	4,992	6,536	8,437	10,367	12,615	14,905	17,203	19,449
Other	1,453	2,694	3,888	5,112	6,584	8,078	9,793	11,541	13,294	15,007
Water Heating	1,066	2,747	4,670	6,643	8,209	9,800	11,058	12,341	13,627	14,884
Space Heat	365	1,018	1,782	2,565	3,151	3,745	4,175	4,614	5,054	5,484
Building Envelope	62	202	371	544	662	782	855	930	1,005	1,079
Total	163,933	314,261	462,429	614,306	785,903	960,200	1,152,491	1,348,004	1,544,154	1,735,830
% of Annual Sales Forecast	0.5%	1.0%	1.4%	1.8%	2.3%	2.8%	3.4%	3.9%	4.5%	5.0%

Table 8-17: Cumulative Annual Industrial Demand Savings in the Achievable UCT Potential Scenario by End Use

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Machine Drive	23.2	46.5	69.7	92.9	116.2	139.4	162.6	185.8	209.1	232.3
Lighting	14.6	33.2	53.4	73.5	89.6	105.7	119.8	133.7	147.7	161.8
Process	3.5	7.0	10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0
Ventilation	2.4	4.9	7.3	9.8	12.2	14.7	17.2	19.6	22.0	24.5
Space Cooling	1.2	2.7	4.4	6.1	7.4	8.8	10.0	11.1	12.3	13.5
HVAC Controls	0.1	0.4	0.7	1.1	1.2	1.4	1.5	1.6	1.7	1.8
Other	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	7.9
Office Equipment	9.1	18.3	27.4	36.6	45.7	54.9	64.0	73.2	82.3	91.5
Space Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Heating	0.2	0.6	1.0	1.5	1.7	2.0	2.2	2.4	2.6	2.8
Building Envelope	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Total	**55.2**	**115.1**	**176.9**	**238.7**	**295.8**	**352.8**	**407.5**	**462.0**	**516.5**	**571.1**
% of Annual Sales Forecast	1.3%	2.7%	4.1%	5.4%	6.7%	7.9%	9.2%	10.3%	11.5%	12.7%

Table 8-18: Cumulative Annual Industrial Demand Savings in the Achievable TRC Potential Scenario by End Use

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Machine Drive	23.2	46.5	69.7	92.9	116.2	139.4	162.6	185.8	209.1	232.3
Lighting	10.5	25.0	41.5	58.1	70.6	83.1	93.6	104.0	114.5	125.0
Process	3.5	7.0	10.5	14.0	17.5	21.0	24.5	28.0	31.5	35.0
Ventilation	2.4	4.9	7.3	9.8	12.2	14.7	17.2	19.6	22.0	24.5
Space Cooling	0.2	0.3	0.5	0.7	0.9	1.1	1.2	1.4	1.5	1.7
HVAC Controls	0.1	0.4	0.7	1.1	1.2	1.4	1.5	1.6	1.7	1.8
Other	1.2	2.5	3.7	4.9	6.2	7.4	8.6	9.9	11.1	12.3
Office Equipment	9.7	19.4	29.2	38.9	48.6	58.3	68.1	77.8	87.5	97.2
Space Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Heating	0.2	0.6	1.0	1.5	1.8	2.1	2.3	2.5	2.7	2.9
Building Envelope	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.2	5.8	6.4
Total	**51.7**	**107.8**	**166.2**	**224.5**	**278.5**	**332.4**	**384.1**	**435.8**	**487.5**	**539.2**
% of Annual Demand Forecast	1.2%	2.5%	3.8%	5.1%	6.3%	7.5%	8.6%	9.7%	10.9%	12.0%

Table 8-19: Cumulative Annual Industrial Demand Savings in Constrained UCT Potential Scenario by End Use

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Machine Drive	13.3	22.7	31.5	40.9	55.6	68.6	87.3	103.8	120.2	135.5
Lighting	8.4	16.4	24.1	32.1	41.0	50.0	59.7	69.6	79.3	89.0
Process	2.0	3.5	4.9	6.3	8.2	10.1	12.5	14.9	17.3	19.7
Ventilation	1.4	2.4	3.4	4.4	5.7	7.1	8.8	10.5	12.2	13.8
Space Cooling	0.7	1.3	2.0	2.7	3.4	4.1	4.9	5.8	6.6	7.4
HVAC Controls	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	0.9
Other	0.5	0.8	1.1	1.4	1.9	2.3	2.9	3.5	4.2	4.7
Office Equipment	5.2	9.2	12.7	16.4	21.1	27.2	36.0	45.0	54.1	62.5
Space Heating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Water Heating	0.1	0.3	0.4	0.6	0.8	0.9	1.1	1.2	1.3	1.4
Building Envelope	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
Total	**31.6**	**56.8**	**80.4**	**105.2**	**138.1**	**171.0**	**214.0**	**255.1**	**296.0**	**334.9**
% of Annual Demand Forecast	0.8%	1.3%	1.9%	2.4%	3.1%	3.8%	4.8%	5.7%	6.6%	7.4%

8.1.5 Industrial Electric Savings Summary by Measure Group

Table 8-20 below provides an end-use breakdown of the industrial electric savings potential estimates for technical and economic potential, and each of the three achievable potential scenarios. The table indicates how the savings potential decreases systematically from the technical potential scenario to the Constrained UCT potential scenario as additional limiting factors such as cost-effectiveness requirements and anticipated market adoption at given funding levels are introduced.

Table 8-20 Electric Potential by End-Use and Measure

End Use	Technical Potential (MWh)	Economic Potential -UCT- (MWh)	Economic Potential -TRC- (MWh)	Achievable Potential -UCT- (MWh)	Achievable Potential -TRC- (MWh)	Constrained Achievable -UCT- (MWh)
Water Heating						
Low Flow Faucet Aerator	16,458	16,458	16,458	3,542	3,542	1,759
Heat Pump Water Heater	15,728	15,728	15,728	6,620	6,620	3,719
Tank Insulation (electric)	14,885	14,885	14,885	9,940	9,940	4,937
Solar Water Heating System	10,539	10,539	0	6,007	0	0
High Efficiency Electric Water Heater	3,177	3,177	3,177	1,543	1,543	867
Efficient Hot Water Pump	3,005	3,005	3,005	943	943	468
Drain water Heat Recovery Water Heater	446	446	0	147	0	82
Hot Water (DHW) Pipe Insulation	174	174	174	113	113	56
Hot Water Circulation Pump Time-Clock	56	56	56	26	26	13
Point of Use Water Heating	22	0	0	0	0	0
Ventilation						
Enthalpy Economizer	895,829	0	0	0	0	22,196
Demand-Controlled Ventilation	196,425	196,425	196,425	84,211	84,211	47,307
High Performance Air Filters	145,378	145,378	145,378	16,564	16,564	9,305
Improved Duct Sealing	139,823	0	0	0	0	0
Variable Speed Drive Control, 5 HP	96,838	96,838	96,838	58,331	58,331	28,968
Variable Speed Drive Control, 40 HP	96,838	96,838	96,838	58,331	58,331	28,968
Variable Speed Drive Control, 15 HP	96,838	96,838	96,838	58,331	58,331	28,968
Electronically-Commutated Permanent Magnet Motors (ECPMs)	38,207	38,207	38,207	15,441	15,441	8,674
Destratification Fan	11,858	0	0	0	0	0
Controlled Ventilation Optimization	2,405	2,405	2,405	943	943	530
Space Cooling - Chillers						
Chilled Hot Water Reset	59,940	59,940	104,809	36,899	64,521	23,479
Efficient Chilled Water Pump	18,897	18,897	33,042	3,596	6,289	2,288

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE -UCT- (MWH)
Air-Cooled Screw Chiller	14,824	14,824	14,824	3,202	3,202	1,799
Air-Cooled Recip Chiller	14,604	14,604	14,604	3,155	3,155	1,772
High Efficiency Pumps	3,001	3,001	12,378	571	2,356	509
Water-Cooled Centrifugal Chiller < 150 ton	2,932	2,932	2,932	633	633	356
Water-Cooled Centrifugal Chiller > 300 ton	2,929	2,929	2,929	633	633	355
Water-Cooled Centrifugal Chiller 150 - 300 ton	2,908	2,908	2,908	628	628	353
Water-Cooled Screw Chiller > 300 ton	2,755	2,755	2,755	595	595	334
Water-Cooled Screw Chiller 150 - 300 ton	2,527	2,527	2,527	546	546	307
Water-Cooled Screw Chiller < 150 ton	2,019	2,019	2,019	436	436	245
Space Cooling - Unitary and Split AC						
Ground Source Heat Pump - Cooling	170,048	19,588	0	4,972	0	0
Ductless (mini split) - Cooling	169,368	0	0	0	0	0
High Efficiency AC - Unitary & Split Systems	63,112	63,112	0	22,784	0	12,799
Water Loop Heat Pump (WLHP) - Cooling	11,039	11,039	11,039	3,985	3,985	2,239
Lighting						
New Fluorescent Fixtures T5/HP T8 (replacing T12)	128,982	128,982	0	49,603	0	28,701
Induction Fluorescent	104,252	104,252	104,252	53,870	53,870	31,170
High Intensity Fluorescent Fixture (replacing HID)	94,044	94,044	94,044	45,294	45,294	26,208
T5 HP replacing T12	86,105	86,105	0	41,392	0	23,950
LED Exterior Flood and Spotlight	69,735	3,953	0	2,567	0	0
LED Wallpack	66,853	66,853	66,853	28,945	28,945	16,748
42W 8 lamp Hi Bay CFL	63,350	63,350	0	34,099	0	19,730
CFL Exterior Lighting	58,985	58,985	58,985	28,141	28,141	16,283
Light Tube	58,510	58,510	0	26,947	0	15,592
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	43,239	43,239	43,239	0	0	0

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE -UCT- (MWH)
HID Fixture Upgrade - Pulse Start Metal Halide	41,385	41,385	41,385	9,515	9,515	5,506
Lamp & Ballast Retrofit (HPT8 Replacing T12)	41,380	41,380	41,380	19,892	19,892	11,299
Fluorescent Fixture with Reflectors	12,814	12,814	12,814	0	0	0
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	11,223	11,223	11,223	0	0	0
LED Specialty	10,936	10,936	10,936	6,504	6,504	3,763
CFL Screw in Specialty	10,115	10,115	10,115	6,015	6,015	3,480
LED Outdoor Area Fixture (Parking Light or Street Light)	10,028	10,028	10,028	5,010	5,010	2,899
CFL Screw-in	6,576	6,576	6,576	3,911	3,911	2,045
LED Screw In	7,919	7,919	7,919	3,140	3,140	1,817
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	7,576	11,223	0	0	0	0
LED Pin Based Lamp	7,299	7,299	7,299	2,894	2,894	1,674
LED Exit Sign	4,231	4,231	4,231	285	285	165
Illuminated Signs to LED	3,953	0	0	0	0	1,486
CFL Fixture	1,259	1,259	1,259	624	624	325
CFL Flood	1,029	1,029	1,029	612	612	354
LED Replacing Halogen Incandescent	954	954	954	567	567	328
LED Downlight	839	839	839	483	483	280
Lighting Controls						
Daylight Dimming	241,517	241,517	241,517	156,853	156,853	80,234
Central Lighting Control	138,674	138,674	138,674	75,052	75,052	43,427
Switching Controls for Multilevel Lighting (Non-HID)	89,312	89,312	89,312	48,073	48,073	27,816
Switch Mounted Occupancy Sensor	73,469	73,469	0	46,359	0	26,824
Remote Mounted Occupancy Sensor	73,469	73,469	73,469	46,359	46,359	26,824
Stairwell Bi-Level Control	68,331	68,331	68,331	44,132	44,132	25,536
Controls for H.I.F.	17,350	17,350	17,350	11,268	11,268	6,520

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE -UCT- (MWH)
Controls for HID (Hi/Lo)	8,291	0	0	0	0	0
Appliances, Computers, Office Equipment						
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	61,212	61,212	61,212	31,080	31,080	17,460
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	7,839	0	0	0	0	0
PC Network Energy Management Controls replacing no central control	7,416	7,416	7,416	3,661	3,661	1,818
Energy Star Compliant Single Door Refrigerator	2,078	2,078	0	304	0	171
EZ Save Monitor Power Management Software	753	0	0	0	0	0
Energy Star UPS	263	0	0	0	0	0
Building Envelope						
Cool Roofing	291,304	0	0	0	0	0
Energy Efficient Windows	97,752	0	0	0	0	0
Ceiling Insulation R-11 to R-42	81,842	0	0	0	0	0
Wall Insulation R-7.5 to R13	29,969	29,969	31,280	1,457	1,521	736
Roof Insulation R-11 to R-24	24,134	0	0	0	0	0
Below Grade Insulation	2,311	2,311	2,423	683	716	343
HVAC Controls						
EMS install	239,198	239,198	239,198	147,252	147,252	73,129
Programmable Thermostats	99,062	99,062	99,062	53,089	53,089	73,129
EMS Optimization	25,747	25,747	25,747	15,850	15,850	7,872
Space Heating						
Ductless (mini split) - Heating	93,982	0	0	0	0	0
Ground Source Heat Pump - Heating	62,548	0	0	0	0	0
VFD Pump	14,151	14,151	14,151	7,663	7,663	3,805
High Efficiency Heat Pump	11,967	28,754	0	0	0	0
ECM motors on furnaces	6,289	6,289	6,289	1,197	1,197	594

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE -UCT- (MWH)
Water Loop Heat Pump (WLHP) - Heating	4,510	4,510	0	1,628	0	915
High Efficiency Pumps	2,372	2,372	2,372	301	301	169
Other						
NEMA Premium Transformer, three-phase	59,972	59,972	59,972	12,761	12,761	7,169
NEMA Premium Transformer, single-phase	38,231	38,231	38,231	8,135	8,135	4,570
Optimized Snow and Ice Melt Controls	4,682	4,682	4,682	3,022	3,022	1,501
Engine Block Heater Timer	3,306	3,306	3,306	2,135	2,135	1,199
Electrically Commutated Plug Fans in data centers	1,217	1,217	1,217	524	524	294
Vendor Miser for Non-Refrig Equipment	855	855	0	552	0	274
Process Heating						
Electric Supply System Improvements	115,369	115,369	115,369	39,233	39,233	22,040
Sensors & Controls	112,867	112,867	112,867	38,378	38,378	21,559
Energy Information System	36,807	36,807	36,807	12,514	12,514	7,030
Process Cooling and Refrigeration						
Improved Refrigeration	132,031	132,031	132,031	48,585	48,585	27,294
Electric Supply System Improvements	76,090	76,090	76,090	27,995	27,995	15,727
Sensors & Controls	74,287	74,287	74,287	27,329	27,329	15,353
Energy Information System	24,176	24,176	24,176	8,893	8,893	4,996
Machine Drive						
Motor System Optimization (Including ASD)	1,595,219	1,595,219	1,595,219	612,224	612,224	357,685
Pump System Efficiency Improvements	387,428	387,428	387,428	148,984	148,984	87,042
Compressed Air System Management	324,440	324,440	324,440	187,765	187,765	109,700
Electric Supply System Improvements	278,666	278,666	278,666	106,905	106,905	62,458
Sensors & Controls	272,349	272,349	272,349	104,474	104,474	61,038
Advanced Efficient Motors	162,603	162,603	162,603	37,425	37,425	21,865
Energy Information System	86,616	86,616	86,616	33,224	33,224	19,411

END USE	TECHNICAL POTENTIAL (MWH)	ECONOMIC POTENTIAL -UCT- (MWH)	ECONOMIC POTENTIAL -TRC- (MWH)	ACHIEVABLE POTENTIAL -UCT- (MWH)	ACHIEVABLE POTENTIAL -TRC- (MWH)	CONSTRAINED ACHIEVABLE -UCT- (MWH)
Industrial Motor Management	69,714	69,714	69,714	40,112	40,112	23,435
Compressed Air - Advanced Compressor Controls	67,391	67,391	67,391	26,002	26,002	15,191
Advanced Lubricants	51,830	51,830	51,830	29,847	29,847	17,438
Fan System Improvements	48,056	48,056	48,056	18,082	18,082	10,564
Total	**9,180,717**	**7,133,458**	**6,568,017**	**3,087,742**	**2,816,429**	**1,735,830**
% of Annual Sales Forecast	**26.4%**	**20.5%**	**18.9%**	**8.9%**	**8.1%**	**5.0%**
Note: Measures in the above Table with "0" achievable potential are ones that did not pass the SCT Test.						

Table 8-21 provides a list of the Top 10 industrial electric savings measures for the Achievable UCT scenario. The table provides the measures ranked according to the electric savings potential. The column to the far right shows the results of the measure level cost-effectiveness screening test using the UCT to screen the measures. The table presents an average of the UCT ratios for all measures which are part of the measure categories in the Top 10.

The Top 10 measures combine to yield an estimated 1,682,050 MWh savings. This accounts for 54% of the total industrial electric savings in the Achievable UCT scenario.

Table 8-21: Top 10 Industrial Electric Savings Measures in the Achievable UCT Scenario

MEASURE	2023 ENERGY (MWH)	% OF SECTOR SAVINGS	UCT RATIO
1. Motor System Optimization (Including ASD)	612,224	20%	18.88
2. Compressed Air System Management	187,765	6%	16,869.70
3. Daylight Dimming	156,853	5%	7.57
4. Pump System Efficiency Improvements	148,984	5%	22.06
5. EMS install	147,252	5%	87.52
6. Electric Supply System Improvements (Motors)	106,905	3%	17.61
7. Sensors & Controls (Motors)	104,474	3%	12.63
8. Demand-Controlled Ventilation	84,211	3%	5.00
9. Central Lighting Control	75,052	2%	7.54
10. Variable Speed Drive Control, 40 HP	58,331	2%	2.69
Total	**1,682,050**	**54%**	

8.2 INDUSTRIAL NATURAL GAS POTENTIAL

The GDS Associates natural gas consumption forecasts for the residential, commercial and industrial segments of the Michigan economy indicates that annual natural gas consumption will decrease by about 10% from 656.2 trillion BTU in 2013 to 587.2 trillion BTU in 2023.[46] Over that same period industrial natural gas use is expected to decline by about 4% from 2012 levels.

8.2.1 Natural Gas Energy Efficiency Measures Examined

For the industrial sector, there were 44 unique natural gas energy efficiency measures included in the potential natural gas savings analysis. Table 8-18 provides a brief description of the types of natural gas energy efficiency measures included for each end use in the industrial sector. The list of measures was developed based on a review of the Michigan Energy Measures Database (MEMD), and measures found in other Technical Reference Manuals (TRMs) and industrial potential studies. For each measure, the analysis considered incremental costs, energy savings, and useful measure life.

[46] GDS applied a forecast trends to actual deliveries by customer classes as reported by the U.S. Energy Information Administration (EIA). The annual sales forecast trends are based the EIA's Long term Reference Case forecast of natural gas consumption for the East North Central Region (Illinois, Indiana, Michigan, Ohio, and Wisconsin) as reported in the EIA 2013 Annual Energy Outlook.

Table 8-22: Measures and Programs Included in the Industrial Sector Analysis

END USE TYPE	END USE DESCRIPTION	MEASURES/PROGRAMS INCLUDED
Building Envelope	Building Insulation & Air Sealing	• Wall Insulation R-7.5 to R13 • Below Grade Insulation • Ceiling Insulation R-11 to R-42 • Energy Efficient Windows • Roof Insulation R-11 to R-24
Conventional Boiler Use	Boiler Improvements	• Insulate Steam Lines / Condensate Tank • Repair Malfunctioning Steam Traps • High Efficiency Hot Water Boiler (>300,000 Btu/h) • Condensing Boiler (>300,000 Btu/h) (EF>90%) • Boiler Pipe Insulation • High Efficiency Steam Boiler (>300,000 Btu/h) • Boiler Reset Controls • Boiler Blowdown Heat Exchanger (Steam) • High Efficiency Hot Water Boiler (<=300,000 Btu/h) • Boiler Tune-Up • High Efficiency Steam Boiler (<=300,000 Btu/h) • Condensing Boiler (<=300,000 Btu/h) • Boiler O2 Trim Controls • Electronic Parallel Positioning Controls (linkage less)
Facility HVAC	HVAC improvements	• Stack Heat Exchanger (Condensing Economizer) • Stack Heat Exchanger (Standard Economizer) • High Efficiency Furnace (<=300,000 Btu/h) • Infrared Heater (low intensity - two stage) • Direct Fired Make-up Air System • Gas Unit Heater - Condensing • Heat Recovery: Air to Air • Insulate and Seal Ducts (New Aerosl Duct Sealing)
HVAC Controls	HVAC Controls Improvement	• EMS Optimization • EMS install • Programmable Thermostats
Process Heating	Process Heating Improvements	• Regenerative Thermal Oxidizer vs. STO • Boiler Pipe Insulation • High Efficiency Hot Water Boiler (>300,000 Btu/h)

END USE TYPE	END USE DESCRIPTION	MEASURES/PROGRAMS INCLUDED
		• Condensing Boiler (>300,000 Btu/h) (EF>90%) • High Efficiency Steam Boiler (>300,000 Btu/h) • Boiler Reset Controls • Boiler Tune-Up • Regenerative Thermal Oxidizer vs. CTO • Improved Sensors & Process Controls • Boiler O2 Trim Controls • Electronic Parallel Positioning Controls (linkage less) • Waste-Heat Recovery
Ventilation	Ventilation & Fans	• Demand-Controlled Ventilation • Controlled Ventilation Optimization • Improved Duct Sealing • Destratification Fan

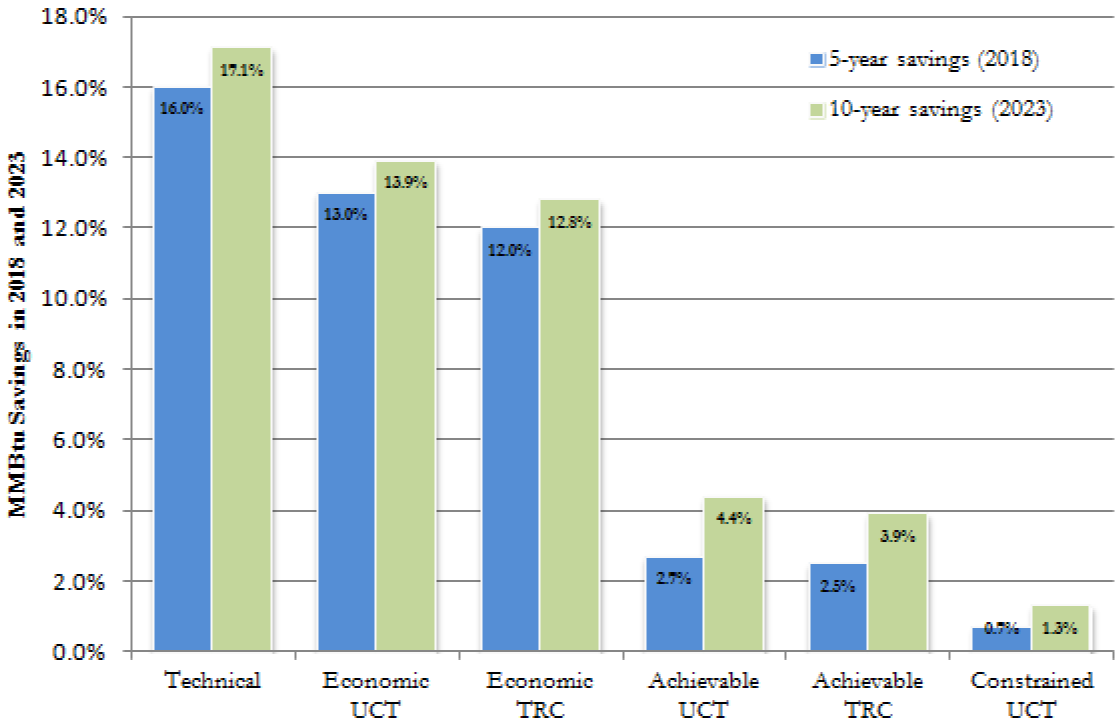
8.2.2 Technical and Economic Potential Natural Gas Savings

This section presents estimates for natural gas technical, economic, and achievable potential for the industrial sector. Each of the tables in the technical, economic and achievable sections present the respective potential for efficiency savings expressed as cumulative savings (MMBtu) and percentage of sales. Data is provided for a 5 and 10-year horizon for Michigan

SUMMARY OF FINDINGS

Figure 8-4 illustrates the estimated savings potential for each of all the scenarios included in this study.

Figure 8-4: Summary of Industrial Natural Gas Energy Efficiency Potential as a % Sales Forecasts



The potential estimates are expressed as cumulative 5-year and 10-year savings, as percentages of the respective 2018 and 2023 industrial sector sales. The technical potential is 16.0% in 2018 and 17.1% in 2023. The 5-year and 10-year economic potential is 13.0% and 13.9% based on the Utility Cost Test (UCT) screen, assuming an incentive level equal to 50% of the measure cost. Based on a measure-level screen using the TRC Test, the economic potential is 12.0% in 2018 and 12.8% in 2023. The slight drop from technical potential to economic potential indicates that most measures are cost-effective.

The 5-year and 10-year achievable potential savings are: 2.7% and 4.4% for the Achievable UCT scenario; 2.5% and 3.9% for the Achievable TRC scenario; and 0.7% and 1.3% for the Constrained Achievable scenario. The Achievable UCT scenario assumes 50% incentives and includes measures that passed the UCT Test. The Achievable TRC scenario also assumes 50% incentives but includes only measures that passed the cost-effectiveness screen based on the TRC Test. Last, the Constrained Achievable scenario is a subset of Achievable UCT scenario, assuming a spending cap on non-residential DSM approximately equal to 2% of future annual industrial and industrial revenue. The percent of the non-residential spending cap allocated to the industrial sector is based on the percentage of total non-residential UCT savings that the industrial sector represents. This presumes that the total non-residential spending cap will allocated at the sector level based on where the savings opportunities are found.

TECHNICAL POTENTIAL

Technical potential represents the quantification of savings that can be realized if energy-efficiency measures passing the qualitative screening are applied in all feasible instances, regardless of cost. Table 8-23 shows that it is technically feasible to save over 26 million MMBtu during the 10 year period from 2013 to 2023 across Michigan, representing just over 16.0% and 17.1% of 2018 and 2023 sector sales, respectively. Process heating represents the majority of the potential at 41% of 10-yr savings, while ventilation and Ventilation represent the smallest share with 3 percent of 10-yr savings.

Table 8-23: Industrial Sector Technical Potential MMBtu Savings By End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Process Heating	11,449,066	44%	11,449,066	44%
Facility HVAC	7,623,712	29%	7,623,712	29%
Conventional Boiler Use	3,225,394	12%	3,225,394	12%
Envelope	2,728,383	10%	2,728,383	10%
HVAC Controls	1,796,940	7%	1,796,940	7%
Ventilation	893,366	3%	893,366	3%
Lighting	-1,533,839	-6%	-1,533,839	-6%
Total	**26,183,022**	**100%**	**26,183,022**	**100%**
Percent of Annual Sales Forecast	16.0%		17.1%	

ECONOMIC POTENTIAL

Economic potential is a subset of technical potential, which only accounts for measures that are cost-effective. This analysis includes two estimates of economic potential. One cost-effectiveness screen is based on the UCT and a second economic potential scenario was screened using the TRC Test. In both scenarios, the utility incentive was assumed to be equal to 50% of the measure incremental cost. The UCT was used for this study because it is mandated in Michigan to be the primary cost-effectiveness test used when considering energy efficiency programs. Because the TRC includes participant costs, it goes beyond utility resource acquisition and looks at the measure/program from a more broad perspective. 77% of all measures that were included in the electric potential analysis passed the UCT and 75% of all measures passed the TRC Test.

Table 8-24 indicates that the economic potential based on the UCT screen is just over 21 million MMBTu during the 10 year period from 2014 to 2023. This represents 13.0% and 13.9% of industrial sales in 2018 and 2023. Process heating again makes up a majority of the savings.

Table 8-24: Industrial Sector Economic Natural Gas UCT Savings By End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Process Heating	10,011,269	47%	10,011,269	47%
Facility HVAC	6,362,046	30%	6,362,046	30%
HVAC Controls	3,069,341	14%	3,069,341	14%
Conventional Boiler Use	1,796,940	8%	1,796,940	8%
Ventilation	893,366	4%	893,366	4%
Envelope	574,166	3%	574,166	3%
Lighting	-1,516,602	-7%	-1,516,602	-7%
Total	**21,190,526**	**100%**	**21,190,526**	**100%**
Percent of Annual Sales Forecast	13.0%		13.9%	

Table 8-25 shows that the economic potential based on the TRC screen is over 19 million MMBtu during the 10 year period from 2014 to 2023. This represents 12.0% and 12.8% of industrial sales in

2018 and 2023. As with UCT process heating measures continue to makes up a majority of the savings potential.

Table 8-25: Industrial Sector Economic Natural Gas TRC Savings By End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Process Heating	8,400,649	43%	8,400,649	43%
Facility HVAC	6,362,046	32%	6,362,046	32%
HVAC Controls	3,071,321	16%	3,071,321	16%
Conventional Boiler Use	1,796,940	9%	1,796,940	9%
Ventilation	893,366	5%	893,366	5%
Envelope	574,166	3%	574,166	3%
Lighting	-1,486,891	-8%	-1,486,891	-8%
Total	**19,611,597**	**100%**	**19,611,597**	**100%**
Percent of Annual Sales Forecast	12.0%		12.8%	

8.2.3 Achievable Potential Savings in the Industrial Sector

Achievable potential is an estimate of energy savings that can feasibly be achieved given market barriers and equipment replacement cycles. This study estimated achievable potential for three scenarios. The Achievable UCT Scenario determines the achievable potential of all measures that passed the UCT economic screening assuming incentives equal to 50% of the measure cost. Unlike the economic potential, the industrial achievable potential takes into account the estimated market adoption of energy efficiency measures based on the incentive level and the natural replacement cycle of equipment. The second scenario, Achievable TRC, also assumes incentives set at 50% of the measure incremental cost, but only includes measures that passed the TRC Test economic screening. The third scenario, Constrained UCT, assumes a spending cap equal to 2% of utility revenues, thereby limiting utilities from reaching the ultimate potential estimated in the Achievable UCT scenario.

8.2.3.1 UCT vs. TRC

Tables 8-26 and 8-27 show the estimated savings for the Achievable UCT and Achievable TRC scenarios over 5 and 10 year time horizons. As noted above, both scenarios assume an incentive level approximately equal to 50% of the incremental measure cost and include an estimate 10-year market adoption rates based on incentive levels and equipment replacement cycles. However, because more measures pass the UCT relative to the TRC Test, the Achievable UCT scenario is able to include additional measures that would result in greater savings potential over the next five and ten years. Overall the Achievable UCT scenario results in an achievable potential that is slightly less than eight million MMBtu greater, over the next decade, than the achievable TRC scenario.

Table 8-26: Industrial Achievable UCT Natural Gas Potential Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Process Heating	2,187,112	49%	3,295,968	49%
Facility HVAC	1,004,760	23%	1,664,228	25%
HVAC Controls	747,065	17%	1,067,236	16%
Conventional Boiler Use	603,287	14%	933,864	14%
Ventilation	211,567	5%	366,527	5%

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Envelope	79,173	2%	113,104	2%
Lighting	-381,744	-9%	-763,489	-11%
Total	4,451,220	**100%**	6,677,438	**100%**
Percent of Annual Sales Forecast	2.7%		4.4%	

Table 8-27 Industrial Achievable TRC Natural Gas Potential Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Process Heating	1,721,341	43%	2,630,580	44%
Facility HVAC	1,004,760	25%	1,664,228	28%
Conventional Boiler Use	747,065	19%	1,067,236	18%
Ventilation	603,859	15%	934,681	16%
HVAC Controls	211,567	5%	366,527	6%
Envelope	79,173	2%	113,104	2%
Lighting	-381,573	-10%	-763,146	-13%
Total	**3,986,192**	**100%**	**6,013,211**	**100%**
Percent of Annual Sales Forecast	2.5%		3.9%	

8.2.3.2 Achievable UCT vs. Constrained UCT

Although the Achievable UCT assumes incentives are set and capped at 50% of the incremental measure cost, and that measures are typically replaced at the end of their useful life, the Achievable UCT scenario also assumes no DSM spending cap to reach all potential participants. In the Constrained UCT scenario, the analysis assumes a spending cap roughly equal to 2% of Michigan utility revenue. The percent of the non-residential spending cap allocated to the industrial sector is based on the percentage of total non-residential UCT savings that the industrial sector represents. This presumes that the total non-residential spending cap will be allocated at the sector level based on where the savings opportunities are found. To model the impact of a spending cap the market penetration of all cost effective measures was reduced by the ratio of capped spending to uncapped spending that would be required to achieve the Achievable UCT scenario savings potential.

Table 8-28 shows the estimated savings for the Constrained UCT scenario over 5 and 10 year time horizons. The 5-year and 10-year Constrained UCT potential savings estimates are approximately 1,070 thousand MMBtu and 2,039 thousand MMBtu. This equates to 0.7% and 1.3% of sector sales in 2018 and 2023.

Table 8-28: Industrial Constrained UCT Natural Gas Achievable Energy Savings by End Use

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
Process Heating	592,610	55%	1,145,569	56%
Facility HVAC	248,601	23%	538,481	26%
Conventional Boiler Use	170,224	16%	306,447	15%
Ventilation	165,198	15%	330,310	16%

END USE	2018 ENERGY SAVINGS (MMBTU)	% OF 2018 TOTAL	2023 ENERGY SAVINGS (MMBTU)	% OF 2023 TOTAL
HVAC Controls	53,730	5%	122,272	6%
Envelope	18,040	2%	32,477	2%
Lighting	-178,091	-17%	-436,739	-21%
Total	**1,070,312**	**100%**	**2,038,818**	**100%**
Percent of Annual Sales Forecast	0.7%		1.3%	

Figure 8-5 shows the estimated 10-year cumulative natural efficiency savings potential broken out by end use across the entire industrial sector. The Process Heating end use shows the largest potential for savings by a wide margin at over 1.1 million MMBtu, or 56% of total savings, in the Constrained UCT Achievable scenario.

Figure 8-5: Industrial Sector 2023 Constrained UCT Achievable Potential Savings by End Use

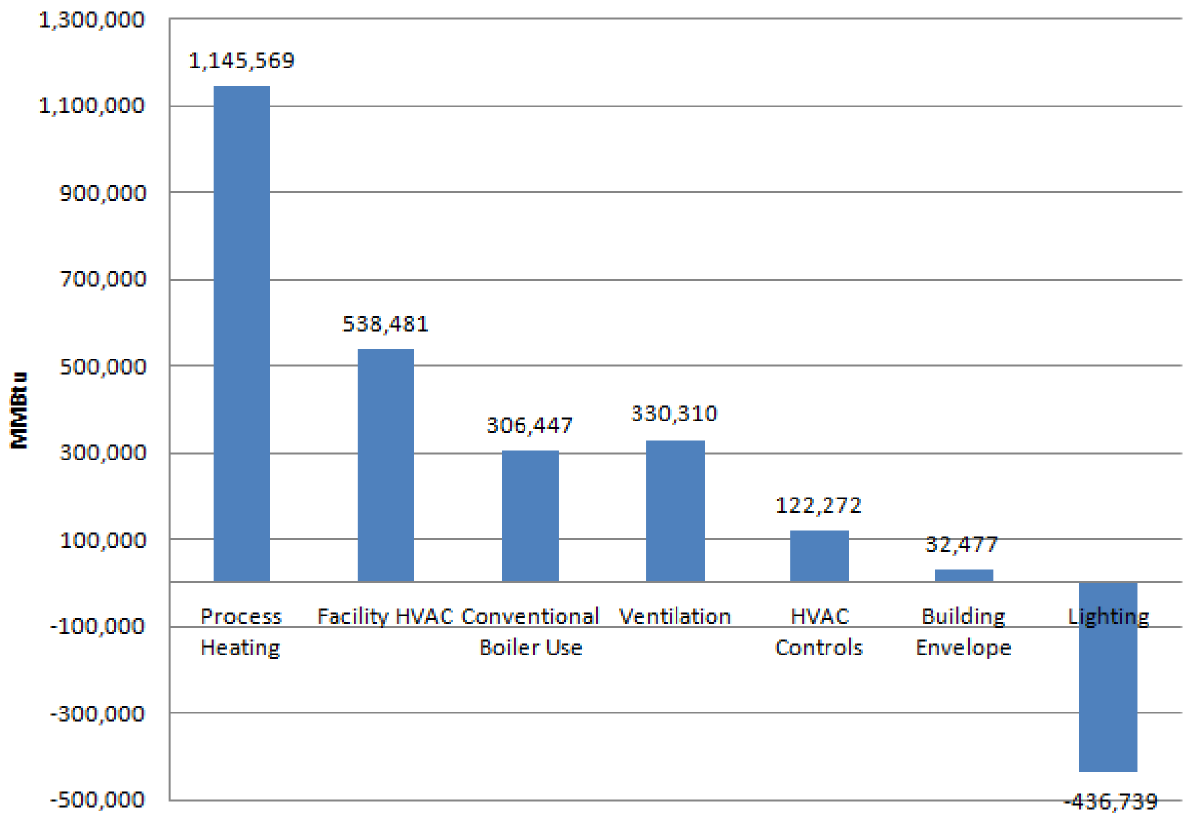
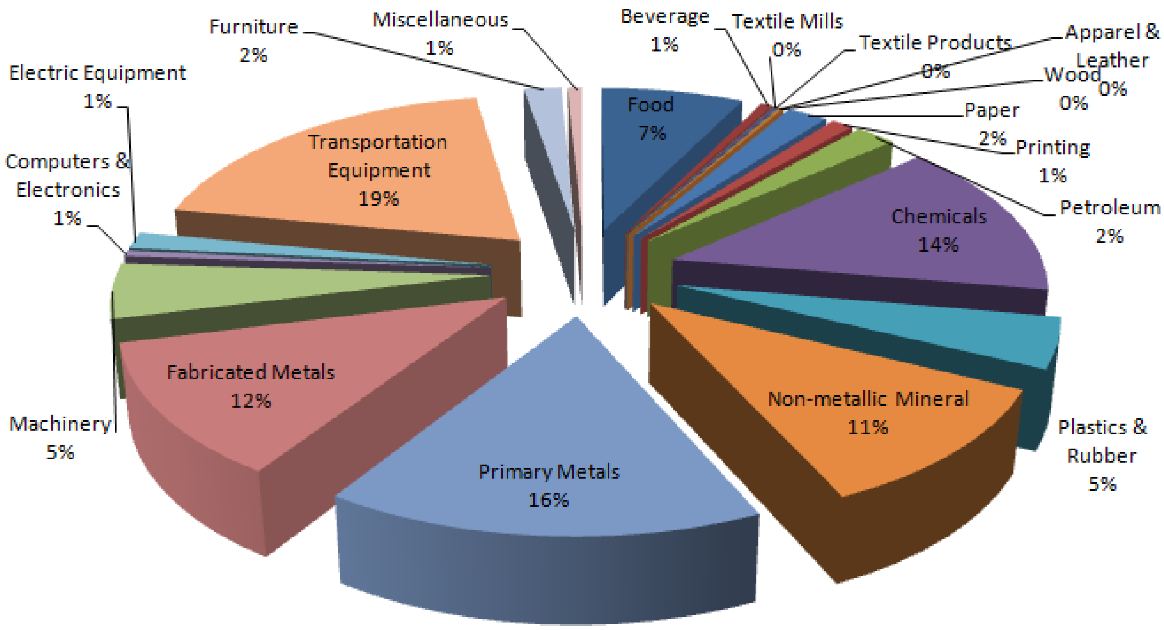


Figure 8-6 shows the breakdown of estimated natural gas savings in 2023 by industry type for the Constrained UCT Achievable scenario. The vast majority of savings come from the transportation equipment, primary metals, chemicals, fabricated metals, non-metallic minerals, and food industries, with all other SIC codes accounting for less than 25% of savings.

Figure 8-6: Industrial Constrained UCT Achievable Potential Savings in 2023 by Industry



8.2.4 Annual Achievable Natural Gas Savings Potential

Tables 8-29, Table 8-30 and Table 8-31 show cumulative energy savings for all achievable scenarios for each year across the 10-year horizon for the study, broken out by end use.

Table 8-29: Cumulative Annual Industrial Natural Gas Savings in the Achievable UCT Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Process Heat	194,815	659,194	1,258,354	1,857,515	2,187,112	2,516,709	2,711,523	2,906,338	3,101,153	3,295,968
Facility HVAC	123,261	332,846	585,591	838,337	1,004,760	1,171,183	1,294,444	1,417,705	1,540,967	1,664,228
HVAC Controls	53,362	213,447	426,895	640,342	747,065	853,789	907,151	960,513	1,013,874	1,067,236
Conventional Boiler Use	59,298	186,773	348,337	509,900	603,287	696,673	755,971	815,268	874,566	933,864
Ventilation	29,577	73,305	124,110	174,915	211,567	248,220	277,797	307,374	336,951	366,527
Envelope	5,655	22,621	45,242	67,862	79,173	90,483	96,138	101,793	107,449	113,104
Lighting	(76,348)	(152,697)	(229,046)	(305,395)	(381,744)	(458,093)	(534,442)	(610,791)	(687,140)	(763,489)
Total	**389,620**	**1,335,488**	**2,559,482**	**3,783,476**	**4,451,220**	**5,118,963**	**5,508,582**	**5,898,201**	**6,287,819**	**6,677,438**
% of Annual Sales Forecast	*0.2%*	*0.8%*	*1.5%*	*2.3%*	*2.7%*	*3.2%*	*3.5%*	*3.8%*	*4.1%*	*4.4%*

Table 8-30: Cumulative Annual Industrial Natural Gas Savings in the Achievable TRC Potential Scenario, by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Process Heat	161,545	526,116	992,199	1,458,283	1,721,341	1,984,399	2,145,944	2,307,490	2,469,035	2,630,580
Facility HVAC	123,261	332,846	585,591	838,337	1,004,760	1,171,183	1,294,444	1,417,705	1,540,967	1,664,228
HVAC Controls	53,362	213,447	426,895	640,342	747,065	853,789	907,151	960,513	1,013,874	1,067,236
Conventional Boiler Use	59,339	186,936	348,664	510,391	603,859	697,327	756,666	816,004	875,343	934,681
Ventilation	29,577	73,305	124,110	174,915	211,567	248,220	277,797	307,374	336,951	366,527
Envelope	5,655	22,621	45,242	67,862	79,173	90,483	96,138	101,793	107,449	113,104
Lighting	(76,314)	(152,629)	(228,943)	(305,258)	(381,573)	(457,887)	(534,202)	(610,516)	(686,831)	(763,146)
Total	**356,425**	**1,202,642**	**2,293,758**	**3,384,872**	**3,986,192**	**4,587,514**	**4,943,938**	**5,300,363**	**5,656,787**	**6,013,211**
% of Annual Sales Forecast	*0.2%*	*0.7%*	*1.4%*	*2.0%*	*2.5%*	*2.9%*	*3.1%*	*3.4%*	*3.7%*	*3.9%*

Table 8-31: Cumulative Annual Industrial Natural Gas Savings in Constrained Achievable Potential Scenario by End Use for Michigan

END USE	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Process Heat	113,268	232,321	353,177	475,207	592,610	710,404	819,060	927,372	1,036,158	1,145,569
Facility HVAC	62,049	108,569	152,708	197,276	248,601	300,097	359,619	418,953	478,546	538,481
HVAC Controls	26,862	62,395	99,671	137,310	170,224	203,247	229,015	254,701	280,500	306,447
Conventional Boiler Use	34,327	66,867	99,314	132,077	165,198	198,428	231,358	264,183	297,152	330,310
Ventilation	14,889	24,595	33,467	42,426	53,730	65,071	79,354	93,591	107,890	122,272
Envelope	2,847	6,613	10,563	14,552	18,040	21,540	24,271	26,993	29,727	32,477
Lighting	(43,775)	(76,534)	(106,235)	(136,682)	(178,091)	(220,151)	(271,815)	(324,465)	(377,287)	(436,739)
Total	**210,467**	**424,825**	**642,666**	**862,166**	**1,070,312**	**1,278,635**	**1,470,860**	**1,661,328**	**1,852,687**	**2,038,818**
% of Annual Sales Forecast	*0.1%*	*0.3%*	*0.4%*	*0.5%*	*0.7%*	*0.8%*	*0.9%*	*1.1%*	*1.2%*	*1.3%*

8.2.5 Industrial Savings Summary

Table 8-32 provides an end-use breakdown of the industrial natural gas savings potential estimates for technical and economic potential, and each of the three achievable potential scenarios. The table indicates how the savings potential decreases systematically from the technical potential scenario to the Constrained Achievable potential scenario as additional limiting factors such as cost-effectiveness requirements and anticipated market adoption at given funding levels are introduced.

Table 8-32: Natural Gas Potential by End-Use and Measure

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE -UCT- (MMBTU)
Conventional Boiler Use						
Insulate Steam Lines / Condensate Tank	83,878	83,878	83,878	34,652	34,652	11,443
Repair Malfunctioning Steam Traps	419,389	419,389	419,389	173,260	173,260	57,213
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	539,964	539,964	539,964	89,229	89,229	37,230
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	32,637	32,637	32,637	7,491	7,491	3,125
Boiler Pipe Insulation	210,169	210,169	210,169	86,826	86,826	28,671
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	251,634	251,634	251,634	41,582	41,582	17,350
Boiler Reset Controls	511,569	511,569	511,569	211,342	211,342	69,788
Boiler Blowdown Heat Exchanger (Steam)	261,211	261,211	261,211	107,913	107,913	35,634
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	194,079	194,079	194,079	40,089	40,089	16,727
Boiler Tune-Up	164,071	164,071	166,051	67,782	68,600	22,382
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	284,426	284,426	284,426	47,001	47,001	19,611
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	116,314	116,314	116,314	26,696	26,696	11,138
Boiler O2 Trim Controls	78,224	0	0	0	0	0
Electronic Parallel Positioning Controls (linkage less)	77,830	0	0	0	0	0
Process Heating						
Regenerative Thermal Oxidizer vs. STO	815,809	815,809	815,809	337,031	337,031	111,776
Boiler Pipe Insulation	848,957	848,957	848,957	350,725	350,725	116,317
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	2,120,091	2,120,091	2,120,091	350,345	350,345	146,812
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	376,904	376,904	376,904	86,505	86,505	36,250

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE -UCT- (MMBTU)
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	989,276	989,276	989,276	163,478	163,478	68,505
Boiler Reset Controls	1,992,335	1,992,335	1,992,335	823,083	823,083	272,974
Boiler Tune-Up	729,934	729,934	729,934	301,554	301,554	100,010
Regenerative Thermal Oxidizer vs. CTO	527,344	527,344	527,344	217,859	217,859	72,252
Improved Sensors & Process Controls	1,610,620	1,610,620	0	665,387	0	220,674
Boiler O2 Trim Controls	310,217	0	0	0	0	0
Electronic Parallel Positioning Controls (linkage less)	308,653	0	0	0	0	0
Waste-Heat Recovery	818,927	0	0	0	0	0
Facility HVAC						
Stack Heat Exchanger (Condensing Economizer)	570,220	570,220	570,220	208,558	208,558	59,885
Stack Heat Exchanger (Standard Economizer)	277,633	277,633	277,633	101,544	101,544	29,158
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	1,740,448	1,740,448	1,740,448	353,649	353,649	128,309
Infrared Heater (low intensity - two stage)	1,459,915	1,459,915	1,459,915	314,096	314,096	113,958
Direct Fired Make-up Air System	1,512,309	1,512,309	1,512,309	553,127	553,127	158,825
Gas Unit Heater - Condensing	801,522	801,522	801,522	133,253	133,253	48,346
Heat Recovery: Air to Air	470,878	0	0	0	0	0
Insulate and Seal Ducts (New Aerosol Duct Sealing)	790,787	0	0	0	0	0
Building Envelope						
Wall Insulation R-7.5 to R13	159,032	159,032	159,032	7,733	7,733	2,220
Below Grade Insulation	7,912	0	0	0	0	0
Ceiling Insulation R-11 to R-42	415,134	415,134	415,134	105,371	105,371	30,256
Energy Efficient Windows	1,896,822	0	0	0	0	0
Roof Insulation R-11 to R-24	249,483	0	0	0	0	0
Ventilation						
Improved Duct Sealing	653,831	653,831	653,831	225,009	225,009	81,636

END USE	TECHNICAL POTENTIAL (MMBTU)	ECONOMIC POTENTIAL -UCT- (MMBTU)	ECONOMIC POTENTIAL -TRC- (MMBTU)	ACHIEVABLE POTENTIAL -UCT- (MMBTU)	ACHIEVABLE POTENTIAL -TRC- (MMBTU)	CONSTRAINED ACHIEVABLE -UCT- (MMBTU)
Destratification Fan	239,535	239,535	239,535	141,519	141,519	40,636
HVAC Controls						
EMS Optimization	127,103	127,103	127,103	78,245	78,245	22,467
EMS install	1,180,814	1,180,814	1,180,814	726,916	726,916	208,727
Programmable Thermostats	489,024	489,024	489,024	262,075	262,075	75,252
Lighting						
Induction Fluorescent	-1,533,839	-1,516,602	-1,486,891	-763,489	-763,146	-436,739
Total	**26,183,022**	**21,190,526**	**19,611,597**	**6,677,438**	**6,013,211**	**2,038,818**
% of Annual Sales Forecast	**17.1%**	**13.9%**	**12.8%**	**4.4%**	**3.9%**	**1.3%**
Note: Measures in the above Table with "0" achievable potential are ones that did not pass the SCT Test.						

Table 8-33 provides a list of the Top 10 industrial natural gas savings measures for the Achievable UCT scenario. The table provides the measures ranked according to the electric savings potential. The column to the far right shows the results of the measure level cost-effectiveness screening test using the UCT to screen the measures.

The Top 10 measures combine to yield an estimated 4,775,915 MMBtu savings. This accounts for 64% of the total industrial electric savings in the Achievable UCT scenario.

Table 8-33: Top 10 Industrial Gas Savings Measures in the Achievable UCT Scenario

MEASURE	2023 ENERGY (MMBTU)	% OF SECTOR SAVINGS	UCT RATIO
1. Boiler Reset Controls	823,083	11%	2.59
2. EMS Install	726,916	10%	18.81
3. Improved Sensors & Process Controls	665,387	9%	1.20
4. Direct Fired Make-up Air System	553,127	7%	1.99
5. High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	353,649	5%	5.69
6. Boiler Pipe Insulation	350,725	5%	4.00
7. High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	350,345	5%	2.11
8. Regenerative Thermal Oxidizer vs. STO	337,031	5%	17.61
9. Infrared Heater (low intensity - two stage)	314,096	4%	5.61
10. Boiler Tune-Up	301,554	4%	2.29
Total	**4,775,915**	**64%**	

8.3 ACHIEVABLE POTENTIAL BENEFITS & COSTS

The tables below provide the net present value (NPV) benefits and costs associated with the three achievable potential scenarios for the industrial sector at the 5-year and 10-year periods. Tables 8-33 and 8-34 compare the 5 and 10 year NPV benefits and costs associated with the Achievable UCT and Achievable TRC Scenarios. Both the UCT and TRC scenario benefits include avoided energy supply and demand costs, while the Achievable TRC scenario benefits also include water savings benefits. The NPV costs in the Achievable UCT scenario includes only program administrator costs (incentives paid, staff labor, marketing, etc.) whereas the Achievable TRC scenario costs include both participant and program administrator costs.

Table 8-34: 5-Year Benefit-Cost Ratios for Achievable Potential Scenarios – Industrial Sector Only

5-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$1,460,878,857	$458,092,836	3.19	$1,002,786,022
Achievable TRC	$1,586,366,858	$490,194,989	3.24	$1,096,171,869

Table 8-35: 10-Year Benefit-Cost Ratios for Achievable Potential Scenarios– Industrial Sector Only

10-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$2,475,174,491	$697,726,700	3.55	$1,777,447,791
Achievable TRC	$2,710,700,750	$795,215,890	3.41	$1,915,484,860

Tables 8-35 and 8-36 compare the NPV benefits and costs associated with the Achievable UCT and Constrained UCT Scenarios. Both scenarios compared the benefits and costs based the UCT. However the constrained scenario's 2% of revenue spending cap on DSM results in reduced program participation and overall NPV benefits.

Table 8-36: 5-Year Benefit-Cost Ratios for Achievable Potential Scenarios – Industrial Sector Only

5-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$1,460,878,857	$458,092,836	3.19	$1,002,786,022
Constrained UCT	$624,960,526	$186,886,891	3.34	$438,073,636

Table 8-37: 10-Year Benefit-Cost Ratios for Achievable Potential Scenarios– Industrial Sector Only

10-YEAR	NPV BENEFITS	NPV COSTS	B/C RATIO	NET BENEFITS
Achievable UCT	$2,475,174,491	$697,726,700	3.55	$1,777,447,791
Constrained UCT	$1,264,708,643	$332,546,178	3.34	$932,162,465

Year by year budgets for all three scenarios, broken out by incentive and administrative costs are depicted in Tables 8-37 through 8-39. Table 8-40 shows the revenue requirements for each scenario as a percentage of forecasted sector sales.

Table 8-38: Annual Program Budgets Associated with the Achievable UCT Scenario (in millions)

ACHIEVABLE UCT	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incentives	$51.2	$76.5	$88.9	$88.5	$62.2	$62.4	$49.1	$49.2	$49.8	$51.5
Admin.	$21.1	$31.3	$36.2	$36.0	$25.5	$25.6	$20.3	$20.3	$20.6	$21.3
Total Costs	*$72.4*	*$107.8*	*$125.1*	*$124.5*	*$87.7*	*$88.0*	*$69.4*	*$69.5*	*$70.4*	*$72.8*

Table 8-39: Annual Program Budgets Associated with the Achievable TRC Scenario (in millions)

ACHIEVABLE TRC	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incentives	$35.5	$46.8	$52.5	$52.6	$41.8	$42.1	$39.2	$36.7	$37.5	$39.7
Admin.	$14.9	$19.4	$21.7	$21.7	$17.4	$17.5	$15.3	$15.3	$15.7	$16.5
Total Costs	*$50.4*	*$66.2*	*$74.2*	*$74.3*	*$59.1*	*$59.6*	*$55.5*	*$52.0*	*$53.1*	*$56.2*

Table 8-40: Annual Program Budgets Associated with the Constrained UCT Scenario (in millions)

CONSTRAINED UCT	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Incentives	$28.8	$29.2	$29.7	$30.2	$30.6	$31.1	$31.5	$32.0	$32.6	$33.1
Admin.	$11.9	$12.0	$12.3	$12.5	$12.6	$12.8	$13.0	$13.2	$13.4	$13.6
Total Costs	*$40.7*	*$41.2*	*$42.0*	*$42.7*	*$43.2*	*$43.9*	*$44.5*	*$45.2*	*$46.0*	*$46.7*

Table 8-41: Revenue Requirements per Scenario as a % of sector sales

	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Achievable UCT	3.5%	5.2%	5.9%	5.8%	4.0%	3.9%	3.0%	3.0%	3.0%	3.1%
Achievable TRC	2.5%	3.4%	3.7%	3.7%	2.8%	2.8%	2.5%	2.3%	2.4%	2.4%
Constrained UCT	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

APPENDIX A: RESIDENTIAL MEASURE DETAIL

APPENDIX B: COMMERCIAL MEASURE DETAIL

APPENDIX C: INDUSTRIAL MEASURE DETAIL

APPENDIX D: GLOBAL ASSUMPTIONS

Michigan Electric And Natural Gas Energy Efficiency Potential Study

Prepared for:

Michigan Public Service Commission

Consumers Energy
Count on Us

DTE Energy

Prepared By:

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Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
1000	Appliances																	
1001	Refrigerator Retirement (and Recycling) - No Replacement	SF	Retrofit	All	1261.0	100.0%	1261.0	0.124	0.124	0.0	0%	0.0	0	8.0	$93.00	Retirement of secondary refrigerators	31.17%	0.00%
1002	Freezer Retirement (and Recycling) - No Replacement	SF	Retrofit	All	1111.0	100.0%	1111.0	0.115	0.115	0.0	0%	0.0	0	8.0	$93.00	Retirement of secondary stand-alone freezers	2.00%	0.00%
1003	Dehumidifier Retirement (and Recycling) - No Replacement	SF	Retrofit	All	624.2	100.0%	624.2	0.382	0.382	0.0	0%	0.0	0.0	8.0	$49.00	Retirement of secondary dehumidifiers	2.00%	0.00%
1004	Energy Star Dehumidifier	SF	ROB	All	624.2	27.0%	168.7	0.103	0.103	0.0	0%	0.0	0.0	12.0	$50.00	Installation of high efficiency dehumidifiers to replace old units in homes with dehumidifiers	27.00%	41.00%
1005	ENERGY STAR Refrigerators	SF	ROB	All	446.4	10.0%	44.6	0.007	0.007	0.0	0%	0.0	0	16.0	$40.00	Installation of high efficiency refrigerators	100.00%	10.00%
1006	ENERGY STAR Freezers	SF	ROB	All	448.8	10.0%	44.9	0.007	0.007	0.0	0%	0.0	0	21.0	$10.00	Installation of high efficiency freezers in homes with freezers	36.00%	4.00%
1007	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	SF	ROB	All	27.1	-30.8%	-8.4	-0.031	-0.031	1.6	26.9%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and gas drying	47.05%	14.00%
1008	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	SF	ROB	All	307.1	3.0%	9.3	0.034	0.034	0.6	59.5%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and electric drying	36.95%	14.00%
1009	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	SF	ROB	All	167.1	44.8%	74.9	0.276	0.276	1.0	6.3%	0.1	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and gas drying	6.95%	14.00%
1010	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	SF	ROB	All	447.2	20.7%	92.6	0.342	0.342	0.0	0%	0.0	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and electric drying	7.05%	14.00%
1011	High Efficiency Gas Clothes Dryer with Moisture Sensor	SF	ROB	All	-	-	0.0	0.0	0.0	2.6	10.0%	0.26	0	14.0	$150.00	Installation of high efficiency gas dryers with moisture sensors in homes with gas dryers	54.00%	25.00%
1012	High Efficiency Electric Clothes Dryer with Moisture Sensor	SF	ROB	All	684.0	10.0%	68.4	0.242	0.242	0.0	0%	0.0	0	14.0	$150.00	Installation of high efficiency electric dryers with moisture sensors in homes with electric dryers	44.00%	25.00%
1013	Heat Pump Electric Dryer	SF	ROB	All	684.0	17.5%	119.5	0.422	0.422	0.0	0%	0.0	0	16.0	$400.00	Installation of heat pump electric dryer in homes with electric dryers	44.00%	25.00%
1014	Tier 2 Energy Star Dishwasher (electric water heating)	SF	ROB	All	307.0	8.8%	27.0	0.05	0.05	-	-	0.0	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and electric water heaters	9.24%	18.00%
1015	Tier 2 Energy Star Dishwasher (gas water heating)	SF	ROB	All	135.1	8.8%	11.9	0.04	0.04	0.8	8.8%	0.07	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and gas water heaters	55.44%	18.00%
1016	Energy Star Dehumidifier	SF	NC	All	624.2	27.0%	168.7	0.103	0.103	0.0	0%	0.0	0.0	12.0	$50.00	Installation of high efficiency dehumidifiers to replace old units in homes with dehumidifiers	27.00%	0.00%
1017	ENERGY STAR Refrigerators	SF	NC	All	446.4	10.0%	44.6	0.007	0.007	0.0	0%	0.0	0	16.0	$40.00	Installation of high efficiency refrigerators	100.00%	0.00%
1018	ENERGY STAR Freezers	SF	NC	All	448.8	10.0%	44.9	0.007	0.007	0.0	0%	0.0	0	21.0	$10.00	Installation of high efficiency freezers in homes with freezers	36.00%	0.00%
1019	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	SF	NC	All	27.1	-30.8%	-8.4	-0.031	-0.031	1.6	26.9%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and gas drying	47.05%	0.00%
1020	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	SF	NC	All	307.1	3.0%	9.3	0.034	0.034	0.6	59.5%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and electric drying	36.95%	0.00%
1021	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	SF	NC	All	167.1	44.8%	74.9	0.276	0.276	1.0	6.3%	0.1	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and gas drying	6.95%	0.00%
1022	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	SF	NC	All	447.2	20.7%	92.6	0.342	0.342	0.0	0%	0.0	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and electric drying	7.05%	0.00%
1023	High Efficiency Gas Clothes Dryer with Moisture Sensor	SF	NC	All	-	-	0.0	0.0	0.0	2.6	10.0%	0.26	0	14.0	$150.00	Installation of high efficiency gas dryers with moisture sensors in homes with gas dryers	54.00%	0.00%
1024	High Efficiency Electric Clothes Dryer with Moisture Sensor	SF	NC	All	684.0	10.0%	68.4	0.242	0.242	0.0	0%	0.0	0	14.0	$150.00	Installation of high efficiency electric dryers with moisture sensors in homes with electric dryers	44.00%	0.00%
1025	Heat Pump Electric Dryer	SF	NC	All	684.0	17.5%	119.5	0.422	0.422	0.0	0%	0.0	0	16.0	$400.00	Installation of heat pump electric dryer in homes with electric dryers	44.00%	0.00%
1026	Tier 2 Energy Star Dishwasher (electric water heating)	SF	NC	All	307.0	8.8%	27.0	0.05	0.05	-	-	0.0	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and electric water heaters	9.24%	0.00%
1027	Tier 2 Energy Star Dishwasher (gas water heating)	SF	NC	All	135.1	8.8%	11.9	0.04	0.04	0.8	8.8%	0.07	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and gas water heaters	55.44%	18.00%
1028	Refrigerator Retirement (and Recycling) - No Replacement	MF	Retrofit	All	1261.0	100.0%	1261.0	0.124	0.124	0.0	0%	0.0	0	8.0	$93.00	Retirement of secondary refrigerators	6.86%	0.00%
1029	Freezer Retirement (and Recycling) - No Replacement	MF	Retrofit	All	1111.0	100.0%	1111.0	0.115	0.115	0.0	0%	0.0	0	8.0	$93.00	Retirement of secondary stand-alone freezers	2.00%	0.00%
1030	Dehumidifier Retirement (and Recycling) - No Replacement	MF	Retrofit	All	624.2	100.0%	624.2	0.382	0.382	0.0	0%	0.0	0.0	8.0	$49.00	Retirement of secondary dehumidifiers	2.00%	0.00%
1031	Energy Star Dehumidifier	MF	ROB	All	624.2	27.0%	168.7	0.103	0.103	0.0	0%	0.0	0.0	12.0	$50.00	Installation of high efficiency dehumidifiers to replace old units in homes with dehumidifiers	27.00%	41.00%
1032	ENERGY STAR Refrigerators	MF	ROB	All	446.4	10.0%	44.6	0.007	0.007	0.0	0%	0.0	0	16.0	$40.00	Installation of high efficiency refrigerators	100.00%	10.00%
1033	ENERGY STAR Freezers	MF	ROB	All	448.8	10.0%	44.9	0.007	0.007	0.0	0%	0.0	0	21.0	$10.00	Installation of high efficiency freezers in homes with freezers	36.00%	4.00%
1034	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MF	ROB	All	27.1	-30.8%	-8.4	-0.031	-0.031	1.6	26.9%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and gas drying	43.00%	14.00%
1035	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MF	ROB	All	307.1	3.0%	9.3	0.034	0.034	0.6	59.5%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and electric drying	43.00%	14.00%
1036	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MF	ROB	All	167.1	44.8%	74.9	0.276	0.276	1.0	6.3%	0.1	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and gas drying	7.00%	14.00%
1037	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MF	ROB	All	447.2	20.7%	92.6	0.342	0.342	0.0	0%	0.0	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and electric drying	7.00%	14.00%
1038	High Efficiency Gas Clothes Dryer with Moisture Sensor	MF	ROB	All	-	-	0.0	0.0	0.0	2.6	10.0%	0.26	0	14.0	$150.00	Installation of high efficiency gas dryers with moisture sensors in homes with gas dryers	50.00%	25.00%
1039	High Efficiency Electric Clothes Dryer with Moisture Sensor	MF	ROB	All	684.0	10.0%	68.4	0.242	0.242	0.0	0%	0.0	0	14.0	$150.00	Installation of high efficiency electric dryers with moisture sensors in homes with electric dryers	50.00%	25.00%
1040	Heat Pump Electric Dryer	MF	ROB	All	684.0	17.5%	119.5	0.422	0.422	0.0	0%	0.0	0	16.0	$400.00	Installation of heat pump electric dryer in homes with electric dryers	50.00%	25.00%
1041	Tier 2 Energy Star Dishwasher (electric water heating)	MF	ROB	All	307.0	8.8%	27.0	0.05	0.05	-	-	0.0	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and electric water heaters	9.24%	18.00%
1042	Tier 2 Energy Star Dishwasher (gas water heating)	MF	ROB	All	135.1	8.8%	11.9	0.04	0.04	0.8	8.8%	0.07	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and gas water heaters	56.76%	18.00%
1043	Energy Star Dehumidifier	MF	NC	All	624.2	27.0%	168.7	0.103	0.103	0.0	0%	0.0	0.0	12.0	$50.00	Installation of high efficiency dehumidifiers to replace old units in homes with dehumidifiers	27.00%	0.00%
1044	ENERGY STAR Refrigerators	MF	NC	All	446.4	10.0%	44.6	0.007	0.007	0.0	0%	0.0	0	16.0	$40.00	Installation of high efficiency refrigerators	100.00%	0.00%
1045	ENERGY STAR Freezers	MF	NC	All	448.8	10.0%	44.9	0.007	0.007	0.0	0%	0.0	0	21.0	$10.00	Installation of high efficiency freezers in homes with freezers	36.00%	0.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
1046	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MF	NC	All	27.1	-30.8%	-8.4	-0.031	-0.031	1.6	26.9%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and gas drying	43.00%	0.00%
1047	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MF	NC	All	307.1	3.0%	9.3	0.034	0.034	0.6	59.5%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and electric drying	43.00%	0.00%
1048	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MF	NC	All	167.1	44.8%	74.9	0.276	0.276	1.0	6.3%	0.1	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and gas drying	7.00%	0.00%
1049	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MF	NC	All	447.2	20.7%	92.6	0.342	0.342	0.0	0%	0.0	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and electric drying	7.00%	0.00%
1050	High Efficiency Gas Clothes Dryer with Moisture Sensor	MF	NC	All	-	-	0.0	0.0	0.0	2.6	10.0%	0.26	0	14.0	$150.00	Installation of high efficiency gas dryers with moisture sensors in homes with gas dryers	50.00%	0.00%
1051	High Efficiency Electric Clothes Dryer with Moisture Sensor	MF	NC	All	684.0	10.0%	68.4	0.242	0.242	0.0	0%	0.0	0	14.0	$150.00	Installation of high efficiency electric dryers with moisture sensors in homes with electric dryers	50.00%	0.00%
1052	Heat Pump Electric Dryer	MF	NC	All	684.0	17.5%	119.5	0.422	0.422	0.0	0%	0.0	0	16.0	$400.00	Installation of heat pump electric dryer in homes with electric dryers	50.00%	0.00%
1053	Tier 2 Energy Star Dishwasher (electric water heating)	MF	NC	All	307.0	8.8%	27.0	0.05	0.05	-	-	0.0	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and electric water heaters	9.24%	0.00%
1054	Tier 2 Energy Star Dishwasher (gas water heating)	MF	NC	All	135.1	8.8%	11.9	0.04	0.04	0.8	8.8%	0.07	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and gas water heaters	56.76%	18.00%
1055	Refrigerator Retirement (and Recycling) - No Replacement	MAN	Retrofit	All	1261.0	100.0%	1261.0	0.124	0.124	0.0	0%	0.0	0	8.0	$93.00	Retirement of secondary refrigerators	6.86%	0.00%
1056	Freezer Retirement (and Recycling) - No Replacement	MAN	Retrofit	All	1111.0	100.0%	1111.0	0.115	0.115	0.0	0%	0.0	0	8.0	$93.00	Retirement of secondary stand-alone freezers	2.00%	0.00%
1057	Dehumidifier Retirement (and Recycling) - No Replacement	MAN	Retrofit	All	624.2	100.0%	624.2	0.382	0.382	0.0	0%	0.0	0.0	8.0	$49.00	Retirement of secondary dehumidifiers	2.00%	0.00%
1058	Energy Star Dehumidifier	MAN	ROB	All	624.2	27.0%	168.7	0.103	0.103	0.0	0%	0.0	0.0	12.0	$50.00	Installation of high efficiency dehumidifiers to replace old units in homes with dehumidifiers	27.00%	41.00%
1059	ENERGY STAR Refrigerators	MAN	ROB	All	446.4	10.0%	44.6	0.007	0.007	0.0	0%	0.0	0	16.0	$40.00	Installation of high efficiency refrigerators	100.00%	10.00%
1060	ENERGY STAR Freezers	MAN	ROB	All	448.8	10.0%	44.9	0.007	0.007	0.0	0%	0.0	0	21.0	$10.00	Installation of high efficiency freezers in homes with freezers	36.00%	4.00%
1061	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MAN	ROB	All	27.1	-30.8%	-8.4	-0.031	-0.031	1.6	26.9%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and gas drying	23.95%	14.00%
1062	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MAN	ROB	All	307.1	3.0%	9.3	0.034	0.034	0.6	59.5%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and electric drying	44.55%	14.00%
1063	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MAN	ROB	All	167.1	44.8%	74.9	0.276	0.276	1.0	6.3%	0.1	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and gas drying	6.05%	14.00%
1064	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MAN	ROB	All	447.2	20.7%	92.6	0.342	0.342	0.0	0%	0.0	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and electric drying	24.45%	14.00%
1065	High Efficiency Gas Clothes Dryer with Moisture Sensor	MAN	ROB	All	-	-	0.0	0.0	0.0	2.6	10.0%	0.26	0	14.0	$150.00	Installation of high efficiency gas dryers with moisture sensors in homes with gas dryers	30.00%	25.00%
1066	High Efficiency Electric Clothes Dryer with Moisture Sensor	MAN	ROB	All	684.0	10.0%	68.4	0.242	0.242	0.0	0%	0.0	0	14.0	$150.00	Installation of high efficiency electric dryers with moisture sensors in homes with electric dryers	69.00%	25.00%
1067	Heat Pump Electric Dryer	MAN	ROB	All	684.0	17.5%	119.5	0.422	0.422	0.0	0%	0.0	0	16.0	$400.00	Installation of heat pump electric dryer in homes with electric dryers	69.00%	25.00%
1068	Tier 2 Energy Star Dishwasher (electric water heating)	MAN	ROB	All	307.0	8.8%	27.0	0.05	0.05	-	-	0.0	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and electric water heaters	20.13%	18.00%
1069	Tier 2 Energy Star Dishwasher (gas water heating)	MAN	ROB	All	135.1	8.8%	11.9	0.04	0.04	0.8	8.8%	0.07	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and gas water heaters	45.21%	18.00%
1070	Energy Star Dehumidifier	MAN	NC	All	624.2	27.0%	168.7	0.103	0.103	0.0	0%	0.0	0.0	12.0	$50.00	Installation of high efficiency dehumidifiers to replace old units in homes with dehumidifiers	27.00%	0.00%
1071	ENERGY STAR Refrigerators	MAN	NC	All	446.4	10.0%	44.6	0.007	0.007	0.0	0%	0.0	0	16.0	$40.00	Installation of high efficiency refrigerators	100.00%	0.00%
1072	ENERGY STAR Freezers	MAN	NC	All	448.8	10.0%	44.9	0.007	0.007	0.0	0%	0.0	0	21.0	$10.00	Installation of high efficiency freezers in homes with freezers	36.00%	0.00%
1073	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MAN	NC	All	27.1	-30.8%	-8.4	-0.031	-0.031	1.6	26.9%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and gas drying	23.95%	0.00%
1074	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MAN	NC	All	307.1	3.0%	9.3	0.034	0.034	0.6	59.5%	0.4	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with gas water heating and electric drying	44.55%	0.00%
1075	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MAN	NC	All	167.1	44.8%	74.9	0.276	0.276	1.0	6.3%	0.1	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and gas drying	6.05%	0.00%
1076	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MAN	NC	All	447.2	20.7%	92.6	0.342	0.342	0.0	0%	0.0	1717	11.0	$247.00	Installing an ENERGY STAR clothes washer, in homes with electric water heating and electric drying	24.45%	0.00%
1077	High Efficiency Gas Clothes Dryer with Moisture Sensor	MAN	NC	All	-	-	0.0	0.0	0.0	2.6	10.0%	0.26	0	14.0	$150.00	Installation of high efficiency gas dryers with moisture sensors in homes with gas dryers	30.00%	0.00%
1078	High Efficiency Electric Clothes Dryer with Moisture Sensor	MAN	NC	All	684.0	10.0%	68.4	0.242	0.242	0.0	0%	0.0	0	14.0	$150.00	Installation of high efficiency electric dryers with moisture sensors in homes with electric dryers	69.00%	0.00%
1079	Heat Pump Electric Dryer	MAN	NC	All	684.0	17.5%	119.5	0.422	0.422	0.0	0%	0.0	0	16.0	$400.00	Installation of heat pump electric dryer in homes with electric dryers	69.00%	0.00%
1080	Tier 2 Energy Star Dishwasher (electric water heating)	MAN	NC	All	307.0	8.8%	27.0	0.05	0.05	-	-	0.0	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and electric water heaters	20.13%	0.00%
1081	Tier 2 Energy Star Dishwasher (gas water heating)	MAN	NC	All	135.1	8.8%	11.9	0.04	0.04	0.8	8.8%	0.07	215	11.0	$50.00	Installation of high efficiency dishwashers in homes with dishwashers and gas water heaters	45.21%	18.00%
2000	Electronics																	
2001	Smart Strip plug outlet	SF	Retrofit	All	-	-	24.0	0.01	0.009	0.0	0%	0.00	0	5.0	$40.00	Installation of smart strip power strips for home enertertainment and office centers to eliminate standby power use	100.00%	6.00%
2002	Efficient Set Top Box	SF	Retrofit	All	-	-	41.3	0.026	0.026	0.0	0%	0.00	0	5.0	$5.00	Installation of high-efficiency set-top boxes to reduce "on-mode" power use; in homes with at least one TV	274.00%	63.00%
2003	ENERGY STAR + 10% Display	SF	ROB	All	66.2	29.3%	19.4	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (10% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2004	ENERGY STAR + 30% Display	SF	ROB	All	66.2	45.0%	29.8	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (30% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2005	ENERGY STAR + 50 % Display	SF	ROB	All	66.2	60.7%	40.2	0.02	0.02	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2006	ENERGY STAR 6.0 TV + 20% (0-20")	SF	ROB	All	61.6	36.0%	22.2	0.01	0.01	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 0-20" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	16.44%	41.41%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
2007	ENERGY STAR 6.0 TV + 20% (21-30")	SF	ROB	All	110.0	43.5%	47.9	0.03	0.03	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 21-30" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	41.41%
2008	ENERGY STAR 6.0 TV + 20% (31-40")	SF	ROB	All	170.6	42.0%	71.7	0.05	0.05	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 31-40" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	41.41%
2009	ENERGY STAR 6.0 TV + 20% (41-50")	SF	ROB	All	246.0	43.5%	106.9	0.07	0.07	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 41-50" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	41.41%
2010	ENERGY STAR 6.0 TV + 20% (51-60")	SF	ROB	All	334.7	48.7%	162.9	0.11	0.11	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 51-60" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	41.41%
2011	ENERGY STAR 6.0 TV + 20% (over 60")	SF	ROB	All	452.6	56.8%	257.2	0.18	0.18	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 60+" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	5.48%	41.41%
2012	ENERGY STAR PC	SF	ROB	All	238.5	32.1%	76.6	0.02	0.02	-	-	0.0	-	4.0	$8.00	Installation of high-efficiency desktop computers in homes with deskptop computers	108.00%	10.84%
2013	ES Laptop	SF	ROB	All	134.4	33.0%	44.4	0.01	0.01	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops	61.00%	32.79%
2014	ES Laptop (Power Mgmt Enabled)	SF	ROB	All	37.1	27.2%	10.1	0.00	0.00	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops (w/ power management)	61.00%	32.79%
2015	Smart Strip plug outlet	SF	NC	All	-	-	24.0	0.01	0.01	0.0	0%	0.00	0	5.0	$40.00	Installation of smart strip power strips for home enertertainment and office centers to eliminate standby power use	100.00%	6.00%
2016	Efficient Set Top Box	SF	NC	All	-	-	41.3	0.026	0.026	0.0	0%	0.00	0	5.0	$5.00	Installation of high-efficiency set-top boxes to reduce "on-mode" power use; in homes with at least one TV	274.00%	63.00%
2017	ENERGY STAR + 10% Display	SF	NC	All	66.2	29.3%	19.4	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (10% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2018	ENERGY STAR + 30% Display	SF	NC	All	66.2	45.0%	29.8	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (30% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2019	ENERGY STAR + 50 % Display	SF	NC	All	66.2	60.7%	40.2	0.02	0.02	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2020	ENERGY STAR 6.0 TV + 20% (0-20")	SF	NC	All	61.6	36.0%	22.2	0.01	0.01	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 0-20" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	16.44%	0.00%
2021	ENERGY STAR 6.0 TV + 20% (21-30")	SF	NC	All	110.0	43.5%	47.9	0.03	0.03	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 21-30" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	0.00%
2022	ENERGY STAR 6.0 TV + 20% (31-40")	SF	NC	All	170.6	42.0%	71.7	0.05	0.05	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 31-40" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	0.00%
2023	ENERGY STAR 6.0 TV + 20% (41-50")	SF	NC	All	246.0	43.5%	106.9	0.07	0.07	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 41-50" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	0.00%
2024	ENERGY STAR 6.0 TV + 20% (51-60")	SF	NC	All	334.7	48.7%	162.9	0.11	0.11	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 51-60" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	0.00%
2025	ENERGY STAR 6.0 TV + 20% (over 60")	SF	NC	All	452.6	56.8%	257.2	0.18	0.18	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 60+" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	5.48%	0.00%
2026	ENERGY STAR PC	SF	NC	All	238.5	32.1%	76.6	0.02	0.02	-	-	0.0	-	4.0	$8.00	Installation of high-efficiency desktop computers in homes with deskptop computers	108.00%	0.00%
2027	ES Laptop	SF	NC	All	134.4	33.0%	44.4	0.01	0.01	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops	61.00%	0.00%
2028	ES Laptop (Power Mgmt Enabled)	SF	NC	All	37.1	27.2%	10.1	0.00	0.00	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops (w/ power management)	61.00%	0.00%
2029	Smart Strip plug outlet	MF	Retrofit	All	-	-	24.0	0.01	0.01	0.0	0%	0.00	0	5.0	$40.00	Installation of smart strip power strips for home enertertainment and office centers to eliminate standby power use	100.00%	6.00%
2030	Efficient Set Top Box	MF	Retrofit	All	-	-	41.3	0.026	0.026	0.0	0%	0.00	0	5.0	$5.00	Installation of high-efficiency set-top boxes to reduce "on-mode" power use; in homes with at least one TV	274.00%	63.00%
2031	ENERGY STAR + 10% Display	MF	ROB	All	66.2	29.3%	19.4	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (10% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2032	ENERGY STAR + 30% Display	MF	ROB	All	66.2	45.0%	29.8	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (30% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2033	ENERGY STAR + 50 % Display	MF	ROB	All	66.2	60.7%	40.2	0.02	0.02	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2034	ENERGY STAR 6.0 TV + 20% (0-20")	MF	ROB	All	61.6	36.0%	22.2	0.01	0.01	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 0-20" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	16.44%	41.41%
2035	ENERGY STAR 6.0 TV + 20% (21-30")	MF	ROB	All	110.0	43.5%	47.9	0.03	0.03	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 21-30" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	41.41%
2036	ENERGY STAR 6.0 TV + 20% (31-40")	MF	ROB	All	170.6	42.0%	71.7	0.05	0.05	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 31-40" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	41.41%
2037	ENERGY STAR 6.0 TV + 20% (41-50")	MF	ROB	All	246.0	43.5%	106.9	0.07	0.07	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 41-50" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	41.41%
2038	ENERGY STAR 6.0 TV + 20% (51-60")	MF	ROB	All	334.7	48.7%	162.9	0.11	0.11	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 51-60" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	41.41%
2039	ENERGY STAR 6.0 TV + 20% (over 60")	MF	ROB	All	452.6	56.8%	257.2	0.18	0.18	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 60+" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	5.48%	41.41%
2040	ENERGY STAR PC	MF	ROB	All	238.5	32.1%	76.6	0.02	0.02	-	-	0.0	-	4.0	$8.00	Installation of high-efficiency desktop computers in homes with deskptop computers	108.00%	10.84%
2041	ES Laptop	MF	ROB	All	134.4	33.0%	44.4	0.01	0.01	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops	61.00%	32.79%
2042	ES Laptop (Power Mgmt Enabled)	MF	ROB	All	37.1	27.2%	10.1	0.00	0.00	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops (w/ power management)	61.00%	32.79%
2043	Smart Strip plug outlet	MF	NC	All	-	-	24.0	0.01	0.01	0.0	0%	0.00	0	5.0	$40.00	Installation of smart strip power strips for home enertertainment and office centers to eliminate standby power use	100.00%	6.00%
2044	Efficient Set Top Box	MF	NC	All	-	-	41.3	0.026	0.026	0.0	0%	0.00	0	5.0	$5.00	Installation of high-efficiency set-top boxes to reduce "on-mode" power use; in homes with at least one TV	274.00%	63.00%
2045	ENERGY STAR + 10% Display	MF	NC	All	66.2	29.3%	19.4	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (10% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2046	ENERGY STAR + 30% Display	MF	NC	All	66.2	45.0%	29.8	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (30% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2047	ENERGY STAR + 50 % Display	MF	NC	All	66.2	60.7%	40.2	0.02	0.02	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2048	ENERGY STAR 6.0 TV + 20% (0-20")	MF	NC	All	61.6	36.0%	22.2	0.01	0.01	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 0-20" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	16.44%	0.00%

Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
2049	ENERGY STAR 6.0 TV + 20% (21-30")	MF	NC	All	110.0	43.5%	47.9	0.03	0.03	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 21-30" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	0.00%
2050	ENERGY STAR 6.0 TV + 20% (31-40")	MF	NC	All	170.6	42.0%	71.7	0.05	0.05	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 31-40" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	0.00%
2051	ENERGY STAR 6.0 TV + 20% (41-50")	MF	NC	All	246.0	43.5%	106.9	0.07	0.07	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 41-50" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	0.00%
2052	ENERGY STAR 6.0 TV + 20% (51-60")	MF	NC	All	334.7	48.7%	162.9	0.11	0.11	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 51-60" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	0.00%
2053	ENERGY STAR 6.0 TV + 20% (over 60")	MF	NC	All	452.6	56.8%	257.2	0.18	0.18	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 60+" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	5.48%	0.00%
2054	ENERGY STAR PC	MF	NC	All	238.5	32.1%	76.6	0.02	0.02	-	-	0.0	-	4.0	$8.00	Installation of high-efficiency desktop computers in homes with deskptop computers	108.00%	0.00%
2055	ES Laptop	MF	NC	All	134.4	33.0%	44.4	0.01	0.01	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops	61.00%	0.00%
2056	ES Laptop (Power Mgmt Enabled)	MF	NC	All	37.1	27.2%	10.1	0.00	0.00	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops (w/ power management)	61.00%	0.00%
2057	Smart Strip plug outlet	MAN	Retrofit	All	-	-	24.0	0.01	0.01	0.0	0%	0.00	0	5.0	$40.00	Installation of smart strip power strips for home enertertainment and office centers to eliminate standby power use	100.00%	6.00%
2058	Efficient Set Top Box	MAN	Retrofit	All	-	-	41.3	0.026	0.026	0.0	0%	0.00	0	5.0	$5.00	Installation of high-efficiency set-top boxes to reduce "on-mode" power use; in homes with at least one TV	274.00%	63.00%
2059	ENERGY STAR + 10% Display	MAN	ROB	All	66.2	29.3%	19.4	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (10% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2060	ENERGY STAR + 30% Display	MAN	ROB	All	66.2	45.0%	29.8	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (30% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2061	ENERGY STAR + 50 % Display	MAN	ROB	All	66.2	60.7%	40.2	0.02	0.02	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	17.95%
2062	ENERGY STAR 6.0 TV + 20% (0-20")	MAN	ROB	All	61.6	36.0%	22.2	0.01	0.01	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 0-20" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	16.44%	41.41%
2063	ENERGY STAR 6.0 TV + 20% (21-30")	MAN	ROB	All	110.0	43.5%	47.9	0.03	0.03	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 21-30" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	41.41%
2064	ENERGY STAR 6.0 TV + 20% (31-40")	MAN	ROB	All	170.6	42.0%	71.7	0.05	0.05	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 31-40" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	41.41%
2065	ENERGY STAR 6.0 TV + 20% (41-50")	MAN	ROB	All	246.0	43.5%	106.9	0.07	0.07	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 41-50" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	41.41%
2066	ENERGY STAR 6.0 TV + 20% (51-60")	MAN	ROB	All	334.7	48.7%	162.9	0.11	0.11	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 51-60" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	41.41%
2067	ENERGY STAR 6.0 TV + 20% (over 60")	MAN	ROB	All	452.6	56.8%	257.2	0.18	0.18	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 60+" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	5.48%	41.41%
2068	ENERGY STAR PC	MAN	ROB	All	238.5	32.1%	76.6	0.02	0.02	-	-	0.0	-	4.0	$8.00	Installation of high-efficiency desktop computers in homes with deskptop computers	108.00%	10.84%
2069	ES Laptop	MAN	ROB	All	134.4	33.0%	44.4	0.01	0.01	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops	61.00%	32.79%
2070	ES Laptop (Power Mgmt Enabled)	MAN	ROB	All	37.1	27.2%	10.1	0.00	0.00	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops (w/ power management)	61.00%	32.79%
2071	Smart Strip plug outlet	MAN	NC	All	-	-	24.0	0.01	0.01	0.0	0%	0.00	0	5.0	$40.00	Installation of smart strip power strips for home enertertainment and office centers to eliminate standby power use	100.00%	6.00%
2072	Efficient Set Top Box	MAN	NC	All	-	-	41.3	0.026	0.026	0.0	0%	0.00	0	5.0	$5.00	Installation of high-efficiency set-top boxes to reduce "on-mode" power use; in homes with at least one TV	274.00%	63.00%
2073	ENERGY STAR + 10% Display	MAN	NC	All	66.2	29.3%	19.4	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (10% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2074	ENERGY STAR + 30% Display	MAN	NC	All	66.2	45.0%	29.8	0.01	0.01	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (30% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2075	ENERGY STAR + 50 % Display	MAN	NC	All	66.2	60.7%	40.2	0.02	0.02	0.0	0%	0.00	0	5.0	$1.00	Installation of high-efficiency displays (50% more efficient than ENERGY STAR minimum spec) for desktop computers in homes with deskptop computers	108.00%	0.00%
2076	ENERGY STAR 6.0 TV + 20% (0-20")	MAN	NC	All	61.6	36.0%	22.2	0.01	0.01	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 0-20" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	16.44%	0.00%
2077	ENERGY STAR 6.0 TV + 20% (21-30")	MAN	NC	All	110.0	43.5%	47.9	0.03	0.03	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 21-30" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	0.00%
2078	ENERGY STAR 6.0 TV + 20% (31-40")	MAN	NC	All	170.6	42.0%	71.7	0.05	0.05	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 31-40" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	82.20%	0.00%
2079	ENERGY STAR 6.0 TV + 20% (41-50")	MAN	NC	All	246.0	43.5%	106.9	0.07	0.07	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 41-50" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	0.00%
2080	ENERGY STAR 6.0 TV + 20% (51-60")	MAN	NC	All	334.7	48.7%	162.9	0.11	0.11	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 51-60" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	43.84%	0.00%
2081	ENERGY STAR 6.0 TV + 20% (over 60")	MAN	NC	All	452.6	56.8%	257.2	0.18	0.18	0.0	0%	0.00	0	6.0	$1.00	Installationof high-efficiency 60+" (20% more efficient than ENERGY STAR spec) TV's in homes with TV's	5.48%	0.00%
2082	ENERGY STAR PC	MAN	NC	All	238.5	32.1%	76.6	0.02	0.02	-	-	0.0	-	4.0	$8.00	Installation of high-efficiency desktop computers in homes with deskptop computers	108.00%	0.00%
2083	ES Laptop	MAN	NC	All	134.4	33.0%	44.4	0.01	0.01	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops	61.00%	0.00%
2084	ES Laptop (Power Mgmt Enabled)	MAN	NC	All	37.1	27.2%	10.1	0.00	0.00	-	-	0.0	-	4.0	$8.00	Replacing the existing laptops with high efficiency laptops (w/ power management)	61.00%	0.00%
3000	Lighting																	
3001	CFL bulbs - 9W	SF	ROB	All	24.3	73.4%	17.9	0.02	0.02	-	-	-0.03	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	2964.07%	17.01%
3002	CFL bulbs - 14W	SF	ROB	All	36.1	71.8%	25.9	0.04	0.04	-	-	-0.04	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	2964.07%	17.01%
3003	CFL bulbs - 20W	SF	ROB	All	44.5	66.2%	29.5	0.04	0.04	-	-	-0.05	0	9	$3.00	Installing a CFL to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	2964.07%	17.01%
3004	CFL bulbs - 26W	SF	ROB	All	60.4	68.0%	41.1	0.06	0.06	-	-	-0.07	0	9	$3.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	2964.07%	17.01%
3005	LED Replacing A-line 40W	SF	ROB	All	24.3	77.0%	18.8	0.03	0.03	-	-	-0.03	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	2964.07%	17.01%
3006	LED Replacing A-line 60W	SF	ROB	All	36.1	76.7%	27.7	0.04	0.04	-	-	-0.05	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	2964.07%	17.01%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
3007	LED Replacing A-line 75W (53W halogen)	SF	ROB	All	44.5	74.3%	33.0	0.04	0.04	-	-	-0.05	0	15	$22.50	Installing an LED to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	2964.07%	17.01%
3008	LED Replacing A-line 100W (72W Halogen)	SF	ROB	All	60.4	76.8%	46.4	0.06	0.06	-	-	-0.08	0	15	$33.75	Installing an LED to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	2964.07%	17.01%
3009	LED Lighting (screw-in) ; 2021 and later	SF	ROB	All	15.0	44.7%	6.7	0.01	0.01	-	-	-0.01	0	20	$4.79	Installing an LED to replace an inefficient bulb 2020 and later	2964.07%	17.01%
3010	CFL bulbs high wattage	SF	ROB	All	167.9	71.8%	120.6	0.16	0.16	-	-	-0.20	0	9	$15.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 200 W incandescent	2964.07%	17.01%
3011	LED fixtures downlights	SF	ROB	All	54.6	86.8%	47.3	0.06	0.06	-	-	-0.08	0	15	$42.75	Installation of LED downlight fixtures to replace standard downlight fixtures - baseline is 65 W incandescent	1869.48%	17.01%
3012	CFL bulbs 3-Way	SF	ROB	All	108.9	76.4%	83.2	0.11	0.11	-	-	-0.14	0	9	$10.00	Installing a 3-way CFL to replace an inefficient 3-way bulb	1869.48%	17.01%
3013	CFL bulbs dimmable	SF	ROB	All	49.7	78.9%	39.2	0.05	0.05	-	-	-0.07	0	9	$10.00	Installing a dimmable CFL to replace a standard bulb controlled by a dimmer	1869.48%	17.01%
3014	CFL bulbs Globe	SF	ROB	All	38.2	79.3%	30.3	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL globe to replace a standard globe bulb	1869.48%	17.01%
3015	CFL bulbs candelabra	SF	ROB	All	39.7	79.4%	31.5	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL candelabra bulb to replace a standard candelabra bulb	1869.48%	17.01%
3016	LED Flood PAR (average values)	SF	ROB	All	65.5	87.3%	57.2	0.08	0.08	-	-	-0.09	0	15	$18.00	Installation of LED flood light to replace standard flood light	2964.07%	17.01%
3017	LED Globe	SF	ROB	All	31.5	90.8%	28.6	0.04	0.04	-	-	-0.05	0	15	$18.00	Installation of LED Globe to replace standard globe	1869.48%	17.01%
3018	LED Night Light	SF	ROB	All	30.7	91.2%	28.0	0.01	0.01	-	-	-0.05	0	12	$2.25	Installing an LED nightlight to replace an inefficient nightlight	24.55%	10.86%
3019	Torchiere Floor Lamps	SF	ROB	All	209.9	83.0%	174.2	0.24	0.24	-	-	-0.29	0	12	$50.00	Installation of CFL torchiere to replace standard torchiere - baseline is 250 W torchiere	76.96%	17.01%
3020	Outdoor LED PAR/Flood	SF	ROB	All	336.9	82.0%	276.4	0.06	0.06	-	-	0.00	0	15	$18.00	Installation of outdoor LED PAR/flood lamp to replace standard outdoor PAR/flood lamp	286.04%	17.01%
3021	Holiday Lights	SF	ROB	All	13.1	81.0%	10.6	0.07	0.07	-	-	0.00	0	10	$12.00	Installation of LED holiday lights to replace stanard holiday lights	315.01%	23.50%
3022	HPT8 4ft 2 lamp replacing T12	SF	ROB	All	55.4	23.5%	13.0	0.02	0.02	-	-	0.00	0	8	$41.00	Installation of HPT8 lamp to replace T12 - two lamps	384.82%	17.01%
3023	LW HPT8 4ft 2 lamp replacing T12	SF	ROB	All	55.4	30.7%	17.0	0.02	0.02	-	-	0.00	0	8	$39.00	Installation of low wattage HPT8 lamp to replace T12 - two lamps	384.82%	17.01%
3024	CFL Exterior fixture - 1 Lamp	SF	ROB	All	70.6	69.8%	49.3	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of CFL exterior fixture to replace standard exterior fixture - one lamp	286.04%	17.01%
3025	LED Exterior fixture - 1 Lamp	SF	ROB	All	70.6	75.3%	53.2	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of LED exterior fixture to replace standard exterior fixture - one lamp	286.04%	17.01%
3026	Occupancy Sensor	SF	Retrofit	All	50.4	31.9%	16.1	0.02	0.02	-	-	-0.03	0	10	$30.00	Installation of occupancy sensors in low occupancy rooms	1234.00%	0.10%
3027	CFL bulbs - 9W	SF	NC	All	24.3	73.4%	17.9	0.02	0.02	-	-	-0.03	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	2964.07%	0.00%
3028	CFL bulbs - 14W	SF	NC	All	36.1	71.8%	25.9	0.04	0.04	-	-	-0.04	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	2964.07%	0.00%
3029	CFL bulbs - 20W	SF	NC	All	44.5	66.2%	29.5	0.04	0.04	-	-	-0.05	0	9	$3.00	Installing a CFL to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	2964.07%	0.00%
3030	CFL bulbs - 26W	SF	NC	All	60.4	68.0%	41.1	0.06	0.06	-	-	-0.07	0	9	$3.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	2964.07%	0.00%
3031	LED Replacing A-line 40W	SF	NC	All	24.3	77.0%	18.8	0.03	0.03	-	-	-0.03	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	2964.07%	0.00%
3032	LED Replacing A-line 60W	SF	NC	All	36.1	76.7%	27.7	0.04	0.04	-	-	-0.05	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	2964.07%	0.00%
3033	LED Replacing A-line 75W (53W halogen)	SF	NC	All	44.5	74.3%	33.0	0.04	0.04	-	-	-0.05	0	15	$22.50	Installing an LED to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	2964.07%	0.00%
3034	LED Replacing A-line 100W (72W Halogen)	SF	NC	All	60.4	76.8%	46.4	0.06	0.06	-	-	-0.08	0	15	$33.75	Installing an LED to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	2964.07%	0.00%
3035	LED Lighting (screw-in) ; 2021 and later	SF	NC	All	15.0	44.7%	6.7	0.01	0.01	-	-	-0.01	0	20	$4.79	Installing an LED to replace an inefficient bulb 2020 and later	2964.07%	0.00%
3036	CFL bulbs high wattage	SF	NC	All	167.9	71.8%	120.6	0.16	0.16	-	-	-0.20	0	9	$15.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 200 W incandescent	2964.07%	0.00%
3037	LED fixtures downlights	SF	NC	All	54.6	86.8%	47.3	0.06	0.06	-	-	-0.08	0	15	$42.75	Installation of LED downlight fixtures to replace standard downlight fixtures - baseline is 65 W incandescent	1869.48%	0.00%
3038	CFL bulbs 3-Way	SF	NC	All	108.9	76.4%	83.2	0.11	0.11	-	-	-0.14	0	9	$10.00	Installing a 3-way CFL to replace an inefficient 3-way bulb	1869.48%	0.00%
3039	CFL bulbs dimmable	SF	NC	All	49.7	78.9%	39.2	0.05	0.05	-	-	-0.07	0	9	$10.00	Installing a dimmable CFL to replace a standard bulb controlled by a dimmer	1869.48%	0.00%
3040	CFL bulbs Globe	SF	NC	All	38.2	79.3%	30.3	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL globe to replace a standard globe bulb	1869.48%	0.00%
3041	CFL bulbs candelabra	SF	NC	All	39.7	79.4%	31.5	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL candelabra bulb to replace a standard candelabra bulb	1869.48%	0.00%
3042	LED Flood PAR (average values)	SF	NC	All	65.5	87.3%	57.2	0.08	0.08	-	-	-0.09	0	15	$18.00	Installation of LED flood light to replace standard flood light	2964.07%	0.00%
3043	LED Globe	SF	NC	All	31.5	90.8%	28.6	0.04	0.04	-	-	-0.05	0	15	$18.00	Installation of LED Globe to replace standard globe	1869.48%	0.00%
3044	LED Night Light	SF	NC	All	30.7	91.2%	28.0	0.01	0.01	-	-	-0.05	0	12	$2.25	Installing an LED nightlight to replace an inefficient nightlight	24.55%	0.00%
3045	Torchiere Floor Lamps	SF	NC	All	209.9	83.0%	174.2	0.24	0.24	-	-	-0.29	0	12	$50.00	Installation of CFL torchiere to replace standard torchiere - baseline is 250 W torchiere	76.96%	0.00%
3046	Outdoor LED PAR/Flood	SF	NC	All	336.9	82.0%	276.4	0.06	0.06	-	-	0.00	0	15	$18.00	Installation of outdoor LED PAR/flood lamp to replace standard outdoor PAR/flood lamp	286.04%	0.00%
3047	Holiday Lights	SF	NC	All	13.1	81.0%	10.6	0.07	0.07	-	-	0.00	0	10	$12.00	Installation of LED holiday lights to replace stanard holiday lights	315.01%	0.00%
3048	HPT8 4ft 2 lamp replacing T12	SF	NC	All	55.4	23.5%	13.0	0.02	0.02	-	-	0.00	0	8	$41.00	Installation of HPT8 lamp to replace T12 - two lamps	384.82%	0.00%
3049	LW HPT8 4ft 2 lamp replacing T12	SF	NC	All	55.4	30.7%	17.0	0.02	0.02	-	-	0.00	0	8	$39.00	Installation of low wattage HPT8 lamp to replace T12 - two lamps	384.82%	0.00%
3050	CFL Exterior fixture - 1 Lamp	SF	NC	All	70.6	69.8%	49.3	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of CFL exterior fixture to replace standard exterior fixture - one lamp	286.04%	0.00%
3051	LED Exterior fixture - 1 Lamp	SF	NC	All	70.6	75.3%	53.2	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of LED exterior fixture to replace standard exterior fixture - one lamp	286.04%	0.00%
3052	Occupancy Sensor	SF	NC	All	50.4	31.9%	16.1	0.02	0.02	-	-	-0.03	0	10	$30.00	Installation of occupancy sensors in low occupancy rooms	1234.00%	0.00%
3053	CFL bulbs - 9W	MF	ROB	All	24.3	73.4%	17.9	0.02	0.02	-	-	-0.03	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1233.67%	17.53%
3054	CFL bulbs - 14W	MF	ROB	All	36.1	71.8%	25.9	0.04	0.04	-	-	-0.04	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1233.67%	17.53%
3055	CFL bulbs - 20W	MF	ROB	All	44.5	66.2%	29.5	0.04	0.04	-	-	-0.05	0	9	$3.00	Installing a CFL to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1233.67%	17.53%
3056	CFL bulbs - 26W	MF	ROB	All	60.4	68.0%	41.1	0.06	0.06	-	-	-0.07	0	9	$3.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1233.67%	17.53%
3057	LED Replacing A-line 40W	MF	ROB	All	24.3	77.0%	18.8	0.03	0.03	-	-	-0.03	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1233.67%	17.53%

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3058	LED Replacing A-line 60W	MF	ROB	All	36.1	76.7%	27.7	0.04	0.04	-	-	-0.05	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1233.67%	17.53%
3059	LED Replacing A-line 75W (53W halogen)	MF	ROB	All	44.5	74.3%	33.0	0.04	0.04	-	-	-0.05	0	15	$22.50	Installing an LED to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1233.67%	17.53%
3060	LED Replacing A-line 100W (72W Halogen)	MF	ROB	All	60.4	76.8%	46.4	0.06	0.06	-	-	-0.08	0	15	$33.75	Installing an LED to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1233.67%	17.53%
3061	LED Lighting (screw-in) ; 2021 and later	MF	ROB	All	15.0	44.7%	6.7	0.01	0.01	-	-	-0.01	0	20	$4.79	Installing an LED to replace an inefficient bulb 2020 and later	1233.67%	17.53%
3062	CFL bulbs high wattage	MF	ROB	All	167.9	71.8%	120.6	0.16	0.16	-	-	-0.20	0	9	$15.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 200 W incandescent	1233.67%	17.53%
3063	LED fixtures downlights	MF	ROB	All	54.6	86.8%	47.3	0.06	0.06	-	-	-0.08	0	15	$42.75	Installation of LED downlight fixtures to replace standard downlight fixtures - baseline is 65 W incandescent	778.09%	17.53%
3064	CFL bulbs 3-Way	MF	ROB	All	108.9	76.4%	83.2	0.11	0.11	-	-	-0.14	0	9	$10.00	Installing a 3-way CFL to replace an inefficient 3-way bulb	778.09%	17.53%
3065	CFL bulbs dimmable	MF	ROB	All	49.7	78.9%	39.2	0.05	0.05	-	-	-0.07	0	9	$10.00	Installing a dimmable CFL to replace a standard bulb controlled by a dimmer	778.09%	17.53%
3066	CFL bulbs Globe	MF	ROB	All	38.2	79.3%	30.3	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL globe to replace a standard globe bulb	778.09%	17.53%
3067	CFL bulbs candelabra	MF	ROB	All	39.7	79.4%	31.5	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL candelabra bulb to replace a standard candelabra bulb	778.09%	17.53%
3068	LED Flood PAR (average values)	MF	ROB	All	65.5	87.3%	57.2	0.08	0.08	-	-	-0.09	0	15	$18.00	Installation of LED flood light to replace standard flood light	1233.67%	17.53%
3069	LED Globe	MF	ROB	All	31.5	90.8%	28.6	0.04	0.04	-	-	-0.05	0	15	$18.00	Installation of LED Globe to replace standard globe	778.09%	17.53%
3070	LED Night Light	MF	ROB	All	30.7	91.2%	28.0	0.01	0.01	-	-	-0.05	0	12	$2.25	Installing an LED nightlight to replace an inefficient nightlight	24.55%	10.86%
3071	Torchiere Floor Lamps	MF	ROB	All	209.9	83.0%	174.2	0.24	0.24	-	-	-0.29	0	12	$50.00	Installation of CFL torchiere to replace standard torchiere - baseline is 250 W torchiere	31.06%	17.53%
3072	Outdoor LED PAR/Flood	MF	ROB	All	336.9	82.0%	276.4	0.06	0.06	-	-	0.00	0	15	$18.00	Installation of outdoor LED PAR/flood lamp to replace standard outdoor PAR/flood lamp	115.44%	17.53%
3073	Holiday Lights	MF	ROB	All	13.1	81.0%	10.6	0.07	0.07	-	-	0.00	0	10	$12.00	Installation of LED holiday lights to replace stanard holiday lights	127.13%	23.50%
3074	HPT8 4ft 2 lamp replacing T12	MF	ROB	All	55.4	23.5%	13.0	0.02	0.02	-	-	0.00	0	8	$41.00	Installation of HPT8 lamp to replace T12 - two lamps	155.30%	17.53%
3075	LW HPT8 4ft 2 lamp replacing T12	MF	ROB	All	55.4	30.7%	17.0	0.02	0.02	-	-	0.00	0	8	$39.00	Installation of low wattage HPT8 lamp to replace T12 - two lamps	155.30%	17.53%
3076	CFL Exterior fixture - 1 Lamp	MF	ROB	All	70.6	69.8%	49.3	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of CFL exterior fixture to replace standard exterior fixture - one lamp	115.44%	17.53%
3077	LED Exterior fixture - 1 Lamp	MF	ROB	All	70.6	75.3%	53.2	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of LED exterior fixture to replace standard exterior fixture - one lamp	115.44%	17.53%
3078	Occupancy Sensor	MF	Retrofit	All	50.4	31.9%	16.1	0.02	0.02	-	-	-0.03	0	10	$30.00	Installation of occupancy sensors in low occupancy rooms	498.00%	0.10%
3079	CFL Fixture	MF	ROB	All	1103.10	65.8%	725.7	0.19	0.19	-	-	-1.22	0	12	$79.00	Installation of CFL fixtures in multifamily building common areas	11.54%	41.67%
3080	CFL Screw in	MF	ROB	All	252.99	62.3%	157.6	0.04	0.04	-	-	-0.27	0	2	$5.00	Installation of CFL Screw-in bulbs in multifamily building common areas	23.09%	41.67%
3081	CFL Screw in - high wattage	MF	ROB	All	959.22	65.5%	628.0	0.16	0.16	-	-	-1.06	0	2	$15.00	Installation of high-wattage CFL bulbs in multifamily building common areas	23.09%	41.67%
3082	LED Screw in	MF	ROB	All	252.99	69.4%	175.6	0.05	0.05	-	-	-0.30	0	8	$9.00	Installation of LED Screw-in bulbs in multifamily building common areas	23.09%	41.67%
3083	CFL Candelabra - 24/7	MF	ROB	All	399.68	79.1%	316.3	0.04	0.04	-	-	-0.53	0	8	$30.00	Installation of CFL candelabra in multifamily building common areas - bulbs run 24 hrs/day	14.56%	41.67%
3084	CFL Candelabra - 12/7	MF	ROB	All	199.84	79.1%	158.2	0.04	0.04	-	-	-0.27	0	8	$30.00	Installation of CFL candelabra in multifamily building common areas - bulbs run 12 hrs/day	14.56%	41.67%
3085	LED Candelabra - 24/7	MF	ROB	All	311.75	84.3%	262.8	0.03	0.03	-	-	-0.44	0	8	$13.50	Installation of LED candelabra in multifamily building common areas - bulbs run 24 hrs/day	14.56%	0.00%
3086	LED Candelabra - 12/7	MF	ROB	All	155.87	84.3%	131.4	0.03	0.03	-	-	-0.22	0	8	$13.50	Installation of LED candelabra in multifamily building common areas - bulbs run 12 hrs/day	14.56%	0.00%
3087	LED Globe - 24/7	MF	ROB	All	359.71	83.0%	298.6	0.04	0.04	-	-	-0.50	0	8	$13.50	Installation of LED globe in multifamily building common areas - bulbs run 24 hrs/day	14.56%	0.00%
3088	LED Globe - 12/7	MF	ROB	All	179.85	83.0%	149.3	0.04	0.04	-	-	-0.25	0	8	$13.50	Installation of LED globe in multifamily building common areas - bulbs run 12 hrs/day	14.56%	0.00%
3089	Exterior CFL Fixture - replace HID fixture in common area	MF	ROB	All	708.10	54.6%	386.9	0.12	0.12	-	-	0.00	0	12	$79.00	Installation of CFL exterior fixture to replace HID fixture in common areas	1.00%	0.00%
3090	Photo Cell Daylight Sensor	MF	Retrofit	All	26.97	100.0%	26.97	0.00	0.00	-	-	0.00	0	15	$9.47	Installation of exterior photo cell daylight sensor	1.00%	0.00%
3091	HPT8 4ft 2 lamp replacing T12, 12 hrs	MF	Retrofit	All	316.54	23.5%	74.4	0.01	0.02	-	-	-0.13	0	8	$72.00	Retrofit of T12 fixture with T8 fixture in common area - 12 hrs/day	134.91%	50.56%
3092	HPT8 4ft 2 lamp replacing T12, 24 hrs	MF	Retrofit	All	633.09	23.5%	148.9	0.02	0.02	-	-	-0.25	0	8	$72.00	Retrofit of T12 fixture with T8 fixture in common area - 24 hrs/day	134.91%	50.56%
3093	LW HPT8 4ft 2 lamp replacing T12, 12 hrs	MF	Retrofit	All	316.54	30.9%	97.7	0.03	0.03	-	-	-0.16	0	8	$72.00	Retrofit of T12 fixture with HPT8 fixture in common area - 12 hrs/day	134.91%	50.56%
3094	LW HPT8 4ft 2 lamp replacing T12, 24 hrs	MF	Retrofit	All	633.09	30.9%	195.4	0.03	0.03	-	-	-0.33	0	8	$72.00	Retrofit of T12 fixture with HPT8 fixture in common area - 24 hrs/day	134.91%	50.56%
3095	CFL bulbs - 9W	MF	NC	All	24.3	73.4%	17.9	0.02	0.02	-	-	-0.03	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1233.67%	0.00%
3096	CFL bulbs - 14W	MF	NC	All	36.1	71.8%	25.9	0.04	0.04	-	-	-0.04	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1233.67%	0.00%
3097	CFL bulbs - 20W	MF	NC	All	44.5	66.2%	29.5	0.04	0.04	-	-	-0.05	0	9	$3.00	Installing a CFL to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1233.67%	0.00%
3098	CFL bulbs - 26W	MF	NC	All	60.4	68.0%	41.1	0.06	0.06	-	-	-0.07	0	9	$3.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1233.67%	0.00%
3099	LED Replacing A-line 40W	MF	NC	All	24.3	77.0%	18.8	0.03	0.03	-	-	-0.03	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1233.67%	0.00%
3100	LED Replacing A-line 60W	MF	NC	All	36.1	76.7%	27.7	0.04	0.04	-	-	-0.05	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1233.67%	0.00%
3101	LED Replacing A-line 75W (53W halogen)	MF	NC	All	44.5	74.3%	33.0	0.04	0.04	-	-	-0.05	0	15	$22.50	Installing an LED to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1233.67%	0.00%
3102	LED Replacing A-line 100W (72W Halogen)	MF	NC	All	60.4	76.8%	46.4	0.06	0.06	-	-	-0.08	0	15	$33.75	Installing an LED to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1233.67%	0.00%
3103	LED Lighting (screw-in) ; 2021 and later	MF	NC	All	15.0	44.7%	6.7	0.01	0.01	-	-	-0.01	0	20	$4.79	Installing an LED to replace an inefficient bulb 2020 and later	1233.67%	0.00%
3104	CFL bulbs high wattage	MF	NC	All	167.9	71.8%	120.6	0.16	0.16	-	-	-0.20	0	9	$15.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 200 W incandescent	1233.67%	0.00%
3105	LED fixtures downlights	MF	NC	All	54.6	86.8%	47.3	0.06	0.06	-	-	-0.08	0	15	$42.75	Installation of LED downlight fixtures to replace standard downlight fixtures - baseline is 65 W incandescent	778.09%	0.00%
3106	CFL bulbs 3-Way	MF	NC	All	108.9	76.4%	83.2	0.11	0.11	-	-	-0.14	0	9	$10.00	Installing a 3-way CFL to replace an inefficient 3-way bulb	778.09%	0.00%
3107	CFL bulbs dimmable	MF	NC	All	49.7	78.9%	39.2	0.05	0.05	-	-	-0.07	0	9	$10.00	Installing a dimmable CFL to replace a standard bulb controlled by a dimmer	778.09%	0.00%
3108	CFL bulbs Globe	MF	NC	All	38.2	79.3%	30.3	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL globe to replace a standard globe bulb	778.09%	0.00%
3109	CFL bulbs candelabra	MF	NC	All	39.7	79.4%	31.5	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL candelabra bulb to replace a standard candelabra bulb	778.09%	0.00%
3110	LED Flood PAR (average values)	MF	NC	All	65.5	87.3%	57.2	0.08	0.08	-	-	-0.09	0	15	$18.00	Installation of LED flood light to replace standard flood light	1233.67%	0.00%
3111	LED Globe	MF	NC	All	31.5	90.8%	28.6	0.04	0.04	-	-	-0.05	0	15	$18.00	Installation of LED Globe to replace standard globe	778.09%	0.00%
3112	LED Night Light	MF	NC	All	30.7	91.2%	28.0	0.01	0.01	-	-	-0.05	0	12	$2.25	Installing an LED nightlight to replace an inefficient nightlight	24.55%	0.00%
3113	Torchiere Floor Lamps	MF	NC	All	209.9	83.0%	174.2	0.24	0.24	-	-	-0.29	0	12	$50.00	Installation of CFL torchiere to replace standard torchiere - baseline is 250 W torchiere	31.06%	0.00%
3114	Outdoor LED PAR/Flood	MF	NC	All	336.9	82.0%	276.4	0.06	0.06	-	-	0.00	0	15	$18.00	Installation of outdoor LED PAR/flood lamp to replace standard outdoor PAR/flood lamp	115.44%	0.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
3115	Holiday Lights	MF	NC	All	13.1	81.0%	10.6	0.07	0.07	-	-	0.00	0	10	$12.00	Installation of LED holiday lights to replace stanard holiday lights	127.13%	0.00%
3116	HPT8 4ft 2 lamp replacing T12	MF	NC	All	55.4	23.5%	13.0	0.02	0.02	-	-	0.00	0	8	$41.00	Installation of HPT8 lamp to replace T12 - two lamps	155.30%	0.00%
3117	LW HPT8 4ft 2 lamp replacing T12	MF	NC	All	55.4	30.7%	17.0	0.02	0.02	-	-	0.00	0	8	$39.00	Installation of low wattage HPT8 lamp to replace T12 - two lamps	155.30%	0.00%
3118	CFL Exterior fixture - 1 Lamp	MF	NC	All	70.6	69.8%	49.3	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of CFL exterior fixture to replace standard exterior fixture - one lamp	115.44%	0.00%
3119	LED Exterior fixture - 1 Lamp	MF	NC	All	70.6	75.3%	53.2	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of LED exterior fixture to replace standard exterior fixture - one lamp	115.44%	0.00%
3120	Occupancy Sensor	MF	NC	All	50.4	31.9%	16.1	0.02	0.02	-	-	-0.03	0	10	$30.00	Installation of occupancy sensors in low occupancy rooms	498.00%	0.00%
3121	CFL Fixture	MF	NC	All	1103.10	65.8%	725.7	0.19	0.19	-	-	-1.22	0	12	$79.00	Installation of CFL fixtures in multifamily building common areas	11.54%	0.00%
3122	CFL Screw in	MF	NC	All	252.99	62.3%	157.6	0.04	0.04	-	-	-0.27	0	2	$5.00	Installation of CFL Screw-in bulbs in multifamily building common areas	23.09%	0.00%
3123	CFL Screw in - high wattage	MF	NC	All	959.22	65.5%	628.0	0.16	0.16	-	-	-1.06	0	2	$15.00	Installation of high-wattage CFL bulbs in multifamily building common areas	23.09%	0.00%
3124	LED Screw in	MF	NC	All	252.99	69.4%	175.6	0.05	0.05	-	-	-0.30	0	8	$9.00	Installation of LED Screw-in bulbs in multifamily building common areas	23.09%	0.00%
3125	CFL Candelabra - 24/7	MF	NC	All	399.68	79.1%	316.3	0.04	0.04	-	-	-0.53	0	8	$30.00	Installation of CFL candelabra in multifamily building common areas - bulbs run 24 hrs/day	14.56%	0.00%
3126	CFL Candelabra - 12/7	MF	NC	All	199.84	79.1%	158.2	0.04	0.04	-	-	-0.27	0	8	$30.00	Installation of CFL candelabra in multifamily building common areas - bulbs run 12 hrs/day	14.56%	0.00%
3127	LED Candelabra - 24/7	MF	NC	All	311.75	84.3%	262.8	0.03	0.03	-	-	-0.44	0	8	$13.50	Installation of LED candelabra in multifamily building common areas - bulbs run 24 hrs/day	14.56%	0.00%
3128	LED Candelabra - 12/7	MF	NC	All	155.87	84.3%	131.4	0.03	0.03	-	-	-0.22	0	8	$13.50	Installation of LED candelabra in multifamily building common areas - bulbs run 12 hrs/day	14.56%	0.00%
3129	LED Globe - 24/7	MF	NC	All	359.71	83.0%	298.6	0.04	0.04	-	-	-0.50	0	8	$13.50	Installation of LED globe in multifamily building common areas - bulbs run 24 hrs/day	14.56%	0.00%
3130	LED Globe - 12/7	MF	NC	All	179.85	83.0%	149.3	0.04	0.04	-	-	-0.25	0	8	$13.50	Installation of LED globe in multifamily building common areas - bulbs run 12 hrs/day	14.56%	0.00%
3131	Exterior CFL Fixture - replace HID fixture in common area	MF	NC	All	708.10	54.6%	386.9	0.12	0.12	-	-	0.00	0	12	$79.00	Installation of CFL exterior fixture to replace HID fixture in common areas	1.00%	0.00%
3132	CFL bulbs - 9W	MAN	ROB	All	24.3	73.4%	17.9	0.02	0.02	-	-	-0.03	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1805.17%	20.48%
3133	CFL bulbs - 14W	MAN	ROB	All	36.1	71.8%	25.9	0.04	0.04	-	-	-0.04	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1805.17%	20.48%
3134	CFL bulbs - 20W	MAN	ROB	All	44.5	66.2%	29.5	0.04	0.04	-	-	-0.05	0	9	$3.00	Installing a CFL to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1805.17%	20.48%
3135	CFL bulbs - 26W	MAN	ROB	All	60.4	68.0%	41.1	0.06	0.06	-	-	-0.07	0	9	$3.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1805.17%	20.48%
3136	LED Replacing A-line 40W	MAN	ROB	All	24.3	77.0%	18.8	0.03	0.03	-	-	-0.03	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1805.17%	20.48%
3137	LED Replacing A-line 60W	MAN	ROB	All	36.1	76.7%	27.7	0.04	0.04	-	-	-0.05	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1805.17%	20.48%
3138	LED Replacing A-line 75W (53W halogen)	MAN	ROB	All	44.5	74.3%	33.0	0.04	0.04	-	-	-0.05	0	15	$22.50	Installing an LED to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1805.17%	20.48%
3139	LED Replacing A-line 100W (72W Halogen)	MAN	ROB	All	60.4	76.8%	46.4	0.06	0.06	-	-	-0.08	0	15	$33.75	Installing an LED to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1805.17%	20.48%
3140	LED Lighting (screw-in) ; 2021 and later	MAN	ROB	All	15.0	44.7%	6.7	0.01	0.01	-	-	-0.01	0	20	$4.79	Installing an LED to replace an inefficient bulb 2020 and later	1805.17%	20.48%
3141	CFL bulbs high wattage	MAN	ROB	All	167.9	71.8%	120.6	0.16	0.16	-	-	-0.20	0	9	$15.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 200 W incandescent	1805.17%	20.48%
3142	LED fixtures downlights	MAN	ROB	All	54.6	86.8%	47.3	0.06	0.06	-	-	-0.08	0	15	$42.75	Installation of LED downlight fixtures to replace standard downlight fixtures - baseline is 65 W incandescent	1138.54%	20.48%
3143	CFL bulbs 3-Way	MAN	ROB	All	108.9	76.4%	83.2	0.11	0.11	-	-	-0.14	0	9	$10.00	Installing a 3-way CFL to replace an inefficient 3-way bulb	1138.54%	20.48%
3144	CFL bulbs dimmable	MAN	ROB	All	49.7	78.9%	39.2	0.05	0.05	-	-	-0.07	0	9	$10.00	Installing a dimmable CFL to replace a standard bulb controlled by a dimmer	1138.54%	20.48%
3145	CFL bulbs Globe	MAN	ROB	All	38.2	79.3%	30.3	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL globe to replace a standard globe bulb	1138.54%	20.48%
3146	CFL bulbs candelabra	MAN	ROB	All	39.7	79.4%	31.5	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL candelabra bulb to replace a standard candelabra bulb	1138.54%	20.48%
3147	LED Flood PAR (average values)	MAN	ROB	All	65.5	87.3%	57.2	0.08	0.08	-	-	-0.09	0	15	$18.00	Installation of LED flood light to replace standard flood light	1805.17%	20.48%
3148	LED Globe	MAN	ROB	All	31.5	90.8%	28.6	0.04	0.04	-	-	-0.05	0	15	$18.00	Installation of LED Globe to replace standard globe	1138.54%	20.48%
3149	LED Night Light	MAN	ROB	All	30.7	91.2%	28.0	0.01	0.01	-	-	-0.05	0	12	$2.25	Installing an LED nightlight to replace an inefficient nightlight	24.55%	10.86%
3150	Torchiere Floor Lamps	MAN	ROB	All	209.9	83.0%	174.2	0.24	0.24	-	-	-0.29	0	12	$50.00	Installation of CFL torchiere to replace standard torchiere - baseline is 250 W torchiere	42.29%	20.48%
3151	Outdoor LED PAR/Flood	MAN	ROB	All	336.9	82.0%	276.4	0.06	0.06	-	-	0.00	0	15	$18.00	Installation of outdoor LED PAR/flood lamp to replace standard outdoor PAR/flood lamp	157.16%	20.48%
3152	Holiday Lights	MAN	ROB	All	13.1	81.0%	10.6	0.07	0.07	-	-	0.00	0	10	$12.00	Installation of LED holiday lights to replace stanard holiday lights	173.08%	23.50%
3153	HPT8 4ft 2 lamp replacing T12	MAN	ROB	All	55.4	23.5%	13.0	0.02	0.02	-	-	0.00	0	8	$41.00	Installation of HPT8 lamp to replace T12 - two lamps	211.43%	20.48%
3154	LW HPT8 4ft 2 lamp replacing T12	MAN	ROB	All	55.4	30.7%	17.0	0.02	0.02	-	-	0.00	0	8	$39.00	Installation of low wattage HPT8 lamp to replace T12 - two lamps	211.43%	20.48%
3155	CFL Exterior fixture - 1 Lamp	MAN	ROB	All	70.6	69.8%	49.3	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of CFL exterior fixture to replace standard exterior fixture - one lamp	157.16%	20.48%
3156	LED Exterior fixture - 1 Lamp	MAN	ROB	All	70.6	75.3%	53.2	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of LED exterior fixture to replace standard exterior fixture - one lamp	157.16%	20.48%
3157	Occupancy Sensor	MAN	ROB	All	50.4	31.9%	16.1	0.02	0.02	-	-	-0.03	0	10	$30.00	Installation of occupancy sensors in low occupancy rooms	678.00%	0.10%
3158	CFL bulbs - 9W	MAN	NC	All	24.3	73.4%	17.9	0.02	0.02	-	-	-0.03	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1805.17%	0.00%
3159	CFL bulbs - 14W	MAN	NC	All	36.1	71.8%	25.9	0.04	0.04	-	-	-0.04	0	9	$3.00	Installing a CFL to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1805.17%	0.00%
3160	CFL bulbs - 20W	MAN	NC	All	44.5	66.2%	29.5	0.04	0.04	-	-	-0.05	0	9	$3.00	Installing a CFL to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1805.17%	0.00%
3161	CFL bulbs - 26W	MAN	NC	All	60.4	68.0%	41.1	0.06	0.06	-	-	-0.07	0	9	$3.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1805.17%	0.00%
3162	LED Replacing A-line 40W	MAN	NC	All	24.3	77.0%	18.8	0.03	0.03	-	-	-0.03	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 29 W modified halogen	1805.17%	0.00%
3163	LED Replacing A-line 60W	MAN	NC	All	36.1	76.7%	27.7	0.04	0.04	-	-	-0.05	0	15	$9.00	Installing an LED to replace an inefficient low wattage bulb - baseline is 43 W modified halogen	1805.17%	0.00%
3164	LED Replacing A-line 75W (53W halogen)	MAN	NC	All	44.5	74.3%	33.0	0.04	0.04	-	-	-0.05	0	15	$22.50	Installing an LED to replace an inefficient medium wattage bulb - baseline is 53 W modified halogen	1805.17%	0.00%
3165	LED Replacing A-line 100W (72W Halogen)	MAN	NC	All	60.4	76.8%	46.4	0.06	0.06	-	-	-0.08	0	15	$33.75	Installing an LED to replace an inefficient high wattage bulb - baseline is 72 W modified halogen	1805.17%	0.00%
3166	LED Lighting (screw-in) ; 2021 and later	MAN	NC	All	15.0	44.7%	6.7	0.01	0.01	-	-	-0.01	0	20	$4.79	Installing an LED to replace an inefficient bulb 2020 and later	1805.17%	0.00%
3167	CFL bulbs high wattage	MAN	NC	All	167.9	71.8%	120.6	0.16	0.16	-	-	-0.20	0	9	$15.00	Installing a CFL to replace an inefficient high wattage bulb - baseline is 200 W incandescent	1805.17%	0.00%
3168	LED fixtures downlights	MAN	NC	All	54.6	86.8%	47.3	0.06	0.06	-	-	-0.08	0	15	$42.75	Installation of LED downlight fixtures to replace standard downlight fixtures - baseline is 65 W incandescent	1138.54%	0.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
3169	CFL bulbs 3-Way	MAN	NC	All	108.9	76.4%	83.2	0.11	0.11	-	-	-0.14	0	9	$10.00	Installing a 3-way CFL to replace an inefficient 3-way bulb	1138.54%	0.00%
3170	CFL bulbs dimmable	MAN	NC	All	49.7	78.9%	39.2	0.05	0.05	-	-	-0.07	0	9	$10.00	Installing a dimmable CFL to replace a standard bulb controlled by a dimmer	1138.54%	0.00%
3171	CFL bulbs Globe	MAN	NC	All	38.2	79.3%	30.3	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL globe to replace a standard globe bulb	1138.54%	0.00%
3172	CFL bulbs candelabra	MAN	NC	All	39.7	79.4%	31.5	0.04	0.04	-	-	-0.05	0	9	$10.00	Installing a CFL candelabra bulb to replace a standard candelabra bulb	1138.54%	0.00%
3173	LED Flood PAR (average values)	MAN	NC	All	65.5	87.3%	57.2	0.08	0.08	-	-	-0.09	0	15	$18.00	Installation of LED flood light to replace standard flood light	1805.17%	0.00%
3174	LED Globe	MAN	NC	All	31.5	90.8%	28.6	0.04	0.04	-	-	-0.05	0	15	$18.00	Installation of LED Globe to replace standard globe	1138.54%	0.00%
3175	LED Night Light	MAN	NC	All	30.7	91.2%	28.0	0.01	0.01	-	-	-0.05	0	12	$2.25	Installing an LED nightlight to replace an inefficient nightlight	24.55%	0.00%
3176	Torchiere Floor Lamps	MAN	NC	All	209.9	83.0%	174.2	0.24	0.24	-	-	-0.29	0	12	$50.00	Installation of CFL torchiere to replace standard torchiere - baseline is 250 W torchiere	42.29%	0.00%
3177	Outdoor LED PAR/Flood	MAN	NC	All	336.9	82.0%	276.4	0.06	0.06	-	-	0.00	0	15	$18.00	Installation of outdoor LED PAR/flood lamp to replace standard outdoor PAR/flood lamp	157.16%	0.00%
3178	Holiday Lights	MAN	NC	All	13.1	81.0%	10.6	0.07	0.07	-	-	0.00	0	10	$12.00	Installation of LED holiday lights to replace stanard holiday lights	173.08%	0.00%
3179	HPT8 4ft 2 lamp replacing T12	MAN	NC	All	55.4	23.5%	13.0	0.02	0.02	-	-	0.00	0	8	$41.00	Installation of HPT8 lamp to replace T12 - two lamps	211.43%	0.00%
3180	LW HPT8 4ft 2 lamp replacing T12	MAN	NC	All	55.4	30.7%	17.0	0.02	0.02	-	-	0.00	0	8	$39.00	Installation of low wattage HPT8 lamp to replace T12 - two lamps	211.43%	0.00%
3181	CFL Exterior fixture - 1 Lamp	MAN	NC	All	70.6	69.8%	49.3	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of CFL exterior fixture to replace standard exterior fixture - one lamp	157.16%	0.00%
3182	LED Exterior fixture - 1 Lamp	MAN	NC	All	70.6	75.3%	53.2	0.03	0.03	-	-	0.00	0	12	$20.00	Installation of LED exterior fixture to replace standard exterior fixture - one lamp	157.16%	0.00%
3183	Occupancy Sensor	MAN	NC	All	50.4	31.9%	16.1	0.02	0.02	-	-	-0.03	0	10	$30.00	Installation of occupancy sensors in low occupancy rooms	678.00%	0.00%
4000	Water Heating																	
4001	Heat Pump Water Heaters	SF	ROB	All	4,626.0	56.8%	2628.0	0.46	0.46	-	-	-4.29	0	15.0	$700.00	Installing an efficient heat pump water heater in lieu of a standard efficiency storage tank WH	13.00%	30.10%
4002	Super Efficiency Gas Water Heater 0.70 EF	SF	ROB	All	0.0	0%	0	0.00	0.00	25.0	14.4%	3.60	0	15.0	$235.00	Installing an efficient gas storage tank water heater in lieu of a standard efficiency gas storage tank WH	83.00%	28.60%
4003	Instant Gas Water Heater	SF	ROB	All	0.0	0%	0	0.00	0.00	25.0	26.8%	6.70	0	15.0	$434.00	Installing an efficient instantaneous gas tankless water heater in lieu of a standard efficiency gas storage tank WH	83.00%	28.60%
4004	Tank Wrap	SF	Retrofit	All	0.0	0%	0		0.00	28.8	2.3%	0.65	0	5.0	$35.00	Installation of water heater tank wrap in homes with gas tank water heating	81.76%	28.60%
4005	Pipe Wrap - gas water heater - Insulated Pipe with R3	SF	Retrofit	NLI	0.0	0%	0	0.00	0.00	2.37	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	83.00%	18.00%
4006	Pipe Wrap - gas water heater - Insulated Pipe with R2	SF	Retrofit	NLI	0.0	0%	0	0.00	0.00	2.37	58.3%	1.38	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have gas water heaters	83.00%	18.00%
4007	Pipe Wrap - electric water heater - Insulated Pipe with R3	SF	Retrofit	NLI	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	13.00%	18.00%
4008	Pipe Wrap - electric water heater - Insulated Pipe with R2	SF	Retrofit	NLI	46.2	58.4%	27.0	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have electric water heaters	13.00%	18.00%
4009	Low Flow Showerheads 1.75 gpm - gas water heating	SF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	30.0%	1.10	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with gas water heating	83.00%	58.00%
4010	Low Flow Showerheads 1.5 gpm - gas water heating	SF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	40.0%	1.47	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with gas water heating	83.00%	58.00%
4011	Low Flow Showerheads 1.25 gpm - gas water heating	SF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	50.1%	1.84	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	83.00%	58.00%
4012	Low Flow Showerheads 1.0 gpm - gas water heating	SF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	59.9%	2.20	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with gas water heating	83.00%	58.00%
4013	Low Flow Showerheads 0.5 gpm - gas water heating	SF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	80.1%	2.94	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with gas water heating	83.00%	58.00%
4014	Low Flow Showerheads 1.75 gpm - electric water heating	SF	Retrofit	NLI	834.4	30.0%	250.0	0.03	0.03	0	0%	0	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with electric water heating	13.00%	58.00%
4015	Low Flow Showerheads 1.5 gpm - electric water heating	SF	Retrofit	NLI	834.4	40.0%	334.0	0.04	0.04	0	0%	0	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with electric water heating	13.00%	58.00%
4016	Low Flow Showerheads 1.25 gpm - electric water heating	SF	Retrofit	NLI	834.4	50.0%	417.0	0.05	0.05	0	0%	0	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	13.00%	58.00%
4017	Low Flow Showerheads 1.0 gpm - electric water heating	SF	Retrofit	NLI	834.4	60.0%	501.0	0.06	0.06	0	0%	0	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with electric water heating	13.00%	58.00%
4018	Low Flow Showerheads 0.5 gpm - electric water heating	SF	Retrofit	NLI	834.4	80.1%	668.0	0.08	0.08	0	0%	0	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with electric water heating	13.00%	58.00%
4019	Pipe Wrap - gas water heater - Insulated Pipe with R3	SF	Retrofit	LI	0.0	0%	0.0	0.0	0.0	2.4	0.7	1.56	0.0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	83.00%	18.00%
4020	Pipe Wrap - electric water heater - Insulated Pipe with R3	SF	Retrofit	LI	46.2	66.2%	30.6	0.03	0.03	0.0	0%	0.0	0.0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	13.00%	18.00%
4021	Low Flow Showerheads 1.25 gpm - gas water heating	SF	Retrofit	LI	0.0	0%	0.0	0.0	0.0	3.7	0.5	1.8	3,601.5	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	83.00%	58.00%
4022	Low Flow Showerheads 1.25 gpm - electric water heating	SF	Retrofit	LI	834.4	0.5	417.0	0.05	0.05	0.0	0%	0	3,601.5	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	13.00%	58.00%
4023	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.9	31.9%	1.23	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with gas water heating	83.00%	62.00%
4024	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.9	54.4%	2.10	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with gas water heating	83.00%	62.00%
4025	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	32.7%	0.18	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with gas water heating	83.00%	62.00%
4026	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	54.5%	0.30	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with gas water heating	83.00%	62.00%
4027	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	78.2%	0.43	1231	10.0	$9.50	Installing 0.5 low flow bathroom faucet aerators in homes with gas water heating	83.00%	62.00%
4028	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	SF	Retrofit	All	876.8	31.8%	279.0	0.05	0.05	0	0%	0	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with electric water heating	13.00%	62.00%
4029	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	SF	Retrofit	All	876.8	54.5%	478.0	0.08	0.08	0	0%	0	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with electric water heating	13.00%	62.00%
4030	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	SF	Retrofit	All	125.0	32.0%	40.0	0.01	0.01	0	0%	0	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with electric water heating	13.00%	62.00%
4031	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	SF	Retrofit	All	125.0	54.4%	68.0	0.01	0.01	0	0%	0	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with electric water heating	13.00%	62.00%
4032	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	SF	Retrofit	All	125.0	77.6%	97.0	0.02	0.02	0	0%	0	1231	10.0	$9.50	Installing 0.5 gpm low flow bathroom faucet aerators in homes with electric water heating	13.00%	62.00%
4033	Shower start - 1.75 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.7	35.4%	1.30	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with gas water heating	83.00%	58.00%
4034	Shower start - 1.5 gpm - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.7	45.5%	1.67	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with gas water heating	83.00%	58.00%
4035	Shower start - 1.75 gpm - electric water heating	SF	Retrofit	All	834.4	35.4%	295.0	0.04	0.04	0	0%	0	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with electric water heating	13.00%	58.00%
4036	Shower start - 1.5 gpm - electric water heating	SF	Retrofit	All	834.4	45.4%	379.0	0.05	0.05	0	0%	0	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with electric water heating	13.00%	58.00%
4037	Gravity Film Heat Exchanger GFX - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	25.0	4.1%	1.02	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with gas water heating	83.00%	1.00%
4038	Gravity Film Heat Exchanger GFX - electric water heating	SF	Retrofit	All	4,626.0	4.5%	208.0	0.03	0.03	0	0%	0	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with electric water heating	13.00%	1.00%
4039	Solar Domestic Hot Water - gas water heating	SF	Retrofit	All	0.0	0%	0.0	0.00	0.00	25.0	38.0%	9.50	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with gas water heating	83.00%	28.60%
4040	Solar Domestic Hot Water - electric water heating	SF	Retrofit	All	4,626.0	44.5%	2059.0	0.42	0.42	0	0%	0	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with electric water heating	13.00%	30.10%

Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
4041	Heat Pump Water Heaters	SF	NC	All	4,626.0	56.8%	2628.0	0.46	0.46	-	-	-4.29	0	15.0	$700.00	Installing an efficient heat pump water heater in lieu of a standard efficiency storage tank WH	13.00%	0.00%
4042	Super Efficiency Gas Water Heater 0.70 EF	SF	NC	All	0.0	0%	0	0.00	0.00	25.0	14.4%	3.60	0	15.0	$235.00	Installing an efficient gas storage tank water heater in lieu of a standard efficiency gas storage tank WH	83.00%	0.00%
4043	Instant Gas Water Heater	SF	NC	All	0.0	0%	0	0.00	0.00	25.0	26.8%	6.70	0	15.0	$434.00	Installing an efficient instantaneous gas tankless water heater in lieu of a standard efficiency gas storage tank WH	83.00%	0.00%
4044	Pipe Wrap - gas water heater - Insulated Pipe with R3	SF	NC	All	0.0	0%	0	0.00	0.00	2.37	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	83.00%	0.00%
4045	Pipe Wrap - gas water heater - Insulated Pipe with R2	SF	NC	All	0.0	0%	0	0.00	0.00	2.37	58.3%	1.38	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have gas water heaters	83.00%	0.00%
4046	Pipe Wrap - electric water heater - Insulated Pipe with R3	SF	NC	All	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	13.00%	0.00%
4047	Pipe Wrap - electric water heater - Insulated Pipe with R2	SF	NC	All	46.2	58.4%	27.0	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have electric water heaters	13.00%	0.00%
4048	Low Flow Showerheads 1.75 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	30.0%	1.10	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with gas water heating	83.00%	0.00%
4049	Low Flow Showerheads 1.5 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	40.0%	1.47	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with gas water heating	83.00%	0.00%
4050	Low Flow Showerheads 1.25 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	50.1%	1.84	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	83.00%	0.00%
4051	Low Flow Showerheads 1.0 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	59.9%	2.20	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with gas water heating	83.00%	0.00%
4052	Low Flow Showerheads 0.5 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	80.1%	2.94	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with gas water heating	83.00%	0.00%
4053	Low Flow Showerheads 1.75 gpm - electric water heating	SF	NC	All	834.4	30.0%	250.0	0.03	0.03	0	0%	0	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with electric water heating	13.00%	0.00%
4054	Low Flow Showerheads 1.5 gpm - electric water heating	SF	NC	All	834.4	40.0%	334.0	0.04	0.04	0	0%	0	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with electric water heating	13.00%	0.00%
4055	Low Flow Showerheads 1.25 gpm - electric water heating	SF	NC	All	834.4	50.0%	417.0	0.05	0.05	0	0%	0	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	13.00%	0.00%
4056	Low Flow Showerheads 1.0 gpm - electric water heating	SF	NC	All	834.4	60.0%	501.0	0.06	0.06	0	0%	0	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with electric water heating	13.00%	0.00%
4057	Low Flow Showerheads 0.5 gpm - electric water heating	SF	NC	All	834.4	80.1%	668.0	0.08	0.08	0	0%	0	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with electric water heating	13.00%	0.00%
4058	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.9	31.9%	1.23	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with gas water heating	83.00%	0.00%
4059	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.9	54.4%	2.10	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with gas water heating	83.00%	0.00%
4060	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	0.6	32.7%	0.18	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with gas water heating	83.00%	0.00%
4061	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	0.6	54.5%	0.30	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with gas water heating	83.00%	0.00%
4062	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	0.6	78.2%	0.43	1231	10.0	$9.50	Installing 0.5 low flow bathroom faucet aerators in homes with gas water heating	83.00%	0.00%
4063	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	SF	NC	All	876.8	31.8%	279.0	0.05	0.05	0	0%	0	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with electric water heating	13.00%	0.00%
4064	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	SF	NC	All	876.8	54.5%	478.0	0.08	0.08	0	0%	0	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with electric water heating	13.00%	0.00%
4065	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	SF	NC	All	125.0	32.0%	40.0	0.01	0.01	0	0%	0	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with electric water heating	13.00%	0.00%
4066	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	SF	NC	All	125.0	54.4%	68.0	0.01	0.01	0	0%	0	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with electric water heating	13.00%	0.00%
4067	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	SF	NC	All	125.0	77.6%	97.0	0.02	0.02	0	0%	0	1231	10.0	$9.50	Installing 0.5 gpm low flow bathroom faucet aerators in homes with electric water heating	13.00%	0.00%
4068	Shower start - 1.75 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	35.4%	1.30	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with gas water heating	83.00%	0.00%
4069	Shower start - 1.5 gpm - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	3.7	45.5%	1.67	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with gas water heating	83.00%	0.00%
4070	Shower start - 1.75 gpm - electric water heating	SF	NC	All	834.4	35.4%	295.0	0.04	0.04	0	0%	0	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with electric water heating	13.00%	0.00%
4071	Shower start - 1.5 gpm - electric water heating	SF	NC	All	834.4	45.4%	379.0	0.05	0.05	0	0%	0	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with electric water heating	13.00%	0.00%
4072	Gravity Film Heat Exchanger GFX - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	25.0	4.1%	1.02	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with gas water heating	83.00%	0.00%
4073	Gravity Film Heat Exchanger GFX - electric water heating	SF	NC	All	4,626.0	4.5%	208.0	0.03	0.03	0	0%	0	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with electric water heating	13.00%	0.00%
4074	Solar Domestic Hot Water - gas water heating	SF	NC	All	0.0	0%	0.0	0.00	0.00	25.0	38.0%	9.50	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with gas water heating	83.00%	0.00%
4075	Solar Domestic Hot Water - electric water heating	SF	NC	All	4,626.0	44.5%	2059.0	0.42	0.42	0	0%	0	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with electric water heating	13.00%	0.00%
4076	Heat Pump Water Heaters	MF	ROB	All	4,626.0	56.8%	2628.0	0.46	0.46	-	-	-4.29	0	15.0	$700.00	Installing an efficient heat pump water heater in lieu of a standard efficiency storage tank WH	14.00%	30.10%
4077	Super Efficiency Gas Water Heater 0.70 EF	MF	ROB	All	0.0	0%	0	0.00	0.00	25.0	14.4%	3.60	0	15.0	$235.00	Installing an efficient gas storage tank water heater in lieu of a standard efficiency gas storage tank WH	86.00%	28.60%
4078	Instant Gas Water Heater	MF	ROB	All	0.0	0%	0	0.00	0.00	25.0	26.8%	6.70	0	15.0	$434.00	Installing an efficient instantaneous gas tankless water heater in lieu of a standard efficiency gas storage tank WH	86.00%	28.60%
4079	Tank Wrap	MF	Retrofit	All	0.0	0%	0		0.00	28.8	2.3%	0.65	0	5.0	$35.00	Installation of water heater tank wrap in homes with gas tank water heating	84.71%	28.60%
4080	Pipe Wrap - gas water heater - Insulated Pipe with R3	MF	Retrofit	NLI	0.0	0%	0	0.00	0.00	2.37	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	86.00%	18.00%
4081	Pipe Wrap - gas water heater - Insulated Pipe with R2	MF	Retrofit	NLI	0.0	0%	0	0.00	0.00	2.37	58.3%	1.38	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have gas water heaters	86.00%	18.00%
4082	Pipe Wrap - electric water heater - Insulated Pipe with R3	MF	Retrofit	NLI	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	14.00%	18.00%
4083	Pipe Wrap - electric water heater - Insulated Pipe with R2	MF	Retrofit	NLI	46.2	58.4%	27.0	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have electric water heaters	14.00%	18.00%
4084	Low Flow Showerheads 1.75 gpm - gas water heating	MF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.6	30.1%	1.08	2112	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with gas water heating	86.00%	58.00%
4085	Low Flow Showerheads 1.5 gpm - gas water heating	MF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.6	40.1%	1.44	2816	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with gas water heating	86.00%	58.00%
4086	Low Flow Showerheads 1.25 gpm - gas water heating	MF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.6	49.9%	1.79	3520	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	86.00%	58.00%
4087	Low Flow Showerheads 1.0 gpm - gas water heating	MF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.6	59.9%	2.15	4224	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with gas water heating	86.00%	58.00%
4088	Low Flow Showerheads 0.5 gpm - gas water heating	MF	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.6	80.0%	2.87	5632	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with gas water heating	86.00%	58.00%
4089	Low Flow Showerheads 1.75 gpm - electric water heating	MF	Retrofit	NLI	815.6	30.0%	245.0	0.03	0.03	0	0%	0	2112	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with electric water heating	14.00%	58.00%
4090	Low Flow Showerheads 1.5 gpm - electric water heating	MF	Retrofit	NLI	815.6	40.0%	326.0	0.04	0.04	0	0%	0	2816	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with electric water heating	14.00%	58.00%
4091	Low Flow Showerheads 1.25 gpm - electric water heating	MF	Retrofit	NLI	815.6	50.0%	408.0	0.05	0.05	0	0%	0	3520	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	14.00%	58.00%
4092	Low Flow Showerheads 1.0 gpm - electric water heating	MF	Retrofit	NLI	815.6	60.0%	489.0	0.06	0.06	0	0%	0	4224	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with electric water heating	14.00%	58.00%
4093	Low Flow Showerheads 0.5 gpm - electric water heating	MF	Retrofit	NLI	815.6	79.9%	652.0	0.08	0.08	0	0%	0	5632	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with electric water heating	14.00%	58.00%
4094	Pipe Wrap - gas water heater - Insulated Pipe with R3	MF	Retrofit	LI	0.0	0%	0.0	0.00	0.00	2	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	86.00%	18.00%
4095	Pipe Wrap - electric water heater - Insulated Pipe with R3	MF	Retrofit	LI	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	14.00%	18.00%
4096	Low Flow Showerheads 1.25 gpm - gas water heating	MF	Retrofit	LI	0.0	0%	0.0	0.00	0.00	4	49.9%	2	3520	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	86.00%	58.00%

Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
4097	Low Flow Showerheads 1.25 gpm - electric water heating	MF	Retrofit	LI	815.6	50.0%	408.0	0.05	0.05	0	0%	0	3520	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	14.00%	58.00%
4098	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	2.8	31.9%	0.89	2104	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with gas water heating	86.00%	62.00%
4099	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	2.8	54.5%	1.52	3607	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with gas water heating	86.00%	62.00%
4100	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	31.7%	0.18	523	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with gas water heating	86.00%	62.00%
4101	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	54.6%	0.31	897	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with gas water heating	86.00%	62.00%
4102	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	77.5%	0.44	1271	10.0	$9.50	Installing 0.5 low flow bathroom faucet aerators in homes with gas water heating	86.00%	62.00%
4103	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MF	Retrofit	All	634.2	31.8%	202.0	0.03	0.03	0	0%	0	2104	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with electric water heating	14.00%	62.00%
4104	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MF	Retrofit	All	634.2	54.6%	346.0	0.06	0.06	0	0%	0	3607	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with electric water heating	14.00%	62.00%
4105	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MF	Retrofit	All	129.0	31.8%	41.0	0.01	0.01	0	0%	0	523	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with electric water heating	14.00%	62.00%
4106	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MF	Retrofit	All	129.0	54.3%	70.0	0.01	0.01	0	0%	0	897	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with electric water heating	14.00%	62.00%
4107	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MF	Retrofit	All	129.0	77.5%	100.0	0.02	0.02	0	0%	0	1271	10.0	$9.50	Installing 0.5 gpm low flow bathroom faucet aerators in homes with electric water heating	14.00%	62.00%
4108	Shower start - 1.75 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.6	35.4%	1.27	2491	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with gas water heating	86.00%	58.00%
4109	Shower start - 1.5 gpm - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.6	45.4%	1.63	3195	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with gas water heating	86.00%	58.00%
4110	Shower start - 1.75 gpm - electric water heating	MF	Retrofit	All	815.6	35.4%	288.6	0.02	0.02	0	0%	0	2491	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with electric water heating	14.00%	58.00%
4111	Shower start - 1.5 gpm - electric water heating	MF	Retrofit	All	815.6	45.4%	370.2	0.03	0.03	0	0%	0	3195	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with electric water heating	14.00%	58.00%
4112	Gravity Film Heat Exchanger GFX - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	25.0	4.1%	1.02	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with gas water heating	86.00%	1.00%
4113	Gravity Film Heat Exchanger GFX - electric water heating	MF	Retrofit	All	4,626.0	4.5%	208.0	0.03	0.03	0	0%	0	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with electric water heating	14.00%	1.00%
4114	Solar Domestic Hot Water - gas water heating	MF	Retrofit	All	0.0	0%	0.0	0.00	0.00	25.0	38.0%	9.50	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with gas water heating	86.00%	28.60%
4115	Solar Domestic Hot Water - electric water heating	MF	Retrofit	All	4,626.0	44.5%	2059.0	0.42	0.42	0	0%	0	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with electric water heating	14.00%	30.10%
4116	Heat Pump Water Heaters	MF	NC	All	4,626.0	56.8%	2628.0	0.46	0.46	-	-	-4.29	0	15.0	$700.00	Installing an efficient heat pump water heater in lieu of a standard efficiency storage tank WH	14.00%	0.00%
4117	Super Efficiency Gas Water Heater 0.70 EF	MF	NC	All	0.0	0%	0	0.00	0.00	25.0	14.4%	3.60	0	15.0	$235.00	Installing an efficient gas storage tank water heater in lieu of a standard efficiency gas storage tank WH	86.00%	0.00%
4118	Instant Gas Water Heater	MF	NC	All	0.0	0%	0	0.00	0.00	25.0	26.8%	6.70	0	15.0	$434.00	Installing an efficient instantaneous gas tankless water heater in lieu of a standard efficiency gas storage tank WH	86.00%	0.00%
4119	Pipe Wrap - gas water heater - Insulated Pipe with R3	MF	NC	All	0.0	0%	0	0.00	0.00	2.37	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	86.00%	0.00%
4120	Pipe Wrap - gas water heater - Insulated Pipe with R2	MF	NC	All	0.0	0%	0	0.00	0.00	2.37	58.3%	1.38	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have gas water heaters	86.00%	0.00%
4121	Pipe Wrap - electric water heater - Insulated Pipe with R3	MF	NC	All	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	14.00%	0.00%
4122	Pipe Wrap - electric water heater - Insulated Pipe with R2	MF	NC	All	46.2	58.4%	27.0	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have electric water heaters	14.00%	0.00%
4123	Low Flow Showerheads 1.75 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	30.1%	1.08	2112	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with gas water heating	86.00%	0.00%
4124	Low Flow Showerheads 1.5 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	40.1%	1.44	2816	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with gas water heating	86.00%	0.00%
4125	Low Flow Showerheads 1.25 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	49.9%	1.79	3520	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	86.00%	0.00%
4126	Low Flow Showerheads 1.0 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	59.9%	2.15	4224	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with gas water heating	86.00%	0.00%
4127	Low Flow Showerheads 0.5 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	80.0%	2.87	5632	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with gas water heating	86.00%	0.00%
4128	Low Flow Showerheads 1.75 gpm - electric water heating	MF	NC	All	815.6	30.0%	245.0	0.03	0.03	0	0%	0	2112	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with electric water heating	14.00%	0.00%
4129	Low Flow Showerheads 1.5 gpm - electric water heating	MF	NC	All	815.6	40.0%	326.0	0.04	0.04	0	0%	0	2816	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with electric water heating	14.00%	0.00%
4130	Low Flow Showerheads 1.25 gpm - electric water heating	MF	NC	All	815.6	50.0%	408.0	0.05	0.05	0	0%	0	3520	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	14.00%	0.00%
4131	Low Flow Showerheads 1.0 gpm - electric water heating	MF	NC	All	815.6	60.0%	489.0	0.06	0.06	0	0%	0	4224	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with electric water heating	14.00%	0.00%
4132	Low Flow Showerheads 0.5 gpm - electric water heating	MF	NC	All	815.6	79.9%	652.0	0.08	0.08	0	0%	0	5632	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with electric water heating	14.00%	0.00%
4133	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	2.8	31.9%	0.89	2104	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with gas water heating	86.00%	0.00%
4134	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	2.8	54.5%	1.52	3607	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with gas water heating	86.00%	0.00%
4135	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	0.6	31.7%	0.18	523	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with gas water heating	86.00%	0.00%
4136	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	0.6	54.6%	0.31	897	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with gas water heating	86.00%	0.00%
4137	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	0.6	77.5%	0.44	1271	10.0	$9.50	Installing 0.5 low flow bathroom faucet aerators in homes with gas water heating	86.00%	0.00%
4138	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MF	NC	All	634.2	31.8%	202.0	0.03	0.03	0	0%	0	2104	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with electric water heating	14.00%	0.00%
4139	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MF	NC	All	634.2	54.6%	346.0	0.06	0.06	0	0%	0	3607	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with electric water heating	14.00%	0.00%
4140	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MF	NC	All	129.0	31.8%	41.0	0.01	0.01	0	0%	0	523	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with electric water heating	14.00%	0.00%
4141	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MF	NC	All	129.0	54.3%	70.0	0.01	0.01	0	0%	0	897	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with electric water heating	14.00%	0.00%
4142	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MF	NC	All	129.0	77.5%	100.0	0.02	0.02	0	0%	0	1271	10.0	$9.50	Installing 0.5 gpm low flow bathroom faucet aerators in homes with electric water heating	14.00%	0.00%
4143	Shower start - 1.75 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	35.4%	1.27	2491	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with gas water heating	86.00%	0.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
4144	Shower start - 1.5 gpm - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	3.6	45.4%	1.63	3195	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with gas water heating	86.00%	0.00%
4145	Shower start - 1.75 gpm - electric water heating	MF	NC	All	815.6	35.4%	288.6	0.02	0.02	0	0%	0	2491	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with electric water heating	14.00%	0.00%
4146	Shower start - 1.5 gpm - electric water heating	MF	NC	All	815.6	45.4%	370.2	0.03	0.03	0	0%	0	3195	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with electric water heating	14.00%	0.00%
4147	Gravity Film Heat Exchanger GFX - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	25.0	4.1%	1.02	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with gas water heating	86.00%	0.00%
4148	Gravity Film Heat Exchanger GFX - electric water heating	MF	NC	All	4,626.0	4.5%	208.0	0.03	0.03	0	0%	0	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with electric water heating	14.00%	0.00%
4149	Solar Domestic Hot Water - gas water heating	MF	NC	All	0.0	0%	0.0	0.00	0.00	25.0	38.0%	9.50	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with gas water heating	86.00%	0.00%
4150	Solar Domestic Hot Water - electric water heating	MF	NC	All	4,626.0	44.5%	2059.0	0.42	0.42	0	0%	0	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with electric water heating	14.00%	0.00%
4151	Heat Pump Water Heaters	MAN	ROB	All	4,626.0	56.8%	2628.0	0.46	0.46	-	-	-4.29	0	15.0	$700.00	Installing an efficient heat pump water heater in lieu of a standard efficiency storage tank WH	26.00%	30.10%
4152	Super Efficiency Gas Water Heater 0.70 EF	MAN	ROB	All	0.0	0%	0	0.00	0.00	25.0	14.4%	3.60	0	15.0	$235.00	Installing an efficient gas storage tank water heater in lieu of a standard efficiency gas storage tank WH	64.00%	28.60%
4153	Instant Gas Water Heater	MAN	ROB	All	0.0	0%	0	0.00	0.00	25.0	26.8%	6.70	0	15.0	$434.00	Installing an efficient instantaneous gas tankless water heater in lieu of a standard efficiency gas storage tank WH	64.00%	28.60%
4154	Tank Wrap	MAN	Retrofit	All	0.0	0%	0		0.00	28.8	2.3%	0.65	0	5.0	$35.00	Installation of water heater tank wrap in homes with gas tank water heating	63.04%	28.60%
4155	Pipe Wrap - gas water heater - Insulated Pipe with R3	MAN	Retrofit	NLI	0.0	0%	0	0.00	0.00	2.37	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	64.00%	18.00%
4156	Pipe Wrap - gas water heater - Insulated Pipe with R2	MAN	Retrofit	NLI	0.0	0%	0	0.00	0.00	2.37	58.3%	1.38	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have gas water heaters	64.00%	18.00%
4157	Pipe Wrap - electric water heater - Insulated Pipe with R3	MAN	Retrofit	NLI	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	26.00%	18.00%
4158	Pipe Wrap - electric water heater - Insulated Pipe with R2	MAN	Retrofit	NLI	46.2	58.4%	27.0	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have electric water heaters	26.00%	18.00%
4159	Low Flow Showerheads 1.75 gpm - gas water heating	MAN	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	30.0%	1.10	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with gas water heating	64.00%	58.00%
4160	Low Flow Showerheads 1.5 gpm - gas water heating	MAN	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	40.0%	1.47	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with gas water heating	64.00%	58.00%
4161	Low Flow Showerheads 1.25 gpm - gas water heating	MAN	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	50.1%	1.84	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	64.00%	58.00%
4162	Low Flow Showerheads 1.0 gpm - gas water heating	MAN	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	59.9%	2.20	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with gas water heating	64.00%	58.00%
4163	Low Flow Showerheads 0.5 gpm - gas water heating	MAN	Retrofit	NLI	0.0	0%	0.0	0.00	0.00	3.7	80.1%	2.94	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with gas water heating	64.00%	58.00%
4164	Low Flow Showerheads 1.75 gpm - electric water heating	MAN	Retrofit	NLI	834.4	30.0%	250.0	0.03	0.03	0	0%	0	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with electric water heating	26.00%	58.00%
4165	Low Flow Showerheads 1.5 gpm - electric water heating	MAN	Retrofit	NLI	834.4	40.0%	334.0	0.04	0.04	0	0%	0	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with electric water heating	26.00%	58.00%
4166	Low Flow Showerheads 1.25 gpm - electric water heating	MAN	Retrofit	NLI	834.4	50.0%	417.0	0.05	0.05	0	0%	0	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	26.00%	58.00%
4167	Low Flow Showerheads 1.0 gpm - electric water heating	MAN	Retrofit	NLI	834.4	60.0%	501.0	0.06	0.06	0	0%	0	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with electric water heating	26.00%	58.00%
4168	Low Flow Showerheads 0.5 gpm - electric water heating	MAN	Retrofit	NLI	834.4	80.1%	668.0	0.08	0.08	0	0%	0	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with electric water heating	26.00%	58.00%
4169	Pipe Wrap - gas water heater - Insulated Pipe with R3	MAN	Retrofit	LI	0.0	0%	0.0	0.00	0.00	2	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	64.00%	18.00%
4170	Pipe Wrap - electric water heater - Insulated Pipe with R3	MAN	Retrofit	LI	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	26.00%	18.00%
4171	Low Flow Showerheads 1.25 gpm - gas water heating	MAN	Retrofit	LI	0.0	0%	0.0	0.00	0.00	4	50.1%	2	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	64.00%	58.00%
4172	Low Flow Showerheads 1.25 gpm - electric water heating	MAN	Retrofit	LI	834.4	50.0%	417.0	0.05	0.05	0	0%	0	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	26.00%	58.00%
4173	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.9	31.9%	1.23	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with gas water heating	64.00%	62.00%
4174	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.9	54.4%	2.10	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with gas water heating	64.00%	62.00%
4175	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	32.7%	0.18	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with gas water heating	64.00%	62.00%
4176	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	54.5%	0.30	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with gas water heating	64.00%	62.00%
4177	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	0.6	78.2%	0.43	1231	10.0	$9.50	Installing 0.5 low flow bathroom faucet aerators in homes with gas water heating	64.00%	62.00%
4178	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MAN	Retrofit	All	876.8	31.8%	279.0	0.05	0.05	0	0%	0	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with electric water heating	26.00%	62.00%
4179	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MAN	Retrofit	All	876.8	54.5%	478.0	0.08	0.08	0	0%	0	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with electric water heating	26.00%	62.00%
4180	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MAN	Retrofit	All	125.0	32.0%	40.0	0.01	0.01	0	0%	0	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with electric water heating	26.00%	62.00%
4181	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MAN	Retrofit	All	125.0	54.4%	68.0	0.01	0.01	0	0%	0	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with electric water heating	26.00%	62.00%
4182	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MAN	Retrofit	All	125.0	77.6%	97.0	0.02	0.02	0	0%	0	1231	10.0	$9.50	Installing 0.5 gpm low flow bathroom faucet aerators in homes with electric water heating	26.00%	62.00%
4183	Shower start - 1.75 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.7	35.4%	1.30	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with gas water heating	64.00%	58.00%
4184	Shower start - 1.5 gpm - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	3.7	45.5%	1.67	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with gas water heating	64.00%	58.00%
4185	Shower start - 1.75 gpm - electric water heating	MAN	Retrofit	All	834.4	35.4%	295.0	0.04	0.04	0	0%	0	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with electric water heating	26.00%	58.00%
4186	Shower start - 1.5 gpm - electric water heating	MAN	Retrofit	All	834.4	45.4%	379.0	0.05	0.05	0	0%	0	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with electric water heating	26.00%	58.00%
4187	Gravity Film Heat Exchanger GFX - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	25.0	4.1%	1.02	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with gas water heating	64.00%	1.00%
4188	Gravity Film Heat Exchanger GFX - electric water heating	MAN	Retrofit	All	4,626.0	4.5%	208.0	0.03	0.03	0	0%	0	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with electric water heating	26.00%	1.00%
4189	Solar Domestic Hot Water - gas water heating	MAN	Retrofit	All	0.0	0%	0.0	0.00	0.00	25.0	38.0%	9.50	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with gas water heating	64.00%	28.60%
4190	Solar Domestic Hot Water - electric water heating	MAN	Retrofit	All	4,626.0	44.5%	2059.0	0.42	0.42	0	0%	0	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with electric water heating	26.00%	30.10%
4191	Heat Pump Water Heaters	MAN	NC	All	4,626.0	56.8%	2628.0	0.46	0.46	-	-	-4.29	0	15.0	$700.00	Installing an efficient heat pump water heater in lieu of a standard efficiency storage tank WH	26.00%	0.00%
4192	Super Efficiency Gas Water Heater 0.70 EF	MAN	NC	All	0.0	0%	0	0.00	0.00	25.0	14.4%	3.60	0	15.0	$235.00	Installing an efficient gas storage tank water heater in lieu of a standard efficiency gas storage tank WH	64.00%	0.00%
4193	Instant Gas Water Heater	MAN	NC	All	0.0	0%	0	0.00	0.00	25.0	26.8%	6.70	0	15.0	$434.00	Installing an efficient instantaneous gas tankless water heater in lieu of a standard efficiency gas storage tank WH	64.00%	0.00%
4194	Pipe Wrap - gas water heater - Insulated Pipe with R3	MAN	NC	All	0.0	0%	0	0.00	0.00	2.37	66.0%	1.56	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have gas water heaters	64.00%	0.00%
4195	Pipe Wrap - gas water heater - Insulated Pipe with R2	MAN	NC	All	0.0	0%	0	0.00	0.00	2.37	58.3%	1.38	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have gas water heaters	64.00%	0.00%
4196	Pipe Wrap - electric water heater - Insulated Pipe with R3	MAN	NC	All	46.2	66.2%	30.6	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-3 pipe wrap on hot water lines in homes that have electric water heaters	26.00%	0.00%

Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
4197	Pipe Wrap - electric water heater - Insulated Pipe with R2	MAN	NC	All	46.2	58.4%	27.0	0.03	0.03	0	0%	0	0	6.0	$4.83	Installing R-2 pipe wrap on hot water lines in homes that have electric water heaters	26.00%	0.00%
4198	Low Flow Showerheads 1.75 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	30.0%	1.10	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with gas water heating	64.00%	0.00%
4199	Low Flow Showerheads 1.5 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	40.0%	1.47	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with gas water heating	64.00%	0.00%
4200	Low Flow Showerheads 1.25 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	50.1%	1.84	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with gas water heating	64.00%	0.00%
4201	Low Flow Showerheads 1.0 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	59.9%	2.20	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with gas water heating	64.00%	0.00%
4202	Low Flow Showerheads 0.5 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	80.1%	2.94	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with gas water heating	64.00%	0.00%
4203	Low Flow Showerheads 1.75 gpm - electric water heating	MAN	NC	All	834.4	30.0%	250.0	0.03	0.03	0	0%	0	2161	10.0	$18.70	Installing 1.75 gpm low flow showerheads in homes with electric water heating	26.00%	0.00%
4204	Low Flow Showerheads 1.5 gpm - electric water heating	MAN	NC	All	834.4	40.0%	334.0	0.04	0.04	0	0%	0	2881	10.0	$18.70	Installing 1.5 gpm low flow showerheads in homes with electric water heating	26.00%	0.00%
4205	Low Flow Showerheads 1.25 gpm - electric water heating	MAN	NC	All	834.4	50.0%	417.0	0.05	0.05	0	0%	0	3601	10.0	$18.70	Installing 1.25 gpm low flow showerheads in homes with electric water heating	26.00%	0.00%
4206	Low Flow Showerheads 1.0 gpm - electric water heating	MAN	NC	All	834.4	60.0%	501.0	0.06	0.06	0	0%	0	4322	10.0	$18.70	Installing 1.0 gpm low flow showerheads in homes with electric water heating	26.00%	0.00%
4207	Low Flow Showerheads 0.5 gpm - electric water heating	MAN	NC	All	834.4	80.1%	668.0	0.08	0.08	0	0%	0	5762	10.0	$18.70	Installing 0.5 gpm low flow showerheads in homes with electric water heating	26.00%	0.00%
4208	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.9	31.9%	1.23	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with gas water heating	64.00%	0.00%
4209	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.9	54.4%	2.10	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with gas water heating	64.00%	0.00%
4210	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	0.6	32.7%	0.18	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with gas water heating	64.00%	0.00%
4211	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	0.6	54.5%	0.30	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with gas water heating	64.00%	0.00%
4212	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	0.6	78.2%	0.43	1231	10.0	$9.50	Installing 0.5 low flow bathroom faucet aerators in homes with gas water heating	64.00%	0.00%
4213	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MAN	NC	All	876.8	31.8%	279.0	0.05	0.05	0	0%	0	2909	10.0	$9.50	Installing 1.5 gpm low flow kitchen faucet aerators in homes with electric water heating	26.00%	0.00%
4214	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MAN	NC	All	876.8	54.5%	478.0	0.08	0.08	0	0%	0	4987	10.0	$9.50	Installing 1.0 gpm low flow kitchen faucet aerators in homes with electric water heating	26.00%	0.00%
4215	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MAN	NC	All	125.0	32.0%	40.0	0.01	0.01	0	0%	0	507	10.0	$9.50	Installing 1.5 gpm low flow bathroom faucet aerators in homes with electric water heating	26.00%	0.00%
4216	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MAN	NC	All	125.0	54.4%	68.0	0.01	0.01	0	0%	0	869	10.0	$9.50	Installing 1.0 gpm low flow bathroom faucet aerators in homes with electric water heating	26.00%	0.00%
4217	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MAN	NC	All	125.0	77.6%	97.0	0.02	0.02	0	0%	0	1231	10.0	$9.50	Installing 0.5 gpm low flow bathroom faucet aerators in homes with electric water heating	26.00%	0.00%
4218	Shower start - 1.75 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	35.4%	1.30	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with gas water heating	64.00%	0.00%
4219	Shower start - 1.5 gpm - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	3.7	45.5%	1.67	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with gas water heating	64.00%	0.00%
4220	Shower start - 1.75 gpm - electric water heating	MAN	NC	All	834.4	35.4%	295.0	0.04	0.04	0	0%	0	2549	10.0	$40.00	Installing shower start technology and 1.75 gpm low-flow showerheads in homes with electric water heating	26.00%	0.00%
4221	Shower start - 1.5 gpm - electric water heating	MAN	NC	All	834.4	45.4%	379.0	0.05	0.05	0	0%	0	3269	10.0	$40.00	Installing shower start technology and 1.5 gpm low-flow showerheads in homes with electric water heating	26.00%	0.00%
4222	Gravity Film Heat Exchanger GFX - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	25.0	4.1%	1.02	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with gas water heating	64.00%	0.00%
4223	Gravity Film Heat Exchanger GFX - electric water heating	MAN	NC	All	4,626.0	4.5%	208.0	0.03	0.03	0	0%	0	0	20.0	$1,022.00	Installing a gravity film heat exchanger in homes with electric water heating	26.00%	0.00%
4224	Solar Domestic Hot Water - gas water heating	MAN	NC	All	0.0	0%	0.0	0.00	0.00	25.0	38.0%	9.50	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with gas water heating	64.00%	0.00%
4225	Solar Domestic Hot Water - electric water heating	MAN	NC	All	4,626.0	44.5%	2059.0	0.42	0.42	0	0%	0	0	20.0	$4,500.00	Installing a solar domestic water heater in homes with electric water heating	26.00%	0.00%
5000	Other																	
5001	Pump and Motor Single Speed	SF	ROB	All	2,120.9	32.7%	694.0	0.72	0.72	0.0	0%	0.00	0	10	$85.00	Installing high efficiency single-speed pool pumps and motors in homes that have inefficient pool pumps and motors	9.38%	33.00%
5002	Pump and motor w auto controls - multi speed	SF	ROB	All	2,120.9	51.0%	1081.0	1.59	1.59	0.0	0%	0.00	0	10	$579.00	Installing high efficiency multi-speed pool pumps and motors in homes that have inefficient pool pumps and motors	9.38%	33.00%
5003	Pump and Motor Single Speed	SF	NC	All	2,120.9	32.7%	694.0	0.72	0.72	0.0	0%	0.00	0	10	$85.00	Installing high efficiency single-speed pool pumps and motors in homes that have inefficient pool pumps and motors	9.38%	33.00%
5004	Pump and motor w auto controls - multi speed	SF	NC	All	2,120.9	51.0%	1081.0	1.59	1.59	0.0	0%	0.00	0	10	$579.00	Installing high efficiency multi-speed pool pumps and motors in homes that have inefficient pool pumps and motors	9.38%	33.00%
6000	HVAC (Envelope)																	
6001	Airtight Can Lights	SF	Retrofit-OLD	All	-	-	15.7	0.0	0.0	-	-	2.1	-	15	$613.20	Reducing air infiltration leakage from can lights in homes with gas heating and central AC	28.43%	76.92%
6002	Basement Wall Insulation	SF	Retrofit-OLD	All	-	-	-45.3	-0.1	-0.1	-	-	11.9	-	20	$1,104.21	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and central AC	15.35%	71.00%
6003	Cool roof	SF	Retrofit-OLD	All	-	-	49.0	0.0	0.0	-	-	-0.8	-	20	$1,660.05	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and central AC	28.43%	5.00%
6004	Crawlspace Wall Insulation	SF	Retrofit-OLD	All	-	-	-80.6	-0.1	-0.1	-	-	6.3	-	20	$552.11	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and central AC	2.27%	30.00%
6005	Door weatherstripping	SF	Retrofit-OLD	All	-	-	4.6	0.0	0.0	-	-	0.5	-	5	$86.00	Adding weatherstripping to exterior doors in homes with gas heating and central AC	56.86%	76.92%
6006	Duct Insulation	SF	Retrofit-OLD	NLI	-	-	-5.4	0.0	0.0	-	-	2.8	-	20	$405.36	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	24.80%	78.95%
6007	Duct location	SF	Retrofit-OLD	All	-	-	68.4	0.1	0.1	-	-	8.6	-	30	$1,266.75	Moving duct work into a conditioned space in homes with gas heating and central AC	24.80%	47.18%
6008	Duct sealing 15% leakage base	SF	Retrofit-OLD	NLI	-	-	23.6	0.0	0.0	-	-	1.4	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	24.80%	76.92%
6009	Duct sealing 20% leakage base	SF	Retrofit-OLD	NLI	-	-	37.1	0.0	0.0	-	-	2.1	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	24.80%	76.92%
6010	Duct sealing 25% leakage base	SF	Retrofit-OLD	NLI	-	-	52.4	0.1	0.1	-	-	2.8	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	24.80%	76.92%
6011	Duct sealing 30% leakage base	SF	Retrofit-OLD	NLI	-	-	70.2	0.1	0.1	-	-	3.5	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	24.80%	76.92%
6012	Energy Star Door	SF	Retrofit-OLD	All	-	-	43.4	0.0	0.0	-	-	2.9	-	20	$4,650.00	Installing Energy Star exterior doors in homes with gas heating and central AC	28.43%	56.00%
6013	Floor Insulation	SF	Retrofit-OLD	All	-	-	-127.8	-0.1	-0.1	-	-	10.5	-	20	$874.23	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and central AC	9.38%	23.00%

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6014	Infiltration reduction - 10%	SF	Retrofit-OLD	NLI	-	-	27.5	0.1	0.1	-	-	3.6	-	13	$202.68	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	28.43%	76.92%
6015	Infiltration reduction - 15%	SF	Retrofit-OLD	NLI	-	-	43.4	0.1	0.1	-	-	5.4	-	13	$202.68	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	28.43%	76.92%
6016	Infiltration reduction - 20%	SF	Retrofit-OLD	NLI	-	-	60.6	0.1	0.1	-	-	7.4	-	13	$202.68	Reducing air infiltration (by 20%) in poorly sealed homes in homes with gas heating and central AC	28.43%	76.92%
6017	Infiltration reduction - 30%	SF	Retrofit-OLD	NLI	-	-	89.5	0.2	0.2	-	-	11.0	-	13	$202.68	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and central AC	28.43%	76.92%
6018	Infiltration reduction - 40%	SF	Retrofit-OLD	NLI	-	-	121.1	0.3	0.3	-	-	14.7	-	13	$202.68	Reducing air infiltration (by 40%) in poorly sealed homes in homes with gas heating and central AC	28.43%	76.92%
6019	Infiltration reduction - 50%	SF	Retrofit-OLD	NLI	-	-	152.6	0.4	0.4	-	-	18.4	-	13	$202.68	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and central AC	28.43%	76.92%
6020	Rim Joist Insulation	SF	Retrofit-OLD	All	-	-	36.0	0.0	0.0	-	-	3.7	-	20	$191.84	Adding rim joist insulation in homes with poorly insulated rim joists in homes with gas heating and central AC	28.43%	78.95%
6021	Wall Insulation	SF	Retrofit-OLD	NLI	-	-	137.6	0.1	0.1	-	-	14.3	-	20	$3,041.11	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	28.43%	78.95%
6022	Window Film	SF	Retrofit-OLD	NLI	-	-	562.2	0.6	0.6	-	-	-14.5	-	10	$538.35	Adding window film to existing windows in homes with gas heating and central AC	28.43%	65.79%
6023	Window Replacement	SF	Retrofit-OLD	NLI	-	-	552.0	0.6	0.6	-	-	23.0	-	20	$1,500.20	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	28.43%	65.79%
6024	New vinyl window	SF	Retrofit-OLD	NLI	-	-	726.3	0.8	0.8	-	-	28.5	-	20	$3,500.00	Installing a new vinyl window to replace a single-pane, double hung window in homes with gas heating and central AC	28.43%	65.79%
6025	Original double hung window with low U storm	SF	Retrofit-OLD	NLI	-	-	1062.8	1.2	1.2	-	-	38.2	-	20	$5,250.00	Installing a new double hung low U storm window to replace a single-pane, double hung window in homes with gas heating and central AC	28.43%	65.79%
6026	Original double hung window with original storm window	SF	Retrofit-OLD	NLI	-	-	384.0	0.4	0.4	-	-	17.2	-	20	$5,250.00	Installing a new double hung original storm window by replacing a single-pane, double hung window in homes with gas heating and central AC	28.43%	65.79%
6027	Rehabbed double hung	SF	Retrofit-OLD	NLI	-	-	365.2	0.4	0.4	-	-	24.1	-	20	$8,750.00	Rehabilitating a single-pane, double hung window by installing a new double hung window in homes with gas heating and central AC	28.43%	65.79%
6028	Rehabbed double hung with low U storm	SF	Retrofit-OLD	NLI	-	-	1102.6	1.3	1.3	-	-	38.9	-	20	$12,250.00	Rehabilitating a single-pane, double hung window by installing a new double hung, low U window in homes with gas heating and central AC	28.43%	65.79%
6029	Rehabbed double hung with single glazed storm	SF	Retrofit-OLD	NLI	-	-	542.0	0.6	0.6	-	-	35.3	-	20	$12,250.00	Rehabilitating a single-pane, double hung window by installing a new double hung, single-glazed storm window in homes with gas heating and central AC	28.43%	65.79%
6030	R19 kneewalls	SF	Retrofit-OLD	All	-	-	76.2	0.1	0.1	-	-	7.3	-	20	$172.53	Adding R19 insulation to poorly insulated kneewalls - in homes with gas heating and central AC	28.43%	78.95%
6031	R-38 "scuttle hole" Attic hatch	SF	Retrofit-OLD	All	-	-	10.0	0.0	0.0	-	-	0.9	-	20	$6.81	Installing R-38 insulation to a "scuttle hole" attic hatch - in homes with gas heating and central AC	28.43%	78.95%
6032	R-38 pull-down stairs Attic hatch	SF	Retrofit-OLD	All	-	-	19.4	0.0	0.0	-	-	1.7	-	20	$13.63	Installing R-38 insulation to a pull-down stairs attic hatch - in homes with gas heating and central AC	28.43%	78.95%
6033	R-30 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	31.1	0.0	0.0	-	-	3.3	-	20	$958.87	Installing R-30 roof insulation in poorly insulated attics - in homes with gas heating and central AC	28.43%	78.95%
6034	R-38 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	43.7	0.1	0.1	-	-	4.5	-	20	$1,656.22	Installing R-38 roof insulation in poorly insulated attics - in homes with gas heating and central AC	28.43%	78.95%
6035	R-49 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	53.7	0.1	0.1	-	-	5.7	-	20	$2,615.09	Installing R-49 roof insulation in poorly insulated attics - in homes with gas heating and central AC	28.43%	78.95%
6036	R-60 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	61.0	0.1	0.1	-	-	6.4	-	20	$3,573.96	Installing R-60 roof insulation in poorly insulated attics - in homes with gas heating and central AC	28.43%	78.95%
6037	Low Income Weatherization Package	SF	Retrofit-OLD	LI	-	-	871.8	1.1	1.1	-	-	59.7	-	13	$9,087.84	Package of weatherization measures - in homes with gas heating and central AC	24.80%	78.95%
6038	Basement Wall Insulation	SF	Retrofit-AVG	All	-	-	-39.0	0.0	0.0	-	-	7.8	-	20	$1,104.21	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and central AC	23.03%	71.00%
6039	Cool roof	SF	Retrofit-AVG	All	-	-	28.5	0.0	0.0	-	-	-0.6	-	20	$1,660.05	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and central AC	42.65%	5.00%
6040	Crawlspace Wall Insulation	SF	Retrofit-AVG	All	-	-	-20.3	0.0	0.0	-	-	1.1	-	20	$552.11	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and central AC	3.41%	30.00%
6041	Duct Insulation	SF	Retrofit-AVG	NLI	-	-	0.5	0.0	0.0	-	-	2.2	-	20	$405.36	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	37.20%	78.95%
6042	Duct location	SF	Retrofit-AVG	All	-	-	80.0	0.1	0.1	-	-	8.6	-	30	$1,266.75	Moving duct work into a conditioned space in homes with gas heating and central AC	37.20%	47.18%
6043	Duct sealing 15% leakage base	SF	Retrofit-AVG	NLI	-	-	17.4	0.0	0.0	-	-	0.8	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	37.20%	76.92%
6044	Duct sealing 20% leakage base	SF	Retrofit-AVG	NLI	-	-	28.2	0.0	0.0	-	-	1.2	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	37.20%	76.92%
6045	Duct sealing 25% leakage base	SF	Retrofit-AVG	NLI	-	-	39.9	0.1	0.1	-	-	1.6	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	37.20%	76.92%
6046	Duct sealing 30% leakage base	SF	Retrofit-AVG	NLI	-	-	51.8	0.1	0.1	-	-	2.0	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	37.20%	76.92%
6047	Energy Star Door	SF	Retrofit-AVG	All	-	-	39.2	0.0	0.0	-	-	3.0	-	20	$4,650.00	Installing Energy Star exterior doors in homes with gas heating and central AC	42.65%	56.00%
6048	Floor Insulation	SF	Retrofit-AVG	All	-	-	-28.4	0.0	0.0	-	-	2.5	-	20	$874.23	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and central AC	14.07%	23.00%
6049	Infiltration reduction - 10%	SF	Retrofit-AVG	NLI	-	-	14.6	0.0	0.0	-	-	1.7	-	13	$202.68	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	42.65%	76.92%
6050	Infiltration reduction - 15%	SF	Retrofit-AVG	NLI	-	-	22.1	0.1	0.1	-	-	2.6	-	13	$202.68	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	42.65%	76.92%
6051	Infiltration reduction - 20%	SF	Retrofit-AVG	NLI	-	-	30.0	0.0	0.0	-	-	3.8	-	13	$202.68	Reducing air infiltration (by 20%) in poorly sealed homes in homes with gas heating and central AC	42.65%	76.92%
6052	Infiltration reduction - 30%	SF	Retrofit-AVG	NLI	-	-	43.1	0.1	0.1	-	-	5.7	-	13	$202.68	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and central AC	42.65%	76.92%
6053	Infiltration reduction - 40%	SF	Retrofit-AVG	NLI	-	-	58.1	0.1	0.1	-	-	7.5	-	13	$202.68	Reducing air infiltration (by 40%) in poorly sealed homes in homes with gas heating and central AC	42.65%	76.92%

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6054	Infiltration reduction - 50%	SF	Retrofit-AVG	NLI	-	-	73.1	0.1	0.1	-	-	9.4	-	13	$202.68	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and central AC	42.65%	76.92%
6055	Wall Insulation	SF	Retrofit-AVG	NLI	-	-	85.4	0.1	0.1	-	-	9.3	-	20	$3,041.11	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	42.65%	78.95%
6056	Window Film	SF	Retrofit-AVG	NLI	-	-	523.2	0.5	0.5	-	-	-10.9	-	10	$538.35	Adding window film to existing windows in homes with gas heating and central AC	42.65%	65.79%
6057	Window Replacement	SF	Retrofit-AVG	NLI	-	-	392.8	0.5	0.5	-	-	15.1	-	20	$1,500.20	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	42.65%	65.79%
6058	R19 kneewalls	SF	Retrofit-AVG	All	-	-	75.9	0.1	0.1	-	-	7.6	-	20	$172.53	Adding R19 insulation to poorly insulated kneewalls - in homes with gas heating and central AC in homes with gas heating and central AC	42.65%	78.95%
6059	R-38 "scuttle hole" Attic hatch	SF	Retrofit-AVG	All	-	-	9.3	0.0	0.0	-	-	0.9	-	20	$6.81	Installing R-38 insulation to a "scuttle hole" attic hatch - in homes with gas heating and central AC	42.65%	78.95%
6060	R-38 pull-down stairs Attic hatch	SF	Retrofit-AVG	All	-	-	21.4	0.0	0.0	-	-	1.7	-	20	$13.63	Installing R-38 insulation to a pull-down stairs attic hatch - in homes with gas heating and central AC	42.65%	78.95%
6061	R-30 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	32.7	0.0	0.0	-	-	3.3	-	20	$958.87	Installing R-30 roof insulation in poorly insulated attics - in homes with gas heating and central AC in homes with gas heating and central AC	42.65%	78.95%
6062	R-38 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	44.3	0.1	0.1	-	-	4.6	-	20	$1,656.22	Installing R-38 roof insulation in poorly insulated attics - in homes with gas heating and central AC	42.65%	78.95%
6063	R-49 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	54.8	0.1	0.1	-	-	5.8	-	20	$2,615.09	Installing R-49 roof insulation in poorly insulated attics - in homes with gas heating and central AC	42.65%	78.95%
6064	R-60 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	61.4	0.1	0.1	-	-	6.5	-	20	$3,573.96	Installing R-60 roof insulation in poorly insulated attics - in homes with gas heating and central AC	42.65%	78.95%
6065	Low Income Weatherization Package	SF	Retrofit-AVG	LI	-	-	611.4	0.7	0.7	-	-	39.9	-	13	$9,087.84	Package of weatherization measures - in homes with gas heating and central AC	37.20%	78.95%
6066	Airtight Can Lights	SF	Retrofit-OLD	All	-	-	10.0	0.0	0.0	-	-	2.1	-	15	$613.20	Reducing air infiltration leakage from can lights in homes with gas heating and no central AC	7.57%	76.92%
6067	Basement Wall Insulation	SF	Retrofit-OLD	All	-	-	36.5	0.0	0.0	-	-	13.4	-	20	$1,104.21	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and no central AC	4.09%	71.00%
6068	Cool roof	SF	Retrofit-OLD	All	-	-	-3.6	0.0	0.0	-	-	-0.8	-	20	$1,660.05	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and no central AC	7.57%	5.00%
6069	Crawlspace Wall Insulation	SF	Retrofit-OLD	All	-	-	20.5	0.0	0.0	-	-	9.6	-	20	$552.11	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and no central AC	0.61%	30.00%
6070	Door weatherstripping	SF	Retrofit-OLD	All	-	-	2.3	0.0	0.0	-	-	0.5	-	5	$86.00	Adding weatherstripping to exterior doors in homes with gas heating and no central AC	15.14%	76.92%
6071	Duct Insulation	SF	Retrofit-OLD	NLI	-	-	-16.4	0.0	0.0	-	-	2.8	-	20	$405.36	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	5.14%	78.95%
6072	Duct location	SF	Retrofit-OLD	All	-	-	4.3	0.0	0.0	-	-	10.1	-	30	$1,266.75	Moving duct work into a conditioned space in homes with gas heating and no central AC	5.14%	47.18%
6073	Duct sealing 15% leakage base	SF	Retrofit-OLD	NLI	-	-	6.8	0.0	0.0	-	-	1.4	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	5.14%	76.92%
6074	Duct sealing 20% leakage base	SF	Retrofit-OLD	NLI	-	-	11.3	0.0	0.0	-	-	2.1	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	5.14%	76.92%
6075	Duct sealing 25% leakage base	SF	Retrofit-OLD	NLI	-	-	16.3	0.0	0.0	-	-	2.8	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	5.14%	76.92%
6076	Duct sealing 30% leakage base	SF	Retrofit-OLD	NLI	-	-	21.9	0.0	0.0	-	-	3.5	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	5.14%	76.92%
6077	Energy Star Door	SF	Retrofit-OLD	All	-	-	14.1	0.0	0.0	-	-	2.9	-	20	$4,650.00	Installing Energy Star exterior doors in homes with gas heating and no central AC	7.57%	56.00%
6078	Floor Insulation	SF	Retrofit-OLD	All	-	-	33.6	0.0	0.0	-	-	6.6	-	20	$874.23	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and no central AC	2.50%	23.00%
6079	Infiltration reduction - 10%	SF	Retrofit-OLD	NLI	-	-	14.8	0.0	0.0	-	-	3.9	-	13	$202.68	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	7.57%	76.92%
6080	Infiltration reduction - 15%	SF	Retrofit-OLD	NLI	-	-	22.6	0.0	0.0	-	-	5.8	-	13	$202.68	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	7.57%	76.92%
6081	Infiltration reduction - 20%	SF	Retrofit-OLD	NLI	-	-	31.1	0.0	0.0	-	-	7.9	-	13	$202.68	Reducing air infiltration (by 20%) in poorly sealed homes in homes with gas heating and no central AC	7.57%	76.92%
6082	Infiltration reduction - 30%	SF	Retrofit-OLD	NLI	-	-	47.3	0.0	0.0	-	-	11.9	-	13	$202.68	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and no central AC	7.57%	76.92%
6083	Infiltration reduction - 40%	SF	Retrofit-OLD	NLI	-	-	63.2	0.0	0.0	-	-	15.9	-	13	$202.68	Reducing air infiltration (by 40%) in poorly sealed homes in homes with gas heating and no central AC	7.57%	76.92%
6084	Infiltration reduction - 50%	SF	Retrofit-OLD	NLI	-	-	79.1	0.0	0.0	-	-	19.8	-	13	$202.68	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and no central AC	7.57%	76.92%
6085	Rim Joist Insulation	SF	Retrofit-OLD	All	-	-	0.0	0.0	0.0	-	-	3.9	-	20	$191.84	Adding rim joist insulation in homes with poorly insulated rim joists in homes with gas heating and central AC	7.57%	78.95%
6086	Steam pipe insulation	SF	Retrofit-OLD	All	-	-	-2.2	0.0	0.0	-	-	11.4	-	11	$280.92	Adding steam pipe insulation in homes with steam piping in homes with gas heating and no central AC	7.57%	18.00%
6087	Wall Insulation	SF	Retrofit-OLD	NLI	-	-	52.4	0.0	0.0	-	-	14.9	-	20	$3,041.11	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	7.57%	78.95%
6088	Window Film	SF	Retrofit-OLD	NLI	-	-	-69.6	0.0	0.0	-	-	-14.5	-	10	$538.35	Adding window film to existing windows in homes with gas heating and no central AC	7.57%	65.79%
6089	Window Replacement	SF	Retrofit-OLD	NLI	-	-	90.0	0.0	0.0	-	-	24.1	-	20	$1,500.20	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no central AC	7.57%	65.79%
6090	New vinyl window	SF	Retrofit-OLD	NLI	-	-	163.9	0.0	0.0	-	-	28.5	-	20	$3,500.00	Installing a new vinyl window to replace a single-pane, double hung window in homes with gas heating and no central AC	7.57%	65.79%
6091	Original double hung window with low U storm	SF	Retrofit-OLD	NLI	-	-	218.8	0.0	0.0	-	-	38.2	-	20	$5,250.00	Installing a new double hung low U storm window to replace a single-pane, double hung window in homes with gas heating and no central AC	7.57%	65.79%
6092	Original double hung window with original storm window	SF	Retrofit-OLD	NLI	-	-	99.5	0.0	0.0	-	-	17.2	-	20	$5,250.00	Installing a new double hung original storm window by replacing a single-pane, double hung window in homes with gas heating and no central AC	7.57%	65.79%
6093	Rehabbed double hung	SF	Retrofit-OLD	NLI	-	-	139.0	0.0	0.0	-	-	24.1	-	20	$8,750.00	Rehabilitating a single-pane, double hung window by installing a new double hung window in homes with gas heating and no central AC	7.57%	65.79%

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6094	Rehabbed double hung with low U storm	SF	Retrofit-OLD	NLI	-	-	222.7	0.0	0.0	-	-	38.9	-	20	$12,250.00	Rehabilitating a single-pane, double hung window by installing a new double hung, low U window in homes with gas heating and no central AC	7.57%	65.79%
6095	Rehabbed double hung with single glazed storm	SF	Retrofit-OLD	NLI	-	-	202.8	0.0	0.0	-	-	35.3	-	20	$12,250.00	Rehabilitating a single-pane, double hung window by installing a new double hung, single-glazed storm window in homes with gas heating and no central AC	7.57%	65.79%
6096	R19 kneewalls	SF	Retrofit-OLD	All	-	-	26.6	0.0	0.0	-	-	7.6	-	20	$172.53	Adding R19 insulation to poorly insulated kneewalls - in homes with gas heating and no central AC	7.57%	78.95%
6097	R-38 "scuttle hole" Attic hatch	SF	Retrofit-OLD	All	-	-	2.7	0.0	0.0	-	-	0.8	-	20	$6.81	Installing R-38 insulation to a "scuttle hole" attic hatch - in homes with gas heating and no central AC	7.57%	78.95%
6098	R-38 pull-down stairs Attic hatch	SF	Retrofit-OLD	All	-	-	5.7	0.0	0.0	-	-	1.6	-	20	$13.63	Installing R-38 insulation to a pull-down stairs attic hatch - in homes with gas heating and no central AC	7.57%	78.95%
6099	R-30 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	14.8	0.0	0.0	-	-	5.4	-	20	$958.87	Installing R-30 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	7.57%	78.95%
6100	R-38 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	19.5	0.0	0.0	-	-	6.7	-	20	$1,656.22	Installing R-38 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	7.57%	78.95%
6101	R-49 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	23.6	0.0	0.0	-	-	7.9	-	20	$2,615.09	Installing R-49 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	7.57%	78.95%
6102	R-60 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	26.2	0.0	0.0	-	-	8.7	-	20	$3,573.96	Installing R-60 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	7.57%	78.95%
6103	Low Income Weatherization Package	SF	Retrofit-OLD	LI	-	-	210.9	0.0	0.0	-	-	64.6	-	13	$9,087.84	Package of weatherization measures - in homes with gas heating and no central AC	5.14%	78.95%
6104	Basement Wall Insulation	SF	Retrofit-AVG	All	-	-	24.4	0.0	0.0	-	-	8.8	-	20	$1,104.21	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and no central AC	6.13%	71.00%
6105	Cool roof	SF	Retrofit-AVG	All	-	-	-2.4	0.0	0.0	-	-	-0.6	-	20	$1,660.05	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and no central AC	11.35%	5.00%
6106	Crawlspace Wall Insulation	SF	Retrofit-AVG	All	-	-	3.6	0.0	0.0	-	-	3.0	-	20	$552.11	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and no central AC	0.91%	30.00%
6107	Duct Insulation	SF	Retrofit-AVG	NLI	-	-	-14.5	0.0	0.0	-	-	2.2	-	20	$405.36	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	7.71%	78.95%
6108	Duct location	SF	Retrofit-AVG	All	-	-	16.0	0.0	0.0	-	-	10.1	-	30	$1,266.75	Moving duct work into a conditioned space in homes with gas heating and no central AC	7.71%	47.18%
6109	Duct sealing 15% leakage base	SF	Retrofit-AVG	NLI	-	-	3.8	0.0	0.0	-	-	0.8	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	7.71%	76.92%
6110	Duct sealing 20% leakage base	SF	Retrofit-AVG	NLI	-	-	6.3	0.0	0.0	-	-	1.2	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	7.71%	76.92%
6111	Duct sealing 25% leakage base	SF	Retrofit-AVG	NLI	-	-	9.0	0.0	0.0	-	-	1.6	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	7.71%	76.92%
6112	Duct sealing 30% leakage base	SF	Retrofit-AVG	NLI	-	-	12.1	0.0	0.0	-	-	2.0	-	18	$364.52	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	7.71%	76.92%
6113	Energy Star Door	SF	Retrofit-AVG	All	-	-	14.0	0.0	0.0	-	-	3.0	-	20	$4,650.00	Installing Energy Star exterior doors in homes with gas heating and no central AC	11.35%	56.00%
6114	Floor Insulation	SF	Retrofit-AVG	All	-	-	7.5	0.0	0.0	-	-	1.6	-	20	$874.23	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and no central AC	3.75%	23.00%
6115	Infiltration reduction - 10%	SF	Retrofit-AVG	NLI	-	-	7.1	0.0	0.0	-	-	1.9	-	13	$202.68	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	11.35%	76.92%
6116	Infiltration reduction - 15%	SF	Retrofit-AVG	NLI	-	-	10.7	0.0	0.0	-	-	2.9	-	13	$202.68	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	11.35%	76.92%
6117	Infiltration reduction - 20%	SF	Retrofit-AVG	NLI	-	-	15.2	0.0	0.0	-	-	4.1	-	13	$202.68	Reducing air infiltration (by 20%) in poorly sealed homes in homes with gas heating and no central AC	11.35%	76.92%
6118	Infiltration reduction - 30%	SF	Retrofit-AVG	NLI	-	-	21.1	0.0	0.0	-	-	6.1	-	13	$202.68	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and no central AC	11.35%	76.92%
6119	Infiltration reduction - 40%	SF	Retrofit-AVG	NLI	-	-	28.7	0.0	0.0	-	-	8.2	-	13	$202.68	Reducing air infiltration (by 40%) in poorly sealed homes in homes with gas heating and no AC	11.35%	76.92%
6120	Infiltration reduction - 50%	SF	Retrofit-AVG	NLI	-	-	36.3	0.0	0.0	-	-	10.2	-	13	$202.68	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and no central AC	11.35%	76.92%
6121	Steam pipe insulation	SF	Retrofit-AVG	All	-	-	-3.3	0.0	0.0	-	-	9.0	-	11	$280.92	Adding steam pipe insulation in homes with steam piping in homes with gas heating and no central AC	11.35%	18.00%
6122	Wall Insulation	SF	Retrofit-AVG	NLI	-	-	34.8	0.0	0.0	-	-	10.0	-	20	$3,041.11	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	11.35%	78.95%
6123	Window Film	SF	Retrofit-AVG	NLI	-	-	-48.3	0.0	0.0	-	-	-10.9	-	10	$538.35	Adding window film to existing windows in homes with gas heating and no central AC	11.35%	65.79%
6124	Window Replacement	SF	Retrofit-AVG	NLI	-	-	56.2	0.0	0.0	-	-	16.0	-	20	$1,500.20	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no AC	11.35%	65.79%
6125	R19 kneewalls	SF	Retrofit-AVG	All	-	-	26.9	0.0	0.0	-	-	8.0	-	20	$172.53	Adding R19 insulation to poorly insulated kneewalls - in homes with gas heating and no AC	11.35%	78.95%
6126	R-38 "scuttle hole" Attic hatch	SF	Retrofit-AVG	All	-	-	3.0	0.0	0.0	-	-	0.9	-	20	$6.81	Installing R-38 insulation to a "scuttle hole" attic hatch - in homes with gas heating and no central AC	11.35%	78.95%
6127	R-38 pull-down stairs Attic hatch	SF	Retrofit-AVG	All	-	-	6.4	0.0	0.0	-	-	1.8	-	20	$13.63	Installing R-38 insulation to a pull-down stairs attic hatch - in homes with gas heating and no central AC	11.35%	78.95%
6128	R-30 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	11.8	0.0	0.0	-	-	3.5	-	20	$958.87	Installing R-30 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	11.35%	78.95%
6129	R-38 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	16.6	0.0	0.0	-	-	4.9	-	20	$1,656.22	Installing R-38 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	11.35%	78.95%
6130	R-49 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	20.8	0.0	0.0	-	-	6.1	-	20	$2,615.09	Installing R-49 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	11.35%	78.95%
6131	R-60 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	23.5	0.0	0.0	-	-	6.9	-	20	$3,573.96	Installing R-60 roof insulation in poorly insulated attics - in homes with gas heating and no central AC	11.35%	78.95%
6132	Low Income Weatherization Package	SF	Retrofit-AVG	LI	-	-	127.5	0.0	0.0	-	-	42.4	-	13	$9,087.84	Package of weatherization measures - in homes with gas heating and no central AC	7.71%	78.95%
6133	Basement Wall Insulation	SF	NC	All	-	-	-2.1	0.0	0.0	-	-	3.9	-	20	$437.37	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and central AC	48.60%	0.00%

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6134	Cool roof	SF	NC	All	-	-	15.6	0.0	0.0	-	-	-0.3	-	20	$217.00	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and central AC	90.00%	0.00%
6135	Crawlspace Wall Insulation	SF	NC	All	-	-	-2.3	0.0	0.0	-	-	0.1	-	20	$218.68	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and central AC	7.20%	0.00%
6136	Duct Insulation	SF	NC	All	-	-	4.0	0.0	0.0	-	-	1.8	-	20	$168.90	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	90.00%	0.00%
6137	Duct location	SF	NC	All	-	-	58.7	0.0	0.0	-	-	7.2	-	30	$1,266.75	Moving duct work into a conditioned space in homes with gas heating and central AC	90.00%	0.00%
6138	Duct sealing 15% leakage base	SF	NC	All	-	-	11.0	0.0	0.0	-	-	0.4	-	18	$56.30	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	90.00%	0.00%
6139	Duct sealing 20% leakage base	SF	NC	All	-	-	16.5	0.0	0.0	-	-	0.6	-	18	$56.30	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	90.00%	0.00%
6140	Duct sealing 25% leakage base	SF	NC	All	-	-	23.1	0.0	0.0	-	-	0.8	-	18	$56.30	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	90.00%	0.00%
6141	Duct sealing 30% leakage base	SF	NC	All	-	-	29.2	0.0	0.0	-	-	1.0	-	18	$56.30	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	90.00%	0.00%
6142	Energy Star Door	SF	NC	All	-	-	35.4	0.0	0.0	-	-	3.0	-	20	$1,080.00	Installing Energy Star exterior doors in homes with gas heating and central AC	90.00%	0.00%
6143	Floor Insulation	SF	NC	All	-	-	-6.0	0.0	0.0	-	-	0.7	-	20	$346.27	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and central AC	29.70%	0.00%
6144	Infiltration reduction - 10%	SF	NC	All	-	-	9.3	0.0	0.0	-	-	1.2	-	13	$33.78	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	90.00%	0.00%
6145	Infiltration reduction - 15%	SF	NC	All	-	-	13.2	0.0	0.0	-	-	1.8	-	13	$33.78	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	90.00%	0.00%
6146	Infiltration reduction - 20%	SF	NC	All	-	-	18.6	0.0	0.0	-	-	2.7	-	13	$33.78	Reducing air infiltration (by 20%) in poorly sealed homes in homes with gas heating and central AC	90.00%	0.00%
6147	Infiltration reduction - 30%	SF	NC	All	-	-	30.4	0.0	0.0	-	-	4.1	-	13	$33.78	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and central AC	90.00%	0.00%
6148	Infiltration reduction - 40%	SF	NC	All	-	-	40.3	0.0	0.0	-	-	5.5	-	13	$33.78	Reducing air infiltration (by 40%) in poorly sealed homes in homes with gas heating and central AC	90.00%	0.00%
6149	Infiltration reduction - 50%	SF	NC	All	-	-	50.2	0.0	0.0	-	-	6.8	-	13	$33.78	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and central AC	90.00%	0.00%
6150	Wall Insulation	SF	NC	All	-	-	34.5	0.0	0.0	-	-	3.3	-	20	$349.57	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	90.00%	0.00%
6151	Window Film	SF	NC	All	-	-	143.0	0.1	0.1	-	-	-2.9	-	10	$314.62	Adding window film to existing windows in homes with gas heating and central AC	90.00%	0.00%
6152	Window Replacement	SF	NC	All	-	-	108.8	0.0	0.0	-	-	1.9	-	20	$1,500.20	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	90.00%	0.00%
6153	Airtight Can Lights	MF	Retrofit-OLD	All	-	-	10.8	0.0	0.0	-	-	2.2	-	15	$459.90	Reducing air infiltration leakage from can lights in homes with gas heating and central AC	13.98%	76.92%
6154	Cool roof	MF	Retrofit-OLD	All	-	-	120.8	0.1	0.1	-	-	-1.2	-	20	$709.92	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and central AC	3.49%	5.00%
6155	Door weatherstripping	MF	Retrofit-OLD	All	-	-	2.1	0.0	0.0	-	-	0.3	-	5	$43.00	Adding weatherstripping to exterior doors in homes with gas heating and central AC	27.96%	76.92%
6156	Duct Insulation	MF	Retrofit-OLD	NLI	-	-	34.2	0.1	0.1	-	-	3.0	-	20	$222.72	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	8.40%	78.95%
6157	Duct location	MF	Retrofit-OLD	All	-	-	83.4	0.1	0.1	-	-	6.7	-	30	$696.00	Moving duct work into a conditioned space in homes with gas heating and central AC	8.40%	22.33%
6158	Duct sealing 15% leakage base	MF	Retrofit-OLD	NLI	-	-	18.6	0.0	0.0	-	-	1.1	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	8.40%	76.92%
6159	Duct sealing 20% leakage base	MF	Retrofit-OLD	NLI	-	-	28.1	0.0	0.0	-	-	1.8	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	8.40%	76.92%
6160	Duct sealing 25% leakage base	MF	Retrofit-OLD	NLI	-	-	38.6	0.0	0.0	-	-	2.4	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	8.40%	76.92%
6161	Duct sealing 30% leakage base	MF	Retrofit-OLD	NLI	-	-	49.5	0.1	0.1	-	-	3.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	8.40%	76.92%
6162	Energy Star Door	MF	Retrofit-OLD	All	-	-	17.9	0.0	0.0	-	-	1.9	-	20	$2,900.00	Installing Energy Star exterior doors in homes with gas heating and central AC	13.98%	56.00%
6163	Infiltration reduction - 10%	MF	Retrofit-OLD	NLI	-	-	18.4	0.0	0.0	-	-	2.3	-	13	$111.36	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	2.80%	76.92%
6164	Infiltration reduction - 15%	MF	Retrofit-OLD	NLI	-	-	28.1	0.0	0.0	-	-	3.4	-	13	$111.36	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	13.98%	76.92%
6165	Infiltration reduction - 30%	MF	Retrofit-OLD	NLI	-	-	49.7	0.1	0.1	-	-	6.2	-	13	$111.36	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and central AC	13.98%	76.92%
6166	Infiltration reduction - 50%	MF	Retrofit-OLD	NLI	-	-	84.0	0.1	0.1	-	-	10.2	-	13	$111.36	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and central AC	13.98%	76.92%
6167	Roof Insulation	MF	Retrofit-OLD	NLI	-	-	76.5	0.1	0.1	-	-	6.2	-	20	$702.45	Installing roof insulation in poorly insulated attics - in homes with gas heating and central AC	13.98%	78.95%
6168	Wall Insulation	MF	Retrofit-OLD	NLI	-	-	61.9	0.0	0.0	-	-	8.9	-	20	$1,670.90	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	13.98%	78.95%
6169	Window Film	MF	Retrofit-OLD	NLI	-	-	704.2	0.7	0.7	-	-	-14.8	-	10	$295.79	Adding window film to existing windows in homes with gas heating and central AC	13.98%	65.79%
6170	Window Replacement	MF	Retrofit-OLD	NLI	-	-	297.9	0.3	0.3	-	-	13.3	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	13.98%	65.79%
6171	Basement Wall Insulation	MF	Retrofit-OLD	All	-	-	-26.3	0.0	0.0	-	-	6.9	-	20	$640.44	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and central AC	4.05%	71.00%
6172	New vinyl window	MF	Retrofit-OLD	NLI	-	-	564.0	0.5	0.5	-	-	43.6	-	20	$1,923.03	Installing a new vinyl window to replace a single-pane, double hung window in homes with gas heating and central AC	13.98%	65.79%
6173	Original double hung window with low U storm	MF	Retrofit-OLD	NLI	-	-	825.0	0.8	0.8	-	-	61.0	-	20	$2,884.55	Installing a new double hung low U storm window to replace a single-pane, double hung window in homes with gas heating and central AC	13.98%	65.79%
6174	Original double hung window with original storm window	MF	Retrofit-OLD	NLI	-	-	301.6	0.3	0.3	-	-	24.8	-	20	$2,884.55	Installing a new double hung original storm window by replacing a single-pane, double hung window in homes with gas heating and central AC	13.98%	65.79%

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6175	Rehabbed double hung	MF	Retrofit-OLD	NLI	-	-	310.7	0.3	0.3	-	-	33.3	-	20	$4,807.58	Rehabilitating a single-pane, double hung window by installing a new double hung window in homes with gas heating and central AC	13.98%	65.79%
6176	Rehabbed double hung with low U storm	MF	Retrofit-OLD	NLI	-	-	853.3	0.8	0.8	-	-	62.5	-	20	$6,730.61	Rehabilitating a single-pane, double hung window by installing a new double hung, low U window in homes with gas heating and central AC	13.98%	65.79%
6177	Rehabbed double hung with single glazed storm	MF	Retrofit-OLD	NLI	-	-	463.1	0.4	0.4	-	-	50.2	-	20	$6,730.61	Rehabilitating a single-pane, double hung window by installing a new double hung, single-glazed storm window in homes with gas heating and central AC	13.98%	65.79%
6178	Low Income Weatherization Package	MF	Retrofit-OLD	LI	-	-	548.3	0.5	0.5	-	-	39.4	-	13	$3,731.98	Package of weatherization measures - in homes with gas heating and central AC	8.40%	78.95%
6179	Airtight Can Lights	MF	Retrofit-AVG	All	-	-	8.3	0.0	0.0	-	-	2.2	-	15	$459.90	Reducing air infiltration leakage from can lights in homes with gas heating and central AC	55.91%	76.92%
6180	Cool roof	MF	Retrofit-AVG	All	-	-	99.0	0.1	0.1	-	-	-0.8	-	20	$709.92	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and central AC	13.98%	5.00%
6181	Door weatherstripping	MF	Retrofit-AVG	All	-	-	2.4	0.0	0.0	-	-	0.3	-	5	$43.00	Adding weatherstripping to exterior doors in homes with gas heating and central AC	111.83%	76.92%
6182	Duct Insulation	MF	Retrofit-AVG	NLI	-	-	45.6	0.1	0.1	-	-	2.7	-	20	$222.72	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	33.60%	78.95%
6183	Duct location	MF	Retrofit-AVG	All	-	-	87.7	0.1	0.1	-	-	5.3	-	30	$696.00	Moving duct work into a conditioned space in homes with gas heating and central AC	33.60%	22.33%
6184	Duct sealing 15% leakage base	MF	Retrofit-AVG	NLI	-	-	15.3	0.0	0.0	-	-	0.8	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	33.60%	76.92%
6185	Duct sealing 20% leakage base	MF	Retrofit-AVG	NLI	-	-	23.8	0.0	0.0	-	-	1.3	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	33.60%	76.92%
6186	Duct sealing 25% leakage base	MF	Retrofit-AVG	NLI	-	-	32.5	0.0	0.0	-	-	1.7	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	33.60%	76.92%
6187	Duct sealing 30% leakage base	MF	Retrofit-AVG	NLI	-	-	41.4	0.0	0.0	-	-	2.2	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	33.60%	76.92%
6188	Energy Star Door	MF	Retrofit-AVG	All	-	-	18.6	0.0	0.0	-	-	2.0	-	20	$2,900.00	Installing Energy Star exterior doors in homes with gas heating and central AC	55.91%	56.00%
6189	Infiltration reduction - 10%	MF	Retrofit-AVG	NLI	-	-	10.2	0.0	0.0	-	-	1.2	-	13	$111.36	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	55.91%	76.92%
6190	Infiltration reduction - 15%	MF	Retrofit-AVG	NLI	-	-	14.8	0.0	0.0	-	-	1.8	-	13	$111.36	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	55.91%	76.92%
6191	Infiltration reduction - 30%	MF	Retrofit-AVG	NLI	-	-	24.3	0.0	0.0	-	-	3.2	-	13	$111.36	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and central AC	55.91%	76.92%
6192	Infiltration reduction - 50%	MF	Retrofit-AVG	NLI	-	-	41.8	0.1	0.1	-	-	5.3	-	13	$111.36	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and central AC	55.91%	76.92%
6193	Roof Insulation	MF	Retrofit-AVG	NLI	-	-	37.6	0.0	0.0	-	-	3.4	-	20	$702.45	Installing roof insulation in poorly insulated attics - in homes with gas heating and central AC	55.91%	78.95%
6194	Wall Insulation	MF	Retrofit-AVG	NLI	-	-	36.7	0.0	0.0	-	-	5.6	-	20	$1,670.90	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	55.91%	78.95%
6195	Window Film	MF	Retrofit-AVG	NLI	-	-	612.9	0.5	0.5	-	-	-11.8	-	10	$295.79	Adding window film to existing windows in homes with gas heating and central AC	55.91%	65.79%
6196	Window Replacement	MF	Retrofit-AVG	NLI	-	-	240.3	0.2	0.2	-	-	7.9	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	55.91%	65.79%
6197	Basement Wall Insulation	MF	Retrofit-AVG	All	-	-	-22.6	0.0	0.0	-	-	4.5	-	20	$640.44	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and central AC	16.22%	71.00%
6198	Low Income Weatherization Package	MF	Retrofit-AVG	LI	-	-	408.4	0.4	0.4	-	-	24.0	-	13	$3,731.98	Package of weatherization measures - in homes with gas heating and central AC	33.60%	78.95%
6199	Airtight Can Lights	MF	Retrofit-OLD	All	-	-	4.0	0.0	0.0	-	-	2.6	-	15	$459.90	Reducing air infiltration leakage from can lights in homes with gas heating and no central AC	3.45%	76.92%
6200	Cool roof	MF	Retrofit-OLD	All	-	-	46.1	0.0	0.0	-	-	-1.2	-	20	$709.92	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and no central AC	0.86%	5.00%
6201	Door weatherstripping	MF	Retrofit-OLD	All	-	-	1.2	0.0	0.0	-	-	0.3	-	5	$43.00	Adding weatherstripping to exterior doors in homes with gas heating and no central AC	6.89%	76.92%
6202	Duct Insulation	MF	Retrofit-OLD	NLI	-	-	-3.8	0.0	0.0	-	-	3.0	-	20	$222.72	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	1.90%	78.95%
6203	Duct location	MF	Retrofit-OLD	All	-	-	4.6	0.0	0.0	-	-	6.7	-	30	$696.00	Moving duct work into a conditioned space in homes with gas heating and no central AC	1.90%	22.33%
6204	Duct sealing 15% leakage base	MF	Retrofit-OLD	NLI	-	-	5.3	0.0	0.0	-	-	1.1	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	1.90%	76.92%
6205	Duct sealing 20% leakage base	MF	Retrofit-OLD	NLI	-	-	8.5	0.0	0.0	-	-	1.8	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	1.90%	76.92%
6206	Duct sealing 25% leakage base	MF	Retrofit-OLD	NLI	-	-	11.7	0.0	0.0	-	-	2.4	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	1.90%	76.92%
6207	Duct sealing 30% leakage base	MF	Retrofit-OLD	NLI	-	-	15.0	0.0	0.0	-	-	3.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	1.90%	76.92%
6208	Energy Star Door	MF	Retrofit-OLD	All	-	-	8.3	0.0	0.0	-	-	1.9	-	20	$2,900.00	Installing Energy Star exterior doors in homes with gas heating and no central AC	3.45%	56.00%
6209	Infiltration reduction - 10%	MF	Retrofit-OLD	NLI	-	-	8.2	0.0	0.0	-	-	2.1	-	13	$111.36	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	3.45%	76.92%
6210	Infiltration reduction - 15%	MF	Retrofit-OLD	NLI	-	-	11.8	0.0	0.0	-	-	3.1	-	13	$111.36	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	3.45%	76.92%
6211	Infiltration reduction - 30%	MF	Retrofit-OLD	NLI	-	-	20.3	0.0	0.0	-	-	5.6	-	13	$111.36	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and no central AC	3.45%	76.92%
6212	Infiltration reduction - 50%	MF	Retrofit-OLD	NLI	-	-	33.9	0.0	0.0	-	-	9.4	-	13	$111.36	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and no central AC	3.45%	76.92%
6213	Roof Insulation	MF	Retrofit-OLD	NLI	-	-	19.0	0.0	0.0	-	-	6.5	-	20	$702.45	Installing roof insulation in poorly insulated attics - in homes with gas heating and no central AC	3.45%	78.95%
6214	Wall Insulation	MF	Retrofit-OLD	NLI	-	-	30.8	0.0	0.0	-	-	8.1	-	20	$1,670.90	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	3.45%	78.95%
6215	Window Film	MF	Retrofit-OLD	NLI	-	-	65.2	0.0	0.0	-	-	-13.9	-	10	$295.79	Adding window film to existing windows in homes with gas heating and no central AC	3.45%	65.79%
6216	Window Replacement	MF	Retrofit-OLD	NLI	-	-	95.9	0.0	0.0	-	-	12.2	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no central AC	3.45%	65.79%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
6217	Basement Wall Insulation	MF	Retrofit-OLD	All	-	-	17.8	0.0	0.0	-	-	8.1	-	20	$640.44	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and no central AC	1.00%	71.00%
6218	New vinyl window	MF	Retrofit-OLD	NLI	-	-	238.2	0.0	0.0	-	-	39.6	-	20	$1,923.03	Installing a new vinyl window to replace a single-pane, double hung window in homes with gas heating and no central AC	3.45%	65.79%
6219	Original double hung window with low U storm	MF	Retrofit-OLD	NLI	-	-	309.1	0.0	0.0	-	-	55.2	-	20	$2,884.55	Installing a new double hung low U storm window to replace a single-pane, double hung window in homes with gas heating and no central AC	3.45%	65.79%
6220	Original double hung window with original storm window	MF	Retrofit-OLD	NLI	-	-	138.8	0.0	0.0	-	-	22.6	-	20	$2,884.55	Installing a new double hung original storm window by replacing a single-pane, double hung window in homes with gas heating and no central AC	3.45%	65.79%
6221	Rehabbed double hung	MF	Retrofit-OLD	NLI	-	-	169.0	0.0	0.0	-	-	30.3	-	20	$4,807.58	Rehabilitating a single-pane, double hung window by installing a new double hung window in homes with gas heating and no central AC	3.45%	65.79%
6222	Rehabbed double hung with low U storm	MF	Retrofit-OLD	NLI	-	-	314.9	0.0	0.0	-	-	56.6	-	20	$6,730.61	Rehabilitating a single-pane, double hung window by installing a new double hung, low U window in homes with gas heating and no central AC	3.45%	65.79%
6223	Rehabbed double hung with single glazed storm	MF	Retrofit-OLD	NLI	-	-	238.0	0.0	0.0	-	-	45.7	-	20	$6,730.61	Rehabilitating a single-pane, double hung window by installing a new double hung, single-glazed storm window in homes with gas heating and no central AC	3.45%	65.79%
6224	Low Income Weatherization Package	MF	Retrofit-OLD	LI	-	-	170.8	0.0	0.0	-	-	37.3	-	13	$3,731.98	Package of weatherization measures - in homes with gas heating and no central AC	1.90%	78.95%
6225	Airtight Can Lights	MF	Retrofit-AVG	All	-	-	-1.6	0.0	0.0	-	-	2.5	-	15	$459.90	Reducing air infiltration leakage from can lights in homes with gas heating and no central AC	13.78%	76.92%
6226	Cool roof	MF	Retrofit-AVG	All	-	-	35.0	0.0	0.0	-	-	-0.9	-	20	$709.92	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and no central AC	3.45%	5.00%
6227	Door weatherstripping	MF	Retrofit-AVG	All	-	-	1.2	0.0	0.0	-	-	0.3	-	5	$43.00	Adding weatherstripping to exterior doors in homes with gas heating and no central AC	27.56%	76.92%
6228	Duct Insulation	MF	Retrofit-AVG	NLI	-	-	1.2	0.0	0.0	-	-	2.7	-	20	$222.72	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	7.59%	78.95%
6229	Duct location	MF	Retrofit-AVG	All	-	-	6.5	0.0	0.0	-	-	5.3	-	30	$696.00	Moving duct work into a conditioned space in homes with gas heating and no central AC	7.59%	22.33%
6230	Duct sealing 15% leakage base	MF	Retrofit-AVG	NLI	-	-	3.9	0.0	0.0	-	-	0.8	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	7.59%	76.92%
6231	Duct sealing 20% leakage base	MF	Retrofit-AVG	NLI	-	-	6.1	0.0	0.0	-	-	1.3	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	7.59%	76.92%
6232	Duct sealing 25% leakage base	MF	Retrofit-AVG	NLI	-	-	8.4	0.0	0.0	-	-	1.7	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	7.59%	76.92%
6233	Duct sealing 30% leakage base	MF	Retrofit-AVG	NLI	-	-	10.7	0.0	0.0	-	-	2.2	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	7.59%	76.92%
6234	Energy Star Door	MF	Retrofit-AVG	All	-	-	8.6	0.0	0.0	-	-	2.0	-	20	$2,900.00	Installing Energy Star exterior doors in homes with gas heating and no central AC	13.78%	56.00%
6235	Infiltration reduction - 10%	MF	Retrofit-AVG	NLI	-	-	3.9	0.0	0.0	-	-	1.1	-	13	$111.36	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	13.78%	76.92%
6236	Infiltration reduction - 15%	MF	Retrofit-AVG	NLI	-	-	6.0	0.0	0.0	-	-	1.6	-	13	$111.36	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	13.78%	76.92%
6237	Infiltration reduction - 30%	MF	Retrofit-AVG	NLI	-	-	9.5	0.0	0.0	-	-	2.8	-	13	$111.36	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and no central AC	13.78%	76.92%
6238	Infiltration reduction - 50%	MF	Retrofit-AVG	NLI	-	-	15.0	0.0	0.0	-	-	4.7	-	13	$111.36	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and no central AC	13.78%	76.92%
6239	Roof Insulation	MF	Retrofit-AVG	NLI	-	-	10.1	0.0	0.0	-	-	3.4	-	20	$702.45	Installing roof insulation in poorly insulated attics - in homes with gas heating and no central AC	13.78%	78.95%
6240	Wall Insulation	MF	Retrofit-AVG	NLI	-	-	14.5	0.0	0.0	-	-	3.9	-	20	$1,670.90	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	13.78%	78.95%
6241	Window Film	MF	Retrofit-AVG	All	-	-	73.8	0.0	0.0	-	-	-11.0	-	10	$295.79	Adding window film to existing windows in homes with gas heating and no central AC	13.78%	65.79%
6242	Window Replacement	MF	Retrofit-AVG	NLI	-	-	75.2	0.0	0.0	-	-	7.1	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no central AC	13.78%	65.79%
6243	Basement Wall Insulation	MF	Retrofit-AVG	All	-	-	12.0	0.0	0.0	-	-	5.3	-	20	$640.44	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and no central AC	4.00%	71.00%
6244	Low Income Weatherization Package	MF	Retrofit-AVG	LI	-	-	116.6	0.0	0.0	-	-	21.2	-	13	$3,731.98	Package of weatherization measures - in homes with gas heating and no central AC	7.59%	78.95%
6245	Airtight Can Lights	MF	Retrofit-OLD	All	-	-	347.8	0.0	0.0	-	-	0.0	-	15	$459.90	Reducing air infiltration leakage from can lights in homes with electric heating and central AC	1.67%	76.92%
6246	Cool roof	MF	Retrofit-OLD	All	-	-	-94.0	0.1	0.1	-	-	0.0	-	20	$709.92	Installing a cool roof to increase the solar reflectance of roofs in homes with electric heating and central AC	0.42%	5.00%
6247	Door weatherstripping	MF	Retrofit-OLD	All	-	-	54.3	0.0	0.0	-	-	0.0	-	5	$43.00	Adding weatherstripping to exterior doors in homes with electric heating and central AC	3.34%	76.92%
6248	Duct Insulation	MF	Retrofit-OLD	NLI	-	-	715.2	0.1	0.1	-	-	0.0	-	20	$222.72	Insulating duct work in homes with poorly insulated ducts in homes with electric heating and central AC	0.92%	78.95%
6249	Duct location	MF	Retrofit-OLD	All	-	-	1577.8	0.1	0.1	-	-	0.0	-	30	$696.00	Moving duct work into a conditioned space in homes with electric heating and central AC	0.92%	22.33%
6250	Duct sealing 15% leakage base	MF	Retrofit-OLD	NLI	-	-	264.3	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with electric heating and central AC	0.92%	76.92%
6251	Duct sealing 20% leakage base	MF	Retrofit-OLD	NLI	-	-	408.6	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with electric heating and central AC	0.92%	76.92%
6252	Duct sealing 25% leakage base	MF	Retrofit-OLD	NLI	-	-	552.7	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with electric heating and central AC	0.92%	76.92%
6253	Duct sealing 30% leakage base	MF	Retrofit-OLD	NLI	-	-	696.5	0.1	0.1	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with electric heating and central AC	0.92%	76.92%
6254	Energy Star Door	MF	Retrofit-OLD	All	-	-	380.4	0.0	0.0	-	-	0.0	-	20	$2,900.00	Installing Energy Star exterior doors in homes with electric heating and central AC	1.67%	56.00%
6255	Infiltration reduction - 10%	MF	Retrofit-OLD	NLI	-	-	469.9	0.0	0.0	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	1.67%	76.92%
6256	Infiltration reduction - 15%	MF	Retrofit-OLD	NLI	-	-	704.7	0.0	0.0	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 15%) in poorly sealed homes in homes with electric heating and central AC	1.67%	76.92%

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6257	Infiltration reduction - 30%	MF	Retrofit-OLD	NLI	-	-	1413.7	0.1	0.1	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 30%) in poorly sealed homes in homes with electric heating and central AC	1.67%	76.92%
6258	Infiltration reduction - 50%	MF	Retrofit-OLD	NLI	-	-	2344.1	0.2	0.2	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 50%) in poorly sealed homes in homes with electric heating and central AC	1.67%	76.92%
6259	Roof Insulation	MF	Retrofit-OLD	NLI	-	-	1513.0	0.1	0.1	-	-	0.0	-	20	$702.45	Installing roof insulation in poorly insulated attics - in homes with electric heating and central AC	1.67%	78.95%
6260	Wall Insulation	MF	Retrofit-OLD	NLI	-	-	1787.8	0.1	0.1	-	-	0.0	-	20	$1,670.90	Adding wall insulation in homes with poorly insulated walls in homes with electric heating and central AC	1.67%	78.95%
6261	Window Film	MF	Retrofit-OLD	NLI	-	-	-2208.1	0.7	0.7	-	-	0.0	-	10	$295.79	Adding window film to existing windows in homes with electric heating and central AC	1.67%	65.79%
6262	Window Replacement	MF	Retrofit-OLD	NLI	-	-	3623.3	0.4	0.4	-	-	0.0	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with electric heating and central AC	1.67%	65.79%
6263	Basement Wall Insulation	MF	Retrofit-OLD	All	-	-	1358.8	0.0	0.0	-	-	0.0	-	20	$640.44	Adding basement wall insulation in homes with poorly insulated basements in homes with electric heating and central AC	0.48%	71.00%
6264	New vinyl window	MF	Retrofit-OLD	NLI	-	-	9175.8	0.7	0.7	-	-	0.0	-	20	$1,923.03	Installing a new vinyl window to replace a single-pane, double hung window in homes with electric heating and central AC	1.67%	65.79%
6265	Original double hung window with low U storm	MF	Retrofit-OLD	NLI	-	-	12705.4	1.0	1.0	-	-	0.0	-	20	$2,884.55	Installing a new double hung low U storm window to replace a single-pane, double hung window in homes with electric heating and central AC	1.67%	65.79%
6266	Original double hung window with original storm window	MF	Retrofit-OLD	NLI	-	-	5278.2	0.4	0.4	-	-	0.0	-	20	$2,884.55	Installing a new double hung original storm window by replacing a single-pane, double hung window in homes with electric heating and central AC	1.67%	65.79%
6267	Rehabbed double hung	MF	Retrofit-OLD	NLI	-	-	6753.5	0.4	0.4	-	-	0.0	-	20	$4,807.58	Rehabilitating a single-pane, double hung window by installing a new double hung window in homes with electric heating and central AC	1.67%	65.79%
6268	Rehabbed double hung with low U storm	MF	Retrofit-OLD	NLI	-	-	13018.4	1.0	1.0	-	-	0.0	-	20	$6,730.61	Rehabilitating a single-pane, double hung window by installing a new double hung, low U window in homes with electric heating and central AC	1.67%	65.79%
6269	Rehabbed double hung with single glazed storm	MF	Retrofit-OLD	NLI	-	-	10005.2	0.5	0.5	-	-	0.0	-	20	$6,730.61	Rehabilitating a single-pane, double hung window by installing a new double hung, single-glazed storm window in homes with electric heating and central AC	1.67%	65.79%
6270	Low Income Weatherization Package	MF	Retrofit-OLD	LI	-	-	8401.9	0.6	0.6	-	-	0.0	-	13	$3,731.98	Package of weatherization measures - in homes with electric heating and central AC	0.92%	78.95%
6271	Airtight Can Lights	MF	Retrofit-AVG	All	-	-	349.0	0.0	0.0	-	-	0.0	-	15	$459.90	Reducing air infiltration leakage from can lights in homes with electric heating and central AC	6.69%	76.92%
6272	Cool roof	MF	Retrofit-AVG	All	-	-	-56.0	0.1	0.1	-	-	0.0	-	20	$709.92	Installing a cool roof to increase the solar reflectance of roofs in homes with electric heating and central AC	1.67%	5.00%
6273	Door weatherstripping	MF	Retrofit-AVG	All	-	-	54.4	0.0	0.0	-	-	0.0	-	5	$43.00	Adding weatherstripping to exterior doors in homes with electric heating and central AC	13.38%	76.92%
6274	Duct Insulation	MF	Retrofit-AVG	NLI	-	-	657.1	0.1	0.1	-	-	0.0	-	20	$222.72	Insulating duct work in homes with poorly insulated ducts in homes with electric heating and central AC	3.70%	78.95%
6275	Duct location	MF	Retrofit-AVG	All	-	-	1269.7	0.1	0.1	-	-	0.0	-	30	$696.00	Moving duct work into a conditioned space in homes with electric heating and central AC	3.70%	22.33%
6276	Duct sealing 15% leakage base	MF	Retrofit-AVG	NLI	-	-	191.8	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with electric heating and central AC	3.70%	76.92%
6277	Duct sealing 20% leakage base	MF	Retrofit-AVG	NLI	-	-	298.8	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with electric heating and central AC	3.70%	76.92%
6278	Duct sealing 25% leakage base	MF	Retrofit-AVG	NLI	-	-	406.3	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with electric heating and central AC	3.70%	76.92%
6279	Duct sealing 30% leakage base	MF	Retrofit-AVG	NLI	-	-	514.0	0.0	0.0	-	-	0.0	-	18	$200.28	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with electric heating and central AC	3.70%	76.92%
6280	Energy Star Door	MF	Retrofit-AVG	All	-	-	395.7	0.0	0.0	-	-	0.0	-	20	$2,900.00	Installing Energy Star exterior doors in homes with electric heating and central AC	6.69%	56.00%
6281	Infiltration reduction - 10%	MF	Retrofit-AVG	NLI	-	-	240.4	0.0	0.0	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	6.69%	76.92%
6282	Infiltration reduction - 15%	MF	Retrofit-AVG	NLI	-	-	358.3	0.0	0.0	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 15%) in poorly sealed homes in homes with electric heating and central AC	6.69%	76.92%
6283	Infiltration reduction - 30%	MF	Retrofit-AVG	NLI	-	-	709.3	0.0	0.0	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 30%) in poorly sealed homes in homes with electric heating and central AC	6.69%	76.92%
6284	Infiltration reduction - 50%	MF	Retrofit-AVG	NLI	-	-	1184.3	0.1	0.1	-	-	0.0	-	13	$111.36	Reducing air infiltration (by 50%) in poorly sealed homes in homes with electric heating and central AC	6.69%	76.92%
6285	Roof Insulation	MF	Retrofit-AVG	NLI	-	-	792.3	0.0	0.0	-	-	0.0	-	20	$702.45	Installing roof insulation in poorly insulated attics - in homes with electric heating and central AC	6.69%	78.95%
6286	Wall Insulation	MF	Retrofit-AVG	NLI	-	-	1195.4	0.0	0.0	-	-	0.0	-	20	$1,670.90	Adding wall insulation in homes with poorly insulated walls in homes with electric heating and central AC	6.69%	78.95%
6287	Window Film	MF	Retrofit-AVG	NLI	-	-	-1651.6	0.6	0.6	-	-	0.0	-	10	$295.79	Adding window film to existing windows in homes with electric heating and central AC	6.69%	65.79%
6288	Window Replacement	MF	Retrofit-AVG	NLI	-	-	2198.4	0.3	0.3	-	-	0.0	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with electric heating and central AC	6.69%	65.79%
6289	Basement Wall Insulation	MF	Retrofit-AVG	All	-	-	868.9	0.0	0.0	-	-	0.0	-	20	$640.44	Adding basement wall insulation in homes with poorly insulated basements in homes with electric heating and central AC	1.94%	71.00%
6290	Low Income Weatherization Package	MF	Retrofit-AVG	LI	-	-	5244.0	0.5	0.5	-	-	0.0	-	13	$3,731.98	Package of weatherization measures - in homes with electric heating and central AC	3.70%	78.95%
6291	Airtight Can Lights	MF	NC	All	-	-	6.0	0.0	0.0	-	-	2.3	-	15	$150.00	Reducing air infiltration leakage from can lights in homes with gas heating and central AC	87.12%	0.00%
6292	Cool roof	MF	NC	All	-	-	78.2	0.1	0.1	-	-	-0.5	-	20	$92.80	Installing a cool roof to increase the solar reflectance of roofs in homes with gas heating and central AC	21.78%	0.00%
6293	Door weatherstripping	MF	NC	All	-	-	2.1	0.0	0.0	-	-	0.3	-	5	$13.00	Adding weatherstripping to exterior doors in homes with gas heating and central AC	174.24%	0.00%
6294	Duct Insulation	MF	NC	All	-	-	55.1	0.1	0.1	-	-	2.5	-	20	$92.80	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	17.23%	0.00%
6295	Duct location	MF	NC	All	-	-	89.1	0.1	0.1	-	-	4.1	-	30	$696.00	Moving duct work into a conditioned space in homes with gas heating and central AC	17.23%	0.00%
6296	Duct sealing 15% leakage base	MF	NC	All	-	-	11.4	0.0	0.0	-	-	0.5	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	17.23%	0.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
6297	Duct sealing 20% leakage base	MF	NC	All	-	-	18.1	0.0	0.0	-	-	0.8	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	17.23%	0.00%
6298	Duct sealing 25% leakage base	MF	NC	All	-	-	24.8	0.0	0.0	-	-	1.1	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	17.23%	0.00%
6299	Duct sealing 30% leakage base	MF	NC	All	-	-	31.8	0.0	0.0	-	-	1.4	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	17.23%	0.00%
6300	Energy Star Door	MF	NC	All	-	-	18.8	0.0	0.0	-	-	2.2	-	20	$1,115.00	Installing Energy Star exterior doors in homes with gas heating and central AC	87.12%	0.00%
6301	Infiltration reduction - 10%	MF	NC	All	-	-	6.9	0.0	0.0	-	-	0.9	-	13	$18.56	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	87.12%	0.00%
6302	Infiltration reduction - 15%	MF	NC	All	-	-	10.1	0.0	0.0	-	-	1.3	-	13	$18.56	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	87.12%	0.00%
6303	Infiltration reduction - 30%	MF	NC	All	-	-	17.4	0.0	0.0	-	-	2.4	-	13	$18.56	Reducing air infiltration (by 30%) in poorly sealed homes in homes with gas heating and central AC	87.12%	0.00%
6304	Infiltration reduction - 50%	MF	NC	All	-	-	29.6	0.0	0.0	-	-	4.0	-	13	$18.56	Reducing air infiltration (by 50%) in poorly sealed homes in homes with gas heating and central AC	87.12%	0.00%
6305	Roof Insulation	MF	NC	All	-	-	16.1	0.0	0.0	-	-	1.5	-	20	$524.16	Adding attic wall insulation in homes with poorly insulated attics in homes with gas heating and central AC	87.12%	0.00%
6306	Wall Insulation	MF	NC	All	-	-	13.0	0.0	0.0	-	-	2.3	-	20	$192.06	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	87.12%	0.00%
6307	Window Film	MF	NC	All	-	-	139.4	0.1	0.1	-	-	-2.9	-	10	$172.86	Adding window film to existing windows in homes with gas heating and central AC	87.12%	0.00%
6308	Window Replacement	MF	NC	All	-	-	39.4	0.0	0.0	-	-	1.3	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	87.12%	0.00%
6309	Basement Wall Insulation	MF	NC	All	-	-	-1.2	0.0	0.0	-	-	2.3	-	20	$253.67	Adding basement wall insulation in homes with poorly insulated basements in homes with gas heating and central AC	25.26%	0.00%
6310	Airtight Can Lights	MF	NC	All	-	-	248.6	0.0	0.0	-	-	0.0	-	15	$150.00	Reducing air infiltration leakage from can lights in homes with electric heating and central AC	8.36%	0.00%
6311	Cool roof	MF	NC	All	-	-	-3.3	0.0	0.0	-	-	0.0	-	20	$92.80	Installing a cool roof to increase the solar reflectance of roofs in homes with electric heating and central AC	2.09%	0.00%
6312	Door weatherstripping	MF	NC	All	-	-	39.0	0.0	0.0	-	-	0.0	-	5	$13.00	Adding weatherstripping to exterior doors in homes with electric heating and central AC	16.72%	0.00%
6313	Duct Insulation	MF	NC	All	-	-	630.2	0.1	0.1	-	-	0.0	-	20	$92.80	Insulating duct work in homes with poorly insulated ducts in homes with electric heating and central AC	8.36%	0.00%
6314	Duct location	MF	NC	All	-	-	985.6	0.1	0.1	-	-	0.0	-	30	$696.00	Moving duct work into a conditioned space in homes with electric heating and central AC	8.36%	0.00%
6315	Duct sealing 15% leakage base	MF	NC	All	-	-	96.1	0.0	0.0	-	-	0.0	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with electric heating and central AC	8.36%	0.00%
6316	Duct sealing 20% leakage base	MF	NC	All	-	-	149.9	0.0	0.0	-	-	0.0	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with electric heating and central AC	8.36%	0.00%
6317	Duct sealing 25% leakage base	MF	NC	All	-	-	203.2	0.0	0.0	-	-	0.0	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with electric heating and central AC	8.36%	0.00%
6318	Duct sealing 30% leakage base	MF	NC	All	-	-	256.9	0.0	0.0	-	-	0.0	-	18	$30.93	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with electric heating and central AC	8.36%	0.00%
6319	Energy Star Door	MF	NC	All	-	-	281.3	0.0	0.0	-	-	0.0	-	20	$1,115.00	Installing Energy Star exterior doors in homes with electric heating and central AC	8.36%	0.00%
6320	Infiltration reduction - 10%	MF	NC	All	-	-	117.4	0.0	0.0	-	-	0.0	-	13	$18.56	Reducing air infiltration (by 10%) in poorly sealed homes in homes with electric heating and central AC	8.36%	0.00%
6321	Infiltration reduction - 15%	MF	NC	All	-	-	176.2	0.0	0.0	-	-	0.0	-	13	$18.56	Reducing air infiltration (by 15%) in poorly sealed homes in homes with electric heating and central AC	8.36%	0.00%
6322	Infiltration reduction - 30%	MF	NC	All	-	-	353.0	0.0	0.0	-	-	0.0	-	13	$18.56	Reducing air infiltration (by 30%) in poorly sealed homes in homes with electric heating and central AC	8.36%	0.00%
6323	Infiltration reduction - 50%	MF	NC	All	-	-	590.4	0.0	0.0	-	-	0.0	-	13	$18.56	Reducing air infiltration (by 50%) in poorly sealed homes in homes with electric heating and central AC	8.36%	0.00%
6324	Roof Insulation	MF	NC	All	-	-	237.4	0.0	0.0	-	-	0.0	-	20	$524.16	Adding attic insulation in homes with poorly insulated attic in homes with electric heating and central AC	8.36%	0.00%
6325	Wall Insulation	MF	NC	All	-	-	276.6	0.0	0.0	-	-	0.0	-	20	$192.06	Adding wall insulation in homes with poorly insulated walls in homes with electric heating and central AC	8.36%	0.00%
6326	Window Film	MF	NC	All	-	-	-158.9	0.2	0.2	-	-	0.0	-	10	$172.86	Adding window film to existing windows in homes with electric heating and central AC	8.36%	0.00%
6327	Window Replacement	MF	NC	All	-	-	474.5	0.1	0.1	-	-	0.0	-	20	$824.27	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with electric heating and central AC	8.36%	0.00%
6328	Basement Wall Insulation	MF	NC	All	-	-	265.9	0.0	0.0	-	-	0.0	-	20	$253.67	Adding basement wall insulation in homes with poorly insulated basements in homes with electric heating and central AC	2.42%	0.00%
6329	Crawlspace Wall Insulation	MAN	Retrofit-OLD	All	-	-	51.8	0.0	0.0	-	-	1.6	-	20	$369.38	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and central AC	15.82%	30.00%
6330	Duct Insulation	MAN	Retrofit-OLD	NLI	-	-	59.9	0.1	0.1	-	-	5.9	-	20	$271.20	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	16.00%	78.95%
6331	Duct sealing 15% leakage base	MAN	Retrofit-OLD	NLI	-	-	59.8	0.1	0.1	-	-	5.2	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	16.00%	76.92%
6332	Duct sealing 20% leakage base	MAN	Retrofit-OLD	NLI	-	-	92.5	0.2	0.2	-	-	8.1	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	16.00%	76.92%
6333	Duct sealing 25% leakage base	MAN	Retrofit-OLD	NLI	-	-	125.9	0.2	0.2	-	-	11.0	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	16.00%	76.92%
6334	Duct sealing 30% leakage base	MAN	Retrofit-OLD	NLI	-	-	159.4	0.2	0.2	-	-	13.9	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	16.00%	76.92%
6335	Floor Insulation	MAN	Retrofit-OLD	All	-	-	34.0	0.0	0.0	-	-	4.4	-	20	$779.85	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and central AC	26.36%	23.00%

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6336	Infiltration reduction - 10%	MAN	Retrofit-OLD	NLI	-	-	22.8	0.0	0.0	-	-	2.5	-	13	$135.60	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	3.16%	76.92%
6337	Infiltration reduction - 15%	MAN	Retrofit-OLD	NLI	-	-	33.2	0.0	0.0	-	-	3.8	-	13	$135.60	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	26.36%	76.92%
6338	Roof Insulation	MAN	Retrofit-OLD	NLI	-	-	101.9	0.1	0.1	-	-	6.4	-	20	$855.35	Installing roof insulation in poorly insulated attics - in homes with gas heating and central AC	26.36%	78.95%
6339	Wall Insulation	MAN	Retrofit-OLD	NLI	-	-	137.1	0.1	0.1	-	-	13.1	-	20	$2,034.61	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	26.36%	78.95%
6340	Window Replacement	MAN	Retrofit-OLD	NLI	-	-	378.6	0.5	0.5	-	-	17.9	-	20	$1,003.69	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	26.36%	65.79%
6341	Low Income Weatherization Package	MAN	Retrofit-OLD	LI	-	-	803.3	1.0	1.0	-	-	55.3	-	13	$4,544.33	Package of weatherization measures - in homes with gas heating and central AC	16.00%	78.95%
6342	Crawlspace Wall Insulation	MAN	Retrofit-AVG	All	-	-	45.5	0.0	0.0	-	-	1.2	-	20	$369.38	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and central AC	23.72%	30.00%
6343	Duct Insulation	MAN	Retrofit-AVG	NLI	-	-	73.0	0.1	0.1	-	-	6.0	-	20	$271.20	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	24.00%	78.95%
6344	Duct sealing 15% leakage base	MAN	Retrofit-AVG	NLI	-	-	52.3	0.1	0.1	-	-	4.0	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	24.00%	76.92%
6345	Duct sealing 20% leakage base	MAN	Retrofit-AVG	NLI	-	-	81.1	0.1	0.1	-	-	6.3	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	24.00%	76.92%
6346	Duct sealing 25% leakage base	MAN	Retrofit-AVG	NLI	-	-	109.6	0.2	0.2	-	-	8.6	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	24.00%	76.92%
6347	Duct sealing 30% leakage base	MAN	Retrofit-AVG	NLI	-	-	138.5	0.2	0.2	-	-	10.9	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	24.00%	76.92%
6348	Floor Insulation	MAN	Retrofit-AVG	All	-	-	39.7	0.0	0.0	-	-	5.3	-	20	$779.85	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and central AC	4.74%	23.00%
6349	Infiltration reduction - 10%	MAN	Retrofit-AVG	NLI	-	-	10.6	0.0	0.0	-	-	1.2	-	13	$135.60	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	39.54%	76.92%
6350	Infiltration reduction - 15%	MAN	Retrofit-AVG	NLI	-	-	16.5	0.0	0.0	-	-	1.8	-	13	$135.60	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	39.54%	76.92%
6351	Roof Insulation	MAN	Retrofit-AVG	NLI	-	-	134.1	0.1	0.1	-	-	9.4	-	20	$855.35	Installing roof insulation in poorly insulated attics - in homes with gas heating and central AC	39.54%	78.95%
6352	Wall Insulation	MAN	Retrofit-AVG	NLI	-	-	79.6	0.1	0.1	-	-	8.0	-	20	$2,034.61	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	39.54%	78.95%
6353	Window Replacement	MAN	Retrofit-AVG	NLI	-	-	267.1	0.3	0.3	-	-	7.6	-	20	$1,003.69	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	39.54%	65.79%
6354	Low Income Weatherization Package	MAN	Retrofit-AVG	LI	-	-	651.3	0.8	0.8	-	-	39.0	-	13	$4,544.33	Package of weatherization measures - in homes with gas heating and central AC	24.00%	78.95%
6355	Crawlspace Wall Insulation	MAN	Retrofit-OLD	All	-	-	7.1	0.0	0.0	-	-	1.6	-	20	$369.38	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and no central AC	6.00%	30.00%
6356	Duct Insulation	MAN	Retrofit-OLD	NLI	-	-	1.6	0.0	0.0	-	-	5.9	-	20	$271.20	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	9.29%	78.95%
6357	Duct sealing 15% leakage base	MAN	Retrofit-OLD	NLI	-	-	15.8	0.0	0.0	-	-	5.2	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	9.29%	76.92%
6358	Duct sealing 20% leakage base	MAN	Retrofit-OLD	NLI	-	-	25.1	0.0	0.0	-	-	8.1	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	9.29%	76.92%
6359	Duct sealing 25% leakage base	MAN	Retrofit-OLD	NLI	-	-	34.8	0.0	0.0	-	-	11.0	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	9.29%	76.92%
6360	Duct sealing 30% leakage base	MAN	Retrofit-OLD	NLI	-	-	45.1	0.0	0.0	-	-	13.8	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	9.29%	76.92%
6361	Floor Insulation	MAN	Retrofit-OLD	All	-	-	20.5	0.0	0.0	-	-	4.4	-	20	$779.85	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and no central AC	1.20%	23.00%
6362	Infiltration reduction - 10%	MAN	Retrofit-OLD	NLI	-	-	11.4	0.0	0.0	-	-	2.5	-	13	$135.60	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	10.00%	76.92%
6363	Infiltration reduction - 15%	MAN	Retrofit-OLD	NLI	-	-	17.2	0.0	0.0	-	-	3.8	-	13	$135.60	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	10.00%	76.92%
6364	Roof Insulation	MAN	Retrofit-OLD	NLI	-	-	30.8	0.0	0.0	-	-	6.4	-	20	$855.35	Installing roof insulation in poorly insulated attics - in homes with gas heating and no central AC	10.00%	78.95%
6365	Wall Insulation	MAN	Retrofit-OLD	NLI	-	-	58.2	0.0	0.0	-	-	13.1	-	20	$2,034.61	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	10.00%	78.95%
6366	Window Replacement	MAN	Retrofit-OLD	NLI	-	-	81.2	0.0	0.0	-	-	17.9	-	20	$1,003.69	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no central AC	10.00%	65.79%
6367	Low Income Weatherization Package	MAN	Retrofit-OLD	LI	-	-	214.0	0.0	0.0	-	-	55.2	-	13	$4,544.33	Package of weatherization measures - in homes with gas heating and no central AC	9.29%	78.95%
6368	Crawlspace Wall Insulation	MAN	Retrofit-AVG	All	-	-	5.2	0.0	0.0	-	-	1.1	-	20	$369.38	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and no central AC	9.00%	30.00%
6369	Duct Insulation	MAN	Retrofit-AVG	NLI	-	-	6.7	0.0	0.0	-	-	6.0	-	20	$271.20	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	13.94%	78.95%
6370	Duct sealing 15% leakage base	MAN	Retrofit-AVG	NLI	-	-	11.8	0.0	0.0	-	-	4.0	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	13.94%	76.92%
6371	Duct sealing 20% leakage base	MAN	Retrofit-AVG	NLI	-	-	18.8	0.0	0.0	-	-	6.3	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	13.94%	76.92%
6372	Duct sealing 25% leakage base	MAN	Retrofit-AVG	NLI	-	-	26.2	0.0	0.0	-	-	8.6	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	13.94%	76.92%
6373	Duct sealing 30% leakage base	MAN	Retrofit-AVG	NLI	-	-	34.2	0.0	0.0	-	-	10.9	-	18	$243.88	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	13.94%	76.92%
6374	Floor Insulation	MAN	Retrofit-AVG	All	-	-	23.5	0.0	0.0	-	-	5.3	-	20	$779.85	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and no central AC	1.80%	23.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
6375	Infiltration reduction - 10%	MAN	Retrofit-AVG	NLI	-	-	5.2	0.0	0.0	-	-	1.2	-	13	$135.60	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	15.00%	76.92%
6376	Infiltration reduction - 15%	MAN	Retrofit-AVG	NLI	-	-	7.8	0.0	0.0	-	-	1.8	-	13	$135.60	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	15.00%	76.92%
6377	Roof Insulation	MAN	Retrofit-AVG	NLI	-	-	42.6	0.0	0.0	-	-	9.4	-	20	$855.35	Installing roof insulation in poorly insulated attics - in homes with gas heating and no central AC	15.00%	78.95%
6378	Wall Insulation	MAN	Retrofit-AVG	NLI	-	-	34.5	0.0	0.0	-	-	8.0	-	20	$2,034.61	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	15.00%	78.95%
6379	Window Replacement	MAN	Retrofit-AVG	NLI	-	-	34.5	0.0	0.0	-	-	7.6	-	20	$1,003.69	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no central AC	15.00%	65.79%
6380	Low Income Weatherization Package	MAN	Retrofit-AVG	LI	-	-	171.3	0.0	0.0	-	-	48.1	-	13	$4,652.61	Package of weatherization measures - in homes with gas heating and no central AC	13.94%	78.95%
6381	Crawlspace Wall Insulation	MAN	NC	All	-	-	38.2	0.0	0.0	-	-	0.8	-	20	$146.31	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and central AC	39.54%	0.00%
6382	Duct Insulation	MAN	NC	All	-	-	77.2	0.1	0.1	-	-	6.2	-	20	$113.00	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and central AC	65.90%	0.00%
6383	Duct sealing 15% leakage base	MAN	NC	All	-	-	47.5	0.1	0.1	-	-	3.6	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and central AC	65.90%	0.00%
6384	Duct sealing 20% leakage base	MAN	NC	All	-	-	73.6	0.1	0.1	-	-	5.7	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and central AC	65.90%	0.00%
6385	Duct sealing 25% leakage base	MAN	NC	All	-	-	99.4	0.1	0.1	-	-	7.8	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and central AC	65.90%	0.00%
6386	Duct sealing 30% leakage base	MAN	NC	All	-	-	126.4	0.2	0.2	-	-	9.9	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and central AC	65.90%	0.00%
6387	Floor Insulation	MAN	NC	All	-	-	33.0	0.0	0.0	-	-	4.4	-	20	$308.89	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and central AC	7.91%	0.00%
6388	Infiltration reduction - 10%	MAN	NC	All	-	-	8.4	0.0	0.0	-	-	1.0	-	13	$22.60	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and central AC	65.90%	0.00%
6389	Infiltration reduction - 15%	MAN	NC	All	-	-	12.7	0.0	0.0	-	-	1.4	-	13	$22.60	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and central AC	65.90%	0.00%
6390	Roof Insulation	MAN	NC	All	-	-	107.1	0.1	0.1	-	-	7.6	-	20	$638.25	Installing roof insulation in poorly insulated attics - in homes with gas heating and central AC	65.90%	0.00%
6391	Wall Insulation	MAN	NC	All	-	-	67.8	0.1	0.1	-	-	7.0	-	20	$233.87	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and central AC	65.90%	0.00%
6392	Window Replacement	MAN	NC	All	-	-	178.1	0.2	0.2	-	-	5.8	-	20	$1,003.69	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and central AC	65.90%	0.00%
6393	Crawlspace Wall Insulation	MAN	NC	All	-	-	3.7	0.0	0.0	-	-	0.8	-	20	$146.31	Adding crawl space insulation in homes with poorly insulated crawl spaces in homes with gas heating and no central AC	15.00%	0.00%
6394	Duct Insulation	MAN	NC	All	-	-	8.5	0.0	0.0	-	-	6.3	-	20	$113.00	Insulating duct work in homes with poorly insulated ducts in homes with gas heating and no central AC	23.23%	0.00%
6395	Duct sealing 15% leakage base	MAN	NC	All	-	-	10.5	0.0	0.0	-	-	3.6	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (15% leakage base) in homes with gas heating and no central AC	23.23%	0.00%
6396	Duct sealing 20% leakage base	MAN	NC	All	-	-	16.9	0.0	0.0	-	-	5.7	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (20% leakage base) in homes with gas heating and no central AC	23.23%	0.00%
6397	Duct sealing 25% leakage base	MAN	NC	All	-	-	23.7	0.0	0.0	-	-	7.8	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (25% leakage base) in homes with gas heating and no central AC	23.23%	0.00%
6398	Duct sealing 30% leakage base	MAN	NC	All	-	-	31.0	0.0	0.0	-	-	9.9	-	18	$37.67	Reducing duct leakage to 6% of the HVAC system air flow in homes with poorly insulated ductwork (30% leakage base) in homes with gas heating and no central AC	23.23%	0.00%
6399	Floor Insulation	MAN	NC	All	-	-	19.1	0.0	0.0	-	-	4.4	-	20	$308.89	Installing floor insulation in homes with poorly insulated floors in homes with gas heating and no central AC	3.00%	0.00%
6400	Infiltration reduction - 10%	MAN	NC	All	-	-	4.2	0.0	0.0	-	-	1.0	-	13	$22.60	Reducing air infiltration (by 10%) in poorly sealed homes in homes with gas heating and no central AC	25.00%	0.00%
6401	Infiltration reduction - 15%	MAN	NC	All	-	-	6.3	0.0	0.0	-	-	1.4	-	13	$22.60	Reducing air infiltration (by 15%) in poorly sealed homes in homes with gas heating and no central AC	25.00%	0.00%
6402	Roof Insulation	MAN	NC	All	-	-	34.0	0.0	0.0	-	-	7.6	-	20	$638.25	Installing roof insulation in poorly insulated attics - in homes with gas heating and no central AC	25.00%	0.00%
6403	Wall Insulation	MAN	NC	All	-	-	29.7	0.0	0.0	-	-	7.0	-	20	$233.87	Adding wall insulation in homes with poorly insulated walls in homes with gas heating and no central AC	25.00%	0.00%
6404	Window Replacement	MAN	NC	All	-	-	25.8	0.0	0.0	-	-	5.8	-	20	$1,003.69	Installing new windows (U-value = 0.28 ; SHGC = 0.58) in homes with gas heating and no central AC	25.00%	0.00%
7000	HVAC (Equipment)																	
7001	ENERGY STAR Room AC	SF	ROB	All	470.2	13.2%	62	0.108	0.108	-	-	0	0	15	$75.00	Installation of ENERGY STAR Room AC	16.75%	23.00%
7002	CEE Tier 2 Room AC	SF	ROB	All	470.2	17.0%	80	0.138	0.138	-	-	0	0	12	$250.00	Installation of CEE Tier 2 Room AC	16.75%	23.00%
7003	Room AC recycling	SF	Retrofit	All	113.0	100.0%	113	0.107	0.107	-	-	0	0	8	$49.00	Retirement of tertiary room AC	1.94%	0.00%
7004	ASHP - SEER 15	SF	ROB	All			447.5	0.3	0.3			0.0	0	15	$293.81	Installation of SEER 15 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7005	ASHP - SEER 16	SF	ROB	All			925.7	0.2	0.2			0.0	0	15	$587.62	Installation of SEER 16 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7006	ASHP - SEER 17	SF	ROB	All			1191.8	0.2	0.2			0.0	0	15	$881.42	Installation of SEER 17 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7007	ASHP - SEER 18	SF	ROB	All			1229.7	0.3	0.3			0.0	0	15	$1,175.23	Installation of SEER 18 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7008	DFHP - SEER 15 with 95 AFUE furnace	SF	ROB	All			829.9	0.3	0.3			2.8	0	15	$277.86	Installation of SEER 15/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7009	DFHP - SEER 16 with 95 AFUE furnace	SF	ROB	All			977.6	0.2	0.2			3.9	0	15	$555.71	Installation of SEER 16/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
7010	DFHP - SEER 17 with 95 AFUE furnace	SF	ROB	All			1409.9	0.2	0.2			3.3	0	15	$833.57	Installation of SEER 17/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7011	DFHP - SEER 18 with 95 AFUE furnace	SF	ROB	All			1350.5	0.3	0.3			3.7	0	15	$1,189.14	Installation of SEER 18/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7012	Furnace/AC - SEER 15	SF	ROB	All			531.2	0.5	0.5			-1.5	0	15	$555.71	Installation of 15 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7013	Furnace/AC - SEER 16	SF	ROB	All			403.1	0.5	0.5			-0.9	0	15	$833.57	Installation of 16 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7014	Furnace/AC - SEER 17	SF	ROB	All			564.6	0.7	0.7			-1.3	0	15	$1,111.42	Installation of 17 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7015	GSHP - EER 17 ASHP Base	SF	ROB	All			6042.7	0.4	0.4			0.0	0	15	$20,316.19	Installation of EER 17 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7016	GSHP - EER 19 ASHP Base	SF	ROB	All			6455.8	0.6	0.6			0.0	0	15	$20,316.19	Installation of EER 19 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7017	High efficiency 92 AFUE furnace with ECM	SF	ROB	All			596.0	0.3	0.3			19.8	0	15	$1,097.94	Installation of 92 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7018	High efficiency 94 AFUE furnace with ECM	SF	ROB	All			596.0	0.3	0.3			23.1	0	15	$1,354.65	Installation of 94 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7019	High efficiency 95 AFUE furnace with ECM	SF	ROB	All			596.0	0.3	0.3			24.8	0	15	$1,483.00	Installation of 95 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7020	O&M Tune-up - furnace only	SF	Retrofit	NLI			0.0	0.0	0.0			8.4	0	3	$139.00	5% increase in furnace efficiency - in homes with gas furnaces	81.00%	49.50%
7021	O&M Tune-up - furnace only	SF	Retrofit	LI	-	-	0.0	0.0	0.0			21.5	0	3	$139.00	5% increase in furnace efficiency - in homes with gas furnaces	81.00%	49.50%
7022	RCA 10% improvement	SF	Retrofit	All			92.7	0.2	0.2			0.0	0	5	$139.00	Refrigerant charge and air flow adjustment - 10% improvement - in homes with gas furnace and central AC	62.00%	23.80%
7023	RCA 15% improvement	SF	Retrofit	All			139.1	0.3	0.3			0.0	0	5	$438.81	Refrigerant charge and air flow adjustment - 15% improvement - in homes with gas furnace and central AC	62.00%	23.80%
7024	RCA 5% improvement	SF	Retrofit	All			46.4	0.1	0.1			0.0	0	5	$115.08	Refrigerant charge and air flow adjustment - 5% improvement - in homes with gas furnace and central AC	62.00%	23.80%
7025	Setback thermostat - full setback	SF	Retrofit	All			106.6	0.0	0.0			11.6	0	9	$56.37	Full thermostat setback per MEMD - all heating/cooling combinations	100.00%	53.00%
7026	Setback thermostat - moderate setback	SF	Retrofit	NLI			77.1	0.0	0.0			5.9	0	9	$56.37	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	53.00%
7027	Setback thermostat - moderate setback	SF	Retrofit	LI	-	-	77.1	0.0	0.0			0.4	0	9	$56.37	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	53.00%
7028	Whole House Fan	SF	Retrofit	All			53.9	0.0	0.0			0.0	0	15	$1,903.21	Installing a whole house fan to ventilate homes - all heating/cooling combinations	100.00%	4.20%
7029	High efficiency 93 AFUE furnace with ECM	SF	ROB	All			596.0	0.3	0.3			21.5	0	15	$1,225.55	Installation of 93 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7030	High efficiency 96 AFUE furnace with ECM	SF	ROB	All			596.0	0.3	0.3			26.4	0	15	$1,610.60	Installation of 96 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7031	High efficiency 97 AFUE furnace with ECM	SF	ROB	All			596.0	0.3	0.3			28.1	0	15	$1,738.95	Installation of 97 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7032	High efficiency 98 AFUE furnace with ECM	SF	ROB	All	-	-	596.0	0.3	0.3			29.7	0	15	$1,867.30	Installation of 98 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	49.50%
7033	ECM Furnace Fan	SF	Retrofit	All	-	-	596.0	0.3	0.3			-0.7	0	18	$97.00	Installing an efficient furnace fan motor - in homes with gas furnaces	81.00%	49.50%
7034	ASHP - SEER 19	SF	ROB	All			1454.0	0.6	0.6			0.0	0	15	$1,532.23	Installation of SEER 19 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7035	DFHP - SEER 19 with 95 AFUE furnace	SF	ROB	All			1616.1	0.6	0.6			3.7	0	15	$1,546.14	Installation of SEER 19/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7036	Furnace/AC - SEER 18	SF	ROB	All			667.3	1.1	1.1			-1.2	0	15	$1,975.35	Installation of 18 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7037	Furnace/AC - SEER 19	SF	ROB	All			758.6	1.3	1.3			-1.2	0	15	$2,332.35	Installation of 19 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7038	ASHP - SEER 20	SF	ROB	All			1938.5	1.2	1.2			0.0	0	15	$1,889.25	Installation of SEER 20 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7039	DFHP - SEER 20 with 95 AFUE furnace	SF	ROB	All			2189.8	1.2	1.2			3.7	0	15	$1,903.14	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7040	Furnace/AC - SEER 20	SF	ROB	All			840.8	1.6	1.6			-1.2	0	15	$2,689.35	Installation of 20 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7041	ASHP - SEER 21	SF	ROB	All			2810.6	2.6	2.6			0.0	0	15	$2,111.76	Installation of SEER 21 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7042	DFHP - SEER 21 with 95 AFUE furnace	SF	ROB	All			3222.6	2.6	2.6			3.7	0	15	$2,125.65	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7043	Furnace/AC - SEER 21	SF	ROB	All			915.1	1.8	1.8			-1.2	0	15	$2,911.86	Installation of 21 SEER air conditioner - baseline is 13 SEER AC	62.00%	29.40%
7044	SEER21 Minisplit Heat pump	SF	ROB	All			4659.5	0.8	0.8			0.0	0	15	$2,111.74	Installation of SEER 21 minisplit heat pump in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7045	SEER21 Minisplit Heat pump	SF	Retrofit	All			10722.6	-1.5	-1.5			0.0	0	15	$4,334.05	Installation of SEER 21 minisplit heat pump in homes with electric heating/cooling - baseline is electic furnace / central air conditioning	0.25%	0.00%
7046	Boiler Tune-up	SF	Retrofit	NLI			0.0	0.0	0.0			8.8	0	5	$139.00	Increasing boiler efficiency by 5% - in homes with gas boilers	9.00%	49.50%
7047	Boiler Tune-up	SF	Retrofit	LI			0.0	0.0	0.0			8.8	0	5	$139.00	Increasing boiler efficiency by 5% - in homes with gas boilers	9.00%	49.50%
7048	Boiler reset control	SF	Retrofit	All			0.0	0.0	0.0			7.1	0	20	$56,000.00	Installing boiler reset controls - in single-family homes with boilers	9.00%	49.50%
7049	Boiler 87% plus AFUE 82 AFUE BASE	SF	ROB	All			0.0	0.0	0.0			10.7	0	15	$1,100.00	Installing 87 AFUE boilers to replace standard boilers - in homes with gas boilers	9.00%	49.50%
7050	Boiler 92% plus AFUE 82 AFUE BASE	SF	ROB	All			-431.2	0.0	0.0			51.7	0	15	$1,954.00	Installing 92 AFUE boilers to replace standard boilers - in homes with gas boilers	9.00%	49.50%
7051	Boiler 95% plus AFUE 82 AFUE BASE	SF	ROB	All			-431.2	0.0	0.0			55.2	0	15	$2,436.00	Installing 95 AFUE boilers to replace standard boilers - in homes with gas boilers	9.00%	49.50%
7052	ENERGY STAR Room AC	SF	NC	All	470.2	13.2%	62	0.108	0.108	-	-	0	0	15	$75.00	Installation of ENERGY STAR Room AC	16.75%	0.00%
7053	CEE Tier 2 Room AC	SF	NC	All	470.2	17.0%	80	0.138	0.138	-	-	0	0	12	$250.00	Installation of CEE Tier 2 Room AC	16.75%	0.00%
7054	ASHP - SEER 15	SF	NC	All			642.1	0.6	0.6			0.0	0	15	$293.81	Installation of SEER 15 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7055	ASHP - SEER 16	SF	NC	All			1146.2	0.6	0.6			0.0	0	15	$587.62	Installation of SEER 16 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7056	ASHP - SEER 17	SF	NC	All			1341.8	0.6	0.6			0.0	0	15	$881.42	Installation of SEER 17 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7057	ASHP - SEER 18	SF	NC	All			1394.4	0.7	0.7			0.0	0	15	$1,175.23	Installation of SEER 18 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7058	DFHP - SEER 15 with 95 AFUE furnace	SF	NC	All			809.8	0.3	0.3			3.8	0	15	$277.86	Installation of SEER 15/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
7059	DFHP - SEER 16 with 95 AFUE furnace	SF	NC	All			899.2	0.2	0.2			4.6	0	15	$555.71	Installation of SEER 16/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7060	DFHP - SEER 17 with 95 AFUE furnace	SF	NC	All			1282.2	0.2	0.2			4.0	0	15	$833.57	Installation of SEER 17/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7061	DFHP - SEER 18 with 95 AFUE furnace	SF	NC	All			1188.8	0.3	0.3			4.3	0	15	$1,189.14	Installation of SEER 18/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7062	Furnace/AC - SEER 15	SF	NC	All			334.0	0.3	0.3			-0.7	0	15	$555.71	Installation of 15 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7063	Furnace/AC - SEER 16	SF	NC	All			217.4	0.4	0.4			-0.4	0	15	$833.57	Installation of 16 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7064	Furnace/AC - SEER 17	SF	NC	All			368.3	0.6	0.6			-0.8	0	15	$1,111.42	Installation of 17 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7065	GSHP - EER 17 ASHP Base	SF	NC	All			6071.9	0.5	0.5			0.0	0	15	$20,316.19	Installation of EER 17 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	1.00%	0.00%
7066	GSHP - EER 19 ASHP Base	SF	NC	All			6453.9	0.7	0.7			0.0	0	15	$20,316.19	Installation of EER 19 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	1.00%	0.00%
7067	High efficiency 92 AFUE furnace with ECM	SF	NC	All			556.0	0.3	0.3			11.7	0	15	$1,097.94	Installation of 92 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7068	High efficiency 94 AFUE furnace with ECM	SF	NC	All			556.0	0.3	0.3			13.6	0	15	$1,354.65	Installation of 94 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7069	High efficiency 95 AFUE furnace with ECM	SF	NC	All			556.0	0.3	0.3			14.6	0	15	$1,483.00	Installation of 95 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7070	Setback thermostat - full setback	SF	NC	All			66.6	0.0	0.0			6.6	0	9	$18.15	Full thermostat setback per MEMD - all heating/cooling combinations	100.00%	0.00%
7071	Setback thermostat - moderate setback	SF	NC	All			54.7	0.0	0.0			3.7	0	9	$18.15	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	0.00%
7072	Whole House Fan	SF	NC	All			40.8	0.0	0.0			0.0	0	15	$902.35	Installing a whole house fan to ventilate homes - all heating/cooling combinations	100.00%	0.00%
7073	High efficiency 93 AFUE furnace with ECM	SF	NC	All			556.0	0.3	0.3			12.7	0	15	$1,225.55	Installation of 93 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7074	High efficiency 96 AFUE furnace with ECM	SF	NC	All			556.0	0.3	0.3			15.6	0	15	$1,610.60	Installation of 96 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7075	High efficiency 97 AFUE furnace with ECM	SF	NC	All			556.0	0.3	0.3			16.5	0	15	$1,738.95	Installation of 97 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7076	High efficiency 98 AFUE furnace with ECM	SF	NC	All	-	-	556.0	0.3	0.3			17.5	0	15	$1,867.30	Installation of 98 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	81.00%	0.00%
7077	ECM Furnace Fan	SF	NC	All	-	-	556.0	0.3	0.3			-0.7	0	18	$97.00	Installing an efficient furnace fan motor - in homes with gas furnaces	81.00%	0.00%
7078	ASHP - SEER 19	SF	NC	All			1331.7	0.6	0.6			0.0	0	15	$1,532.23	Installation of SEER 19 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7079	DFHP - SEER 19 with 95 AFUE furnace	SF	NC	All			1427.4	0.6	0.6			4.3	0	15	$1,546.14	Installation of SEER 19/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7080	Furnace/AC - SEER 18	SF	NC	All			518.3	1.0	1.0			-0.6	0	15	$1,975.35	Installation of 18 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7081	Furnace/AC - SEER 19	SF	NC	All			589.18257	1.257	1.257			-0.639549	0	15	$2,332.35	Installation of 19 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7082	ASHP - SEER 20	SF	NC	All			1743.8776	1.129	1.129			0	0	15	$1,889.25	Installation of SEER 20 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7083	DFHP - SEER 20 with 95 AFUE furnace	SF	NC	All			1942.8733	1.253	1.3			4.3	0	15	$1,903.14	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7084	Furnace/AC - SEER 20	SF	NC	All			653.5	1.5	1.5			-0.6	0	15	$2,689.35	Installation of 20 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7085	ASHP - SEER 21	SF	NC	All			2485.7	2.3	2.3			0.0	0	15	$2,111.76	Installation of SEER 21 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7086	DFHP - SEER 21 with 95 AFUE furnace	SF	NC	All			2870.7	2.7	2.7			4.3	0	15	$2,125.65	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7087	Furnace/AC - SEER 21	SF	NC	All			710.8	1.7	1.7			-0.6	0	15	$2,911.86	Installation of 21 SEER air conditioner - baseline is 13 SEER AC	62.00%	0.00%
7088	SEER21 Minisplit Heat pump	SF	NC	All			1919.1	0.7	0.7			0.0	0	15	$2,111.74	Installation of SEER 21 minisplit heat pump in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7089	Boiler 87% plus AFUE 82 AFUE BASE	SF	NC	All			0.0	0.0	0.0			6.2	0	15	$1,100.00	Installing 87 AFUE boilers to replace standard boilers - in homes with gas boilers	9.00%	0.00%
7090	Boiler 92% plus AFUE 82 AFUE BASE	SF	NC	All			-258.8	0.0	0.0			32.2	0	15	$1,954.00	Installing 92 AFUE boilers to replace standard boilers - in homes with gas boilers	9.00%	0.00%
7091	Boiler 95% plus AFUE 82 AFUE BASE	SF	NC	All			-258.8	0.0	0.0			34.2	0	15	$2,436.00	Installing 95 AFUE boilers to replace standard boilers - in homes with gas boilers	9.00%	0.00%
7092	ENERGY STAR Room AC	MF	ROB	All	470.2	13.2%	62	0.108	0.108	-	-	0	0	15	$75.00	Installation of ENERGY STAR Room AC	47.45%	20.00%
7093	CEE Tier 2 Room AC	MF	ROB	All	470.2	17.0%	80	0.138	0.138	-	-	0	0	12	$250.00	Installation of CEE Tier 2 Room AC	47.45%	20.00%
7094	Room AC recycling	MF	Retrofit	All	113.0	100.0%	113	0.107	0.107	-	-	0	0	8	$49.00	Retirement of tertiary room AC	5.49%	0.00%
7095	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	MF	ROB	All			36794.2	6.8	6.8			0.0	0	20	$9,013.11	Installation of efficient reciprocating chiller (2.8 COP; 3.41 IPLV) in apartment buildings with chillers	0.12%	29.40%
7096	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	MF	ROB	All			66535.5	14.7	14.7			0.0	0	20	$18,407.87	Installation of efficient reciprocating chiller (2.8 COP; 3.89 IPLV) in apartment buildings with chillers	0.12%	29.40%
7097	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	MF	ROB	All			85178.7	18.2	18.2			0.0	0	20	$23,917.23	Installation of efficient reciprocating chiller (2.8 COP; 4.24 IPLV) in apartment buildings with chillers	0.12%	29.40%
7098	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	MF	ROB	All			22051.8	19.9	19.9			0.0	0	20	$11,715.95	Installation of efficient reciprocating chiller (3.08 COP; 3.36 IPLV) in apartment buildings with chillers	0.12%	29.40%
7099	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	MF	ROB	All			55547.5	26.1	26.1			0.0	0	20	$19,936.13	Installation of efficient reciprocating chiller (3.08 COP; 3.76 IPLV) in apartment buildings with chillers	0.12%	29.40%
7100	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	MF	ROB	All			82623.7	33.3	33.3			0.0	0	20	$28,325.32	Installation of efficient reciprocating chiller (3.08 COP; 4.28 IPLV) in apartment buildings with chillers	0.12%	29.40%
7101	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	MF	ROB	All			99595.2	36.5	36.5			0.0	0	20	$33,391.17	Installation of efficient reciprocating chiller (3.08 COP; 4.67 IPLV) in apartment buildings with chillers	0.12%	29.40%
7102	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	MF	ROB	All			40658.3	36.7	36.7			0.0	0	20	$21,246.06	Installation of efficient reciprocating chiller (3.36 COP; 3.66 IPLV) in apartment buildings with chillers	0.12%	29.40%
7103	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	MF	ROB	All			71371.0	42.4	42.4			0.0	0	20	$28,858.71	Installation of efficient reciprocating chiller (3.36 COP; 4.10 IPLV) in apartment buildings with chillers	0.12%	29.40%
7104	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	MF	ROB	All			96197.6	48.9	48.9			0.0	0	20	$36,587.70	Installation of efficient reciprocating chiller (3.36 COP; 4.67 IPLV) in apartment buildings with chillers	0.12%	29.40%

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7105	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	MF	ROB	All			111759.1	51.9	51.9			0.0	0	20	$41,175.06	Installation of efficient reciprocating chiller (3.36 COP; 5.09 IPLV) in apartment buildings with chillers	0.12%	29.40%
7106	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	MF	ROB	All			39962.1	7.9	7.9			0.0	0	20	$10,113.35	Installation of efficient screw chiller (2.8 COP; 3.46 IPLV) in apartment buildings with chillers	0.12%	29.40%
7107	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	MF	ROB	All			39375.1	13.9	13.9			0.0	0	20	$13,823.94	Installation of efficient screw chiller (2.8 COP; 3.64 IPLV) in apartment buildings with chillers	0.12%	29.40%
7108	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	MF	ROB	All			118543.3	21.2	21.2			0.0	0	20	$30,491.67	Installation of efficient screw chiller (2.8 COP; 4.75 IPLV) in apartment buildings with chillers	0.12%	29.40%
7109	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	MF	ROB	All			23624.3	19.9	19.9			0.0	0	20	$11,715.95	Installation of efficient screw chiller (3.08 COP; 3.36 IPLV) in apartment buildings with chillers	0.12%	29.40%
7110	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	MF	ROB	All			60004.6	27.1	27.1			0.0	0	20	$20,662.97	Installation of efficient screw chiller (3.08 COP; 3.80 IPLV) in apartment buildings with chillers	0.12%	29.40%
7111	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	MF	ROB	All			59470.4	32.6	32.6			0.0	0	20	$24,079.10	Installation of efficient screw chiller (3.08 COP; 4.00 IPLV) in apartment buildings with chillers	0.12%	29.40%
7112	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	MF	ROB	All			131541.8	39.3	39.3			0.0	0	20	$39,248.83	Installation of efficient screw chiller (3.08 COP; 5.22 IPLV) in apartment buildings with chillers	0.12%	29.40%
7113	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	MF	ROB	All			43557.0	36.6	36.6			0.0	0	20	$21,246.06	Installation of efficient screw chiller (3.36 COP; 3.66 IPLV) in apartment buildings with chillers	0.12%	29.40%
7114	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	MF	ROB	All			76915.0	43.3	43.3			0.0	0	20	$29,621.65	Installation of efficient screw chiller (3.36 COP; 4.15 IPLV) in apartment buildings with chillers	0.12%	29.40%
7115	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	MF	ROB	All			76425.6	48.3	48.3			0.0	0	20	$33,443.22	Installation of efficient screw chiller (3.36 COP; 4.42 IPLV) in apartment buildings with chillers	0.12%	29.40%
7116	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	MF	ROB	All			142509.4	54.4	54.4			0.0	0	20	$46,553.67	Installation of efficient screw chiller (3.36 COP; 5.69 IPLV) in apartment buildings with chillers	0.12%	29.40%
7117	ASHP - SEER 15	MF	ROB	All			485.2	0.3	0.3			0.0	0	15	$293.81	Installation of SEER 15 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7118	ASHP - SEER 16	MF	ROB	All			742.4	0.2	0.2			0.0	0	15	$587.62	Installation of SEER 16 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7119	ASHP - SEER 17	MF	ROB	All			911.3	0.2	0.2			0.0	0	15	$881.42	Installation of SEER 17 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7120	ASHP - SEER 18	MF	ROB	All			987.7	0.2	0.2			0.0	0	15	$1,175.23	Installation of SEER 18 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7121	Boiler 85% Ec	MF	Retrofit	All			0.0	0.0	0.0			138.0	0	20	$7,232.27	Boiler economizer; 5% increase in boiler efficiency - in apartments with gas boilers and no central AC	20.24%	49.50%
7122	Boiler turndown control	MF	Retrofit	All			-132.2	0.0	0.0			170.6	0	15	$195.00	Installing boiler turndown controls - in apartment buildings with boilers	20.24%	49.50%
7123	CHW reset 10 deg	MF	Retrofit	All			15371.8	-0.3	-0.3			0.0	0	5	$158.98	Chilled water reset control strategy (10 degrees) - in apartment buildings with chillers	0.12%	29.40%
7124	CHW reset 5 deg	MF	Retrofit	All			8697.3	-0.1	-0.1			0.0	0	5	$158.98	Chilled water reset control strategy (5 degrees) - in apartment buildings with chillers	0.12%	29.40%
7125	DFHP - SEER 15 with 95 AFUE furnace	MF	ROB	All			686.8	0.3	0.3			12.9	0	15	$277.86	Installation of SEER 15/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7126	DFHP - SEER 16 with 95 AFUE furnace	MF	ROB	All			822.0	0.2	0.2			17.2	0	15	$555.71	Installation of SEER 16/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7127	DFHP - SEER 17 with 95 AFUE furnace	MF	ROB	All			1076.2	0.2	0.2			14.1	0	15	$833.57	Installation of SEER 17/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7128	DFHP - SEER 18 with 95 AFUE furnace	MF	ROB	All			1100.1	0.2	0.2			1.6	0	15	$1,189.14	Installation of SEER 18/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7129	Furnace/AC - SEER 15	MF	ROB	All			335.3	0.5	0.5			-1.4	0	15	$555.71	Installation of 15 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7130	Furnace/AC - SEER 16	MF	ROB	All			235.4	0.4	0.4			-2.1	0	15	$833.57	Installation of 16 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7131	Furnace/AC - SEER 17	MF	ROB	All			345.1	0.5	0.5			-2.4	0	15	$1,111.42	Installation of 17 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7132	High efficiency 92 AFUE furnace with ECM	MF	ROB	All			396.7	0.3	0.3			12.4	0	15	$1,097.94	Installation of 92 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7133	High efficiency 93 AFUE furnace with ECM	MF	ROB	All			396.7	0.3	0.3			13.5	0	15	$1,225.55	Installation of 93 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7134	High efficiency 94 AFUE furnace with ECM	MF	ROB	All			396.7	0.3	0.3			14.5	0	15	$1,354.65	Installation of 94 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7135	High efficiency 95 AFUE furnace with ECM	MF	ROB	All			396.7	0.3	0.3			15.5	0	15	$1,483.00	Installation of 95 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7136	High efficiency 96 AFUE furnace with ECM	MF	ROB	All			396.7	0.3	0.3			16.6	0	15	$1,610.60	Installation of 96 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7137	High efficiency 97 AFUE furnace with ECM	MF	ROB	All			396.7	0.3	0.3			17.6	0	15	$1,738.95	Installation of 97 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7138	High efficiency 98 AFUE furnace with ECM	MF	ROB	All	-	-	396.7	0.3	0.3			18.6	0	15	$1,867.30	Installation of 98 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	49.50%
7139	ECM Furnace Fan	MF	Retrofit	All	-	-	396.7	0.3	0.3			-0.7	0	18	$97.00	Installing an efficient furnace fan motor - in homes with gas furnaces	66.88%	49.50%
7140	O&M Tune-up - furnace only	MF	Retrofit	NLI			0.0	0.0	0.0			5.4	0	3	$139.00	5% increase in furnace efficiency - in homes with gas furnaces	66.88%	49.50%
7141	O&M Tune-up - furnace only	MF	Retrofit	LI			0.0	0.0	0.0	0.0	0.0%	5.4	0	3	$139.00	5% increase in furnace efficiency - in homes with gas furnaces	66.88%	49.50%
7142	O2 Trim Control	MF	Retrofit	All			0.0	0.0	0.0			2.8	0	15	$255.00	1.1% improvement in boiler efficiency resulting from the addition of oxygen trim controls - apartment buildings with boilers	6.75%	49.50%
7143	PTAC 9.3 EER	MF	ROB	All			136.1	0.2	0.2			0.0	0	15	$135.59	Installation of 9.3 EER packaged terminal air conditioner (PTAC) - in homes with PTACs	42.00%	29.40%
7144	PTHP 9.1 EER	MF	ROB	All			291.9	0.2	0.2			0.0	0	15	$169.21	Installation of 9.1 EER packaged terminal heat pump (PTHP) - in homes with PTHPs	5.50%	29.40%
7145	RCA 10% improvement	MF	Retrofit	All			82.6	0.2	0.2			0.0	0	5	$139.00	Refrigerant charge and air flow adjustment - 10% improvement - in homes with gas furnace and central AC	36.12%	23.80%
7146	RCA 15% improvement	MF	Retrofit	All			123.9	0.3	0.3			0.0	0	5	$438.81	Refrigerant charge and air flow adjustment - 15% improvement - in homes with gas furnace and central AC	36.12%	23.80%
7147	RCA 5% improvement	MF	Retrofit	All			41.3	0.1	0.1			0.0	0	5	$115.08	Refrigerant charge and air flow adjustment - 5% improvement - in homes with gas furnace and central AC	36.12%	23.80%

Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
7148	Setback thermostat - full setback	MF	Retrofit	All			108.6	0.0	0.0			3.0	0	9	$30.97	Full thermostat setback per MEMD - all heating/cooling combinations	100.00%	17.00%
7149	Setback thermostat - moderate setback	MF	Retrofit	NLI			70.2	0.0	0.0			1.7	0	9	$30.97	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	17.00%
7150	Setback thermostat - moderate setback	MF	Retrofit	LI			70.2	0.0	0.0	0.0	0.0%	1.7	0	9	$30.97	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	17.00%
7151	Whole House Fan	MF	Retrofit	All			70.4	0.0	0.0			0.0	0	15	$1,045.70	Installing a whole house fan to ventilate homes - all heating/cooling combinations	100.00%	4.20%
7152	ASHP - SEER 19	MF	ROB	All			1164.1	0.4	0.4			0.0	0	15	$1,532.23	Installation of SEER 19 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7153	ASHP - SEER 20	MF	ROB	All			1545.0	0.9	0.9			0.0	0	15	$1,889.25	Installation of SEER 20 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7154	ASHP - SEER 21	MF	ROB	All			2230.7	1.9	1.9			0.0	0	15	$2,111.76	Installation of SEER 21 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7155	DFHP - SEER 19 with 95 AFUE furnace	MF	ROB	All			1302.9	0.4	0.4			1.6	0	15	$1,546.14	Installation of SEER 19/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7156	DFHP - SEER 20 with 95 AFUE furnace	MF	ROB	All			1741.0	0.9	0.9			1.6	0	15	$1,903.14	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7157	DFHP - SEER 21 with 95 AFUE furnace	MF	ROB	All			2529.6	1.9	1.9			1.6	0	15	$2,125.65	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	2.75%	29.40%
7158	Furnace/AC - SEER 18	MF	ROB	All			486.2	0.8	0.8			-2.0	0	15	$1,975.35	Installation of 18 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7159	Furnace/AC - SEER 19	MF	ROB	All			552.8	1.0	1.0			-2.0	0	15	$2,332.35	Installation of 19 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7160	Furnace/AC - SEER 20	MF	ROB	All			612.7	1.2	1.2			-2.0	0	15	$2,689.35	Installation of 20 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7161	Furnace/AC - SEER 21	MF	ROB	All			666.8	1.3	1.3			-2.0	0	15	$2,911.86	Installation of 21 SEER air conditioner - baseline is 13 SEER AC	36.12%	29.40%
7162	SEER21 Minisplit Heat pump	MF	ROB	All			2560.1	0.5	0.5			0.0	0	15	$1,160.27	Installation of SEER 21 minisplit heat pump in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	29.40%
7163	SEER21 Minisplit Heat pump	MF	Retrofit	All			5891.4	-0.8	-0.8			0.0	0	15	$2,381.29	Installation of SEER 21 minisplit heat pump in homes with electric heating/cooling - baseline is electic furnace / central air conditioning	2.75%	0.00%
7164	Boiler Tune-up	MF	Retrofit	NLI			0.0	0.0	0.0			11.0	0	5	$139.00	Increasing boiler efficiency by 5% - in homes with gas boilers	20.24%	49.50%
7165	Boiler Tune-up	MF	Retrofit	LI			0.0	0.0	0.0	0.0	0.0%	11.0	0	5	$139.00	Increasing boiler efficiency by 5% - in homes with gas boilers	20.24%	49.50%
7166	Boiler 87% plus AFUE 82 AFUE BASE	MF	ROB	All			0.0	0.0	0.0			13.3	0	20	$1,100.00	Installing 87 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	49.50%
7167	Boiler 90% plus AFUE 82 AFUE BASE	MF	ROB	All			-695.3	0.0	0.0			29.4	0	20	$1,633.00	Installing 90 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	49.50%
7168	Boiler 92% plus AFUE 82 AFUE BASE	MF	ROB	All			-666.2	0.0	0.0			35.9	0	20	$1,954.00	Installing 92 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	49.50%
7169	Boiler 95% plus AFUE 82 AFUE BASE	MF	ROB	All			-666.2	0.0	0.0			42.5	0	20	$2,436.00	Installing 95 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	49.50%
7170	ENERGY STAR Room AC	MF	NC	All	470.2	13.2%	62	0.108	0.108	-	-	0	0	15	$75.00	Installation of ENERGY STAR Room AC	47.45%	0.00%
7171	CEE Tier 2 Room AC	MF	NC	All	470.2	17.0%	80	0.138	0.138	-	-	0	0	12	$250.00	Installation of CEE Tier 2 Room AC	47.45%	0.00%
7172	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	MF	NC	All			39855.7	2.0	2.0			0.0	0	20	$9,013.11	Installation of efficient reciprocating chiller (2.8 COP; 3.41 IPLV) in apartment buildings with chillers	0.12%	0.00%
7173	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	MF	NC	All			72948.6	4.5	4.5			0.0	0	20	$18,407.87	Installation of efficient reciprocating chiller (2.8 COP; 3.89 IPLV) in apartment buildings with chillers	0.12%	0.00%
7174	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	MF	NC	All			93462.3	5.2	5.2			0.0	0	20	$23,917.23	Installation of efficient reciprocating chiller (2.8 COP; 4.24 IPLV) in apartment buildings with chillers	0.12%	0.00%
7175	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	MF	NC	All			24624.9	21.2	21.2			0.0	0	20	$11,715.95	Installation of efficient reciprocating chiller (3.08 COP; 3.36 IPLV) in apartment buildings with chillers	0.12%	0.00%
7176	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	MF	NC	All			60908.0	23.0	23.0			0.0	0	20	$19,936.13	Installation of efficient reciprocating chiller (3.08 COP; 3.76 IPLV) in apartment buildings with chillers	0.12%	0.00%
7177	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	MF	NC	All			91034.5	25.4	25.4			0.0	0	20	$28,325.32	Installation of efficient reciprocating chiller (3.08 COP; 4.28 IPLV) in apartment buildings with chillers	0.12%	0.00%
7178	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	MF	NC	All			109709.8	26.0	26.0			0.0	0	20	$33,391.17	Installation of efficient reciprocating chiller (3.08 COP; 4.67 IPLV) in apartment buildings with chillers	0.12%	0.00%
7179	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	MF	NC	All			45402.4	39.0	39.0			0.0	0	20	$21,246.06	Installation of efficient reciprocating chiller (3.36 COP; 3.66 IPLV) in apartment buildings with chillers	0.12%	0.00%
7180	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	MF	NC	All			78670.5	40.7	40.7			0.0	0	20	$28,858.71	Installation of efficient reciprocating chiller (3.36 COP; 4.10 IPLV) in apartment buildings with chillers	0.12%	0.00%
7181	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	MF	NC	All			106295.1	42.9	42.9			0.0	0	20	$36,587.70	Installation of efficient reciprocating chiller (3.36 COP; 4.67 IPLV) in apartment buildings with chillers	0.12%	0.00%
7182	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	MF	NC	All			123418.5	43.6	43.6			0.0	0	20	$41,175.06	Installation of efficient reciprocating chiller (3.36 COP; 5.09 IPLV) in apartment buildings with chillers	0.12%	0.00%
7183	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	MF	NC	All			43124.7	2.3	2.3			0.0	0	20	$10,113.35	Installation of efficient screw chiller (2.8 COP; 3.46 IPLV) in apartment buildings with chillers	0.12%	0.00%
7184	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	MF	NC	All			44084.0	3.7	3.7			0.0	0	20	$13,823.94	Installation of efficient screw chiller (2.8 COP; 3.64 IPLV) in apartment buildings with chillers	0.12%	0.00%
7185	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	MF	NC	All			126348.5	5.6	5.6			0.0	0	20	$30,491.67	Installation of efficient screw chiller (2.8 COP; 4.75 IPLV) in apartment buildings with chillers	0.12%	0.00%
7186	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	MF	NC	All			26093.4	20.8	20.8			0.0	0	20	$11,715.95	Installation of efficient screw chiller (3.08 COP; 3.36 IPLV) in apartment buildings with chillers	0.12%	0.00%
7187	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	MF	NC	All			65352.2	23.1	23.1			0.0	0	20	$20,662.97	Installation of efficient screw chiller (3.08 COP; 3.80 IPLV) in apartment buildings with chillers	0.12%	0.00%
7188	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	MF	NC	All			66225.3	24.5	24.5			0.0	0	20	$24,079.10	Installation of efficient screw chiller (3.08 COP; 4.00 IPLV) in apartment buildings with chillers	0.12%	0.00%
7189	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	MF	NC	All			141115.6	26.2	26.2			0.0	0	20	$39,248.83	Installation of efficient screw chiller (3.08 COP; 5.22 IPLV) in apartment buildings with chillers	0.12%	0.00%
7190	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	MF	NC	All			48109.5	38.4	38.4			0.0	0	20	$21,246.06	Installation of efficient screw chiller (3.36 COP; 3.66 IPLV) in apartment buildings with chillers	0.12%	0.00%
7191	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	MF	NC	All			84105.8	40.6	40.6			0.0	0	20	$29,621.65	Installation of efficient screw chiller (3.36 COP; 4.15 IPLV) in apartment buildings with chillers	0.12%	0.00%
7192	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	MF	NC	All			84907.1	41.9	41.9			0.0	0	20	$33,443.22	Installation of efficient screw chiller (3.36 COP; 4.42 IPLV) in apartment buildings with chillers	0.12%	0.00%
7193	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	MF	NC	All			153575.7	43.6	43.6			0.0	0	20	$46,553.67	Installation of efficient screw chiller (3.36 COP; 5.69 IPLV) in apartment buildings with chillers	0.12%	0.00%

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation
7194	ASHP - SEER 15	MF	NC	All			442.8	0.4	0.4			0.0	0	15	$293.81	Installation of SEER 15 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7195	ASHP - SEER 16	MF	NC	All			514.6	0.2	0.2			0.0	0	15	$587.62	Installation of SEER 16 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7196	ASHP - SEER 17	MF	NC	All			620.8	0.2	0.2			0.0	0	15	$881.42	Installation of SEER 17 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7197	ASHP - SEER 18	MF	NC	All			705.9	0.2	0.2			0.0	0	15	$1,175.23	Installation of SEER 18 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7198	Boiler 85% Ec	MF	NC	All			0.0	0.0	0.0			10.3	0	20	$3,693.25	Boiler economizer; 5% increase in boiler efficiency - in apartments with gas boilers and no central AC	20.24%	0.00%
7199	Boiler turndown control	MF	NC	All			-106.0	0.0	0.0			13.0	0	15	$195.00	Installing boiler turndown controls - in apartment buildings with boilers	20.24%	0.00%
7200	CHW reset 10 deg	MF	NC	All			16359.1	-0.4	-0.4			0.0	0	5	$81.85	Chilled water reset control strategy (10 degrees) - in apartment buildings with chillers	0.12%	0.00%
7201	CHW reset 5 deg	MF	NC	All			9260.1	-0.3	-0.3			0.0	0	5	$81.85	Chilled water reset control strategy (5 degrees) - in apartment buildings with chillers	0.12%	0.00%
7202	DFHP - SEER 15 with 95 AFUE furnace	MF	NC	All			589.5	0.4	0.4			1.4	0	15	$277.86	Installation of SEER 15/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7203	DFHP - SEER 16 with 95 AFUE furnace	MF	NC	All			617.2	0.2	0.2			1.5	0	15	$555.71	Installation of SEER 16/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7204	DFHP - SEER 17 with 95 AFUE furnace	MF	NC	All			798.7	0.2	0.2			1.2	0	15	$833.57	Installation of SEER 17/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7205	DFHP - SEER 18 with 95 AFUE furnace	MF	NC	All			834.8	0.2	0.2			1.4	0	15	$1,189.14	Installation of SEER 18/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7206	Furnace/AC - SEER 15	MF	NC	All			296.3	0.5	0.5			-1.2	0	15	$555.71	Installation of 15 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7207	Furnace/AC - SEER 16	MF	NC	All			174.4	0.3	0.3			-2.8	0	15	$833.57	Installation of 16 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7208	Furnace/AC - SEER 17	MF	NC	All			253.7	0.5	0.5			-3.1	0	15	$1,111.42	Installation of 17 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7209	High efficiency 92 AFUE furnace with ECM	MF	NC	All			333.7	0.3	0.3			9.3	0	15	$1,097.94	Installation of 92 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7210	High efficiency 93 AFUE furnace with ECM	MF	NC	All			333.7	0.3	0.3			10.1	0	15	$1,225.55	Installation of 93 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7211	High efficiency 94 AFUE furnace with ECM	MF	NC	All			333.7	0.3	0.3			10.9	0	15	$1,354.65	Installation of 94 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7212	High efficiency 95 AFUE furnace with ECM	MF	NC	All			333.7	0.3	0.3			11.7	0	15	$1,483.00	Installation of 95 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7213	High efficiency 96 AFUE furnace with ECM	MF	NC	All			333.7	0.3	0.3			12.4	0	15	$1,610.60	Installation of 96 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7214	High efficiency 97 AFUE furnace with ECM	MF	NC	All			333.7	0.3	0.3			13.2	0	15	$1,738.95	Installation of 97 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7215	High efficiency 98 AFUE furnace with ECM	MF	NC	All	-	-	333.7	0.3	0.3			14.0	0	15	$1,867.30	Installation of 98 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	66.88%	0.00%
7216	ECM Furnace Fan	MF	NC	All	-	-	333.7	0.3	0.3			-0.7	0	18	$97.00	Installing an efficient furnace fan motor - in homes with gas furnaces	66.88%	0.00%
7217	O2 Trim Control	MF	NC	All			0.0	0.0	0.0			2.1	0	15	$165.00	1.1% improvement in boiler efficiency resulting from the addition of oxygen trim controls - apartment buildings with boilers	6.75%	0.00%
7218	PTAC 9.3 EER	MF	NC	All			159.9	0.2	0.2			0.0	0	15	$135.59	Installation of 9.3 EER packaged terminal air conditioner (PTAC) - in homes with PTACs	42.00%	0.00%
7219	PTHP 9.1 EER	MF	NC	All			265.7	0.2	0.2			0.0	0	15	$169.21	Installation of 9.1 EER packaged terminal heat pump (PTHP) - in homes with PTHPs	11.00%	0.00%
7220	Setback thermostat - full setback	MF	NC	All			69.6	0.0	0.0			1.7	0	9	$9.97	Full thermostat setback per MEMD - all heating/cooling combinations	100.00%	0.00%
7221	Setback thermostat - moderate setback	MF	NC	All			50.5	0.0	0.0			1.1	0	9	$9.97	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	0.00%
7222	Whole House Fan	MF	NC	All			70.4	0.0	0.0			0.0	0	15	$495.79	Installing a whole house fan to ventilate homes - all heating/cooling combinations	100.00%	0.00%
7223	ASHP - SEER 19	MF	NC	All			838.3	0.4	0.4			0.0	0	15	$1,532.23	Installation of SEER 19 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7224	ASHP - SEER 20	MF	NC	All			1124.3	0.9	0.9			0.0	0	15	$1,889.25	Installation of SEER 20 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7225	ASHP - SEER 21	MF	NC	All			1639.0	1.8	1.8			0.0	0	15	$2,111.76	Installation of SEER 21 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7226	DFHP - SEER 19 with 95 AFUE furnace	MF	NC	All			993.3	0.4	0.4			1.4	0	15	$1,546.14	Installation of SEER 19/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7227	DFHP - SEER 20 with 95 AFUE furnace	MF	NC	All			1335.7	0.9	0.9			1.4	0	15	$1,903.14	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7228	DFHP - SEER 21 with 95 AFUE furnace	MF	NC	All			1952.1	1.8	1.8			1.4	0	15	$2,125.65	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	5.50%	0.00%
7229	Furnace/AC - SEER 18	MF	NC	All			398.2	0.8	0.8			-2.4	0	15	$1,975.35	Installation of 18 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7230	Furnace/AC - SEER 19	MF	NC	All			452.7	1.0	1.0			-2.4	0	15	$2,332.35	Installation of 19 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7231	Furnace/AC - SEER 20	MF	NC	All			501.8	1.2	1.2			-2.4	0	15	$2,689.35	Installation of 20 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7232	Furnace/AC - SEER 21	MF	NC	All			546.1	1.3	1.3			-2.4	0	15	$2,911.86	Installation of 21 SEER air conditioner - baseline is 13 SEER AC	36.12%	0.00%
7233	SEER21 Minisplit Heat pump	MF	NC	All			2560.1	0.5	0.5			0.0	0	15	$1,160.27	Installation of SEER 21 minisplit heat pump in homes with electric heating/cooling - baseline is 14 SEER ASHP	5.50%	0.00%
7234	Boiler 87% plus AFUE 82 AFUE BASE	MF	NC	All			0.0	0.0	0.0			10.9	0	15	$1,100.00	Installing 87 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	0.00%
7235	Boiler 90% plus AFUE 82 AFUE BASE	MF	NC	All			-654.9	0.0	0.0			24.8	0	15	$1,633.00	Installing 90 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	0.00%
7236	Boiler 92% plus AFUE 82 AFUE BASE	MF	NC	All			-568.6	0.0	0.0			30.3	0	15	$1,954.00	Installing 92 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	0.00%
7237	Boiler 95% plus AFUE 82 AFUE BASE	MF	NC	All			-568.6	0.0	0.0			35.7	0	15	$2,436.00	Installing 95 AFUE boilers to replace standard boilers - in homes with gas boilers	20.24%	0.00%
7238	ENERGY STAR Room AC	MAN	ROB	All	470.2	13.2%	62	0.108	0.108	-	-	0	0	15	$75.00	Installation of ENERGY STAR Room AC	40.47%	4.00%
7239	CEE Tier 2 Room AC	MAN	ROB	All	470.2	17.0%	80	0.138	0.138	-	-	0	0	12	$250.00	Installation of CEE Tier 2 Room AC	40.47%	4.00%
7240	Room AC recycling	MAN	Retrofit	All	113.0	100.0%	113	0.107	0.107	-	-	0	0	8	$49.00	Retirement of tertiary room AC	4.68%	0.00%
7241	ASHP - SEER 15	MAN	ROB	All			276.0	0.3	0.3			0.0	0	15	$293.81	Installation of SEER 15 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7242	ASHP - SEER 16	MAN	ROB	All			809.5	0.2	0.2			0.0	0	15	$587.62	Installation of SEER 16 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%

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7243	ASHP - SEER 17	MAN	ROB	All			1036.2	0.2	0.2			0.0	0	15	$881.42	Installation of SEER 17 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7244	ASHP - SEER 18	MAN	ROB	All			1127.3	0.3	0.3			0.0	0	15	$1,175.23	Installation of SEER 18 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7245	DFHP - SEER 15 with 95 AFUE furnace	MAN	ROB	All			548.0	0.3	0.3			-1.3	0	15	$277.86	Installation of SEER 15/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7246	DFHP - SEER 16 with 95 AFUE furnace	MAN	ROB	All			839.5	0.2	0.2			-0.2	0	15	$555.71	Installation of SEER 16/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7247	DFHP - SEER 17 with 95 AFUE furnace	MAN	ROB	All			1120.4	0.2	0.2			-0.4	0	15	$833.57	Installation of SEER 17/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7248	DFHP - SEER 18 with 95 AFUE furnace	MAN	ROB	All			1185.4	0.3	0.3			-0.3	0	15	$1,189.14	Installation of SEER 18/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7249	Furnace/AC - SEER 15	MAN	ROB	All			361.9	0.4	0.4			-1.5	0	15	$555.71	Installation of 15 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7250	Furnace/AC - SEER 16	MAN	ROB	All			263.6	0.4	0.4			-2.1	0	15	$833.57	Installation of 16 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7251	Furnace/AC - SEER 17	MAN	ROB	All			410.9	0.6	0.6			-2.5	0	15	$1,111.42	Installation of 17 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7252	GSHP - EER 17 ASHP Base	MAN	ROB	All			4739.8	0.4	0.4			0.0	0	15	$18,717.47	Installation of EER 17 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7253	GSHP - EER 19 ASHP Base	MAN	ROB	All			5003.5	0.5	0.5			0.0	0	15	$18,717.47	Installation of EER 19 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7254	High efficiency 92 AFUE furnace with ECM	MAN	ROB	All			396.2	0.2	0.2			14.4	0	15	$1,097.94	Installation of 92 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7255	High efficiency 94 AFUE furnace with ECM	MAN	ROB	All			396.2	0.2	0.2			16.8	0	15	$1,354.65	Installation of 94 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7256	High efficiency 95 AFUE furnace with ECM	MAN	ROB	All			396.2	0.2	0.2			18.0	0	15	$1,483.00	Installation of 95 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7257	RCA 10% improvement	MAN	Retrofit	All			55.9	0.1	0.1			0.0	0	5	$139.00	Refrigerant charge and air flow adjustment - 10% improvement - in homes with gas furnace and central AC	40.00%	23.80%
7258	RCA 15% improvement	MAN	Retrofit	All			147.9	0.4	0.4			0.0	0	5	$438.81	Refrigerant charge and air flow adjustment - 15% improvement - in homes with gas furnace and central AC	40.00%	23.80%
7259	RCA 5% improvement	MAN	Retrofit	All			28.0	0.1	0.1			0.0	0	5	$115.08	Refrigerant charge and air flow adjustment - 5% improvement - in homes with gas furnace and central AC	40.00%	23.80%
7260	Setback thermostat - full setback	MAN	Retrofit	All			191.8	0.0	0.0			26.9	0	9	$37.72	Full thermostat setback per MEMD - all heating/cooling combinations	100.00%	17.00%
7261	Setback thermostat - moderate setback	MAN	Retrofit	NLI			128.4	0.0	0.0			13.5	0	9	$37.72	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	17.00%
7262	Setback thermostat - moderate setback	MAN	Retrofit	LI			128.4	0.0	0.0			13.5	0	9	$37.72	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	17.00%
7263	Whole House Fan	MAN	Retrofit	All	-	-	129.8	0.0	0.0			-0.1	0	15	$1,273.32	Installing a whole house fan to ventilate homes - all heating/cooling combinations	100.00%	4.20%
7264	High efficiency 93 AFUE furnace with ECM	MAN	ROB	All	-	-	587.9	0.3	0.3			18.5	0	15	$1,225.55	Installation of 93 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7265	High efficiency 96 AFUE furnace with ECM	MAN	ROB	All	-	-	587.9	0.3	0.3			22.2	0	15	$1,610.60	Installation of 96 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7266	High efficiency 97 AFUE furnace with ECM	MAN	ROB	All	-	-	587.9	0.3	0.3			23.4	0	15	$1,738.95	Installation of 97 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7267	High efficiency 98 AFUE furnace with ECM	MAN	ROB	All	-	-	587.9	0.3	0.3			24.6	0	15	$1,867.30	Installation of 98 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	49.50%
7268	ECM Furnace Fan	MAN	Retrofit	All	-	-	587.9	0.3	0.3			-0.7	0	18	$97.00	Installing an efficient furnace fan motor - in homes with gas furnaces	87.30%	49.50%
7269	Furnace/AC - SEER 18	MAN	ROB	All	-	-	485.1	0.9	0.9			-2.5	0	15	$1,975.35	Installation of 18 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7270	Furnace/AC - SEER 19	MAN	ROB	All	-	-	551.4	1.1	1.1			-2.5	0	15	$1,824.00	Installation of 19 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7271	Furnace/AC - SEER 20	MAN	ROB	All	-	-	611.2	1.3	1.3			-2.5	0	15	$2,689.35	Installation of 20 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7272	Furnace/AC - SEER 21	MAN	ROB	All	-	-	665.2	1.5	1.5			-2.5	0	15	$2,911.86	Installation of 21 SEER air conditioner - baseline is 13 SEER AC	40.00%	29.40%
7273	ASHP - SEER 19	MAN	ROB	All	-	-	1160.1	0.6	0.6			0.0	0	15	$1,532.23	Installation of SEER 19 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7274	ASHP - SEER 20	MAN	ROB	All	-	-	1535.7	1.1	1.1			0.0	0	15	$1,889.25	Installation of SEER 20 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7275	ASHP - SEER 21	MAN	ROB	All	-	-	2211.6	2.1	2.1			0.0	0	15	$2,111.76	Installation of SEER 21 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	29.40%
7276	DFHP - SEER 19 with 95 AFUE furnace	MAN	ROB	All	-	-	1319.6	0.6	0.6			0.3	0	15	$1,546.14	Installation of SEER 19/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%

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7277	DFHP - SEER 20 with 95 AFUE furnace	MAN	ROB	All	-	-	1755.1	1.1	1.1			0.3	0	15	$1,903.14	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7278	DFHP - SEER 21 with 95 AFUE furnace	MAN	ROB	All	-	-	2538.9	2.1	2.1			0.3	0	15	$2,125.65	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.25%	29.40%
7279	ENERGY STAR Room AC	MAN	NC	All	470.2	13.2%	62	0.108	0.108	-	-	0	0	15	$75.00	Installation of ENERGY STAR Room AC	40.47%	0.00%
7280	CEE Tier 2 Room AC	MAN	NC	All	470.2	17.0%	80	0.138	0.138	-	-	0	0	12	$250.00	Installation of CEE Tier 2 Room AC	40.47%	0.00%
7281	ASHP - SEER 15	MAN	NC	All	-	-	232.5	0.3	0.3			0.0	0	15	$293.81	Installation of SEER 15 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7282	ASHP - SEER 16	MAN	NC	All	-	-	702.4	0.2	0.2			0.0	0	15	$587.62	Installation of SEER 16 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7283	ASHP - SEER 17	MAN	NC	All	-	-	900.4	0.2	0.2			0.0	0	15	$881.42	Installation of SEER 17 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7284	ASHP - SEER 18	MAN	NC	All	-	-	999.4	0.3	0.3			0.0	0	15	$1,175.23	Installation of SEER 18 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7285	DFHP - SEER 15 with 95 AFUE furnace	MAN	NC	All	-	-	502.2	0.3	0.3			0.2	0	15	$277.86	Installation of SEER 15/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7286	DFHP - SEER 16 with 95 AFUE furnace	MAN	NC	All	-	-	738.1	0.2	0.2			1.1	0	15	$555.71	Installation of SEER 16/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7287	DFHP - SEER 17 with 95 AFUE furnace	MAN	NC	All	-	-	988.2	0.2	0.2			0.9	0	15	$833.57	Installation of SEER 17/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7288	DFHP - SEER 18 with 95 AFUE furnace	MAN	NC	All	-	-	1061.9	0.3	0.3			1.0	0	15	$1,189.14	Installation of SEER 18/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7289	Furnace/AC - SEER 15	MAN	NC	All	-	-	336.4	0.4	0.4			-1.6	0	15	$555.71	Installation of 15 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7290	Furnace/AC - SEER 16	MAN	NC	All	-	-	248.4	0.4	0.4			-2.7	0	15	$833.57	Installation of 16 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7291	Furnace/AC - SEER 17	MAN	NC	All	-	-	383.7	0.5	0.5			-3.0	0	15	$1,111.42	Installation of 17 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7292	GSHP - EER 17 ASHP Base	MAN	NC	All	-	-	5153.5	0.5	0.5			0.0	0	15	$18,717.47	Installation of EER 17 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	1.00%	0.00%
7293	GSHP - EER 19 ASHP Base	MAN	NC	All	-	-	5425.0	0.6	0.6			0.0	0	15	$18,717.47	Installation of EER 19 GSHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	1.00%	0.00%
7294	High efficiency 92 AFUE furnace with ECM	MAN	NC	All	-	-	364.2	0.3	0.3			13.4	0	15	$1,097.94	Installation of 92 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7295	High efficiency 94 AFUE furnace with ECM	MAN	NC	All	-	-	364.2	0.3	0.3			15.7	0	15	$1,354.65	Installation of 94 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7296	High efficiency 95 AFUE furnace with ECM	MAN	NC	All	-	-	364.2	0.3	0.3			16.8	0	15	$1,483.00	Installation of 95 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7297	Setback thermostat - full setback	MAN	NC	All	-	-	134.8	0.0	0.0			20.1	0	9	$12.14	Full thermostat setback per MEMD - all heating/cooling combinations	100.00%	0.00%
7298	Setback thermostat - moderate setback	MAN	NC	All	-	-	94.6	0.0	0.0			10.1	0	9	$12.14	Moderate thermostat setback per MEMD - all heating/cooling combinations	100.00%	0.00%
7299	Whole House Fan	MAN	NC	All	-	-	107.8	0.0	0.0			-0.1	0	15	$603.71	Installing a whole house fan to ventilate homes - all heating/cooling combinations	100.00%	0.00%
7300	High efficiency 93 AFUE furnace with ECM	MAN	NC	All	-	-	569.4	0.3	0.3			14.6	0	15	$1,225.55	Installation of 93 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7301	High efficiency 96 AFUE furnace with ECM	MAN	NC	All	-	-	569.4	0.3	0.3			17.9	0	15	$1,610.60	Installation of 96 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7302	High efficiency 97 AFUE furnace with ECM	MAN	NC	All	-	-	569.4	0.3	0.3			19.0	0	15	$1,738.95	Installation of 97 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7303	High efficiency 98 AFUE furnace with ECM	MAN	NC	All	-	-	569.4	0.3	0.3			20.2	0	15	$1,867.30	Installation of 98 AFUE furnace with electronically commutated motor - baseline is 80 AFUE furnace	87.30%	0.00%
7304	ECM Furnace Fan	MAN	NC	All	-	-	569.4	0.3	0.3			-0.7	0	18	$97.00	Installing an efficient furnace fan motor - in homes with gas furnaces	87.30%	0.00%
7305	Furnace/AC - SEER 18	MAN	NC	All	-	-	452.9	0.9	0.9			-3.0	0	15	$1,975.35	Installation of 18 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7306	Furnace/AC - SEER 19	MAN	NC	All	-	-	514.9	1.1	1.1			-3.0	0	15	$1,824.00	Installation of 19 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7307	Furnace/AC - SEER 20	MAN	NC	All	-	-	570.7	1.3	1.3			-3.0	0	15	$2,689.35	Installation of 20 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7308	Furnace/AC - SEER 21	MAN	NC	All	-	-	621.2	1.4	1.4			-3.0	0	15	$2,911.86	Installation of 21 SEER air conditioner - baseline is 13 SEER AC	40.00%	0.00%
7309	ASHP - SEER 19	MAN	NC	All	-	-	839.4	0.5	0.5			0.0	0	15	$1,532.23	Installation of SEER 19 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7310	ASHP - SEER 20	MAN	NC	All	-	-	1125.4	1.0	1.0			0.0	0	15	$1,889.25	Installation of SEER 20 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7311	ASHP - SEER 21	MAN	NC	All	-	-	1640.1	1.9	1.9			0.0	0	15	$2,111.76	Installation of SEER 21 ASHP in homes with electric heating/cooling - baseline is 14 SEER ASHP	0.50%	0.00%
7312	DFHP - SEER 19 with 95 AFUE furnace	MAN	NC	All	-	-	989.6	0.5	0.5			1.4	0	15	$1,546.14	Installation of SEER 19/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7313	DFHP - SEER 20 with 95 AFUE furnace	MAN	NC	All	-	-	1332.0	1.0	1.0			1.4	0	15	$1,903.14	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
7314	DFHP - SEER 21 with 95 AFUE furnace	MAN	NC	All	-	-	1948.4	1.9	1.9			1.4	0	15	$2,125.65	Installation of SEER 20/95 AFUE dual fuel heat pump in homes with electric heating/cooling - baseline is 14 SEER/80 AFUE DFHP	0.50%	0.00%
8000	Behavioral Programs																	
8001	Behavior Modification: Home Energy Reports (All Years)	SF	Retrofit	All	8,901.5	1.2%	106.4	0.012	0.012	104.4	0.68%	0.7	0	1	$6.77	Indirect feedback in single-family homes	100.00%	5.00%
8002	Real-time feedback	SF	Retrofit	All	8,901.5	5.3%	473.6	0.05	0.05	104.4	3.87%	4.0	0	3	$110.00	Direct feedback in single-family homes	100.00%	5.00%
8003	Behavior Modification: Home Energy Reports (All Years)	SF	NC	All	8,901.5	1.2%	106.4	0.012	0.012	104.4	0.68%	0.7	0	1	$6.77	Indirect feedback in single-family homes	100.00%	0.00%
8004	Real-time feedback	SF	NC	All	8,901.5	5.3%	473.6	0.05	0.05	104.4	3.87%	4.0	0	3	$110.00	Direct feedback in single-family homes	100.00%	0.00%
8005	Behavior Modification: Home Energy Reports (All Years)	MF	Retrofit	All	4,890.8	1.2%	58.4	0.012	0.012	57.3	0.68%	0.4	0	1	$6.77	Indirect feedback in multifamily homes	100.00%	5.00%
8006	Real-time feedback	MF	Retrofit	All	4,890.8	5.3%	260.2	0.03	0.03	57.3	3.87%	2.2	0	3	$110.00	Direct feedback in single-family homes	100.00%	5.00%
8007	Behavior Modification: Home Energy Reports (All Years)	MF	NC	All	4,890.8	1.2%	58.4	0.012	0.012	57.3	0.68%	0.4	0	1	$6.77	Indirect feedback in multifamily homes	100.00%	0.00%
8008	Real-time feedback	MF	NC	All	4,890.8	5.3%	260.2	0.03	0.03	57.3	3.87%	2.2	0	3	$110.00	Direct feedback in single-family homes	100.00%	0.00%
8009	Behavior Modification: Home Energy Reports (All Years)	MAN	Retrofit	All	5,955.4	1.2%	71.2	0.012	0.012	69.8	0.68%	0.5	0	1	$6.77	Indirect feedback in manufactured homes	100.00%	5.00%
8010	Real-time feedback	MAN	Retrofit	All	5,955.4	5.3%	316.8	0.04	0.04	69.8	3.87%	2.7	0	3	$110.00	Direct feedback in single-family homes	100.00%	5.00%
8011	Behavior Modification: Home Energy Reports (All Years)	MAN	NC	All	5,955.4	1.2%	71.2	0.012	0.012	69.8	0.68%	0.5	0	1	$6.77	Indirect feedback in manufactured homes	100.00%	0.00%
8012	Real-time feedback	MAN	NC	All	5,955.4	5.3%	316.8	0.04	0.04	69.8	3.87%	2.7	0	3	$110.00	Direct feedback in single-family homes	100.00%	0.00%

Michigan - Residential Measure Database

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Annual kWh	% Savings	Annual kWh Savings	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Measure/End Use Description	Base Saturation	EE Saturation

Column Acronyms:

Income Target (All/LI/NLI): All Homes, Low Income Homes, Non-Low Income Homes
MAN: Manufactured homes
MF: Multifamily buildings
SF: Multifamily buildings
NCP: Non-Coincident Peak
ROB/Retrofit/Old/Average/NC: Replace on Burnout / Retrofit / Old = Retrofit for "Old" vintage home / Average = Retroft for "Average" vintage home / New Construction; vintages vary by housing type

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF / MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
1000	Appliances																	
1001	Refrigerator Retirement (and Recycling) - No Replacement	SF	Retrofit	All	MEMD	-	MEMD	Cadmus Group	Cadmus Group	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: 25% from Michigan Residential Baseline Study - saturation estimate is based on ratio of single-family home refrigerator ownership to total refrigerator ownership; Per Unit Demand Savings: Non-coincident peak demand savings from Table 14 of Cadmus memo to Michigan Evaluation Working Group (August 20, 2012) EE saturation %: GDS estimate
1002	Freezer Retirement (and Recycling) - No Replacement	SF	Retrofit	All	MEMD	-	MEMD	Cadmus Group	Cadmus Group	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: 2% from Michigan Residential Baseline Study (= saturation minus penetration) - does not distinguish between housing types; Per Unit Demand Savings: Non-coincident peak demand savings from Table 14 of Cadmus memo to Michigan Evaluation Working Group (August 20, 2012) EE saturation %: GDS estimate
1003	Dehumidifier Retirement (and Recycling) - No Replacement	SF	Retrofit	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	PA Baseline 2011 / GDS	GDS	Base elec use: Derived from MEMD work papers; Annual elec. Savings: Derived from MEMD work papers - assumes no replacement Annual kW Savings: Derived from MEMD work papers - assumes no replacement Base saturation: ~2% of homes in PA had secondary dehumidifiers (= saturation - penetration) EE saturation: GDS estimate
1004	Energy Star Dehumidifier	SF	ROB	All	MEMD work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base saturation: % of homes using dehumidifiers; EE saturation: % of dehumidifiers rated as ENERGY STAR
1005	ENERGY STAR Refrigerators	SF	ROB	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual kWh: Average of 7 configurations using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year
1006	ENERGY STAR Freezers	SF	ROB	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual kWh: Average of 6 freezer configurations (#8-10, and #16-18) using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year; EE saturation: 4% of freezers ENERGY STAR rated
1007	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and gas drying EE saturation: 14% among all clothes washers
1008	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and electric drying EE saturation: 14% among all clothes washers
1009	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and gas drying EE saturation: 14% among all clothes washers
1010	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD / GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and electric drying EE saturation: 14% among all clothes washers
1011	High Efficiency Gas Clothes Dryer with Moisture Sensor	SF	ROB	All	-	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS	-	MEMD / GDS	-	MEMD	MEMD	MI Baseline 2011	ACEEE (Bendt)	Base Annual Non-elec: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.3 EF); Annual Elec. Savings: Assumes 10% per MEMD EE saturation: 2010 ACEEE paper by Paul Bendt of Ecos
1012	High Efficiency Electric Clothes Dryer with Moisture Sensor	SF	ROB	All	GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	ES Dryer Rpt	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 10% per MEMD; EE saturation: Based on 2010 U.S. Appliance Shipment Statistics
1013	Heat Pump Electric Dryer	SF	ROB	All	GDS	-	LBNL / GDS	LBNL / GDS	LBNL / GDS	-	-	-	-	ES Dryer Rpt	LBNL	MI Baseline 2011	ES Dryer Rpt	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 4.52 EF; Per Unit kW Savings: Assumes 283 hrs/yr operation (1 hr/load) EE saturation: Based on 2010 U.S. Appliance Shipment Statistics
1014	Tier 2 Energy Star Dishwasher (electric water heating)	SF	ROB	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs Annual kW Savings: assumes 1.5 hours/cycle Base saturation: Homes with dishwashers and electric water heating = 66% saturation of dishwashers * % of homes with electric water heating
1015	Tier 2 Energy Star Dishwasher (gas water heating)	SF	ROB	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs; Annual kW Savings: assumes 1.5 hours/cycle; Base Non-elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Non-elec savings: Draft 2 Version 5.0 specs; Base saturation: Homes with dishwashers and gas water heating = 66% saturation of dishwashers * % of homes with gas water heating
1016	Energy Star Dehumidifier	SF	NC	All	MEMD work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base saturation: % of homes using dehumidifiers
1017	ENERGY STAR Refrigerators	SF	NC	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: Average of 7 configurations using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year
1018	ENERGY STAR Freezers	SF	NC	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: Average of 6 freezer configurations (#8-10, and #16-18) using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year;
1019	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and gas drying
1020	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and electric drying
1021	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and gas drying
1022	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD / GDS	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and electric drying
1023	High Efficiency Gas Clothes Dryer with Moisture Sensor	SF	NC	All	-	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS	-	MEMD / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Non-elec: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.3 EF); Annual Elec. Savings: Assumes 10% per MEMD
1024	High Efficiency Electric Clothes Dryer with Moisture Sensor	SF	NC	All	GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 10% per MEMD
1025	Heat Pump Electric Dryer	SF	NC	All	GDS	-	LBNL / GDS	LBNL / GDS	LBNL / GDS	-	-	-	-	ES Dryer Rpt	LBNL	MI Baseline 2011	GDS/NC	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 4.52 EF; Per Unit kW Savings: Assumes 283 hrs/yr operation (1 hr/load)
1026	Tier 2 Energy Star Dishwasher (electric water heating)	SF	NC	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs Annual kW Savings: assumes 1.5 hours/cycle Base saturation: Homes with dishwashers and electric water heating = 66% saturation of dishwashers * % of homes with electric water heating
1027	Tier 2 Energy Star Dishwasher (gas water heating)	SF	NC	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs; Annual kW Savings: assumes 1.5 hours/cycle; Base Non-elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Non-elec savings: Draft 2 Version 5.0 specs; Base saturation: Homes with dishwashers and gas water heating = 66% saturation of dishwashers * % of homes with gas water heating
1028	Refrigerator Retirement (and Recycling) - No Replacement	MF	Retrofit	All	MEMD	-	MEMD	Cadmus Group	Cadmus Group	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: 25% from Michigan Residential Baseline Study - saturation estimate is based on ratio of multifamily home refrigerator ownership to total refrigerator ownership; Per Unit Demand Savings: Non-coincident peak demand savings from Table 14 of Cadmus memo to Michigan Evaluation Working Group (August 20, 2012) EE saturation %: GDS estimate
1029	Freezer Retirement (and Recycling) - No Replacement	MF	Retrofit	All	MEMD	-	MEMD	Cadmus Group	Cadmus Group	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: 2% from Michigan Residential Baseline Study (= saturation minus penetration) - does not distinguish between housing types; Per Unit Demand Savings: Non-coincident peak demand savings from Table 14 of Cadmus memo to Michigan Evaluation Working Group (August 20, 2012) EE saturation %: GDS estimate
1030	Dehumidifier Retirement (and Recycling) - No Replacement	MF	Retrofit	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	PA Baseline 2011 / GDS	GDS	Base elec use: Derived from MEMD work papers; Annual elec. Savings: Derived from MEMD work papers - assumes no replacement Annual kW Savings: Derived from MEMD work papers - assumes no replacement Base saturation: ~2% of homes in PA had secondary dehumidifiers (= saturation - penetration) EE saturation: GDS estimate
1031	Energy Star Dehumidifier	MF	ROB	All	MEMD work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base saturation: % of homes using dehumidifiers; EE saturation: % of dehumidifiers rated as ENERGY STAR
1032	ENERGY STAR Refrigerators	MF	ROB	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual kWh: Average of 7 configurations using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year
1033	ENERGY STAR Freezers	MF	ROB	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual kWh: Average of 6 freezer configurations (#8-10, and #16-18) using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year; EE saturation: 4% of freezers ENERGY STAR rated
1034	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and gas drying EE saturation: 14% among all clothes washers

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
1035	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and electric drying EE saturation: 14% among all clothes washers
1036	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and gas drying EE saturation: 14% among all clothes washers
1037	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD / GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and electric drying EE saturation: 14% among all clothes washers
1038	High Efficiency Gas Clothes Dryer with Moisture Sensor	MF	ROB	All	-	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS	-	MEMD / GDS	-	MEMD	MEMD	MI Baseline 2011	ACEEE (Bendt)	Base Annual Non-elec: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.3 EF); Annual Elec. Savings: Assumes 10% per MEMD EE saturation: 2010 ACEEE paper by Paul Bendt of Ecos
1039	High Efficiency Electric Clothes Dryer with Moisture Sensor	MF	ROB	All	GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	ES Dryer Rpt	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 10% per MEMD; EE saturation: Based on 2010 U.S. Appliance Shipment Statistics
1040	Heat Pump Electric Dryer	MF	ROB	All	GDS	-	LBNL / GDS	LBNL / GDS	LBNL / GDS	-	-	-	-	ES Dryer Rpt	LBNL	MI Baseline 2011	ES Dryer Rpt	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 4.52 EF; Per Unit kW Savings: Assumes 283 hrs/yr operation (1 hr/load) EE saturation: Based on 2010 U.S. Appliance Shipment Statistics
1041	Tier 2 Energy Star Dishwasher (electric water heating)	MF	ROB	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs Annual kW Savings: assumes 1.5 hours/cycle Base saturation: Homes with dishwashers and electric water heating = 66% saturation of dishwashers * % of homes with electric water heating
1042	Tier 2 Energy Star Dishwasher (gas water heating)	MF	ROB	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs; Annual kW Savings: assumes 1.5 hours/cycle; Base Non-elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Non-elec savings: Draft 2 Version 5.0 specs; Base saturation: Homes with dishwashers and gas water heating = 66% saturation of dishwashers * % of homes with gas water heating
1043	Energy Star Dehumidifier	MF	NC	All	MEMD work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base saturation: % of homes using dehumidifiers
1044	ENERGY STAR Refrigerators	MF	NC	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: Average of 7 configurations using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year
1045	ENERGY STAR Freezers	MF	NC	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: Average of 6 freezer configurations (#8-10, and #16-18) using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year;
1046	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and gas drying
1047	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and electric drying
1048	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and gas drying
1049	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD / GDS	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and electric drying
1050	High Efficiency Gas Clothes Dryer with Moisture Sensor	MF	NC	All	-	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS	-	MEMD / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Non-elec: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.3 EF); Annual Elec. Savings: Assumes 10% per MEMD
1051	High Efficiency Electric Clothes Dryer with Moisture Sensor	MF	NC	All	GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 10% per MEMD
1052	Heat Pump Electric Dryer	MF	NC	All	GDS	-	LBNL / GDS	LBNL / GDS	LBNL / GDS	-	-	-	-	ES Dryer Rpt	LBNL	MI Baseline 2011	GDS/NC	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 4.52 EF; Per Unit kW Savings: Assumes 283 hrs/yr operation (1 hr/load)
1053	Tier 2 Energy Star Dishwasher (electric water heating)	MF	NC	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs Annual kW Savings: assumes 1.5 hours/cycle Base saturation: Homes with dishwashers and electric water heating = 66% saturation of dishwashers * % of homes with electric water heating
1054	Tier 2 Energy Star Dishwasher (gas water heating)	MF	NC	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs; Annual kW Savings: assumes 1.5 hours/cycle; Base Non-elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Non-elec savings: Draft 2 Version 5.0 specs; Base saturation: Homes with dishwashers and gas water heating = 66% saturation of dishwashers * % of homes with gas water heating
1055	Refrigerator Retirement (and Recycling) - No Replacement	MAN	Retrofit	All	MEMD	-	MEMD	Cadmus Group	Cadmus Group	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: 25% from Michigan Residential Baseline Study - saturation estimate is based on ratio of manufactured home refrigerator ownership to total refrigerator ownership; Per Unit Demand Savings: Non-coincident peak demand savings from Table 14 of Cadmus memo to Michigan Evaluation Working Group (August 20, 2012) EE saturation %: GDS estimate
1056	Freezer Retirement (and Recycling) - No Replacement	MAN	Retrofit	All	MEMD	-	MEMD	Cadmus Group	Cadmus Group	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: 2% from Michigan Residential Baseline Study (= saturation minus penetration) - does not distinguish between housing types; Per Unit Demand Savings: Non-coincident peak demand savings from Table 14 of Cadmus memo to Michigan Evaluation Working Group (August 20, 2012) EE saturation %: GDS estimate
1057	Dehumidifier Retirement (and Recycling) - No Replacement	MAN	Retrofit	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	PA Baseline 2011 / GDS	GDS	Base elec use: Derived from MEMD work papers; Annual elec. Savings: Derived from MEMD work papers - assumes no replacement Annual kW Savings: Derived from MEMD work papers - assumes no replacement Base saturation: ~2% of homes in PA had secondary dehumidifiers (= saturation - penetration) EE saturation: GDS estimate
1058	Energy Star Dehumidifier	MAN	ROB	All	MEMD work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base saturation: % of homes using dehumidifiers; EE saturation: % of dehumidifiers rated as ENERGY STAR
1059	ENERGY STAR Refrigerators	MAN	ROB	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual kWh: Average of 7 configurations using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year
1060	ENERGY STAR Freezers	MAN	ROB	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual kWh: Average of 6 freezer configurations (#8-10, and #16-18) using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year; EE saturation: 4% of freezers ENERGY STAR rated
1061	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and gas drying EE saturation: 14% among all clothes washers
1062	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and electric drying EE saturation: 14% among all clothes washers
1063	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and gas drying EE saturation: 14% among all clothes washers
1064	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD / GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and electric drying EE saturation: 14% among all clothes washers
1065	High Efficiency Gas Clothes Dryer with Moisture Sensor	MAN	ROB	All	-	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS	-	MEMD / GDS	-	MEMD	MEMD	MI Baseline 2011	ACEEE (Bendt)	Base Annual Non-elec: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.3 EF); Annual Elec. Savings: Assumes 10% per MEMD EE saturation: 2010 ACEEE paper by Paul Bendt of Ecos
1066	High Efficiency Electric Clothes Dryer with Moisture Sensor	MAN	ROB	All	GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	ES Dryer Rpt	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 10% per MEMD; EE saturation: Based on 2010 U.S. Appliance Shipment Statistics
1067	Heat Pump Electric Dryer	MAN	ROB	All	GDS	-	LBNL / GDS	LBNL / GDS	LBNL / GDS	-	-	-	-	ES Dryer Rpt	LBNL	MI Baseline 2011	ES Dryer Rpt	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 4.52 EF; Per Unit kW Savings: Assumes 283 hrs/yr operation (1 hr/load) EE saturation: Based on 2010 U.S. Appliance Shipment Statistics

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
1068	Tier 2 Energy Star Dishwasher (electric water heating)	MAN	ROB	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs Annual kW Savings: assumes 1.5 hours/cycle Base saturation: Homes with dishwashers and electric water heating = 66% saturation of dishwashers * % of homes with electric water heating
1069	Tier 2 Energy Star Dishwasher (gas water heating)	MAN	ROB	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs; Annual kW Savings: assumes 1.5 hours/cycle; Base Non-elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Non-elec savings: Draft 2 Version 5.0 specs; Base saturation: Homes with dishwashers and gas water heating = 66% saturation of dishwashers * % of homes with gas water heating
1070	Energy Star Dehumidifier	MAN	NC	All	MEMD work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base saturation: % of homes using dehumidifiers
1071	ENERGY STAR Refrigerators	MAN	NC	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: Average of 7 configurations using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year
1072	ENERGY STAR Freezers	MAN	NC	All	CFR / GDS	-	ES Refrigerators 5.0	GDS calc	GDS calc	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: Average of 6 freezer configurations (#8-10, and #16-18) using Code of Federal Regulations (10 CFR 430.32(a)); Annual Elec Savings: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0 - 10% savings for all product classes; Per Unit NCP kW Savings: Assumes 8,760 hrs of operation per year;
1073	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and gas drying
1074	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with gas water heating and electric drying
1075	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and gas drying
1076	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	MEMD / GDS	MEMD	MEMD / GDS	MI Baseline 2011 / GDS	GDS/NC	Baseline Annual kWh: MEMD calculations adjusted to reflect federal minimum standards - Modified Energy Factor of 1.26 and Water Factor of 9.5; Incremental Cost: Equal to difference between CEE Tier 3 and ENERGY STAR cost in MEMD - to account for new standards; Base saturation: Used MI Baseline data to create ratiod percentage of homes with electric water heating and electric drying
1077	High Efficiency Gas Clothes Dryer with Moisture Sensor	MAN	NC	All	-	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS	-	MEMD / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Non-elec: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.3 EF); Annual Elec. Savings: Assumes 10% per MEMD
1078	High Efficiency Electric Clothes Dryer with Moisture Sensor	MAN	NC	All	GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 10% per MEMD
1079	Heat Pump Electric Dryer	MAN	NC	All	GDS	-	LBNL / GDS	LBNL / GDS	LBNL / GDS	-	-	-	-	ES Dryer Rpt	LBNL	MI Baseline 2011	GDS/NC	Base Annual kWh: GDS calculation using the 2015 federal standard and testing procedure (283 loads/yr; 9 lbs/load; 3.73 EF); Annual Elec. Savings: Assumes 4.52 EF; Per Unit kW Savings: Assumes 283 hrs/yr operation (1 hr/load)
1080	Tier 2 Energy Star Dishwasher (electric water heating)	MAN	NC	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs Annual kW Savings: assumes 1.5 hours/cycle Base saturation: Homes with dishwashers and electric water heating = 66% saturation of dishwashers * % of homes with electric water heating
1081	Tier 2 Energy Star Dishwasher (gas water heating)	MAN	NC	All	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	DOE	-	ES Dishwasher 5.0 / GDS	ES Dishwasher 5.0 / GDS	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Annual elec. Savings: Draft 2 Version 5.0 specs; Annual kW Savings: assumes 1.5 hours/cycle; Base Non-elec use: Adopts DOE Final Rule - 77 FR 31918 (May 30, 2012); Non-elec savings: Draft 2 Version 5.0 specs; Base saturation: Homes with dishwashers and gas water heating = 66% saturation of dishwashers * % of homes with gas water heating
2000	Electronics																	
2001	Smart Strip plug outlet	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	GDS	RIA 2010	Annual kWh Savings: GDS used algorithm in NEEP Emerging Technologies Report and available MI saturation data to calculate per home savings; Per-unit kW Savings: Assumes 7,149 hrs/yr sleep mode per MID-ATL TRM; Base Saturation: Assumed an average of 2 per home EE Saturation: 2010 Plug Load Characterization Study for SoCal Edison has % of homes that do not use powerstrips or do not turn them off at 94%
2002	Efficient Set Top Box	SF	Retrofit	All	-	-	NEEP (ETR) / RIA 2010 / GDS	GDS calc	GDS calc	-	-	-	-	NEEP (ETR)	ACEEE (A041)	GDS	ES Unit Ship	Annual kWh Savings: GDS used Table 11-3 deemed savings in NEEP Emerging Technologies Report and Table F.1 in RIA study to calculate per home savings; Per-unit kW Savings: Assumes 1,611 hrs/yr active mode (=8,760-7,149); Incremental Cost: ~$400 wholesale cost per NEEP ETR (used this value as opposed to $10/month average over life of measure) Base Saturation: Saturation of televisions; EE Saturation: 4-yr average of ENERGY STAR market shipment data
2003	ENERGY STAR + 10% Display	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2004	ENERGY STAR + 30% Display	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2005	ENERGY STAR + 50 % Display	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2006	ENERGY STAR 6.0 TV + 20% (0-20")	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2007	ENERGY STAR 6.0 TV + 20% (21-30")	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 19-39" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2008	ENERGY STAR 6.0 TV + 20% (31-40")	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 19-39" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2009	ENERGY STAR 6.0 TV + 20% (41-50")	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 40-59" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2010	ENERGY STAR 6.0 TV + 20% (51-60")	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 40-59" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2011	ENERGY STAR 6.0 TV + 20% (over 60")	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2012	ENERGY STAR PC	SF	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM	VT TRM	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES desktop computers to sum of saturation of ES desktop and non-ES desktop computers
2013	ES Laptop	SF	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of laptop computers; EE Saturation: Ratio of saturation of ES laptop computers to total laptop computers
2014	ES Laptop (Power Mgmt Enabled)	SF	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of laptop computers; EE Saturation: Ratio of saturation of ES laptop computers to total laptop computers
2015	Smart Strip plug outlet	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	GDS	GDS/NC	Annual kWh Savings: GDS used algorithm in NEEP Emerging Technologies Report and available MI saturation data to calculate per home savings; Per-unit kW Savings: Assumes 7,149 hrs/yr sleep mode per MID-ATL TRM; Base Saturation: AAssumed an average of 2 per home
2016	Efficient Set Top Box	SF	NC	All	-	-	NEEP (ETR) / RIA 2010 / GDS	GDS calc	GDS calc	-	-	-	-	NEEP (ETR)	ACEEE (A041)	GDS	GDS/NC	Annual kWh Savings: GDS used Table 11-3 deemed savings in NEEP Emerging Technologies Report and Table F.1 in RIA study to calculate per home savings; Per-unit kW Savings: Assumes 1,611 hrs/yr active mode (=8,760-7,149); Incremental Cost: ~$400 wholesale cost per NEEP ETR (used this value as opposed to $10/month average over life of measure) Base Saturation: Saturation of televisions;
2017	ENERGY STAR + 10% Display	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2018	ENERGY STAR + 30% Display	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2019	ENERGY STAR + 50 % Display	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2020	ENERGY STAR 6.0 TV + 20% (0-20")	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2021	ENERGY STAR 6.0 TV + 20% (21-30")	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
2022	ENERGY STAR 6.0 TV + 20% (31-40")	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2023	ENERGY STAR 6.0 TV + 20% (41-50")	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2024	ENERGY STAR 6.0 TV + 20% (51-60")	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2025	ENERGY STAR 6.0 TV + 20% (over 60")	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2026	ENERGY STAR PC	SF	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM	VT TRM	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of desktop computers;
2027	ES Laptop	SF	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of laptop computers
2028	ES Laptop (Power Mgmt Enabled)	SF	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of laptop computers;
2029	Smart Strip plug outlet	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	GDS	RIA 2010	Annual kWh Savings: GDS used algorithm in NEEP Emerging Technologies Report and available MI saturation data to calculate per home savings; Per-unit kW Savings: Assumes 7,149 hrs/yr sleep mode per MID-ATL TRM; Base Saturation: Assumed an average of 2 per home EE Saturation: 2010 Plug Load Characterization Study for SoCal Edison has % of homes that do not use powerstrips or do not turn them off at 94%
2030	Efficient Set Top Box	MF	Retrofit	All	-	-	NEEP (ETR) / RIA 2010 / GDS	GDS calc	GDS calc	-	-	-	-	NEEP (ETR)	ACEEE (A041)	GDS	ES Unit Ship	Annual kWh Savings: GDS used Table 11-3 deemed savings in NEEP Emerging Technologies Report and Table F.1 in RIA study to calculate per home savings; Per-unit kW Savings: Assumes 1,611 hrs/yr active mode (=8,760-7,149); Incremental Cost: ~$400 wholesale cost per NEEP ETR (used this value as opposed to $10/month average over life of measure) Base Saturation: Saturation of televisions; EE Saturation: 4-yr average of ENERGY STAR market shipment data
2031	ENERGY STAR + 10% Display	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2032	ENERGY STAR + 30% Display	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2033	ENERGY STAR + 50 % Display	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2034	ENERGY STAR 6.0 TV + 20% (0-20")	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2035	ENERGY STAR 6.0 TV + 20% (21-30")	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 19-39" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2036	ENERGY STAR 6.0 TV + 20% (31-40")	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 19-39" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2037	ENERGY STAR 6.0 TV + 20% (41-50")	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 40-59" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2038	ENERGY STAR 6.0 TV + 20% (51-60")	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 40-59" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2039	ENERGY STAR 6.0 TV + 20% (over 60")	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2040	ENERGY STAR PC	MF	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM	VT TRM	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES desktop computers to sum of saturation of ES desktop and non-ES desktop computers
2041	ES Laptop	MF	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of laptop computers; EE Saturation: Ratio of saturation of ES laptop computers to total laptop computers
2042	ES Laptop (Power Mgmt Enabled)	MF	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of laptop computers; EE Saturation: Ratio of saturation of ES laptop computers to total laptop computers
2043	Smart Strip plug outlet	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	GDS	GDS/NC	Annual kWh Savings: GDS used algorithm in NEEP Emerging Technologies Report and available MI saturation data to calculate per home savings; Per-unit kW Savings: Assumes 7,149 hrs/yr sleep mode per MID-ATL TRM; Base Saturation: AAssumed an average of 2 per home
2044	Efficient Set Top Box	MF	NC	All	-	-	NEEP (ETR) / RIA 2010 / GDS	GDS calc	GDS calc	-	-	-	-	NEEP (ETR)	ACEEE (A041)	GDS	GDS/NC	Annual kWh Savings: GDS used Table 11-3 deemed savings in NEEP Emerging Technologies Report and Table F.1 in RIA study to calculate per home savings; Per-unit kW Savings: Assumes 1,611 hrs/yr active mode (=8,760-7,149); Incremental Cost: ~$400 wholesale cost per NEEP ETR (used this value as opposed to $10/month average over life of measure) Base Saturation: Saturation of televisions;
2045	ENERGY STAR + 10% Display	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2046	ENERGY STAR + 30% Display	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2047	ENERGY STAR + 50 % Display	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2048	ENERGY STAR 6.0 TV + 20% (0-20")	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2049	ENERGY STAR 6.0 TV + 20% (21-30")	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2050	ENERGY STAR 6.0 TV + 20% (31-40")	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2051	ENERGY STAR 6.0 TV + 20% (41-50")	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2052	ENERGY STAR 6.0 TV + 20% (51-60")	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2053	ENERGY STAR 6.0 TV + 20% (over 60")	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2054	ENERGY STAR PC	MF	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM	VT TRM	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of desktop computers;
2055	ES Laptop	MF	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of laptop computers
2056	ES Laptop (Power Mgmt Enabled)	MF	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of laptop computers;
2057	Smart Strip plug outlet	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	GDS	RIA 2010	Annual kWh Savings: GDS used algorithm in NEEP Emerging Technologies Report and available MI saturation data to calculate per home savings; Per-unit kW Savings: Assumes 7,149 hrs/yr sleep mode per MID-ATL TRM; Base Saturation: Assumed an average of 2 per home EE Saturation: 2010 Plug Load Characterization Study for SoCal Edison has % of homes that do not use powerstrips or do not turn them off at 94%
2058	Efficient Set Top Box	MAN	Retrofit	All	-	-	NEEP (ETR) / RIA 2010 / GDS	GDS calc	GDS calc	-	-	-	-	NEEP (ETR)	ACEEE (A041)	GDS	ES Unit Ship	Annual kWh Savings: GDS used Table 11-3 deemed savings in NEEP Emerging Technologies Report and Table F.1 in RIA study to calculate per home savings; Per-unit kW Savings: Assumes 1,611 hrs/yr active mode (=8,760-7,149); Incremental Cost: ~$400 wholesale cost per NEEP ETR (used this value as opposed to $10/month average over life of measure) Base Saturation: Saturation of televisions; EE Saturation: 4-yr average of ENERGY STAR market shipment data
2059	ENERGY STAR + 10% Display	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2060	ENERGY STAR + 30% Display	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors
2061	ENERGY STAR + 50 % Display	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES computer monitors to total computer monitors

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
2062	ENERGY STAR 6.0 TV + 20% (0-20")	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2063	ENERGY STAR 6.0 TV + 20% (21-30")	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 19-39" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2064	ENERGY STAR 6.0 TV + 20% (31-40")	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 19-39" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2065	ENERGY STAR 6.0 TV + 20% (41-50")	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 40-59" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2066	ENERGY STAR 6.0 TV + 20% (51-60")	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; Base Saturation: Half of the saturation of 40-59" TV's; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2067	ENERGY STAR 6.0 TV + 20% (over 60")	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	MI Baseline 2011	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes; EE Saturation: Applies the 6-yr (2007-2012) average estimated market penetration of ENERGY STAR units to the 51% of TV's identified by the baseline study as either LCD, plasma, LED or front/rear projection units; assumes that the 49% of TV's identified by the baseline study as traditional/CRT units are inefficient
2068	ENERGY STAR PC	MAN	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM	VT TRM	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of desktop computers; EE Saturation: Ratio of saturation of ES desktop computers to sum of saturation of ES desktop and non-ES desktop computers
2069	ES Laptop	MAN	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of laptop computers; EE Saturation: Ratio of saturation of ES laptop computers to total laptop computers
2070	ES Laptop (Power Mgmt Enabled)	MAN	ROB	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	MI Baseline 2011	Base Saturation: Saturation of laptop computers; EE Saturation: Ratio of saturation of ES laptop computers to total laptop computers
2071	Smart Strip plug outlet	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	GDS	GDS/NC	Annual kWh Savings: GDS used algorithm in NEEP Emerging Technologies Report and available MI saturation data to calculate per home savings; Per-unit kW Savings: Assumes 7,149 hrs/yr sleep mode per MID-ATL TRM; Base Saturation: AAssumed an average of 2 per home
2072	Efficient Set Top Box	MAN	NC	All	-	-	NEEP (ETR) / RIA 2010 / GDS	GDS calc	GDS calc	-	-	-	-	NEEP (ETR)	ACEEE (A041)	GDS	GDS/NC	Annual kWh Savings: GDS used Table 11-3 deemed savings in NEEP Emerging Technologies Report and Table F.1 in RIA study to calculate per home savings; Per-unit kW Savings: Assumes 1,611 hrs/yr active mode (=8,760-7,149); Incremental Cost: ~$400 wholesale cost per NEEP ETR (used this value as opposed to $10/month average over life of measure) Base Saturation: Saturation of televisions;
2073	ENERGY STAR + 10% Display	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2074	ENERGY STAR + 30% Display	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2075	ENERGY STAR + 50 % Display	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Incremental Cost: MEMD states incremental cost is $0 - GDS assumes $1 for purposes of benefit-cost modeling; Base Saturation: Saturation of desktop computers;
2076	ENERGY STAR 6.0 TV + 20% (0-20")	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2077	ENERGY STAR 6.0 TV + 20% (21-30")	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2078	ENERGY STAR 6.0 TV + 20% (31-40")	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2079	ENERGY STAR 6.0 TV + 20% (41-50")	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2080	ENERGY STAR 6.0 TV + 20% (51-60")	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011 / GDS	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2081	ENERGY STAR 6.0 TV + 20% (over 60")	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	GDS	MI Baseline 2011	GDS/NC	Base Elec Use: ES 6.0 +20% measure chosen to represent all ES television measures in this size range (MEMD also has ES 6.0 and ES 6.0 + 35%); Incremental Cost: MEMD lists an incremental cost of $0 - GDS assumes $1 for benefit-cost modeling purposes
2082	ENERGY STAR PC	MAN	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM	VT TRM	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of desktop computers;
2083	ES Laptop	MAN	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of laptop computers
2084	ES Laptop (Power Mgmt Enabled)	MAN	NC	All	ES Calc. - IT	-	ES Calc. - IT	ES Calc. - IT	ES Calc. - IT	-	-	-	-	VT TRM / GDS	VT TRM / GDS	MI Baseline 2011	GDS/NC	Base Saturation: Saturation of laptop computers;
3000	Lighting																	
3001	CFL bulbs - 9W	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3002	CFL bulbs - 14W	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3003	CFL bulbs - 20W	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3004	CFL bulbs - 26W	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3005	LED Replacing A-line 40W	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3006	LED Replacing A-line 60W	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3007	LED Replacing A-line 75W (53W halogen)	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3008	LED Replacing A-line 100W (72W Halogen)	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3009	LED Lighting (screw-in) ; 2021 and later	SF	ROB	All	NEEP / DC SEU	-	NEEP / DC SEU	NEEP / DC SEU	NEEP / DC SEU	-	-	DC SEU TRM	-	NEEP	NEEP	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Savings/Cost/Lifetime: LED Modeling Inputs derived from Table 2-6 of NEEP Residential Lighting Strategy; hours of use from DC SEU TRM Baseline: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3010	CFL bulbs high wattage	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3011	LED fixtures downlights	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 65 W incandescent downlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3012	CFL bulbs 3-Way	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 130 W 3-way incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3013	CFL bulbs dimmable	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 59 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3014	CFL bulbs Globe	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 46 W incandescent globe; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3015	CFL bulbs candelabra	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 47 W incandescent candelabra; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3016	LED Flood PAR (average values)	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78 W incandescent flood light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3017	LED Globe	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 38 W incandescent globe light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3018	LED Night Light	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	PA 2011	PA 2011	Base elec use: 7 W incandescent nightlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating
3019	Torchiere Floor Lamps	SF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MA Baseline 2009	MI Baseline 2011	Base elec use: 250 W halogen torchiere; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 0.8 halogen torchieres per SF home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3020	Outdoor LED PAR/Flood	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78W incandescent flood light; Base saturation: Assumes 4.7 exterior bulbs per SF home; EE saturation: % of eligbile exterior bulbs that are CFLs or LEDs
3021	Holiday Lights	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	ES Unit Ship / GDS	ES Unit Ship / GDS	Base elec use: 13 W incandescent holiday lights; Base saturation: Assumes 3.2 strings per home; EE saturation: 2-year average of ENERGY STAR Market Shipment data (2011-2012) - % of decorative lighting that is efficient
3022	HPT8 4ft 2 lamp replacing T12	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 50 W fluorescent (= two 25 W tubes); Base saturation: Assumes 7.7 tubes per SF home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs (used as proxy because MI Baseline does not specify)
3023	LW HPT8 4ft 2 lamp replacing T12	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 45 W fluorescent (~ two 25 W tubes); Base saturation: Assumes 7.7 tubes per SF home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs (used as proxy because MI Baseline does not specify)
3024	CFL Exterior fixture - 1 Lamp	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 5.7 eligible exterior bulbs per SF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3182	LED Exterior fixture - 1 Lamp	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 4.7 eligible exterior bulbs per MAN home; 38.7% are considered standard screw-in
3026	Occupancy Sensor	SF	Retrofit	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD / GDS	MEMD / GDS	MEMD / GDS	PA 2011	Base elec use: Assumes 60 W average bulb; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20% of all bulbs per SF home are eligible; EE saturation: GDS work papers from PA 2011 study show ~0.1% of bulbs have occupancy sensor
3027	CFL bulbs - 9W	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3028	CFL bulbs - 14W	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3029	CFL bulbs - 20W	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3030	CFL bulbs - 26W	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3031	LED Replacing A-line 40W	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3032	LED Replacing A-line 60W	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3033	LED Replacing A-line 75W (53W halogen)	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3034	LED Replacing A-line 100W (72W Halogen)	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3035	LED Lighting (screw-in) ; 2021 and later	SF	NC	All	NEEP / DC SEU	-	NEEP / DC SEU	NEEP / DC SEU	NEEP / DC SEU	-	-	DC SEU TRM	-	NEEP	NEEP	MI Baseline 2011 / DOE 2010	GDS/NC	Savings/Cost/Lifetime: LED Modeling Inputs derived from Table 2-6 of NEEP Residential Lighting Strategy; hours of use from DC SEU TRM Baseline: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3036	CFL bulbs high wattage	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3037	LED fixtures downlights	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 65 W incandescent downlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in
3038	CFL bulbs 3-Way	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 130 W 3-way incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in
3039	CFL bulbs dimmable	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 59 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in
3040	CFL bulbs Globe	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 46 W incandescent globe; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in
3041	CFL bulbs candelabra	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 47 W incandescent candelabra; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in
3042	LED Flood PAR (average values)	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 78 W incandescent flood light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 61.3% are considered standard screw-in
3043	LED Globe	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 38 W incandescent globe light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 48 eligible sockets per SF home; 38.7% are considered specialty screw-in
3044	LED Night Light	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	PA 2011	GDS/NC	Base elec use: 7 W incandescent nightlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating
3045	Torchiere Floor Lamps	SF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MA Baseline 2009	GDS/NC	Base elec use: 250 W halogen torchiere; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 0.8 halogen torchieres per SF home;
3046	Outdoor LED PAR/Flood	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 78W incandescent flood light; Base saturation: Assumes 4.7 exterior bulbs per SF home;
3047	Holiday Lights	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	ES Unit Ship / GDS	ES Unit Ship / GDS	Base elec use: 13 W incandescent holiday lights; Base saturation: Assumes 3.2 strings per home;
3048	HPT8 4ft 2 lamp replacing T12	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 50 W fluorescent (= two 25 W tubes); Base saturation: Assumes 7.7 tubes per SF home;
3049	LW HPT8 4ft 2 lamp replacing T12	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 45 W fluorescent (~ two 25 W tubes); Base saturation: Assumes 7.7 tubes per SF home;
3050	CFL Exterior fixture - 1 Lamp	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 5.7 eligible exterior bulbs per SF home; 61.3% are considered standard screw-in
3156	LED Exterior fixture - 1 Lamp	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 4.7 eligible exterior bulbs per MAN home; 38.7% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3052	Occupancy Sensor	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS/NC	Base elec use: Assumes 60 W average bulb; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20% of all bulbs per SF home are eligible
3053	CFL bulbs - 9W	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3054	CFL bulbs - 14W	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3055	CFL bulbs - 20W	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3056	CFL bulbs - 26W	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3057	LED Replacing A-line 40W	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3058	LED Replacing A-line 60W	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3059	LED Replacing A-line 75W (53W halogen)	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3060	LED Replacing A-line 100W (72W Halogen)	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3061	LED Lighting (screw-in) ; 2021 and later	MF	ROB	All	NEEP / DC SEU	-	NEEP / DC SEU	NEEP / DC SEU	NEEP / DC SEU	-	-	DC SEU TRM	-	NEEP	NEEP	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Savings/Cost/Lifetime: LED Modeling Inputs derived from Table 2-6 of NEEP Residential Lighting Strategy; hours of use from DC SEU TRM Baseline: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3062	CFL bulbs high wattage	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3063	LED fixtures downlights	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 65 W incandescent downlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3064	CFL bulbs 3-Way	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 130 W 3-way incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3065	CFL bulbs dimmable	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 59 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3066	CFL bulbs Globe	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 46 W incandescent globe; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3067	CFL bulbs candelabra	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 47 W incandescent candelabra; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3068	LED Flood PAR (average values)	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78 W incandescent flood light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3069	LED Globe	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 38 W incandescent globe light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3070	LED Night Light	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	PA 2011	PA 2011	Base elec use: 7 W incandescent nightlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating
3071	Torchiere Floor Lamps	MF	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MA Baseline 2009	MI Baseline 2011	Base elec use: 250 W halogen torchiere; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 0.8 halogen torchieres per MF home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3072	Outdoor LED PAR/Flood	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78W incandescent flood light; Base saturation: Assumes 4.7 exterior bulbs per MF home; EE saturation: % of eligbile exterior bulbs that are CFLs or LEDs
3073	Holiday Lights	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	ES Unit Ship / GDS	ES Unit Ship / GDS	Base elec use: 13 W incandescent holiday lights; Base saturation: Assumes 3.2 strings per home; EE saturation: 2-year average of ENERGY STAR Market Shipment data (2011-2012) - % of decorative lighting that is efficient
3074	HPT8 4ft 2 lamp replacing T12	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 50 W fluorescent (= two 25 W tubes); Base saturation: Assumes 7.7 tubes per MF home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs (used as proxy because MI Baseline does not specify)
3075	LW HPT8 4ft 2 lamp replacing T12	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 45 W fluorescent (~ two 25 W tubes); Base saturation: Assumes 7.7 tubes per MF home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs (used as proxy because MI Baseline does not specify)
3076	CFL Exterior fixture - 1 Lamp	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 5.7 eligible exterior bulbs per MF home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3119	LED Exterior fixture - 1 Lamp	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 1.9 eligible exterior bulbs per MF home; 38.7% are considered standard screw-in
3078	Occupancy Sensor	MF	Retrofit	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD / GDS	MEMD / GDS	MEMD / GDS	PA 2011	Base elec use: Assumes 60 W average bulb; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20% of all bulbs per MF home are eligible; EE saturation: GDS work papers from PA 2011 study show ~0.1% of bulbs have occupancy sensor
3079	CFL Fixture	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 115 W modified halogens (2 bulb average of 53 W and 72 W bulbs; adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit, 2 bulbs per fixture; 61.3% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are CFLs
3080	CFL Screw in	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 61.3% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are CFLs
3081	CFL Screw in - high wattage	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 61.3% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are CFLs
3082	LED Screw in	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 53 W modified halogen; Annual Elec. Savings: Assumes 15 W LED bulb; accounts for heating and cooling waste heat factors Winter and Summer kW Savings: Accounts for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 61.3% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are CFLs or LEDs

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3083	CFL Candelabra - 24/7	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 42 W specialty incandescent, operates 24 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are CFLs
3084	CFL Candelabra - 12/7	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 42 W specialty incandescent, operates 12 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are CFLs
3085	LED Candelabra - 24/7	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 33 W specialty incandescent, operates 24 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are LEDs
3086	LED Candelabra - 12/7	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 33 W specialty incandescent, operates 12 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are LEDs
3087	LED Globe - 24/7	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 38 W specialty incandescent, operates 24 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are LEDs
3088	LED Globe - 12/7	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS	Base elec use: 38 W specialty incandescent, operates 12 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in EE saturation: Several sources combined to estimate % of eligbile interior bulbs that are LEDs
3089	Exterior CFL Fixture - replace HID fixture in common area	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	MI Comm Base	GDS	Base elec use: 200 W average metal halide bulb
3090	Photo Cell Daylight Sensor	MF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Comm Base	GDS	Base elec use: ~100 bulb
3091	HPT8 4ft 2 lamp replacing T12, 12 hrs	MF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 50 W fluorescent (= two 25 W tubes), 12 hrs/day; Base saturation: Assumes 2.7 tubes per unit (assumes that half are operated 12 hrs/day & remaining half 24 hrs/day); EE saturation: Based on Michigan Commercial Baseline study
3092	HPT8 4ft 2 lamp replacing T12, 24 hrs	MF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 50 W fluorescent (= two 25 W tubes), 24 hrs/day; Base saturation: Assumes 2.7 tubes per unit (assumes that half are operated 12 hrs/day & remaining half 24 hrs/day); EE saturation: Based on Michigan Commercial Baseline study
3093	LW HPT8 4ft 2 lamp replacing T12, 12 hrs	MF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 45 W fluorescent (= two 25 W tubes); 12 hrs/day Base saturation: Assumes 2.7 tubes per unit (assumes that half are operated 12 hrs/day & remaining half 24 hrs/day); EE saturation: Based on Michigan Commercial Baseline study
3094	LW HPT8 4ft 2 lamp replacing T12, 24 hrs	MF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 45 W fluorescent (= two 25 W tubes); 24 hrs/day Base saturation: Assumes 2.7 tubes per unit (assumes that half are operated 12 hrs/day & remaining half 24 hrs/day); EE saturation: Based on Michigan Commercial Baseline study
3095	CFL bulbs - 9W	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3096	CFL bulbs - 14W	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3097	CFL bulbs - 20W	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3098	CFL bulbs - 26W	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3099	LED Replacing A-line 40W	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3100	LED Replacing A-line 60W	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3101	LED Replacing A-line 75W (53W halogen)	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3102	LED Replacing A-line 100W (72W Halogen)	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3103	LED Lighting (screw-in) ; 2021 and later	MF	NC	All	NEEP / DC SEU	-	NEEP / DC SEU	NEEP / DC SEU	NEEP / DC SEU	-	-	DC SEU TRM	-	NEEP	NEEP	MI Baseline 2011 / DOE 2010	GDS/NC	Savings/Cost/Lifetime: LED Modeling Inputs derived from Table 2-6 of NEEP Residential Lighting Strategy; hours of use from DC SEU TRM Baseline: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3104	CFL bulbs high wattage	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3105	LED fixtures downlights	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 65 W incandescent downlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in
3106	CFL bulbs 3-Way	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 130 W 3-way incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in
3107	CFL bulbs dimmable	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 59 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3108	CFL bulbs Globe	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 46 W incandescent globe; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in
3109	CFL bulbs candelabra	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 47 W incandescent candelabra; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in
3110	LED Flood PAR (average values)	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 78 W incandescent flood light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 61.3% are considered standard screw-in
3111	LED Globe	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 38 W incandescent globe light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20 eligible sockets per MF home; 38.7% are considered specialty screw-in
3112	LED Night Light	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	PA 2011	GDS/NC	Base elec use: 7 W incandescent nightlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating
3113	Torchiere Floor Lamps	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MA Baseline 2009	GDS/NC	Base elec use: 250 W halogen torchiere; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 0.8 halogen torchieres per MF home;
3114	Outdoor LED PAR/Flood	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / DOE 2010	GDS/NC	Base elec use: 78W incandescent flood light; Base saturation: Assumes 4.7 exterior bulbs per MF home;
3115	Holiday Lights	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	ES Unit Ship / GDS	ES Unit Ship / GDS	Base elec use: 13 W incandescent holiday lights; Base saturation: Assumes 3.2 strings per home;
3116	HPT8 4ft 2 lamp replacing T12	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 50 W fluorescent (= two 25 W tubes); Base saturation: Assumes 7.7 tubes per MF home;
3117	LW HPT8 4ft 2 lamp replacing T12	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 45 W fluorescent (~ two 25 W tubes); Base saturation: Assumes 7.7 tubes per MF home;
3118	CFL Exterior fixture - 1 Lamp	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 5.7 eligible exterior bulbs per MF home; 61.3% are considered standard screw-in
3077	LED Exterior fixture - 1 Lamp	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 1.9 eligible exterior bulbs per MF home; 38.7% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3120	Occupancy Sensor	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS/NC	Base elec use: Assumes 60 W average bulb; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20% of all bulbs per MF home are eligible
3121	CFL Fixture	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 115 W modified halogens (2 bulb average of 53 W and 72 W bulbs; adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit, 2 bulbs per fixture; 61.3% of bulbs are standard screw-in
3122	CFL Screw in	MF	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 61.3% of bulbs are standard screw-in
3123	CFL Screw in - high wattage	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 61.3% of bulbs are standard screw-in
3124	LED Screw in	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 53 W modified halogen; Annual Elec. Savings: Assumes 15 W LED bulb; accounts for heating and cooling waste heat factors Winter and Summer kW Savings: Accounts for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 61.3% of bulbs are standard screw-in
3125	CFL Candelabra - 24/7	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 42 W specialty incandescent, operates 24 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in
3126	CFL Candelabra - 12/7	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 42 W specialty incandescent, operates 12 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in
3127	LED Candelabra - 24/7	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 42 W specialty incandescent, operates 24 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in
3128	LED Candelabra - 12/7	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 42 W specialty incandescent, operates 12 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in
3129	LED Globe - 24/7	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 38 W specialty incandescent, operates 24 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in
3130	LED Globe - 12/7	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	GDS	GDS/NC	Base elec use: 38 W specialty incandescent, operates 12 hrs/day; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Several sources combined to estimate 0.4 eligible sockets in common area per unit; 38.7% of bulbs are standard screw-in
3131	Exterior CFL Fixture - replace HID fixture in common area	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	-	MEMD	MEMD	MI Comm Base	GDS/NC	Base elec use: 200 W average metal halide bulb
3132	CFL bulbs - 9W	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3133	CFL bulbs - 14W	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3134	CFL bulbs - 20W	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3135	CFL bulbs - 26W	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3136	LED Replacing A-line 40W	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3137	LED Replacing A-line 60W	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3138	LED Replacing A-line 75W (53W halogen)	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3139	LED Replacing A-line 100W (72W Halogen)	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3140	LED Lighting (screw-in) ; 2021 and later	MAN	ROB	All	NEEP / DC SEU	-	NEEP / DC SEU	NEEP / DC SEU	NEEP / DC SEU	-	-	DC SEU TRM	-	NEEP	NEEP	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Savings/Cost/Lifetime: LED Modeling Inputs derived from Table 2-6 of NEEP Residential Lighting Strategy; hours of use from DC SEU TRM Baseline: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3141	CFL bulbs high wattage	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3142	LED fixtures downlights	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 65 W incandescent downlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3143	CFL bulbs 3-Way	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 130 W 3-way incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3144	CFL bulbs dimmable	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 59 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3145	CFL bulbs Globe	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 46 W incandescent globe; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3146	CFL bulbs candelabra	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 47 W incandescent candelabra; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3147	LED Flood PAR (average values)	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78 W incandescent flood light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standarad screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3148	LED Globe	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 38 W incandescent globe light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 38.7% are considered specialty screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3149	LED Night Light	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	PA 2011	PA 2011	Base elec use: 7 W incandescent nightlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating
3150	Torchiere Floor Lamps	MAN	ROB	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MA Baseline 2009	MI Baseline 2011	Base elec use: 250 W halogen torchiere; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 0.8 halogen torchieres per MAN home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs
3151	Outdoor LED PAR/Flood	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78W incandescent flood light; Base saturation: Assumes 4.7 exterior bulbs per MAN home; EE saturation: % of eligbile exterior bulbs that are CFLs or LEDs
3152	Holiday Lights	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	ES Unit Ship / GDS	ES Unit Ship / GDS	Base elec use: 13 W incandescent holiday lights; Base saturation: Assumes 3.2 strings per home; EE saturation: 2-year average of ENERGY STAR Market Shipment data (2011-2012) - % of decorative lighting that is efficient
3153	HPT8 4ft 2 lamp replacing T12	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 50 W fluorescent (= two 25 W tubes); Base saturation: Assumes 7.7 tubes per MAN home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs (used as proxy because MI Baseline does not specify)
3154	LW HPT8 4ft 2 lamp replacing T12	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 45 W fluorescent (~ two 25 W tubes); Base saturation: Assumes 7.7 tubes per MAN home; EE saturation: % of eligbile interior bulbs that are CFLs or LEDs (used as proxy because MI Baseline does not specify)
3155	CFL Exterior fixture - 1 Lamp	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 5.7 eligible exterior bulbs per MAN home; 61.3% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are CFLs and LEDs
3051	LED Exterior fixture - 1 Lamp	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 2.6 eligible exterior bulbs per SF home; 38.7% are considered standard screw-in
3157	Occupancy Sensor	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD / GDS	MEMD / GDS	MEMD / GDS	PA 2011	Base elec use: Assumes 60 W average bulb; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20% of all bulbs per MAN home are eligible; EE saturation: GDS work papers from PA 2011 study show ~0.1% of bulbs have occupancy sensor

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
3158	CFL bulbs - 9W	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 61.3% are considered standard screw-in
3159	CFL bulbs - 14W	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 61.3% are considered standard screw-in
3160	CFL bulbs - 20W	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 61.3% are considered standard screw-in
3161	CFL bulbs - 26W	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 61.3% are considered standard screw-in
3162	LED Replacing A-line 40W	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 29 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in
3163	LED Replacing A-line 60W	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 43 W modified halogen (adjusted MEMD work papers to account for EISA standard); Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in
3164	LED Replacing A-line 75W (53W halogen)	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 53 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in
3165	LED Replacing A-line 100W (72W Halogen)	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 72 W modified halogen; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in
3166	LED Lighting (screw-in) ; 2021 and later	MAN	NC	All	NEEP / DC SEU	-	NEEP / DC SEU	NEEP / DC SEU	NEEP / DC SEU	-	-	DC SEU TRM	-	NEEP	NEEP	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Savings/Cost/Lifetime: LED Modeling Inputs derived from Table 2-6 of NEEP Residential Lighting Strategy; hours of use from DC SEU TRM Baseline: Assumes 29 eligible sockets per MAN home; 61.3% are considered standard screw-in
3167	CFL bulbs high wattage	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 200 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 61.3% are considered standard screw-in
3168	LED fixtures downlights	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 65 W incandescent downlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 38.7% are considered specialty screw-in
3169	CFL bulbs 3-Way	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 130 W 3-way incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 38.7% are considered specialty screw-in
3170	CFL bulbs dimmable	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 59 W incandescent; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 38.7% are considered specialty screw-in
3171	CFL bulbs Globe	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 46 W incandescent globe; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 38.7% are considered specialty screw-in
3172	CFL bulbs candelabra	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 47 W incandescent candelabra; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 38.7% are considered specialty screw-in
3173	LED Flood PAR (average values)	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78 W incandescent flood light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 61.3% are considered standard screw-in
3174	LED Globe	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 38 W incandescent globe light; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 29 eligible sockets per MF home; 38.7% are considered specialty screw-in
3175	LED Night Light	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	PA 2011	PA 2011	Base elec use: 7 W incandescent nightlight; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating
3176	Torchiere Floor Lamps	MAN	NC	All	MEMD	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD	MEMD	MA Baseline 2009	MI Baseline 2011	Base elec use: 250 W halogen torchiere; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 0.8 halogen torchieres per MF home;
3177	Outdoor LED PAR/Flood	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / DOE 2010	MI Baseline 2011	Base elec use: 78W incandescent flood light; Base saturation: Assumes 4.7 exterior bulbs per MAN home;
3178	Holiday Lights	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	ES Unit Ship / GDS	ES Unit Ship / GDS	Base elec use: 13 W incandescent holiday lights; Base saturation: Assumes 3.2 strings per home;
3179	HPT8 4ft 2 lamp replacing T12	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 50 W fluorescent (= two 25 W tubes); Base saturation: Assumes 7.7 tubes per MAN home;
3180	LW HPT8 4ft 2 lamp replacing T12	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 45 W fluorescent (~ two 25 W tubes); Base saturation: Assumes 7.7 tubes per MAN home;
3181	CFL Exterior fixture - 1 Lamp	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 5.7 eligible exterior bulbs per MAN home; 61.3% are considered standard screw-in
3025	LED Exterior fixture - 1 Lamp	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base elec use: 43 W modified halogen bulb; Base saturation: Assumes 2.6 eligible exterior bulbs per SF home; 38.7% are considered standard screw-in EE saturation: % of eligbile interior bulbs that are LEDs
3183	Occupancy Sensor	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	GDS / DC SEU / Ohio TRM	GDS / DC SEU / Ohio TRM	MEMD / GDS	MEMD / GDS	MEMD / GDS	PA 2011	Base elec use: Assumes 60 W average bulb; Annual Elec. Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Winter and Summer kW Savings: MEMD work papers adjusted to account for heating and cooling waste heat factors Annual Non-elec. Savings: GDS calculation (using DC SEU TRM algorithm) to account for increased heating load in homes with gas heating Base saturation: Assumes 20% of all bulbs per MAN home are eligible
4000	Water Heating																	
4001	Heat Pump Water Heaters	SF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD	MEMD	-	-	MID-ATL TRM / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS	Base Annual Elec: MEMD algorithm adjusted to account for 2015 federal standard (~0.95 EF) for electric water heaters; Annual kWh Savings: MEMD algorithm used with updated federal baseline; Base Saturation: % of homes with electric water heating; EE Saturation: GDS estimate based on secondary data
4002	Super Efficiency Gas Water Heater 0.70 EF	SF	ROB	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: % of homes with gas water heating EE saturation: GDS estimate based on secondary data

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
4003	Instant Gas Water Heater	SF	ROB	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS	Base Saturation: % of homes with gas water heating; EE Saturation: GDS estimate based on secondary research
4004	Tank Wrap	SF	Retrofit	All	-	-	-	-	-	GDS calc	-	GDS calc	-	MID-ATL TRM	MID-ATL TRM	MI Baseline 2011	GDS	Base Saturation: percentage of homes with gas water heating, less the percentage with tankless water heating
4005	Pipe Wrap - gas water heater - Insulated Pipe with R3	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4006	Pipe Wrap - gas water heater - Insulated Pipe with R2	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.23 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4007	Pipe Wrap - electric water heater - Insulated Pipe with R3	SF	Retrofit	NLI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4008	Pipe Wrap - electric water heater - Insulated Pipe with R2	SF	Retrofit	NLI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (45 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4009	Low Flow Showerheads 1.75 gpm - gas water heating	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4010	Low Flow Showerheads 1.5 gpm - gas water heating	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4011	Low Flow Showerheads 1.25 gpm - gas water heating	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4012	Low Flow Showerheads 1.0 gpm - gas water heating	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4013	Low Flow Showerheads 0.5 gpm - gas water heating	SF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4014	Low Flow Showerheads 1.75 gpm - electric water heating	SF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4015	Low Flow Showerheads 1.5 gpm - electric water heating	SF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4016	Low Flow Showerheads 1.25 gpm - electric water heating	SF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4017	Low Flow Showerheads 1.0 gpm - electric water heating	SF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4018	Low Flow Showerheads 0.5 gpm - electric water heating	SF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4019	Pipe Wrap - gas water heater - Insulated Pipe with R3	SF	Retrofit	LI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4020	Pipe Wrap - electric water heater - Insulated Pipe with R3	SF	Retrofit	LI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4021	Low Flow Showerheads 1.25 gpm - gas water heating	SF	Retrofit	LI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4022	Low Flow Showerheads 1.25 gpm - electric water heating	SF	Retrofit	LI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4023	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4024	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4025	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4026	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4027	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4028	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4029	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4030	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4031	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4032	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4033	Shower start - 1.75 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4034	Shower start - 1.5 gpm - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4035	Shower start - 1.75 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric water heating
4036	Shower start - 1.5 gpm - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric water heating
4037	Gravity Film Heat Exchanger GFX - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4038	Gravity Film Heat Exchanger GFX - electric water heating	SF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric heating
4039	Solar Domestic Hot Water - gas water heating	SF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4040	Solar Domestic Hot Water - electric water heating	SF	Retrofit	All	MEMD / GDS	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual Elec: Adjusted to account for 2015 federal water heating standards Base Saturation: % of homes with electric water heating
4041	Heat Pump Water Heaters	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD	MEMD	-	-	MID-ATL TRM / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Elec: MEMD algorithm adjusted to account for 2015 federal standard (~0.95 EF) for electric water heaters; Annual kWh Savings: MEMD algorithm used with updated federal baseline; Base Saturation: % of homes with electric water heating
4042	Super Efficiency Gas Water Heater 0.70 EF	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base saturation: % of homes with gas water heating
4043	Instant Gas Water Heater	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating;
4044	Pipe Wrap - gas water heater - Insulated Pipe with R3	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4045	Pipe Wrap - gas water heater - Insulated Pipe with R2	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.23 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4046	Pipe Wrap - electric water heater - Insulated Pipe with R3	SF	NC	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4047	Pipe Wrap - electric water heater - Insulated Pipe with R2	SF	NC	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (45 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4048	Low Flow Showerheads 1.75 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4049	Low Flow Showerheads 1.5 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4050	Low Flow Showerheads 1.25 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
4051	Low Flow Showerheads 1.0 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4052	Low Flow Showerheads 0.5 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4053	Low Flow Showerheads 1.75 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4054	Low Flow Showerheads 1.5 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4055	Low Flow Showerheads 1.25 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4056	Low Flow Showerheads 1.0 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4057	Low Flow Showerheads 0.5 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4058	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4059	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4060	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4061	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4062	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4063	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4064	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4065	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4066	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4067	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4068	Shower start - 1.75 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4069	Shower start - 1.5 gpm - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4070	Shower start - 1.75 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric water heating
4071	Shower start - 1.5 gpm - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric water heating
4072	Gravity Film Heat Exchanger GFX - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4073	Gravity Film Heat Exchanger GFX - electric water heating	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric heating
4074	Solar Domestic Hot Water - gas water heating	SF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4075	Solar Domestic Hot Water - electric water heating	SF	NC	All	MEMD / GDS	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Elec: Adjusted to account for 2015 federal water heating standards Base Saturation: % of homes with electric water heating
4076	Heat Pump Water Heaters	MF	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD	MEMD	-	-	MID-ATL TRM / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS	Base Annual Elec: MEMD algorithm adjusted to account for 2015 federal standard (~0.95 EF) for electric water heaters; Annual kWh Savings: MEMD algorithm used with updated federal baseline; Base Saturation: % of homes with electric water heating; EE Saturation: GDS estimate based on secondary data
4077	Super Efficiency Gas Water Heater 0.70 EF	MF	ROB	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: % of homes with gas water heating EE saturation: GDS estimate based on secondary data
4078	Instant Gas Water Heater	MF	ROB	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS	Base Saturation: % of homes with gas water heating; EE Saturation: GDS estimate based on secondary research
4079	Tank Wrap	MF	Retrofit	All	-	-	-	-	-	GDS calc	-	GDS calc	-	MID-ATL TRM	MID-ATL TRM	MI Baseline 2011	GDS	Base Saturation: percentage of homes with gas water heating, less the percentage with tankless water heating
4080	Pipe Wrap - gas water heater - Insulated Pipe with R3	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4081	Pipe Wrap - gas water heater - Insulated Pipe with R2	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.23 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4082	Pipe Wrap - electric water heater - Insulated Pipe with R3	MF	Retrofit	NLI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4083	Pipe Wrap - electric water heater - Insulated Pipe with R2	MF	Retrofit	NLI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (45 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4084	Low Flow Showerheads 1.75 gpm - gas water heating	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4085	Low Flow Showerheads 1.5 gpm - gas water heating	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4086	Low Flow Showerheads 1.25 gpm - gas water heating	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4087	Low Flow Showerheads 1.0 gpm - gas water heating	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4088	Low Flow Showerheads 0.5 gpm - gas water heating	MF	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4089	Low Flow Showerheads 1.75 gpm - electric water heating	MF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4090	Low Flow Showerheads 1.5 gpm - electric water heating	MF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4091	Low Flow Showerheads 1.25 gpm - electric water heating	MF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4092	Low Flow Showerheads 1.0 gpm - electric water heating	MF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4093	Low Flow Showerheads 0.5 gpm - electric water heating	MF	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4094	Pipe Wrap - gas water heater - Insulated Pipe with R3	MF	Retrofit	LI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4095	Pipe Wrap - electric water heater - Insulated Pipe with R3	MF	Retrofit	LI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4096	Low Flow Showerheads 1.25 gpm - gas water heating	MF	Retrofit	LI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4097	Low Flow Showerheads 1.25 gpm - electric water heating	MF	Retrofit	LI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4098	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4099	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
4100	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4101	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4102	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4103	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4104	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4105	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4106	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4107	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4108	Shower start - 1.75 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4109	Shower start - 1.5 gpm - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4110	Shower start - 1.75 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric water heating
4111	Shower start - 1.5 gpm - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric water heating
4112	Gravity Film Heat Exchanger GFX - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4113	Gravity Film Heat Exchanger GFX - electric water heating	MF	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric heating
4114	Solar Domestic Hot Water - gas water heating	MF	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4115	Solar Domestic Hot Water - electric water heating	MF	Retrofit	All	MEMD / GDS	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual Elec: Adjusted to account for 2015 federal water heating standards Base Saturation: % of homes with electric water heating
4116	Heat Pump Water Heaters	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD	MEMD	-	-	MID-ATL TRM / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Elec: MEMD algorithm adjusted to account for 2015 federal standard (~0.95 EF) for electric water heaters; Annual kWh Savings: MEMD algorithm used with updated federal baseline; Base Saturation: % of homes with electric water heating
4117	Super Efficiency Gas Water Heater 0.70 EF	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base saturation: % of homes with gas water heating
4118	Instant Gas Water Heater	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating;
4119	Pipe Wrap - gas water heater - Insulated Pipe with R3	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4120	Pipe Wrap - gas water heater - Insulated Pipe with R2	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.23 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4121	Pipe Wrap - electric water heater - Insulated Pipe with R3	MF	NC	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4122	Pipe Wrap - electric water heater - Insulated Pipe with R2	MF	NC	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (45 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4123	Low Flow Showerheads 1.75 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4124	Low Flow Showerheads 1.5 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4125	Low Flow Showerheads 1.25 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4126	Low Flow Showerheads 1.0 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4127	Low Flow Showerheads 0.5 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4128	Low Flow Showerheads 1.75 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4129	Low Flow Showerheads 1.5 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4130	Low Flow Showerheads 1.25 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4131	Low Flow Showerheads 1.0 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4132	Low Flow Showerheads 0.5 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4133	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4134	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4135	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4136	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4137	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4138	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4139	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4140	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4141	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4142	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4143	Shower start - 1.75 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4144	Shower start - 1.5 gpm - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4145	Shower start - 1.75 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric water heating
4146	Shower start - 1.5 gpm - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric water heating

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
4147	Gravity Film Heat Exchanger GFX - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4148	Gravity Film Heat Exchanger GFX - electric water heating	MF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric heating
4149	Solar Domestic Hot Water - gas water heating	MF	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4150	Solar Domestic Hot Water - electric water heating	MF	NC	All	MEMD / GDS	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Elec: Adjusted to account for 2015 federal water heating standards Base Saturation: % of homes with electric water heating
4151	Heat Pump Water Heaters	MAN	ROB	All	MEMD / GDS	-	MEMD / GDS	MEMD	MEMD	-	-	MID-ATL TRM / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS	Base Annual Elec: MEMD algorithm adjusted to account for 2015 federal standard (~0.95 EF) for electric water heaters; Annual kWh Savings: MEMD algorithm used with updated federal baseline; Base Saturation: % of homes with electric water heating; EE Saturation: GDS estimate based on secondary data
4152	Super Efficiency Gas Water Heater 0.70 EF	MAN	ROB	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS	Base saturation: % of homes with gas water heating EE saturation: GDS estimate based on secondary data
4153	Instant Gas Water Heater	MAN	ROB	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS	Base Saturation: % of homes with gas water heating; EE Saturation: GDS estimate based on secondary research
4154	Tank Wrap	MAN	Retrofit	All	-	-	-	-	-	GDS calc	-	GDS calc	-	MID-ATL TRM	MID-ATL TRM	MI Baseline 2011	GDS	Base Saturation: percentage of homes with gas water heating, less the percentage with tankless water heating
4155	Pipe Wrap - gas water heater - Insulated Pipe with R3	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4156	Pipe Wrap - gas water heater - Insulated Pipe with R2	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.23 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4157	Pipe Wrap - electric water heater - Insulated Pipe with R3	MAN	Retrofit	NLI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4158	Pipe Wrap - electric water heater - Insulated Pipe with R2	MAN	Retrofit	NLI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (45 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4159	Low Flow Showerheads 1.75 gpm - gas water heating	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4160	Low Flow Showerheads 1.5 gpm - gas water heating	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4161	Low Flow Showerheads 1.25 gpm - gas water heating	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4162	Low Flow Showerheads 1.0 gpm - gas water heating	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4163	Low Flow Showerheads 0.5 gpm - gas water heating	MAN	Retrofit	NLI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4164	Low Flow Showerheads 1.75 gpm - electric water heating	MAN	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4165	Low Flow Showerheads 1.5 gpm - electric water heating	MAN	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4166	Low Flow Showerheads 1.25 gpm - electric water heating	MAN	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4167	Low Flow Showerheads 1.0 gpm - electric water heating	MAN	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4168	Low Flow Showerheads 0.5 gpm - electric water heating	MAN	Retrofit	NLI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4169	Pipe Wrap - gas water heater - Insulated Pipe with R3	MAN	Retrofit	LI	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4170	Pipe Wrap - electric water heater - Insulated Pipe with R3	MAN	Retrofit	LI	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4171	Low Flow Showerheads 1.25 gpm - gas water heating	MAN	Retrofit	LI	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4172	Low Flow Showerheads 1.25 gpm - electric water heating	MAN	Retrofit	LI	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	MI Baseline 2011	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4173	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4174	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4175	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4176	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4177	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4178	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4179	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4180	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4181	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4182	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4183	Shower start - 1.75 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4184	Shower start - 1.5 gpm - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4185	Shower start - 1.75 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric water heating
4186	Shower start - 1.5 gpm - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric water heating
4187	Gravity Film Heat Exchanger GFX - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4188	Gravity Film Heat Exchanger GFX - electric water heating	MAN	Retrofit	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with electric heating
4189	Solar Domestic Hot Water - gas water heating	MAN	Retrofit	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Saturation: % of homes with gas water heating
4190	Solar Domestic Hot Water - electric water heating	MAN	Retrofit	All	MEMD / GDS	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Annual Elec: Adjusted to account for 2015 federal water heating standards Base Saturation: % of homes with electric water heating
4191	Heat Pump Water Heaters	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD	MEMD	-	-	MID-ATL TRM / GDS	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Elec: MEMD algorithm adjusted to account for 2015 federal standard (~0.95 EF) for electric water heaters; Annual kWh Savings: MEMD algorithm used with updated federal baseline; Base Saturation: % of homes with electric water heating
4192	Super Efficiency Gas Water Heater 0.70 EF	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base saturation: % of homes with gas water heating
4193	Instant Gas Water Heater	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating;
4194	Pipe Wrap - gas water heater - Insulated Pipe with R3	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.26 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
4195	Pipe Wrap - gas water heater - Insulated Pipe with R2	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD / GDS	-	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Annual Non-elec Savings: Assumes 6 LF of pipe wrap; savings = (0.23 MMBtu/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with gas water heating
4196	Pipe Wrap - electric water heater - Insulated Pipe with R3	MAN	NC	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (51 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4197	Pipe Wrap - electric water heater - Insulated Pipe with R2	MAN	NC	All	MEMD work papers	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	-	-	-	-	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Annual kWh Savings: Assumes 6 LF of pipe wrap; savings = (45 kWh/LF)*(6 LF); Incremental Cost: = ($0.20/LF)*(6 LF) incremental cost + $3.63 installation cost; Base Saturation: % of homes with electric water heating
4198	Low Flow Showerheads 1.75 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4199	Low Flow Showerheads 1.5 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4200	Low Flow Showerheads 1.25 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4201	Low Flow Showerheads 1.0 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4202	Low Flow Showerheads 0.5 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with gas heating
4203	Low Flow Showerheads 1.75 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4204	Low Flow Showerheads 1.5 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4205	Low Flow Showerheads 1.25 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4206	Low Flow Showerheads 1.0 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4207	Low Flow Showerheads 0.5 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD / GDS	MI Baseline 2011	GDS/NC	Incremental Cost: $12 for equipment - assumes $6.70 for labor; Base Saturation: % of homes with electric heating
4208	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4209	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4210	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4211	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4212	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with gas water heating
4213	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4214	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	MI Baseline 2011	Base Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4215	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4216	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4217	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Non-Elec Use: Derived from MEMD work papers; Incremental Cost: $2.80 per aerator + $6.70 labor cost Base Saturation: Percentage of homes with electric water heating
4218	Shower start - 1.75 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4219	Shower start - 1.5 gpm - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	MEMD work papers	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4220	Shower start - 1.75 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric water heating
4221	Shower start - 1.5 gpm - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric water heating
4222	Gravity Film Heat Exchanger GFX - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4223	Gravity Film Heat Exchanger GFX - electric water heating	MAN	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with electric heating
4224	Solar Domestic Hot Water - gas water heating	MAN	NC	All	-	-	-	-	-	MEMD work papers	-	MEMD	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Saturation: % of homes with gas water heating
4225	Solar Domestic Hot Water - electric water heating	MAN	NC	All	MEMD / GDS	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	GDS/NC	Base Annual Elec: Adjusted to account for 2015 federal water heating standards Base Saturation: % of homes with electric water heating
5000	Other																	
5001	Pump and Motor Single Speed	SF	ROB	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	CEE	Base saturation: % of homes with pools (assigns all pools to single-family homes)
5002	Pump and motor w auto controls - multi speed	SF	ROB	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011	CEE	Base saturation: % of homes with pools (assigns all pools to single-family homes)
5003	Pump and Motor Single Speed	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	CEE	Base saturation: % of homes with pools (assigns all pools to single-family homes)
5004	Pump and motor w auto controls - multi speed	SF	NC	All	MEMD Work papers	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	CEE	Base saturation: % of homes with pools (assigns all pools to single-family homes)
6000	HVAC (Envelope)																	
6001	Airtight Can Lights	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6002	Basement Wall Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6003	Cool roof	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6004	Crawlspace Wall Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6005	Door weatherstripping	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6006	Duct Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6007	Duct location	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6008	Duct sealing 15% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6009	Duct sealing 20% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6010	Duct sealing 25% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6011	Duct sealing 30% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6012	Energy Star Door	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6013	Floor Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6014	Infiltration reduction - 10%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6015	Infiltration reduction - 15%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6016	Infiltration reduction - 20%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
6017	Infiltration reduction - 30%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6018	Infiltration reduction - 40%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6019	Infiltration reduction - 50%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6020	Rim Joist Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6021	Wall Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6022	Window Film	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6023	Window Replacement	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6024	New vinyl window	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6025	Original double hung window with low U storm	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6026	Original double hung window with original storm window	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6027	Rehabbed double hung	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6028	Rehabbed double hung with low U storm	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6029	Rehabbed double hung with single glazed storm	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6030	R19 kneewalls	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6031	R-38 "scuttle hole" Attic hatch	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6032	R-38 pull-down stairs Attic hatch	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6033	R-30 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6034	R-38 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6035	R-49 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6036	R-60 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6037	Low Income Weatherization Package	SF	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6038	Basement Wall Insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6039	Cool roof	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6040	Crawlspace Wall Insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6041	Duct Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6042	Duct location	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6043	Duct sealing 15% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6044	Duct sealing 20% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6045	Duct sealing 25% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6046	Duct sealing 30% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6047	Energy Star Door	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6048	Floor Insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6049	Infiltration reduction - 10%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6050	Infiltration reduction - 15%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6051	Infiltration reduction - 20%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6052	Infiltration reduction - 30%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6053	Infiltration reduction - 40%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6054	Infiltration reduction - 50%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6055	Wall Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6056	Window Film	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6057	Window Replacement	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6058	R19 kneewalls	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6059	R-38 "scuttle hole" Attic hatch	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6060	R-38 pull-down stairs Attic hatch	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6061	R-30 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6062	R-38 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6063	R-49 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6064	R-60 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6065	Low Income Weatherization Package	SF	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6066	Airtight Can Lights	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6067	Basement Wall Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6068	Cool roof	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6069	Crawlspace Wall Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6070	Door weatherstripping	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6071	Duct Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6072	Duct location	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6073	Duct sealing 15% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6074	Duct sealing 20% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6075	Duct sealing 25% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
6076	Duct sealing 30% leakage base	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6077	Energy Star Door	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6078	Floor Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6079	Infiltration reduction - 10%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6080	Infiltration reduction - 15%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6081	Infiltration reduction - 20%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6082	Infiltration reduction - 30%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6083	Infiltration reduction - 40%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6084	Infiltration reduction - 50%	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6085	Rim Joist Insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6086	Steam pipe insulation	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	
6087	Wall Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6088	Window Film	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6089	Window Replacement	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6090	New vinyl window	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6091	Original double hung window with low U storm	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6092	Original double hung window with original storm window	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6093	Rehabbed double hung	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6094	Rehabbed double hung with low U storm	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6095	Rehabbed double hung with single glazed storm	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6096	R19 kneewalls	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6097	R-38 "scuttle hole" Attic hatch	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6098	R-38 pull-down stairs Attic hatch	SF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6099	R-30 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6100	R-38 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6101	R-49 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6102	R-60 Roof Insulation	SF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6103	Low Income Weatherization Package	SF	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6104	Basement Wall Insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6105	Cool roof	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6106	Crawlspace Wall Insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6107	Duct Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6108	Duct location	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6109	Duct sealing 15% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6110	Duct sealing 20% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6111	Duct sealing 25% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6112	Duct sealing 30% leakage base	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6113	Energy Star Door	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6114	Floor Insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6115	Infiltration reduction - 10%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6116	Infiltration reduction - 15%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6117	Infiltration reduction - 20%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6118	Infiltration reduction - 30%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6119	Infiltration reduction - 40%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6120	Infiltration reduction - 50%	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6121	Steam pipe insulation	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	
6122	Wall Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6123	Window Film	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6124	Window Replacement	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6125	R19 kneewalls	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6126	R-38 "scuttle hole" Attic hatch	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6127	R-38 pull-down stairs Attic hatch	SF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6128	R-30 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6129	R-38 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6130	R-49 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6131	R-60 Roof Insulation	SF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6132	Low Income Weatherization Package	SF	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6133	Basement Wall Insulation	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6134	Cool roof	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
6135	Crawlspace Wall Insulation	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6136	Duct Insulation	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6137	Duct location	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6138	Duct sealing 15% leakage base	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6139	Duct sealing 20% leakage base	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6140	Duct sealing 25% leakage base	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6141	Duct sealing 30% leakage base	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6142	Energy Star Door	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6143	Floor Insulation	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6144	Infiltration reduction - 10%	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6145	Infiltration reduction - 15%	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6146	Infiltration reduction - 20%	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6147	Infiltration reduction - 30%	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6148	Infiltration reduction - 40%	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6149	Infiltration reduction - 50%	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6150	Wall Insulation	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6151	Window Film	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6152	Window Replacement	SF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6153	Airtight Can Lights	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6154	Cool roof	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6155	Door weatherstripping	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6156	Duct Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6157	Duct location	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6158	Duct sealing 15% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6159	Duct sealing 20% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6160	Duct sealing 25% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6161	Duct sealing 30% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6162	Energy Star Door	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6163	Infiltration reduction - 10%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6164	Infiltration reduction - 15%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6165	Infiltration reduction - 30%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6166	Infiltration reduction - 50%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6167	Roof Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6168	Wall Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6169	Window Film	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6170	Window Replacement	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6171	Basement Wall Insulation	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6172	New vinyl window	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6173	Original double hung window with low U storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6174	Original double hung window with original storm window	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6175	Rehabbed double hung	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6176	Rehabbed double hung with low U storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6177	Rehabbed double hung with single glazed storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6178	Low Income Weatherization Package	MF	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6179	Airtight Can Lights	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6180	Cool roof	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6181	Door weatherstripping	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6182	Duct Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6183	Duct location	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6184	Duct sealing 15% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6185	Duct sealing 20% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6186	Duct sealing 25% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6187	Duct sealing 30% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6188	Energy Star Door	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6189	Infiltration reduction - 10%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6190	Infiltration reduction - 15%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6191	Infiltration reduction - 30%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6192	Infiltration reduction - 50%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6193	Roof Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
6194	Wall Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6195	Window Film	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6196	Window Replacement	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6197	Basement Wall Insulation	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6198	Low Income Weatherization Package	MF	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6199	Airtight Can Lights	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6200	Cool roof	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6201	Door weatherstripping	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6202	Duct Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6203	Duct location	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6204	Duct sealing 15% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6205	Duct sealing 20% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6206	Duct sealing 25% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6207	Duct sealing 30% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6208	Energy Star Door	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6209	Infiltration reduction - 10%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6210	Infiltration reduction - 15%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6211	Infiltration reduction - 30%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6212	Infiltration reduction - 50%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6213	Roof Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6214	Wall Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6215	Window Film	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6216	Window Replacement	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6217	Basement Wall Insulation	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6218	New vinyl window	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6219	Original double hung window with low U storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6220	Original double hung window with original storm window	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6221	Rehabbed double hung	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6222	Rehabbed double hung with low U storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6223	Rehabbed double hung with single glazed storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6224	Low Income Weatherization Package	MF	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6225	Airtight Can Lights	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6226	Cool roof	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6227	Door weatherstripping	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6228	Duct Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6229	Duct location	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6230	Duct sealing 15% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6231	Duct sealing 20% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6232	Duct sealing 25% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6233	Duct sealing 30% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6234	Energy Star Door	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6235	Infiltration reduction - 10%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6236	Infiltration reduction - 15%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6237	Infiltration reduction - 30%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6238	Infiltration reduction - 50%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6239	Roof Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6240	Wall Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6241	Window Film	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6242	Window Replacement	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6243	Basement Wall Insulation	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6244	Low Income Weatherization Package	MF	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6245	Airtight Can Lights	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6246	Cool roof	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6247	Door weatherstripping	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6248	Duct Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6249	Duct location	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6250	Duct sealing 15% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6251	Duct sealing 20% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6252	Duct sealing 25% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
6253	Duct sealing 30% leakage base	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6254	Energy Star Door	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6255	Infiltration reduction - 10%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6256	Infiltration reduction - 15%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6257	Infiltration reduction - 30%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6258	Infiltration reduction - 50%	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6259	Roof Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6260	Wall Insulation	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6261	Window Film	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6262	Window Replacement	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6263	Basement Wall Insulation	MF	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6264	New vinyl window	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6265	Original double hung window with low U storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6266	Original double hung window with original storm window	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6267	Rehabbed double hung	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6268	Rehabbed double hung with low U storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6269	Rehabbed double hung with single glazed storm	MF	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6270	Low Income Weatherization Package	MF	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6271	Airtight Can Lights	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6272	Cool roof	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS estimate	
6273	Door weatherstripping	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6274	Duct Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6275	Duct location	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Equals the percent of homes with either an unfinished basement or crawlspace, less the percentage of homes which have finished (proxy for conditioned) crawl spaces or basements
6276	Duct sealing 15% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6277	Duct sealing 20% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6278	Duct sealing 25% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6279	Duct sealing 30% leakage base	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6280	Energy Star Door	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	EE Saturation: % of all customers with insulated or storm doors - based on GDS review of various Michigan data sources
6281	Infiltration reduction - 10%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6282	Infiltration reduction - 15%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6283	Infiltration reduction - 30%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6284	Infiltration reduction - 50%	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6285	Roof Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6286	Wall Insulation	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6287	Window Film	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6288	Window Replacement	MF	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6289	Basement Wall Insulation	MF	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE saturation: Table 13 of MI Baseline study; % of finished basements with no insulation = 29%; therefore 71% assumed to have some insulation
6290	Low Income Weatherization Package	MF	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6291	Airtight Can Lights	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6292	Cool roof	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6293	Door weatherstripping	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6294	Duct Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6295	Duct location	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6296	Duct sealing 15% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6297	Duct sealing 20% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6298	Duct sealing 25% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6299	Duct sealing 30% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6300	Energy Star Door	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6301	Infiltration reduction - 10%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6302	Infiltration reduction - 15%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6303	Infiltration reduction - 30%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6304	Infiltration reduction - 50%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6305	Roof Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6306	Wall Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6307	Window Film	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6308	Window Replacement	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6309	Basement Wall Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6310	Airtight Can Lights	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6311	Cool roof	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	

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6312	Door weatherstripping	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6313	Duct Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6314	Duct location	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6315	Duct sealing 15% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6316	Duct sealing 20% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6317	Duct sealing 25% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6318	Duct sealing 30% leakage base	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6319	Energy Star Door	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6320	Infiltration reduction - 10%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6321	Infiltration reduction - 15%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6322	Infiltration reduction - 30%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6323	Infiltration reduction - 50%	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6324	Roof Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6325	Wall Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6326	Window Film	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6327	Window Replacement	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6328	Basement Wall Insulation	MF	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6329	Crawlspace Wall Insulation	MAN	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6330	Duct Insulation	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6331	Duct sealing 15% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6332	Duct sealing 20% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6333	Duct sealing 25% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6334	Duct sealing 30% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6335	Floor Insulation	MAN	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6336	Infiltration reduction - 10%	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6337	Infiltration reduction - 15%	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6338	Roof Insulation	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6339	Wall Insulation	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6340	Window Replacement	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6341	Low Income Weatherization Package	MAN	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6342	Crawlspace Wall Insulation	MAN	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6343	Duct Insulation	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6344	Duct sealing 15% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6345	Duct sealing 20% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6346	Duct sealing 25% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6347	Duct sealing 30% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6348	Floor Insulation	MAN	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6349	Infiltration reduction - 10%	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6350	Infiltration reduction - 15%	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6351	Roof Insulation	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6352	Wall Insulation	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6353	Window Replacement	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6354	Low Income Weatherization Package	MAN	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6355	Crawlspace Wall Insulation	MAN	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6356	Duct Insulation	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6357	Duct sealing 15% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6358	Duct sealing 20% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6359	Duct sealing 25% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6360	Duct sealing 30% leakage base	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6361	Floor Insulation	MAN	Retrofit-OLD	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6362	Infiltration reduction - 10%	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6363	Infiltration reduction - 15%	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6364	Roof Insulation	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6365	Wall Insulation	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6366	Window Replacement	MAN	Retrofit-OLD	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6367	Low Income Weatherization Package	MAN	Retrofit-OLD	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6368	Crawlspace Wall Insulation	MAN	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of MI Baseline Study; 70% of crawl spaces are uninsulated; therefore EE saturation assumed to be 30%
6369	Duct Insulation	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are poorly insulated
6370	Duct sealing 15% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
6371	Duct sealing 20% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6372	Duct sealing 25% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6373	Duct sealing 30% leakage base	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6374	Floor Insulation	MAN	Retrofit-AVG	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	MI Baseline 2011	EE Saturation: Table 13 of Baseline Report; 77% of unfinished basements did not have insulation; therefore assumes 23% of homes do not have floor insulation (homes with crawl spaces would receive crawl space wall insulation)
6375	Infiltration reduction - 10%	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6376	Infiltration reduction - 15%	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes that are drafty most or all of the time
6377	Roof Insulation	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6378	Wall Insulation	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6379	Window Replacement	MAN	Retrofit-AVG	NLI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturation: % of Michigan homes with double or triple pane windows
6380	Low Income Weatherization Package	MAN	Retrofit-AVG	LI	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	EE saturations: % of Michigan homes that are poorly insulated
6381	Crawlspace Wall Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6382	Duct Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6383	Duct sealing 15% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6384	Duct sealing 20% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6385	Duct sealing 25% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6386	Duct sealing 30% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6387	Floor Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6388	Infiltration reduction - 10%	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6389	Infiltration reduction - 15%	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6390	Roof Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6391	Wall Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6392	Window Replacement	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6393	Crawlspace Wall Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6394	Duct Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6395	Duct sealing 15% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6396	Duct sealing 20% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6397	Duct sealing 25% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6398	Duct sealing 30% leakage base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6399	Floor Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6400	Infiltration reduction - 10%	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6401	Infiltration reduction - 15%	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6402	Roof Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6403	Wall Insulation	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
6404	Window Replacement	MAN	NC	All	-	-	MEMD	MEMD	MEMD	MEMD	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	
7000	HVAC (Equipment)																	
7001	ENERGY STAR Room AC	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	PA 2011	Base Saturation: saturation of primary and secondary room air conditioners
7002	CEE Tier 2 Room AC	SF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	PA 2011	Base Saturation: saturation of primary and secondary room air conditioners
7003	Room AC recycling	SF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: saturation of tertiary room air conditioners
7004	ASHP - SEER 15	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7005	ASHP - SEER 16	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7006	ASHP - SEER 17	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7007	ASHP - SEER 18	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7008	DFHP - SEER 15 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7009	DFHP - SEER 16 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7010	DFHP - SEER 17 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7011	DFHP - SEER 18 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7012	Furnace/AC - SEER 15	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7013	Furnace/AC - SEER 16	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7014	Furnace/AC - SEER 17	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7015	GSHP - EER 17 ASHP Base	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7016	GSHP - EER 19 ASHP Base	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7017	High efficiency 92 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7018	High efficiency 94 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7019	High efficiency 95 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7020	O&M Tune-up - furnace only	SF	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on a review of several Michigan sources
7021	O&M Tune-up - furnace only	SF	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on a review of several Michigan sources
7022	RCA 10% improvement	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: % of single-family homes with central AC; EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7023	RCA 15% improvement	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: % of single-family homes with central AC; EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7024	RCA 5% improvement	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: % of single-family homes with central AC; EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
7025	Setback thermostat - full setback	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of single-family homes with programmable thermostats
7026	Setback thermostat - moderate setback	SF	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of single-family homes with programmable thermostats
7027	Setback thermostat - moderate setback	SF	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of single-family homes with programmable thermostats
7028	Whole House Fan	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	CASE	EE Saturation: % of homes with whole house attic fans
7029	High efficiency 93 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7030	High efficiency 96 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7031	High efficiency 97 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7032	High efficiency 98 AFUE furnace with ECM	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7033	ECM Furnace Fan	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Annual Elec. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual kW. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual Non-Elec Savings: Heating penalty taken from p. 87 of MASS TRM; Base Saturation; % of single-family homes with gas furnaces EE saturation: Based on review of various Michigan sources
7034	ASHP - SEER 19	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7035	DFHP - SEER 19 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7036	Furnace/AC - SEER 18	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7037	Furnace/AC - SEER 19	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7038	ASHP - SEER 20	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7039	DFHP - SEER 20 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7040	Furnace/AC - SEER 20	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7041	ASHP - SEER 21	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7042	DFHP - SEER 21 with 95 AFUE furnace	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7043	Furnace/AC - SEER 21	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of single-family homes with central AC; EE saturation: Based on review of various Michigan sources
7044	SEER21 Minisplit Heat pump	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7045	SEER21 Minisplit Heat pump	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of single-family homes use electric heat - assuming one-quarter of this group uses electric furnace / baseboards for heating; EE saturation: Based on review of various Michigan sources
7046	Boiler Tune-up	SF	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7047	Boiler Tune-up	SF	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7048	Boiler reset control	SF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7049	Boiler 87% plus AFUE 82 AFUE BASE	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7050	Boiler 92% plus AFUE 82 AFUE BASE	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7051	Boiler 95% plus AFUE 82 AFUE BASE	SF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of single-family homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7052	ENERGY STAR Room AC	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: saturation of primary and secondary room air conditioners
7053	CEE Tier 2 Room AC	SF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: saturation of primary and secondary room air conditioners
7054	ASHP - SEER 15	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7055	ASHP - SEER 16	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7056	ASHP - SEER 17	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7057	ASHP - SEER 18	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7058	DFHP - SEER 15 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7059	DFHP - SEER 16 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7060	DFHP - SEER 17 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7061	DFHP - SEER 18 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7062	Furnace/AC - SEER 15	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7063	Furnace/AC - SEER 16	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7064	Furnace/AC - SEER 17	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7065	GSHP - EER 17 ASHP Base	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes new construction with electric heat will use heat pump technology
7066	GSHP - EER 19 ASHP Base	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes new construction with electric heat will use heat pump technology
7067	High efficiency 92 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7068	High efficiency 94 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7069	High efficiency 95 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7070	Setback thermostat - full setback	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7071	Setback thermostat - moderate setback	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7072	Whole House Fan	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7073	High efficiency 93 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7074	High efficiency 96 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7075	High efficiency 97 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7076	High efficiency 98 AFUE furnace with ECM	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with gas furnaces
7077	ECM Furnace Fan	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Annual Elec. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual kW. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual Non-Elec Savings: Heating penalty taken from p. 87 of MASS TRM; Base Saturation; % of single-family homes with gas furnace
7078	ASHP - SEER 19	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7079	DFHP - SEER 19 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7080	Furnace/AC - SEER 18	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7081	Furnace/AC - SEER 19	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7082	ASHP - SEER 20	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology

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Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
7083	DFHP - SEER 20 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7084	Furnace/AC - SEER 20	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7085	ASHP - SEER 21	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7086	DFHP - SEER 21 with 95 AFUE furnace	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7087	Furnace/AC - SEER 21	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of single-family homes with central AC
7088	SEER21 Minisplit Heat pump	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of single-family homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7089	Boiler 87% plus AFUE 82 AFUE BASE	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with boilers
7090	Boiler 92% plus AFUE 82 AFUE BASE	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with boilers
7091	Boiler 95% plus AFUE 82 AFUE BASE	SF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of single-family homes with boilers
7092	ENERGY STAR Room AC	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	PA 2011	Base Saturation: saturation of primary and secondary room air conditioners
7093	CEE Tier 2 Room AC	MF	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	PA 2011	Base Saturation: saturation of primary and secondary room air conditioners
7094	Room AC recycling	MF	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: saturation of tertiary room air conditioners
7095	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7096	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7097	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7098	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7099	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7100	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7101	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7102	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7103	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7104	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7105	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7106	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7107	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7108	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7109	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7110	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7111	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7112	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7113	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7114	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7115	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7116	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller EE saturation: Based on review of various Michigan sources
7117	ASHP - SEER 15	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7118	ASHP - SEER 16	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7119	ASHP - SEER 17	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7120	ASHP - SEER 18	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7121	Boiler 85% Ec	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7122	Boiler turndown control	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7123	CHW reset 10 deg	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller; EE saturation: Based on review of various Michigan sources (assumes same EE saturation as high-efficiency central air conditioners)
7124	CHW reset 5 deg	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller; EE saturation: Based on review of various Michigan sources (assumes same EE saturation as high-efficiency central air conditioners)
7125	DFHP - SEER 15 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7126	DFHP - SEER 16 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7127	DFHP - SEER 17 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7128	DFHP - SEER 18 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7129	Furnace/AC - SEER 15	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7130	Furnace/AC - SEER 16	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7131	Furnace/AC - SEER 17	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7132	High efficiency 92 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7133	High efficiency 93 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7134	High efficiency 94 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7135	High efficiency 95 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7136	High efficiency 96 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7137	High efficiency 97 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7138	High efficiency 98 AFUE furnace with ECM	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7139	ECM Furnace Fan	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Annual Elec. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual kW. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual Non-Elec Savings: Heating penalty taken from p. 87 of MASS TRM; Base Saturation; % of single-family homes with gas furnaces EE saturation: Based on review of various Michigan sources

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
7140	O&M Tune-up - furnace only	MF	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on a review of several Michigan sources
7141	O&M Tune-up - furnace only	MF	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with gas furnaces; EE saturation: Based on a review of several Michigan sources
7142	O2 Trim Control	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers (divided by 3 based on size of O2 trim control measure compared to boiler tune-up in MEMD)
7143	PTAC 9.3 EER	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS	
7144	PTHP 9.1 EER	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7145	RCA 10% improvement	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7146	RCA 15% improvement	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7147	RCA 5% improvement	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7148	Setback thermostat - full setback	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of multifamily homes with programmable thermostats
7149	Setback thermostat - moderate setback	MF	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of multifamily homes with programmable thermostats
7150	Setback thermostat - moderate setback	MF	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of multifamily homes with programmable thermostats
7151	Whole House Fan	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	CASE	EE Saturation: % of homes with whole house attic fans
7152	ASHP - SEER 19	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7153	ASHP - SEER 20	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7154	ASHP - SEER 21	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7155	DFHP - SEER 19 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7156	DFHP - SEER 20 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7157	DFHP - SEER 21 with 95 AFUE furnace	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7158	Furnace/AC - SEER 18	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7159	Furnace/AC - SEER 19	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7160	Furnace/AC - SEER 20	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7161	Furnace/AC - SEER 21	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers); EE saturation: Based on review of various Michigan sources
7162	SEER21 Minisplit Heat pump	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multimily homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7163	SEER21 Minisplit Heat pump	MF	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 11% of multifamily homes use electric heat - assuming one-quarter of this group uses electric furnace / baseboards for heating; EE saturation: Retrofit measure - implicit that none are efficient
7164	Boiler Tune-up	MF	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7165	Boiler Tune-up	MF	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7166	Boiler 87% plus AFUE 82 AFUE BASE	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7167	Boiler 90% plus AFUE 82 AFUE BASE	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7168	Boiler 92% plus AFUE 82 AFUE BASE	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7169	Boiler 95% plus AFUE 82 AFUE BASE	MF	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of multifamily homes with boilers; EE saturation: Based on review of various Michigan sources (assumes percentage to be the same as for efficient furnaces)
7170	ENERGY STAR Room AC	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: saturation of primary and secondary room air conditioners
7171	CEE Tier 2 Room AC	MF	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: saturation of primary and secondary room air conditioners
7172	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7173	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7174	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7175	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7176	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7177	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7178	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7179	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7180	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7181	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7182	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7183	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7184	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7185	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7186	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7187	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7188	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7189	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7190	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7191	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7192	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7193	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7194	ASHP - SEER 15	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7195	ASHP - SEER 16	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7196	ASHP - SEER 17	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7197	ASHP - SEER 18	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7198	Boiler 85% Ec	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers
7199	Boiler turndown control	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
7200	CHW reset 10 deg	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7201	CHW reset 5 deg	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: 42% central/AC*14% of multifamily homes are high-rise buildings; assumes 50 units per chiller
7202	DFHP - SEER 15 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7203	DFHP - SEER 16 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7204	DFHP - SEER 17 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7205	DFHP - SEER 18 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7206	Furnace/AC - SEER 15	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7207	Furnace/AC - SEER 16	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7208	Furnace/AC - SEER 17	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7209	High efficiency 92 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7210	High efficiency 93 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7211	High efficiency 94 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7212	High efficiency 95 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7213	High efficiency 96 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7214	High efficiency 97 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7215	High efficiency 98 AFUE furnace with ECM	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with gas furnaces
7216	ECM Furnace Fan	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Annual Elec. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual kW. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual Non-Elec Savings: Heating penalty taken from p. 87 of MASS TRM; Base Saturation; % of single-family homes with gas furnace
7217	O2 Trim Control	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers (divided by 3 based on size of O2 trim control measure compared to boiler tune-up in MEMD)
7218	PTAC 9.3 EER	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7219	PTHP 9.1 EER	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multimily homes use electric heat - assumes half of new construction with electric heat will use heat pump technology
7220	Setback thermostat - full setback	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7221	Setback thermostat - moderate setback	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7222	Whole House Fan	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7223	ASHP - SEER 19	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7224	ASHP - SEER 20	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7225	ASHP - SEER 21	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7226	DFHP - SEER 19 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7227	DFHP - SEER 20 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7228	DFHP - SEER 21 with 95 AFUE furnace	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multifamily homes use electric heat - assumes half of new construction market with electric heat will use dual-fuel heat pump technology
7229	Furnace/AC - SEER 18	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7230	Furnace/AC - SEER 19	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7231	Furnace/AC - SEER 20	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7232	Furnace/AC - SEER 21	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 42% of MF homes have central AC; assumes 86% of homes are in low-rise buildings (14% of homes assumed to be in high-rise buildings with chillers)
7233	SEER21 Minisplit Heat pump	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 11% of multimily homes use electric heat - assumes half of new construction with electric heat will use heat pump technology
7234	Boiler 87% plus AFUE 82 AFUE BASE	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers
7235	Boiler 90% plus AFUE 82 AFUE BASE	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers
7236	Boiler 92% plus AFUE 82 AFUE BASE	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers
7237	Boiler 95% plus AFUE 82 AFUE BASE	MF	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of multifamily homes with boilers
7238	ENERGY STAR Room AC	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	PA 2011	Base Saturation: saturation of primary and secondary room air conditioners
7239	CEE Tier 2 Room AC	MAN	ROB	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	PA 2011	Base Saturation: saturation of primary and secondary room air conditioners
7240	Room AC recycling	MAN	Retrofit	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: saturation of tertiary room air conditioners
7241	ASHP - SEER 15	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7242	ASHP - SEER 16	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7243	ASHP - SEER 17	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7244	ASHP - SEER 18	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7245	DFHP - SEER 15 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7246	DFHP - SEER 16 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7247	DFHP - SEER 17 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7248	DFHP - SEER 18 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7249	Furnace/AC - SEER 15	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7250	Furnace/AC - SEER 16	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7251	Furnace/AC - SEER 17	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7252	GSHP - EER 17 ASHP Base	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7253	GSHP - EER 19 ASHP Base	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7254	High efficiency 92 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7255	High efficiency 94 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7256	High efficiency 95 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7257	RCA 10% improvement	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: % of manufactured homes with central AC; EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7258	RCA 15% improvement	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: % of manufactured homes with central AC; EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance
7259	RCA 5% improvement	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	RECS 2009	Base saturation: % of manufactured homes with central AC; EE Saturation: Michigan-specific RECS 2009 data - homes with routine AC maintenance

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
7260	Setback thermostat - full setback	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of manufactured homes with programmable thermostats
7261	Setback thermostat - moderate setback	MAN	Retrofit	NLI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of manufactured homes with programmable thermostats
7262	Setback thermostat - moderate setback	MAN	Retrofit	LI	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	MI Baseline 2011	EE saturation: % of manufactured homes with programmable thermostats
7263	Whole House Fan	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	CASE	EE Saturation: % of homes with whole house attic fans
7264	High efficiency 93 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7265	High efficiency 96 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7266	High efficiency 97 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7267	High efficiency 98 AFUE furnace with ECM	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base Saturation: % of manufactured homes with gas furnaces; EE saturation: Based on review of various Michigan sources
7268	ECM Furnace Fan	MAN	Retrofit	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Annual Elec. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual kW. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual Non-Elec Savings: Heating penalty taken from p. 87 of MASS TRM; Base Saturation; % of single-family homes with gas furnaces EE saturation: Based on review of various Michigan sources
7269	Furnace/AC - SEER 18	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7270	Furnace/AC - SEER 19	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7271	Furnace/AC - SEER 20	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7272	Furnace/AC - SEER 21	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: % of manufactured homes with central AC; EE saturation: Based on review of various Michigan sources
7273	ASHP - SEER 19	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7274	ASHP - SEER 20	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7275	ASHP - SEER 21	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming half of this group uses heat pumps for heating; EE saturation: Based on review of various Michigan sources
7276	DFHP - SEER 19 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7277	DFHP - SEER 20 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7278	DFHP - SEER 21 with 95 AFUE furnace	MAN	ROB	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS	Base saturation: 1% of manufactured homes use electric heat - assuming one-quarter of this group uses dual-fuel heat pumps for heating; EE saturation: Based on review of various Michigan sources
7279	ENERGY STAR Room AC	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: saturation of primary and secondary room air conditioners
7280	CEE Tier 2 Room AC	MAN	NC	All	MEMD	-	MEMD	MEMD	MEMD	-	-	-	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: saturation of primary and secondary room air conditioners
7281	ASHP - SEER 15	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7282	ASHP - SEER 16	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7283	ASHP - SEER 17	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7284	ASHP - SEER 18	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7285	DFHP - SEER 15 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
7286	DFHP - SEER 16 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
7287	DFHP - SEER 17 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
7288	DFHP - SEER 18 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
7289	Furnace/AC - SEER 15	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7290	Furnace/AC - SEER 16	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7291	Furnace/AC - SEER 17	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7292	GSHP - EER 17 ASHP Base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes new construction with electric heat will use heat pump technology
7293	GSHP - EER 19 ASHP Base	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes new construction with electric heat will use heat pump technology
7294	High efficiency 92 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7295	High efficiency 94 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7296	High efficiency 95 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7297	Setback thermostat - full setback	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7298	Setback thermostat - moderate setback	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7299	Whole House Fan	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	GDS	GDS/NC	
7300	High efficiency 93 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7301	High efficiency 96 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7302	High efficiency 97 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7303	High efficiency 98 AFUE furnace with ECM	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base Saturation: % of manufactured homes with gas furnaces
7304	ECM Furnace Fan	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Annual Elec. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual kW. Savings: Assumed to be equal to the savings High efficiency 98 AFUE furnace with ECM measure; Annual Non-Elec Savings: Heating penalty taken from p. 87 of MASS TRM; Base Saturation; % of single-family homes with gas furnace
7305	Furnace/AC - SEER 18	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7306	Furnace/AC - SEER 19	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7307	Furnace/AC - SEER 20	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7308	Furnace/AC - SEER 21	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: % of manufactured homes with central AC
7309	ASHP - SEER 19	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7310	ASHP - SEER 20	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7311	ASHP - SEER 21	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will use heat pump technology
7312	DFHP - SEER 19 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
7313	DFHP - SEER 20 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
7314	DFHP - SEER 21 with 95 AFUE furnace	MAN	NC	All	-	-	MEMD	MEMD	MEMD	-	-	MEMD	-	MEMD	MEMD	MI Baseline 2011 / GDS	GDS/NC	Base saturation: 1% of manufactured homes use electric heat - assumes half of new construction market with electric heat will dual-fuel use heat pump technology
8000	Behavioral Programs																	
8001	Behavior Modification: Home Energy Reports (All Years)	SF	Retrofit	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS calc	-	MEMD / GDS	-	MEMD	MEMD	GDS	GDS	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of single-family homes; Annual kWh Savings: Averages the first year (1.05%) and consecutive year (1.34%) savings for 7k-9k kWh/yr households in MEMD; Per-unit kW Savings: Divides kWh savings by 8,760 hours/yr; Base Annual Non-elec Use: GDS calc using Michigan data Annual Non-Elec Savings: Averages the first year (0.64%) and consecutive year (0.71%) savings for 7k-9k kWh/yr households in MEMD; EE saturation: GDS estimate

Michigan - Residential Measure Database - Sources

Measure ID	Measure Name	Home Type (SF/ MF/ MAN)	ROB vs. Retrofit vs. Old vs. Average vs. NC	Income Target (All / NLI / LI)	Base Elec. Use (kWh)	% Elec. Savings	Annual Elec. Savings (kWh)	Per Unit Winter NCP kW Savings	Per Unit Summer NCP kW Savings	Base Annual Non-elec (MMBTU)	% Non-elec Savings	Annual Non-elec. Savings (MMBTU)	Annual Water Savings (gal.)	Useful Life	Incremental /Full Cost	Base Saturation	EE Saturation	Notes
8002	Real-time feedback	SF	Retrofit	All	MEMD / GDS	-	ODC/MA	GDS	GDS	GDS calc	-	ODC/MA	-	VT TRM	ECW	GDS	GDS	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of single-family homes; Energy: Based on opt-in program in Massachusetts ; Gas reduced based on gas:electric ratio for OPower ; reduced by 5% to account for cross-cutting savings Demand: Assumed consistent conservation across all annual hours (GDS est) Base and EE saturation: GDS estimate
8003	Behavior Modification: Home Energy Reports (All Years)	SF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS calc	-	MEMD / GDS	-	MEMD	MEMD	GDS	GDS/NC	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of single-family homes; Annual kWh Savings: Averages the first year (1.05%) and consecutive year (1.34%) savings for 7k-9k kWh/yr households in MEMD; Per-unit kW Savings: Divides kWh savings by 8,760 hours/yr; Base Annual Non-elec Use: GDS calc using Michigan data Annual Non-Elec Savings: Averages the first year (0.64%) and consecutive year (0.71%) savings for 7k-9k kWh/yr households in MEMD;
8004	Real-time feedback	SF	NC	All	MEMD / GDS	-	ODC/MA	GDS	GDS	GDS calc	-	ODC/MA	-	VT TRM	ECW	GDS	GDS/NC	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of single-family homes; Energy: Based on opt-in program in Massachusetts ; Gas reduced based on gas:electric ratio for OPower ; reduced by 5% to account for cross-cutting savings Demand: Assumed consistent conservation across all annual hours (GDS est) Base saturation: GDS estimate
8005	Behavior Modification: Home Energy Reports (All Years)	MF	Retrofit	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS calc	-	MEMD / GDS	-	MEMD	MEMD	GDS	GDS	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of multifamily homes; Annual kWh Savings: Averages the first year (1.05%) and consecutive year (1.34%) savings for 7k-9k kWh/yr households in MEMD; Per-unit kW Savings: Divides kWh savings by 8,760 hours/yr; Base Annual Non-elec Use: GDS calc using Michigan data Annual Non-Elec Savings: Averages the first year (0.64%) and consecutive year (0.71%) savings for 7k-9k kWh/yr households in MEMD; EE saturation: GDS estimate
8006	Real-time feedback	MF	Retrofit	All	MEMD / GDS	-	ODC/MA	GDS	GDS	GDS calc	-	ODC/MA	-	VT TRM	ECW	GDS	GDS	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of multifamily homes; Energy: Based on opt-in program in Massachusetts ; Gas reduced based on gas:electric ratio for OPower ; reduced by 5% to account for cross-cutting savings Demand: Assumed consistent conservation across all annual hours (GDS est) Base and EE saturation: GDS estimate
8007	Behavior Modification: Home Energy Reports (All Years)	MF	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS calc	-	MEMD / GDS	-	MEMD	MEMD	GDS	GDS/NC	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of multifamily homes; Annual kWh Savings: Averages the first year (1.05%) and consecutive year (1.34%) savings for 7k-9k kWh/yr households in MEMD; Per-unit kW Savings: Divides kWh savings by 8,760 hours/yr; Base Annual Non-elec Use: GDS calc using Michigan data Annual Non-Elec Savings: Averages the first year (0.64%) and consecutive year (0.71%) savings for 7k-9k kWh/yr households in MEMD;
8008	Real-time feedback	MF	NC	All	MEMD / GDS	-	ODC/MA	GDS	GDS	GDS calc	-	ODC/MA	-	VT TRM	ECW	GDS	GDS/NC	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of multifamily homes; Energy: Based on opt-in program in Massachusetts ; Gas reduced based on gas:electric ratio for OPower ; reduced by 5% to account for cross-cutting savings Demand: Assumed consistent conservation across all annual hours (GDS est) Base saturation: GDS estimate
8009	Behavior Modification: Home Energy Reports (All Years)	MAN	Retrofit	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS calc	-	MEMD / GDS	-	MEMD	MEMD	GDS	GDS	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of manufactured homes; Annual kWh Savings: Averages the first year (1.05%) and consecutive year (1.34%) savings for 7k-9k kWh/yr households in MEMD; Per-unit kW Savings: Divides kWh savings by 8,760 hours/yr; Base Annual Non-elec Use: GDS calc using Michigan data Annual Non-Elec Savings: Averages the first year (0.64%) and consecutive year (0.71%) savings for 7k-9k kWh/yr households in MEMD; EE saturation: GDS estimate
8010	Real-time feedback	MAN	Retrofit	All	MEMD / GDS	-	ODC/MA	GDS	GDS	GDS calc	-	ODC/MA	-	VT TRM	ECW	GDS	GDS	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of manufactured homes; Energy: Based on opt-in program in Massachusetts ; Gas reduced based on gas:electric ratio for OPower ; reduced by 5% to account for cross-cutting savings Demand: Assumed consistent conservation across all annual hours (GDS est) Base and EE saturation: GDS estimate
8011	Behavior Modification: Home Energy Reports (All Years)	MAN	NC	All	MEMD / GDS	-	MEMD / GDS	MEMD / GDS	MEMD / GDS	GDS calc	-	MEMD / GDS	-	MEMD	MEMD	GDS	GDS/NC	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of manufactured homes; Annual kWh Savings: Averages the first year (1.05%) and consecutive year (1.34%) savings for 7k-9k kWh/yr households in MEMD; Per-unit kW Savings: Divides kWh savings by 8,760 hours/yr; Base Annual Non-elec Use: GDS calc using Michigan data Annual Non-Elec Savings: Averages the first year (0.64%) and consecutive year (0.71%) savings for 7k-9k kWh/yr households in MEMD;
8012	Real-time feedback	MAN	NC	All	MEMD / GDS	-	ODC/MA	GDS	GDS	GDS calc	-	ODC/MA	-	VT TRM	ECW	GDS	GDS/NC	Base Elec Use: Based on GDS sales forecast - adjusted based on square footage of manufactured homes; Energy: Based on opt-in program in Massachusetts ; Gas reduced based on gas:electric ratio for OPower ; reduced by 5% to account for cross-cutting savings Demand: Assumed consistent conservation across all annual hours (GDS est) Base saturation: GDS estimate

Abbreviations

ACEEE (A041): Set-Top Boxes: Opportunities and Issues in Setting Efficiency Standards, Report Number A041.
ACEEE (Bendt): From 2010 ACEEE Summer Study on Energy Efficiency in Buildings, "Are We Missing Energy Savings in Clothes Dryers?", Paul Bendt, Ecos. 2010.
CASE: Codes and Standards Enhancement Initiative - Analysis of Standards Options for Whole House Fans, prepared by Davis Energy Group.
Cadmus Group, Michigan Appliance Recycling Metering Study: Overview of the Study and the Results, August 2012
CEE: Email exchange with Eileen Eaton (CEE) on 6/15/2012. Speculated based on industry sources that ~ 1/3 of all pool pumps are two-speed or greater
CFR/GDS: Referenced Code of Federal Regulations in order to calculate updated baseline electric use for refrigerators and freezers
DC SEU TRM: Technical Reference Manual (TRM) Measure Savings Algorithms and Cost Assumptions. August 2012.
DOE: Department of Energy, DOE Final Rule - 77 FR 31918 (May 30, 2012); used to calculate updated base electric use for dishwashers
ECW: Energy Center of Wisconsin - "Focus on Energy - PowerCost Monitor Study", 2010
ES Calc-IT: Energy Star Low Carbon IT Savings Calc. V26 w/ 5.0 (Also see Computers worksheet)
ES Dishwasher 5.0 / GDS: GDS calculated the savings using Draft 2 Version 5.0 of the ENERGY STAR specs for dishwashers, along with the new federal baseline (see DOE abbreviation for details); applied ratio of baseline electric standard to ES electric standard to calculate gas savings
ES Dryer Rpt: ENERGY STAR Market & Industry Scoping Report Residential Clothes Dryers November 2011
ES Refrigerators 5.0: ENERGY STAR Product Specification for Residential Refrigerators and Freezers version 5.0
ES Unit Ship: Data from various ENERGY STAR Unit Shipment and Market Penetration Reports
ES Unit Ship / GDS: GDS estimated the holiday light saturation based on 2-yrs of ENERGY STAR unit shipment data
GDS: GDS assumption. See source notes.
GDS Calc: GDS calculation. See source notes.
GDS / DC SEU / Ohio TRM: Algorithm used for savings estimate taken from the DC SEU TRM; waste heat factors taken from the Ohio TRM (2010, VEIC).
LBNL: Ernest Orlando Lawrence Berkeley National Laboratory report, "Do Heat Pump Clothes Dryers Make Sense for the U.S. Market?," August 2010
LBNL / GDS: Utilized the baseline integrated energy factor of 4.52 from Table 1 of the Ernest Orlando Lawrence Berkeley National Laboratory report, "Do Heat Pump Clothes Dryers Make Sense for the U.S. Market?," August 2010. GDS then calculated the savings using the residential dryer savings algorithm from the MEMD
MA Baseline 2009: Massachusetts Residential Appliance Saturation Survey (RASS), Opinion Dynamics Corporation, April 2009
MEMD: Michigan Energy Measures Database, received via email from Rick Morgan on August 2, 2013.
MEMD/GDS: The MEMD is the primary source; GDS made various adjustments to account for things like prospective changes to federal standards
MEMD Work Papers: Source calculations and data used in developing the MEMD; received via email from Rick Morgan on August 8, 2013.
Mid Atl TRM: Mid-Atlantic Technical Reference Manual. Version 2.0
Mid Atl TRM / GDS : Algorithm and heat pump water heater efficiency taken from the Mid-Atlantic Technical Reference Manual. Version 2.0; savings estimate calculated independently by GDS
MI Baseline 2011: Michigan Baseline Study 2011: Residential Baseline Report, July 2011. The Cadmus Group Inc.
MI Baseline 2011 / DOE 2010: Socket counts taken from the 2011 Michigan Baseline study; % of sockets that are specialty vs. standard etc. taken from the January 2012 Department of Energy report, "2010 U.S. Lighting Market Characterization."
MI Baseline 2011 / GDS: Data from the 2011 Michigan Baseline study used as the basis for the estimate; GDS refined the estimate to align with specific market segments as necessary
MI Comm Base: Michigan Baseline Study 2011: Commercial Baseline Report, July 2011. The Cadmus Group Inc.
NEEP: Northeast Residential Lighting Strategy. Presented by NEEP. March 2012.
NEEP / DC SEU: Used assumed wattages presented in NEEP RLS report ; used remaining algorithm/assumptions in DC SEU TRM
NEEP (ETR): NEEP Emerging Technologies Report (Feb. 13, 2013)
NEEP (ETR) / RIA 2010 / GDS: Utilized Table 11-3 from the NEEP Emerging Technologies Report (Feb. 13, 2013) and Table F.1 from the Research into Action report, "Electronics and Energy Efficiency: A Plug Load Characterization Study," (January 29, 2010), to independently calculate the savings estimate of set-top boxes.
ODC/MA: Massachusetts 3-Year Cross-Cutting Behavioral Program Evaluation Integrated Report. July 2012. Completed by Opinion Dynamics & Navigant Consulting
PA 2011: Pennsylvania Statewide Residential End-Use and Saturation Study. GDS Associates. 2011.
PA Baseline 2011 / GDS: GDS estimate of homes with secondary dehumidifiers using 2011 Pennsylvania baseline study regarding penetration and saturation percentages
RECS 2009: Residential Energy Consumption Survey. EIA. 2009. Restricted to DC,MD, VT, DE sub-region.
RIA 2010: Electronics and Energy Efficiency: A Plug Load Characterization Study. Appendix K. Prepared by Research Into Action for Southern California Edison.
VT TRM: Technical Reference Manual. Measure Savings Algorithms and Cost Assumptions. Efficiency Vermont. December 31, 2011.
VT TRM / GDS: Assumes same useful life for laptops as desktops

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
1000	Appliances		
1001	Refrigerator Retirement (and Recycling) - No Replacement	$0.01	$0.00
1002	Freezer Retirement (and Recycling) - No Replacement	$0.01	$0.00
1003	Dehumidifier Retirement (and Recycling) - No Replacement	$0.01	$0.00
1004	Energy Star Dehumidifier	$0.04	$0.00
1005	ENERGY STAR Refrigerators	$0.09	$0.00
1006	ENERGY STAR Freezers	$0.02	$0.00
1007	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	$0.00	$76.41
1008	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	$0.28	$82.01
1009	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	$0.35	$101.21
1010	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	$0.35	$0.00
1011	High Efficiency Gas Clothes Dryer with Moisture Sensor	$0.00	$64.81
1012	High Efficiency Electric Clothes Dryer with Moisture Sensor	$0.24	$0.00
1013	Heat Pump Electric Dryer	$0.34	$0.00
1014	Tier 2 Energy Star Dishwasher (electric water heating)	$0.24	$0.00
1015	Tier 2 Energy Star Dishwasher (gas water heating)	$0.20	$59.20
1016	Energy Star Dehumidifier	$0.04	$0.00
1017	ENERGY STAR Refrigerators	$0.09	$0.00
1018	ENERGY STAR Freezers	$0.02	$0.00
1019	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	$0.00	$76.41
1020	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	$0.28	$82.01
1021	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	$0.35	$101.21
1022	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	$0.35	$0.00
1023	High Efficiency Gas Clothes Dryer with Moisture Sensor	$0.00	$64.81
1024	High Efficiency Electric Clothes Dryer with Moisture Sensor	$0.24	$0.00
1025	Heat Pump Electric Dryer	$0.34	$0.00
1026	Tier 2 Energy Star Dishwasher (electric water heating)	$0.24	$0.00
1027	Tier 2 Energy Star Dishwasher (gas water heating)	$0.20	$59.20
1028	Refrigerator Retirement (and Recycling) - No Replacement	$0.01	$0.00
1029	Freezer Retirement (and Recycling) - No Replacement	$0.01	$0.00
1030	Dehumidifier Retirement (and Recycling) - No Replacement	$0.01	$0.00
1031	Energy Star Dehumidifier	$0.04	$0.00
1032	ENERGY STAR Refrigerators	$0.09	$0.00
1033	ENERGY STAR Freezers	$0.02	$0.00
1034	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	$0.00	$76.41
1035	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	$0.28	$82.01
1036	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	$0.35	$101.21
1037	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	$0.35	$0.00
1038	High Efficiency Gas Clothes Dryer with Moisture Sensor	$0.00	$64.81
1039	High Efficiency Electric Clothes Dryer with Moisture Sensor	$0.24	$0.00
1040	Heat Pump Electric Dryer	$0.34	$0.00
1041	Tier 2 Energy Star Dishwasher (electric water heating)	$0.24	$0.00
1042	Tier 2 Energy Star Dishwasher (gas water heating)	$0.20	$59.20
1043	Energy Star Dehumidifier	$0.04	$0.00
1044	ENERGY STAR Refrigerators	$0.09	$0.00
1045	ENERGY STAR Freezers	$0.02	$0.00
1046	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	$0.00	$76.41
1047	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	$0.28	$82.01
1048	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	$0.35	$101.21
1049	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	$0.35	$0.00
1050	High Efficiency Gas Clothes Dryer with Moisture Sensor	$0.00	$64.81
1051	High Efficiency Electric Clothes Dryer with Moisture Sensor	$0.24	$0.00
1052	Heat Pump Electric Dryer	$0.34	$0.00
1053	Tier 2 Energy Star Dishwasher (electric water heating)	$0.24	$0.00
1054	Tier 2 Energy Star Dishwasher (gas water heating)	$0.20	$59.20
1055	Refrigerator Retirement (and Recycling) - No Replacement	$0.01	$0.00
1056	Freezer Retirement (and Recycling) - No Replacement	$0.01	$0.00
1057	Dehumidifier Retirement (and Recycling) - No Replacement	$0.01	$0.00

Measure-level Levelized Costs

Measure #	*Measure Name*	*Levelized Cost/kWh (- Admin)*	*Levelized Cost/MMBTu (- Admin)*
1058	Energy Star Dehumidifier	$0.04	$0.00
1059	ENERGY STAR Refrigerators	$0.09	$0.00
1060	ENERGY STAR Freezers	$0.02	$0.00
1061	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	$0.00	$76.41
1062	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	$0.28	$82.01
1063	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	$0.35	$101.21
1064	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	$0.35	$0.00
1065	High Efficiency Gas Clothes Dryer with Moisture Sensor	$0.00	$64.81
1066	High Efficiency Electric Clothes Dryer with Moisture Sensor	$0.24	$0.00
1067	Heat Pump Electric Dryer	$0.34	$0.00
1068	Tier 2 Energy Star Dishwasher (electric water heating)	$0.24	$0.00
1069	Tier 2 Energy Star Dishwasher (gas water heating)	$0.20	$59.20
1070	Energy Star Dehumidifier	$0.04	$0.00
1071	ENERGY STAR Refrigerators	$0.09	$0.00
1072	ENERGY STAR Freezers	$0.02	$0.00
1073	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	$0.00	$76.41
1074	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	$0.28	$82.01
1075	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	$0.35	$101.21
1076	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	$0.35	$0.00
1077	High Efficiency Gas Clothes Dryer with Moisture Sensor	$0.00	$64.81
1078	High Efficiency Electric Clothes Dryer with Moisture Sensor	$0.24	$0.00
1079	Heat Pump Electric Dryer	$0.34	$0.00
1080	Tier 2 Energy Star Dishwasher (electric water heating)	$0.24	$0.00
1081	Tier 2 Energy Star Dishwasher (gas water heating)	$0.20	$59.20
2000	Electronics		
2001	Smart Strip plug outlet	$0.40	$0.00
2002	Efficient Set Top Box	$0.03	$0.00
2003	ENERGY STAR + 10% Display	$0.01	$0.00
2004	ENERGY STAR + 30% Display	$0.01	$0.00
2005	ENERGY STAR + 50 % Display	$0.01	$0.00
2006	ENERGY STAR 6.0 TV + 20% (0-20")	$0.01	$0.00
2007	ENERGY STAR 6.0 TV + 20% (21-30")	$0.00	$0.00
2008	ENERGY STAR 6.0 TV + 20% (31-40")	$0.00	$0.00
2009	ENERGY STAR 6.0 TV + 20% (41-50")	$0.00	$0.00
2010	ENERGY STAR 6.0 TV + 20% (51-60")	$0.00	$0.00
2011	ENERGY STAR 6.0 TV + 20% (over 60")	$0.00	$0.00
2012	ENERGY STAR PC	$0.03	$0.00
2013	ES Laptop	$0.05	$0.00
2014	ES Laptop (Power Mgmt Enabled)	$0.23	$0.00
2015	Smart Strip plug outlet	$0.40	$0.00
2016	Efficient Set Top Box	$0.03	$0.00
2017	ENERGY STAR + 10% Display	$0.01	$0.00
2018	ENERGY STAR + 30% Display	$0.01	$0.00
2019	ENERGY STAR + 50 % Display	$0.01	$0.00
2020	ENERGY STAR 6.0 TV + 20% (0-20")	$0.01	$0.00
2021	ENERGY STAR 6.0 TV + 20% (21-30")	$0.00	$0.00
2022	ENERGY STAR 6.0 TV + 20% (31-40")	$0.00	$0.00
2023	ENERGY STAR 6.0 TV + 20% (41-50")	$0.00	$0.00
2024	ENERGY STAR 6.0 TV + 20% (51-60")	$0.00	$0.00
2025	ENERGY STAR 6.0 TV + 20% (over 60")	$0.00	$0.00
2026	ENERGY STAR PC	$0.03	$0.00
2027	ES Laptop	$0.05	$0.00
2028	ES Laptop (Power Mgmt Enabled)	$0.23	$0.00
2029	Smart Strip plug outlet	$0.40	$0.00
2030	Efficient Set Top Box	$0.03	$0.00
2031	ENERGY STAR + 10% Display	$0.01	$0.00
2032	ENERGY STAR + 30% Display	$0.01	$0.00
2033	ENERGY STAR + 50 % Display	$0.01	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
2034	ENERGY STAR 6.0 TV + 20% (0-20")	$0.01	$0.00
2035	ENERGY STAR 6.0 TV + 20% (21-30")	$0.00	$0.00
2036	ENERGY STAR 6.0 TV + 20% (31-40")	$0.00	$0.00
2037	ENERGY STAR 6.0 TV + 20% (41-50")	$0.00	$0.00
2038	ENERGY STAR 6.0 TV + 20% (51-60")	$0.00	$0.00
2039	ENERGY STAR 6.0 TV + 20% (over 60")	$0.00	$0.00
2040	ENERGY STAR PC	$0.03	$0.00
2041	ES Laptop	$0.05	$0.00
2042	ES Laptop (Power Mgmt Enabled)	$0.23	$0.00
2043	Smart Strip plug outlet	$0.40	$0.00
2044	Efficient Set Top Box	$0.03	$0.00
2045	ENERGY STAR + 10% Display	$0.01	$0.00
2046	ENERGY STAR + 30% Display	$0.01	$0.00
2047	ENERGY STAR + 50 % Display	$0.01	$0.00
2048	ENERGY STAR 6.0 TV + 20% (0-20")	$0.01	$0.00
2049	ENERGY STAR 6.0 TV + 20% (21-30")	$0.00	$0.00
2050	ENERGY STAR 6.0 TV + 20% (31-40")	$0.00	$0.00
2051	ENERGY STAR 6.0 TV + 20% (41-50")	$0.00	$0.00
2052	ENERGY STAR 6.0 TV + 20% (51-60")	$0.00	$0.00
2053	ENERGY STAR 6.0 TV + 20% (over 60")	$0.00	$0.00
2054	ENERGY STAR PC	$0.03	$0.00
2055	ES Laptop	$0.05	$0.00
2056	ES Laptop (Power Mgmt Enabled)	$0.23	$0.00
2057	Smart Strip plug outlet	$0.40	$0.00
2058	Efficient Set Top Box	$0.03	$0.00
2059	ENERGY STAR + 10% Display	$0.01	$0.00
2060	ENERGY STAR + 30% Display	$0.01	$0.00
2061	ENERGY STAR + 50 % Display	$0.01	$0.00
2062	ENERGY STAR 6.0 TV + 20% (0-20")	$0.01	$0.00
2063	ENERGY STAR 6.0 TV + 20% (21-30")	$0.00	$0.00
2064	ENERGY STAR 6.0 TV + 20% (31-40")	$0.00	$0.00
2065	ENERGY STAR 6.0 TV + 20% (41-50")	$0.00	$0.00
2066	ENERGY STAR 6.0 TV + 20% (51-60")	$0.00	$0.00
2067	ENERGY STAR 6.0 TV + 20% (over 60")	$0.00	$0.00
2068	ENERGY STAR PC	$0.03	$0.00
2069	ES Laptop	$0.05	$0.00
2070	ES Laptop (Power Mgmt Enabled)	$0.23	$0.00
2071	Smart Strip plug outlet	$0.40	$0.00
2072	Efficient Set Top Box	$0.03	$0.00
2073	ENERGY STAR + 10% Display	$0.01	$0.00
2074	ENERGY STAR + 30% Display	$0.01	$0.00
2075	ENERGY STAR + 50 % Display	$0.01	$0.00
2076	ENERGY STAR 6.0 TV + 20% (0-20")	$0.01	$0.00
2077	ENERGY STAR 6.0 TV + 20% (21-30")	$0.00	$0.00
2078	ENERGY STAR 6.0 TV + 20% (31-40")	$0.00	$0.00
2079	ENERGY STAR 6.0 TV + 20% (41-50")	$0.00	$0.00
2080	ENERGY STAR 6.0 TV + 20% (51-60")	$0.00	$0.00
2081	ENERGY STAR 6.0 TV + 20% (over 60")	$0.00	$0.00
2082	ENERGY STAR PC	$0.03	$0.00
2083	ES Laptop	$0.05	$0.00
2084	ES Laptop (Power Mgmt Enabled)	$0.23	$0.00
3000	Lighting		
3001	CFL bulbs - 9W	$0.03	$0.00
3002	CFL bulbs - 14W	$0.02	$0.00
3003	CFL bulbs - 20W	$0.02	$0.00
3004	CFL bulbs - 26W	$0.01	$0.00
3005	LED Replacing A-line 40W	$0.05	$0.00
3006	LED Replacing A-line 60W	$0.03	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
3007	LED Replacing A-line 75W (53W halogen)	$0.07	$0.00
3008	LED Replacing A-line 100W (72W Halogen)	$0.08	$0.00
3009	LED Lighting (screw-in) ; 2021 and later	$0.06	$0.00
3010	CFL bulbs high wattage	$0.02	$0.00
3011	LED fixtures downlights	$0.10	$0.00
3012	CFL bulbs 3-Way	$0.02	$0.00
3013	CFL bulbs dimmable	$0.04	$0.00
3014	CFL bulbs Globe	$0.05	$0.00
3015	CFL bulbs candelabra	$0.05	$0.00
3016	LED Flood PAR (average values)	$0.03	$0.00
3017	LED Globe	$0.07	$0.00
3018	LED Night Light	$0.01	$0.00
3019	Torchiere Floor Lamps	$0.04	$0.00
3020	Outdoor LED PAR/Flood	$0.01	$0.00
3021	Holiday Lights	$0.16	$0.00
3022	HPT8 4ft 2 lamp replacing T12	$0.52	$0.00
3023	LW HPT8 4ft 2 lamp replacing T12	$0.38	$0.00
3024	CFL Exterior fixture - 1 Lamp	$0.05	$0.00
3025	LED Exterior fixture - 1 Lamp	$0.05	$0.00
3026	Occupancy Sensor	$0.26	$0.00
3027	CFL bulbs - 9W	$0.03	$0.00
3028	CFL bulbs - 14W	$0.02	$0.00
3029	CFL bulbs - 20W	$0.02	$0.00
3030	CFL bulbs - 26W	$0.01	$0.00
3031	LED Replacing A-line 40W	$0.05	$0.00
3032	LED Replacing A-line 60W	$0.03	$0.00
3033	LED Replacing A-line 75W (53W halogen)	$0.07	$0.00
3034	LED Replacing A-line 100W (72W Halogen)	$0.08	$0.00
3035	LED Lighting (screw-in) ; 2021 and later	$0.06	$0.00
3036	CFL bulbs high wattage	$0.02	$0.00
3037	LED fixtures downlights	$0.10	$0.00
3038	CFL bulbs 3-Way	$0.02	$0.00
3039	CFL bulbs dimmable	$0.04	$0.00
3040	CFL bulbs Globe	$0.05	$0.00
3041	CFL bulbs candelabra	$0.05	$0.00
3042	LED Flood PAR (average values)	$0.03	$0.00
3043	LED Globe	$0.07	$0.00
3044	LED Night Light	$0.01	$0.00
3045	Torchiere Floor Lamps	$0.04	$0.00
3046	Outdoor LED PAR/Flood	$0.01	$0.00
3047	Holiday Lights	$0.16	$0.00
3048	HPT8 4ft 2 lamp replacing T12	$0.52	$0.00
3049	LW HPT8 4ft 2 lamp replacing T12	$0.38	$0.00
3050	CFL Exterior fixture - 1 Lamp	$0.05	$0.00
3051	LED Exterior fixture - 1 Lamp	$0.05	$0.00
3052	Occupancy Sensor	$0.26	$0.00
3053	CFL bulbs - 9W	$0.03	$0.00
3054	CFL bulbs - 14W	$0.02	$0.00
3055	CFL bulbs - 20W	$0.02	$0.00
3056	CFL bulbs - 26W	$0.01	$0.00
3057	LED Replacing A-line 40W	$0.05	$0.00
3058	LED Replacing A-line 60W	$0.03	$0.00
3059	LED Replacing A-line 75W (53W halogen)	$0.07	$0.00
3060	LED Replacing A-line 100W (72W Halogen)	$0.08	$0.00
3061	LED Lighting (screw-in) ; 2021 and later	$0.06	$0.00
3062	CFL bulbs high wattage	$0.02	$0.00
3063	LED fixtures downlights	$0.10	$0.00
3064	CFL bulbs 3-Way	$0.02	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
3065	CFL bulbs dimmable	$0.04	$0.00
3066	CFL bulbs Globe	$0.05	$0.00
3067	CFL bulbs candelabra	$0.05	$0.00
3068	LED Flood PAR (average values)	$0.03	$0.00
3069	LED Globe	$0.07	$0.00
3070	LED Night Light	$0.01	$0.00
3071	Torchiere Floor Lamps	$0.04	$0.00
3072	Outdoor LED PAR/Flood	$0.01	$0.00
3073	Holiday Lights	$0.16	$0.00
3074	HPT8 4ft 2 lamp replacing T12	$0.52	$0.00
3075	LW HPT8 4ft 2 lamp replacing T12	$0.38	$0.00
3076	CFL Exterior fixture - 1 Lamp	$0.05	$0.00
3077	LED Exterior fixture - 1 Lamp	$0.05	$0.00
3078	Occupancy Sensor	$0.26	$0.00
3079	CFL Fixture	$0.01	$0.00
3080	CFL Screw in	$0.02	$0.00
3081	CFL Screw in - high wattage	$0.01	$0.00
3082	LED Screw in	$0.01	$0.00
3083	CFL Candelabra - 24/7	$0.02	$0.00
3084	CFL Candelabra - 12/7	$0.03	$0.00
3085	LED Candelabra - 24/7	$0.01	$0.00
3086	LED Candelabra - 12/7	$0.02	$0.00
3087	LED Globe - 24/7	$0.01	$0.00
3088	LED Globe - 12/7	$0.01	$0.00
3089	Exterior CFL Fixture - replace HID fixture in common area	$0.02	$0.00
3090	Photo Cell Daylight Sensor	$0.04	$0.00
3091	HPT8 4ft 2 lamp replacing T12, 12 hrs	$0.16	$0.00
3092	HPT8 4ft 2 lamp replacing T12, 24 hrs	$0.08	$0.00
3093	LW HPT8 4ft 2 lamp replacing T12, 12 hrs	$0.12	$0.00
3094	LW HPT8 4ft 2 lamp replacing T12, 24 hrs	$0.06	$0.00
3095	CFL bulbs - 9W	$0.03	$0.00
3096	CFL bulbs - 14W	$0.02	$0.00
3097	CFL bulbs - 20W	$0.02	$0.00
3098	CFL bulbs - 26W	$0.01	$0.00
3099	LED Replacing A-line 40W	$0.05	$0.00
3100	LED Replacing A-line 60W	$0.03	$0.00
3101	LED Replacing A-line 75W (53W halogen)	$0.07	$0.00
3102	LED Replacing A-line 100W (72W Halogen)	$0.08	$0.00
3103	LED Lighting (screw-in) ; 2021 and later	$0.06	$0.00
3104	CFL bulbs high wattage	$0.02	$0.00
3105	LED fixtures downlights	$0.10	$0.00
3106	CFL bulbs 3-Way	$0.02	$0.00
3107	CFL bulbs dimmable	$0.04	$0.00
3108	CFL bulbs Globe	$0.05	$0.00
3109	CFL bulbs candelabra	$0.05	$0.00
3110	LED Flood PAR (average values)	$0.03	$0.00
3111	LED Globe	$0.07	$0.00
3112	LED Night Light	$0.01	$0.00
3113	Torchiere Floor Lamps	$0.04	$0.00
3114	Outdoor LED PAR/Flood	$0.01	$0.00
3115	Holiday Lights	$0.16	$0.00
3116	HPT8 4ft 2 lamp replacing T12	$0.52	$0.00
3117	LW HPT8 4ft 2 lamp replacing T12	$0.38	$0.00
3118	CFL Exterior fixture - 1 Lamp	$0.05	$0.00
3119	LED Exterior fixture - 1 Lamp	$0.05	$0.00
3120	Occupancy Sensor	$0.26	$0.00
3121	CFL Fixture	$0.01	$0.00
3122	CFL Screw in	$0.02	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
3123	CFL Screw in - high wattage	$0.01	$0.00
3124	LED Screw in	$0.01	$0.00
3125	CFL Candelabra - 24/7	$0.02	$0.00
3126	CFL Candelabra - 12/7	$0.03	$0.00
3127	LED Candelabra - 24/7	$0.01	$0.00
3128	LED Candelabra - 12/7	$0.02	$0.00
3129	LED Globe - 24/7	$0.01	$0.00
3130	LED Globe - 12/7	$0.01	$0.00
3131	Exterior CFL Fixture - replace HID fixture in common area	$0.02	$0.00
3132	CFL bulbs - 9W	$0.03	$0.00
3133	CFL bulbs - 14W	$0.02	$0.00
3134	CFL bulbs - 20W	$0.02	$0.00
3135	CFL bulbs - 26W	$0.01	$0.00
3136	LED Replacing A-line 40W	$0.05	$0.00
3137	LED Replacing A-line 60W	$0.03	$0.00
3138	LED Replacing A-line 75W (53W halogen)	$0.07	$0.00
3139	LED Replacing A-line 100W (72W Halogen)	$0.08	$0.00
3140	LED Lighting (screw-in) ; 2021 and later	$0.06	$0.00
3141	CFL bulbs high wattage	$0.02	$0.00
3142	LED fixtures downlights	$0.10	$0.00
3143	CFL bulbs 3-Way	$0.02	$0.00
3144	CFL bulbs dimmable	$0.04	$0.00
3145	CFL bulbs Globe	$0.05	$0.00
3146	CFL bulbs candelabra	$0.05	$0.00
3147	LED Flood PAR (average values)	$0.03	$0.00
3148	LED Globe	$0.07	$0.00
3149	LED Night Light	$0.01	$0.00
3150	Torchiere Floor Lamps	$0.04	$0.00
3151	Outdoor LED PAR/Flood	$0.01	$0.00
3152	Holiday Lights	$0.16	$0.00
3153	HPT8 4ft 2 lamp replacing T12	$0.52	$0.00
3154	LW HPT8 4ft 2 lamp replacing T12	$0.38	$0.00
3155	CFL Exterior fixture - 1 Lamp	$0.05	$0.00
3156	LED Exterior fixture - 1 Lamp	$0.05	$0.00
3157	Occupancy Sensor	$0.26	$0.00
3158	CFL bulbs - 9W	$0.03	$0.00
3159	CFL bulbs - 14W	$0.02	$0.00
3160	CFL bulbs - 20W	$0.02	$0.00
3161	CFL bulbs - 26W	$0.01	$0.00
3162	LED Replacing A-line 40W	$0.05	$0.00
3163	LED Replacing A-line 60W	$0.03	$0.00
3164	LED Replacing A-line 75W (53W halogen)	$0.07	$0.00
3165	LED Replacing A-line 100W (72W Halogen)	$0.08	$0.00
3166	LED Lighting (screw-in) ; 2021 and later	$0.06	$0.00
3167	CFL bulbs high wattage	$0.02	$0.00
3168	LED fixtures downlights	$0.10	$0.00
3169	CFL bulbs 3-Way	$0.02	$0.00
3170	CFL bulbs dimmable	$0.04	$0.00
3171	CFL bulbs Globe	$0.05	$0.00
3172	CFL bulbs candelabra	$0.05	$0.00
3173	LED Flood PAR (average values)	$0.03	$0.00
3174	LED Globe	$0.07	$0.00
3175	LED Night Light	$0.01	$0.00
3176	Torchiere Floor Lamps	$0.04	$0.00
3177	Outdoor LED PAR/Flood	$0.01	$0.00
3178	Holiday Lights	$0.16	$0.00
3179	HPT8 4ft 2 lamp replacing T12	$0.52	$0.00
3180	LW HPT8 4ft 2 lamp replacing T12	$0.38	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
3181	CFL Exterior fixture - 1 Lamp	$0.05	$0.00
3182	LED Exterior fixture - 1 Lamp	$0.05	$0.00
3183	Occupancy Sensor	$0.26	$0.00
4000	Water Heating		
4001	Heat Pump Water Heaters	$0.03	$0.00
4002	Super Efficiency Gas Water Heater 0.70 EF	$0.00	$6.90
4003	Instant Gas Water Heater	$0.00	$6.85
4004	Tank Wrap	$0.00	$12.83
4005	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4006	Pipe Wrap - gas water heater - Insulated Pipe with R2	$0.00	$0.72
4007	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4008	Pipe Wrap - electric water heater - Insulated Pipe with R2	$0.04	$0.00
4009	Low Flow Showerheads 1.75 gpm - gas water heating	$0.00	$2.35
4010	Low Flow Showerheads 1.5 gpm - gas water heating	$0.00	$1.76
4011	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.41
4012	Low Flow Showerheads 1.0 gpm - gas water heating	$0.00	$1.18
4013	Low Flow Showerheads 0.5 gpm - gas water heating	$0.00	$0.88
4014	Low Flow Showerheads 1.75 gpm - electric water heating	$0.01	$0.00
4015	Low Flow Showerheads 1.5 gpm - electric water heating	$0.01	$0.00
4016	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4017	Low Flow Showerheads 1.0 gpm - electric water heating	$0.01	$0.00
4018	Low Flow Showerheads 0.5 gpm - electric water heating	$0.00	$0.00
4019	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4020	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4021	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.41
4022	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4023	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$1.07
4024	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$0.63
4025	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$7.31
4026	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$4.39
4027	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	$0.00	$3.06
4028	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	$0.00	$0.00
4029	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	$0.00	$0.00
4030	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	$0.03	$0.00
4031	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	$0.02	$0.00
4032	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	$0.01	$0.00
4033	Shower start - 1.75 gpm - gas water heating	$0.00	$4.26
4034	Shower start - 1.5 gpm - gas water heating	$0.00	$3.32
4035	Shower start - 1.75 gpm - electric water heating	$0.02	$0.00
4036	Shower start - 1.5 gpm - electric water heating	$0.01	$0.00
4037	Gravity Film Heat Exchanger GFX - gas water heating	$0.00	$90.25
4038	Gravity Film Heat Exchanger GFX - electric water heating	$0.44	$0.00
4039	Solar Domestic Hot Water - gas water heating	$0.00	$42.67
4040	Solar Domestic Hot Water - electric water heating	$0.20	$0.00
4041	Heat Pump Water Heaters	$0.03	$0.00
4042	Super Efficiency Gas Water Heater 0.70 EF	$0.00	$6.90
4043	Instant Gas Water Heater	$0.00	$6.85
4044	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4045	Pipe Wrap - gas water heater - Insulated Pipe with R2	$0.00	$0.72
4046	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4047	Pipe Wrap - electric water heater - Insulated Pipe with R2	$0.04	$0.00
4048	Low Flow Showerheads 1.75 gpm - gas water heating	$0.00	$2.35
4049	Low Flow Showerheads 1.5 gpm - gas water heating	$0.00	$1.76
4050	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.41
4051	Low Flow Showerheads 1.0 gpm - gas water heating	$0.00	$1.18
4052	Low Flow Showerheads 0.5 gpm - gas water heating	$0.00	$0.88
4053	Low Flow Showerheads 1.75 gpm - electric water heating	$0.01	$0.00
4054	Low Flow Showerheads 1.5 gpm - electric water heating	$0.01	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
4055	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4056	Low Flow Showerheads 1.0 gpm - electric water heating	$0.01	$0.00
4057	Low Flow Showerheads 0.5 gpm - electric water heating	$0.00	$0.00
4058	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$1.07
4059	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$0.63
4060	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$7.31
4061	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$4.39
4062	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	$0.00	$3.06
4063	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	$0.00	$0.00
4064	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	$0.00	$0.00
4065	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	$0.03	$0.00
4066	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	$0.02	$0.00
4067	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	$0.01	$0.00
4068	Shower start - 1.75 gpm - gas water heating	$0.00	$4.26
4069	Shower start - 1.5 gpm - gas water heating	$0.00	$3.32
4070	Shower start - 1.75 gpm - electric water heating	$0.02	$0.00
4071	Shower start - 1.5 gpm - electric water heating	$0.01	$0.00
4072	Gravity Film Heat Exchanger GFX - gas water heating	$0.00	$90.25
4073	Gravity Film Heat Exchanger GFX - electric water heating	$0.44	$0.00
4074	Solar Domestic Hot Water - gas water heating	$0.00	$42.67
4075	Solar Domestic Hot Water - electric water heating	$0.20	$0.00
4076	Heat Pump Water Heaters	$0.03	$0.00
4077	Super Efficiency Gas Water Heater 0.70 EF	$0.00	$6.90
4078	Instant Gas Water Heater	$0.00	$6.85
4079	Tank Wrap	$0.00	$12.83
4080	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4081	Pipe Wrap - gas water heater - Insulated Pipe with R2	$0.00	$0.72
4082	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4083	Pipe Wrap - electric water heater - Insulated Pipe with R2	$0.04	$0.00
4084	Low Flow Showerheads 1.75 gpm - gas water heating	$0.00	$2.40
4085	Low Flow Showerheads 1.5 gpm - gas water heating	$0.00	$1.80
4086	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.45
4087	Low Flow Showerheads 1.0 gpm - gas water heating	$0.00	$1.20
4088	Low Flow Showerheads 0.5 gpm - gas water heating	$0.00	$0.90
4089	Low Flow Showerheads 1.75 gpm - electric water heating	$0.01	$0.00
4090	Low Flow Showerheads 1.5 gpm - electric water heating	$0.01	$0.00
4091	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4092	Low Flow Showerheads 1.0 gpm - electric water heating	$0.01	$0.00
4093	Low Flow Showerheads 0.5 gpm - electric water heating	$0.00	$0.00
4094	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4095	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4096	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.45
4097	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4098	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$1.48
4099	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$0.87
4100	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$7.31
4101	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$4.24
4102	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	$0.00	$2.99
4103	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	$0.01	$0.00
4104	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	$0.00	$0.00
4105	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	$0.03	$0.00
4106	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	$0.02	$0.00
4107	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	$0.01	$0.00
4108	Shower start - 1.75 gpm - gas water heating	$0.00	$4.36
4109	Shower start - 1.5 gpm - gas water heating	$0.00	$3.40
4110	Shower start - 1.75 gpm - electric water heating	$0.02	$0.00
4111	Shower start - 1.5 gpm - electric water heating	$0.01	$0.00
4112	Gravity Film Heat Exchanger GFX - gas water heating	$0.00	$90.25

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
4113	Gravity Film Heat Exchanger GFX - electric water heating	$0.44	$0.00
4114	Solar Domestic Hot Water - gas water heating	$0.00	$42.67
4115	Solar Domestic Hot Water - electric water heating	$0.20	$0.00
4116	Heat Pump Water Heaters	$0.03	$0.00
4117	Super Efficiency Gas Water Heater 0.70 EF	$0.00	$6.90
4118	Instant Gas Water Heater	$0.00	$6.85
4119	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4120	Pipe Wrap - gas water heater - Insulated Pipe with R2	$0.00	$0.72
4121	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4122	Pipe Wrap - electric water heater - Insulated Pipe with R2	$0.04	$0.00
4123	Low Flow Showerheads 1.75 gpm - gas water heating	$0.00	$2.40
4124	Low Flow Showerheads 1.5 gpm - gas water heating	$0.00	$1.80
4125	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.45
4126	Low Flow Showerheads 1.0 gpm - gas water heating	$0.00	$1.20
4127	Low Flow Showerheads 0.5 gpm - gas water heating	$0.00	$0.90
4128	Low Flow Showerheads 1.75 gpm - electric water heating	$0.01	$0.00
4129	Low Flow Showerheads 1.5 gpm - electric water heating	$0.01	$0.00
4130	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4131	Low Flow Showerheads 1.0 gpm - electric water heating	$0.01	$0.00
4132	Low Flow Showerheads 0.5 gpm - electric water heating	$0.00	$0.00
4133	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$1.48
4134	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$0.87
4135	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$7.31
4136	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$4.24
4137	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	$0.00	$2.99
4138	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	$0.01	$0.00
4139	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	$0.00	$0.00
4140	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	$0.03	$0.00
4141	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	$0.02	$0.00
4142	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	$0.01	$0.00
4143	Shower start - 1.75 gpm - gas water heating	$0.00	$4.36
4144	Shower start - 1.5 gpm - gas water heating	$0.00	$3.40
4145	Shower start - 1.75 gpm - electric water heating	$0.02	$0.00
4146	Shower start - 1.5 gpm - electric water heating	$0.01	$0.00
4147	Gravity Film Heat Exchanger GFX - gas water heating	$0.00	$90.25
4148	Gravity Film Heat Exchanger GFX - electric water heating	$0.44	$0.00
4149	Solar Domestic Hot Water - gas water heating	$0.00	$42.67
4150	Solar Domestic Hot Water - electric water heating	$0.20	$0.00
4151	Heat Pump Water Heaters	$0.03	$0.00
4152	Super Efficiency Gas Water Heater 0.70 EF	$0.00	$6.90
4153	Instant Gas Water Heater	$0.00	$6.85
4154	Tank Wrap	$0.00	$12.83
4155	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4156	Pipe Wrap - gas water heater - Insulated Pipe with R2	$0.00	$0.72
4157	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4158	Pipe Wrap - electric water heater - Insulated Pipe with R2	$0.04	$0.00
4159	Low Flow Showerheads 1.75 gpm - gas water heating	$0.00	$2.35
4160	Low Flow Showerheads 1.5 gpm - gas water heating	$0.00	$1.76
4161	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.41
4162	Low Flow Showerheads 1.0 gpm - gas water heating	$0.00	$1.18
4163	Low Flow Showerheads 0.5 gpm - gas water heating	$0.00	$0.88
4164	Low Flow Showerheads 1.75 gpm - electric water heating	$0.01	$0.00
4165	Low Flow Showerheads 1.5 gpm - electric water heating	$0.01	$0.00
4166	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4167	Low Flow Showerheads 1.0 gpm - electric water heating	$0.01	$0.00
4168	Low Flow Showerheads 0.5 gpm - electric water heating	$0.00	$0.00
4169	Pipe Wrap - gas water heater - Insulated Pipe with R3	$0.00	$0.64
4170	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
4171	Low Flow Showerheads 1.25 gpm - gas water heating	$0.00	$1.41
4172	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4173	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$1.07
4174	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$0.63
4175	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$7.31
4176	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$4.39
4177	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	$0.00	$3.06
4178	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	$0.00	$0.00
4179	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	$0.00	$0.00
4180	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	$0.03	$0.00
4181	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	$0.02	$0.00
4182	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	$0.01	$0.00
4183	Shower start - 1.75 gpm - gas water heating	$0.00	$4.26
4184	Shower start - 1.5 gpm - gas water heating	$0.00	$3.32
4185	Shower start - 1.75 gpm - electric water heating	$0.02	$0.00
4186	Shower start - 1.5 gpm - electric water heating	$0.01	$0.00
4187	Gravity Film Heat Exchanger GFX - gas water heating	$0.00	$90.25
4189	Solar Domestic Hot Water - gas water heating	$0.00	$42.67
4190	Solar Domestic Hot Water - electric water heating	$0.20	$0.00
4192	Super Efficiency Gas Water Heater 0.70 EF	$0.00	$6.90
4193	Instant Gas Water Heater	$0.00	$6.85
4195	Pipe Wrap - gas water heater - Insulated Pipe with R2	$0.00	$0.72
4196	Pipe Wrap - electric water heater - Insulated Pipe with R3	$0.03	$0.00
4198	Low Flow Showerheads 1.75 gpm - gas water heating	$0.00	$2.35
4199	Low Flow Showerheads 1.5 gpm - gas water heating	$0.00	$1.76
4201	Low Flow Showerheads 1.0 gpm - gas water heating	$0.00	$1.18
4202	Low Flow Showerheads 0.5 gpm - gas water heating	$0.00	$0.88
4204	Low Flow Showerheads 1.5 gpm - electric water heating	$0.01	$0.00
4205	Low Flow Showerheads 1.25 gpm - electric water heating	$0.01	$0.00
4206	Low Flow Showerheads 1.0 gpm - electric water heating	$0.01	$0.00
4207	Low Flow Showerheads 0.5 gpm - electric water heating	$0.00	$0.00
4208	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$1.07
4209	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$0.63
4210	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	$0.00	$7.31
4211	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	$0.00	$4.39
4212	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	$0.00	$3.06
4213	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	$0.00	$0.00
4214	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	$0.00	$0.00
4215	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	$0.03	$0.00
4216	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	$0.02	$0.00
4217	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	$0.01	$0.00
4218	Shower start - 1.75 gpm - gas water heating	$0.00	$4.26
4219	Shower start - 1.5 gpm - gas water heating	$0.00	$3.32
4220	Shower start - 1.75 gpm - electric water heating	$0.02	$0.00
4221	Shower start - 1.5 gpm - electric water heating	$0.01	$0.00
4222	Gravity Film Heat Exchanger GFX - gas water heating	$0.00	$90.25
4223	Gravity Film Heat Exchanger GFX - electric water heating	$0.44	$0.00
4224	Solar Domestic Hot Water - gas water heating	$0.00	$42.67
4225	Solar Domestic Hot Water - electric water heating	$0.20	$0.00
5000	Other		
5001	Pump and Motor Single Speed	$0.02	$0.00
5002	Pump and motor w auto controls - multi speed	$0.07	$0.00
5003	Pump and Motor Single Speed	$0.02	$0.00
5004	Pump and motor w auto controls - multi speed	$0.07	$0.00
6000	HVAC (Envelope)		
6001	Airtight Can Lights	$0.10	$30.50
6002	Basement Wall Insulation	$0.00	$8.36
6003	Cool roof	$3.05	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	*Levelized Cost/kWh (- Admin)*	*Levelized Cost/MMBTu (- Admin)*
6004	Crawlspace Wall Insulation	$0.00	$7.87
6005	Door weatherstripping	$0.15	$42.59
6006	Duct Insulation	$0.00	$12.88
6007	Duct location	$0.04	$10.83
6008	Duct sealing 15% leakage base	$0.08	$23.66
6009	Duct sealing 20% leakage base	$0.05	$15.46
6010	Duct sealing 25% leakage base	$0.04	$11.55
6011	Duct sealing 30% leakage base	$0.03	$9.22
6012	Energy Star Door	$0.46	$135.95
6013	Floor Insulation	$0.00	$7.46
6014	Infiltration reduction - 10%	$0.02	$6.40
6015	Infiltration reduction - 15%	$0.01	$4.25
6016	Infiltration reduction - 20%	$0.01	$3.10
6017	Infiltration reduction - 30%	$0.01	$2.07
6018	Infiltration reduction - 40%	$0.01	$1.55
6019	Infiltration reduction - 50%	$0.00	$1.24
6020	Rim Joist Insulation	$0.02	$4.47
6021	Wall Insulation	$0.06	$18.54
6022	Window Film	$0.13	$0.00
6023	Window Replacement	$0.02	$5.42
6024	New vinyl window	$0.03	$10.17
6025	Original double hung window with low U storm	$0.04	$11.30
6026	Original double hung window with original storm window	$0.09	$25.51
6027	Rehabbed double hung	$0.11	$31.10
6028	Rehabbed double hung with low U storm	$0.09	$25.85
6029	Rehabbed double hung with single glazed storm	$0.10	$29.68
6030	R19 kneewalls	$0.01	$2.04
6031	R-38 "scuttle hole" Attic hatch	$0.00	$0.68
6032	R-38 pull-down stairs Attic hatch	$0.00	$0.68
6033	R-30 Roof Insulation	$0.09	$25.67
6034	R-38 Roof Insulation	$0.11	$31.75
6035	R-49 Roof Insulation	$0.14	$40.23
6036	R-60 Roof Insulation	$0.17	$48.63
6037	Low Income Weatherization Package	$0.06	$16.76
6038	Basement Wall Insulation	$0.00	$12.76
6039	Cool roof	$5.25	$0.00
6040	Crawlspace Wall Insulation	$0.00	$47.11
6041	Duct Insulation	$0.06	$16.72
6042	Duct location	$0.04	$10.77
6043	Duct sealing 15% leakage base	$0.15	$42.61
6044	Duct sealing 20% leakage base	$0.09	$27.49
6045	Duct sealing 25% leakage base	$0.07	$20.40
6046	Duct sealing 30% leakage base	$0.06	$16.26
6047	Energy Star Door	$0.46	$133.36
6048	Floor Insulation	$0.00	$31.56
6049	Infiltration reduction - 10%	$0.04	$13.09
6050	Infiltration reduction - 15%	$0.03	$8.70
6051	Infiltration reduction - 20%	$0.02	$6.08
6052	Infiltration reduction - 30%	$0.01	$4.04
6053	Infiltration reduction - 40%	$0.01	$3.03
6054	Infiltration reduction - 50%	$0.01	$2.42
6055	Wall Insulation	$0.10	$28.49
6056	Window Film	$0.14	$0.00
6057	Window Replacement	$0.03	$8.24
6058	R19 kneewalls	$0.01	$1.98
6059	R-38 "scuttle hole" Attic hatch	$0.00	$0.68
6060	R-38 pull-down stairs Attic hatch	$0.00	$0.67
6061	R-30 Roof Insulation	$0.09	$25.15

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
6062	R-38 Roof Insulation	$0.11	$31.12
6063	R-49 Roof Insulation	$0.13	$39.47
6064	R-60 Roof Insulation	$0.16	$47.73
6065	Low Income Weatherization Package	$0.09	$25.02
6066	Airtight Can Lights	$0.11	$30.83
6067	Basement Wall Insulation	$0.03	$7.35
6068	Cool roof	-$0.62	-$181.10
6069	Crawlspace Wall Insulation	$0.02	$5.15
6070	Door weatherstripping	$0.15	$44.10
6071	Duct Insulation	$0.00	$12.86
6072	Duct location	$0.03	$9.54
6073	Duct sealing 15% leakage base	$0.08	$24.58
6074	Duct sealing 20% leakage base	$0.05	$16.04
6075	Duct sealing 25% leakage base	$0.04	$12.01
6076	Duct sealing 30% leakage base	$0.03	$9.65
6077	Energy Star Door	$0.48	$141.08
6078	Floor Insulation	$0.04	$11.80
6079	Infiltration reduction - 10%	$0.02	$5.96
6080	Infiltration reduction - 15%	$0.01	$3.96
6081	Infiltration reduction - 20%	$0.01	$2.92
6082	Infiltration reduction - 30%	$0.01	$1.95
6083	Infiltration reduction - 40%	$0.00	$1.46
6084	Infiltration reduction - 50%	$0.00	$1.17
6085	Rim Joist Insulation	$0.00	$4.42
6086	Steam pipe insulation	$0.00	$3.19
6087	Wall Insulation	$0.06	$18.11
6088	Window Film	-$0.02	-$5.06
6089	Window Replacement	$0.02	$5.53
6090	New vinyl window	$0.04	$10.84
6091	Original double hung window with low U storm	$0.04	$12.14
6092	Original double hung window with original storm window	$0.09	$26.94
6093	Rehabbed double hung	$0.11	$32.07
6094	Rehabbed double hung with low U storm	$0.09	$27.81
6095	Rehabbed double hung with single glazed storm	$0.10	$30.64
6096	R19 kneewalls	$0.01	$2.02
6097	R-38 "scuttle hole" Attic hatch	$0.00	$0.79
6098	R-38 pull-down stairs Attic hatch	$0.00	$0.78
6099	R-30 Roof Insulation	$0.05	$15.85
6100	R-38 Roof Insulation	$0.07	$21.93
6101	R-49 Roof Insulation	$0.10	$29.50
6102	R-60 Roof Insulation	$0.13	$36.80
6103	Low Income Weatherization Package	$0.05	$16.10
6104	Basement Wall Insulation	$0.04	$11.17
6105	Cool roof	-$0.90	-$263.53
6106	Crawlspace Wall Insulation	$0.06	$16.71
6107	Duct Insulation	$0.00	$16.70
6108	Duct location	$0.03	$9.41
6109	Duct sealing 15% leakage base	$0.15	$45.04
6110	Duct sealing 20% leakage base	$0.10	$29.14
6111	Duct sealing 25% leakage base	$0.07	$21.77
6112	Duct sealing 30% leakage base	$0.06	$17.37
6113	Energy Star Door	$0.47	$136.97
6114	Floor Insulation	$0.17	$48.47
6115	Infiltration reduction - 10%	$0.04	$11.98
6116	Infiltration reduction - 15%	$0.03	$7.95
6117	Infiltration reduction - 20%	$0.02	$5.69
6118	Infiltration reduction - 30%	$0.01	$3.79
6119	Infiltration reduction - 40%	$0.01	$2.83

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
6120	Infiltration reduction - 50%	$0.01	$2.27
6121	Steam pipe insulation	$0.00	$4.04
6122	Wall Insulation	$0.09	$27.14
6123	Window Film	-$0.02	-$6.72
6124	Window Replacement	$0.03	$8.32
6125	R19 kneewalls	$0.01	$1.92
6126	R-38 "scuttle hole" Attic hatch	$0.00	$0.67
6127	R-38 pull-down stairs Attic hatch	$0.00	$0.66
6128	R-30 Roof Insulation	$0.08	$24.29
6129	R-38 Roof Insulation	$0.10	$30.05
6130	R-49 Roof Insulation	$0.13	$38.04
6131	R-60 Roof Insulation	$0.16	$46.02
6132	Low Income Weatherization Package	$0.08	$24.53
6133	Basement Wall Insulation	$0.00	$10.04
6134	Cool roof	$1.25	$0.00
6135	Crawlspace Wall Insulation	$0.00	$283.33
6136	Duct Insulation	$0.03	$8.33
6137	Duct location	$0.04	$12.92
6138	Duct sealing 15% leakage base	$0.04	$13.06
6139	Duct sealing 20% leakage base	$0.03	$8.32
6140	Duct sealing 25% leakage base	$0.02	$6.20
6141	Duct sealing 30% leakage base	$0.02	$4.89
6142	Energy Star Door	$0.11	$30.78
6143	Floor Insulation	$0.00	$44.23
6144	Infiltration reduction - 10%	$0.01	$3.13
6145	Infiltration reduction - 15%	$0.01	$2.08
6146	Infiltration reduction - 20%	$0.00	$1.40
6147	Infiltration reduction - 30%	$0.00	$0.93
6148	Infiltration reduction - 40%	$0.00	$0.70
6149	Infiltration reduction - 50%	$0.00	$0.56
6150	Wall Insulation	$0.03	$9.17
6151	Window Film	$0.30	$0.00
6152	Window Replacement	$0.20	$58.54
6153	Airtight Can Lights	$0.07	$21.55
6154	Cool roof	$0.53	$0.00
6155	Door weatherstripping	$0.13	$38.12
6156	Duct Insulation	$0.02	$6.38
6157	Duct location	$0.03	$7.50
6158	Duct sealing 15% leakage base	$0.05	$15.89
6159	Duct sealing 20% leakage base	$0.04	$10.30
6160	Duct sealing 25% leakage base	$0.03	$7.61
6161	Duct sealing 30% leakage base	$0.02	$6.05
6162	Energy Star Door	$0.46	$135.10
6163	Infiltration reduction - 10%	$0.02	$5.46
6164	Infiltration reduction - 15%	$0.01	$3.63
6165	Infiltration reduction - 30%	$0.01	$2.03
6166	Infiltration reduction - 50%	$0.00	$1.22
6167	Roof Insulation	$0.03	$9.80
6168	Wall Insulation	$0.06	$16.51
6169	Window Film	$0.06	$0.00
6170	Window Replacement	$0.02	$5.18
6171	Basement Wall Insulation	$0.00	$8.36
6172	New vinyl window	$0.01	$3.80
6173	Original double hung window with low U storm	$0.01	$4.07
6174	Original double hung window with original storm window	$0.03	$10.05
6175	Rehabbed double hung	$0.04	$12.61
6176	Rehabbed double hung with low U storm	$0.03	$9.27
6177	Rehabbed double hung with single glazed storm	$0.04	$11.70

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
6178	Low Income Weatherization Package	$0.04	$10.47
6179	Airtight Can Lights	$0.07	$21.49
6180	Cool roof	$0.65	$0.00
6181	Door weatherstripping	$0.13	$36.79
6182	Duct Insulation	$0.02	$6.98
6183	Duct location	$0.03	$9.36
6184	Duct sealing 15% leakage base	$0.07	$21.94
6185	Duct sealing 20% leakage base	$0.05	$14.07
6186	Duct sealing 25% leakage base	$0.04	$10.35
6187	Duct sealing 30% leakage base	$0.03	$8.18
6188	Energy Star Door	$0.43	$126.92
6189	Infiltration reduction - 10%	$0.04	$10.57
6190	Infiltration reduction - 15%	$0.02	$7.05
6191	Infiltration reduction - 30%	$0.01	$3.96
6192	Infiltration reduction - 50%	$0.01	$2.37
6193	Roof Insulation	$0.06	$18.07
6194	Wall Insulation	$0.09	$26.41
6195	Window Film	$0.07	$0.00
6196	Window Replacement	$0.03	$8.52
6197	Basement Wall Insulation	$0.00	$12.76
6198	Low Income Weatherization Package	$0.06	$16.99
6199	Airtight Can Lights	$0.06	$18.95
6200	Cool roof	$1.39	$0.00
6201	Door weatherstripping	$0.13	$38.53
6202	Duct Insulation	$0.00	$6.62
6203	Duct location	$0.03	$7.80
6204	Duct sealing 15% leakage base	$0.06	$16.52
6205	Duct sealing 20% leakage base	$0.04	$10.68
6206	Duct sealing 25% leakage base	$0.03	$7.90
6207	Duct sealing 30% leakage base	$0.02	$6.28
6208	Energy Star Door	$0.47	$137.38
6209	Infiltration reduction - 10%	$0.02	$6.06
6210	Infiltration reduction - 15%	$0.01	$4.04
6211	Infiltration reduction - 30%	$0.01	$2.26
6212	Infiltration reduction - 50%	$0.00	$1.35
6213	Roof Insulation	$0.03	$9.64
6214	Wall Insulation	$0.06	$18.29
6215	Window Film	$0.63	$0.00
6216	Window Replacement	$0.02	$5.90
6217	Basement Wall Insulation	$0.02	$7.06
6218	New vinyl window	$0.01	$4.28
6219	Original double hung window with low U storm	$0.02	$4.62
6220	Original double hung window with original storm window	$0.04	$11.24
6221	Rehabbed double hung	$0.05	$14.00
6222	Rehabbed double hung with low U storm	$0.04	$10.52
6223	Rehabbed double hung with single glazed storm	$0.04	$13.04
6224	Low Income Weatherization Package	$0.04	$11.39
6225	Airtight Can Lights	$0.00	$19.13
6226	Cool roof	$1.82	$0.00
6227	Door weatherstripping	$0.13	$37.29
6228	Duct Insulation	$0.03	$7.36
6229	Duct location	$0.03	$9.84
6230	Duct sealing 15% leakage base	$0.08	$22.97
6231	Duct sealing 20% leakage base	$0.05	$14.73
6232	Duct sealing 25% leakage base	$0.04	$10.84
6233	Duct sealing 30% leakage base	$0.03	$8.57
6234	Energy Star Door	$0.44	$129.04
6235	Infiltration reduction - 10%	$0.04	$12.02

Measure-level Levelized Costs

Measure #	Measure Name	*Levelized Cost/kWh (- Admin)*	*Levelized Cost/MMBTu (- Admin)*
6236	Infiltration reduction - 15%	$0.03	$8.00
6237	Infiltration reduction - 30%	$0.02	$4.48
6238	Infiltration reduction - 50%	$0.01	$2.68
6239	Roof Insulation	$0.06	$18.25
6240	Wall Insulation	$0.13	$38.45
6241	Window Film	$0.56	$0.00
6242	Window Replacement	$0.03	$10.16
6243	Basement Wall Insulation	$0.04	$10.70
6244	Low Income Weatherization Package	$0.07	$20.00
6245	Airtight Can Lights	$0.14	$0.00
6246	Cool roof	-$0.68	$0.00
6247	Door weatherstripping	$0.19	$0.00
6248	Duct Insulation	$0.03	$0.00
6249	Duct location	$0.03	$0.00
6250	Duct sealing 15% leakage base	$0.07	$0.00
6251	Duct sealing 20% leakage base	$0.05	$0.00
6252	Duct sealing 25% leakage base	$0.03	$0.00
6253	Duct sealing 30% leakage base	$0.03	$0.00
6254	Energy Star Door	$0.69	$0.00
6255	Infiltration reduction - 10%	$0.03	$0.00
6256	Infiltration reduction - 15%	$0.02	$0.00
6257	Infiltration reduction - 30%	$0.01	$0.00
6258	Infiltration reduction - 50%	$0.01	$0.00
6259	Roof Insulation	$0.04	$0.00
6260	Wall Insulation	$0.08	$0.00
6261	Window Film	-$0.02	$0.00
6262	Window Replacement	$0.02	$0.00
6263	Basement Wall Insulation	$0.04	$0.00
6264	New vinyl window	$0.02	$0.00
6265	Original double hung window with low U storm	$0.02	$0.00
6266	Original double hung window with original storm window	$0.05	$0.00
6267	Rehabbed double hung	$0.06	$0.00
6268	Rehabbed double hung with low U storm	$0.05	$0.00
6269	Rehabbed double hung with single glazed storm	$0.06	$0.00
6270	Low Income Weatherization Package	$0.05	$0.00
6271	Airtight Can Lights	$0.14	$0.00
6272	Cool roof	-$1.14	$0.00
6273	Door weatherstripping	$0.19	$0.00
6274	Duct Insulation	$0.03	$0.00
6275	Duct location	$0.04	$0.00
6276	Duct sealing 15% leakage base	$0.10	$0.00
6277	Duct sealing 20% leakage base	$0.06	$0.00
6278	Duct sealing 25% leakage base	$0.05	$0.00
6279	Duct sealing 30% leakage base	$0.04	$0.00
6280	Energy Star Door	$0.66	$0.00
6281	Infiltration reduction - 10%	$0.05	$0.00
6282	Infiltration reduction - 15%	$0.04	$0.00
6283	Infiltration reduction - 30%	$0.02	$0.00
6284	Infiltration reduction - 50%	$0.01	$0.00
6285	Roof Insulation	$0.08	$0.00
6286	Wall Insulation	$0.13	$0.00
6287	Window Film	-$0.02	$0.00
6288	Window Replacement	$0.03	$0.00
6289	Basement Wall Insulation	$0.07	$0.00
6290	Low Income Weatherization Package	$0.08	$0.00
6291	Airtight Can Lights	$0.02	$6.70
6292	Cool roof	$0.11	$0.00
6293	Door weatherstripping	$0.04	$10.41

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
6294	Duct Insulation	$0.01	$3.14
6295	Duct location	$0.04	$11.85
6296	Duct sealing 15% leakage base	$0.02	$5.10
6297	Duct sealing 20% leakage base	$0.01	$3.27
6298	Duct sealing 25% leakage base	$0.01	$2.41
6299	Duct sealing 30% leakage base	$0.01	$1.91
6300	Energy Star Door	$0.15	$45.12
6301	Infiltration reduction - 10%	$0.01	$2.36
6302	Infiltration reduction - 15%	$0.01	$1.57
6303	Infiltration reduction - 30%	$0.00	$0.89
6304	Infiltration reduction - 50%	$0.00	$0.53
6305	Roof Insulation	$0.10	$29.90
6306	Wall Insulation	$0.03	$7.38
6307	Window Film	$0.17	$0.00
6308	Window Replacement	$0.18	$52.53
6309	Basement Wall Insulation	$0.00	$10.04
6310	Airtight Can Lights	$0.06	$0.00
6311	Cool roof	-$2.51	$0.00
6312	Door weatherstripping	$0.08	$0.00
6313	Duct Insulation	$0.01	$0.00
6314	Duct location	$0.05	$0.00
6315	Duct sealing 15% leakage base	$0.03	$0.00
6316	Duct sealing 20% leakage base	$0.02	$0.00
6317	Duct sealing 25% leakage base	$0.01	$0.00
6318	Duct sealing 30% leakage base	$0.01	$0.00
6319	Energy Star Door	$0.36	$0.00
6320	Infiltration reduction - 10%	$0.02	$0.00
6321	Infiltration reduction - 15%	$0.01	$0.00
6322	Infiltration reduction - 30%	$0.01	$0.00
6323	Infiltration reduction - 50%	$0.00	$0.00
6324	Roof Insulation	$0.20	$0.00
6325	Wall Insulation	$0.06	$0.00
6326	Window Film	-$0.15	$0.00
6327	Window Replacement	$0.16	$0.00
6328	Basement Wall Insulation	$0.09	$0.00
6329	Crawlspace Wall Insulation	$0.07	$19.08
6330	Duct Insulation	$0.01	$3.98
6331	Duct sealing 15% leakage base	$0.01	$4.28
6332	Duct sealing 20% leakage base	$0.01	$2.75
6333	Duct sealing 25% leakage base	$0.01	$2.04
6334	Duct sealing 30% leakage base	$0.01	$1.61
6335	Floor Insulation	$0.05	$15.47
6336	Infiltration reduction - 10%	$0.02	$6.01
6337	Infiltration reduction - 15%	$0.01	$4.01
6338	Roof Insulation	$0.04	$11.39
6339	Wall Insulation	$0.05	$13.49
6340	Window Replacement	$0.02	$4.71
6341	Low Income Weatherization Package	$0.03	$9.06
6342	Crawlspace Wall Insulation	$0.09	$25.37
6343	Duct Insulation	$0.01	$3.92
6344	Duct sealing 15% leakage base	$0.02	$5.53
6345	Duct sealing 20% leakage base	$0.01	$3.55
6346	Duct sealing 25% leakage base	$0.01	$2.60
6347	Duct sealing 30% leakage base	$0.01	$2.05
6348	Floor Insulation	$0.04	$13.03
6349	Infiltration reduction - 10%	$0.04	$13.03
6350	Infiltration reduction - 15%	$0.03	$8.62
6351	Roof Insulation	$0.03	$7.84

Measure-level Levelized Costs

Measure #	Measure Name	*Levelized Cost/kWh (- Admin)*	*Levelized Cost/MMBTu (- Admin)*
6352	Wall Insulation	$0.08	$22.24
6353	Window Replacement	$0.04	$10.57
6354	Low Income Weatherization Package	$0.04	$12.75
6355	Crawlspace Wall Insulation	$0.07	$20.88
6356	Duct Insulation	$0.01	$4.11
6357	Duct sealing 15% leakage base	$0.02	$4.41
6358	Duct sealing 20% leakage base	$0.01	$2.84
6359	Duct sealing 25% leakage base	$0.01	$2.09
6360	Duct sealing 30% leakage base	$0.01	$1.66
6361	Floor Insulation	$0.05	$15.61
6362	Infiltration reduction - 10%	$0.02	$6.10
6363	Infiltration reduction - 15%	$0.01	$4.08
6364	Roof Insulation	$0.04	$11.84
6365	Wall Insulation	$0.05	$13.76
6366	Window Replacement	$0.02	$4.98
6367	Low Income Weatherization Package	$0.03	$9.39
6368	Crawlspace Wall Insulation	$0.10	$28.75
6369	Duct Insulation	$0.01	$4.06
6370	Duct sealing 15% leakage base	$0.02	$5.71
6371	Duct sealing 20% leakage base	$0.01	$3.66
6372	Duct sealing 25% leakage base	$0.01	$2.68
6373	Duct sealing 30% leakage base	$0.01	$2.11
6374	Floor Insulation	$0.04	$13.16
6375	Infiltration reduction - 10%	$0.04	$13.17
6376	Infiltration reduction - 15%	$0.03	$8.75
6377	Roof Insulation	$0.03	$8.10
6378	Wall Insulation	$0.08	$22.62
6379	Window Replacement	$0.04	$11.70
6380	Low Income Weatherization Package	$0.04	$11.05
6381	Crawlspace Wall Insulation	$0.05	$13.95
6382	Duct Insulation	$0.01	$1.57
6383	Duct sealing 15% leakage base	$0.00	$0.94
6384	Duct sealing 20% leakage base	$0.00	$0.60
6385	Duct sealing 25% leakage base	$0.00	$0.44
6386	Duct sealing 30% leakage base	$0.00	$0.35
6387	Floor Insulation	$0.02	$6.22
6388	Infiltration reduction - 10%	$0.01	$2.66
6389	Infiltration reduction - 15%	$0.01	$1.76
6390	Roof Insulation	$0.02	$7.18
6391	Wall Insulation	$0.01	$2.92
6392	Window Replacement	$0.05	$14.06
6393	Crawlspace Wall Insulation	$0.05	$15.99
6394	Duct Insulation	$0.01	$1.62
6395	Duct sealing 15% leakage base	$0.00	$0.97
6396	Duct sealing 20% leakage base	$0.00	$0.62
6397	Duct sealing 25% leakage base	$0.00	$0.46
6398	Duct sealing 30% leakage base	$0.00	$0.36
6399	Floor Insulation	$0.02	$6.28
6400	Infiltration reduction - 10%	$0.01	$2.65
6401	Infiltration reduction - 15%	$0.01	$1.79
6402	Roof Insulation	$0.03	$7.43
6403	Wall Insulation	$0.01	$2.96
6404	Window Replacement	$0.05	$15.36
7000	HVAC (Equipment)		
7001	ENERGY STAR Room AC	$0.13	$0.00
7002	CEE Tier 2 Room AC	$0.38	$0.00
7003	Room AC recycling	$0.07	$0.00
7004	ASHP - SEER 15	$0.07	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
7005	ASHP - SEER 16	$0.07	$0.00
7006	ASHP - SEER 17	$0.08	$0.00
7007	ASHP - SEER 18	$0.10	$0.00
7008	DFHP - SEER 15 with 95 AFUE furnace	$0.02	$5.24
7009	DFHP - SEER 16 with 95 AFUE furnace	$0.03	$8.11
7010	DFHP - SEER 17 with 95 AFUE furnace	$0.04	$10.82
7011	DFHP - SEER 18 with 95 AFUE furnace	$0.05	$15.18
7012	Furnace/AC - SEER 15	$0.11	$0.00
7013	Furnace/AC - SEER 16	$0.22	$0.00
7014	Furnace/AC - SEER 17	$0.21	$0.00
7015	GSHP - EER 17 ASHP Base	$0.36	$104.14
7016	GSHP - EER 19 ASHP Base	$0.33	$97.47
7017	High efficiency 92 AFUE furnace with ECM	$0.02	$5.32
7018	High efficiency 94 AFUE furnace with ECM	$0.02	$5.70
7019	High efficiency 95 AFUE furnace with ECM	$0.02	$5.85
7020	O&M Tune-up - furnace only	$0.00	$6.25
7021	O&M Tune-up - furnace only	$0.00	$2.44
7022	RCA 10% improvement	$0.36	$0.00
7023	RCA 15% improvement	$0.76	$0.00
7024	RCA 5% improvement	$0.60	$0.00
7025	Setback thermostat - full setback	$0.00	$0.71
7026	Setback thermostat - moderate setback	$0.00	$1.36
7027	Setback thermostat - moderate setback	$0.04	$12.91
7028	Whole House Fan	$3.73	$0.00
7029	High efficiency 93 AFUE furnace with ECM	$0.02	$5.52
7030	High efficiency 96 AFUE furnace with ECM	$0.02	$5.99
7031	High efficiency 97 AFUE furnace with ECM	$0.02	$6.11
7032	High efficiency 98 AFUE furnace with ECM	$0.02	$6.22
7033	ECM Furnace Fan	$0.02	$0.00
7034	ASHP - SEER 19	$0.11	$0.00
7035	DFHP - SEER 19 with 95 AFUE furnace	$0.06	$17.79
7036	Furnace/AC - SEER 18	$0.31	$0.00
7037	Furnace/AC - SEER 19	$0.32	$0.00
7038	ASHP - SEER 20	$0.10	$0.00
7039	DFHP - SEER 20 with 95 AFUE furnace	$0.06	$18.05
7040	Furnace/AC - SEER 20	$0.34	$0.00
7041	ASHP - SEER 21	$0.08	$0.00
7042	DFHP - SEER 21 with 95 AFUE furnace	$0.05	$15.32
7043	Furnace/AC - SEER 21	$0.34	$0.00
7044	SEER21 Minisplit Heat pump	$0.05	$0.00
7045	SEER21 Minisplit Heat pump	$0.04	$0.00
7046	Boiler Tune-up	$0.00	$3.79
7047	Boiler Tune-up	$0.00	$3.79
7048	Boiler reset control	$0.00	$714.15
7049	Boiler 87% plus AFUE 82 AFUE BASE	$0.00	$10.90
7050	Boiler 92% plus AFUE 82 AFUE BASE	$0.00	$4.00
7051	Boiler 95% plus AFUE 82 AFUE BASE	$0.00	$4.67
7052	ENERGY STAR Room AC	$0.13	$0.00
7053	CEE Tier 2 Room AC	$0.38	$0.00
7054	ASHP - SEER 15	$0.05	$0.00
7055	ASHP - SEER 16	$0.05	$0.00
7056	ASHP - SEER 17	$0.07	$0.00
7057	ASHP - SEER 18	$0.09	$0.00
7058	DFHP - SEER 15 with 95 AFUE furnace	$0.02	$4.48
7059	DFHP - SEER 16 with 95 AFUE furnace	$0.03	$7.69
7060	DFHP - SEER 17 with 95 AFUE furnace	$0.04	$10.55
7061	DFHP - SEER 18 with 95 AFUE furnace	$0.05	$14.98
7062	Furnace/AC - SEER 15	$0.18	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
7063	Furnace/AC - SEER 16	$0.41	$0.00
7064	Furnace/AC - SEER 17	$0.32	$0.00
7065	GSHP - EER 17 ASHP Base	$0.35	$0.00
7066	GSHP - EER 19 ASHP Base	$0.33	$0.00
7067	High efficiency 92 AFUE furnace with ECM	$0.03	$8.55
7068	High efficiency 94 AFUE furnace with ECM	$0.03	$9.23
7069	High efficiency 95 AFUE furnace with ECM	$0.03	$9.50
7070	Setback thermostat - full setback	$0.00	$0.40
7071	Setback thermostat - moderate setback	$0.00	$0.69
7072	Whole House Fan	$2.34	$0.00
7073	High efficiency 93 AFUE furnace with ECM	$0.03	$8.90
7074	High efficiency 96 AFUE furnace with ECM	$0.03	$9.75
7075	High efficiency 97 AFUE furnace with ECM	$0.03	$9.97
7076	High efficiency 98 AFUE furnace with ECM	$0.03	$10.17
7077	ECM Furnace Fan	$0.02	$0.00
7078	ASHP - SEER 19	$0.12	$0.00
7079	DFHP - SEER 19 with 95 AFUE furnace	$0.06	$17.76
7080	Furnace/AC - SEER 18	$0.40	$0.00
7081	Furnace/AC - SEER 19	$0.42	$0.00
7082	ASHP - SEER 20	$0.11	$0.00
7083	DFHP - SEER 20 with 95 AFUE furnace	$0.06	$18.35
7084	Furnace/AC - SEER 20	$0.44	$0.00
7085	ASHP - SEER 21	$0.09	$0.00
7086	DFHP - SEER 21 with 95 AFUE furnace	$0.05	$15.90
7087	Furnace/AC - SEER 21	$0.43	$0.00
7088	SEER21 Minisplit Heat pump	$0.12	$0.00
7089	Boiler 87% plus AFUE 82 AFUE BASE	$0.00	$18.61
7090	Boiler 92% plus AFUE 82 AFUE BASE	$0.00	$6.41
7091	Boiler 95% plus AFUE 82 AFUE BASE	$0.00	$7.53
7092	ENERGY STAR Room AC	$0.13	$0.00
7093	CEE Tier 2 Room AC	$0.38	$0.00
7094	Room AC recycling	$0.07	$0.00
7095	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	$0.02	$0.00
7096	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	$0.02	$0.00
7097	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	$0.03	$0.00
7098	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	$0.05	$0.00
7099	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	$0.03	$0.00
7100	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	$0.03	$0.00
7101	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	$0.03	$0.00
7102	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	$0.05	$0.00
7103	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	$0.04	$0.00
7104	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	$0.03	$0.00
7105	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	$0.03	$0.00
7106	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	$0.02	$0.00
7107	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	$0.03	$0.00
7108	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	$0.02	$0.00
7109	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	$0.04	$0.00
7110	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	$0.03	$0.00
7111	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	$0.04	$0.00
7112	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	$0.03	$0.00
7113	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	$0.04	$0.00
7114	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	$0.03	$0.00
7115	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	$0.04	$0.00
7116	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	$0.03	$0.00
7117	ASHP - SEER 15	$0.06	$0.00
7118	ASHP - SEER 16	$0.08	$0.00
7119	ASHP - SEER 17	$0.10	$0.00
7120	ASHP - SEER 18	$0.13	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
7121	Boiler 85% Ec	$0.00	$4.72
7122	Boiler turndown control	$0.00	$0.12
7123	CHW reset 10 deg	$0.00	$0.00
7124	CHW reset 5 deg	$0.00	$0.00
7125	DFHP - SEER 15 with 95 AFUE furnace	$0.01	$1.93
7126	DFHP - SEER 16 with 95 AFUE furnace	$0.01	$2.94
7127	DFHP - SEER 17 with 95 AFUE furnace	$0.02	$4.94
7128	DFHP - SEER 18 with 95 AFUE furnace	$0.08	$23.47
7129	Furnace/AC - SEER 15	$0.18	$0.00
7130	Furnace/AC - SEER 16	$0.37	$0.00
7131	Furnace/AC - SEER 17	$0.34	$0.00
7132	High efficiency 92 AFUE furnace with ECM	$0.03	$8.42
7133	High efficiency 93 AFUE furnace with ECM	$0.03	$8.74
7134	High efficiency 94 AFUE furnace with ECM	$0.03	$9.03
7135	High efficiency 95 AFUE furnace with ECM	$0.03	$9.28
7136	High efficiency 96 AFUE furnace with ECM	$0.03	$9.50
7137	High efficiency 97 AFUE furnace with ECM	$0.03	$9.69
7138	High efficiency 98 AFUE furnace with ECM	$0.03	$9.87
7139	ECM Furnace Fan	$0.02	$0.00
7140	O&M Tune-up - furnace only	$0.00	$9.77
7141	O&M Tune-up - furnace only	$0.00	$9.77
7142	O2 Trim Control	$0.00	$9.51
7143	PTAC 9.3 EER	$0.11	$0.00
7144	PTHP 9.1 EER	$0.06	$0.00
7145	RCA 10% improvement	$0.40	$0.00
7146	RCA 15% improvement	$0.85	$0.00
7147	RCA 5% improvement	$0.67	$0.00
7148	Setback thermostat - full setback	$0.00	$1.37
7149	Setback thermostat - moderate setback	$0.01	$2.41
7150	Setback thermostat - moderate setback	$0.01	$2.41
7151	Whole House Fan	$1.57	$0.00
7152	ASHP - SEER 19	$0.14	$0.00
7153	ASHP - SEER 20	$0.13	$0.00
7154	ASHP - SEER 21	$0.10	$0.00
7155	DFHP - SEER 19 with 95 AFUE furnace	$0.09	$27.03
7156	DFHP - SEER 20 with 95 AFUE furnace	$0.09	$26.68
7157	DFHP - SEER 21 with 95 AFUE furnace	$0.07	$21.96
7158	Furnace/AC - SEER 18	$0.43	$0.00
7159	Furnace/AC - SEER 19	$0.45	$0.00
7160	Furnace/AC - SEER 20	$0.46	$0.00
7161	Furnace/AC - SEER 21	$0.46	$0.00
7162	SEER21 Minisplit Heat pump	$0.05	$0.00
7163	SEER21 Minisplit Heat pump	$0.04	$0.00
7164	Boiler Tune-up	$0.00	$3.05
7165	Boiler Tune-up	$0.00	$3.05
7166	Boiler 87% plus AFUE 82 AFUE BASE	$0.00	$7.46
7167	Boiler 90% plus AFUE 82 AFUE BASE	$0.00	$5.01
7168	Boiler 92% plus AFUE 82 AFUE BASE	$0.00	$4.90
7169	Boiler 95% plus AFUE 82 AFUE BASE	$0.00	$5.16
7170	ENERGY STAR Room AC	$0.13	$0.00
7171	CEE Tier 2 Room AC	$0.38	$0.00
7172	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	$0.02	$0.00
7173	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	$0.02	$0.00
7174	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	$0.02	$0.00
7175	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	$0.04	$0.00
7176	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	$0.03	$0.00
7177	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	$0.03	$0.00
7178	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	$0.03	$0.00

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
7179	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	$0.04	$0.00
7180	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	$0.03	$0.00
7181	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	$0.03	$0.00
7182	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	$0.03	$0.00
7183	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	$0.02	$0.00
7184	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	$0.03	$0.00
7185	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	$0.02	$0.00
7186	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	$0.04	$0.00
7187	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	$0.03	$0.00
7188	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	$0.03	$0.00
7189	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	$0.03	$0.00
7190	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	$0.04	$0.00
7191	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	$0.03	$0.00
7192	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	$0.04	$0.00
7193	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	$0.03	$0.00
7194	ASHP - SEER 15	$0.07	$0.00
7195	ASHP - SEER 16	$0.12	$0.00
7196	ASHP - SEER 17	$0.15	$0.00
7197	ASHP - SEER 18	$0.18	$0.00
7198	Boiler 85% Ec	$0.00	$32.20
7199	Boiler turndown control	$0.00	$1.58
7200	CHW reset 10 deg	$0.00	$0.00
7201	CHW reset 5 deg	$0.00	$0.00
7202	DFHP - SEER 15 with 95 AFUE furnace	$0.03	$8.72
7203	DFHP - SEER 16 with 95 AFUE furnace	$0.06	$16.25
7204	DFHP - SEER 17 with 95 AFUE furnace	$0.08	$22.23
7205	DFHP - SEER 18 with 95 AFUE furnace	$0.10	$29.53
7206	Furnace/AC - SEER 15	$0.20	$0.00
7207	Furnace/AC - SEER 16	$0.51	$0.00
7208	Furnace/AC - SEER 17	$0.46	$0.00
7209	High efficiency 92 AFUE furnace with ECM	$0.04	$11.09
7210	High efficiency 93 AFUE furnace with ECM	$0.04	$11.52
7211	High efficiency 94 AFUE furnace with ECM	$0.04	$11.91
7212	High efficiency 95 AFUE furnace with ECM	$0.04	$12.25
7213	High efficiency 96 AFUE furnace with ECM	$0.04	$12.54
7214	High efficiency 97 AFUE furnace with ECM	$0.04	$12.81
7215	High efficiency 98 AFUE furnace with ECM	$0.04	$13.04
7216	ECM Furnace Fan	$0.03	$0.00
7217	O2 Trim Control	$0.00	$8.22
7218	PTAC 9.3 EER	$0.09	$0.00
7219	PTHP 9.1 EER	$0.07	$0.00
7220	Setback thermostat - full setback	$0.00	$0.77
7221	Setback thermostat - moderate setback	$0.00	$1.19
7222	Whole House Fan	$0.74	$0.00
7223	ASHP - SEER 19	$0.19	$0.00
7224	ASHP - SEER 20	$0.18	$0.00
7225	ASHP - SEER 21	$0.14	$0.00
7226	DFHP - SEER 19 with 95 AFUE furnace	$0.12	$34.07
7227	DFHP - SEER 20 with 95 AFUE furnace	$0.12	$33.72
7228	DFHP - SEER 21 with 95 AFUE furnace	$0.10	$27.85
7229	Furnace/AC - SEER 18	$0.52	$0.00
7230	Furnace/AC - SEER 19	$0.54	$0.00
7231	Furnace/AC - SEER 20	$0.57	$0.00
7232	Furnace/AC - SEER 21	$0.56	$0.00
7233	SEER21 Minisplit Heat pump	$0.05	$0.00
7234	Boiler 87% plus AFUE 82 AFUE BASE	$0.00	$10.68
7235	Boiler 90% plus AFUE 82 AFUE BASE	$0.00	$6.97
7236	Boiler 92% plus AFUE 82 AFUE BASE	$0.00	$6.82

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
7237	Boiler 95% plus AFUE 82 AFUE BASE	$0.00	$7.22
7238	ENERGY STAR Room AC	$0.13	$0.00
7239	CEE Tier 2 Room AC	$0.38	$0.00
7240	Room AC recycling	$0.07	$0.00
7241	ASHP - SEER 15	$0.11	$0.00
7242	ASHP - SEER 16	$0.08	$0.00
7243	ASHP - SEER 17	$0.09	$0.00
7244	ASHP - SEER 18	$0.11	$0.00
7245	DFHP - SEER 15 with 95 AFUE furnace	$0.05	$0.00
7246	DFHP - SEER 16 with 95 AFUE furnace	$0.07	$0.00
7247	DFHP - SEER 17 with 95 AFUE furnace	$0.08	$0.00
7248	DFHP - SEER 18 with 95 AFUE furnace	$0.11	$0.00
7249	Furnace/AC - SEER 15	$0.16	$0.00
7250	Furnace/AC - SEER 16	$0.33	$0.00
7251	Furnace/AC - SEER 17	$0.29	$0.00
7252	GSHP - EER 17 ASHP Base	$0.42	$0.00
7253	GSHP - EER 19 ASHP Base	$0.40	$0.00
7254	High efficiency 92 AFUE furnace with ECM	$0.03	$7.36
7255	High efficiency 94 AFUE furnace with ECM	$0.03	$7.88
7256	High efficiency 95 AFUE furnace with ECM	$0.03	$8.09
7257	RCA 10% improvement	$0.60	$0.00
7258	RCA 15% improvement	$0.71	$0.00
7259	RCA 5% improvement	$0.99	$0.00
7260	Setback thermostat - full setback	$0.00	$0.20
7261	Setback thermostat - moderate setback	$0.00	$0.40
7262	Setback thermostat - moderate setback	$0.00	$0.40
7263	Whole House Fan	$1.04	$0.00
7264	High efficiency 93 AFUE furnace with ECM	$0.02	$6.32
7265	High efficiency 96 AFUE furnace with ECM	$0.02	$7.04
7266	High efficiency 97 AFUE furnace with ECM	$0.02	$7.23
7267	High efficiency 98 AFUE furnace with ECM	$0.03	$7.40
7268	ECM Furnace Fan	$0.02	$0.00
7269	Furnace/AC - SEER 18	$0.43	$0.00
7270	Furnace/AC - SEER 19	$0.35	$0.00
7271	Furnace/AC - SEER 20	$0.47	$0.00
7272	Furnace/AC - SEER 21	$0.46	$0.00
7273	ASHP - SEER 19	$0.14	$0.00
7274	ASHP - SEER 20	$0.13	$0.00
7275	ASHP - SEER 21	$0.10	$0.00
7276	DFHP - SEER 19 with 95 AFUE furnace	$0.12	$33.71
7277	DFHP - SEER 20 with 95 AFUE furnace	$0.11	$31.76
7278	DFHP - SEER 21 with 95 AFUE furnace	$0.09	$24.94
7279	ENERGY STAR Room AC	$0.13	$0.00
7280	CEE Tier 2 Room AC	$0.38	$0.00
7281	ASHP - SEER 15	$0.13	$0.00
7282	ASHP - SEER 16	$0.09	$0.00
7283	ASHP - SEER 17	$0.10	$0.00
7284	ASHP - SEER 18	$0.12	$0.00
7285	DFHP - SEER 15 with 95 AFUE furnace	$0.05	$15.04
7286	DFHP - SEER 16 with 95 AFUE furnace	$0.05	$16.04
7287	DFHP - SEER 17 with 95 AFUE furnace	$0.07	$20.45
7288	DFHP - SEER 18 with 95 AFUE furnace	$0.09	$26.97
7289	Furnace/AC - SEER 15	$0.17	$0.00
7290	Furnace/AC - SEER 16	$0.35	$0.00
7291	Furnace/AC - SEER 17	$0.31	$0.00
7292	GSHP - EER 17 ASHP Base	$0.38	$0.00
7293	GSHP - EER 19 ASHP Base	$0.36	$0.00
7294	High efficiency 92 AFUE furnace with ECM	$0.03	$7.91

Measure-level Levelized Costs

Measure #	Measure Name	Levelized Cost/kWh (- Admin)	Levelized Cost/MMBTu (- Admin)
7295	High efficiency 94 AFUE furnace with ECM	$0.03	$8.46
7296	High efficiency 95 AFUE furnace with ECM	$0.03	$8.69
7297	Setback thermostat - full setback	$0.00	$0.09
7298	Setback thermostat - moderate setback	$0.00	$0.17
7299	Whole House Fan	$0.59	$0.00
7300	High efficiency 93 AFUE furnace with ECM	$0.03	$7.85
7301	High efficiency 96 AFUE furnace with ECM	$0.03	$8.57
7302	High efficiency 97 AFUE furnace with ECM	$0.03	$8.76
7303	High efficiency 98 AFUE furnace with ECM	$0.03	$8.93
7304	ECM Furnace Fan	$0.02	$0.00
7305	Furnace/AC - SEER 18	$0.46	$0.00
7306	Furnace/AC - SEER 19	$0.37	$0.00
7307	Furnace/AC - SEER 20	$0.50	$0.00
7308	Furnace/AC - SEER 21	$0.50	$0.00
7309	ASHP - SEER 19	$0.19	$0.00
7310	ASHP - SEER 20	$0.18	$0.00
7311	ASHP - SEER 21	$0.14	$0.00
7312	DFHP - SEER 19 with 95 AFUE furnace	$0.12	$34.16
7313	DFHP - SEER 20 with 95 AFUE furnace	$0.12	$33.79
7314	DFHP - SEER 21 with 95 AFUE furnace	$0.10	$27.89
8000	Behavioral Programs		
8001	Behavior Modification: Home Energy Reports (All Years)	$0.06	$1.79
8002	Real-time feedback	$0.03	$7.33
8003	Behavior Modification: Home Energy Reports (All Years)	$0.02	$6.75
8004	Real-time feedback	$0.03	$7.33
8005	Behavior Modification: Home Energy Reports (All Years)	$0.04	$12.28
8006	Real-time feedback	$0.05	$13.34
8007	Behavior Modification: Home Energy Reports (All Years)	$0.04	$12.28
8008	Real-time feedback	$0.05	$13.34
8009	Behavior Modification: Home Energy Reports (All Years)	$0.03	$10.09
8010	Real-time feedback	$0.04	$10.95
8011	Behavior Modification: Home Energy Reports (All Years)	$0.03	$10.09
8012	Real-time feedback	$0.04	$10.95

Residential Load Shapes (listed by measure type)

	Allocation of Annual Energy Savings by Season			
Measure Type	Winter		Summer	
	Peak	*Off Peak*	*Peak*	*Off Peak*
A - Refrigeration	37%	18%	30%	15%
B - Freezers	39%	16%	32%	13%
C - Dehumidifier	13%	16%	32%	39%
D - Clothes Washer	47%	11%	34%	8%
E - Dishwasher	49%	9%	36%	6%
F - Smart Strip	25%	34%	18%	24%
G - Televisions	48%	19%	24%	9%
H - Computers	34%	33%	17%	16%
I - Residential interior lighting	48%	16%	26%	11%
J - Night Lights	0%	60%	0%	40%
K - Holiday Lights	0%	100%	0%	0%
L - Non-electric	0%	0%	0%	0%
M - Residential exterior lighting	18%	44%	9%	28%
N - Common area indoor lighting - 12 hrs/day	40%	19%	28%	13%
N - Common area indoor lighting - 24 hrs/day	40%	19%	28%	13%
P - Common area exterior lighting	23%	35%	13%	28%
Q - Electric Water Heating	43%	21%	25%	12%
R - Flat	36%	22%	26%	16%
S - Central Air (gas heating; single-family HVAC cooling meaures)	4%	1%	71%	24%
T - Room Air Conditioning	4%	1%	71%	24%
U - Electric Heating & Cooling	35%	23%	31%	11%
V - Thermostat	35%	23%	31%	11%
X - Chiller	5%	1%	66%	28%
Y - Pool	0%	0%	62%	38%

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
1000	Appliances		
1001	Refrigerator Retirement (and Recycling) - No Replacement	6.28	5.56
1002	Freezer Retirement (and Recycling) - No Replacement	5.64	5.00
1003	Dehumidifier Retirement (and Recycling) - No Replacement	16.83	16.16
1004	Energy Star Dehumidifier	6.08	11.66
1005	ENERGY STAR Refrigerators	1.03	1.87
1006	ENERGY STAR Freezers	4.96	8.94
1007	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	0.24	0.09
1008	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	0.27	0.16
1009	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	0.41	0.40
1010	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	0.45	0.47
1011	High Efficiency Gas Clothes Dryer with Moisture Sensor	0.09	0.16
1012	High Efficiency Electric Clothes Dryer with Moisture Sensor	0.37	0.66
1013	Heat Pump Electric Dryer	0.27	0.48
1014	Tier 2 Energy Star Dishwasher (electric water heating)	0.58	0.85
1015	Tier 2 Energy Star Dishwasher (gas water heating)	0.46	0.65
1016	Energy Star Dehumidifier	6.08	11.66
1017	ENERGY STAR Refrigerators	1.03	1.87
1018	ENERGY STAR Freezers	4.96	8.94
1019	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	0.24	0.09
1020	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	0.27	0.16
1021	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	0.41	0.40
1022	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	0.45	0.47
1023	High Efficiency Gas Clothes Dryer with Moisture Sensor	0.09	0.16
1024	High Efficiency Electric Clothes Dryer with Moisture Sensor	0.37	0.66
1025	Heat Pump Electric Dryer	0.27	0.48
1026	Tier 2 Energy Star Dishwasher (electric water heating)	0.58	0.85
1027	Tier 2 Energy Star Dishwasher (gas water heating)	0.46	0.65
1028	Refrigerator Retirement (and Recycling) - No Replacement	6.28	5.56
1029	Freezer Retirement (and Recycling) - No Replacement	5.64	5.00
1030	Dehumidifier Retirement (and Recycling) - No Replacement	16.83	16.16
1031	Energy Star Dehumidifier	6.08	11.66
1032	ENERGY STAR Refrigerators	1.03	1.87
1033	ENERGY STAR Freezers	4.96	8.94
1034	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	0.24	0.09
1035	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	0.27	0.16
1036	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	0.41	0.40
1037	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	0.45	0.47
1038	High Efficiency Gas Clothes Dryer with Moisture Sensor	0.09	0.16
1039	High Efficiency Electric Clothes Dryer with Moisture Sensor	0.37	0.66
1040	Heat Pump Electric Dryer	0.27	0.48
1041	Tier 2 Energy Star Dishwasher (electric water heating)	0.58	0.85
1042	Tier 2 Energy Star Dishwasher (gas water heating)	0.46	0.65
1043	Energy Star Dehumidifier	6.08	11.66
1044	ENERGY STAR Refrigerators	1.03	1.87
1045	ENERGY STAR Freezers	4.96	8.94
1046	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	0.24	0.09
1047	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	0.27	0.16
1048	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	0.41	0.40
1049	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	0.45	0.47
1050	High Efficiency Gas Clothes Dryer with Moisture Sensor	0.09	0.16
1051	High Efficiency Electric Clothes Dryer with Moisture Sensor	0.37	0.66
1052	Heat Pump Electric Dryer	0.27	0.48
1053	Tier 2 Energy Star Dishwasher (electric water heating)	0.58	0.85
1054	Tier 2 Energy Star Dishwasher (gas water heating)	0.46	0.65

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
1055	Refrigerator Retirement (and Recycling) - No Replacement	6.28	5.56
1056	Freezer Retirement (and Recycling) - No Replacement	5.64	5.00
1057	Dehumidifier Retirement (and Recycling) - No Replacement	16.83	16.16
1058	Energy Star Dehumidifier	6.08	11.66
1059	ENERGY STAR Refrigerators	1.03	1.87
1060	ENERGY STAR Freezers	4.96	8.94
1061	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	0.24	0.09
1062	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	0.27	0.16
1063	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	0.41	0.40
1064	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	0.45	0.47
1065	High Efficiency Gas Clothes Dryer with Moisture Sensor	0.09	0.16
1066	High Efficiency Electric Clothes Dryer with Moisture Sensor	0.37	0.66
1067	Heat Pump Electric Dryer	0.27	0.48
1068	Tier 2 Energy Star Dishwasher (electric water heating)	0.58	0.85
1069	Tier 2 Energy Star Dishwasher (gas water heating)	0.46	0.65
1070	Energy Star Dehumidifier	6.08	11.66
1071	ENERGY STAR Refrigerators	1.03	1.87
1072	ENERGY STAR Freezers	4.96	8.94
1073	ENERGY STAR Clothes Washer, Gas water heater, Gas dryer	0.24	0.09
1074	ENERGY STAR Clothes Washer, Gas water heater, Electric dryer	0.27	0.16
1075	ENERGY STAR Clothes Washer, Electric Water heater, Gas Dryer	0.41	0.40
1076	ENERGY STAR Clothes Washer, Electric Water heater, Electric Dryer	0.45	0.47
1077	High Efficiency Gas Clothes Dryer with Moisture Sensor	0.09	0.16
1078	High Efficiency Electric Clothes Dryer with Moisture Sensor	0.37	0.66
1079	Heat Pump Electric Dryer	0.27	0.48
1080	Tier 2 Energy Star Dishwasher (electric water heating)	0.58	0.85
1081	Tier 2 Energy Star Dishwasher (gas water heating)	0.46	0.65
2000	Electronics		
2001	Smart Strip plug outlet	0.24	0.44
2002	Efficient Set Top Box	3.72	6.85
2003	ENERGY STAR + 10% Display	6.77	12.18
2004	ENERGY STAR + 30% Display	10.42	18.74
2005	ENERGY STAR + 50 % Display	14.04	25.25
2006	ENERGY STAR 6.0 TV + 20% (0-20")	11.69	21.54
2007	ENERGY STAR 6.0 TV + 20% (21-30")	26.64	49.31
2008	ENERGY STAR 6.0 TV + 20% (31-40")	41.00	76.07
2009	ENERGY STAR 6.0 TV + 20% (41-50")	59.59	110.33
2010	ENERGY STAR 6.0 TV + 20% (51-60")	90.61	167.75
2011	ENERGY STAR 6.0 TV + 20% (over 60")	143.06	264.85
2012	ENERGY STAR PC	2.28	4.00
2013	ES Laptop	1.08	1.84
2014	ES Laptop (Power Mgmt Enabled)	0.25	0.42
2015	Smart Strip plug outlet	0.24	0.44
2016	Efficient Set Top Box	3.72	6.85
2017	ENERGY STAR + 10% Display	6.77	12.18
2018	ENERGY STAR + 30% Display	10.42	18.74
2019	ENERGY STAR + 50 % Display	14.04	25.25
2020	ENERGY STAR 6.0 TV + 20% (0-20")	11.69	21.54
2021	ENERGY STAR 6.0 TV + 20% (21-30")	26.64	49.31
2022	ENERGY STAR 6.0 TV + 20% (31-40")	41.00	76.07
2023	ENERGY STAR 6.0 TV + 20% (41-50")	59.59	110.33
2024	ENERGY STAR 6.0 TV + 20% (51-60")	90.61	167.75
2025	ENERGY STAR 6.0 TV + 20% (over 60")	143.06	264.85
2026	ENERGY STAR PC	2.28	4.00
2027	ES Laptop	1.08	1.84

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
2028	ES Laptop (Power Mgmt Enabled)	0.25	0.42
2029	Smart Strip plug outlet	0.24	0.44
2030	Efficient Set Top Box	3.72	6.85
2031	ENERGY STAR + 10% Display	6.77	12.18
2032	ENERGY STAR + 30% Display	10.42	18.74
2033	ENERGY STAR + 50 % Display	14.04	25.25
2034	ENERGY STAR 6.0 TV + 20% (0-20")	11.69	21.54
2035	ENERGY STAR 6.0 TV + 20% (21-30")	26.64	49.31
2036	ENERGY STAR 6.0 TV + 20% (31-40")	41.00	76.07
2037	ENERGY STAR 6.0 TV + 20% (41-50")	59.59	110.33
2038	ENERGY STAR 6.0 TV + 20% (51-60")	90.61	167.75
2039	ENERGY STAR 6.0 TV + 20% (over 60")	143.06	264.85
2040	ENERGY STAR PC	2.28	4.00
2041	ES Laptop	1.08	1.84
2042	ES Laptop (Power Mgmt Enabled)	0.25	0.42
2043	Smart Strip plug outlet	0.24	0.44
2044	Efficient Set Top Box	3.72	6.85
2045	ENERGY STAR + 10% Display	6.77	12.18
2046	ENERGY STAR + 30% Display	10.42	18.74
2047	ENERGY STAR + 50 % Display	14.04	25.25
2048	ENERGY STAR 6.0 TV + 20% (0-20")	11.69	21.54
2049	ENERGY STAR 6.0 TV + 20% (21-30")	26.64	49.31
2050	ENERGY STAR 6.0 TV + 20% (31-40")	41.00	76.07
2051	ENERGY STAR 6.0 TV + 20% (41-50")	59.59	110.33
2052	ENERGY STAR 6.0 TV + 20% (51-60")	90.61	167.75
2053	ENERGY STAR 6.0 TV + 20% (over 60")	143.06	264.85
2054	ENERGY STAR PC	2.28	4.00
2055	ES Laptop	1.08	1.84
2056	ES Laptop (Power Mgmt Enabled)	0.25	0.42
2057	Smart Strip plug outlet	0.24	0.44
2058	Efficient Set Top Box	3.72	6.85
2059	ENERGY STAR + 10% Display	6.77	12.18
2060	ENERGY STAR + 30% Display	10.42	18.74
2061	ENERGY STAR + 50 % Display	14.04	25.25
2062	ENERGY STAR 6.0 TV + 20% (0-20")	11.69	21.54
2063	ENERGY STAR 6.0 TV + 20% (21-30")	26.64	49.31
2064	ENERGY STAR 6.0 TV + 20% (31-40")	41.00	76.07
2065	ENERGY STAR 6.0 TV + 20% (41-50")	59.59	110.33
2066	ENERGY STAR 6.0 TV + 20% (51-60")	90.61	167.75
2067	ENERGY STAR 6.0 TV + 20% (over 60")	143.06	264.85
2068	ENERGY STAR PC	2.28	4.00
2069	ES Laptop	1.08	1.84
2070	ES Laptop (Power Mgmt Enabled)	0.25	0.42
2071	Smart Strip plug outlet	0.24	0.44
2072	Efficient Set Top Box	3.72	6.85
2073	ENERGY STAR + 10% Display	6.77	12.18
2074	ENERGY STAR + 30% Display	10.42	18.74
2075	ENERGY STAR + 50 % Display	14.04	25.25
2076	ENERGY STAR 6.0 TV + 20% (0-20")	11.69	21.54
2077	ENERGY STAR 6.0 TV + 20% (21-30")	26.64	49.31
2078	ENERGY STAR 6.0 TV + 20% (31-40")	41.00	76.07
2079	ENERGY STAR 6.0 TV + 20% (41-50")	59.59	110.33
2080	ENERGY STAR 6.0 TV + 20% (51-60")	90.61	167.75
2081	ENERGY STAR 6.0 TV + 20% (over 60")	143.06	264.85
2082	ENERGY STAR PC	2.28	4.00

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
2083	ES Laptop	1.08	1.84
2084	ES Laptop (Power Mgmt Enabled)	0.25	0.42
3000	Lighting		
3001	CFL bulbs - 9W	5.45	6.06
3002	CFL bulbs - 14W	6.95	8.78
3003	CFL bulbs - 20W	7.62	9.99
3004	CFL bulbs - 26W	9.79	13.93
3005	LED Replacing A-line 40W	2.76	3.12
3006	LED Replacing A-line 60W	3.58	4.60
3007	LED Replacing A-line 75W (53W halogen)	1.63	2.20
3008	LED Replacing A-line 100W (72W Halogen)	1.41	2.06
3009	LED Lighting (screw-in) ; 2021 and later	3.67	2.64
3010	CFL bulbs high wattage	4.93	8.17
3011	LED fixtures downlights	1.13	1.66
3012	CFL bulbs 3-Way	5.30	8.46
3013	CFL bulbs dimmable	2.83	3.99
3014	CFL bulbs Globe	2.33	3.08
3015	CFL bulbs candelabra	2.40	3.21
3016	LED Flood PAR (average values)	3.14	4.75
3017	LED Globe	1.83	2.37
3018	LED Night Light	7.74	6.73
3019	Torchiere Floor Lamps	2.60	4.42
3020	Outdoor LED PAR/Flood	7.96	12.24
3021	Holiday Lights	0.32	0.52
3022	HPT8 4ft 2 lamp replacing T12	0.31	0.31
3023	LW HPT8 4ft 2 lamp replacing T12	0.38	0.43
3024	CFL Exterior fixture - 1 Lamp	1.41	1.66
3025	LED Exterior fixture - 1 Lamp	3.31	3.97
3026	Occupancy Sensor	0.33	0.59
3027	CFL bulbs - 9W	5.45	6.06
3028	CFL bulbs - 14W	6.95	8.78
3029	CFL bulbs - 20W	7.62	9.99
3030	CFL bulbs - 26W	9.79	13.93
3031	LED Replacing A-line 40W	2.76	3.12
3032	LED Replacing A-line 60W	3.58	4.60
3033	LED Replacing A-line 75W (53W halogen)	1.63	2.20
3034	LED Replacing A-line 100W (72W Halogen)	1.41	2.06
3035	LED Lighting (screw-in) ; 2021 and later	3.67	2.64
3036	CFL bulbs high wattage	4.93	8.17
3037	LED fixtures downlights	1.13	1.66
3038	CFL bulbs 3-Way	5.30	8.46
3039	CFL bulbs dimmable	2.83	3.99
3040	CFL bulbs Globe	2.33	3.08
3041	CFL bulbs candelabra	2.40	3.21
3042	LED Flood PAR (average values)	3.14	4.75
3043	LED Globe	1.83	2.37
3044	LED Night Light	7.74	6.73
3045	Torchiere Floor Lamps	2.60	4.42
3046	Outdoor LED PAR/Flood	7.96	12.24
3047	Holiday Lights	0.32	0.52
3048	HPT8 4ft 2 lamp replacing T12	0.31	0.31
3049	LW HPT8 4ft 2 lamp replacing T12	0.38	0.43
3050	CFL Exterior fixture - 1 Lamp	1.41	1.66
3051	LED Exterior fixture - 1 Lamp	3.31	3.97
3052	Occupancy Sensor	0.33	0.59

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
3053	CFL bulbs - 9W	5.45	6.06
3054	CFL bulbs - 14W	6.95	8.78
3055	CFL bulbs - 20W	7.62	9.99
3056	CFL bulbs - 26W	9.79	13.93
3057	LED Replacing A-line 40W	2.76	3.12
3058	LED Replacing A-line 60W	3.58	4.60
3059	LED Replacing A-line 75W (53W halogen)	1.63	2.20
3060	LED Replacing A-line 100W (72W Halogen)	1.41	2.06
3061	LED Lighting (screw-in) ; 2021 and later	3.67	2.64
3062	CFL bulbs high wattage	4.93	8.17
3063	LED fixtures downlights	1.13	1.66
3064	CFL bulbs 3-Way	5.30	8.46
3065	CFL bulbs dimmable	2.83	3.99
3066	CFL bulbs Globe	2.33	3.08
3067	CFL bulbs candelabra	2.40	3.21
3068	LED Flood PAR (average values)	3.14	4.75
3069	LED Globe	1.83	2.37
3070	LED Night Light	7.74	6.73
3071	Torchiere Floor Lamps	2.60	4.42
3072	Outdoor LED PAR/Flood	7.96	12.24
3073	Holiday Lights	0.32	0.52
3074	HPT8 4ft 2 lamp replacing T12	0.31	0.31
3075	LW HPT8 4ft 2 lamp replacing T12	0.38	0.43
3076	CFL Exterior fixture - 1 Lamp	1.41	1.66
3077	LED Exterior fixture - 1 Lamp	3.31	3.97
3078	Occupancy Sensor	0.33	0.59
3079	CFL Fixture	3.18	4.96
3080	CFL Screw in	2.45	3.67
3081	CFL Screw in - high wattage	3.06	4.87
3082	LED Screw in	4.74	7.64
3083	CFL Candelabra - 24/7	5.02	8.66
3084	CFL Candelabra - 12/7	1.47	2.06
3085	LED Candelabra - 24/7	9.34	16.00
3086	LED Candelabra - 12/7	2.79	3.81
3087	LED Globe - 24/7	10.55	18.18
3088	LED Globe - 12/7	3.11	4.33
3089	Exterior CFL Fixture - replace HID fixture in common area	2.10	3.29
3090	Photo Cell Daylight Sensor	1.38	2.27
3091	HPT8 4ft 2 lamp replacing T12, 12 hrs	0.25	0.40
3092	HPT8 4ft 2 lamp replacing T12, 24 hrs	0.50	0.81
3093	LW HPT8 4ft 2 lamp replacing T12, 12 hrs	0.33	0.53
3094	LW HPT8 4ft 2 lamp replacing T12, 24 hrs	0.66	1.06
3095	CFL bulbs - 9W	5.45	6.06
3096	CFL bulbs - 14W	6.95	8.78
3097	CFL bulbs - 20W	7.62	9.99
3098	CFL bulbs - 26W	9.79	13.93
3099	LED Replacing A-line 40W	2.76	3.12
3100	LED Replacing A-line 60W	3.58	4.60
3101	LED Replacing A-line 75W (53W halogen)	1.63	2.20
3102	LED Replacing A-line 100W (72W Halogen)	1.41	2.06
3103	LED Lighting (screw-in) ; 2021 and later	3.67	2.64
3104	CFL bulbs high wattage	4.93	8.17
3105	LED fixtures downlights	1.13	1.66
3106	CFL bulbs 3-Way	5.30	8.46
3107	CFL bulbs dimmable	2.83	3.99

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
3108	CFL bulbs Globe	2.33	3.08
3109	CFL bulbs candelabra	2.40	3.21
3110	LED Flood PAR (average values)	3.14	4.75
3111	LED Globe	1.83	2.37
3112	LED Night Light	7.74	6.73
3113	Torchiere Floor Lamps	2.60	4.42
3114	Outdoor LED PAR/Flood	7.96	12.24
3115	Holiday Lights	0.32	0.52
3116	HPT8 4ft 2 lamp replacing T12	0.31	0.31
3117	LW HPT8 4ft 2 lamp replacing T12	0.38	0.43
3118	CFL Exterior fixture - 1 Lamp	1.41	1.66
3119	LED Exterior fixture - 1 Lamp	3.31	3.97
3120	Occupancy Sensor	0.33	0.59
3121	CFL Fixture	3.18	4.96
3122	CFL Screw in	2.45	3.67
3123	CFL Screw in - high wattage	3.06	4.87
3124	LED Screw in	4.74	7.64
3125	CFL Candelabra - 24/7	5.02	8.66
3126	CFL Candelabra - 12/7	1.47	2.06
3127	LED Candelabra - 24/7	9.34	16.00
3128	LED Candelabra - 12/7	2.79	3.81
3129	LED Globe - 24/7	10.55	18.18
3130	LED Globe - 12/7	3.11	4.33
3131	Exterior CFL Fixture - replace HID fixture in common area	2.10	3.29
3132	CFL bulbs - 9W	5.45	6.06
3133	CFL bulbs - 14W	6.95	8.78
3134	CFL bulbs - 20W	7.62	9.99
3135	CFL bulbs - 26W	9.79	13.93
3136	LED Replacing A-line 40W	2.76	3.12
3137	LED Replacing A-line 60W	3.58	4.60
3138	LED Replacing A-line 75W (53W halogen)	1.63	2.20
3139	LED Replacing A-line 100W (72W Halogen)	1.41	2.06
3140	LED Lighting (screw-in) ; 2021 and later	3.67	2.64
3141	CFL bulbs high wattage	4.93	8.17
3142	LED fixtures downlights	1.13	1.66
3143	CFL bulbs 3-Way	5.30	8.46
3144	CFL bulbs dimmable	2.83	3.99
3145	CFL bulbs Globe	2.33	3.08
3146	CFL bulbs candelabra	2.40	3.21
3147	LED Flood PAR (average values)	3.14	4.75
3148	LED Globe	1.83	2.37
3149	LED Night Light	7.74	6.73
3150	Torchiere Floor Lamps	2.60	4.42
3151	Outdoor LED PAR/Flood	7.96	12.24
3152	Holiday Lights	0.32	0.52
3153	HPT8 4ft 2 lamp replacing T12	0.31	0.31
3154	LW HPT8 4ft 2 lamp replacing T12	0.38	0.43
3155	CFL Exterior fixture - 1 Lamp	1.41	1.66
3156	LED Exterior fixture - 1 Lamp	3.31	3.97
3157	Occupancy Sensor	0.33	0.59
3158	CFL bulbs - 9W	5.45	6.06
3159	CFL bulbs - 14W	6.95	8.78
3160	CFL bulbs - 20W	7.62	9.99
3161	CFL bulbs - 26W	9.79	13.93
3162	LED Replacing A-line 40W	2.76	3.12

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
3163	LED Replacing A-line 60W	3.58	4.60
3164	LED Replacing A-line 75W (53W halogen)	1.63	2.20
3165	LED Replacing A-line 100W (72W Halogen)	1.41	2.06
3166	LED Lighting (screw-in) ; 2021 and later	3.67	2.64
3167	CFL bulbs high wattage	4.93	8.17
3168	LED fixtures downlights	1.13	1.66
3169	CFL bulbs 3-Way	5.30	8.46
3170	CFL bulbs dimmable	2.83	3.99
3171	CFL bulbs Globe	2.33	3.08
3172	CFL bulbs candelabra	2.40	3.21
3173	LED Flood PAR (average values)	1.83	2.37
3174	LED Globe	3.14	4.75
3175	LED Night Light	7.74	6.73
3176	Torchiere Floor Lamps	2.60	4.42
3177	Outdoor LED PAR/Flood	7.96	12.24
3178	Holiday Lights	0.32	0.52
3179	HPT8 4ft 2 lamp replacing T12	0.31	0.31
3180	LW HPT8 4ft 2 lamp replacing T12	0.38	0.43
3181	CFL Exterior fixture - 1 Lamp	1.41	1.66
3182	LED Exterior fixture - 1 Lamp	3.31	3.97
3183	Occupancy Sensor	0.33	0.59
4000	Water Heating		
4001	Heat Pump Water Heaters	3.05	5.43
4002	Super Efficiency Gas Water Heater 0.70 EF	0.83	1.49
4003	Instant Gas Water Heater	0.83	1.50
4004	Tank Wrap	0.43	0.77
4005	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	15.40
4006	Pipe Wrap - gas water heater - Insulated Pipe with R2	7.57	13.62
4007	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	21.37
4008	Pipe Wrap - electric water heater - Insulated Pipe with R2	9.63	18.80
4009	Low Flow Showerheads 1.75 gpm - gas water heating	5.22	4.21
4010	Low Flow Showerheads 1.5 gpm - gas water heating	6.97	5.62
4011	Low Flow Showerheads 1.25 gpm - gas water heating	8.71	7.03
4012	Low Flow Showerheads 1.0 gpm - gas water heating	10.44	8.41
4013	Low Flow Showerheads 0.5 gpm - gas water heating	13.93	11.24
4014	Low Flow Showerheads 1.75 gpm - electric water heating	9.76	12.05
4015	Low Flow Showerheads 1.5 gpm - electric water heating	13.06	16.16
4016	Low Flow Showerheads 1.25 gpm - electric water heating	16.24	20.02
4017	Low Flow Showerheads 1.0 gpm - electric water heating	19.54	24.13
4018	Low Flow Showerheads 0.5 gpm - electric water heating	26.02	32.11
4019	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	7.70
4020	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	10.69
4021	Low Flow Showerheads 1.25 gpm - gas water heating	8.71	3.52
4022	Low Flow Showerheads 1.25 gpm - electric water heating	16.24	10.01
4023	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	12.78	9.26
4024	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	21.87	15.80
4025	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	2.08	1.35
4026	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	3.53	2.26
4027	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	5.03	3.24
4028	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	24.70	30.37
4029	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	42.35	52.11
4030	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	3.86	4.52
4031	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	6.48	7.48
4032	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	9.14	10.51
4033	Shower start - 1.75 gpm - gas water heating	2.88	2.32

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
4034	Shower start - 1.5 gpm - gas water heating	3.70	2.98
4035	Shower start - 1.75 gpm - electric water heating	5.45	6.78
4036	Shower start - 1.5 gpm - electric water heating	6.99	8.70
4037	Gravity Film Heat Exchanger GFX - gas water heating	0.07	0.12
4038	Gravity Film Heat Exchanger GFX - electric water heating	0.19	0.34
4039	Solar Domestic Hot Water - gas water heating	0.49	0.25
4040	Solar Domestic Hot Water - electric water heating	0.83	0.85
4041	Heat Pump Water Heaters	3.05	5.43
4042	Super Efficiency Gas Water Heater 0.70 EF	0.83	1.49
4043	Instant Gas Water Heater	0.83	1.50
4044	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	15.40
4045	Pipe Wrap - gas water heater - Insulated Pipe with R2	7.57	13.62
4046	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	21.37
4047	Pipe Wrap - electric water heater - Insulated Pipe with R2	9.63	18.80
4048	Low Flow Showerheads 1.75 gpm - gas water heating	5.22	4.21
4049	Low Flow Showerheads 1.5 gpm - gas water heating	6.97	5.62
4050	Low Flow Showerheads 1.25 gpm - gas water heating	8.71	7.03
4051	Low Flow Showerheads 1.0 gpm - gas water heating	10.44	8.41
4052	Low Flow Showerheads 0.5 gpm - gas water heating	13.93	11.24
4053	Low Flow Showerheads 1.75 gpm - electric water heating	9.76	12.05
4054	Low Flow Showerheads 1.5 gpm - electric water heating	13.06	16.16
4055	Low Flow Showerheads 1.25 gpm - electric water heating	16.24	20.02
4056	Low Flow Showerheads 1.0 gpm - electric water heating	19.54	24.13
4057	Low Flow Showerheads 0.5 gpm - electric water heating	26.02	32.11
4058	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	12.78	9.26
4059	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	21.87	15.80
4060	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	2.08	1.35
4061	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	3.53	2.26
4062	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	5.03	3.24
4063	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	24.70	30.37
4064	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	42.35	52.11
4065	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	3.86	4.52
4066	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	6.48	7.48
4067	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	9.14	10.51
4068	Shower start - 1.75 gpm - gas water heating	2.88	2.32
4069	Shower start - 1.5 gpm - gas water heating	3.70	2.98
4070	Shower start - 1.75 gpm - electric water heating	5.45	6.78
4071	Shower start - 1.5 gpm - electric water heating	6.99	8.70
4072	Gravity Film Heat Exchanger GFX - gas water heating	0.07	0.12
4073	Gravity Film Heat Exchanger GFX - electric water heating	0.19	0.34
4074	Solar Domestic Hot Water - gas water heating	0.49	0.25
4075	Solar Domestic Hot Water - electric water heating	0.83	0.85
4076	Heat Pump Water Heaters	3.05	5.43
4077	Super Efficiency Gas Water Heater 0.70 EF	0.83	1.49
4078	Instant Gas Water Heater	0.83	1.50
4079	Tank Wrap	0.43	0.77
4080	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	15.40
4081	Pipe Wrap - gas water heater - Insulated Pipe with R2	7.57	13.62
4082	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	21.37
4083	Pipe Wrap - electric water heater - Insulated Pipe with R2	9.63	18.80
4084	Low Flow Showerheads 1.75 gpm - gas water heating	5.11	4.13
4085	Low Flow Showerheads 1.5 gpm - gas water heating	6.82	5.51
4086	Low Flow Showerheads 1.25 gpm - gas water heating	8.50	6.84
4087	Low Flow Showerheads 1.0 gpm - gas water heating	10.20	8.22
4088	Low Flow Showerheads 0.5 gpm - gas water heating	13.61	10.97

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
4089	Low Flow Showerheads 1.75 gpm - electric water heating	9.60	11.89
4090	Low Flow Showerheads 1.5 gpm - electric water heating	12.72	15.70
4091	Low Flow Showerheads 1.25 gpm - electric water heating	15.96	19.74
4092	Low Flow Showerheads 1.0 gpm - electric water heating	19.18	23.75
4093	Low Flow Showerheads 0.5 gpm - electric water heating	25.54	31.60
4094	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	7.70
4095	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	10.69
4096	Low Flow Showerheads 1.25 gpm - gas water heating	8.50	3.42
4097	Low Flow Showerheads 1.25 gpm - electric water heating	15.96	9.87
4098	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	9.24	6.70
4099	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	15.82	11.44
4100	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	2.13	1.35
4101	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	3.65	2.33
4102	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	5.17	3.31
4103	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	17.84	21.92
4104	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	30.49	37.39
4105	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	3.94	4.58
4106	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	6.63	7.61
4107	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	9.35	10.70
4108	Shower start - 1.75 gpm - gas water heating	2.81	2.27
4109	Shower start - 1.5 gpm - gas water heating	3.61	2.91
4110	Shower start - 1.75 gpm - electric water heating	4.98	5.94
4111	Shower start - 1.5 gpm - electric water heating	6.38	7.59
4112	Gravity Film Heat Exchanger GFX - gas water heating	0.07	0.12
4113	Gravity Film Heat Exchanger GFX - electric water heating	0.19	0.34
4114	Solar Domestic Hot Water - gas water heating	0.49	0.25
4115	Solar Domestic Hot Water - electric water heating	0.83	0.85
4116	Heat Pump Water Heaters	3.05	5.43
4117	Super Efficiency Gas Water Heater 0.70 EF	0.83	1.49
4118	Instant Gas Water Heater	0.83	1.50
4119	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	15.40
4120	Pipe Wrap - gas water heater - Insulated Pipe with R2	7.57	13.62
4121	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	21.37
4122	Pipe Wrap - electric water heater - Insulated Pipe with R2	9.63	18.80
4123	Low Flow Showerheads 1.75 gpm - gas water heating	5.11	4.13
4124	Low Flow Showerheads 1.5 gpm - gas water heating	6.82	5.51
4125	Low Flow Showerheads 1.25 gpm - gas water heating	8.50	6.84
4126	Low Flow Showerheads 1.0 gpm - gas water heating	10.20	8.22
4127	Low Flow Showerheads 0.5 gpm - gas water heating	13.61	10.97
4128	Low Flow Showerheads 1.75 gpm - electric water heating	9.60	11.89
4129	Low Flow Showerheads 1.5 gpm - electric water heating	12.72	15.70
4130	Low Flow Showerheads 1.25 gpm - electric water heating	15.96	19.74
4131	Low Flow Showerheads 1.0 gpm - electric water heating	19.18	23.75
4132	Low Flow Showerheads 0.5 gpm - electric water heating	25.54	31.60
4133	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	9.24	6.70
4134	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	15.82	11.44
4135	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	2.13	1.35
4136	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	3.65	2.33
4137	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	5.17	3.31
4138	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	17.84	21.92
4139	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	30.49	37.39
4140	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	3.94	4.58
4141	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	6.63	7.61
4142	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	9.35	10.70
4143	Shower start - 1.75 gpm - gas water heating	2.81	2.27

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
4144	Shower start - 1.5 gpm - gas water heating	3.61	2.91
4145	Shower start - 1.75 gpm - electric water heating	4.98	5.94
4146	Shower start - 1.5 gpm - electric water heating	6.38	7.59
4147	Gravity Film Heat Exchanger GFX - gas water heating	0.07	0.12
4148	Gravity Film Heat Exchanger GFX - electric water heating	0.19	0.34
4149	Solar Domestic Hot Water - gas water heating	0.49	0.25
4150	Solar Domestic Hot Water - electric water heating	0.83	0.85
4151	Heat Pump Water Heaters	3.05	5.43
4152	Super Efficiency Gas Water Heater 0.70 EF	0.83	1.49
4153	Instant Gas Water Heater	0.83	1.50
4154	Tank Wrap	0.43	0.77
4155	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	15.40
4156	Pipe Wrap - gas water heater - Insulated Pipe with R2	7.57	13.62
4157	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	21.37
4158	Pipe Wrap - electric water heater - Insulated Pipe with R2	9.63	18.80
4159	Low Flow Showerheads 1.75 gpm - gas water heating	5.22	4.21
4160	Low Flow Showerheads 1.5 gpm - gas water heating	6.97	5.62
4161	Low Flow Showerheads 1.25 gpm - gas water heating	8.71	7.03
4162	Low Flow Showerheads 1.0 gpm - gas water heating	10.44	8.41
4163	Low Flow Showerheads 0.5 gpm - gas water heating	13.93	11.24
4164	Low Flow Showerheads 1.75 gpm - electric water heating	9.76	12.05
4165	Low Flow Showerheads 1.5 gpm - electric water heating	13.06	16.16
4166	Low Flow Showerheads 1.25 gpm - electric water heating	16.24	20.02
4167	Low Flow Showerheads 1.0 gpm - electric water heating	19.54	24.13
4168	Low Flow Showerheads 0.5 gpm - electric water heating	26.02	32.11
4169	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	7.70
4170	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	10.69
4171	Low Flow Showerheads 1.25 gpm - gas water heating	8.71	3.52
4172	Low Flow Showerheads 1.25 gpm - electric water heating	16.24	10.01
4173	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	12.78	9.26
4174	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	21.87	15.80
4175	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	2.08	1.35
4176	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	3.53	2.26
4177	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	5.03	3.24
4178	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	24.70	30.37
4179	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	42.35	52.11
4180	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	3.86	4.52
4181	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	6.48	7.48
4182	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	9.14	10.51
4183	Shower start - 1.75 gpm - gas water heating	2.88	2.32
4184	Shower start - 1.5 gpm - gas water heating	3.70	2.98
4185	Shower start - 1.75 gpm - electric water heating	5.45	6.78
4186	Shower start - 1.5 gpm - electric water heating	6.99	8.70
4187	Gravity Film Heat Exchanger GFX - gas water heating	0.07	0.12
4188	Gravity Film Heat Exchanger GFX - electric water heating	0.19	0.34
4189	Solar Domestic Hot Water - gas water heating	0.49	0.25
4190	Solar Domestic Hot Water - electric water heating	0.83	0.85
4191	Heat Pump Water Heaters	3.05	5.43
4192	Super Efficiency Gas Water Heater 0.70 EF	0.83	1.49
4193	Instant Gas Water Heater	0.83	1.50
4194	Pipe Wrap - gas water heater - Insulated Pipe with R3	8.56	15.40
4195	Pipe Wrap - gas water heater - Insulated Pipe with R2	7.57	13.62
4196	Pipe Wrap - electric water heater - Insulated Pipe with R3	10.95	21.37
4197	Pipe Wrap - electric water heater - Insulated Pipe with R2	9.63	18.80
4198	Low Flow Showerheads 1.75 gpm - gas water heating	5.22	4.21

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
4199	Low Flow Showerheads 1.5 gpm - gas water heating	6.97	5.62
4200	Low Flow Showerheads 1.25 gpm - gas water heating	8.71	7.03
4201	Low Flow Showerheads 1.0 gpm - gas water heating	10.44	8.41
4202	Low Flow Showerheads 0.5 gpm - gas water heating	13.93	11.24
4203	Low Flow Showerheads 1.75 gpm - electric water heating	9.76	12.05
4204	Low Flow Showerheads 1.5 gpm - electric water heating	13.06	16.16
4205	Low Flow Showerheads 1.25 gpm - electric water heating	16.24	20.02
4206	Low Flow Showerheads 1.0 gpm - electric water heating	19.54	24.13
4207	Low Flow Showerheads 0.5 gpm - electric water heating	26.02	32.11
4208	Low Flow Kitchen Faucet Aerators - 1.5 gpm - gas water heating	12.78	9.26
4209	Low Flow Kitchen Faucet Aerators - 1.0 gpm - gas water heating	21.87	15.80
4210	Low Flow Bathroom Faucet Aerators - 1.5 gpm - gas water heating	2.08	1.35
4211	Low Flow Bathroom Faucet Aerators - 1.0 gpm - gas water heating	3.53	2.26
4212	Low Flow Bathroom Faucet Aerators - 0.5 gpm - gas water heating	5.03	3.24
4213	Low Flow Kitchen Faucet Aerators - 1.5 gpm - electric water heating	24.70	30.37
4214	Low Flow Kitchen Faucet Aerators - 1.0 gpm - electric water heating	42.35	52.11
4215	Low Flow Bathroom Faucet Aerators - 1.5 gpm - electric water heating	3.86	4.52
4216	Low Flow Bathroom Faucet Aerators - 1.0 gpm - electric water heating	6.48	7.48
4217	Low Flow Bathroom Faucet Aerators - 0.5 gpm - electric water heating	9.14	10.51
4218	Shower start - 1.75 gpm - gas water heating	2.88	2.32
4219	Shower start - 1.5 gpm - gas water heating	3.70	2.98
4220	Shower start - 1.75 gpm - electric water heating	5.45	6.78
4221	Shower start - 1.5 gpm - electric water heating	6.99	8.70
4222	Gravity Film Heat Exchanger GFX - gas water heating	0.07	0.12
4223	Gravity Film Heat Exchanger GFX - electric water heating	0.19	0.34
4224	Solar Domestic Hot Water - gas water heating	0.49	0.25
4225	Solar Domestic Hot Water - electric water heating	0.83	0.85
5000	Other		
5001	Pump and Motor Single Speed	10.58	20.11
5002	Pump and motor w auto controls - multi speed	3.17	6.10
5003	Pump and Motor Single Speed	10.58	20.11
5004	Pump and motor w auto controls - multi speed	3.17	6.10
6000	HVAC (Envelope)		
6001	Airtight Can Lights	0.32	0.59
6002	Basement Wall Insulation	0.51	0.88
6003	Cool roof	0.05	0.11
6004	Crawlspace Wall Insulation	0.35	0.57
6005	Door weatherstripping	0.14	0.24
6006	Duct Insulation	0.58	1.07
6007	Duct location	0.83	1.51
6008	Duct sealing 15% leakage base	0.48	0.89
6009	Duct sealing 20% leakage base	0.74	1.39
6010	Duct sealing 25% leakage base	1.03	1.94
6011	Duct sealing 30% leakage base	1.32	2.47
6012	Energy Star Door	0.07	0.13
6013	Floor Insulation	0.53	0.92
6014	Infiltration reduction - 10%	1.50	2.81
6015	Infiltration reduction - 15%	2.38	4.46
6016	Infiltration reduction - 20%	3.03	5.65
6017	Infiltration reduction - 30%	4.75	8.88
6018	Infiltration reduction - 40%	6.58	12.34
6019	Infiltration reduction - 50%	8.41	15.80
6020	Rim Joist Insulation	1.77	3.24
6021	Wall Insulation	0.43	0.78
6022	Window Film	1.19	2.46

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
6023	Window Replacement	2.38	4.47
6024	New vinyl window	1.27	2.38
6025	Original double hung window with low U storm	1.21	2.28
6026	Original double hung window with original storm window	0.47	0.88
6027	Rehabbed double hung	0.33	0.61
6028	Rehabbed double hung with low U storm	0.53	1.01
6029	Rehabbed double hung with single glazed storm	0.35	0.65
6030	R19 kneewalls	4.37	8.07
6031	R-38 "scuttle hole" Attic hatch	9.37	16.71
6032	R-38 pull-down stairs Attic hatch	9.92	17.83
6033	R-30 Roof Insulation	0.36	0.66
6034	R-38 Roof Insulation	0.28	0.52
6035	R-49 Roof Insulation	0.23	0.42
6036	R-60 Roof Insulation	0.19	0.35
6037	Low Income Weatherization Package	0.61	0.57
6038	Basement Wall Insulation	0.34	0.59
6039	Cool roof	0.02	0.04
6040	Crawlspace Wall Insulation	0.10	0.18
6041	Duct Insulation	0.53	1.00
6042	Duct location	0.79	1.43
6043	Duct sealing 15% leakage base	0.37	0.69
6044	Duct sealing 20% leakage base	0.51	0.96
6045	Duct sealing 25% leakage base	0.68	1.28
6046	Duct sealing 30% leakage base	0.89	1.68
6047	Energy Star Door	0.07	0.13
6048	Floor Insulation	0.15	0.27
6049	Infiltration reduction - 10%	0.83	1.56
6050	Infiltration reduction - 15%	1.28	2.41
6051	Infiltration reduction - 20%	1.39	2.57
6052	Infiltration reduction - 30%	2.03	3.75
6053	Infiltration reduction - 40%	2.63	4.84
6054	Infiltration reduction - 50%	3.22	5.92
6055	Wall Insulation	0.29	0.53
6056	Window Film	0.99	2.01
6057	Window Replacement	1.62	3.04
6058	R19 kneewalls	4.53	8.37
6059	R-38 "scuttle hole" Attic hatch	16.92	31.85
6060	R-38 pull-down stairs Attic hatch	13.86	25.65
6061	R-30 Roof Insulation	0.35	0.64
6062	R-38 Roof Insulation	0.28	0.52
6063	R-49 Roof Insulation	0.23	0.42
6064	R-60 Roof Insulation	0.18	0.34
6065	Low Income Weatherization Package	0.41	0.38
6066	Airtight Can Lights	0.19	0.34
6067	Basement Wall Insulation	0.81	1.46
6068	Cool roof	-0.03	-0.06
6069	Crawlspace Wall Insulation	1.16	2.08
6070	Door weatherstripping	0.13	0.23
6071	Duct Insulation	0.43	0.78
6072	Duct location	0.66	1.17
6073	Duct sealing 15% leakage base	0.24	0.44
6074	Duct sealing 20% leakage base	0.37	0.67
6075	Duct sealing 25% leakage base	0.50	0.89
6076	Duct sealing 30% leakage base	0.62	1.12
6077	Energy Star Door	0.04	0.08

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
6078	Floor Insulation	0.51	0.92
6079	Infiltration reduction - 10%	0.97	1.73
6080	Infiltration reduction - 15%	1.45	2.60
6081	Infiltration reduction - 20%	1.97	3.53
6082	Infiltration reduction - 30%	2.96	5.29
6083	Infiltration reduction - 40%	3.95	7.07
6084	Infiltration reduction - 50%	4.94	8.84
6085	Rim Joist Insulation	1.34	2.40
6086	Steam pipe insulation	1.74	3.13
6087	Wall Insulation	0.33	0.59
6088	Window Film	-1.12	-2.00
6089	Window Replacement	1.09	1.95
6090	New vinyl window	0.56	1.00
6091	Original double hung window with low U storm	0.50	0.90
6092	Original double hung window with original storm window	0.23	0.40
6093	Rehabbed double hung	0.19	0.34
6094	Rehabbed double hung with low U storm	0.22	0.39
6095	Rehabbed double hung with single glazed storm	0.20	0.36
6096	R19 kneewalls	2.97	5.32
6097	R-38 "scuttle hole" Attic hatch	7.60	13.60
6098	R-38 pull-down stairs Attic hatch	7.71	13.80
6099	R-30 Roof Insulation	0.38	0.68
6100	R-38 Roof Insulation	0.27	0.49
6101	R-49 Roof Insulation	0.20	0.36
6102	R-60 Roof Insulation	0.16	0.29
6103	Low Income Weatherization Package	0.36	0.32
6104	Basement Wall Insulation	0.54	0.96
6105	Cool roof	-0.02	-0.04
6106	Crawlspace Wall Insulation	0.36	0.64
6107	Duct Insulation	0.33	0.60
6108	Duct location	0.67	1.20
6109	Duct sealing 15% leakage base	0.13	0.24
6110	Duct sealing 20% leakage base	0.21	0.37
6111	Duct sealing 25% leakage base	0.28	0.49
6112	Duct sealing 30% leakage base	0.35	0.62
6113	Energy Star Door	0.04	0.08
6114	Floor Insulation	0.12	0.22
6115	Infiltration reduction - 10%	0.48	0.86
6116	Infiltration reduction - 15%	0.72	1.29
6117	Infiltration reduction - 20%	1.01	1.81
6118	Infiltration reduction - 30%	1.52	2.71
6119	Infiltration reduction - 40%	2.03	3.63
6120	Infiltration reduction - 50%	2.54	4.54
6121	Steam pipe insulation	1.37	2.47
6122	Wall Insulation	0.22	0.40
6123	Window Film	-0.84	-1.50
6124	Window Replacement	0.72	1.29
6125	R19 kneewalls	3.13	5.61
6126	R-38 "scuttle hole" Attic hatch	8.98	16.07
6127	R-38 pull-down stairs Attic hatch	9.07	16.23
6128	R-30 Roof Insulation	0.25	0.44
6129	R-38 Roof Insulation	0.20	0.36
6130	R-49 Roof Insulation	0.16	0.28
6131	R-60 Roof Insulation	0.13	0.23
6132	Low Income Weatherization Package	0.23	0.21

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
6133	Basement Wall Insulation	0.47	0.81
6134	Cool roof	-0.01	-0.03
6135	Crawlspace Wall Insulation	0.01	0.03
6136	Duct Insulation	1.13	2.10
6137	Duct location	0.61	1.10
6138	Duct sealing 15% leakage base	1.13	2.13
6139	Duct sealing 20% leakage base	1.79	3.40
6140	Duct sealing 25% leakage base	2.23	4.20
6141	Duct sealing 30% leakage base	3.17	6.02
6142	Energy Star Door	0.26	0.47
6143	Floor Insulation	0.12	0.21
6144	Infiltration reduction - 10%	2.27	4.14
6145	Infiltration reduction - 15%	3.22	5.83
6146	Infiltration reduction - 20%	5.10	9.31
6147	Infiltration reduction - 30%	7.52	13.69
6148	Infiltration reduction - 40%	9.99	18.18
6149	Infiltration reduction - 50%	12.46	22.66
6150	Wall Insulation	0.80	1.45
6151	Window Film	0.12	0.26
6152	Window Replacement	0.14	0.24
6153	Airtight Can Lights	0.37	0.69
6154	Cool roof	0.28	0.54
6155	Door weatherstripping	0.22	0.41
6156	Duct Insulation	1.77	3.32
6157	Duct location	1.58	2.96
6158	Duct sealing 15% leakage base	0.64	1.18
6159	Duct sealing 20% leakage base	1.00	1.85
6160	Duct sealing 25% leakage base	1.35	2.52
6161	Duct sealing 30% leakage base	1.71	3.19
6162	Energy Star Door	0.06	0.11
6163	Infiltration reduction - 10%	1.59	2.95
6164	Infiltration reduction - 15%	2.39	4.43
6165	Infiltration reduction - 30%	4.28	7.93
6166	Infiltration reduction - 50%	7.22	13.41
6167	Roof Insulation	0.85	1.57
6168	Wall Insulation	0.44	0.81
6169	Window Film	2.58	5.27
6170	Window Replacement	2.12	3.94
6171	Basement Wall Insulation	0.55	0.97
6172	New vinyl window	2.41	4.45
6173	Original double hung window with low U storm	2.30	4.26
6174	Original double hung window with original storm window	0.89	1.64
6175	Rehabbed double hung	0.65	1.19
6176	Rehabbed double hung with low U storm	1.02	1.88
6177	Rehabbed double hung with single glazed storm	0.69	1.27
6178	Low Income Weatherization Package	0.87	0.80
6179	Airtight Can Lights	0.38	0.70
6180	Cool roof	0.27	0.52
6181	Door weatherstripping	0.23	0.42
6182	Duct Insulation	1.76	3.32
6183	Duct location	1.39	2.60
6184	Duct sealing 15% leakage base	0.49	0.91
6185	Duct sealing 20% leakage base	0.77	1.44
6186	Duct sealing 25% leakage base	1.06	1.98
6187	Duct sealing 30% leakage base	1.33	2.49

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
6188	Energy Star Door	0.06	0.12
6189	Infiltration reduction - 10%	0.82	1.53
6190	Infiltration reduction - 15%	1.23	2.28
6191	Infiltration reduction - 30%	2.20	4.09
6192	Infiltration reduction - 50%	3.72	6.91
6193	Roof Insulation	0.44	0.81
6194	Wall Insulation	0.28	0.50
6195	Window Film	2.23	4.52
6196	Window Replacement	1.46	2.74
6197	Basement Wall Insulation	0.36	0.64
6198	Low Income Weatherization Package	0.58	0.53
6199	Airtight Can Lights	0.32	0.58
6200	Cool roof	-0.06	-0.12
6201	Door weatherstripping	0.15	0.26
6202	Duct Insulation	0.88	1.58
6203	Duct location	0.81	1.44
6204	Duct sealing 15% leakage base	0.36	0.65
6205	Duct sealing 20% leakage base	0.56	1.00
6206	Duct sealing 25% leakage base	0.76	1.35
6207	Duct sealing 30% leakage base	0.95	1.70
6208	Energy Star Door	0.04	0.08
6209	Infiltration reduction - 10%	0.95	1.70
6210	Infiltration reduction - 15%	1.42	2.55
6211	Infiltration reduction - 30%	2.56	4.58
6212	Infiltration reduction - 50%	4.26	7.62
6213	Roof Insulation	0.62	1.11
6214	Wall Insulation	0.33	0.59
6215	Window Film	-1.64	-2.92
6216	Window Replacement	1.10	1.98
6217	Basement Wall Insulation	0.85	1.52
6218	New vinyl window	1.45	2.60
6219	Original double hung window with low U storm	1.36	2.43
6220	Original double hung window with original storm window	0.55	0.98
6221	Rehabbed double hung	0.44	0.78
6222	Rehabbed double hung with low U storm	0.60	1.07
6223	Rehabbed double hung with single glazed storm	0.47	0.84
6224	Low Income Weatherization Package	0.52	0.46
6225	Airtight Can Lights	0.31	0.56
6226	Cool roof	-0.04	-0.08
6227	Door weatherstripping	0.15	0.27
6228	Duct Insulation	0.80	1.44
6229	Duct location	0.64	1.14
6230	Duct sealing 15% leakage base	0.26	0.47
6231	Duct sealing 20% leakage base	0.41	0.73
6232	Duct sealing 25% leakage base	0.55	0.99
6233	Duct sealing 30% leakage base	0.70	1.25
6234	Energy Star Door	0.05	0.08
6235	Infiltration reduction - 10%	0.48	0.86
6236	Infiltration reduction - 15%	0.72	1.29
6237	Infiltration reduction - 30%	1.28	2.30
6238	Infiltration reduction - 50%	2.14	3.84
6239	Roof Insulation	0.33	0.59
6240	Wall Insulation	0.16	0.28
6241	Window Film	-1.22	-2.17
6242	Window Replacement	0.68	1.22

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
6243	Basement Wall Insulation	0.56	1.00
6244	Low Income Weatherization Package	0.30	0.27
6245	Airtight Can Lights	0.49	0.84
6246	Cool roof	0.23	0.48
6247	Door weatherstripping	0.33	0.57
6248	Duct Insulation	2.75	4.82
6249	Duct location	2.44	4.29
6250	Duct sealing 15% leakage base	0.98	1.70
6251	Duct sealing 20% leakage base	1.53	2.66
6252	Duct sealing 25% leakage base	2.08	3.61
6253	Duct sealing 30% leakage base	2.62	4.56
6254	Energy Star Door	0.09	0.16
6255	Infiltration reduction - 10%	2.41	4.17
6256	Infiltration reduction - 15%	3.63	6.27
6257	Infiltration reduction - 30%	7.31	12.63
6258	Infiltration reduction - 50%	12.19	21.09
6259	Roof Insulation	1.51	2.56
6260	Wall Insulation	0.73	1.23
6261	Window Film	1.51	3.97
6262	Window Replacement	3.93	6.93
6263	Basement Wall Insulation	1.14	1.83
6264	New vinyl window	3.83	6.65
6265	Original double hung window with low U storm	3.60	6.27
6266	Original double hung window with original storm window	1.44	2.49
6267	Rehabbed double hung	1.05	1.80
6268	Rehabbed double hung with low U storm	1.59	2.76
6269	Rehabbed double hung with single glazed storm	1.11	1.90
6270	Low Income Weatherization Package	1.34	1.17
6271	Airtight Can Lights	0.49	0.84
6272	Cool roof	0.25	0.51
6273	Door weatherstripping	0.33	0.57
6274	Duct Insulation	2.66	4.70
6275	Duct location	2.07	3.66
6276	Duct sealing 15% leakage base	0.73	1.28
6277	Duct sealing 20% leakage base	1.15	2.01
6278	Duct sealing 25% leakage base	1.58	2.76
6279	Duct sealing 30% leakage base	1.99	3.48
6280	Energy Star Door	0.10	0.17
6281	Infiltration reduction - 10%	1.25	2.16
6282	Infiltration reduction - 15%	1.87	3.23
6283	Infiltration reduction - 30%	3.67	6.34
6284	Infiltration reduction - 50%	6.14	10.62
6285	Roof Insulation	0.78	1.32
6286	Wall Insulation	0.48	0.81
6287	Window Film	1.64	3.99
6288	Window Replacement	2.56	4.55
6289	Basement Wall Insulation	0.72	1.16
6290	Low Income Weatherization Package	0.88	0.77
6291	Airtight Can Lights	1.17	2.15
6292	Cool roof	1.84	3.58
6293	Door weatherstripping	0.77	1.43
6294	Duct Insulation	4.44	8.40
6295	Duct location	1.24	2.34
6296	Duct sealing 15% leakage base	2.29	4.29
6297	Duct sealing 20% leakage base	3.54	6.62

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
6298	Duct sealing 25% leakage base	4.87	9.11
6299	Duct sealing 30% leakage base	6.22	11.65
6300	Energy Star Door	0.17	0.32
6301	Infiltration reduction - 10%	3.59	6.64
6302	Infiltration reduction - 15%	5.46	10.12
6303	Infiltration reduction - 30%	9.82	18.21
6304	Infiltration reduction - 50%	16.49	30.61
6305	Roof Insulation	0.25	0.45
6306	Wall Insulation	0.96	1.74
6307	Window Film	0.71	0.73
6308	Window Replacement	0.26	0.48
6309	Basement Wall Insulation	0.46	0.80
6310	Airtight Can Lights	1.14	2.00
6311	Cool roof	1.19	2.38
6312	Door weatherstripping	0.87	1.54
6313	Duct Insulation	6.86	12.28
6314	Duct location	1.75	3.13
6315	Duct sealing 15% leakage base	2.57	4.52
6316	Duct sealing 20% leakage base	4.00	7.05
6317	Duct sealing 25% leakage base	5.51	9.72
6318	Duct sealing 30% leakage base	6.94	12.25
6319	Energy Star Door	0.20	0.34
6320	Infiltration reduction - 10%	4.01	7.04
6321	Infiltration reduction - 15%	6.13	10.78
6322	Infiltration reduction - 30%	11.81	20.65
6323	Infiltration reduction - 50%	19.55	34.13
6324	Roof Insulation	0.30	0.51
6325	Wall Insulation	1.05	1.79
6326	Window Film	1.20	2.52
6327	Window Replacement	0.72	1.33
6328	Basement Wall Insulation	0.62	1.02
6329	Crawlspace Wall Insulation	0.67	1.25
6330	Duct Insulation	2.73	5.13
6331	Duct sealing 15% leakage base	2.48	4.64
6332	Duct sealing 20% leakage base	3.90	7.31
6333	Duct sealing 25% leakage base	4.80	8.93
6334	Duct sealing 30% leakage base	6.03	11.22
6335	Floor Insulation	0.51	0.94
6336	Infiltration reduction - 10%	1.50	2.78
6337	Infiltration reduction - 15%	2.18	4.04
6338	Roof Insulation	0.87	1.62
6339	Wall Insulation	0.63	1.15
6340	Window Replacement	2.61	4.91
6341	Low Income Weatherization Package	1.12	1.05
6342	Crawlspace Wall Insulation	0.57	1.07
6343	Duct Insulation	2.95	5.55
6344	Duct sealing 15% leakage base	1.92	3.59
6345	Duct sealing 20% leakage base	2.97	5.55
6346	Duct sealing 25% leakage base	4.01	7.50
6347	Duct sealing 30% leakage base	5.06	9.45
6348	Floor Insulation	0.60	1.11
6349	Infiltration reduction - 10%	0.59	1.08
6350	Infiltration reduction - 15%	1.02	1.90
6351	Roof Insulation	1.23	2.27
6352	Wall Insulation	0.37	0.69

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
6353	Window Replacement	1.48	2.79
6354	Low Income Weatherization Package	0.83	1.56
6355	Crawlspace Wall Insulation	0.29	0.52
6356	Duct Insulation	1.44	2.58
6357	Duct sealing 15% leakage base	1.34	2.41
6358	Duct sealing 20% leakage base	2.09	3.74
6359	Duct sealing 25% leakage base	2.83	5.07
6360	Duct sealing 30% leakage base	3.58	6.40
6361	Floor Insulation	0.39	0.69
6362	Infiltration reduction - 10%	0.95	1.69
6363	Infiltration reduction - 15%	1.42	2.53
6364	Roof Insulation	0.51	0.91
6365	Wall Insulation	0.44	0.79
6366	Window Replacement	1.21	2.17
6367	Low Income Weatherization Package	0.61	0.55
6368	Crawlspace Wall Insulation	0.21	0.38
6369	Duct Insulation	1.46	2.62
6370	Duct sealing 15% leakage base	1.04	1.86
6371	Duct sealing 20% leakage base	1.62	2.90
6372	Duct sealing 25% leakage base	2.21	3.95
6373	Duct sealing 30% leakage base	2.81	5.03
6374	Floor Insulation	0.46	0.82
6375	Infiltration reduction - 10%	0.44	0.78
6376	Infiltration reduction - 15%	0.66	1.18
6377	Roof Insulation	0.75	1.33
6378	Wall Insulation	0.27	0.48
6379	Window Replacement	0.52	0.92
6380	Low Income Weatherization Package	0.52	0.93
6381	Crawlspace Wall Insulation	1.18	2.24
6382	Duct Insulation	7.43	13.98
6383	Duct sealing 15% leakage base	11.45	21.43
6384	Duct sealing 20% leakage base	17.67	33.05
6385	Duct sealing 25% leakage base	23.89	44.66
6386	Duct sealing 30% leakage base	30.16	56.35
6387	Floor Insulation	1.26	2.30
6388	Infiltration reduction - 10%	2.97	5.45
6389	Infiltration reduction - 15%	4.47	8.22
6390	Roof Insulation	1.34	2.49
6391	Wall Insulation	2.88	5.29
6392	Window Replacement	1.04	1.96
6393	Crawlspace Wall Insulation	0.38	0.68
6394	Duct Insulation	3.67	6.58
6395	Duct sealing 15% leakage base	6.07	10.88
6396	Duct sealing 20% leakage base	9.51	17.02
6397	Duct sealing 25% leakage base	13.02	23.30
6398	Duct sealing 30% leakage base	16.57	29.67
6399	Floor Insulation	0.96	1.72
6400	Infiltration reduction - 10%	2.18	3.90
6401	Infiltration reduction - 15%	3.23	5.77
6402	Roof Insulation	0.81	1.45
6403	Wall Insulation	2.04	3.65
6404	Window Replacement	0.39	0.70
7000	HVAC (Equipment)		
7001	ENERGY STAR Room AC	3.91	7.67
7002	CEE Tier 2 Room AC	1.28	2.52

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
7003	Room AC recycling	4.03	7.82
7004	ASHP - SEER 15	2.92	5.57
7005	ASHP - SEER 16	1.73	3.18
7006	ASHP - SEER 17	1.22	2.21
7007	ASHP - SEER 18	1.10	2.02
7008	DFHP - SEER 15 with 95 AFUE furnace	4.30	7.96
7009	DFHP - SEER 16 with 95 AFUE furnace	2.25	4.12
7010	DFHP - SEER 17 with 95 AFUE furnace	1.64	2.94
7011	DFHP - SEER 18 with 95 AFUE furnace	1.30	2.37
7012	Furnace/AC - SEER 15	2.22	4.31
7013	Furnace/AC - SEER 16	1.55	3.03
7014	Furnace/AC - SEER 17	1.51	2.94
7015	GSHP - EER 17 ASHP Base	0.52	0.33
7016	GSHP - EER 19 ASHP Base	0.55	0.38
7017	High efficiency 92 AFUE furnace with ECM	0.97	1.75
7018	High efficiency 94 AFUE furnace with ECM	0.92	1.65
7019	High efficiency 95 AFUE furnace with ECM	0.90	1.62
7020	O&M Tune-up - furnace only	0.88	1.58
7021	O&M Tune-up - furnace only	2.24	2.03
7022	RCA 10% improvement	1.59	3.13
7023	RCA 15% improvement	0.75	1.48
7024	RCA 5% improvement	0.95	1.88
7025	Setback thermostat - full setback	8.14	14.52
7026	Setback thermostat - moderate setback	4.31	7.66
7027	Setback thermostat - moderate setback	0.70	0.60
7028	Whole House Fan	0.01	0.02
7029	High efficiency 93 AFUE furnace with ECM	0.95	1.70
7030	High efficiency 96 AFUE furnace with ECM	0.89	1.59
7031	High efficiency 97 AFUE furnace with ECM	0.87	1.56
7032	High efficiency 98 AFUE furnace with ECM	0.86	1.54
7033	ECM Furnace Fan	11.96	22.71
7034	ASHP - SEER 19	1.35	2.54
7035	DFHP - SEER 19 with 95 AFUE furnace	1.52	2.83
7036	Furnace/AC - SEER 18	1.37	2.69
7037	Furnace/AC - SEER 19	1.42	2.78
7038	ASHP - SEER 20	2.00	3.83
7039	DFHP - SEER 20 with 95 AFUE furnace	2.16	4.10
7040	Furnace/AC - SEER 20	1.43	2.82
7041	ASHP - SEER 21	3.51	6.79
7042	DFHP - SEER 21 with 95 AFUE furnace	3.68	7.07
7043	Furnace/AC - SEER 21	1.50	2.94
7044	SEER21 Minisplit Heat pump	1.99	3.60
7045	SEER21 Minisplit Heat pump	0.40	0.36
7046	Boiler Tune-up	1.45	2.61
7047	Boiler Tune-up	1.45	1.30
7048	Boiler reset control	0.01	0.01
7049	Boiler 87% plus AFUE 82 AFUE BASE	0.52	0.94
7050	Boiler 92% plus AFUE 82 AFUE BASE	1.43	2.56
7051	Boiler 95% plus AFUE 82 AFUE BASE	1.22	2.20
7052	ENERGY STAR Room AC	3.91	7.67
7053	CEE Tier 2 Room AC	1.28	2.52
7054	ASHP - SEER 15	5.76	11.15
7055	ASHP - SEER 16	3.33	6.32
7056	ASHP - SEER 17	2.40	4.54
7057	ASHP - SEER 18	1.95	3.70

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
7058	DFHP - SEER 15 with 95 AFUE furnace	4.36	8.06
7059	DFHP - SEER 16 with 95 AFUE furnace	2.28	4.19
7060	DFHP - SEER 17 with 95 AFUE furnace	1.61	2.90
7061	DFHP - SEER 18 with 95 AFUE furnace	1.28	2.34
7062	Furnace/AC - SEER 15	1.25	2.41
7063	Furnace/AC - SEER 16	1.13	2.23
7064	Furnace/AC - SEER 17	1.25	2.44
7065	GSHP - EER 17 ASHP Base	0.54	0.37
7066	GSHP - EER 19 ASHP Base	0.57	0.42
7067	High efficiency 92 AFUE furnace with ECM	0.57	1.03
7068	High efficiency 94 AFUE furnace with ECM	0.54	0.98
7069	High efficiency 95 AFUE furnace with ECM	0.53	0.95
7070	Setback thermostat - full setback	14.56	25.96
7071	Setback thermostat - moderate setback	8.54	15.18
7072	Whole House Fan	0.02	0.04
7073	High efficiency 93 AFUE furnace with ECM	0.56	1.00
7074	High efficiency 96 AFUE furnace with ECM	0.52	0.94
7075	High efficiency 97 AFUE furnace with ECM	0.51	0.92
7076	High efficiency 98 AFUE furnace with ECM	0.51	0.91
7077	ECM Furnace Fan	12.34	23.56
7078	ASHP - SEER 19	1.30	2.45
7079	DFHP - SEER 19 with 95 AFUE furnace	1.50	2.81
7080	Furnace/AC - SEER 18	1.27	2.49
7081	Furnace/AC - SEER 19	1.31	2.58
7082	ASHP - SEER 20	1.84	3.52
7083	DFHP - SEER 20 with 95 AFUE furnace	2.15	4.10
7084	Furnace/AC - SEER 20	1.33	2.61
7085	ASHP - SEER 21	3.13	6.06
7086	DFHP - SEER 21 with 95 AFUE furnace	3.69	7.12
7087	Furnace/AC - SEER 21	1.38	2.73
7088	SEER21 Minisplit Heat pump	1.22	2.29
7089	Boiler 87% plus AFUE 82 AFUE BASE	0.31	0.55
7090	Boiler 92% plus AFUE 82 AFUE BASE	0.89	1.60
7091	Boiler 95% plus AFUE 82 AFUE BASE	0.76	1.36
7092	ENERGY STAR Room AC	3.91	7.67
7093	CEE Tier 2 Room AC	1.28	2.52
7094	Room AC recycling	4.03	7.82
7095	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	4.44	8.02
7096	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	4.27	7.77
7097	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	4.14	7.53
7098	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	5.62	10.85
7099	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	5.14	9.69
7100	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	4.85	9.09
7101	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	4.68	8.73
7102	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	5.72	11.04
7103	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	5.37	10.23
7104	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	5.11	9.67
7105	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	4.96	9.35
7106	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	4.44	8.04
7107	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	4.37	8.13
7108	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	4.16	7.51
7109	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	5.71	11.00
7110	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	5.21	9.81
7111	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	5.06	9.60
7112	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	4.65	8.60

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	*Measure Name*	*TRC ratio*	*UCT ratio*
7113	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	5.80	11.16
7114	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	5.42	10.30
7115	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	5.19	9.90
7116	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	4.92	9.20
7117	ASHP - SEER 15	3.31	6.33
7118	ASHP - SEER 16	1.50	2.79
7119	ASHP - SEER 17	1.03	1.89
7120	ASHP - SEER 18	0.86	1.58
7121	Boiler 85% Ec	1.25	2.24
7122	Boiler turndown control	47.28	84.84
7123	CHW reset 10 deg	17.73	28.66
7124	CHW reset 5 deg	10.16	16.47
7125	DFHP - SEER 15 with 95 AFUE furnace	6.35	11.77
7126	DFHP - SEER 16 with 95 AFUE furnace	3.33	6.06
7127	DFHP - SEER 17 with 95 AFUE furnace	2.11	3.80
7128	DFHP - SEER 18 with 95 AFUE furnace	0.97	1.76
7129	Furnace/AC - SEER 15	1.96	3.85
7130	Furnace/AC - SEER 16	0.97	1.91
7131	Furnace/AC - SEER 17	1.03	2.03
7132	High efficiency 92 AFUE furnace with ECM	0.61	1.10
7133	High efficiency 93 AFUE furnace with ECM	0.59	1.07
7134	High efficiency 94 AFUE furnace with ECM	0.58	1.04
7135	High efficiency 95 AFUE furnace with ECM	0.57	1.02
7136	High efficiency 96 AFUE furnace with ECM	0.56	1.00
7137	High efficiency 97 AFUE furnace with ECM	0.55	0.98
7138	High efficiency 98 AFUE furnace with ECM	0.54	0.97
7139	ECM Furnace Fan	9.89	18.97
7140	O&M Tune-up - furnace only	0.56	1.01
7141	O&M Tune-up - furnace only	0.56	0.51
7142	O2 Trim Control	0.60	1.08
7143	PTAC 9.3 EER	3.56	6.95
7144	PTHP 9.1 EER	3.37	6.45
7145	RCA 10% improvement	1.38	2.71
7146	RCA 15% improvement	0.66	1.30
7147	RCA 5% improvement	0.83	1.63
7148	Setback thermostat - full setback	3.68	6.23
7149	Setback thermostat - moderate setback	1.92	3.17
7150	Setback thermostat - moderate setback	1.92	1.58
7151	Whole House Fan	0.05	0.09
7152	ASHP - SEER 19	1.03	1.94
7153	ASHP - SEER 20	1.51	2.87
7154	ASHP - SEER 21	2.61	5.04
7155	DFHP - SEER 19 with 95 AFUE furnace	1.12	2.09
7156	DFHP - SEER 20 with 95 AFUE furnace	1.59	3.02
7157	DFHP - SEER 21 with 95 AFUE furnace	2.70	5.20
7158	Furnace/AC - SEER 18	1.00	1.96
7159	Furnace/AC - SEER 19	1.04	2.04
7160	Furnace/AC - SEER 20	1.05	2.08
7161	Furnace/AC - SEER 21	1.10	2.17
7162	SEER21 Minisplit Heat pump	1.99	3.60
7163	SEER21 Minisplit Heat pump	0.40	0.36
7164	Boiler Tune-up	1.80	3.25
7165	Boiler Tune-up	1.80	1.62
7166	Boiler 87% plus AFUE 82 AFUE BASE	0.79	1.42
7167	Boiler 90% plus AFUE 82 AFUE BASE	1.18	2.11

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
7168	Boiler 92% plus AFUE 82 AFUE BASE	1.20	2.16
7169	Boiler 95% plus AFUE 82 AFUE BASE	1.14	2.05
7170	ENERGY STAR Room AC	3.91	7.67
7171	CEE Tier 2 Room AC	1.28	2.52
7172	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.41	3.24	5.54
7173	Air-Cooled Recip Chiller COP = 2.8, IPLV = 3.89	3.01	5.18
7174	Air-Cooled Recip Chiller COP = 2.8, IPLV = 4.24	2.90	4.98
7175	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.36	6.04	11.64
7176	Air-Cooled Recip Chiller COP = 3.08, IPLV = 3.76	4.89	9.13
7177	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.28	4.29	7.91
7178	Air-Cooled Recip Chiller COP = 3.08, IPLV = 4.67	4.02	7.35
7179	Air-Cooled Recip Chiller COP = 3.36, IPLV = 3.66	6.14	11.83
7180	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.10	5.37	10.16
7181	Air-Cooled Recip Chiller COP = 3.36, IPLV = 4.67	4.85	9.08
7182	Air-Cooled Recip Chiller COP = 3.36, IPLV = 5.09	4.59	8.56
7183	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.46	3.14	5.39
7184	Air-Cooled Screw Chiller COP = 2.8, IPLV = 3.64	2.62	4.56
7185	Air-Cooled Screw Chiller COP = 2.8, IPLV = 4.75	2.96	5.05
7186	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.36	6.04	11.62
7187	Air-Cooled Screw Chiller COP = 3.08, IPLV = 3.80	4.86	9.04
7188	Air-Cooled Screw Chiller COP = 3.08, IPLV = 4.00	4.34	8.10
7189	Air-Cooled Screw Chiller COP = 3.08, IPLV = 5.22	3.92	7.08
7190	Air-Cooled Screw Chiller COP = 3.36, IPLV = 3.66	6.15	11.82
7191	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.15	5.33	10.06
7192	Air-Cooled Screw Chiller COP = 3.36, IPLV = 4.42	4.83	9.13
7193	Air-Cooled Screw Chiller COP = 3.36, IPLV = 5.69	4.45	8.21
7194	ASHP - SEER 15	3.51	6.77
7195	ASHP - SEER 16	1.21	2.26
7196	ASHP - SEER 17	0.77	1.42
7197	ASHP - SEER 18	0.72	1.33
7198	Boiler 85% Ec	0.18	0.33
7199	Boiler turndown control	3.61	6.49
7200	CHW reset 10 deg	35.10	56.13
7201	CHW reset 5 deg	19.13	30.29
7202	DFHP - SEER 15 with 95 AFUE furnace	4.24	8.05
7203	DFHP - SEER 16 with 95 AFUE furnace	1.51	2.80
7204	DFHP - SEER 17 with 95 AFUE furnace	1.00	1.81
7205	DFHP - SEER 18 with 95 AFUE furnace	0.83	1.52
7206	Furnace/AC - SEER 15	2.00	3.94
7207	Furnace/AC - SEER 16	0.86	1.71
7208	Furnace/AC - SEER 17	0.94	1.88
7209	High efficiency 92 AFUE furnace with ECM	0.46	0.82
7210	High efficiency 93 AFUE furnace with ECM	0.45	0.80
7211	High efficiency 94 AFUE furnace with ECM	0.43	0.78
7212	High efficiency 95 AFUE furnace with ECM	0.42	0.76
7213	High efficiency 96 AFUE furnace with ECM	0.42	0.75
7214	High efficiency 97 AFUE furnace with ECM	0.41	0.74
7215	High efficiency 98 AFUE furnace with ECM	0.40	0.73
7216	ECM Furnace Fan	9.28	17.97
7217	O2 Trim Control	0.00	0.00
7218	PTAC 9.3 EER	3.56	6.91
7219	PTHP 9.1 EER	3.22	6.17
7220	Setback thermostat - full setback	5.17	8.26
7221	Setback thermostat - moderate setback	-1.11	-2.82
7222	Whole House Fan	0.12	0.22

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
7223	ASHP - SEER 19	0.90	1.70
7224	ASHP - SEER 20	1.35	2.60
7225	ASHP - SEER 21	2.39	4.64
7226	DFHP - SEER 19 with 95 AFUE furnace	0.99	1.85
7227	DFHP - SEER 20 with 95 AFUE furnace	1.43	2.74
7228	DFHP - SEER 21 with 95 AFUE furnace	2.48	4.79
7229	Furnace/AC - SEER 18	0.95	1.88
7230	Furnace/AC - SEER 19	0.99	1.97
7231	Furnace/AC - SEER 20	1.01	2.00
7232	Furnace/AC - SEER 21	1.11	2.18
7233	SEER21 Minisplit Heat pump	1.99	3.60
7234	Boiler 87% plus AFUE 82 AFUE BASE	0.53	0.96
7235	Boiler 90% plus AFUE 82 AFUE BASE	0.82	1.47
7236	Boiler 92% plus AFUE 82 AFUE BASE	0.84	1.50
7237	Boiler 95% plus AFUE 82 AFUE BASE	0.79	1.42
7238	ENERGY STAR Room AC	3.91	7.67
7239	CEE Tier 2 Room AC	1.28	2.52
7240	Room AC recycling	4.03	7.82
7241	ASHP - SEER 15	2.78	5.40
7242	ASHP - SEER 16	1.40	2.56
7243	ASHP - SEER 17	1.09	1.97
7244	ASHP - SEER 18	1.02	1.87
7245	DFHP - SEER 15 with 95 AFUE furnace	3.17	6.06
7246	DFHP - SEER 16 with 95 AFUE furnace	1.49	2.72
7247	DFHP - SEER 17 with 95 AFUE furnace	1.17	2.11
7248	DFHP - SEER 18 with 95 AFUE furnace	1.01	1.86
7249	Furnace/AC - SEER 15	1.96	3.83
7250	Furnace/AC - SEER 16	1.18	2.33
7251	Furnace/AC - SEER 17	1.18	2.31
7252	GSHP - EER 17 ASHP Base	0.54	0.31
7253	GSHP - EER 19 ASHP Base	0.56	0.35
7254	High efficiency 92 AFUE furnace with ECM	0.71	1.27
7255	High efficiency 94 AFUE furnace with ECM	0.67	1.20
7256	High efficiency 95 AFUE furnace with ECM	0.66	1.18
7257	RCA 10% improvement	1.07	2.12
7258	RCA 15% improvement	0.91	1.79
7259	RCA 5% improvement	0.63	1.24
7260	Setback thermostat - full setback	27.81	49.68
7261	Setback thermostat - moderate setback	14.27	12.73
7262	Setback thermostat - moderate setback	14.27	12.73
7263	Whole House Fan	0.07	0.12
7264	High efficiency 93 AFUE furnace with ECM	0.82	1.46
7265	High efficiency 96 AFUE furnace with ECM	0.74	1.34
7266	High efficiency 97 AFUE furnace with ECM	0.73	1.31
7267	High efficiency 98 AFUE furnace with ECM	0.71	1.28
7268	ECM Furnace Fan	11.73	22.35
7269	Furnace/AC - SEER 18	1.10	2.16
7270	Furnace/AC - SEER 19	1.46	2.88
7271	Furnace/AC - SEER 20	1.16	2.30
7272	Furnace/AC - SEER 21	1.22	2.41
7273	ASHP - SEER 19	1.26	2.38
7274	ASHP - SEER 20	1.71	3.27
7275	ASHP - SEER 21	2.83	5.47
7276	DFHP - SEER 19 with 95 AFUE furnace	1.31	2.46
7277	DFHP - SEER 20 with 95 AFUE furnace	1.76	3.36

Measure-level Benefit-Cost Ratios (TRC and UCT)

Measure #	Measure Name	TRC ratio	UCT ratio
7278	DFHP - SEER 21 with 95 AFUE furnace	2.89	5.57
7279	ENERGY STAR Room AC	3.91	7.67
7280	CEE Tier 2 Room AC	1.28	2.52
7281	ASHP - SEER 15	2.61	5.09
7282	ASHP - SEER 16	1.27	2.33
7283	ASHP - SEER 17	0.99	1.79
7284	ASHP - SEER 18	0.94	1.74
7285	DFHP - SEER 15 with 95 AFUE furnace	3.29	6.25
7286	DFHP - SEER 16 with 95 AFUE furnace	1.48	2.71
7287	DFHP - SEER 17 with 95 AFUE furnace	1.15	2.09
7288	DFHP - SEER 18 with 95 AFUE furnace	1.00	1.84
7289	Furnace/AC - SEER 15	1.85	3.64
7290	Furnace/AC - SEER 16	1.04	2.07
7291	Furnace/AC - SEER 17	1.09	2.14
7292	GSHP - EER 17 ASHP Base	0.55	0.34
7293	GSHP - EER 19 ASHP Base	0.57	0.38
7294	High efficiency 92 AFUE furnace with ECM	0.66	1.19
7295	High efficiency 94 AFUE furnace with ECM	0.63	1.12
7296	High efficiency 95 AFUE furnace with ECM	0.61	1.10
7297	Setback thermostat - full setback	64.39	115.07
7298	Setback thermostat - moderate setback	33.13	59.11
7299	Whole House Fan	0.10	0.17
7300	High efficiency 93 AFUE furnace with ECM	0.64	1.15
7301	High efficiency 96 AFUE furnace with ECM	0.60	1.08
7302	High efficiency 97 AFUE furnace with ECM	0.59	1.06
7303	High efficiency 98 AFUE furnace with ECM	0.58	1.05
7304	ECM Furnace Fan	11.76	22.37
7305	Furnace/AC - SEER 18	1.02	2.02
7306	Furnace/AC - SEER 19	1.37	2.71
7307	Furnace/AC - SEER 20	1.09	2.16
7308	Furnace/AC - SEER 21	1.15	2.27
7309	ASHP - SEER 19	1.06	2.03
7310	ASHP - SEER 20	1.49	2.87
7311	ASHP - SEER 21	2.51	4.88
7312	DFHP - SEER 19 with 95 AFUE furnace	1.15	2.18
7313	DFHP - SEER 20 with 95 AFUE furnace	1.57	3.01
7314	DFHP - SEER 21 with 95 AFUE furnace	2.60	5.03
8000	Behavioral Programs		
8001	Behavior Modification: Home Energy Reports (All Years)	1.70	3.05
8002	Real-time feedback	1.43	2.58
8003	Behavior Modification: Home Energy Reports (All Years)	1.70	3.05
8004	Real-time feedback	1.43	2.58
8005	Behavior Modification: Home Energy Reports (All Years)	1.13	2.08
8006	Real-time feedback	0.79	1.42
8007	Behavior Modification: Home Energy Reports (All Years)	1.13	2.08
8008	Real-time feedback	0.79	1.42
8009	Behavior Modification: Home Energy Reports (All Years)	1.28	2.33
8010	Real-time feedback	0.96	1.72
8011	Behavior Modification: Home Energy Reports (All Years)	1.28	2.33
8012	Real-time feedback	0.96	1.72

Michigan Commercial Measure Database - Electric

Base Case Factor:
Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Computers & Office Equipment									
Energy Star Compliant Single Door Refrigerator	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%
PC Network Energy Management Controls replacing no central control	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
EZ Save Monitor Power Management Software	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
Energy Star UPS	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%
Water Heating									
Heat Pump Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Booster Water Heater	0.0%	0.0%	10.0%	0.0%	10.0%	10.0%	62.5%	10.0%	0.0%
Point of Use Water Heating	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Solar Water Heating System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
High Efficiency Electric Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Low Flow Pre-Rinse Spray Nozzle	0.0%	0.0%	10.0%	0.0%	10.0%	10.0%	62.5%	10.0%	0.0%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	0.0%	0.8%	2.0%	0.4%	1.0%	2.0%	3.0%	2.0%	2.0%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	0.0%	0.8%	2.0%	0.4%	1.0%	2.0%	3.0%	2.0%	2.0%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	0.0%	0.8%	2.0%	0.4%	1.0%	2.0%	3.0%	2.0%	2.0%
ES Dishwasher, Low Temp, Elec Heat	0.0%	0.8%	2.0%	0.4%	1.0%	2.0%	3.0%	2.0%	2.0%
ES Dishwasher, Low Temp, Gas Heat	0.0%	0.8%	2.0%	0.4%	1.0%	2.0%	3.0%	2.0%	2.0%
Ozone Commercial laundry System	0.0%	0.0%	0.0%	0.0%	15.0%	17.5%	0.0%	5.0%	5.0%
Low Flow Faucet Aerator	100.0%	96.0%	79.0%	98.0%	35.0%	43.0%	22.5%	37.0%	72.0%
Low Flow Showerhead	0.0%	0.0%	0.0%	0.0%	20.0%	2.0%	0.0%	33.0%	13.0%
Hot Water (DHW) Pipe Insulation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Tank Insulation (electric)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Drain water Heat Recovery Water Heater	2.0%	0.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Hot Water Circulation Pump Time-Clock	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Refrigeration Heat Recovery	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	0.0%	0.0%	0.3%	0.0%	3.8%	4.4%	0.0%	1.3%	0.0%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	0.0%	0.0%	0.3%	0.0%	3.8%	4.4%	0.0%	1.3%	0.0%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	0.0%	0.0%	0.3%	0.0%	3.8%	4.4%	0.0%	1.3%	0.0%
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	0.0%	0.0%	0.3%	0.0%	3.8%	4.4%	0.0%	1.3%	0.0%
Efficient Hot Water Pump	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pools									
Energy Efficient Pool Pump with controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Solar Pool Heating	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%
Heat Pump Pool Heater	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%	42.5%
High efficiency spas/hot tubs	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Building Envelope									

Michigan Commercial Measure Database - Electric

Base Case Factor:
Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Integrated Building Design	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Efficient Windows	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cool Roofing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Ceiling Insulation R-11 to R-42	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Below Grade Insulation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Wall Insulation R-7.5 to R13	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Roof Insulation R-11 to R-24	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Ventilation									
Enthalpy Economizer	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Demand-Controlled Ventilation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Variable Speed Drive Control, 15 HP	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Variable Speed Drive Control, 5 HP	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Variable Speed Drive Control, 40 HP	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Improved Duct Sealing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Destratification Fan	10.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	10.0%
Controlled Ventilation Optimization	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
High Performance Air Filters	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Space Cooling - Chillers									
Air-Cooled Recip Chiller	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Air-Cooled Screw Chiller	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Water-Cooled Centrifugal Chiller < 150 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Centrifugal Chiller 150 - 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Centrifugal Chiller > 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Screw Chiller < 150 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Screw Chiller 150 - 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Screw Chiller > 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Chiller Tune Up/Diagnostics - 300 ton	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Chiller Tune Up/Diagnostics - 500 ton	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
High Efficiency Pumps	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Efficient Chilled Water Pump	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Chilled Hot Water Reset	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
HVAC Controls									
Programmable Thermostats	50.0%	50.0%	50.0%	50.0%	40.0%	50.0%	50.0%	50.0%	50.0%
EMS install	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
EMS Optimization	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%
Hotel Guest Room Occupancy Control System	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%
Zoning	50.0%	50.0%	50.0%	50.0%	0.0%	50.0%	50.0%	50.0%	50.0%
Retrocommissioning	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Commissioning	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Space Cooling - Unitary and Split AC									
High Efficiency AC - Unitary & Split Systems	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Ductless (mini split) - Cooling	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Ground Source Heat Pump - Cooling	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Water Loop Heat Pump (WLHP) - Cooling	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Packaged Terminal Air Conditioner (PTAC) - Cooling	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	0.0%	20.0%	0.0%

Michigan Commercial Measure Database - Electric

Base Case Factor:
Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Cooking									
HE Steamer	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%
HE Combination Oven	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%
HE Convection Ovens	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%
HE Holding Cabinet	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
HE Fryer	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%	23.0%
HE Griddle	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%	19.0%
Induction Cooktops	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%	4.7%
Lighting									
Lamp & Ballast Retrofit (HPT8 Replacing T12)	26.1%	28.2%	27.5%	27.7%	15.8%	30.4%	19.5%	29.1%	26.1%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	19.6%	21.2%	20.7%	20.8%	11.8%	22.8%	14.7%	21.8%	19.6%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	19.6%	21.2%	20.7%	20.8%	11.8%	22.8%	14.7%	21.8%	19.6%
Fluorescent Fixture with Reflectors	19.6%	21.2%	20.7%	20.8%	11.8%	22.8%	14.7%	21.8%	19.6%
T5 HP replacing T12	26.1%	28.2%	27.5%	27.7%	15.8%	30.4%	19.5%	29.1%	26.1%
LED Exterior Flood and Spotlight	6.0%	2.3%	4.1%	3.8%	6.9%	2.7%	7.9%	3.8%	4.0%
Parking Garage LED	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%
LED Exit Sign	0.9%	0.9%	0.9%	0.9%	0.8%	0.9%	0.8%	0.9%	0.9%
LED Traffic Signals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LED Pedestrian Signals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Light Tube	4.3%	4.7%	4.4%	4.5%	4.2%	4.7%	3.9%	4.5%	4.5%
High Intensity Fluorescent Fixture (replacing HID)	1.0%	0.7%	1.1%	0.7%	1.1%	0.3%	0.8%	0.4%	0.9%
42W 8 lamp Hi Bay CFL	1.0%	0.7%	1.1%	0.7%	1.1%	0.3%	0.8%	0.4%	0.9%
HID Fixture Upgrade - Pulse Start Metal Halide	1.0%	0.7%	1.1%	0.7%	1.1%	0.3%	0.8%	0.4%	0.9%
Induction Fluorescent	1.0%	0.7%	1.1%	0.7%	1.1%	0.3%	0.8%	0.4%	0.9%
CFL Fixture	0.6%	1.3%	0.4%	0.9%	6.7%	0.2%	3.1%	0.3%	1.6%
CFL Screw-in	0.6%	1.3%	0.4%	0.9%	6.7%	0.2%	3.1%	0.3%	1.6%
LED Screw In	0.5%	1.0%	0.3%	0.7%	5.2%	0.2%	2.5%	0.3%	1.3%
LED Fuel Pump Canopy Fixture	0.0%	0.0%	0.1%	0.0%	0.0%	0.0%	0.8%	0.0%	0.1%
CFL Flood	0.6%	1.3%	0.4%	0.9%	6.7%	0.2%	3.1%	0.3%	1.6%
LED Downlight	0.5%	1.0%	0.3%	0.7%	5.2%	0.2%	2.5%	0.3%	1.3%
LED Replacing Halogen Incandescent	0.5%	1.0%	0.3%	0.7%	5.2%	0.2%	2.5%	0.3%	1.3%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	26.1%	28.2%	27.5%	27.7%	15.8%	30.4%	19.5%	29.1%	26.1%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	19.6%	21.2%	20.7%	20.8%	11.8%	22.8%	14.7%	21.8%	19.6%
LED Roadway Lights	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LED Outdoor Area Fixture (Parking Light or Street Light)	3.0%	1.2%	2.1%	1.9%	3.5%	1.3%	3.9%	1.9%	2.0%
LED Pin Based Lamp	0.5%	1.0%	0.3%	0.7%	5.2%	0.2%	2.5%	0.3%	1.3%
LED Wallpack	3.0%	1.2%	2.1%	1.9%	3.5%	1.3%	3.9%	1.9%	2.0%
CFL Exterior Lighting	3.0%	1.1%	1.9%	1.7%	3.1%	1.3%	3.8%	1.9%	1.9%
CFL Screw in Specialty	0.6%	1.3%	0.4%	0.9%	6.7%	0.2%	3.1%	0.3%	1.6%
LED Specialty	0.5%	1.0%	0.3%	0.7%	5.2%	0.2%	2.5%	0.3%	1.3%
Illuminated Signs to LED	0.0%	0.7%	0.7%	0.7%	0.1%	0.1%	3.4%	0.0%	0.7%
LED Lighting in Refrigeration	0.0%	1.0%	0.3%	0.7%	5.2%	0.2%	2.5%	0.3%	1.3%
Lighting Controls									

Michigan Commercial Measure Database - Electric

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Controls for HID (Hi/Lo)	1.0%	0.7%	1.1%	0.7%	1.1%	0.3%	0.8%	0.4%	0.9%
Controls for H.I.F.	2.9%	2.2%	3.3%	2.1%	3.2%	0.9%	2.5%	1.3%	2.5%
Daylight Dimming	69.1%	84.6%	73.7%	79.6%	47.3%	91.1%	54.0%	82.8%	76.6%
Daylight Dimming - New Construction	69.1%	84.6%	73.7%	79.6%	47.3%	91.1%	54.0%	82.8%	76.6%
15% More Efficient Design - New Construction	85.1%	93.2%	88.9%	90.1%	83.0%	93.3%	76.9%	90.5%	89.5%
30% More Efficient Design - New Construction	85.1%	93.2%	88.9%	90.1%	83.0%	93.3%	76.9%	90.5%	89.5%
Remote Mounted Occupancy Sensor	39.2%	42.3%	41.3%	41.6%	23.7%	45.6%	29.3%	43.7%	39.2%
Switch Mounted Occupancy Sensor	39.2%	42.3%	41.3%	41.6%	23.7%	45.6%	29.3%	43.7%	39.2%
Central Lighting Control	85.1%	93.2%	88.9%	90.1%	83.0%	93.3%	76.9%	90.5%	89.5%
Switching Controls for Multilevel Lighting (Non-HID)	78.4%	84.6%	82.6%	83.2%	47.3%	91.1%	58.6%	87.4%	78.3%
Lighting Power Density - Exceed Code by 10%	85.1%	93.2%	88.9%	90.1%	83.0%	93.3%	76.9%	90.5%	89.5%
Stairwell Bi-Level Control	3.9%	4.2%	4.0%	4.1%	3.8%	4.2%	3.5%	4.1%	4.1%
Occupancy Sensors for LED Refrigerator Lighting	0.9%	1.0%	0.9%	0.9%	0.9%	1.0%	0.8%	0.9%	0.9%
Refrigeration									
Vending Miser for Soft Drink Vending Machines	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Refrigerated Case Covers	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%	26.0%
Refrigeration Economizer	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%
Commercial Ice-makers	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Evaporator Fan Motor Controls on S-P motors	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Evaporator Fan Motor Controls on PSC motors	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Evaporator Fan Motor Controls on ECM motors	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
H.E. Evaporative Fan Motors	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Zero-Energy Doors	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%
Door Heater Controls	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%
Discus and Scroll Compressors	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Floating Head Pressure Control	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
ENERGY STAR Commercial Solid Door Refrigerators	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
ENERGY STAR Commercial Solid Door Freezers	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
ENERGY STAR Commercial Glass Door Refrigerators	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
ENERGY STAR Commercial Glass Door Freezers	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Strip Curtains	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Efficient Refrigeration Condenser	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Door Gaskets - Cooler and Freezer	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Reach-in Refrigerated display case door retrofit	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%
Refrigeration Savings due to Lighting Savings	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
ECM case fan motors	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%

Michigan Commercial Measure Database - Electric

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Efficient low-temp compressor	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Automatic High Speed Doors - between freezer and cooler	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Refrigerant charging correction	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Compressed Air									
Efficient Air Compressors	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Automatic Drains	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cycling Dryers	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Low Pressure Drop-Filters	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Air-Entraining Air Nozzles	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Receiver Capacity Addition	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Barrel Wraps Inj Mold and Extruders	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pellet Dryer Tanks and Ducts	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compressed Air Audits & Leak Repair	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compressed Air Pressure Flow Controller replacing no flow controller	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
High Efficiency Air Dryers	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Air Compressor Outdoor Air Intake	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Variable Displacement Air Compressor	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Space Heating									
High Efficiency Heat Pump	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Ground Source Heat Pump - Heating	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Ductless (mini split) - Heating	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
High Efficiency Pumps	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
VFD Pump	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
ECM motors on furnaces	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Water Loop Heat Pump (WLHP) - Heating	25.0%	25.0%	25.0%	25.0%	20.0%	20.0%	25.0%	20.0%	25.0%
Packaged Terminal Air Conditioner (PTAC) - Heating	0.0%	0.0%	0.0%	0.0%	20.0%	20.0%	0.0%	20.0%	100.0%
Other									
Electrically Commutated Plug Fans in data centers	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
NEMA Premium Transformer, single-	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NEMA Premium Transformer, three-phase	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Commercial Clothes washers - Non-Water Heating Savings	0.0%	0.0%	1.0%	0.0%	1.0%	3.4%	0.0%	1.0%	1.0%
Vendor Miser for Non-Refrig Equipment	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Optimized Snow and Ice Melt Controls	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Engine Block Heater Timer	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

Michigan Commercial Measure Database - Electric

Convertible Factor:
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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Computers & Office Equipment									
Energy Star Compliant Single Door Refrigerator	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	60%	60%	60%	60%	60%	60%	60%	60%	60%
PC Network Energy Management Controls replacing no central control	80%	80%	80%	80%	80%	80%	80%	80%	80%
EZ Save Monitor Power Management Software	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Star UPS	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water Heating									
Heat Pump Water Heater	25%	25%	85%	85%	85%	85%	85%	85%	85%
Booster Water Heater	25%	25%	90%	90%	90%	90%	90%	90%	90%
Point of Use Water Heating	25%	25%	80%	80%	80%	80%	80%	80%	80%
Solar Water Heating System	34%	34%	34%	34%	34%	34%	34%	34%	34%
High Efficiency Electric Water Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%
Low Flow Pre-Rinse Spray Nozzle	90%	90%	90%	90%	90%	90%	90%	90%	90%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, Low Temp, Elec Heat	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, Low Temp, Gas Heat	95%	95%	95%	95%	95%	95%	95%	95%	95%
Ozone Commercial laundry System	90%	90%	90%	90%	90%	90%	90%	90%	90%
Low Flow Faucet Aerator	90%	90%	90%	90%	90%	90%	90%	90%	90%
Low Flow Showerhead	90%	90%	90%	90%	90%	90%	90%	90%	90%
Hot Water (DHW) Pipe Insulation	50%	50%	50%	50%	50%	50%	50%	50%	50%
Tank Insulation (electric)	50%	50%	50%	50%	50%	50%	50%	50%	50%
Drain water Heat Recovery Water Heater	39%	39%	39%	39%	39%	39%	39%	39%	39%
Hot Water Circulation Pump Time-Clock	10%	5%	80%	10%	20%	80%	80%	15%	5%
Refrigeration Heat Recovery	0%	0%	10%	0%	30%	30%	70%	30%	0%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	100%	100%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	100%	100%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	100%	100%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	100%	100%	99%	99%	99%	99%	99%	99%	99%
Efficient Hot Water Pump	85%	85%	85%	85%	85%	85%	85%	85%	85%
Pools									

Michigan Commercial Measure Database - Electric

Convertible Factor:
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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Energy Efficient Pool Pump with controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Solar Pool Heating	34%	34%	34%	34%	34%	34%	34%	34%	34%
Heat Pump Pool Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%
High efficiency spas/hot tubs	100%	100%	100%	100%	100%	100%	100%	100%	100%
Building Envelope									
Integrated Building Design	39%	39%	95%	95%	95%	95%	95%	95%	95%
Energy Efficient Windows	75%	75%	75%	75%	75%	75%	75%	75%	75%
Cool Roofing	75%	75%	75%	75%	75%	75%	75%	75%	75%
Ceiling Insulation R-11 to R-42	69%	48%	50%	54%	87%	78%	86%	74%	57%
Below Grade Insulation	14%	14%	14%	14%	14%	14%	14%	14%	14%
Wall Insulation R-7.5 to R13	100%	100%	100%	100%	100%	100%	100%	100%	100%
Roof Insulation R-11 to R-24	31%	52%	50%	46%	13%	22%	14%	26%	43%
Ventilation									
Enthalpy Economizer	86%	86%	86%	86%	86%	86%	86%	86%	86%
Demand-Controlled Ventilation	67%	67%	67%	67%	67%	67%	67%	67%	67%
Variable Speed Drive Control, 15 HP	92%	92%	92%	92%	92%	92%	92%	92%	92%
Variable Speed Drive Control, 5 HP	92%	92%	92%	92%	92%	92%	92%	92%	92%
Variable Speed Drive Control, 40 HP	92%	92%	92%	92%	92%	92%	92%	92%	92%
Improved Duct Sealing	75%	75%	75%	75%	75%	75%	75%	75%	75%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	75%	75%	75%	75%	75%	75%	75%	75%	75%
Destratification Fan	90%	90%	90%	90%	90%	90%	90%	90%	90%
Controlled Ventilation Optimization	67%	67%	67%	67%	67%	67%	67%	67%	67%
High Performance Air Filters	95%	95%	95%	95%	95%	95%	95%	95%	95%
Space Cooling - Chillers									
Air-Cooled Recip Chiller	0%	0%	0%	100%	0%	100%	0%	0%	0%
Air-Cooled Screw Chiller	0%	0%	0%	100%	0%	100%	0%	0%	0%
Water-Cooled Centrifugal Chiller < 150 ton	0%	0%	0%	100%	0%	100%	0%	0%	0%
Water-Cooled Centrifugal Chiller 150 - 300 ton	0%	0%	0%	100%	0%	100%	0%	0%	0%
Water-Cooled Centrifugal Chiller > 300 ton	0%	0%	0%	100%	0%	100%	0%	0%	0%
Water-Cooled Screw Chiller < 150 ton	0%	0%	0%	80%	0%	80%	0%	0%	0%
Water-Cooled Screw Chiller 150 - 300 ton	0%	0%	0%	95%	0%	95%	0%	0%	0%
Water-Cooled Screw Chiller > 300 ton	0%	0%	0%	100%	0%	100%	0%	0%	0%
Chiller Tune Up/Diagnostics - 300 ton	0%	0%	0%	100%	0%	100%	0%	0%	0%
Chiller Tune Up/Diagnostics - 500 ton	0%	0%	0%	100%	0%	100%	0%	0%	0%
High Efficiency Pumps	0%	0%	0%	100%	0%	100%	0%	0%	0%
Efficient Chilled Water Pump	0%	0%	0%	100%	0%	100%	0%	0%	0%
Chilled Hot Water Reset	0%	0%	0%	100%	0%	100%	0%	0%	0%
HVAC Controls									
Programmable Thermostats	100%	100%	100%	100%	100%	100%	100%	100%	100%
EMS install	100%	100%	100%	100%	100%	100%	100%	100%	100%
EMS Optimization	100%	100%	100%	100%	100%	100%	100%	100%	100%
Hotel Guest Room Occupancy Control System	0%	0%	0%	0%	90%	0%	0%	0%	0%
Zoning	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Electric

Convertible Factor:
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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Retrocommissioning	54%	54%	54%	54%	54%	54%	54%	54%	54%
Commissioning	71%	71%	71%	71%	71%	71%	71%	71%	71%
Space Cooling - Unitary and Split AC									
High Efficiency AC - Unitary & Split Systems	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ductless (mini split) - Cooling	60%	60%	60%	60%	60%	60%	60%	60%	60%
Ground Source Heat Pump - Cooling	60%	60%	60%	60%	60%	60%	60%	60%	60%
Water Loop Heat Pump (WLHP) - Cooling	60%	60%	60%	60%	60%	60%	60%	60%	60%
Packaged Terminal Air Conditioner (PTAC) - Cooling	0%	0%	0%	0%	100%	100%	0%	100%	0%
Cooking									
HE Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Combination Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Convection Ovens	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Holding Cabinet	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Griddle	100%	100%	100%	100%	100%	100%	100%	100%	100%
Induction Cooktops	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lighting									
Lamp & Ballast Retrofit (HPT8 Replacing T12)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fluorescent Fixture with Reflectors	100%	100%	100%	100%	100%	100%	100%	100%	100%
T5 HP replacing T12	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Exterior Flood and Spotlight	100%	100%	100%	100%	100%	100%	100%	100%	100%
Parking Garage LED	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Exit Sign	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Traffic Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Pedestrian Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%
Light Tube	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Intensity Fluorescent Fixture (replacing HID)	100%	100%	100%	100%	100%	100%	100%	100%	100%
42W 8 lamp Hi Bay CFL	15%	15%	15%	15%	15%	15%	15%	15%	15%
HID Fixture Upgrade - Pulse Start Metal Halide	100%	100%	100%	100%	100%	100%	100%	100%	100%
Induction Fluorescent	75%	75%	75%	75%	75%	75%	75%	75%	75%
CFL Fixture	15%	15%	15%	15%	15%	15%	15%	15%	15%
CFL Screw-in	85%	75%	85%	85%	85%	75%	85%	85%	83%
LED Screw In	85%	75%	85%	85%	85%	75%	85%	85%	83%
LED Fuel Pump Canopy Fixture	15%	15%	15%	15%	15%	15%	15%	15%	15%
CFL Flood	10%	10%	10%	10%	10%	10%	10%	10%	10%
LED Downlight	10%	10%	10%	10%	10%	10%	10%	10%	10%
LED Replacing Halogen Incandescent	10%	10%	10%	10%	10%	10%	10%	10%	10%

Michigan Commercial Measure Database - Electric

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
New Fluorescent Fixtures T5/HP T8 (replacing T12)	100%	100%	100%	100%	100%	100%	100%	100%	100%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Roadway Lights	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Outdoor Area Fixture (Parking Light or Street Light)	15%	15%	15%	15%	15%	15%	15%	15%	15%
LED Pin Based Lamp	85%	75%	85%	85%	85%	75%	85%	85%	83%
LED Wallpack	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFL Exterior Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFL Screw in Specialty	85%	75%	85%	85%	85%	75%	85%	85%	83%
LED Specialty	100%	100%	100%	100%	100%	100%	100%	100%	100%
Illuminated Signs to LED	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Lighting in Refrigeration	90%	90%	90%	0%	90%	90%	90%	90%	90%
Lighting Controls									
Controls for HID (Hi/Lo)	59%	25%	59%	73%	25%	73%	59%	71%	71%
Controls for H.I.F.	90%	10%	10%	40%	75%	75%	0%	90%	80%
Daylight Dimming	35%	35%	35%	35%	35%	35%	35%	35%	35%
Daylight Dimming - New Construction	95%	95%	95%	95%	95%	95%	95%	95%	95%
15% More Efficient Design - New Construction	90%	10%	10%	20%	10%	10%	0%	50%	20%
30% More Efficient Design - New Construction	90%	10%	10%	20%	10%	10%	0%	50%	20%
Remote Mounted Occupancy Sensor	90%	10%	10%	20%	10%	10%	0%	50%	20%
Switch Mounted Occupancy Sensor	90%	10%	10%	20%	10%	10%	0%	50%	20%
Central Lighting Control	90%	10%	10%	20%	10%	10%	0%	50%	20%
Switching Controls for Multilevel Lighting (Non-HID)	90%	10%	10%	20%	10%	10%	0%	50%	20%
Lighting Power Density - Exceed Code by 10%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stairwell Bi-Level Control	100%	100%	100%	100%	100%	100%	100%	100%	100%
Occupancy Sensors for LED Refrigerator Lighting	90%	90%	90%	0%	90%	90%	90%	90%	90%
Refrigeration									
Vending Miser for Soft Drink Vending Machines	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerated Case Covers	75%	75%	75%	75%	75%	75%	75%	75%	75%
Refrigeration Economizer	75%	75%	75%	75%	75%	75%	75%	75%	75%
Commercial Ice-makers	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on S-P motors	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on PSC motors	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on ECM motors	75%	75%	75%	75%	75%	75%	75%	75%	75%
H.E. Evaporative Fan Motors	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Electric

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Zero-Energy Doors	100%	100%	100%	100%	100%	100%	100%	100%	100%
Door Heater Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Discus and Scroll Compressors	100%	100%	100%	100%	100%	100%	100%	100%	100%
Floating Head Pressure Control	18%	18%	75%	18%	18%	18%	50%	18%	18%
ENERGY STAR Commercial Solid Door Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Solid Door Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Glass Door Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Glass Door Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%
Strip Curtains	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient Refrigeration Condenser	100%	100%	100%	100%	100%	100%	100%	100%	100%
Door Gaskets - Cooler and Freezer	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reach-in Refrigerated display case door retrofit	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration Savings due to Lighting Savings	100%	100%	100%	100%	100%	100%	100%	100%	100%
ECM case fan motors	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient low-temp compressor	100%	100%	100%	100%	100%	100%	100%	100%	100%
Automatic High Speed Doors - between freezer and cooler	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerant charging correction	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compressed Air									
Efficient Air Compressors	100%	100%	0%	0%	0%	0%	0%	0%	100%
Automatic Drains	100%	100%	0%	0%	0%	0%	0%	0%	100%
Cycling Dryers	100%	100%	0%	0%	0%	0%	0%	0%	100%
Low Pressure Drop-Filters	100%	100%	0%	0%	0%	0%	0%	0%	100%
Air-Entraining Air Nozzles	100%	100%	0%	0%	0%	0%	0%	0%	100%
Receiver Capacity Addition	100%	100%	0%	0%	0%	0%	0%	0%	100%
Barrel Wraps Inj Mold and Extruders	100%	100%	0%	0%	0%	0%	0%	0%	100%
Pellet Dryer Tanks and Ducts	100%	100%	0%	0%	0%	0%	0%	0%	100%
Compressed Air Audits & Leak Repair	100%	100%	0%	0%	0%	0%	0%	0%	100%
Compressed Air Pressure Flow Controller replacing no flow controller	100%	100%	0%	0%	0%	0%	0%	0%	100%
High Efficiency Air Dryers	100%	100%	0%	0%	0%	0%	0%	0%	100%
Air Compressor Outdoor Air Intake	100%	100%	0%	0%	0%	0%	0%	0%	100%
Variable Displacement Air Compressor	100%	100%	0%	0%	0%	0%	0%	0%	100%
Space Heating									
High Efficiency Heat Pump	77%	77%	77%	67%	77%	60%	77%	60%	77%
Ground Source Heat Pump - Heating	75%	75%	75%	75%	75%	75%	75%	75%	75%
Ductless (mini split) - Heating	60%	60%	60%	60%	60%	60%	60%	60%	60%
High Efficiency Pumps	100%	100%	100%	100%	100%	100%	100%	100%	100%
VFD Pump	80%	80%	80%	80%	80%	80%	80%	80%	80%
ECM motors on furnaces	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Electric

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Loop Heat Pump (WLHP) - Heating	75%	75%	75%	75%	75%	75%	75%	75%	75%
Packaged Terminal Air Conditioner (PTAC) - Heating	0%	0%	0%	0%	100%	100%	0%	100%	0%
Other									
Electrically Commutated Plug Fans in data centers	100%	100%	100%	100%	100%	100%	100%	100%	100%
NEMA Premium Transformer, single-phase	93%	93%	93%	93%	93%	93%	93%	93%	93%
NEMA Premium Transformer, three-phase	93%	93%	93%	93%	93%	93%	93%	93%	93%
Commercial Clothes washers - Non-Water Heating Savings	99%	99%	99%	99%	99%	99%	99%	99%	99%
Vendor Miser for Non-Refrig Equipment	100%	100%	100%	100%	100%	100%	100%	100%	100%
Optimized Snow and Ice Melt Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Engine Block Heater Timer	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	Direct Utility Test	Total Resource Cost Test
Computers & Office Equipment							
Energy Star Compliant Single Door Refrigerator	270	2	per unit	$250	12	1.3	0.7
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	858	2	per unit	$300	4	17.4	8.8
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	17	1	per unit	$40	5	0.2	0.1
PC Network Energy Management Controls replacing no central control	135	1	per PC	$12	4	4.0	2.3
EZ Save Monitor Power Management Software	30	1	per unit	$26	1.7	0.9	0.5
Energy Star UPS	105	2	per kW	$1,303	10	0.1	0.1
Water Heating							
Heat Pump Water Heater	154278	2	per unit	$9,000	15	31.9	17.4
Booster Water Heater	625	2	per unit	$951	10	0.9	0.5
Point of Use Water Heating	345	1	per unit	$665	10	0.7	0.4
Solar Water Heating System	19836	1	per unit	$26,400	20	1.7	1.1
High Efficiency Electric Water Heater	279	2	per unit	$70	13	6.9	3.8
Low Flow Pre-Rinse Spray Nozzle	1396	1	per unit	$35	5	20.7	14.8
ES Dishwasher, High Temp, Elec Heat, Elec Booster	12914	2	per unit	$977.50	16.3	22.5	12.5
ES Dishwasher, High Temp, Gas Heat, Elec Booster	5777	2	per unit	$978	16.3	10.1	5.6
ES Dishwasher, High Temp, Gas Heat, Gas Booster	1775	2	per unit	$1,263	18.3	2.6	1.4
ES Dishwasher, Low Temp, Elec Heat	10520	2	per unit	$228	15	74.4	41.2
ES Dishwasher, Low Temp, Gas Heat	584	2	per unit	$228	20	5.0	2.8
Ozone Commercial laundry System	194220	1	per unit	$65,000	7	3.2	1.7
Low Flow Faucet Aerator	903	1	per unit	$3	10	376.5	280.0
Low Flow Showerhead	527	1	per unit	$25	10	22.0	16.4
Hot Water (DHW) Pipe Insulation	21	1	linear ft	$6	20	12.3	6.5
Tank Insulation (electric)	468	1	sq ft	$2	15	298.5	167.5
Drain water Heat Recovery Water Heater	251	2	per unit	$350	20	1.7	0.9
Hot Water Circulation Pump Time-Clock	1673	1	per unit	$132	10	18.0	9.8
Refrigeration Heat Recovery	1825	1	per unit	$2,861	15	1.2	0.7
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	126	2	per unit	$540	7	0.1	0.1
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	793	2	per unit	$540	7	0.7	0.4
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	627	2	per unit	$540	7	0.6	1.1
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	1293	2	per unit	$540	7	1.2	1.6
Efficient Hot Water Pump	533	1	per hp	$33	15	26.2	14.5
Pools							
Energy Efficient Pool Pump with controls	1235	2	per unit	$450	10	8.8	4.6
Solar Pool Heating	28059	1	per unit	$4,750	20	13.0	7.1
Heat Pump Pool Heater	5732	1	per unit	$4,000	10	3.1	1.6
High efficiency spas/hot tubs	375	2	per unit	$300	10	2.0	1.1
Building Envelope							
Integrated Building Design	322775	2	per unit	$166,226	30	12.6	6.6
Energy Efficient Windows	342	2	100 sq ft	$2,250.00	20	1.0	0.6
Cool Roofing	91	2	1,000 sq ft roof area	$664.88	20	0.4	0.2
Ceiling Insulation R-11 to R-42	146	1	1,000 sq ft roof area	$600.00	20	3.9	2.2
Below Grade Insulation	528	1	1,000 sq ft bsmt wall area	$273.35	20	2.5	1.5
Wall Insulation R-7.5 to R13	680	1	1,000 sq ft wall area	$100.00	20	160.0	89.0
Roof Insulation R-11 to R-24	76	1	1,000 sq ft roof area	$1,000.00	20	1.2	0.6
Ventilation							
Enthalpy Economizer	118	2	per ton	$75.00	10	1.0	0.6
Demand-Controlled Ventilation	161	2	1,000 sq ft cond floor area	$75.00	15	7.1	3.7
Variable Speed Drive Control, 15 HP	10062	1	per unit	$2,339.33	10	2.6	1.6

Michigan Commercial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	Direct Utility Test	Total Resource Cost Test
Variable Speed Drive Control, 5 HP	3354	1	per unit	$779.78	10	2.6	1.6
Variable Speed Drive Control, 40 HP	26831	1	per unit	$6,238.21	10	2.6	1.6
Improved Duct Sealing	26	2	per ton	$107.91	18	1.5	0.8
Electronically-Commutated Permanent Magnet Motors (ECPMs)	1234	2	per motor	$78.00	15	21.4	12.1
Destratification Fan	22	1	1,000 sq ft cond floor area	$375.00	15	0.1	0.0
Controlled Ventilation Optimization	1208	2	linear ft of sash	$985.67	12.8	2.6	1.4
High Performance Air Filters	908	2	1,000 cfm	$70.00	3	5.2	2.9
Space Cooling - Chillers							
Air-Cooled Recip Chiller	337	2	per ton	$123.90	20	8.4	4.5
Air-Cooled Screw Chiller	332	2	per ton	$127.73	20	8.0	4.3
Water-Cooled Centrifugal Chiller < 150 ton	252	2	per ton	$112.38	20	6.2	3.3
Water-Cooled Centrifugal Chiller 150 - 300 ton	223	2	per ton	$90.15	20	6.9	3.7
Water-Cooled Centrifugal Chiller > 300 ton	207	2	per ton	$73.46	20	7.7	4.2
Water-Cooled Screw Chiller < 150 ton	251	2	per ton	$113.28	20	6.6	3.5
Water-Cooled Screw Chiller 150 - 300 ton	227	2	per ton	$88.03	20	7.7	4.1
Water-Cooled Screw Chiller > 300 ton	203	2	per ton	$67.81	20	8.9	4.8
Chiller Tune Up/Diagnostics - 300 ton	137	1	per ton	$2.83	5	58.2	22.8
Chiller Tune Up/Diagnostics - 500 ton	137	1	per ton	$2.83	5	58.2	22.8
High Efficiency Pumps	201	1	per hp	$96.79	15	3.8	2.1
Efficient Chilled Water Pump	764	1	per hp	$33.20	15	35.0	19.5
Chilled Hot Water Reset	113	1	per ton	$5.27	8.3	33.0	18.9
HVAC Controls							
Programmable Thermostats	273	1	1,000 sq ft cond floor area	$49.71	9	30.4	17.1
EMS install	543	1	1,000 sq ft cond floor area	$7.07	15	84.4	49.9
EMS Optimization	1720	1	1,000 sq ft cond floor area	$17.00	16.7	196.8	110.9
Hotel Guest Room Occupancy Control System	676	2	per unit	$250.00	8	3.2	1.8
Zoning	375	2	1,000 sq ft cond floor area	$500.00	15	1.4	0.8
Retrocommissioning	5	1	sq ft	$0.30	7	7.5	4.5
Commissioning	5	1	sq ft	$1.16	7	1.7	1.0
Space Cooling - Unitary & Split AC							
High Efficiency AC - Unitary & Split Systems	54	2	per ton	$105.82	15	3.1	1.6
Ductless (mini split) - Cooling	251	1	per ton	$801.85	15	1.0	0.5
Ground Source Heat Pump - Cooling	1384	2	per ton	$3,524.89	15	0.5	0.6
Water Loop Heat Pump (WLHP) - Cooling	36	2	per ton	$25.11	15	3.3	1.8
Packaged Terminal Air Conditioner (PTAC) - Cooling	49	2	per ton	$220.96	15	1.1	0.6
Cooking							
HE Steamer	12914	2	per unit	$4,150	12	5.4	3.3
HE Combination Oven	18432	2	per unit	$16,884	12	1.9	1.0
HE Convection Ovens	1879	2	per unit	$2,713	12	1.2	0.6
HE Holding Cabinet	3299	2	per unit	$1,783	12	2.8	1.5
HE Fryer	1166	2	per unit	$4,708	12	0.4	0.2
HE Griddle	2594	2	per unit	$3,604	12	1.2	0.7
Induction Cooktops	784	2	per unit	$3,000	11	4.4	2.2
Lighting							
Lamp & Ballast Retrofit (HPT8 Replacing T12)	81	2	per fixture	$51	12	2.8	1.5
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	37	2	per fixture	$46	12	1.4	0.8
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	63	2	per fixture	$38	10.7	2.8	1.5
Fluorescent Fixture with Reflectors	149	2	per fixture	$86	13	2.9	1.6
T5 HP replacing T12	81	2	per fixture	$80	12	1.8	1.0
LED Exterior Flood and Spotlight	550	2	per fixture	$460	11.3	0.9	0.5
Parking Garage LED	1054	2	per fixture	$567	12	2.2	1.2
LED Exit Sign	201	2	per fixture	$25	15	11.4	8.9
LED Traffic Signals	275	2	per lamp	$50	6	6.6	3.5
LED Pedestrian Signals	150	2	per lamp	$100	8	2.2	1.2

Michigan Commercial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	Direct Utility Test	Total Resource Cost Test
Light Tube	361	2	per fixture	$500	14	1.5	0.8
High Intensity Fluorescent Fixture (replacing HID)	684	2	per fixture	$179	12.2	6.6	3.6
42W 8 lamp Hi Bay CFL	345	2	per fixture	$395	12	1.5	0.8
HID Fixture Upgrade - Pulse Start Metal Halide	769	2	per fixture	$175	13	8.0	4.3
Induction Fluorescent	47	2	Watt Reduced	$22	12.5	3.1	1.7
CFL Fixture	342	2	per fixture	$45	12	13.6	7.4
CFL Screw-in	213	2	per lamp	$5	2	15.1	8.2
LED Screw In	156	2	per unit	$37	15	10.4	6.7
LED Fuel Pump Canopy Fixture	195	2	per fixture	$343	21	1.5	0.8
CFL Flood	202	2	per lamp	$6	2	12.9	7.0
LED Downlight	121	2	per fixture	$30	10.3	6.3	4.0
LED Replacing Halogen Incandescent	187	2	per lamp	$26	8	9.3	5.2
New Fluorescent Fixtures T5/HP T8 (replacing T12)	48	2	per fixture	$88	15	1.3	0.7
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	134	2	per fixture	$80	15	3.5	1.9
LED Roadway Lights	484	2	per fixture	$310	18	3.8	2.1
LED Outdoor Area Fixture (Parking Light or Street Light)	768	2	per fixture	$643	13	2.3	1.3
LED Pin Based Lamp	171	2	per unit	$35	15	12.4	6.6
LED Wallpack	722	2	per unit	$250	15	6.5	3.5
CFL Exterior Lighting	1021	2	per fixture	$433	12	1.7	1.0
CFL Screw in Specialty	120	2	per lamp	$3	2	35.1	18.1
LED Specialty	111	2	per lamp	$29	8.8	5.0	2.7
Illuminated Signs to LED	6	2	per watt reduced	$4	9.5	1.3	0.8
LED Lighting in Refrigeration	460	2	per door	$300	16	2.0	1.1
Lighting Controls							
Controls for HID (Hi/Lo)	149	1	per fixture	$400	10	0.6	0.3
Controls for H.I.F.	195	2	per unit	$74	10	4.4	2.4
Daylight Dimming	12100	1	10,000 sq ft	$3,000	12	7.8	4.2
Daylight Dimming - New Construction	14800	1	10,000 sq ft	$3,000	12	9.1	4.9
15% More Efficient Design - New Construction	27000	2	building	$4,000	15	13.6	7.4
30% More Efficient Design - New Construction	54000	2	building	$8,000	15	13.6	7.4
Remote Mounted Occupancy Sensor	994	2	per sensor	$200	10	3.7	2.2
Switch Mounted Occupancy Sensor	751	2	per sensor	$463	10	1.2	0.7
Central Lighting Control	11500	2	10,000 sq ft	$2,700	12	7.6	4.1
Switching Controls for Multilevel Lighting (Non-HID)	8000	2	10,000 sq ft	$3,000	12	5.1	2.8
Lighting Power Density - Exceed Code by 10%	5586	2	per kW reduced	$220	12	29.6	16.7
Stairwell Bi-Level Control	4809	2	per kW controlled	$825	9	5.3	3.0
Occupancy Sensors for LED Refrigerator Lighting	195	2	per door	$20	16	12.7	7.2
Refrigeration							
Vending Miser for Soft Drink Vending Machines	800	1	per unit	$216	10	3.0	1.7
Refrigerated Case Covers	2900	1	per unit	$150	4	9.4	5.2
Refrigeration Economizer	167	1	per ton	$127	15	1.0	0.6
Commercial Ice-makers	926	2	per unit	$1,367	12	0.8	0.5
Evaporator Fan Motor Controls on S-P motors	1155	1	per controller	$300	5	2.2	1.2
Evaporator Fan Motor Controls on PSC motors	796	1	per controller	$300	5	1.5	0.8
Evaporator Fan Motor Controls on ECM motors	330	1	per controller	$300	5	0.6	0.3
H.E. Evaporative Fan Motors	773	1	per unit	$60	15	18.2	10.2
Zero-Energy Doors	1800	2	per unit	$290	10	5.7	3.3
Door Heater Controls	1489	1	per door	$250	12.5	4.8	2.9
Discus and Scroll Compressors	1500	2	per unit	$825	13	2.6	1.4
Floating Head Pressure Control	1264	1	per ton	$80	15	12.7	7.7
ENERGY STAR Commercial Solid Door Refrigerators	666	2	per unit	$600	12	1.3	0.7
ENERGY STAR Commercial Solid Door Freezers	1737	2	per unit	$450	12	4.6	2.6
ENERGY STAR Commercial Glass Door Refrigerators	754	2	per unit	$600	12	1.5	0.8
ENERGY STAR Commercial Glass Door Freezers	3671	2	per unit	$450	12	9.8	5.5
Strip Curtains	270	1	sq ft	$8	4	16.7	9.4

Michigan Commercial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	Direct Utility Test	Total Resource Cost Test
Efficient Refrigeration Condenser	120	2	per ton	$35	15	20.7	10.6
Door Gaskets - Cooler and Freezer	98	2	linear ft	$2	4	21.0	11.7
Reach-in Refrigerated display case door retrofit	1014	1	linear ft	$670	12	3.0	1.6
Refrigeration Savings due to Lighting Savings	1	2	per lighting Watt reduced	$0	12	2.3	1.2
ECM case fan motors	824	2	per motor	$78	15	14.3	8.1
Efficient low-temp compressor	283	2	per unit	$552	13	0.8	0.4
Automatic High Speed Doors - between freezer and cooler	968	2	sq ft	$150	12	7.7	4.3
Refrigerant charging correction	78	2	per ton	$10	2	8.5	4.4
Compressed Air							
Efficient Air Compressors	1390	2	per HP	$100	15	17.0	9.7
Automatic Drains	2097	2	per drain	$355	5	3.8	2.1
Cycling Dryers	13	2	per SCFM	$20	10	0.8	0.4
Low Pressure Drop-Filters	65	1	per hp	$22	10	3.4	1.9
Air-Entraining Air Nozzles	21143	1	per nozzle	$77	15	661.0	354.4
Receiver Capacity Addition	9159	1	per unit	$2,000	10	7.3	3.9
Barrel Wraps Inj Mold and Extruders	1210	1	sq ft	$80	5	13.2	7.1
Pellet Dryer Tanks and Ducts	185	1	linear foot	$56	5	2.8	1.5
Compressed Air Audits & Leak Repair	624	1	per SCFM	$8	1	11.4	6.3
Compressed Air Pressure Flow Controller replacing no flow controller	74	1	per HP	$25	10	3.4	1.9
High Efficiency Air Dryers	47	2	per SCFM	$35	14.4	2.0	1.1
Air Compressor Outdoor Air Intake	110	1	per hp	$5	20	40.9	22.7
Variable Displacement Air Compressor	442	1	per hp	$340	13	1.8	1.0
Space Heating							
High Efficiency Heat Pump	79	2	per ton	$156	15	2.6	1.3
Ground Source Heat Pump - Heating	1384	2	per ton	$3,525	15	0.6	0.6
Ductless (mini split) - Heating	251	1	per ton	$802	15	1.0	0.5
High Efficiency Pumps	201	2	per hp	$97	15	4.0	2.2
VFD Pump	1724	1	per CHW pump hp	$149	10	8.2	4.9
ECM motors on furnaces	720	1	per furnace	$250	20	4.5	2.5
Water Loop Heat Pump (WLHP) - Heating	36	2	per ton	$25	15	3.5	1.9
Packaged Terminal Air Conditioner (PTAC) - Heating	153	2	per ton	$138	15	2.8	1.5
Other							
Electrically Commutated Plug Fans in data centers	1445	2	per fan	$718	15	2.8	1.6
NEMA Premium Transformer, single-phase	7	2	per kVA	$12	30	2.3	1.2
NEMA Premium Transformer, three-phase	10	2	per kVA	$10	30	2.3	1.3
Commercial Clothes washers - Non-Water Heating Savings	235	2	per unit	$98	7	1.2	0.7
Vendor Miser for Non-Refrig Equipment	474	1	per unit	$135	5	1.2	0.7
Optimized Snow and Ice Melt Controls	0	1	sq ft	$0	15	38.4	21.5
Engine Block Heater Timer	576	2	per engine block	$50	5	39.7	20.3

Michigan Commercial Measure Database - Electric

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Computers & Office Equipment									
Energy Star Compliant Single Door Refrigerator	43%	43%	43%	43%	43%	43%	43%	43%	43%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	72%	72%	72%	72%	72%	72%	72%	72%	72%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	70%	70%	70%	70%	70%	70%	70%	70%	70%
PC Network Energy Management Controls replacing no central control	70%	70%	70%	70%	70%	70%	70%	70%	70%
EZ Save Monitor Power Management Software	55%	55%	55%	55%	55%	55%	55%	55%	55%
Energy Star UPS	61%	61%	61%	61%	61%	61%	61%	61%	61%
Water Heating									
Heat Pump Water Heater	100%	92%	94%	88%	97%	100%	100%	91%	100%
Booster Water Heater	100%	92%	94%	88%	97%	100%	100%	91%	100%
Point of Use Water Heating	100%	92%	94%	88%	97%	100%	100%	91%	100%
Solar Water Heating System	75%	75%	75%	75%	75%	75%	75%	75%	75%
High Efficiency Electric Water Heater	100%	92%	94%	88%	97%	100%	100%	91%	100%
Low Flow Pre-Rinse Spray Nozzle	84%	84%	84%	84%	84%	84%	84%	84%	84%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, Low Temp, Elec Heat	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, Low Temp, Gas Heat	80%	80%	80%	80%	80%	80%	80%	80%	80%
Ozone Commercial laundry System	40%	40%	40%	40%	40%	40%	40%	40%	40%
Low Flow Faucet Aerator	56%	48%	60%	41%	78%	51%	63%	47%	43%
Low Flow Showerhead	100%	100%	100%	100%	84%	100%	93%	86%	100%
Hot Water (DHW) Pipe Insulation	94%	95%	85%	93%	72%	88%	92%	87%	100%
Tank Insulation (electric)	100%	93%	100%	97%	97%	88%	94%	100%	75%
Drain water Heat Recovery Water Heater	94%	90%	100%	94%	100%	88%	97%	100%	100%
Hot Water Circulation Pump Time-Clock	60%	60%	60%	60%	60%	60%	60%	60%	60%
Refrigeration Heat Recovery	99%	99%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%
Efficient Hot Water Pump	47%	47%	47%	47%	47%	47%	47%	47%	47%

Michigan Commercial Measure Database - Electric

Remaining Factor:
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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Pools									
Energy Efficient Pool Pump with controls	83%	83%	83%	83%	83%	83%	83%	83%	83%
Solar Pool Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heat Pump Pool Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%
High efficiency spas/hot tubs	83%	83%	83%	83%	83%	83%	83%	83%	83%
Building Envelope									
Integrated Building Design	83%	83%	83%	83%	83%	83%	83%	83%	83%
Energy Efficient Windows	53%	40%	38%	24%	48%	12%	32%	7%	29%
Cool Roofing	100%	100%	93%	99%	97%	100%	97%	100%	99%
Ceiling Insulation R-11 to R-42	54%	28%	54%	47%	23%	33%	31%	39%	51%
Below Grade Insulation	54%	90%	34%	60%	54%	5%	72%	40%	54%
Wall Insulation R-7.5 to R13	40%	40%	47%	42%	16%	56%	44%	24%	40%
Roof Insulation R-11 to R-24	54%	28%	54%	47%	23%	33%	31%	39%	51%
Ventilation									
Enthalpy Economizer	97%	97%	97%	97%	97%	97%	97%	97%	97%
Demand-Controlled Ventilation	99%	99%	99%	99%	99%	99%	99%	99%	99%
Variable Speed Drive Control, 15 HP	89%	89%	89%	89%	89%	89%	89%	89%	89%
Variable Speed Drive Control, 5 HP	89%	89%	89%	89%	89%	89%	89%	89%	89%
Variable Speed Drive Control, 40 HP	89%	89%	89%	89%	89%	89%	89%	89%	89%
Improved Duct Sealing	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	90%	90%	90%	90%	90%	90%	90%	90%	90%
Destratification Fan	93%	93%	93%	93%	93%	93%	93%	93%	93%
Controlled Ventilation Optimization	71%	71%	71%	71%	71%	71%	71%	71%	71%
High Performance Air Filters	40%	40%	40%	40%	40%	40%	40%	40%	40%
Space Cooling - Chillers									
Air-Cooled Recip Chiller	67%	67%	67%	67%	67%	67%	67%	67%	67%
Air-Cooled Screw Chiller	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Centrifugal Chiller < 150 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Centrifugal Chiller 150 - 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Centrifugal Chiller > 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Screw Chiller < 150 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Screw Chiller 150 - 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Screw Chiller > 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%
Chiller Tune Up/Diagnostics - 300 ton	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chiller Tune Up/Diagnostics - 500 ton	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Efficiency Pumps	47%	47%	47%	47%	47%	47%	47%	47%	47%
Efficient Chilled Water Pump	47%	47%	47%	47%	47%	47%	47%	47%	47%
Chilled Hot Water Reset	99%	99%	99%	99%	99%	99%	99%	99%	99%
HVAC Controls									
Programmable Thermostats	82%	82%	82%	82%	82%	82%	82%	82%	82%
EMS install	99%	99%	99%	99%	99%	99%	99%	99%	99%
EMS Optimization	99%	99%	99%	99%	99%	99%	99%	99%	99%

Michigan Commercial Measure Database - Electric

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Hotel Guest Room Occupancy Control System	0%	0%	0%	0%	100%	0%	0%	0%	0%
Zoning	82%	82%	82%	82%	82%	82%	82%	82%	82%
Retrocommissioning	100%	100%	100%	100%	100%	100%	100%	100%	100%
Commissioning	100%	100%	100%	100%	100%	100%	100%	100%	100%
Space Cooling - Unitary and Split AC									
High Efficiency AC - Unitary & Split Systems	83%	83%	83%	83%	83%	83%	83%	83%	83%
Ductless (mini split) - Cooling	55%	55%	55%	55%	55%	55%	55%	55%	55%
Ground Source Heat Pump - Cooling	83%	83%	83%	83%	83%	83%	83%	83%	83%
Water Loop Heat Pump (WLHP) - Cooling	83%	83%	83%	83%	83%	83%	83%	83%	83%
Packaged Terminal Air Conditioner (PTAC) - Cooling	83%	83%	83%	83%	83%	83%	83%	83%	83%
Cooking									
HE Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Combination Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Convection Ovens	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Holding Cabinet	93%	93%	93%	93%	93%	93%	93%	93%	93%
HE Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Griddle	89%	89%	89%	89%	89%	89%	89%	89%	89%
Induction Cooktops	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lighting									
Lamp & Ballast Retrofit (HPT8 Replacing T12)	81%	86%	52%	83%	87%	39%	70%	38%	54%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	17%	13%	38%	17%	10%	1%	30%	62%	10%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	17%	13%	38%	17%	10%	1%	30%	62%	10%
Fluorescent Fixture with Reflectors	17%	13%	38%	17%	10%	1%	30%	62%	10%
T5 HP replacing T12	81%	86%	52%	83%	87%	39%	70%	38%	54%
LED Exterior Flood and Spotlight	100%	99%	100%	100%	100%	100%	100%	100%	100%
Parking Garage LED	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Exit Sign	32%	42%	21%	39%	34%	33%	42%	63%	38%
LED Traffic Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Pedestrian Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%
Light Tube	100%	97%	93%	99%	94%	94%	92%	94%	100%
High Intensity Fluorescent Fixture (replacing HID)	5%	3%	5%	3%	5%	1%	4%	2%	4%
42W 8 lamp Hi Bay CFL	5%	3%	5%	3%	5%	1%	4%	2%	4%
HID Fixture Upgrade - Pulse Start Metal Halide	5%	3%	5%	3%	5%	1%	4%	2%	4%
Induction Fluorescent	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFL Fixture	83%	88%	75%	86%	85%	80%	83%	73%	83%
CFL Screw-in	83%	88%	75%	86%	85%	80%	83%	73%	83%
LED Screw In	83%	88%	75%	86%	85%	80%	83%	73%	83%
LED Fuel Pump Canopy Fixture	0%	100%	0%	0%	0%	0%	0%	0%	0%

Michigan Commercial Measure Database - Electric

Remaining Factor:
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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
CFL Flood	83%	88%	75%	86%	85%	80%	83%	73%	83%
LED Downlight	83%	88%	75%	86%	85%	80%	83%	73%	83%
LED Replacing Halogen Incandescent	83%	88%	75%	86%	85%	80%	83%	73%	83%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	81%	86%	52%	83%	87%	39%	70%	38%	54%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	17%	13%	38%	17%	10%	1%	30%	62%	10%
LED Roadway Lights	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Outdoor Area Fixture (Parking Light or Street Light)	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Pin Based Lamp	83%	88%	75%	86%	85%	80%	83%	73%	83%
LED Wallpack	100%	88%	97%	100%	100%	100%	98%	100%	99%
CFL Exterior Lighting	99%	90%	93%	82%	66%	94%	94%	99%	91%
CFL Screw in Specialty	83%	88%	75%	86%	85%	80%	83%	73%	83%
LED Specialty	83%	88%	75%	86%	85%	80%	83%	73%	83%
Illuminated Signs to LED	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Lighting in Refrigeration	83%	88%	75%	86%	85%	80%	83%	73%	83%
Lighting Controls									
Controls for HID (Hi/Lo)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Controls for H.I.F.	100%	100%	100%	100%	100%	100%	100%	100%	100%
Daylight Dimming	100%	100%	100%	100%	100%	100%	100%	100%	100%
Daylight Dimming - New Construction	100%	100%	100%	100%	100%	100%	100%	100%	100%
15% More Efficient Design - New Construction	63%	89%	89%	89%	89%	89%	89%	89%	89%
30% More Efficient Design - New Construction	100%	89%	89%	89%	89%	89%	89%	89%	89%
Remote Mounted Occupancy Sensor	95%	96%	93%	95%	97%	94%	92%	87%	94%
Switch Mounted Occupancy Sensor	95%	96%	93%	95%	97%	94%	92%	87%	94%
Central Lighting Control	100%	99%	93%	100%	100%	94%	97%	87%	98%
Switching Controls for Multilevel Lighting (Non-HID)	100%	100%	100%	99%	97%	100%	100%	94%	99%
Lighting Power Density - Exceed Code by 10%	62%	29%	36%	66%	31%	61%	32%	31%	43%
Stairwell Bi-Level Control	100%	100%	100%	99%	100%	94%	100%	100%	100%
Occupancy Sensors for LED Refrigerator Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration									
Vending Miser for Soft Drink Vending Machines	95%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerated Case Covers	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration Economizer	69%	69%	69%	69%	69%	69%	69%	69%	69%
Commercial Ice-makers	98%	98%	98%	98%	98%	98%	98%	98%	98%
Evaporator Fan Motor Controls on S-P motors	100%	83%	64%	100%	100%	100%	82%	100%	100%

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Evaporator Fan Motor Controls on PSC motors	100%	83%	64%	100%	100%	100%	82%	100%	100%
Evaporator Fan Motor Controls on ECM motors	100%	83%	64%	100%	100%	100%	82%	100%	100%
H.E. Evaporative Fan Motors	100%	100%	93%	100%	100%	100%	100%	100%	100%
Zero-Energy Doors	96%	96%	96%	96%	96%	96%	96%	96%	96%
Door Heater Controls	77%	77%	77%	77%	77%	77%	77%	77%	77%
Discus and Scroll Compressors	74%	74%	74%	74%	74%	74%	74%	74%	74%
Floating Head Pressure Control	99%	99%	99%	99%	99%	99%	99%	99%	99%
ENERGY STAR Commercial Solid Door Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Solid Door Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Glass Door Refrigerators	99%	99%	99%	99%	99%	99%	99%	99%	99%
ENERGY STAR Commercial Glass Door Freezers	99%	99%	99%	99%	99%	99%	99%	99%	99%
Strip Curtains	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient Refrigeration Condenser	74%	74%	74%	74%	74%	74%	74%	74%	74%
Door Gaskets - Cooler and Freezer	75%	75%	75%	75%	75%	75%	75%	75%	75%
Reach-in Refrigerated display case door retrofit	66%	66%	66%	66%	66%	66%	66%	66%	66%
Refrigeration Savings due to Lighting Savings	100%	100%	100%	100%	100%	100%	100%	100%	100%
ECM case fan motors	88%	88%	88%	88%	88%	88%	88%	88%	88%
Efficient low-temp compressor	80%	80%	80%	80%	80%	80%	80%	80%	80%
Automatic High Speed Doors - between freezer and cooler	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerant charging correction	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compressed Air									
Efficient Air Compressors	75%	75%	0%	0%	0%	0%	0%	0%	60%
Automatic Drains	75%	75%	0%	75%	75%	75%	75%	75%	60%
Cycling Dryers	75%	75%	0%	75%	75%	75%	75%	75%	60%
Low Pressure Drop-Filters	75%	75%	0%	75%	75%	75%	75%	75%	60%
Air-Entraining Air Nozzles	83%	83%	0%	83%	83%	83%	83%	83%	83%
Receiver Capacity Addition	75%	75%	0%	75%	75%	75%	75%	75%	60%
Barrel Wraps Inj Mold and Extruders	75%	75%	0%	75%	75%	75%	75%	75%	60%
Pellet Dryer Tanks and Ducts	75%	75%	0%	75%	75%	75%	75%	75%	60%
Compressed Air Audits & Leak Repair	100%	100%	0%	100%	100%	100%	100%	100%	100%
Compressed Air Pressure Flow Controller replacing no flow controller	83%	83%	0%	83%	83%	83%	83%	83%	83%
High Efficiency Air Dryers	75%	75%	0%	75%	75%	75%	75%	75%	60%
Air Compressor Outdoor Air Intake	75%	75%	0%	75%	75%	75%	75%	75%	60%
Variable Displacement Air Compressor	75%	75%	0%	75%	75%	75%	75%	75%	60%
Space Heating									

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
High Efficiency Heat Pump	67%	67%	67%	67%	67%	67%	67%	67%	67%
Ground Source Heat Pump - Heating	72%	72%	72%	72%	72%	72%	72%	72%	72%
Ductless (mini split) - Heating	90%	90%	90%	90%	90%	90%	90%	90%	90%
High Efficiency Pumps	47%	47%	47%	47%	47%	47%	47%	47%	47%
VFD Pump	83%	83%	83%	83%	83%	83%	83%	83%	83%
ECM motors on furnaces	47%	47%	47%	47%	47%	47%	47%	47%	47%
Water Loop Heat Pump (WLHP) - Heating	83%	83%	83%	83%	83%	83%	83%	83%	83%
Packaged Terminal Air Conditioner (PTAC) - Heating	83%	83%	83%	83%	83%	83%	83%	83%	83%
Other									
Electrically Commutated Plug Fans in data centers	100%	100%	100%	100%	100%	100%	100%	100%	100%
NEMA Premium Transformer, single-phase	98%	98%	98%	98%	98%	98%	98%	98%	98%
NEMA Premium Transformer, three-phase	98%	98%	98%	98%	98%	98%	98%	98%	98%
Commercial Clothes washers - Non-Water Heating Savings	57%	57%	57%	57%	57%	57%	57%	57%	57%
Vendor Miser for Non-Refrig Equipment	95%	100%	100%	100%	100%	100%	100%	100%	100%
Optimized Snow and Ice Melt Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Engine Block Heater Timer	100%	100%	100%	100%	100%	100%	100%	100%	100%

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Computers & Office Equipment									
Energy Star Compliant Single Door Refrigerator	24%	24%	24%	24%	24%	24%	24%	24%	24%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	35%	35%	35%	35%	35%	35%	35%	35%	35%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	50%	50%	50%	50%	50%	50%	50%	50%	50%
PC Network Energy Management Controls replacing no central control	46%	46%	46%	46%	46%	46%	46%	46%	46%
EZ Save Monitor Power Management Software	15%	15%	15%	15%	15%	15%	15%	15%	15%
Energy Star UPS	11%	11%	11%	11%	11%	11%	11%	11%	11%
Water Heating									
Heat Pump Water Heater	31%	31%	31%	31%	31%	31%	31%	31%	31%
Booster Water Heater	13%	13%	13%	13%	13%	13%	13%	13%	13%
Point of Use Water Heating	7%	7%	7%	7%	7%	7%	7%	7%	7%
Solar Water Heating System	60%	60%	60%	60%	60%	60%	60%	60%	60%
High Efficiency Electric Water Heater	5%	5%	5%	5%	5%	5%	5%	5%	5%
Low Flow Pre-Rinse Spray Nozzle	50%	50%	50%	50%	50%	50%	50%	50%	50%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	28%	28%	28%	28%	28%	28%	28%	28%	28%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	26%	26%	26%	26%	26%	26%	26%	26%	26%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	15%	15%	15%	15%	15%	15%	15%	15%	15%
ES Dishwasher, Low Temp, Elec Heat	33%	33%	33%	33%	33%	33%	33%	33%	33%
ES Dishwasher, Low Temp, Gas Heat	5%	5%	5%	5%	5%	5%	5%	5%	5%
Ozone Commercial laundry System	15%	15%	15%	15%	15%	15%	15%	15%	15%
Low Flow Faucet Aerator	66%	66%	66%	66%	66%	66%	66%	66%	66%
Low Flow Showerhead	30%	30%	30%	30%	30%	30%	30%	30%	30%
Hot Water (DHW) Pipe Insulation	2%	2%	2%	2%	2%	2%	2%	2%	2%
Tank Insulation (electric)	91%	91%	91%	91%	91%	91%	91%	91%	91%
Drain water Heat Recovery Water Heater	25%	25%	25%	25%	25%	25%	25%	25%	25%
Hot Water Circulation Pump Time-Clock	5%	5%	5%	5%	5%	5%	5%	5%	5%
Refrigeration Heat Recovery	10%	10%	10%	10%	10%	10%	10%	10%	10%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	38%	38%	38%	38%	38%	38%	38%	38%	38%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	25%	25%	25%	25%	25%	25%	25%	25%	25%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	33%	33%	33%	33%	33%	33%	33%	33%	33%
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	27%	27%	27%	27%	27%	27%	27%	27%	27%
Efficient Hot Water Pump	21%	21%	21%	21%	21%	21%	21%	21%	21%
Pools									
Energy Efficient Pool Pump with controls	67%	67%	67%	67%	67%	67%	67%	67%	67%
Solar Pool Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heat Pump Pool Heater	61%	61%	61%	61%	61%	61%	61%	61%	61%

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High efficiency spas/hot tubs	15%	15%	15%	15%	15%	15%	15%	15%	15%
Building Envelope									
Integrated Building Design	40%	40%	40%	40%	40%	40%	40%	40%	40%
Energy Efficient Windows	14%	14%	14%	14%	14%	14%	14%	14%	14%
Cool Roofing	15%	15%	15%	15%	15%	15%	15%	15%	15%
Ceiling Insulation R-11 to R-42	8%	8%	8%	8%	8%	8%	8%	8%	8%
Below Grade Insulation	1%	1%	1%	1%	1%	1%	1%	1%	1%
Wall Insulation R-7.5 to R13	2%	2%	2%	2%	2%	2%	2%	2%	2%
Roof Insulation R-11 to R-24	8%	8%	8%	8%	8%	8%	8%	8%	8%
Ventilation									
Enthalpy Economizer	22%	22%	22%	22%	22%	22%	22%	22%	22%
Demand-Controlled Ventilation	25%	25%	25%	25%	25%	25%	25%	25%	25%
Variable Speed Drive Control, 15 HP	30%	30%	30%	30%	30%	30%	30%	30%	30%
Variable Speed Drive Control, 5 HP	30%	30%	30%	30%	30%	30%	30%	30%	30%
Variable Speed Drive Control, 40 HP	30%	30%	30%	30%	30%	30%	30%	30%	30%
Improved Duct Sealing	5%	5%	5%	5%	5%	5%	5%	5%	5%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	48%	48%	48%	48%	48%	48%	48%	48%	48%
Destratification Fan	12%	12%	12%	12%	12%	12%	12%	12%	12%
Controlled Ventilation Optimization	43%	43%	43%	43%	43%	43%	43%	43%	43%
High Performance Air Filters	32%	32%	32%	32%	32%	32%	32%	32%	32%
Space Cooling - Chillers									
Air-Cooled Recip Chiller	25%	25%	25%	25%	25%	25%	25%	25%	25%
Air-Cooled Screw Chiller	25%	25%	25%	25%	25%	25%	25%	25%	25%
Water-Cooled Centrifugal Chiller < 150	30%	30%	30%	30%	30%	30%	30%	30%	30%
Water-Cooled Centrifugal Chiller 150 - 300 ton	29%	29%	29%	29%	29%	29%	29%	29%	29%
Water-Cooled Centrifugal Chiller > 300	30%	30%	30%	30%	30%	30%	30%	30%	30%
Water-Cooled Screw Chiller < 150 ton	26%	26%	26%	26%	26%	26%	26%	26%	26%
Water-Cooled Screw Chiller 150 - 300 ton	27%	27%	27%	27%	27%	27%	27%	27%	27%
Water-Cooled Screw Chiller > 300 ton	28%	28%	28%	28%	28%	28%	28%	28%	28%
Chiller Tune Up/Diagnostics - 300 ton	8%	8%	8%	8%	8%	8%	8%	8%	8%
Chiller Tune Up/Diagnostics - 500 ton	8%	8%	8%	8%	8%	8%	8%	8%	8%
High Efficiency Pumps	10%	10%	10%	10%	10%	10%	10%	10%	10%
Efficient Chilled Water Pump	15%	15%	15%	15%	15%	15%	15%	15%	15%
Chilled Hot Water Reset	25%	25%	25%	25%	25%	25%	25%	25%	25%
HVAC Controls									
Programmable Thermostats	5%	5%	5%	5%	5%	5%	5%	5%	5%
EMS install	10%	10%	10%	10%	10%	10%	10%	10%	10%
EMS Optimization	1%	6%	8%	7%	1%	2%	1%	5%	1%
Hotel Guest Room Occupancy Control System	30%	30%	30%	30%	30%	30%	30%	30%	30%
Zoning	0%	0%	0%	0%	20%	0%	0%	0%	0%
Retrocommissioning	9%	9%	9%	9%	9%	9%	9%	9%	9%
Commissioning	9%	9%	9%	9%	9%	9%	9%	9%	9%
Space Cooling - Unitary and Split AC									
High Efficiency AC - Unitary & Split Systems	9%	9%	9%	9%	9%	9%	9%	9%	9%
Ductless (mini split) - Cooling	62%	62%	62%	62%	62%	62%	62%	62%	62%

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Ground Source Heat Pump - Cooling	41%	41%	41%	41%	41%	41%	41%	41%	41%
Water Loop Heat Pump (WLHP) - Cooling	3%	3%	3%	3%	3%	3%	3%	3%	3%
Packaged Terminal Air Conditioner (PTAC) - Cooling	7%	7%	7%	7%	7%	7%	7%	7%	7%
Cooking									
HE Steamer	66%	66%	66%	66%	66%	66%	66%	66%	66%
HE Combination Oven	48%	48%	48%	48%	48%	48%	48%	48%	48%
HE Convection Ovens	15%	15%	15%	15%	15%	15%	15%	15%	15%
HE Holding Cabinet	63%	63%	63%	63%	63%	63%	63%	63%	63%
HE Fryer	6%	6%	6%	6%	6%	6%	6%	6%	6%
HE Griddle	15%	15%	15%	15%	15%	15%	15%	15%	15%
Induction Cooktops	20%	20%	20%	20%	20%	20%	20%	20%	20%
Lighting									
Lamp & Ballast Retrofit (HPT8 Replacing T12)	14%	14%	14%	14%	14%	14%	14%	14%	14%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	17%	17%	17%	17%	17%	17%	17%	17%	17%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	25%	25%	25%	25%	25%	25%	25%	25%	25%
Fluorescent Fixture with Reflectors	27%	27%	27%	27%	27%	27%	27%	27%	27%
T5 HP replacing T12	30%	30%	30%	30%	30%	30%	30%	30%	30%
LED Exterior Flood and Spotlight	38%	38%	38%	38%	38%	38%	38%	38%	38%
Parking Garage LED	40%	40%	40%	40%	40%	40%	40%	40%	40%
LED Exit Sign	41%	41%	41%	41%	41%	41%	41%	41%	41%
LED Traffic Signals	85%	85%	85%	85%	85%	85%	85%	85%	85%
LED Pedestrian Signals	85%	85%	85%	85%	85%	85%	85%	85%	85%
Light Tube	45%	45%	45%	45%	45%	45%	45%	45%	45%
High Intensity Fluorescent Fixture (replacing HID)	32%	32%	32%	32%	32%	32%	32%	32%	32%
42W 8 lamp Hi Bay CFL	18%	18%	18%	18%	18%	18%	18%	18%	18%
HID Fixture Upgrade - Pulse Start Metal Halide	24%	24%	24%	24%	24%	24%	24%	24%	24%
Induction Fluorescent	38%	38%	38%	38%	38%	38%	38%	38%	38%
CFL Fixture	51%	51%	51%	51%	51%	51%	51%	51%	51%
CFL Screw-in	47%	47%	47%	47%	47%	47%	47%	47%	47%
LED Screw In	69%	69%	69%	69%	69%	69%	69%	69%	69%
LED Fuel Pump Canopy Fixture	73%	73%	73%	73%	73%	73%	73%	73%	73%
CFL Flood	63%	63%	63%	63%	63%	63%	63%	63%	63%
LED Downlight	66%	66%	66%	66%	66%	66%	66%	66%	66%
LED Replacing Halogen Incandescent	75%	75%	75%	75%	75%	75%	75%	75%	75%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	21%	21%	21%	21%	21%	21%	21%	21%	21%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	45%	45%	45%	45%	45%	45%	45%	45%	45%
LED Roadway Lights	92%	92%	92%	92%	92%	92%	92%	92%	92%
LED Outdoor Area Fixture (Parking Light or Street Light)	72%	72%	72%	72%	72%	72%	72%	72%	72%
LED Pin Based Lamp	64%	64%	64%	64%	64%	64%	64%	64%	64%
LED Wallpack	68%	68%	68%	68%	68%	68%	68%	68%	68%

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Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
CFL Exterior Lighting	78%	78%	78%	78%	78%	78%	78%	78%	78%
CFL Screw in Specialty	72%	72%	72%	72%	72%	72%	72%	72%	72%
LED Specialty	86%	86%	86%	86%	86%	86%	86%	86%	86%
Illuminated Signs to LED	18%	18%	18%	18%	18%	18%	18%	18%	18%
LED Lighting in Refrigeration	50%	50%	50%	50%	50%	50%	50%	50%	50%
Lighting Controls									
Controls for HID (Hi/Lo)	33%	33%	33%	33%	33%	33%	33%	33%	33%
Controls for H.I.F.	42%	42%	42%	42%	42%	42%	42%	42%	42%
Daylight Dimming	30%	30%	30%	30%	30%	30%	30%	30%	30%
Daylight Dimming - New Construction	30%	30%	30%	30%	30%	30%	30%	30%	30%
15% More Efficient Design - New Construction	15%	15%	15%	15%	15%	15%	15%	15%	15%
30% More Efficient Design - New Construction	30%	30%	30%	30%	30%	30%	30%	30%	30%
Remote Mounted Occupancy Sensor	30%	30%	30%	30%	30%	30%	30%	30%	30%
Switch Mounted Occupancy Sensor	30%	30%	30%	30%	30%	30%	30%	30%	30%
Central Lighting Control	25%	25%	25%	25%	25%	25%	25%	25%	25%
Switching Controls for Multilevel Lighting (Non-HID)	18%	18%	18%	18%	18%	18%	18%	18%	18%
Lighting Power Density - Exceed Code by 10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Stairwell Bi-Level Control	55%	55%	55%	55%	55%	55%	55%	55%	55%
Occupancy Sensors for LED Refrigerator Lighting	43%	43%	43%	43%	43%	43%	43%	43%	43%
Refrigeration									
Vending Miser for Soft Drink Vending Machines	30%	30%	30%	30%	30%	30%	30%	30%	30%
Refrigerated Case Covers	6%	6%	6%	6%	6%	6%	6%	6%	6%
Refrigeration Economizer	30%	30%	30%	30%	30%	30%	30%	30%	30%
Commercial Ice-makers	7%	7%	7%	7%	7%	7%	7%	7%	7%
Evaporator Fan Motor Controls on S-P motors	25%	25%	25%	25%	25%	25%	25%	25%	25%
Evaporator Fan Motor Controls on PSC motors	25%	25%	25%	25%	25%	25%	25%	25%	25%
Evaporator Fan Motor Controls on ECM motors	25%	25%	25%	25%	25%	25%	25%	25%	25%
H.E. Evaporative Fan Motors	30%	30%	30%	30%	30%	30%	30%	30%	30%
Zero-Energy Doors	20%	20%	20%	20%	20%	20%	20%	20%	20%
Door Heater Controls	68%	68%	68%	68%	68%	68%	68%	68%	68%
Discus and Scroll Compressors	8%	8%	8%	8%	8%	8%	8%	8%	8%
Floating Head Pressure Control	9%	9%	9%	9%	9%	9%	9%	9%	9%
ENERGY STAR Commercial Solid Door Refrigerators	32%	32%	32%	32%	32%	32%	32%	32%	32%
ENERGY STAR Commercial Solid Door Freezers	30%	30%	30%	30%	30%	30%	30%	30%	30%
ENERGY STAR Commercial Glass Door Refrigerators	30%	30%	30%	30%	30%	30%	30%	30%	30%
ENERGY STAR Commercial Glass Door Freezers	34%	34%	34%	34%	34%	34%	34%	34%	34%

Michigan Commercial Measure Database - Electric

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Strip Curtains	80%	80%	80%	80%	80%	80%	80%	80%	80%
Efficient Refrigeration Condenser	2%	2%	2%	2%	2%	2%	2%	2%	2%
Door Gaskets - Cooler and Freezer	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reach-in Refrigerated display case door retrofit	43%	43%	43%	43%	43%	43%	43%	43%	43%
Refrigeration Savings due to Lighting Savings	100%	100%	100%	100%	100%	100%	100%	100%	100%
ECM case fan motors	54%	54%	54%	54%	54%	54%	54%	54%	54%
Efficient low-temp compressor	1%	1%	1%	1%	1%	1%	1%	1%	1%
Automatic High Speed Doors - between freezer and cooler	15%	15%	15%	15%	15%	15%	15%	15%	15%
Refrigerant charging correction	14%	14%	14%	14%	14%	14%	14%	14%	14%
Compressed Air									
Efficient Air Compressors	31%	31%	31%	31%	31%	31%	31%	31%	31%
Automatic Drains	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cycling Dryers	29%	29%	29%	29%	29%	29%	29%	29%	29%
Low Pressure Drop-Filters	3%	3%	3%	3%	3%	3%	3%	3%	3%
Air-Entraining Air Nozzles	42%	42%	42%	42%	42%	42%	42%	42%	42%
Receiver Capacity Addition	10%	10%	10%	10%	10%	10%	10%	10%	10%
Barrel Wraps Inj Mold and Extruders	89%	89%	89%	89%	89%	89%	89%	89%	89%
Pellet Dryer Tanks and Ducts	85%	85%	85%	85%	85%	85%	85%	85%	85%
Compressed Air Audits & Leak Repair	50%	50%	50%	50%	50%	50%	50%	50%	50%
Compressed Air Pressure Flow Controller replacing no flow controller	3%	3%	3%	3%	3%	3%	3%	3%	3%
High Efficiency Air Dryers	22%	22%	22%	22%	22%	22%	22%	22%	22%
Air Compressor Outdoor Air Intake	6%	6%	6%	6%	6%	6%	6%	6%	6%
Variable Displacement Air Compressor	10%	10%	10%	10%	10%	10%	10%	10%	10%
Space Heating									
High Efficiency Heat Pump	9%	9%	9%	9%	9%	9%	9%	9%	9%
Ground Source Heat Pump - Heating	41%	41%	41%	41%	41%	41%	41%	41%	41%
Ductless (mini split) - Heating	62%	62%	62%	62%	62%	62%	62%	62%	62%
High Efficiency Pumps	10%	10%	10%	10%	10%	10%	10%	10%	10%
VFD Pump	41%	41%	41%	41%	41%	41%	41%	41%	41%
ECM motors on furnaces	26%	26%	26%	26%	26%	26%	26%	26%	26%
Water Loop Heat Pump (WLHP) - Heating	3%	3%	3%	3%	3%	3%	3%	3%	3%
Packaged Terminal Air Conditioner (PTAC) - Heating	7%	7%	7%	7%	7%	7%	7%	7%	7%
Other									
Electrically Commutated Plug Fans in data centers	33%	33%	33%	33%	33%	33%	33%	33%	33%
NEMA Premium Transformer, single-	35%	35%	35%	35%	35%	35%	35%	35%	35%
NEMA Premium Transformer, three-phase	36%	36%	36%	36%	36%	36%	36%	36%	36%
Commercial Clothes washers - Non-Water Heating Savings	31%	31%	31%	31%	31%	31%	31%	31%	31%
Vendor Miser for Non-Refrig Equipment	52%	52%	52%	52%	52%	52%	52%	52%	52%
Optimized Snow and Ice Melt Controls	92%	92%	92%	92%	92%	92%	92%	92%	92%
Engine Block Heater Timer	64%	64%	64%	64%	64%	64%	64%	64%	64%

Michigan Commercial Measure Database - Electric

Electric Measure Sources

Source Number	Source
1	Michigan Master Database of Deemed Savings - 2013 - Non-Weather Sensitive Commercial
2	Michigan Master Database of Deemed Savings - 2013 - Weather Sensitive
3	Michigan Baseline 2011: Commercial Baseline Report
4	http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/appliance_calculator.xlsx
5	Big Ass Fan Company Calculations, http://www.todaysfacilitymanager.com/articles/the-hvac-factor-high-volume-low-speed-fans.php
6	2009 MPRP EE Potential Study - June 2009
7	Vermont TRM - Manual No. 2011-73b
8	Vermont Energy Efficiency Potential Study - January 2007
9	Natural Gas Energy Efficiency Potential in Massachusetts, Prepared for GasNetworks by GDS Associates, April 22, 2009
10	Energy Efficiency and Renewable Energy Resource Development Potential in New York State - Final Report, Volume 5 Energy Efficiency Technical Appendices, August 2003.
11	GDS Benefit Cost Model
12	Federal Energy Management Program (FEMP), Energy Cost Calculator for Electric and Gas Water Heaters
13	http://www.aceee.org/consumer/water-heating
14	GDS Associates estimate based upon review of various customer and vendor surveys, baseline studies and potential studies conducted by GDS in other states
15	GDS New Hampshire Potential Study
16	Efficiency Vermont Technical Reference User Manual (TRM) No. 2006-41
17	Efficiency Vermont Technical Reference User Manual (TRM) No. 2010-64
18	Efficiency Maine Commercial Technical Reference Manual No. 2007-01
19	Efficiency Maine Commercial Technical Reference Manual No. 2010-01
20	Refrigerant Heat Recovery System Learning Center Dining Facility, PG&E Food Services Technology Center, April 1993
21	http://apps1.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12430
22	http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13200
23	US DOE, EERE Consumer's Guide to Energy Efficiency and Renewable Energy, "Solar Swimming Pool Heaters" http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13230
24	ES Analysis-ResDWH: ENERGY STAR® Residential Water Heaters: Final Criteria Analysis (www.energystar.gov). April 2008.
25	http://web.archive.org/web/20061006153904/http://www.energy.ca.gov/appliances/2003rulemaking/documents/case_studies/CASE_Portable_Spa.pdf
26	City of Keene NH, Cities for Climate Protection Campaign, Local Action Plan, February 19, 2004
27	EPA Energy Star Program
28	DC SEU Technical Reference Manual 2012-1.2
29	Maryland Baseline Study – Commercial and Industrial Sectors, ITRON, December 3, 2010
30	Delaware Statewide Commercial & Industrial End Use & Saturation Study - July 26, 2012
31	Independent Assessment of Conservation and Energy Efficiency Potential for Connecticut and the Southwest Connecticut Region, GDS Associates, June
32	Building Commissioning - A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions. Lawrence Berkeley National Laboratory. Report Prepared for: California Energy Commission Public Interest Energy Research (PIER) - July 21, 2009
33	DTE Non-Residential Potential Study - 2010. Cadmus
34	Efficiency Maine Commercial Technical Reference Manual - Version 2013.1, January 1, 2013, Efficiency Maine Trust
35	Mid-Atlantic Technical Reference Manual - Version 3.0, March, 2013, NEEP
36	MEMD Support Documentation - 2014 - Workbooks and Algorithms
37	ENERGY STAR Qualified Office Equipment Calculator
38	Energy Consumption by Commercial Office and Telecommunication Equipment, ACEEE August 18, 2002

Michigan Commercial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/ Unit	Effective Measure Life	Savings Factor	Remaining Factor
Computers & Office Equipment					
Energy Star Compliant Single Door Refrigerator	1	1	1	36	3
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	26	27	27	26,29	3
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	1	1	1	36	14
PC Network Energy Management Controls replacing no central control	1	1	1	36	14
EZ Save Monitor Power Management Software	16	16	16	16	14
Energy Star UPS	1	1	1	36	14
Water Heating					
Heat Pump Water Heater	1	1	1	1, 36	3
Booster Water Heater	10	10	10	10	3
Point of Use Water Heating	10	10	10	10	3
Solar Water Heating System	9	9	3	14	14
High Efficiency Electric Water Heater	12	13	12	14	3
Low Flow Pre-Rinse Spray Nozzle	1	1	1	36	14
ES Dishwasher, High Temp, Elec Heat, Elec Booster	1	1	1	36	33
ES Dishwasher, High Temp, Gas Heat, Elec Booster	1	1	1	36	33
ES Dishwasher, High Temp, Gas Heat, Gas Booster	1	1	1	36	33
ES Dishwasher, Low Temp, Elec Heat	1	1	1	36	33
ES Dishwasher, Low Temp, Gas Heat	1	1	1	36	33
Ozone Commercial laundry System	14	15	8	14	15
Low Flow Faucet Aerator	1	1	1	36	3
Low Flow Showerhead	1	1	1	36	3
Hot Water (DHW) Pipe Insulation	1	1	1	14	3
Tank Insulation (electric)	1	1	1	1	3
Drain water Heat Recovery Water Heater	10	10	10	10	3
Hot Water Circulation Pump Time-Clock	9	9	9	9	9
Refrigeration Heat Recovery	20	20	9	14	3
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	1	1	1	36	33
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	1	1	1	36	33
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	1	1	1	36	33
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	1	1	1	36	33
Efficient Hot Water Pump	1	1	1	2	29
Pools					
Energy Efficient Pool Pump with controls	7	7	7	7	3
Solar Pool Heating	9	23	24	14	3
Heat Pump Pool Heater	22	23	21	21	3
High efficiency spas/hot tubs	25	25	25	25	3
Building Envelope					
Integrated Building Design	10	11	11	10	14
Energy Efficient Windows	2	2	2	2	3

Michigan Commercial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/ Unit	Effective Measure Life	Savings Factor	Remaining Factor
Cool Roofing	2	2	2	2	3
Ceiling Insulation R-11 to R-42	2	2	2	2	3
Below Grade Insulation	2	2	2	14	3
Wall Insulation R-7.5 to R13	2	2	2	14	3
Roof Insulation R-11 to R-24	2	2	2	14	3
Ventilation					
Enthalpy Economizer	2	2	2	10	3
Demand-Controlled Ventilation	2	2	2	14	3
Variable Speed Drive Control, 15 HP	2	2	2	8	14
Variable Speed Drive Control, 5 HP	2	2	2	8	14
Variable Speed Drive Control, 40 HP	2	2	2	8	14
Improved Duct Sealing	2	2	2	7	3
Electronically-Commutated Permanent Magnet Motors (ECPMs)	1	1	1	36	14
Destratification Fan	2	2	2	5	14
Controlled Ventilation Optimization	2	2	2	2	14
High Performance Air Filters	2	2	2	2	14
Space Cooling - Chillers					
Air-Cooled Recip Chiller	2	2	2	2	14
Air-Cooled Screw Chiller	2	2	2	2	14
Water-Cooled Centrifugal Chiller < 150 ton	2	2	2	2	14
Water-Cooled Centrifugal Chiller 150 - 300 ton	2	2	2	2	14
Water-Cooled Centrifugal Chiller > 300 ton	2	2	2	2	14
Water-Cooled Screw Chiller < 150 ton	2	2	2	2	14
Water-Cooled Screw Chiller 150 - 300 ton	2	2	2	2	14
Water-Cooled Screw Chiller > 300 ton	2	2	2	2	14
Chiller Tune Up/Diagnostics - 300 ton	2	2	2	8	3
Chiller Tune Up/Diagnostics - 500 ton	2	2	2	8	3
High Efficiency Pumps	1	1	1	2	29
Efficient Chilled Water Pump	2	2	2	2	29
Chilled Hot Water Reset	2	2	2	14	29
HVAC Controls					
Programmable Thermostats	2	2	2	8	3
EMS install	2	2	2	8	3
EMS Optimization	2	2	2	14	3
Hotel Guest Room Occupancy Control System	1	1	1	36	3
Zoning	2	2	2	14	15
Retrocommissioning	32	32	7	32	32
Commissioning	32	32	7	32	32
Space Cooling - Unitary & Split AC					
High Efficiency AC - Unitary & Split Systems	2	2	2	2	14
Ductless (mini split) - Cooling	2	2	2	2	3
Ground Source Heat Pump - Cooling	2	2	2	2	14
Water Loop Heat Pump (WLHP) - Cooling	2	2	2	2	14
Packaged Terminal Air Conditioner (PTAC) - Cooling	2	2	2	2	14
Cooking					
HE Steamer	1	1	1	36	3

Michigan Commercial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/ Unit	Effective Measure Life	Savings Factor	Remaining Factor
HE Combination Oven	1	1	1	36	3
HE Convection Ovens	1	1	1	36	3
HE Holding Cabinet	1	1	1	36	3
HE Fryer	1	1	1	36	3
HE Griddle	1	1	1	36	3
Induction Cooktops	6	6	6	6	3
Lighting					
Lamp & Ballast Retrofit (HPT8 Replacing T12)	1	1	1	36	3
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	1	1	1	36	3
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	1	1	1	36	3
Fluorescent Fixture with Reflectors	19	19	19	14	3
T5 HP replacing T12	1	1	1	36	3
LED Exterior Flood and Spotlight	1	1	1	36	3
Parking Garage LED	1	1	1	36	30
LED Exit Sign	1	1	1	36	3
LED Traffic Signals	1	1	1	36	30
LED Pedestrian Signals	1	1	1	36	30
Light Tube	1	1	1	14	3
High Intensity Fluorescent Fixture (replacing HID)	1	1	1	36	3
42W 8 lamp Hi Bay CFL	1	1	1	36	3
HID Fixture Upgrade - Pulse Start Metal Halide	1	1	1	36	3
Induction Fluorescent	1	1	1	36	3
CFL Fixture	1	1	1	36	3
CFL Screw-in	1	1	1	36	3
LED Screw In	28	28	28	14	3
LED Fuel Pump Canopy Fixture	35	35	35	14	14
CFL Flood	1	1	1	36	3
LED Downlight	1	1	1	36	3
LED Replacing Halogen Incandescent	1	1	1	36	3
New Fluorescent Fixtures T5/HP T8 (replacing T12)	19	19	28	14	3
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	19	19	28	14	3
LED Roadway Lights	35	35	35	14	30
LED Outdoor Area Fixture (Parking Light or Street Light)	34	34	34	14	30
LED Pin Based Lamp	28	28	28	14	3
LED Wallpack	28	28	28	14	3
CFL Exterior Lighting	1	1	1	36	3
CFL Screw in Specialty	1	1	1	36	3
LED Specialty	1	1	1	36	3
Illuminated Signs to LED	1	1	1	14	3
LED Lighting in Refrigeration	1	1	1	36	3
Lighting Controls					
Controls for HID (Hi/Lo)	1	1	1	36	3
Controls for H.I.F.	19	19	19	19	3
Daylight Dimming	1	1	1	36	3
Daylight Dimming - New Construction	1	1	1	36	3

Michigan Commercial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/ Unit	Effective Measure Life	Savings Factor	Remaining Factor
15% More Efficient Design - New Construction	31	31	31	14	38
30% More Efficient Design - New Construction	31	31	31	14	38
Remote Mounted Occupancy Sensor	1	1	1	36	3
Switch Mounted Occupancy Sensor	1	1	1	36	3
Central Lighting Control	1	1	1	36	3
Switching Controls for Multilevel Lighting (Non-HID)	1	1	1	36	3
Lighting Power Density - Exceed Code by 10%	1	1	1	36	3, 15
Stairwell Bi-Level Control	1	1	1	36	3
Occupancy Sensors for LED Refrigerator Lighting	1	1	1	36	3
Refrigeration					
Vending Miser for Soft Drink Vending Machines	1	1	1	36	3
Refrigerated Case Covers	7	7	7	14	3
Refrigeration Economizer	2	2	2	8	6
Commercial Ice-makers	1	1	1	36	3

Michigan Commercial Measure Database - Gas

Base Case Factor:
Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	13%	13%	13%	13%	10%	11%	13%	8%	13%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	8%	8%	8%	8%	7%	8%	8%	5%	8%
On-Demand, Tankless Water Heater (>=.82 EF) (<=200,000 BTU/h)	13%	13%	13%	13%	10%	11%	13%	8%	13%
On-Demand, Tankless Water Heater (>=.95 EF) (<=200,000 Btu/h)	13%	13%	13%	13%	10%	11%	13%	8%	13%
On-Demand, Tankless Water Heater (.85 TE) (>200,000 BTU)	8%	8%	8%	8%	7%	8%	8%	5%	8%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=85% (EF=.82)	8%	8%	8%	8%	7%	8%	8%	5%	8%
Heat Recovery Water Heater	15%	0%	100%	0%	20%	0%	50%	0%	0%
Pipe wrap - DHW	100%	100%	100%	100%	100%	100%	100%	100%	100%
Low flow shower head (1.5 gpm)	0%	0%	0%	0%	20%	2%	0%	33%	13%
Faucet aerator	60%	60%	5%	50%	5%	15%	5%	15%	26%
Graywater Heat Exchanger/GFX	2%	0%	0%	2%	20%	2%	50%	33%	13%
Low Flow Pre-Rinse Spray Nozzle (1.6 gpm)	0%	0%	10%	0%	2%	2%	15%	2%	0%
Circulation Pump Time Clocks	100%	100%	100%	100%	100%	100%	100%	100%	100%
Solar Water Heating w/gas auxiliary tank (SEF=1.5)	21%	21%	21%	21%	17%	19%	21%	14%	21%
Wastewater, Filtration/Reclamation	0%	0%	0%	0%	17%	8%	0%	0%	8%
Ozone Commercial Laundry System (Gas HW)	0%	0%	0%	0%	17%	8%	0%	0%	4%
High Efficiency (95%) Gas Pool Water Heater	0%	0%	0%	0%	17%	10%	0%	35%	0%
Pool Cover	0%	0%	0%	0%	17%	8%	0%	35%	0%
Solar pool heater	0%	0%	0%	0%	17%	10%	0%	0%	0%
Stand Alone Commercial Water Heater (>=88% Thermal efficiency)(>75000 btu)	8%	8%	8%	8%	7%	8%	8%	5%	8%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=90% (EF=.90)	8%	8%	8%	8%	7%	8%	8%	5%	8%
Domestic Water Heater Tune-up	100%	100%	100%	100%	93%	90%	100%	65%	100%
O-zone Generator for Laundromat	0%	0%	0%	0%	0%	0%	0%	0%	4%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	0%	0%	0%	0%	6%	3%	0%	0%	0%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	0%	0%	0%	0%	6%	3%	0%	0%	0%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	0%	0%	0%	0%	6%	3%	0%	0%	0%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	0%	0%	3%	0%	3%	3%	3%	3%	0%

Michigan Commercial Measure Database - Gas

Base Case Factor:
Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	13%	13%	13%	13%	10%	11%	13%	8%	13%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	0%	0%	3%	0%	3%	3%	3%	3%	0%
ES Dishwasher, Low Temp, Gas Heat	0%	0%	3%	0%	3%	3%	3%	3%	0%
Space & Water Heating									
Combination Water Heater/Furnace (.86 EF, .90 AFUE)	13%	13%	13%	13%	10%	11%	13%	8%	13%
Combination Water Heater/Boiler (Condensing)(0.9 EF, 0.9 AFUE)	13%	13%	13%	13%	10%	11%	13%	8%	13%
Combination Water Heater/Boiler (Non-Condensing) (0.86 EF, 85 AFUE)	13%	13%	13%	13%	10%	11%	13%	8%	13%
Building Envelope									
Energy Efficient Windows	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ceiling Insulation R-11 to R-42	50%	50%	50%	50%	50%	50%	50%	50%	50%
Below Grade Insulation	100%	100%	100%	100%	100%	100%	100%	100%	100%
Wall Insulation R-7.5 to R13	100%	100%	100%	100%	100%	100%	100%	100%	100%
Roof Insulation R-11 to R-24	50%	50%	50%	50%	50%	50%	50%	50%	50%
Integrated Building Design, Envelope Only (30% > code)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Truck Loading Dock Seals	100%	100%	100%	0%	0%	0%	0%	0%	0%
Heat Curtains for Greenhouses	0%	100%	0%	0%	0%	0%	0%	0%	0%
Infrared film for Greenhouses	0%	100%	0%	0%	0%	0%	0%	0%	0%
Improved Duct Sealing	100%	100%	100%	100%	100%	100%	100%	100%	100%
HVAC Controls									
EMS install	36%	36%	36%	36%	36%	36%	36%	36%	36%
EMS Optimization	7%	7%	7%	7%	7%	7%	7%	7%	7%
Zoning	100%	100%	100%	100%	100%	100%	100%	100%	100%
Retrocommissioning	42%	42%	42%	42%	42%	42%	42%	42%	42%
Commissioning	42%	42%	42%	42%	42%	42%	42%	42%	42%
Programmable Thermostat	14%	24%	61%	23%	6%	5%	60%	12%	20%
Cooking									
High Efficiency Gas Griddle	18%	18%	18%	18%	18%	18%	18%	18%	18%
High Efficiency Gas Combination Oven	5%	5%	5%	5%	5%	5%	5%	5%	5%
High Efficiency Gas Convection Oven	5%	5%	5%	5%	5%	5%	5%	5%	5%
High Efficiency Gas Conveyer Oven	5%	5%	5%	5%	5%	5%	5%	5%	5%
High Efficiency Gas Rack Oven	5%	5%	5%	5%	5%	5%	5%	5%	5%
High Efficiency Gas Broiler	5%	5%	5%	5%	5%	5%	5%	5%	5%
Power Burner Range	5%	5%	5%	5%	5%	5%	5%	5%	5%
High Efficiency Fryer	28%	28%	28%	28%	28%	28%	28%	28%	28%
High Efficiency Gas Steamer	18%	18%	18%	18%	18%	18%	18%	18%	18%
Space Heating									
Gas Furnace 92 AFUE	39%	17%	17%	17%	17%	17%	17%	17%	17%
Gas Furnace 95 AFUE	9%	9%	9%	9%	9%	9%	9%	9%	9%
Improved Duct Sealing	9%	9%	9%	9%	9%	9%	9%	9%	9%

Michigan Commercial Measure Database - Gas

Base Case Factor:
Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	13%	13%	13%	13%	10%	11%	13%	8%	13%
Gas Unit Heater - Condensing (AFUE =93%)	18%	18%	18%	18%	18%	18%	18%	18%	18%
Infrared Heater	3%	3%	3%	3%	3%	3%	3%	3%	3%
Boiler Heating Pipe Insulation	13%	13%	13%	13%	13%	13%	13%	13%	13%
Boiler Tune-Up	13%	13%	13%	13%	13%	13%	13%	13%	13%
Boiler Reset Controls	13%	13%	13%	13%	13%	13%	13%	13%	13%
Boiler O2 Trim Controls	13%	13%	13%	13%	13%	13%	13%	13%	13%
Boiler Parallel Positioning	13%	13%	13%	13%	13%	13%	13%	13%	13%
Repair/Replace malfunctioning steam traps	3%	3%	3%	3%	3%	3%	3%	3%	3%
Insulate steam lines/condensate tank	3%	3%	3%	3%	3%	3%	3%	3%	3%
Destratification Fans	100%	0%	0%	0%	0%	0%	0%	0%	0%
Exhaust Hood Makeup Air	3%	0%	1%	1%	20%	3%	1%	3%	1%
Exhaust Hood - Demand Ventilation	3%	0%	1%	1%	20%	3%	1%	3%	1%
Demand Controlled Ventilation	0%	100%	100%	10%	10%	0%	0%	100%	10%
Furnace Tube Inserts	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Compressor Exhaust Heat Recovery	0%	0%	0%	0%	0%	0%	0%	0%	0%
Linkageless Controls for Process boilers replacing linkages	0%	0%	0%	0%	0%	0%	0%	0%	0%
Modulated Boiler Control for Process	0%	0%	0%	0%	0%	0%	0%	0%	0%
Guest Room Energy Management, Gas Heating	0%	0%	0%	0%	100%	0%	0%	0%	0%
Boiler Efficiency Improvement 80% to 88%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Condensing Boiler 90% Efficiency	7%	7%	7%	7%	7%	7%	7%	7%	7%
Boiler turndown control	13%	13%	13%	13%	13%	13%	13%	13%	13%
Boiler Economizer	13%	13%	13%	13%	13%	13%	13%	13%	13%
Sensible ERV (Flat plate HX)	0%	0%	3%	0%	1%	1%	20%	3%	1%
Total ERV (Enthalpy Wheel)	0%	0%	0%	0%	0%	0%	0%	0%	0%
Boiler sequencing	13%	13%	13%	13%	13%	13%	13%	13%	13%
Furnace Tune-Up	0%	0%	0%	0%	0%	0%	0%	0%	0%
Direct Fired Make Up Air System	0%	0%	0%	0%	0%	0%	0%	0%	0%

Michigan Commercial Measure Database - Gas

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
On-Demand, Tankless Water Heater (>=.82 EF) (<=200,000 BTU/h)	100%	100%	100%	100%	100%	100%	100%	100%	100%
On-Demand, Tankless Water Heater (>=.95 EF) (<=200,000 Btu/h)	100%	100%	100%	100%	100%	100%	100%	100%	100%
On-Demand, Tankless Water Heater (.85 TE) (>200,000 BTU)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=85% (EF=.82)	39%	39%	39%	39%	39%	39%	39%	39%	39%
Heat Recovery Water Heater	10%	5%	80%	10%	20%	80%	80%	15%	5%
Pipe wrap - DHW	50%	50%	50%	50%	50%	50%	50%	50%	50%
Low flow shower head (1.5 gpm)	95%	95%	95%	95%	95%	95%	95%	95%	95%
Faucet aerator	95%	95%	25%	95%	50%	25%	25%	50%	75%
Graywater Heat Exchanger/GFX	50%	50%	50%	50%	50%	50%	50%	50%	50%
Low Flow Pre-Rinse Spray Nozzle (1.6 gpm)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Circulation Pump Time Clocks	100%	100%	100%	100%	100%	100%	100%	100%	100%
Solar Water Heating w/gas auxiliary tank (SEF=1.5)	34%	34%	34%	34%	34%	34%	34%	34%	34%
Wastewater, Filtration/Reclamation	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ozone Commercial Laundry System (Gas HW)	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency (95%) Gas Pool Water Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pool Cover	100%	100%	100%	100%	100%	100%	100%	100%	100%
Solar pool heater	34%	34%	34%	34%	34%	34%	34%	34%	34%
Stand Alone Commercial Water Heater (>=88% Thermal efficiency)(>75000 btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=90% (EF=.90)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Domestic Water Heater Tune-up	100%	100%	100%	100%	100%	100%	100%	100%	100%
O-zone Generator for Laundromat	100%	100%	100%	100%	100%	100%	100%	100%	100%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Gas

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	100%	100%	100%	100%	100%	100%	100%	100%	100%
ES Dishwasher, Low Temp, Gas Heat	100%	100%	100%	100%	100%	100%	100%	100%	100%
Space & Water Heating									
Combination Water Heater/Furnace (.86 EF, .90 AFUE)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Combination Water Heater/Boiler (Condensing)(0.9 EF, 0.9 AFUE)	56%	56%	56%	56%	56%	56%	56%	56%	56%
Combination Water Heater/Boiler (Non-Condensing) (0.86 EF, 85 AFUE)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Building Envelope									
Energy Efficient Windows	75%	75%	75%	75%	75%	75%	75%	75%	75%
Ceiling Insulation R-11 to R-42	69%	48%	50%	54%	87%	78%	86%	74%	57%
Below Grade Insulation	14%	14%	14%	14%	14%	14%	14%	14%	14%
Wall Insulation R-7.5 to R13	100%	100%	100%	100%	100%	100%	100%	100%	100%
Roof Insulation R-11 to R-24	100%	100%	100%	100%	100%	100%	100%	100%	100%
Integrated Building Design, Envelope Only (30% > code)	39%	39%	95%	95%	95%	95%	95%	95%	95%
Truck Loading Dock Seals	80%	80%	80%	80%	80%	50%	50%	80%	80%
Heat Curtains for Greenhouses	100%	100%	100%	100%	100%	100%	100%	100%	100%
Infrared film for Greenhouses	100%	100%	100%	100%	100%	100%	100%	100%	100%
Improved Duct Sealing	100%	100%	100%	100%	100%	100%	100%	100%	100%
HVAC Controls									
EMS install	100%	100%	100%	100%	100%	100%	100%	100%	100%
EMS Optimization	100%	100%	100%	100%	100%	100%	100%	100%	100%
Zoning	100%	100%	100%	100%	100%	100%	100%	100%	100%
Retrocommissioning	54%	54%	54%	54%	54%	54%	54%	54%	54%
Commissioning	71%	71%	71%	71%	71%	71%	71%	71%	71%
Programmable Thermostat	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cooking									
High Efficiency Gas Griddle	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Combination Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Convection Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Conveyer Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Rack Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Broiler	100%	100%	100%	100%	100%	100%	100%	100%	100%
Power Burner Range	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%
Space Heating									
Gas Furnace 92 AFUE	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Gas

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Gas Furnace 95 AFUE	100%	100%	100%	100%	100%	100%	100%	100%	100%
Improved Duct Sealing	100%	100%	100%	100%	100%	100%	100%	100%	100%
Gas Unit Heater - Condensing (AFUE =93%)	100%	0%	65%	0%	0%	0%	0%	0%	35%
Infrared Heater	100%	0%	65%	0%	0%	0%	0%	0%	35%
Boiler Heating Pipe Insulation	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Tune-Up	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Reset Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler O2 Trim Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Parallel Positioning	42%	42%	42%	42%	42%	42%	42%	42%	42%
Repair/Replace malfunctioning steam traps	100%	100%	100%	100%	100%	100%	100%	100%	100%
Insulate steam lines/condensate tank	100%	100%	100%	100%	100%	100%	100%	100%	100%
Destratification Fans	90%	90%	90%	90%	90%	90%	90%	90%	90%
Exhaust Hood Makeup Air	100%	100%	100%	100%	100%	100%	100%	100%	100%
Exhaust Hood - Demand Ventilation	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demand Controlled Ventilation	95%	95%	95%	95%	95%	95%	95%	95%	95%
Furnace Tube Inserts	100%	100%	100%	100%	100%	100%	100%	100%	100%
Air Compressor Exhaust Heat Recovery	100%	100%	100%	100%	100%	100%	100%	100%	100%
Linkageless Controls for Process boilers replacing linkages	100%	100%	100%	100%	100%	100%	100%	100%	100%
Modulated Boiler Control for Process	100%	100%	100%	100%	100%	100%	100%	100%	100%
Guest Room Energy Management, Gas Heating	0%	0%	0%	0%	90%	0%	0%	0%	0%
Boiler Efficiency Improvement 80% to 88%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Condensing Boiler 90% Efficiency	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler turndown control	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Economizer	67%	67%	67%	67%	67%	67%	67%	67%	67%
Sensible ERV (Flat plate HX)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Total ERV (Enthalpy Wheel)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler sequencing	100%	100%	100%	100%	100%	100%	100%	100%	100%
Furnace Tune-Up	100%	100%	100%	100%	100%	100%	100%	100%	100%
Direct Fired Make Up Air System	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Gas

Measure Savings, Cost and Useful Life

Measure Name	Annual MMBTU Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	Direct Utility Test	Total Resource Cost Test
Water Heating							
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	13.15	2	per unit	$335	13	3.4	1.9
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	25.00	2	per unit	$2,340	13	0.9	0.5
On-Demand, Tankless Water Heater (>=.82 EF) (<=200,000 BTU/h)	18.80	2	per unit	$285	20	7.8	4.3
On-Demand, Tankless Water Heater (>=.95 EF) (<=200,000 Btu/h)	9.59	2	per unit	$1,373	20	0.8	0.5
On-Demand, Tankless Water Heater (.85 TE) (>200,000 BTU)	13.50	2	per unit	$1,522	20	1.0	0.6
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=85% (EF=.82)	0.11	2	per MBH	$10	15	1.1	0.6
Heat Recovery Water Heater	258.60	2	per unit	$4,800	15	5.2	2.9
Pipe wrap - DHW	0.21	2	Linear Ft	$6	20	5.7	3.1
Low flow shower head (1.5 gpm)	2.20	2	per unit	$25	10	6.3	8.4
Faucet aerator	3.77	2	per unit	$3	10	107.9	144.3
Graywater Heat Exchanger/GFX	44.60	2	per unit	$3,364	20	1.6	0.9
Low Flow Pre-Rinse Spray Nozzle (1.6 gpm)	6.00	2	per unit	$35	5	7.1	6.9
Circulation Pump Time Clocks	5.91	2	per unit	$132	10	3.2	1.8
Solar Water Heating w/gas auxiliary tank (SEF=1.5)	67.68	2	per unit	$26,400	20	0.3	0.5
Wastewater, Filtration/Reclamation	1396.00	2	per unit	########	20	1.1	0.6
Ozone Commercial Laundry System (Gas HW)	1656.20	2	per unit	$26,000	15	6.2	3.4
High Efficiency (95%) Gas Pool Water Heater	0.24	2	Mbtu	$4	15	6.2	3.5
Pool Cover	0.09	2	per sq ft surface area	$2	10	3.7	2.1
Solar pool heater	94.69	2	per unit	$5,500	20	2.0	1.1
Stand Alone Commercial Water Heater (>=88% Thermal efficiency)(>75000 btu)	18.80	2	per unit	$209	13	7.9	4.4
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=90% (EF=.90)	0.25	2	per MBH	$18	15	1.3	0.7
Domestic Water Heater Tune-up	0.06	2	per MBh	$3	2	0.4	0.2
O-zone Generator for Laundromat	4.21	2	Per lb of laundry capacity	$76	10	4.0	2.2
Clothes Washer ENERGY STAR, Gas water heater, Gas	4.43	2	per unit	$540	7	0.4	1.1
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	2.15	2	per unit	$540	7	0.2	0.8
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	2.27	2	per unit	$540	7	0.2	0.1
ES Dishwasher, High Temp, Gas Heat, Elec Booster	29.83	2	per unit	$978	16.3	3.1	1.7
ES Dishwasher, High Temp, Gas Heat, Gas Booster	46.88	2	per unit	$978	16.3	4.9	2.7
ES Dishwasher, Low Temp, Gas Heat	52.80	2	per unit	$255	16.3	21.2	11.8
Space & Water Heating							
Combination Water Heater/Furnace (.86 EF, .90 AFUE)	24.01	2	per unit	$360	15	6.5	3.6
Combination Water Heater/Boiler (Condensing)(0.9 EF, 0.9 AFUE)	21.10	1	per unit	$1,093	20	2.3	1.3
Combination Water Heater/Boiler (Non-Condensing) (0.86 EF, 85 AFUE)	13.45	2	per unit	$650	20	2.4	1.4
Building Envelope							
Energy Efficient Windows	11.97	2	100 sq ft	$2,250	20	1.0	0.6
Ceiling Insulation R-11 to R-42	15.51	2	1,000 sq ft roof area	$600	20	3.9	2.2
Below Grade Insulation	3.03	1	1,000 sq ft bsmt wall area	$2,271	30	0.2	0.1
Wall Insulation R-7.5 to R13	123.42	1	1,000 sq ft wall area	$100	20	160.0	89.0
Roof Insulation R-11 to R-24	7.07	1	1,000 sq ft roof area	$1,000	20	1.2	0.6
Integrated Building Design, Envelope Only (30% > code)	809.46	1	building	$83,113	40	1.6	0.9
Truck Loading Dock Seals	22.93	2	Per door	$1,819	10	0.9	0.5
Heat Curtains for Greenhouses	0.03	1	per sq ft	$2	5	0.9	0.5
Infrared film for Greenhouses	0.03	1	per sq ft	$0	5	66.1	36.7
Improved Duct Sealing	2.53	1	ton	$108	18	4.0	2.2

Michigan Commercial Measure Database - Gas

Measure Savings, Cost and Useful Life

Measure Name	Annual MMBTU Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	Direct Utility Test	Total Resource Cost Test
HVAC Controls							
EMS install	1.37	1	1,000 sq ft cond floor area	$7	15	84.4	49.9
EMS Optimization	54.75	1	building	$2,608	5	0.9	0.5
Zoning	4.28	1	1,000 sq ft cond floor area	$500	15	1.4	0.8
Retrocommissioning	0.05	1	per sq ft	$0	7	8.1	4.5
Commissioning	0.04	1	per sq ft	$1	7	2.0	1.1
Programmable Thermostat	20.75	1	1,000 sq ft cond floor area	$50	9	33.7	19.1
Cooking							
High Efficiency Gas Griddle	14.90	2	per unit	$4,575	12	0.3	0.1
High Efficiency Gas Combination Oven	40.30	2	per unit	$21,797	12	0.2	0.1
High Efficiency Gas Convection Oven	30.60	2	per unit	$3,144	12	0.8	0.4
High Efficiency Gas Conveyer Oven	80.85	2	per unit	$3,241	12	2.1	1.1
High Efficiency Gas Rack Oven	157.35	2	per unit	$8,434	12	1.5	0.9
High Efficiency Gas Broiler	129.95	2	per unit	$8,518	12	1.3	0.7
Power Burner Range	40.80	2	per unit	$1,400	7	1.6	0.9
High Efficiency Fryer	54.10	2	per unit	$3,459	12	1.3	0.7
High Efficiency Gas Steamer	205.90	2	per unit	$6,221	12	2.7	2.3
Space Heating							
Gas Furnace 92 AFUE	0.26	2	kBtu/hr	$10	15	1.3	1.5
Gas Furnace 95 AFUE	0.32	2	kBtu/hr	$10	15	1.6	1.8
Improved Duct Sealing	2.53	2	ton	$108	18	2.0	2.2
Gas Unit Heater - Condensing (AFUE =93%)	64.94	2	per unit	$2,640	19	1.4	1.6
Infrared Heater	0.44	2	kBtu/hr	$2	15	9.7	10.8
Boiler Heating Pipe Insulation	1.65	2	Linear Ft	$13	13.3	5.9	6.5
Boiler Tune-Up	61.83	2	kBtu/hr	$300	2	1.8	2.0
Boiler Reset Controls	34.35	2	kBtu/hr	$993	20	2.0	2.3
Boiler O2 Trim Controls	0.07	2	kBtu/hr	$1	5	2.6	2.9
Boiler Parallel Positioning	124.19	2	per unit	$14,500	20	0.5	0.6
Repair/Replace malfunctioning steam traps	29.80	2	per unit	$168	5	3.7	4.1
Insulate steam lines/condensate tank	1.91	2	per sq ft	$2	15	41.8	46.5
Destratification Fans	8.66	2	1,000 sq ft cond floor area	$375	15	1.2	1.3
Exhaust Hood Makeup Air	345.86	2	per unit	$5,900	20	4.2	4.7
Exhaust Hood - Demand Ventilation	0.09	2	cfm	$2	17.5	5.3	5.8
Demand Controlled Ventilation	37.16	2	1,000 sq ft cond floor area	$75	15	27.6	30.5
Furnace Tube Inserts	5.00	2	per unit	$325	5	0.3	0.4
Air Compressor Exhaust Heat Recovery	4.13	2	per HP	$75	15	2.7	3.0
Linkageless Controls for Process boilers replacing linkages	0.07	2	kBtu/hr	$2	5	0.8	0.9
Modulated Boiler Control for Process	0.11	2	kBtu/hr	$1	5	3.3	3.7
Guest Room Energy Management, Gas Heating	6.10	2	per unit	$250	8	0.7	0.8
Boiler Efficiency Improvement 80% to 88%	0.08	2	kBtu/hr	$12	20	0.4	0.4
Condensing Boiler 90% Efficiency	0.15	2	kBtu/hr	$25	20	0.4	0.4
Boiler turndown control	0.10	2	kBtu/hr	$1	15	6.8	7.6
Boiler Economizer	0.04	2	kBtu/hr	$5	15	0.4	0.5
Sensible ERV (Flat plate HX)	0.06	2	cfm	$3	15	-0.9	-1.0
Total ERV (Enthalpy Wheel)	0.07	2	cfm	$3	15	-1.0	-1.1
Boiler sequencing	0.06	2	kBtu/hr	$100	15	0.0	0.0
Furnace Tune-Up	0.04	2	kBtu/hr	$18	3	0.0	0.0
Direct Fired Make Up Air System	0.19	2	kBtu/hr capacity	$4	15	2.1	2.4

Michigan Commercial Measure Database - Gas

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	5%	5%	5%	5%	5%	5%	5%	5%	5%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	96%	96%	96%	96%	96%	96%	96%	96%	96%
On-Demand, Tankless Water Heater (>=.82 EF) (<=200,000 BTU/h)	96%	96%	96%	96%	96%	96%	96%	96%	96%
On-Demand, Tankless Water Heater (>=.95 EF) (<=200,000 Btu/h)	96%	96%	96%	96%	96%	96%	96%	96%	96%
On-Demand, Tankless Water Heater (.85 TE) (>200,000 BTU)	96%	96%	96%	96%	96%	96%	96%	96%	96%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=85% (EF=.82)	58%	58%	58%	58%	58%	58%	58%	58%	58%
Heat Recovery Water Heater	99%	99%	99%	99%	99%	99%	99%	99%	99%
Pipe wrap - DHW	93%	93%	93%	93%	93%	93%	93%	93%	93%
Low flow shower head (1.5 gpm)	39%	39%	39%	39%	39%	39%	39%	39%	39%
Faucet aerator	32%	32%	32%	32%	32%	32%	32%	32%	32%
Graywater Heat Exchanger/GFX	99%	99%	99%	99%	99%	99%	99%	99%	99%
Low Flow Pre-Rinse Spray Nozzle (1.6 gpm)	50%	50%	50%	50%	50%	50%	50%	50%	50%
Circulation Pump Time Clocks	60%	60%	60%	60%	60%	60%	60%	60%	60%
Solar Water Heating w/gas auxiliary tank (SEF=1.5)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Wastewater, Filtration/Reclamation	98%	98%	98%	98%	98%	98%	98%	98%	98%
Ozone Commercial Laundry System (Gas HW)	93%	93%	93%	93%	93%	93%	93%	93%	93%
High Efficiency (95%) Gas Pool Water Heater	80%	80%	80%	80%	80%	80%	80%	80%	80%
Pool Cover	89%	89%	89%	89%	89%	89%	89%	89%	89%
Solar pool heater	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stand Alone Commercial Water Heater (>=88% Thermal efficiency)(>75000 btu)	85%	85%	85%	85%	85%	85%	85%	85%	85%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=90% (EF=.90)	85%	85%	85%	85%	85%	85%	85%	85%	85%
Domestic Water Heater Tune-up	93%	93%	93%	93%	93%	93%	93%	93%	93%
O-zone Generator for Laundromat	93%	93%	93%	93%	93%	93%	93%	93%	93%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	80%	80%	80%	80%	80%	80%	80%	80%	80%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	80%	80%	80%	80%	80%	80%	80%	80%	80%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%

Michigan Commercial Measure Database - Gas

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	5%	5%	5%	5%	5%	5%	5%	5%	5%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	96%	96%	96%	96%	96%	96%	96%	96%	96%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, Low Temp, Gas Heat	80%	80%	80%	80%	80%	80%	80%	80%	80%
Space & Water Heating									
Combination Water Heater/Furnace (.86 EF, .90 AFUE)	5%	5%	5%	5%	5%	5%	5%	5%	5%
Combination Water Heater/Boiler (Condensing)(0.9 EF, 0.9 AFUE)	90%	90%	90%	90%	90%	90%	90%	90%	90%
Combination Water Heater/Boiler (Non-Condensing) (0.86 EF, 85 AFUE)	5%	5%	5%	5%	5%	5%	5%	5%	5%
Building Envelope									
Energy Efficient Windows	53%	40%	38%	24%	48%	12%	32%	7%	29%
Ceiling Insulation R-11 to R-42	54%	28%	54%	47%	23%	33%	31%	39%	51%
Below Grade Insulation	54%	90%	34%	60%	54%	5%	72%	40%	54%
Wall Insulation R-7.5 to R13	40%	40%	47%	42%	16%	56%	44%	24%	40%
Roof Insulation R-11 to R-24	54%	28%	54%	47%	23%	33%	31%	39%	51%
Integrated Building Design, Envelope Only (30% > code)	100%	100%	100%	100%	100%	100%	100%	100%	100%
Truck Loading Dock Seals	50%	50%	50%	50%	50%	50%	50%	50%	50%
Heat Curtains for Greenhouses	95%	95%	95%	95%	95%	95%	95%	95%	95%
Infrared film for Greenhouses	10%	10%	10%	10%	10%	10%	10%	10%	10%
Improved Duct Sealing	60%	60%	60%	60%	60%	60%	60%	60%	60%
HVAC Controls									
EMS install	98%	98%	98%	98%	98%	98%	98%	98%	98%
EMS Optimization	86%	86%	86%	86%	86%	86%	86%	86%	86%
Zoning	44%	44%	44%	44%	44%	44%	44%	44%	44%
Retrocommissioning	100%	100%	100%	100%	100%	100%	100%	100%	100%
Commissioning	100%	100%	100%	100%	100%	100%	100%	100%	100%
Programmable Thermostat	81%	81%	81%	81%	81%	81%	81%	81%	81%
Cooking									
High Efficiency Gas Griddle	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Combination Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Convection Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Conveyer Oven	83%	83%	83%	83%	83%	83%	83%	83%	83%
High Efficiency Gas Rack Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Broiler	100%	100%	100%	100%	100%	100%	100%	100%	100%
Power Burner Range	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Gas Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Commercial Measure Database - Gas

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	5%	5%	5%	5%	5%	5%	5%	5%	5%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	96%	96%	96%	96%	96%	96%	96%	96%	96%
Space Heating									
Gas Furnace 92 AFUE	82%	82%	82%	82%	82%	82%	82%	82%	82%
Gas Furnace 95 AFUE	90%	90%	90%	90%	90%	90%	90%	90%	90%
Improved Duct Sealing	60%	60%	60%	60%	60%	60%	60%	60%	60%
Gas Unit Heater - Condensing (AFUE =93%)	90%	90%	90%	90%	90%	90%	90%	90%	90%
Infrared Heater	51%	51%	51%	51%	51%	51%	51%	51%	51%
Boiler Heating Pipe Insulation	65%	65%	65%	65%	65%	65%	65%	65%	65%
Boiler Tune-Up	21%	21%	21%	21%	21%	21%	21%	21%	21%
Boiler Reset Controls	96%	96%	96%	96%	96%	96%	96%	96%	96%
Boiler O2 Trim Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Parallel Positioning	85%	85%	85%	85%	85%	85%	85%	85%	85%
Repair/Replace malfunctioning steam traps	30%	30%	30%	30%	30%	30%	30%	30%	30%
Insulate steam lines/condensate tank	70%	70%	70%	70%	70%	70%	70%	70%	70%
Destratification Fans	93%	93%	93%	93%	93%	93%	93%	93%	93%
Exhaust Hood Makeup Air	84%	84%	84%	84%	84%	84%	84%	84%	84%
Exhaust Hood - Demand Ventilation	98%	98%	98%	98%	98%	98%	98%	98%	98%
Demand Controlled Ventilation	99%	99%	99%	99%	99%	99%	99%	99%	99%
Furnace Tube Inserts	80%	80%	80%	80%	80%	80%	80%	80%	80%
Air Compressor Exhaust Heat Recovery	74%	74%	74%	74%	74%	74%	74%	74%	74%
Linkageless Controls for Process boilers replacing linkages	85%	85%	85%	85%	85%	85%	85%	85%	85%
Modulated Boiler Control for Process	96%	96%	96%	96%	96%	96%	96%	96%	96%
Guest Room Energy Management, Gas Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Efficiency Improvement 80% to 88%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Condensing Boiler 90% Efficiency	90%	90%	90%	90%	90%	90%	90%	90%	90%
Boiler turndown control	97%	97%	97%	97%	97%	97%	97%	97%	97%
Boiler Economizer	96%	96%	96%	96%	96%	96%	96%	96%	96%
Sensible ERV (Flat plate HX)	98%	98%	98%	98%	98%	98%	98%	98%	98%
Total ERV (Enthalpy Wheel)	98%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler sequencing	83%	83%	83%	83%	83%	83%	83%	83%	83%
Furnace Tune-Up	21%	21%	21%	21%	21%	21%	21%	21%	21%
Direct Fired Make Up Air System	90%	90%	90%	90%	90%	90%	90%	90%	90%

Michigan Commercial Measure Database - Gas

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	20%	20%	20%	20%	20%	20%	20%	20%	20%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	23%	23%	23%	23%	23%	23%	23%	23%	23%
On-Demand, Tankless Water Heater (>=.82 EF) (<=200,000 BTU/h)	29%	29%	29%	29%	29%	29%	29%	29%	29%
On-Demand, Tankless Water Heater (>=.95 EF) (<=200,000 Btu/h)	39%	39%	39%	39%	39%	39%	39%	39%	39%
On-Demand, Tankless Water Heater (.85 TE) (>200,000 BTU)	13%	13%	13%	13%	13%	13%	13%	13%	13%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=85% (EF=.82)	28%	28%	28%	28%	28%	28%	28%	28%	28%
Heat Recovery Water Heater	50%	50%	50%	50%	50%	50%	50%	50%	50%
Pipe wrap - DHW	2%	2%	2%	2%	2%	2%	2%	2%	2%
Low flow shower head (1.5 gpm)	30%	30%	30%	30%	30%	30%	30%	30%	30%
Faucet aerator	66%	66%	66%	66%	66%	66%	66%	66%	66%
Graywater Heat Exchanger/GFX	40%	40%	40%	40%	40%	40%	40%	40%	40%
Low Flow Pre-Rinse Spray Nozzle (1.6 gpm)	19%	19%	19%	19%	19%	19%	19%	19%	19%
Circulation Pump Time Clocks	5%	5%	5%	5%	5%	5%	5%	5%	5%
Solar Water Heating w/gas auxiliary tank (SEF=1.5)	61%	61%	61%	61%	61%	61%	61%	61%	61%
Wastewater, Filtration/Reclamation	50%	50%	50%	50%	50%	50%	50%	50%	50%
Ozone Commercial Laundry System (Gas HW)	55%	55%	55%	55%	55%	55%	55%	55%	55%
High Efficiency (95%) Gas Pool Water Heater	18%	18%	18%	18%	18%	18%	18%	18%	18%
Pool Cover	9%	9%	9%	9%	9%	9%	9%	9%	9%
Solar pool heater	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stand Alone Commercial Water Heater (>=88% Thermal efficiency)(>75000 btu)	9%	9%	9%	9%	9%	9%	9%	9%	9%
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=90% (EF=.90)	34%	34%	34%	34%	34%	34%	34%	34%	34%
Domestic Water Heater Tune-up	3%	3%	3%	3%	3%	3%	3%	3%	3%
O-zone Generator for Laundromat	50%	50%	50%	50%	50%	50%	50%	50%	50%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	27%	27%	27%	27%	27%	27%	27%	27%	27%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	32%	32%	32%	32%	32%	32%	32%	32%	32%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	24%	24%	24%	24%	24%	24%	24%	24%	24%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	29%	29%	29%	29%	29%	29%	29%	29%	29%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	46%	46%	46%	46%	46%	46%	46%	46%	46%
ES Dishwasher, Low Temp, Gas Heat	41%	41%	41%	41%	41%	41%	41%	41%	41%
Space & Water Heating									

Michigan Commercial Measure Database - Gas

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	20%	20%	20%	20%	20%	20%	20%	20%	20%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	23%	23%	23%	23%	23%	23%	23%	23%	23%
Combination Water Heater/Furnace (.86 EF, .90 AFUE)	15%	15%	15%	15%	15%	15%	15%	15%	15%
Combination Water Heater/Boiler (Condensing)(0.9 EF, 0.9 AFUE)	14%	14%	14%	14%	14%	14%	14%	14%	14%
Combination Water Heater/Boiler (Non-Condensing) (0.86 EF, 85 AFUE)	9%	9%	9%	9%	9%	9%	9%	9%	9%
Building Envelope									
Energy Efficient Windows	14%	14%	14%	14%	14%	14%	14%	14%	14%
Ceiling Insulation R-11 to R-42	8%	8%	8%	8%	8%	8%	8%	8%	8%
Below Grade Insulation	1%	1%	1%	1%	1%	1%	1%	1%	1%
Wall Insulation R-7.5 to R13	2%	2%	2%	2%	2%	2%	2%	2%	2%
Roof Insulation R-11 to R-24	4%	4%	4%	4%	4%	4%	4%	4%	4%
Integrated Building Design, Envelope Only (30% > code)	30%	30%	30%	30%	30%	30%	30%	30%	30%
Truck Loading Dock Seals	5%	5%	5%	5%	5%	5%	5%	5%	5%
Heat Curtains for Greenhouses	25%	25%	25%	25%	25%	25%	25%	25%	25%
Infrared film for Greenhouses	12%	12%	12%	12%	12%	12%	12%	12%	12%
Improved Duct Sealing	15%	15%	15%	15%	15%	15%	15%	15%	15%
HVAC Controls									
EMS install	20%	20%	20%	20%	20%	20%	20%	20%	20%
EMS Optimization	5%	5%	5%	5%	5%	5%	5%	5%	5%
Zoning	5%	5%	5%	5%	5%	5%	5%	5%	5%
Retrocommissioning	16%	16%	16%	16%	16%	16%	16%	16%	16%
Commissioning	16%	16%	16%	16%	16%	16%	16%	16%	16%
Programmable Thermostat	19%	19%	19%	19%	19%	19%	19%	19%	19%
Cooking									
High Efficiency Gas Griddle	12%	12%	12%	12%	12%	12%	12%	12%	12%
High Efficiency Gas Combination Oven	26%	26%	26%	26%	26%	26%	26%	26%	26%
High Efficiency Gas Convection Oven	29%	29%	29%	29%	29%	29%	29%	29%	29%
High Efficiency Gas Conveyer Oven	30%	30%	30%	30%	30%	30%	30%	30%	30%
High Efficiency Gas Rack Oven	37%	37%	37%	37%	37%	37%	37%	37%	37%
High Efficiency Gas Broiler	19%	19%	19%	19%	19%	19%	19%	19%	19%
Power Burner Range	34%	34%	34%	34%	34%	34%	34%	34%	34%
High Efficiency Fryer	32%	32%	32%	32%	32%	32%	32%	32%	32%
High Efficiency Gas Steamer	76%	76%	76%	76%	76%	76%	76%	76%	76%
Space Heating									
Gas Furnace 92 AFUE	2%	2%	2%	2%	2%	2%	2%	2%	2%
Gas Furnace 95 AFUE	6%	6%	6%	6%	6%	6%	6%	6%	6%
Improved Duct Sealing	15%	15%	15%	15%	15%	15%	15%	15%	15%
Gas Unit Heater - Condensing (AFUE =93%)	13%	13%	13%	13%	13%	13%	13%	13%	13%
Infrared Heater	30%	30%	30%	30%	30%	30%	30%	30%	30%
Boiler Heating Pipe Insulation	2%	2%	2%	2%	2%	2%	2%	2%	2%
Boiler Tune-Up	2%	2%	2%	2%	2%	2%	2%	2%	2%
Boiler Reset Controls	5%	5%	5%	5%	5%	5%	5%	5%	5%

Michigan Commercial Measure Database - Gas

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	Warehouse	Retail	Grocery	Office	Lodging	Health	Restaurant	Education	Other
Water Heating									
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	20%	20%	20%	20%	20%	20%	20%	20%	20%
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	23%	23%	23%	23%	23%	23%	23%	23%	23%
Boiler O2 Trim Controls	2%	2%	2%	2%	2%	2%	2%	2%	2%
Boiler Parallel Positioning	2%	2%	2%	2%	2%	2%	2%	2%	2%
Repair/Replace malfunctioning steam traps	10%	10%	10%	10%	10%	10%	10%	10%	10%
Insulate steam lines/condensate tank	2%	2%	2%	2%	2%	2%	2%	2%	2%
Destratification Fans	23%	23%	23%	23%	23%	23%	23%	23%	23%
Exhaust Hood Makeup Air	57%	57%	57%	57%	57%	57%	57%	57%	57%
Exhaust Hood - Demand Ventilation	25%	25%	25%	25%	25%	25%	25%	25%	25%
Demand Controlled Ventilation	12%	12%	12%	12%	12%	12%	12%	12%	12%
Furnace Tube Inserts	15%	15%	15%	15%	15%	15%	15%	15%	15%
Air Compressor Exhaust Heat Recovery	2%	2%	2%	2%	2%	2%	2%	2%	2%
Linkageless Controls for Process boilers replacing linkages	2%	2%	2%	2%	2%	2%	2%	2%	2%
Modulated Boiler Control for Process	3%	3%	3%	3%	3%	3%	3%	3%	3%
Guest Room Energy Management, Gas Heating	0%	0%	0%	0%	21%	0%	0%	0%	0%
Boiler Efficiency Improvement 80% to 88%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Condensing Boiler 90% Efficiency	10%	10%	10%	10%	10%	10%	10%	10%	10%
Boiler turndown control	2%	2%	2%	2%	2%	2%	2%	2%	2%
Boiler Economizer	5%	5%	5%	5%	5%	5%	5%	5%	5%
Sensible ERV (Flat plate HX)	10%	10%	10%	10%	10%	10%	10%	10%	10%
Total ERV (Enthalpy Wheel)	10%	10%	10%	10%	10%	10%	10%	10%	10%
Boiler sequencing	4%	4%	4%	4%	4%	4%	4%	4%	4%
Furnace Tune-Up	2%	2%	2%	2%	2%	2%	2%	2%	2%
Direct Fired Make Up Air System	16%	16%	16%	16%	16%	16%	16%	16%	16%

Michigan Commercial Measure Database - Gas

Natural Gas Measure Sources

Source Number	Source
1	Michigan Master Database of Deemed Savings - 2013 - Non-Weather Sensitive Commercial
2	Michigan Master Database of Deemed Savings - 2013 - Weather Sensitive
3	Federal Energy Management Program (FEMP), Energy Cost Calculator for Electric and Gas Water Heaters
4	GDS Associates estimate based upon review of various customer and vendor surveys, baseline studies and potential studies conducted by GDS in other states
5	Therma-Stor Return On Investment Calculation Form, http://www.thermastor.com/Heat-Recovery-water-Heaters/Heat-Recovery-ROI-Form.pdf
6	Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006, Appendix C
7	US DOE- Federal Energy Management Program (FEMP): Heat Recovery from Wastewater Using a Gravity-Film Heat Exchanger
8	Food Service Technology Center, Pre-Rinse Spray Valve/Water Cost Calculator
9	Energy Efficiency Potential of Gas-Fired Commercial Hot Water Heating Systems in Restaurants, An Emerging Technology Field Monitoring Study, FSTC Report 5011.07.04, Food Service Technology Center, April 2007
10	US DOE - Energy Efficiency And Renewable Energy - Estimating a Solar Water Heater System's Cost
11	Gene Dedick - East Coast VP Sales - AquaRecycle - ph: 210-325-9258: 1,248,000 lbs/yr = 30 gpm washer-extractor system with lint shaker.
12	http://www.aquarecycle.com/laundry-water-energy-savings.php
13	Commercial Laundry Conservation Technologies, Bill Hoffman, James Riesenberger
14	Trevor Brown Southeastern Laundry/Commercial Laundry Conservation Technologies - Bill Hoffman, James Riesenberger
15	US DOE - Energy Efficiency And Renewable Energy - Determining Gas Swimming Pool Heating Efficiency - http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13170
16	NYSERDA Deemed Savings Database, Rev 09-082006.
17	Revised DEER Measure Cost Summary (05_30_2008) Revised (06_02_2008)
18	Gas Solutions for the Foodservice Industry, http://www.gfen.info/pdf/cookinggas0107.pdf
19	CALIFORNIA STATEWIDE COMMERCIAL SECTOR NATURAL GAS ENERGY EFFICIENCY POTENTIAL STUDY, Study ID #SW061, Prepared for Pacific Gas & Electric Company, Prepared by Mike Rufo and Fred Coito KEMA-XENERGY Inc., May 14, 2003; Questar 2006 DSM Market Characterization Report, Nexant, Appendix D (sq ft) & E (cost/sq ft).
20	Cost of the most common type of steam trap (Inverted bucket trap) according to Grainger catalog ranges from $125 - $147, plus one hour of labor @ $100/hr. http://www.grainger.com/Grainger/ecatalog/N-bkg/No-16/Ntt-inverted+bucket+trap?Ns=List+Price%7C0
21	Greenheck sales representative cost and measure life information on 5,000 CFM model. ($4,500 materials, $1,000 labor, and $400 crane rental (to lift onto roof))
22	http://www.cleanboiler.org/Eff_Improve/Efficiency/Boiler_Reset_Control.asp
23	Measure information from Nexant's "Gas Energy Efficiency Measure Analysis to Support NYSERDA's Con Edison Gas Efficiency Program" reported in August 2005. Savings unit is MMBtu/unit. Baseline efficiency from DOE
24	Natural Gas Boiler/Burner Consortium - http://www.energysolutionscenter.org/boilerburner/Eff_Improve/Efficiency/Oxygen_Control.asp
25	Found a wide range (4% - 16%) of savings estimates based on literature review Used a mid-range savings estimate factor of 10%
26	5% - 10% improvement in energy associated with losses (Optimizing Steam Systems: Saving Energy and Money in Mexican Hotels, by David Jaber, Alliance to Save Energy) GDS estimates that poor insulation represents 15%- 20% of total gas input.
27	Review of various internet sites including Zoo Fans (25%), Big Ass Fan Company (30%) and Energy Wales (20%)
28	Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006 - Appendix C -MD ENERGY SAVINGS FRACTIONS
29	Flex Your Power, Demand Ventilation Control Reduces Kitchen Fan Energy Consumption by 50% to 70% and makeup air heating energy by 25%: http://www.fypower.org/news/?p=682
30	Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006 Appendix C - RET ENERGY SAVINGS FRACTIONS. (Average across all building types - varies significantly based on occupancy and ventilation requirements)
31	ACEE, Emerging Energy Saving Technologies & Practices for the Buildings Sector, 2004 (6 zones at $575 per zone) p 102.
32	Assessment of Energy and Capacity Savings Potential in Iowa', Prepared for The Iowa Utility Association February 15, 2008. In Collaboration with Summit Blue Consulting, Nexant, Inc., A-TEC Energy Corporation, and Britt/Makela Group; Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006 Appendix B p 40-44
33	Actual average project cost provided by NGRID for NY projects
34	ACEE, Emerging Energy Saving Technologies & Practices for the Buildings Sector, 2004
35	Energy Efficiency and Renewable Energy Resource Development Potential in New York State - Final Report, Volume 5 Energy Efficiency Technical
36	http://www.toolbase.org/Technology-Inventory/HVAC/hvac-smart-zoning-controls
37	Energy Star Cost Calculator, Energy Star Website, www.energystar.gov.
38	GasNetworks Aug08update - "Validating the Impacts of Programmable Thermostats." GasNetworks, January 2007
39	EIA, 2003 CBECS, New England, Non Mall saturation, square footage
40	For Combo Heating / Water Heating Units costs and savings add up similar separate equipment from water heating tab and space heating tab. Literature claims combined system equipment costs are higher, installation costs lower compared to separate systems.
41	Gas Fired water Heater Screening Tool http://bea.ugi.esource.com/BEA1/PA/PA_WaterHeating/PA-41_calc
42	Building Commissioning - A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions. Lawrence Berkeley National Laboratory. Report Prepared for: California Energy Commission Public Interest Energy Research (PIER) - July 21, 2009
43	GDS Natural Gas Energy Efficiency Potential in Massachusetts - April 2009
44	MEMD Support Documentation - 2014 - Workbooks and Algorithms
45	Michigan Baseline 2011: Commercial Baseline Report

Michigan Commercial Measure Database - Gas

Natural Gas Measure Sources

Source Number	Source
46	Codes and Standards Enhancement Initiative for PY2004: Title 20 Standards Development, Analysis of Standards Options for Portable Electric Spas, Davis Energy Group Energy Solutions, May 12, 2004
47	Massachusetts Farm Energy Guides by Farm Sector: Best Management Practices for Greenhouses, 2010
48	Public Service New Mexico Electric Energy Efficiency Potential Study; Itron, Inc., September 2006
49	DTE Energy Commercial Baseline Study; Opinion Dynamics Corporation, October 2010

Michigan Commercial Measure Database - Gas
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Natural Gas Source List

Measure Name	Annual MMBTU Savings	Cost/ Unit	Effective Measure	Savings Factor	Remaining Factor
Water Heating					
High Efficiency Stand Alone Commercial Water Heater (>=0.67 EF <=75000 Btu)	1	1	3	44	4
Condensing Stand Alone Commercial Water Heater (>=95% Thermal efficiency)(>75000 btu)	41	4	3	41	45
On-Demand, Tankless Water Heater (>=.82 EF) (<=200,000 BTU/h)	1	1	3	44	45
On-Demand, Tankless Water Heater (>=.95 EF) (<=200,000 Btu/h)	3	4	3	44	45
On-Demand, Tankless Water Heater (.85 TE) (>200,000 BTU)	41	4	3	41	45
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=85% (EF=.82)	1	1	3	4	4
Heat Recovery Water Heater	5	5	3	5	4
Pipe wrap - DHW	1	1	3	6	45
Low flow shower head (1.5 gpm)	1	1	3	44	45
Faucet aerator	1	1	3	44	45
Graywater Heat Exchanger/GFX	41	32	3	7	45
Low Flow Pre-Rinse Spray Nozzle (1.6 gpm)	1	1	3	8	4
Circulation Pump Time Clocks	41	17	3	9	4
Solar Water Heating w/gas auxiliary tank (SEF=1.5)	41	4	3	10	4
Wastewater, Filtration/Reclamation	11	11	3	12	4
Ozone Commercial Laundry System (Gas HW)	14	14	3	13	45
High Efficiency (95%) Gas Pool Water Heater	1	1	3	44	4
Pool Cover	1	1	3	44	4
Solar pool heater	15	33	3	43	4
Stand Alone Commercial Water Heater (>=88% Thermal efficiency)(>75000 btu)	1	1	3	44	4
Indirect Water Heater - Combined appliance efficiency rating (CAE)>=90% (EF=.90)	1	1	3	44, 4	4
Domestic Water Heater Tune-up	1	1	3	44	4
O-zone Generator for Laundromat	1	1	3	43	45
Clothes Washer ENERGY STAR, Gas water heater, Gas	1	1	3	44	45
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	1	1	3	44	45
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	1	1	3	44	45
ES Dishwasher, High Temp, Gas Heat, Elec Booster	1	1	3	44	49
ES Dishwasher, High Temp, Gas Heat, Gas Booster	1	1	3	44	49
ES Dishwasher, Low Temp, Gas Heat	1	1	3	44	49
Space & Water Heating					
Combination Water Heater/Furnace (.86 EF, .90 AFUE)	4	40	3	46	45
Combination Water Heater/Boiler (Condensing)(0.9 EF, 0.9 AFUE)	4	40	3	4	45

Michigan Commercial Measure Database - Gas
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Natural Gas Source List

Combination Water Heater/Boiler (Non-Condensing) (0.86 EF, 85 AFUE)	4	40	3	4	45
Building Envelope					
Energy Efficient Windows	2	2	3	4	45
Ceiling Insulation R-11 to R-42	2	2	3	2	45
Below Grade Insulation	4	4	3	4	45
Wall Insulation R-7.5 to R13	2	2	3	4	45
Roof Insulation R-11 to R-24	2	2	3	4	45
Integrated Building Design, Envelope Only (30% > code)	31	34	3	4	4
Truck Loading Dock Seals	1	1	3	4	4
Heat Curtains for Greenhouses	1	1	3	47	4
Infrared film for Greenhouses	1	1	3	47	4
Improved Duct Sealing	2	2	3	2	4
HVAC Controls					
EMS install	2	2	3	48	45
EMS Optimization	4	35	3	35	4
Zoning	4	36	3	48	4
Retrocommissioning	44	42	3	48	4
Commissioning	44	42	3	48	39
Programmable Thermostat	38	37	3	43	45
Cooking					
High Efficiency Gas Griddle	1	1	3	44	45
High Efficiency Gas Combination Oven	1	1	3	44	4
High Efficiency Gas Convection Oven	1	1	3	44	45
High Efficiency Gas Conveyer Oven	1	1	3	44	45
High Efficiency Gas Rack Oven	1	1	3	44	4
High Efficiency Gas Broiler	1	1	3	43	4
Power Burner Range	43	43	3	44	45
High Efficiency Fryer	1	1	3	44	45
High Efficiency Gas Steamer	1	1	3	44	45
Space Heating					
Gas Furnace 92 AFUE	2	2	3	2	4
Gas Furnace 95 AFUE	2	2	3	2	4
Improved Duct Sealing	2	2	3	2	4
Gas Unit Heater - Condensing (AFUE =93%)	4	16	3	2	4
Infrared Heater	2	2	3	2	4
Boiler Heating Pipe Insulation	1	1	3	43	45
Boiler Tune-Up	2	2	3	2	45
Boiler Reset Controls	2	2	3	22	45
Boiler O2 Trim Controls	1	1	3	23	4
Boiler Parallel Positioning	16	16	3	24	6
Repair/Replace malfunctioning steam traps	1	1	3	25	4
Insulate steam lines/condensate tank	1	1	3	26	19
Destratification Fans	2	2	3	27	4
Exhaust Hood Makeup Air	18	21	3	28	45
Exhaust Hood - Demand Ventilation	2	2	3	29	45
Demand Controlled Ventilation	2	2	3	30	45

Michigan Commercial Measure Database - Gas
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Natural Gas Source List

Furnace Tube Inserts	1	1	3	44	20
Air Compressor Exhaust Heat Recovery	1	1	3	44	20
Linkageless Controls for Process boilers replacing linkages	1	1	3	44	20
Modulated Boiler Control for Process	1	1	3	44	4
Guest Room Energy Management, Gas Heating	1	1	3	44	45
Boiler Efficiency Improvement 80% to 88%	2	2	3	43	4
Condensing Boiler 90% Efficiency	2	2	3	2	4
Boiler turndown control	2	2	3	2	45
Boiler Economizer	2	2	3	43	4
Sensible ERV (Flat plate HX)	2	2	3	4	45
Total ERV (Enthalpy Wheel)	2	2	3	4	4
Boiler sequencing	2	2	3	44	45
Furnace Tune-Up	2	2	3	2	4
Direct Fired Make Up Air System	2	2	3	43	4

Michigan Industrial Measure Database - Electric

Base Case Factor:

Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Computers and Office Equipment																				
Energy Star Compliant Single Door Refrigerator	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%	7.7%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%	47.5%
PC Network Energy Management Controls replacing no central control	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
EZ Save Monitor Power Management Software	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
Energy Star UPS	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%
Water Heating																				
Heat Pump Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Booster Water Heater	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Point of Use Water Heating	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Solar Water Heating System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
High Efficiency Electric Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Low Flow Pre-Rinse Spary Nozzle	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
ES Dishwasher, Low Temp, Elec Heat	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
ES Dishwasher, Low Temp, Gas Heat	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%
Ozone Commercial laundry System	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Low Flow Faucet Aerator	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%	98.0%
Low Flow Showerhead	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hot Water (DHW) Pipe Insulation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Tank Insulation (electric)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Drain water Heat Recovery Water Heater	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Hot Water Circulation Pump Time-Clock	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Refrigeration Heat Recovery	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%	52.0%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Michigan Industrial Measure Database - Electric

Base Case Factor:

Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Efficient Hot Water Pump	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Building Envelope																				
Integrated Building Design	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Efficient Windows	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cool Roofing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Ceiling Insulation R-11 to R-42	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Below Grade Insulation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Wall Insulation R-7.5 to R13	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Roof Insulation R-11 to R-24	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Ventilation																				
Enthalpy Economizer	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Demand-Controlled Ventilation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Variable Speed Drive Control, 15 HP	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Variable Speed Drive Control, 5 HP	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Variable Speed Drive Control, 40 HP	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%
Improved Duct Sealing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Destratification Fan	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Controled Ventilation Optimization	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
High Performance Air Filters	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Space Cooling - Chillers																				
Air-Cooled Recip Chiller	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Air-Cooled Screw Chiller	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Water-Cooled Centrifugal Chiller < 150 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Centrifugal Chiller 150 - 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Centrifugal Chiller > 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Screw Chiller < 150 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Screw Chiller 150 - 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Water-Cooled Screw Chiller > 300 ton	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%	4.2%
Chiller Tune Up/Diagnostics - 300 ton	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Chiller Tune Up/Diagnostics - 500 ton	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
High Efficiency Pumps	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Efficient Chilled Water Pump	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Chilled Hot Water Reset	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
HVAC Controls																				
Programmable Thermostats	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
EMS install	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
EMS Optimization	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%

Michigan Industrial Measure Database - Electric

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Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Hotel Guest Room Occupancy Control System	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Zoning	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Space Cooling - Unitary and Split AC															1					
High Efficiency AC - Unitary & Split Systems	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Ductless (mini split) - Cooling	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Ground Source Heat Pump - Cooling	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Water Loop Heat Pump (WLHP) - Cooling	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Packaged Terminal Air Conditioner (PTAC) - Cooling	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Lighting																				
Lamp & Ballast Retrofit (HPT8 Replacing T12)	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%
Fluorescent Fixture with Reflectors	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%	8.4%
T5 HP replacing T12	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%	11.1%
LED Exterior Flood and Spotlight	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Parking Garage LED	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LED Exit Sign	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
LED Traffic Signals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LED Pedestrian Signals	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Light Tube	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%
High Intensity Fluorescent Fixture (replacing HID)	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%
42W 8 lamp Hi Bay CFL	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%
HID Fixture Upgrade - Pulse Start Metal Halide	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%
Induction Fluorescent	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%	11.3%
CFL Fixture	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
CFL Screw-in	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
LED Screw In	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
LED Fuel Pump Canopy Fixture	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CFL Flood	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
LED Downlight	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
LED Replacing Halogen Incandescent	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%	22.4%

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New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%	16.8%
LED Roadway Lights	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
LED Outdoor Area Fixture (Parking Light or Street Light)	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
LED Pin Based Lamp	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
LED Wallpack	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
CFL Exterior Lighting	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
CFL Screw in Specialty	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
LED Specialty	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Illuminated Signs to LED	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
LED Lighting in Refrigeration	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Lighting Controls																				
Controls for HID (Hi/Lo)	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
Controls for H.I.F.	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%	3.3%
Daylight Dimming	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%
Daylight Dimming - New Construction	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%	73.7%
15% More Efficient Design - New Construction	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%
30% More Efficient Design - New Construction	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%
Remote Mounted Occupancy Sensor	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%
Switch Mounted Occupancy Sensor	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%	41.3%
Central Lighting Control	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%
Switching Controls for Multilevel Lighting (Non-HID)	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%
Lighting Power Density - Exceed Code by 10%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%	88.9%
Stairwell Bi-Level Control	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Occupancy Sensors for LED Refrigerator Lighting	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
Space Heating																				
High Efficiency Heat Pump	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Ground Source Heat Pump - Heating	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Ductless (mini split) - Heating	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
High Efficiency Pumps	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
VFD Pump	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
ECM motors on furnaces	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Water Loop Heat Pump (WLHP) - Heating	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Packaged Terminal Air Conditioner (PTAC) - Heating	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Other																				

Michigan Industrial Measure Database - Electric

Base Case Factor:

Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Electrically Commutated Plug Fans in data centers	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
NEMA Premium Transformer, single-	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
NEMA Premium Transformer, three-phase	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Commercial Clothes washers - Non-Water Heating Savings	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Vendor Miser for Non-Refrig Equipment	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Optimized Snow and Ice Melt Controls	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Engine Block Heater Timer	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Machine Drive																				
Sensors & Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Information System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Electric Supply System Improvements	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Advanced Efficient Motors	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Industrial Motor Management	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Advanced Lubricants	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%
Motor System Optimization (Including ASD)	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Pump System Efficiency Improvements	23.2%	23.2%	23.0%	23.0%	0.0%	12.0%	33.1%	3.0%	59.4%	28.1%	34.0%	9.0%	8.7%	15.9%	15.5%	50.9%	50.9%	25.0%	1.0%	20.4%
Fan System Improvements	10.6%	10.6%	7.0%	7.0%	12.7%	8.0%	20.8%	7.0%	9.6%	12.0%	2.0%	5.0%	15.3%	3.0%	2.2%	1.0%	1.0%	8.0%	18.0%	14.5%
Compressed Air System Management	10.9%	10.9%	14.3%	14.3%	24.0%	8.3%	4.8%	7.3%	15.3%	29.9%	13.0%	25.4%	14.3%	24.4%	15.9%	22.7%	22.7%	18.7%	12.5%	16.1%
Compressed Air - Advanced Compressor Controls	10.9%	10.9%	14.3%	14.3%	24.0%	8.3%	4.8%	7.3%	15.3%	29.9%	13.0%	25.4%	14.3%	24.4%	15.9%	22.7%	22.7%	18.7%	12.5%	16.1%
Process Cooling & Refrigeration																				
Sensors & Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Information System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Electric Supply System Improvements	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Improved Refrigeration	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Process Heating																				
Sensors & Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Information System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Electric Supply System Improvements	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Michigan Industrial Measure Database - Electric

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Computers and Office Equipment																				
Energy Star Compliant Single Door Refrigerator	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
PC Network Energy Management Controls replacing no central control	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
EZ Save Monitor Power Management Software	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Star UPS	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water Heating																				
Heat Pump Water Heater	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Booster Water Heater	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Point of Use Water Heating	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Solar Water Heating System	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
High Efficiency Electric Water Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Low Flow Pre-Rinse Spary Nozzle	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, Low Temp, Elec Heat	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
ES Dishwasher, Low Temp, Gas Heat	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Ozone Commercial laundry System	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Low Flow Faucet Aerator	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Low Flow Showerhead	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Hot Water (DHW) Pipe Insulation	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Tank Insulation (electric)	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Drain water Heat Recovery Water Heater	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
Hot Water Circulation Pump Time-Clock	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Refrigeration Heat Recovery	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%

Michigan Industrial Measure Database - Electric

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Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Efficient Hot Water Pump	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Pools																				
Energy Efficient Pool Pump with controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Solar Pool Heating	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
Heat Pump Pool Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
High efficiency spas/hot tubs	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Building Envelope																				
Integrated Building Design	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Energy Efficient Windows	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Cool Roofing	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Ceiling Insulation R-11 to R-42	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%
Below Grade Insulation	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
Wall Insulation R-7.5 to R13	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Roof Insulation R-11 to R-24	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
Ventilation																				
Enthalpy Economizer	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
Demand-Controlled Ventilation	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Variable Speed Drive Control, 15 HP	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Variable Speed Drive Control, 5 HP	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Variable Speed Drive Control, 40 HP	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Improved Duct Sealing	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Destratification Fan	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Controled Ventilation Optimization	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
High Performance Air Filters	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Space Cooling - Chillers																				
Air-Cooled Recip Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Air-Cooled Screw Chiller	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water-Cooled Centrifugal Chiller < 150 ton	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water-Cooled Centrifugal Chiller 150 - 300 ton	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water-Cooled Centrifugal Chiller > 300 ton	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water-Cooled Screw Chiller < 150 ton	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Water-Cooled Screw Chiller 150 - 300 ton	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Water-Cooled Screw Chiller > 300 ton	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Chiller Tune Up/Diagnostics - 300 ton	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Chiller Tune Up/Diagnostics - 500 ton	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Efficiency Pumps	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient Chilled Water Pump	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Chilled Hot Water Reset	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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HVAC Controls																				
Programmable Thermostats	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
EMS install	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
EMS Optimization	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Hotel Guest Room Occupancy Control System	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Zoning	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Space Cooling - Unitary and Split AC																				
High Efficiency AC - Unitary & Split Systems	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ductless (mini split) - Cooling	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Ground Source Heat Pump - Cooling	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Water Loop Heat Pump (WLHP) - Cooling	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Packaged Terminal Air Conditioner (PTAC) - Cooling	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cooking																				
HE Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Combination Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Convection Ovens	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Holding Cabinet	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Griddle	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Induction Cooktops	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lighting																				
Lamp & Ballast Retrofit (HPT8 Replacing T12)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fluorescent Fixture with Reflectors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
T5 HP replacing T12	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Exterior Flood and Spotlight	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Parking Garage LED	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Exit Sign	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Traffic Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Pedestrian Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Light Tube	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
High Intensity Fluorescent Fixture (replacing HID)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
42W 8 lamp Hi Bay CFL	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HID Fixture Upgrade - Pulse Start Metal Halide	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

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Induction Fluorescent	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
CFL Fixture	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
CFL Screw-in	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LED Screw In	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LED Fuel Pump Canopy Fixture	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
CFL Flood	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
LED Downlight	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
LED Replacing Halogen Incandescent	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Roadway Lights	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Outdoor Area Fixture (Parking Light or Street Light)	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
LED Pin Based Lamp	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LED Wallpack	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFL Exterior Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFL Screw in Specialty	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LED Specialty	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Illuminated Signs to LED	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Lighting in Refrigeration	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Lighting Controls																				
Controls for HID (Hi/Lo)	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%
Controls for H.I.F.	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Daylight Dimming	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
Daylight Dimming - New Construction	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
15% More Efficient Design - New Construction	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
30% More Efficient Design - New Construction	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Remote Mounted Occupancy Sensor	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Switch Mounted Occupancy Sensor	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Central Lighting Control	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Switching Controls for Multilevel Lighting (Non-HID)	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Lighting Power Density - Exceed Code by 10%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stairwell Bi-Level Control	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Occupancy Sensors for LED Refrigerator Lighting	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Refrigeration																				

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Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Vending Miser for Soft Drink Vending Machines	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerated Case Covers	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Refrigeration Economizer	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Commercial Ice-makers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on S-P motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on PSC motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on ECM motors	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
H.E. Evaporative Fan Motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Zero-Energy Doors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Door Heater Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Discus and Scroll Compressors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Floating Head Pressure Control	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%
ENERGY STAR Commercial Solid Door Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Solid Door Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Glass Door Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Glass Door Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Strip Curtains	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient Refrigeration Condenser	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Door Gaskets - Cooler and Freezer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reach-in Refrigerated display case door retrofit	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration Savings due to Lighting Savings	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ECM case fan motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient low-temp compressor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Automatic High Speed Doors - between freezer and cooler	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerant charging correction	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compressed Air																				
Efficient Air Compressors	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Automatic Drains	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Cycling Dryers	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Low Pressure Drop-Filters	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air-Entraining Air Nozzles	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Receiver Capacity Addition	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Michigan Industrial Measure Database - Electric

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective
(e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Barrel Wraps Inj Mold and Extruders	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Pellet Dryer Tanks and Ducts	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compressed Air Audits & Leak Repair	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Compressed Air Pressure Flow Controller replacing no flow controller	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Efficiency Air Dryers	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Air Compressor Outdoor Air Intake	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Variable Displacement Air Compressor	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Space Heating																				
High Efficiency Heat Pump	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Ground Source Heat Pump - Heating	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Ductless (mini split) - Heating	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
High Efficiency Pumps	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
VFD Pump	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
ECM motors on furnaces	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Water Loop Heat Pump (WLHP) - Heating	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Packaged Terminal Air Conditioner (PTAC) - Heating	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Other																				
Electrically Commutated Plug Fans in data centers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NEMA Premium Transformer, single-phase	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%
NEMA Premium Transformer, three-phase	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%
Commercial Clothes washers - Non-Water Heating Savings	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Vendor Miser for Non-Refrig Equipment	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Optimized Snow and Ice Melt Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Engine Block Heater Timer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Machine Drive																				
Sensors & Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Information System	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electric Supply System Improvements	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Advanced Efficient Motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Industrial Motor Management	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Advanced Lubricants	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Motor System Optimization (Including ASD)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump System Efficiency Improvements	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fan System Improvements	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compressed Air System Management	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compressed Air - Advanced Compressor Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Process Cooling & Refrigeration																				

Michigan Industrial Measure Database - Electric

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Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Sensors & Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Information System	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electric Supply System Improvements	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Improved Refrigeration	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Process Heating																				
Sensors & Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Information System	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electric Supply System Improvements	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Industrial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	TRC	UCT
Computers & Office Equipment							
Energy Star Compliant Single Door Refrigerator	270	2	per unit	$250	12.0	0.70	1.40
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	858	2	$/unit	$300	4.0	7.89	15.78
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	17	1	per unit	$40	5.0	0.13	0.26
PC Network Energy Management Controls replacing no central control	135	1	per PC	$12	4.0	2.28	4.57
EZ Save Monitor Power Management Software	30	1	$/unit	$26	1.7	0.43	0.86
Energy Star UPS	105	2	per kW	$1,303	10.0	0.06	0.12
Water Heating							
Heat Pump Water Heater	154,278	2	per heater	$9,000	15.0	13.70	27.41
Booster Water Heater	625	2	$/Unit	$951	10.0	0.40	0.79
Point of Use Water Heating	345	1	$/Unit	$665	10.0	0.31	0.62
Solar Water Heating System	19,836	1	$/unit	$26,400	20.0	0.74	1.48
High Efficiency Electric Water Heater	279	2	$/unit	$70	13.0	2.93	5.86
Low Flow Pre-Rinse Spary Nozzle	1,396	1	each	$35	5.0	10.20	20.39
ES Dishwasher, High Temp, Elec Heat, Elec Booster	12,914	2	per unit	$978	16.3	10.14	20.29
ES Dishwasher, High Temp, Gas Heat, Elec Booster	5,777	2	per unit	$978	16.3	4.54	9.08
ES Dishwasher, High Temp, Gas Heat, Gas Booster	1,775	2	per unit	$1,263	18.3	1.17	2.34
ES Dishwasher, Low Temp, Elec Heat	10,520	2	per unit	$228	15.0	33.52	67.03
ES Dishwasher, Low Temp, Gas Heat	584	2	per unit	$228	20.0	2.26	4.53
Ozone Commercial laundry System	194,220	1	$/unit	$65,000	7.0	1.35	2.70
Low Flow Faucet Aerator	903	1	per unit	$3	10.0	177.40	354.81
Low Flow Showerhead	527	1	per unit	$25	10.0	10.36	20.72
Hot Water (DHW) Pipe Insulation	21	1	linear ft	$6	20.0	4.68	9.36
Tank Insulation (electric)	468	1	per square foot	$30	15.0	10.41	20.82
Drain water Heat Recovery Water Heater	251	2	$/unit	$350	20.0	0.71	1.42
Hot Water Circulation Pump Time-Clock	1,673	1	$/unit	$132	10.0	7.63	15.27
Refrigeration Heat Recovery	1,825	1	$/unit	$2,861	15.0	0.52	1.04
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	126	2	per unit	$540	7.0	0.07	0.13
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	793	2	per unit	$540	7.0	0.42	0.83
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	627	2	per unit	$540	7.0	0.33	0.66
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	1,293	2	per unit	$540	7.0	0.68	1.35
Efficient Hot Water Pump	533	1	hp	$33	15.0	11.76	23.51
Building Envelope							
Integrated Building Design	322,775	2	$/unit	$166,226	30.0	4.50	9.01
Energy Efficient Windows	342	2	100SF	$2,250	20.0	0.51	1.01
Cool Roofing	91	2	1000 sq ft roof area	$665	20.0	0.07	0.15
Ceiling Insulation R-11 to R-42	146	1	1000 sq ft roof area	$600	20.0	2.01	4.03
Below Grade Insulation	528	1	1000 sq ft basement wall area	$273	20.0	1.57	3.14
Wall Insulation R-7.5 to R13	680	1	1000 sq ft wall area	$100	20.0	87.20	174.39
Roof Insulation R-11 to R-24	76	1	1000 sq ft roof area	$1,000	20.0	0.58	1.16
Ventilation							
Enthalpy Economizer	118	2	ton	$75	10.0	0.56	1.12
Demand-Controlled Ventilation	161	2	1000 sq ft cond floor area	$75	15.0	29.32	58.64
Variable Speed Drive Control, 15 HP	10,062	1	per Unit	$2,339	10.0	1.35	2.69

Michigan Industrial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	TRC	UCT
Variable Speed Drive Control, 5 HP	3,354	1	per Unit	$780	10.0	1.35	2.69
Variable Speed Drive Control, 40 HP	26,831	1	per Unit	$6,238	10.0	1.35	2.69
Improved Duct Sealing	26	2	ton	$108	18.0	1.93	3.87
Electronically-Commutated Permanent Magnet Motors (ECPMs)	1,234	2	per motor	$78	15.0	10.16	20.32
Destratification Fan	22	1	1000 sq ft cond floor area	$375	15.0	1.28	2.57
Controled Ventilation Optimization	1,208	2	LF of Sash	$986	12.8	1.87	3.74
High Performance Air Filters	908	2	1000 cfm	$70	3.0	2.34	4.68
Space Cooling - Chillers							
Air-Cooled Recip Chiller	337	2	ton	$124	20.0	2.60	5.19
Air-Cooled Screw Chiller	332	2	ton	$128	20.0	2.48	4.96
Water-Cooled Centrifugal Chiller < 150 ton	252	2	ton	$112	20.0	2.02	4.03
Water-Cooled Centrifugal Chiller 150 - 300 ton	223	2	ton	$90	20.0	2.23	4.46
Water-Cooled Centrifugal Chiller > 300 ton	207	2	ton	$73	20.0	2.53	5.06
Water-Cooled Screw Chiller < 150 ton	251	2	ton	$113	20.0	2.08	4.16
Water-Cooled Screw Chiller 150 - 300 ton	227	2	ton	$88	20.0	2.42	4.85
Water-Cooled Screw Chiller > 300 ton	203	2	ton	$68	20.0	2.81	5.62
Chiller Tune Up/Diagnostics - 300 ton	137	1	ton	$5,100	5.0	0.01	0.02
Chiller Tune Up/Diagnostics - 500 ton	137	1	ton	$8,500	5.0	0.01	0.01
High Efficiency Pumps	201	1	per hp	$97	15.0	1.38	2.77
Efficient Chilled Water Pump	764	1	hp	$33	15.0	14.08	28.17
Chilled Hot Water Reset	113	1	ton	$5	8.3	18.91	37.82
HVAC Controls							
Programmable Thermostats	273	1	1000 sq ft cond floor area	$50	9.0	17.10	34.19
EMS install	543	1	1000 sq ft cond floor area	$7	15.0	49.08	98.17
EMS Optimization	1,720	1	1000 sq ft	$17	16.7	98.54	197.09
Hotel Guest Room Occupancy Control System	676	2	per unit	$250	8.0	1.52	3.04
Zoning	375	2	1000 sq ft cond floor area	$500	15.0	0.83	1.66
Space Cooling - Unitary and Split AC							
High Efficiency AC - Unitary & Split Systems	54	2	ton	$106	15.0	0.71	1.41
Ductless (mini split) - Cooling	251	1	ton	$802	15.0	0.27	0.55
Ground Source Heat Pump - Cooling	1,384	2	ton	$3,525	15.0	0.23	0.45
Water Loop Heat Pump (WLHP) - Cooling	36	2	ton	$25	15.0	1.02	2.05
Packaged Terminal Air Conditioner (PTAC) - Cooling	49	2	ton	$221	15.0	0.27	0.54
Lighting							
Lamp & Ballast Retrofit (HPT8 Replacing T12)	81	2	per fixture	$51	12.0	1.44	2.87
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	37	2	per fixture, Replacing standard T8 4ft 1 lamp	$46	12.0	0.73	1.46
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	63	2	per fixture, Replacing standard T12 4ft 2 lamp	$38	10.7	1.40	2.81
Fluorescent Fixture with Reflectors	159	2	$/unit	$86	13.0	1.53	3.06
T5 HP replacing T12	81	2	per fixture	$80	12.0	0.92	1.83
LED Exterior Flood and Spotlight	550	2	per fixture	$632	11.3	0.36	0.71
Parking Garage LED	1,054	2	per fixture	$754	12.0	0.89	1.77
LED Exit Sign	201	2	per fixture	$25	15.0	6.12	12.24
LED Traffic Signals	275	2	per lamp	$50	6.0	3.29	6.58
LED Pedestrian Signals	150	2	per lamp	$100	8.0	1.11	2.21

Michigan Industrial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	TRC	UCT
Light Tube	361	2	per fixture	$500	14.0	0.74	1.49
High Intensity Fluorescent Fixture (replacing HID)	684	2	per fixture	$179	12.2	3.35	6.70
42W 8 lamp Hi Bay CFL	345	2	per fixture, Replacing 400W HID	$395	12.0	0.77	1.53
HID Fixture Upgrade - Pulse Start Metal Halide	769	2	per fixture	$175	13.0	4.09	8.18
Induction Fluorescent	47	2	Watt Reduced	$22	12.5	1.62	3.24
CFL Fixture	342	2	per fixture	$45	12.0	6.92	13.85
CFL Screw-in	213	2	per lamp	$5	2.0	7.67	15.34
LED Screw In	156	2	$/unit	$37	15.0	5.33	10.66
LED Fuel Pump Canopy Fixture	195	2	Not Found	$343	21.0	0.77	1.55
CFL Flood	202	2	per lamp	$6	2.0	6.54	13.08
LED Downlight	121	2	per fixture	$39	10.3	2.47	4.93
LED Replacing Halogen Incandescent	187	2	per lamp	$26	8.0	4.74	9.48
New Fluorescent Fixtures T5/HP T8 (replacing T12)	48	2	$/unit	$88	15.0	0.66	1.31
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	134	2	$/unit	$80	15.0	1.82	3.63
LED Roadway Lights	484	2	Not Found	$310	18.0	1.93	3.87
LED Outdoor Area Fixture (Parking Light or Street Light)	768	2	Not Found	$643	13.0	1.18	2.37
LED Pin Based Lamp	171	2	$/unit	$35	15.0	6.33	12.66
LED Wallpack	722	2	$/unit	$250	15.0	3.37	6.74
CFL Exterior Lighting	1,021	2	per fixture	$433	12.0	1.01	2.02
CFL Screw in Specialty	120	2	per lamp	$3	2.0	16.62	33.24
LED Specialty	111	2	per lamp	$43	8.8	1.72	3.45
Illuminated Signs to LED	6	2	per watt reduced	$53	9.5	0.73	1.45
LED Lighting in Refrigeration	460	2	per door	$390	16.0	0.85	1.71
Lighting Controls							
Controls for HID (Hi/Lo)	149	1	per fixture	$400	10.0	0.23	0.47
Controls for H.I.F.	195	2	$/unit	$74	10.0	2.21	4.43
Daylight Dimming	12,100	1	10,000 SF	$3,000	12.0	3.92	7.84
Remote Mounted Occupancy Sensor	994	2	per sensor	$200	10.0	2.14	4.27
Switch Mounted Occupancy Sensor	751	2	per sensor	$463	10.0	0.70	1.40
Central Lighting Control	11,500	2	10,000 SF	$2,700	12.0	3.87	7.75
Switching Controls for Multilevel Lighting (Non-HID)	8,000	2	10,000 SF	$3,000	12.0	2.59	5.18
Stairwell Bi-Level Control	4,809	2	per kW controlled	$825	9.0	2.89	5.79
Occupancy Sensors for LED Refrigerator Lighting	195	2	per door	$20	16.0	6.98	13.96
Space Heating							
High Efficiency Heat Pump	79	2	ton	$156	15.0	0.30	0.61
Ground Source Heat Pump - Heating	1,384	2	ton	$3,525	15.0	0.20	0.40
Ductless (mini split) - Heating	251	1	ton	$802	15.0	0.17	0.35
High Efficiency Pumps	201	2	per hp	$97	15.0	1.08	2.16
VFD Pump	1,724	1	per CHW pump hp	$149	10.0	4.36	8.73
ECM motors on furnaces	720	1	per Furnace	$250	20.0	1.76	3.52
Water Loop Heat Pump (WLHP) - Heating	36	2	ton	$25	15.0	0.69	1.39
Packaged Terminal Air Conditioner (PTAC) - Heating	153	2	ton	$138	15.0	0.59	1.18
Other							
Electrically Commutated Plug Fans in data centers	1,445	2	per fan	$718	15.0	1.53	3.06
NEMA Premium Transformer, single-phase	7	2	per kVA	$12	30.0	1.23	2.46
NEMA Premium Transformer, three-phase	10	2	per kVA	$10	30.0	1.29	2.58
Vendor Miser for Non-Refrig Equipment	474	1	per unit	$135	5.0	0.71	1.41
Optimized Snow and Ice Melt Controls	0	1	SF	$0	15.0	21.46	42.92
Engine Block Heater Timer	576	2	per engine block	$50	5.0	19.37	38.74
Machine Drive							
Sensors & Controls	1	1	$/kWh	$0.145	15.0	6.54	13.08

Michigan Industrial Measure Database - Electric

Measure Savings, Cost and Useful Life

Measure Name	Annual kWh Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	TRC	UCT
Energy Information System	1	1	$/kWh	$0.635	15.0	1.49	2.99
Electric Supply System Improvements	1	1	$/kWh	$0.104	15.0	9.12	18.23
Advanced Efficient Motors	1	1	$/kWh	$0.491	25.0	2.66	5.32
Industrial Motor Management	1	1	$/kWh	$0.079	5.0	5.00	9.99
Advanced Lubricants	1	1	$/kWh	$0.000	1.0	8,886.07	17772.14
Motor System Optimization (Including ASD)	1	1	$/kWh	$0.097	15.0	9.77	19.55
Pump System Efficiency Improvements	1	1	$/kWh	$0.083	15.0	11.42	22.85
Fan System Improvements	1	1	$/kWh	$0.249	15.0	3.81	7.62
Compressed Air System Management	1	1	$/kWh	$0.000	1.0	8,886.07	17772.14
Compressed Air - Advanced Compressor Controls	1	1	$/kWh	$0.001	15.0	948.16	1896.31
Process Cooling & Refrigeration							
Sensors & Controls	1	1	$/kWh	$0.145	15.0	6.54	13.08
Energy Information System	1	1	$/kWh	$0.635	15.0	1.49	2.99
Electric Supply System Improvements	1	1	$/kWh	$0.104	15.0	9.12	18.23
Improved Refrigeration	1	1	$/kWh	$0.034	15.0	27.89	55.77
Process Heating							
Sensors & Controls	1	1	$/kWh	$0.145	15.0	6.54	13.08
Energy Information System	1	1	$/kWh	$0.635	15.0	1.49	2.99
Electric Supply System Improvements	1	1	$/kWh	$0.104	15.0	9.12	18.23

Michigan Industrial Measure Database - Electric

Remaining Factor:

Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Computers and Office Equipment																				
Energy Star Compliant Single Door Refrigerator	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
PC Network Energy Management Controls replacing no central control	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
EZ Save Monitor Power Management Software	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Energy Star UPS	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%
Water Heating																				
Heat Pump Water Heater	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Booster Water Heater	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Point of Use Water Heating	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Solar Water Heating System	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
High Efficiency Electric Water Heater	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Low Flow Pre-Rinse Spary Nozzle	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%	84%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, Low Temp, Elec Heat	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
ES Dishwasher, Low Temp, Gas Heat	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Ozone Commercial laundry System	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Low Flow Faucet Aerator	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
Low Flow Showerhead	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Hot Water (DHW) Pipe Insulation	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%
Tank Insulation (electric)	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%
Drain water Heat Recovery Water Heater	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%	94%
Hot Water Circulation Pump Time-Clock	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
Refrigeration Heat Recovery	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%

Michigan Industrial Measure Database - Electric

Remaining Factor:

Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
Efficient Hot Water Pump	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Pools																				
Energy Efficient Pool Pump with controls	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Solar Pool Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heat Pump Pool Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
High efficiency spas/hot tubs	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Building Envelope																				
Integrated Building Design	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Energy Efficient Windows	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%
Cool Roofing	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Ceiling Insulation R-11 to R-42	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%
Below Grade Insulation	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%
Wall Insulation R-7.5 to R13	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Roof Insulation R-11 to R-24	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%
Ventilation																				
Enthalpy Economizer	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%	97%
Demand-Controlled Ventilation	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Variable Speed Drive Control, 15 HP	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Variable Speed Drive Control, 5 HP	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Variable Speed Drive Control, 40 HP	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Improved Duct Sealing	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Destratification Fan	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%
Controled Ventilation Optimization	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%	71%
High Performance Air Filters	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Space Cooling - Chillers																				
Air-Cooled Recip Chiller	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Air-Cooled Screw Chiller	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Centrifugal Chiller < 150 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Centrifugal Chiller 150 - 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Centrifugal Chiller > 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Screw Chiller < 150 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Screw Chiller 150 - 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Water-Cooled Screw Chiller > 300 ton	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Chiller Tune Up/Diagnostics - 300 ton	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Chiller Tune Up/Diagnostics - 500 ton	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
High Efficiency Pumps	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Efficient Chilled Water Pump	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%

Michigan Industrial Measure Database - Electric

Remaining Factor:

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Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Chilled Hot Water Reset	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
HVAC Controls																				
Programmable Thermostats	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
EMS install	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
EMS Optimization	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Hotel Guest Room Occupancy Control System	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Zoning	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
Space Cooling - Unitary and Split AC																				
High Efficiency AC - Unitary & Split Systems	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Ductless (mini split) - Cooling	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Ground Source Heat Pump - Cooling	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Water Loop Heat Pump (WLHP) - Cooling	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Packaged Terminal Air Conditioner (PTAC) - Cooling	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Cooking																				
HE Steamer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Combination Oven	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Convection Ovens	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Holding Cabinet	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%	93%
HE Fryer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HE Griddle	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Induction Cooktops	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Lighting																				
Lamp & Ballast Retrofit (HPT8 Replacing T12)	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%
Fluorescent Fixture with Reflectors	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%
T5 HP replacing T12	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
LED Exterior Flood and Spotlight	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Parking Garage LED	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Exit Sign	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%	39%
LED Traffic Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Pedestrian Signals	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Light Tube	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
High Intensity Fluorescent Fixture (replacing HID)	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
42W 8 lamp Hi Bay CFL	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%

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Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
HID Fixture Upgrade - Pulse Start Metal Halide	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Induction Fluorescent	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
CFL Fixture	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
CFL Screw-in	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
LED Screw In	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
LED Fuel Pump Canopy Fixture	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
CFL Flood	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
LED Downlight	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
LED Replacing Halogen Incandescent	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%
LED Roadway Lights	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Outdoor Area Fixture (Parking Light or Street Light)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Pin Based Lamp	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
LED Wallpack	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
CFL Exterior Lighting	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%	82%
CFL Screw in Specialty	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
LED Specialty	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
Illuminated Signs to LED	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
LED Lighting in Refrigeration	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
Lighting Controls																				
Controls for HID (Hi/Lo)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Controls for H.I.F.	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Daylight Dimming	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Daylight Dimming - New Construction	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
15% More Efficient Design - New Construction	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
30% More Efficient Design - New Construction	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Remote Mounted Occupancy Sensor	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Switch Mounted Occupancy Sensor	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%	95%
Central Lighting Control	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Switching Controls for Multilevel Lighting (Non-HID)	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Lighting Power Density - Exceed Code by 10%	66%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stairwell Bi-Level Control	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%

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Occupancy Sensors for LED Refrigerator Lighting	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration																				
Vending Miser for Soft Drink Vending Machines	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerated Case Covers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration Economizer	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%	69%
Commercial Ice-makers	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Evaporator Fan Motor Controls on S-P motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on PSC motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Evaporator Fan Motor Controls on ECM motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
H.E. Evaporative Fan Motors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Zero-Energy Doors	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%	96%
Door Heater Controls	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%	77%
Discus and Scroll Compressors	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%
Floating Head Pressure Control	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
ENERGY STAR Commercial Solid Door Refrigerators	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Solid Door Freezers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ENERGY STAR Commercial Glass Door Refrigerators	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
ENERGY STAR Commercial Glass Door Freezers	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%	99%
Strip Curtains	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Efficient Refrigeration Condenser	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%	74%
Door Gaskets - Cooler and Freezer	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
Reach-in Refrigerated display case door retrofit	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
Refrigeration Savings due to Lighting Savings	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ECM case fan motors	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%	88%
Efficient low-temp compressor	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Automatic High Speed Doors - between freezer and cooler	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigerant charging correction	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Compressed Air																				
Efficient Air Compressors	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Automatic Drains	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%

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Cycling Dryers	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Low Pressure Drop-Filters	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Air-Entraining Air Nozzles	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Receiver Capacity Addition	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Barrel Wraps Inj Mold and Extruders	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Pellet Dryer Tanks and Ducts	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Compressed Air Audits & Leak Repair	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Compressed Air Pressure Flow Controller replacing no flow controller	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
High Efficiency Air Dryers	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Air Compressor Outdoor Air Intake	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Variable Displacement Air Compressor	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
Space Heating																				
High Efficiency Heat Pump	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Ground Source Heat Pump - Heating	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%
Ductless (mini split) - Heating	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%	90%
High Efficiency Pumps	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
VFD Pump	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
ECM motors on furnaces	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Water Loop Heat Pump (WLHP) - Heating	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Packaged Terminal Air Conditioner (PTAC) - Heating	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%	83%
Other																				
Electrically Commutated Plug Fans in data centers	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
NEMA Premium Transformer, single-phase	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
NEMA Premium Transformer, three-phase	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%	98%
Commercial Clothes washers - Non-Water Heating Savings	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%	57%
Vendor Miser for Non-Refrig Equipment	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Optimized Snow and Ice Melt Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Engine Block Heater Timer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Machine Drive																				
Sensors & Controls	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Energy Information System	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Electric Supply System Improvements	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Advanced Efficient Motors	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Industrial Motor Management	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Advanced Lubricants	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Motor System Optimization (Including ASD)	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Pump System Efficiency Improvements	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Fan System Improvements	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%

Michigan Industrial Measure Database - Electric

Remaining Factor:

Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Compressed Air System Management	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Compressed Air - Advanced Compressor Controls	71%	71%	72%	72%	72%	76%	64%	64%	72%	72%	80%	83%	74%	74%	76%	77%	77%	81%	72%	72%
Process Cooling & Refrigeration																				
Sensors & Controls	72%	72%	86%	86%	86%	78%	64%	64%	86%	86%	82%	83%	76%	76%	78%	80%	80%	84%	86%	86%
Energy Information System	72%	72%	86%	86%	86%	78%	64%	64%	86%	86%	82%	83%	76%	76%	78%	80%	80%	84%	86%	86%
Electric Supply System Improvements	72%	72%	86%	86%	86%	78%	64%	64%	86%	86%	82%	83%	76%	76%	78%	80%	80%	84%	86%	86%
Improved Refrigeration	72%	72%	86%	86%	86%	78%	64%	64%	86%	86%	82%	83%	76%	76%	78%	80%	80%	84%	86%	86%
Process Heating																				
Sensors & Controls	69%	69%	81%	81%	81%	70%	64%	64%	81%	81%	75%	83%	67%	67%	71%	72%	72%	77%	81%	81%
Energy Information System	69%	69%	81%	81%	81%	70%	64%	64%	81%	81%	75%	83%	67%	67%	71%	72%	72%	77%	81%	81%
Electric Supply System Improvements	69%	69%	81%	81%	81%	70%	64%	64%	81%	81%	75%	83%	67%	67%	71%	72%	72%	77%	81%	81%

Michigan Industrial Measure Database - Electric

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Computers and Office Equipment																				
Energy Star Compliant Single Door Refrigerator	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
PC Network Energy Management Controls replacing no central control	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%	46%
EZ Save Monitor Power Management Software	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Energy Star UPS	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Water Heating																				
Heat Pump Water Heater	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
Booster Water Heater	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%	13%
Point of Use Water Heating	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Solar Water Heating System	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%	60%
High Efficiency Electric Water Heater	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Low Flow Pre-Rinse Spary Nozzle	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
ES Dishwasher, High Temp, Elec Heat, Elec Booster	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%
ES Dishwasher, High Temp, Gas Heat, Elec Booster	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%
ES Dishwasher, High Temp, Gas Heat, Gas Booster	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
ES Dishwasher, Low Temp, Elec Heat	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
ES Dishwasher, Low Temp, Gas Heat	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Ozone Commercial laundry System	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Low Flow Faucet Aerator	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
Low Flow Showerhead	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Hot Water (DHW) Pipe Insulation	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Tank Insulation (electric)	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%	91%
Drain water Heat Recovery Water Heater	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Hot Water Circulation Pump Time-Clock	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Refrigeration Heat Recovery	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Clothes Washer ENERGY STAR, Gas water heater, Gas dryer	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%
Clothes Washer ENERGY STAR, Gas water heater, Electric dryer	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Clothes Washer ENERGY STAR, Electric Water heater, Gas Dryer	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%

Michigan Industrial Measure Database - Electric

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Clothes Washer ENERGY STAR, Electric Water heater, Electric Dryer	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%
Efficient Hot Water Pump	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%
Pools																				
Energy Efficient Pool Pump with controls	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%	67%
Solar Pool Heating	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heat Pump Pool Heater	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%	61%
High efficiency spas/hot tubs	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Building Envelope																				
Integrated Building Design	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Energy Efficient Windows	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
Cool Roofing	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Ceiling Insulation R-11 to R-42	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Below Grade Insulation	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Wall Insulation R-7.5 to R13	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Roof Insulation R-11 to R-24	8%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Ventilation																				
Enthalpy Economizer	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
Demand-Controlled Ventilation	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Variable Speed Drive Control, 15 HP	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Variable Speed Drive Control, 5 HP	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Variable Speed Drive Control, 40 HP	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Improved Duct Sealing	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%
Destratification Fan	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%	12%
Controled Ventilation Optimization	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
High Performance Air Filters	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%
Space Cooling - Chillers																				
Air-Cooled Recip Chiller	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Air-Cooled Screw Chiller	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Water-Cooled Centrifugal Chiller < 150 ton	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Water-Cooled Centrifugal Chiller 150 - 300 ton	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%
Water-Cooled Centrifugal Chiller > 300 ton	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Water-Cooled Screw Chiller < 150 ton	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%
Water-Cooled Screw Chiller 150 - 300 ton	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%	27%
Water-Cooled Screw Chiller > 300 ton	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%	28%
Chiller Tune Up/Diagnostics - 300 ton	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Chiller Tune Up/Diagnostics - 500 ton	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
High Efficiency Pumps	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Efficient Chilled Water Pump	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Chilled Hot Water Reset	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%

Michigan Industrial Measure Database - Electric

Savings Factor:
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Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
HVAC Controls																				
Programmable Thermostats	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%
EMS install	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
EMS Optimization	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Hotel Guest Room Occupancy Control System	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Zoning	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Space Cooling - Unitary and Split AC																				
High Efficiency AC - Unitary & Split Systems	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Ductless (mini split) - Cooling	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%
Ground Source Heat Pump - Cooling	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
Water Loop Heat Pump (WLHP) - Cooling	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Packaged Terminal Air Conditioner (PTAC) - Cooling	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Cooking																				
HE Steamer	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
HE Combination Oven	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%
HE Convection Ovens	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
HE Holding Cabinet	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
HE Fryer	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
HE Griddle	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Induction Cooktops	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Lighting																				
Lamp & Ballast Retrofit (HPT8 Replacing T12)	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Fluorescent Fixture with Reflectors	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%
T5 HP replacing T12	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
LED Exterior Flood and Spotlight	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%	38%
Parking Garage LED	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
LED Exit Sign	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
LED Traffic Signals	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
LED Pedestrian Signals	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Light Tube	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
High Intensity Fluorescent Fixture (replacing HID)	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%
42W 8 lamp Hi Bay CFL	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%
HID Fixture Upgrade - Pulse Start Metal Halide	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%	24%

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Induction Fluorescent	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
CFL Fixture	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%	51%
CFL Screw-in	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
LED Screw In	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%
LED Fuel Pump Canopy Fixture	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%	73%
CFL Flood	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%	63%
LED Downlight	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%	66%
LED Replacing Halogen Incandescent	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%	75%
New Fluorescent Fixtures T5/HP T8 (replacing T12)	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%
LED Roadway Lights	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
LED Outdoor Area Fixture (Parking Light or Street Light)	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%
LED Pin Based Lamp	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%
LED Wallpack	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%
CFL Exterior Lighting	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%	78%
CFL Screw in Specialty	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%	72%
LED Specialty	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%	86%
Illuminated Signs to LED	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%
LED Lighting in Refrigeration	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Lighting Controls																				
Controls for HID (Hi/Lo)	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Controls for H.I.F.	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%
Daylight Dimming	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Daylight Dimming - New Construction	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
15% More Efficient Design - New Construction	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
30% More Efficient Design - New Construction	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Remote Mounted Occupancy Sensor	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Switch Mounted Occupancy Sensor	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Central Lighting Control	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Switching Controls for Multilevel Lighting (Non-HID)	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%	18%
Lighting Power Density - Exceed Code by 10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Stairwell Bi-Level Control	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%	55%
Occupancy Sensors for LED Refrigerator Lighting	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
Refrigeration																				

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Vending Miser for Soft Drink Vending Machines	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Refrigerated Case Covers	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Refrigeration Economizer	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Commercial Ice-makers	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Evaporator Fan Motor Controls on S-P motors	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Evaporator Fan Motor Controls on PSC motors	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
Evaporator Fan Motor Controls on ECM motors	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%	25%
H.E. Evaporative Fan Motors	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Zero-Energy Doors	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Door Heater Controls	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%	68%
Discus and Scroll Compressors	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Floating Head Pressure Control	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
ENERGY STAR Commercial Solid Door Refrigerators	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%
ENERGY STAR Commercial Solid Door Freezers	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
ENERGY STAR Commercial Glass Door Refrigerators	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
ENERGY STAR Commercial Glass Door Freezers	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
Strip Curtains	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Efficient Refrigeration Condenser	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Door Gaskets - Cooler and Freezer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Reach-in Refrigerated display case door retrofit	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%	43%
Refrigeration Savings due to Lighting Savings	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
ECM case fan motors	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%	54%
Efficient low-temp compressor	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Automatic High Speed Doors - between freezer and cooler	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%	15%
Refrigerant charging correction	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%	14%
Compressed Air																				
Efficient Air Compressors	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
Automatic Drains	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cycling Dryers	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%	29%
Low Pressure Drop-Filters	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Air-Entraining Air Nozzles	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%	42%
Receiver Capacity Addition	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%

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Barrel Wraps Inj Mold and Extruders	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%	89%
Pellet Dryer Tanks and Ducts	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%	85%
Compressed Air Audits & Leak Repair	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Compressed Air Pressure Flow Controller replacing no flow controller	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
High Efficiency Air Dryers	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%	22%
Air Compressor Outdoor Air Intake	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Variable Displacement Air Compressor	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Space Heating																				
High Efficiency Heat Pump	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%	9%
Ground Source Heat Pump - Heating	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
Ductless (mini split) - Heating	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%	62%
High Efficiency Pumps	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
VFD Pump	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%	41%
ECM motors on furnaces	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%	26%
Water Loop Heat Pump (WLHP) - Heating	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Packaged Terminal Air Conditioner (PTAC) - Heating	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%	7%
Other																				
Electrically Commutated Plug Fans in data centers	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
NEMA Premium Transformer, single-	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%	35%
NEMA Premium Transformer, three-phase	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%	36%
Commercial Clothes washers - Non-Water Heating Savings	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%	31%
Vendor Miser for Non-Refrig Equipment	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%	52%
Optimized Snow and Ice Melt Controls	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%	92%
Engine Block Heater Timer	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%	64%
Machine Drive																				
Sensors & Controls	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Energy Information System	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Electric Supply System Improvements	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Advanced Efficient Motors	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Industrial Motor Management	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Advanced Lubricants	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Motor System Optimization (Including ASD)	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%	19%
Pump System Efficiency Improvements	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%	16%
Fan System Improvements	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
Compressed Air System Management	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%	17%
Compressed Air - Advanced Compressor Controls	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Process Cooling & Refrigeration																				

Michigan Industrial Measure Database - Electric

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Sensors & Controls	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Energy Information System	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Electric Supply System Improvements	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Improved Refrigeration	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Process Heating																				
Sensors & Controls	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Energy Information System	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Electric Supply System Improvements	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%

Michigan Industrial Measure Database - Electric

Electric Measure Sources

Source Number	Source
1	Michigan Master Database of Deemed Savings - 2013 - Non-Weather Sensitive Commercial
2	Michigan Master Database of Deemed Savings - 2013 - Weather Sensitive
3	Michigan Baseline 2011: Commercial Baseline Report
4	http://www.energystar.gov/ia/business/bulk_purchasing/bpsavings_calc/appliance_calculator.xlsx
5	Big Ass Fan Company Calculations, http://www.todaysfacilitymanager.com/articles/the-hvac-factor-high-volume-low-speed-fans.php
6	2009 MPRP EE Potential Study - June 2009
7	Vermont TRM - Manual No. 2011-73b
8	Vermont Energy Efficiency Potential Study - January 2007
9	Natural Gas Energy Efficiency Potential in Massachusetts, Prepared for GasNetworks by GDS Associates, April 22, 2009
10	Energy Efficiency and Renewable Energy Resource Development Potential in New York State - Final Report, Volume 5 Energy Efficiency Technical Appendices, August 2003.
11	GDS Benefit Cost Model
12	Federal Energy Management Program (FEMP), Energy Cost Calculator for Electric and Gas Water Heaters
13	http://www.aceee.org/consumer/water-heating
14	GDS Associates estimate based upon review of various customer and vendor surveys, baseline studies and potential studies conducted by GDS in other states
15	GDS New Hampshire Potential Study
16	Efficiency Vermont Technical Reference User Manual (TRM) No. 2006-41
17	Efficiency Vermont Technical Reference User Manual (TRM) No. 2010-64
18	Efficiency Maine Commercial Technical Reference Manual No. 2007-01
19	Efficiency Maine Commercial Technical Reference Manual No. 2010-01
20	Refrigerant Heat Recovery System Learning Center Dining Facility, PG&E Food Services Technology Center, April 1993
21	http://apps1.eere.energy.gov/consumer/your_home/space_heating_cooling/index.cfm/mytopic=12430
22	http://www.energysavers.gov/your_home/water_heating/index.cfm/mytopic=13200
23	US DOE, EERE Consumer's Guide to Energy Efficiency and Renewable Energy, "Solar Swimming Pool Heaters" http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13230
24	ES Analysis-ResDWH: ENERGY STAR® Residential Water Heaters: Final Criteria Analysis (www.energystar.gov). April 2008.
25	http://web.archive.org/web/20061006153904/http://www.energy.ca.gov/appliances/2003rulemaking/documents/case_studies/CASE_Portable_Spa.pdf
26	City of Keene NH, Cities for Climate Protection Campaign, Local Action Plan, February 19, 2004
27	EPA Energy Star Program
28	DC SEU Technical Reference Manual 2012-1.2
29	Maryland Baseline Study – Commercial and Industrial Sectors, ITRON, December 3, 2010
30	Delaware Statewide Commercial & Industrial End Use & Saturation Study - July 26, 2012
31	Independent Assessment of Conservation and Energy Efficiency Potential for Connecticut and the Southwest Connecticut Region, GDS Associates, June
32	Building Commissioning - A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions. Lawrence Berkeley National Laboratory. Report Prepared for: California Energy Commission Public Interest Energy Research (PIER) - July 21, 2009
33	DTE Non-Residential Potential Study - 2010. Cadmus
34	Efficiency Maine Commercial Technical Reference Manual - Version 2013.1, January 1, 2013, Efficiency Maine Trust
35	Mid-Atlantic Technical Reference Manual - Version 3.0, March, 2013, NEEP
36	MEMD Support Documentation - 2014 - Workbooks and Algorithms
37	ENERGY STAR Qualified Office Equipment Calculator
38	Energy Consumption by Commercial Office and Telecommunication Equipment, ACEEE August 18, 2002
39	U.S. Department of Energy, Office of Industrial Technologies, United States Industrial Electric Motor Systems Market Opportunities, December 2002.
40	U.S. Department of Energy, Office of Industrial Technologies, Assessment of the Market for Compressed Air Efficiency Services, 2002.
41	Advancing Energy Efficeincy In Arkansas, ACEEE, March 2011, p. 173
42	GDS Maine Potential Study (GDS Engineering Estimates)
43	U.S. Energy Information Administration, Model Documentation Report: Industrial Demand Module of the National Energy Modeling System, May 2013.

Michigan Industrial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/Unit	Effective Measure Life	Savings Factor	Remaining Factor
Computers & Office Equipment					
Energy Star office equipment including computers, monitors, copiers, multi-function machines.	26	27	27	26,29	3
Energy Efficient "Smart" Power Strip for PC/Monitor/Printer	1	1	1	36	14
EZ Save Monitor Power Management Software	16	16	16	16	14
Ventilation					
Dual Enthalpy Economizer	2	2	2	10	3
Demand-Controlled Ventilation	2	2	2	14	3
Variable Speed Drive Control, 15 HP	2	2	2	8	14
Variable Speed Drive Control, 5 HP	2	2	2	8	14
Variable Speed Drive Control, 40 HP	2	2	2	8	14
Improved Duct Sealing	2	2	2	7	3
Electronically-Commutated Permanent Magnet Motors (ECPMs)	1	1	1	36	14
Desrtratification Fan	2	2	2	5	14
Controlled Ventilation Optimization	2	2	2	2	14
High Performance Air Filters	2	2	2	2	14
Building Envelope					
Energy Efficient Windows	2	2	2	2	3
Ceiling insulation to R32	2	2	2	2	3
Below Grade Insulation to R6	2	2	2	14	3
Wall Insulation to R12	2	2	2	14	3
Roof Insulation to R-18	2	2	2	14	3
Water Heating					
Heat Pump Water Heater	1	1	1	1, 36	3
Booster Water Heater	10	10	10	10	3
Point of Use Water Heating	10	10	10	10	3
Solar Water Heating System	9	9	3	14	14
High Efficiency Electric Water Heater	12	13	12	14	3
Low Flow Pre-Rinse Spray Nozzle (included in 2006 Federal Standards) (Electric HW)	1	1	1	36	14
Faucet Aerators	1	1	1	36	3
Low-Flow Showerheads	1	1	1	36	3
Commercial Dishwasher (Under Counter Hi-Temp, Electric DHW)	1	1	1	36	33
Commercial Dishwasher (Single Tank Conveyor Hi-Temp, - Electric DHW)	1	1	1	36	33
Commercial Clothes washers - Water Heating Savings	1	1	1	36	33
Ozone Commercial laundry System	14	15	8	14	15
Drain water Heat Recovery Water Heater	10	10	10	10	3
Hot Water Circulation Pump Time-Clock	9	9	9	9	9
Hot Water (DHW) Pipe Insulation	1	1	1	14	3
Refrigeration Heat Recovery	20	20	9	14	3
Space Cooling - Chillers					

Michigan Industrial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/Unit	Effective Measure Life	Savings Factor	Remaining Factor
Air-Cooled Recip Chiller	2	2	2	2	14
Air-Cooled Screw Chiller	2	2	2	2	14
Water-Cooled Centrifugal Chiller < 150 ton	2	2	2	2	14
Water-Cooled Centrifugal Chiller 150 - 300 ton	2	2	2	2	14
Water-Cooled Centrifugal Chiller > 300 ton	2	2	2	2	14
Water-Cooled Screw Chiller < 150 ton	2	2	2	2	14
Water-Cooled Screw Chiller 150 - 300 ton	2	2	2	2	14
Water-Cooled Screw Chiller > 300 ton	2	2	2	2	14
Chiller Tune Up/Diagnostics - 300 ton	2	2	2	8	3
Chiller Tune Up/Diagnostics - 500 ton	2	2	2	8	3
High Efficiency Pumps	1	1	1	2	29
Efficient Chilled Water Pump	2	2	2	2	29
Chilled Hot Water Reset	2	2	2	14	29
HVAC Controls					
Programmable Thermostats	2	2	2	8	3
EMS install	2	2	2	8	3
EMS Optimization	2	2	2	14	3
Space Cooling - Unitary & Split AC					
High Efficiency AC - Unitary & Split Systems	2	2	2	2	14
Ductless (mini split) - Cooling	2	2	2	2	3
Ground Source Heat Pump - Cooling	2	2	2	2	14
Water Loop Heat Pump (WLHP) - Cooling	2	2	2	2	14
Packaged Terminal Air Conditioner (PTAC) - Cooling	2	2	2	2	14
Lighting					
Lamp & Ballast Retrofit (HPT8 Replacing T12)	1	1	1	36	3
Lamp & Ballast Retrofit (HPT8 Replacing Standard T8)	1	1	1	36	3
Lamp & Ballast Retrofit (Low Wattage HPT8 Replacing Standard T8)	1	1	1	36	3
Fluorescent Fixture with Reflectors	19	19	19	14	3
T5 HP replacing T12	1	1	1	36	3
LED Exterior Flood and Spotlight	1	1	1	36	3
Parking Garage LED	1	1	1	36	30
LED Exit Sign	1	1	1	36	3
LED Traffic Signals	1	1	1	36	30
LED Pedestrian Signals	1	1	1	36	30
Light Tube	1	1	1	14	3
High Intensity Fluorescent Fixture (replacing HID)	1	1	1	36	3
42W 8 lamp Hi Bay CFL	1	1	1	36	3
HID Fixture Upgrade - Pulse Start Metal Halide	1	1	1	36	3
Induction Fluorescent	1	1	1	36	3
CFL Fixture	1	1	1	36	3
CFL Screw-in	1	1	1	36	3
LED Screw In	28	28	28	14	3
LED Fuel Pump Canopy Fixture	35	35	35	14	14
CFL Flood	1	1	1	36	3

Michigan Industrial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/Unit	Effective Measure Life	Savings Factor	Remaining Factor
LED Downlight	1	1	1	36	3
LED Replacing Halogen Incandescent	1	1	1	36	3
New Fluorescent Fixtures T5/HP T8 (replacing T12)	19	19	28	14	3
New Fluorescent Fixtures T5/HP T8 reduced wattage (replacing T8)	19	19	28	14	3
LED Roadway Lights	35	35	35	14	30
LED Outdoor Area Fixture (Parking Light or Street Light)	34	34	34	14	30
LED Pin Based Lamp	28	28	28	14	3
LED Wallpack	28	28	28	14	3
CFL Exterior Lighting	1	1	1	36	3
CFL Screw in Specialty	1	1	1	36	3
LED Specialty	1	1	1	36	3
Illuminated Signs to LED	1	1	1	14	3
LED Lighting in Refrigeration	1	1	1	36	3
Lighting Controls					
Controls for HID (Hi/Lo)	1	1	1	36	3
Controls for H.I.F.	19	19	19	19	3
Daylight Dimming	1	1	1	36	3
Remote Mounted Occupancy Sensor	1	1	1	36	3
Switch Mounted Occupancy Sensor	1	1	1	36	3
Central Lighting Control	1	1	1	36	3
Switching Controls for Multilevel Lighting (Non-HID)	1	1	1	36	3
Stairwell Bi-Level Control	1	1	1	36	3
Occupancy Sensors for LED Refrigerator Lighting	1	1	1	36	3
Space Heating					
High Efficiency Heat Pump	2	2	2	2	14
Ground Source Heat Pump - Heating	2	2	2	2	14
Ductless (mini split) - Heating	2	2	2	2	14
High Efficiency Pumps	1	1	1	36	29
VFD Pump	2	2	2	8	14
ECM motors on furnaces	1	1	1	2	29
Water Loop Heat Pump (WLHP) - Heating	2	2	2	2	14
Packaged Terminal Air Conditioner (PTAC) - Heating	2	2	2	2	14
Transformers					
Energy Efficient Transformers - CEE Tier 1	1	1	1	36	14
Energy Efficient Transformers - CEE Tier 2	1	1	1	36	14
Other					
Electrically Commutated Plug Fans in data centers	1	1	1	36	14
Vendor Miser for Non-Refrig Equipment	1	1	1	36	3
Optimized Snow and Ice Melt Controls	1	1	1	36	14
Engine Block Heater Timer	1	1	1	36	14
Machine Drive					
Sensors & Controls	41	41	41	41	43
Energy Information System	41	41	41	41	43
Electric Supply System Improvements	41	41	41	41	43

Michigan Industrial Measure Database - Electric
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Electric Measure Source List

Measure Name	Annual kWh Savings	Cost/Unit	Effective Measure Life	Savings Factor	Remaining Factor
Advanced Efficient Motors	41	41	41	41	43
Industrial Motor Management	41	41	41	41	43
Advanced Lubricants	41	41	41	41	43
Motor System Optimization (Including ASD)	41	41	41	41	43
Pump System Efficiency Improvements	41	41	41	41	43
Fan System Improvements	41	41	41	41	43
Compressed Air System Management	41	41	41	41	43
Compressed Air - Advanced Compressor Controls	41	41	41	41	43
Process Cooling & Refrigeration					
Sensors & Controls	41	41	41	41	43
Energy Information System	41	41	41	41	43
Electric Supply System Improvements	41	41	41	41	43
Improved Refrigeration	41	41	41	41	43
Process Heating					
Sensors & Controls	41	41	41	41	43
Energy Information System	41	41	41	41	43
Electric Supply System Improvements	41	41	41	41	43

Michigan Industrial Measure Database - Natural Gas

Base Case Factor:

Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Conventional Boiler Use																				
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Boiler Tune-Up	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Pipe Insulation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Reset Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler O2 Trim Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electronic Parallel Positioning Controls (linkage less)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Blowdown Heat Exchanger (Steam)	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Repair Malfunctioning Steam Traps	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Insulate Steam Lines / Condensate Tank	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%	47%
Process Heating																				
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%	30%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%	48%
Direct Fired Make-up Air System	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	100%	0%	0%
Direct Contact Water Heater	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Tune-Up	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Pipe Insulation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler Reset Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Boiler O2 Trim Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electronic Parallel Positioning Controls (linkage less)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Waste-Heat Recovery	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Regenerative Thermal Oxidizer vs. STO	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Regenerative Thermal Oxidizer vs. CTO	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%

Michigan Industrial Measure Database - Natural Gas

Base Case Factor:

Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Improved Sensors & Process Controls	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Refrigeration Heat Recovery	100%	100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Facility HVAC																				
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%
Gas Unit Heater - Condensing	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Infrared Heater (low intensity - two stage)	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%	40%
Insulate and Seal Ducts (New Aerosl Duct Sealing)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stack Heat Exchanger (Standard Economizer)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Stack Heat Exchanger (Condensing Economizer)	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heat Recovery: Air to Air	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Direct Fired Make-up Air System	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	0%	100%	0%	0%
Building Envelope																				
Integrated Building Design	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Energy Efficient Windows	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Cool Roofing	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ceiling Insulation R-11 to R-42	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Below Grade Insulation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Wall Insulation R-7.5 to R13	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Roof Insulation R-11 to R-24	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Ventilation																				
Enthalpy Economizer	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Demand-Controlled Ventilation	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Variable Speed Drive Control, 15 HP	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Variable Speed Drive Control, 5 HP	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Variable Speed Drive Control, 40 HP	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%	33%
Improved Duct Sealing	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Destratification Fan	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Controled Ventilation Optimization	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
High Performance Air Filters	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
HVAC Controls																				
Programmable Thermostats	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
EMS install	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
EMS Optimization	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%	8%
Hotel Guest Room Occupancy Control System	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

Michigan Industrial Measure Database - Natural Gas

Base Case Factor:

Is the fraction of the end use energy that is applicable for the efficient technology in a given market segment. For example, for fluorescent lighting, this would be the fraction of all lighting kWh in a given market segment that is associated with fluorescent fixtures.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Zoning	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%
Machine Drive																				
Sensors & Controls	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%	32%
Energy Information System	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%	45%
Advanced Lubricants	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Pump System Efficiency Improvements	23%	23%	23%	23%	0%	12%	33%	3%	59%	28%	34%	9%	9%	16%	16%	51%	51%	25%	1%	20%
Fan System Improvements	11%	11%	7%	7%	13%	8%	21%	7%	10%	12%	2%	5%	15%	3%	2%	1%	1%	8%	18%	15%
Compressed Air System Management	11%	11%	14%	14%	24%	8%	5%	7%	15%	30%	13%	25%	14%	24%	16%	23%	23%	19%	13%	16%
Compressed Air - Advanced Compressor Controls	11%	11%	14%	14%	24%	8%	5%	7%	15%	30%	13%	25%	14%	24%	16%	23%	23%	19%	13%	16%
Process Cooling & Refrigeration																				
Sensors & Controls	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
Energy Information System	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%	11%
Improved Refrigeration	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Michigan Industrial Measure Database - Natural Gas

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Conventional Boiler Use																				
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Boiler Tune-Up	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Boiler Pipe Insulation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Boiler Reset Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Boiler O2 Trim Controls	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%
Electronic Parallel Positioning Controls (linkage less)	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%
Boiler Blowdown Heat Exchanger (Steam)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Repair Malfunctioning Steam Traps	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Insulate Steam Lines / Condensate Tank	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%	80.0%
Process Heating																				
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Direct Fired Make-up Air System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Direct Contact Water Heater	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Boiler Tune-Up	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Boiler Pipe Insulation	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Boiler Reset Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Boiler O2 Trim Controls	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%
Electronic Parallel Positioning Controls (linkage less)	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%	42.0%
Waste-Heat Recovery	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Regenerative Thermal Oxidizer vs. STO	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Regenerative Thermal Oxidizer vs. CTO	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Improved Sensors & Process Controls	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Refrigeration Heat Recovery	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%
Facility HVAC																				

Michigan Industrial Measure Database - Natural Gas

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Gas Unit Heater - Condensing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Infrared Heater (low intensity - two stage)	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Insulate and Seal Ducts (New Aerosl Duct Sealing)	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%	85.0%
Stack Heat Exchanger (Standard Economizer)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Stack Heat Exchanger (Condensing Economizer)	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Heat Recovery: Air to Air	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	35.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%	45.0%
Direct Fired Make-up Air System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Building Envelope																				
Integrated Building Design	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Energy Efficient Windows	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Cool Roofing	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Ceiling Insulation R-11 to R-42	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%	57.0%
Below Grade Insulation	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Wall Insulation R-7.5 to R13	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Roof Insulation R-11 to R-24	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%	43.0%
Ventilation																				
Enthalpy Economizer	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%	86.0%
Demand-Controlled Ventilation	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%
Variable Speed Drive Control, 15 HP	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%
Variable Speed Drive Control, 5 HP	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%
Variable Speed Drive Control, 40 HP	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%	92.0%
Improved Duct Sealing	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Destratification Fan	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
Controled Ventilation Optimization	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%
High Performance Air Filters	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
HVAC Controls																				
Programmable Thermostats	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
EMS install	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
EMS Optimization	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Hotel Guest Room Occupancy Control System	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Zoning	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Machine Drive																				
Sensors & Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Information System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Advanced Lubricants	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Pump System Efficiency Improvements	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Fan System Improvements	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Michigan Industrial Measure Database - Natural Gas

Convertible Factor:
Is the fraction of the equipment or practice that is technically feasible for conversion to the efficient technology from an engineering perspective (e.g., it may not be possible to install VFDs on all motors in a given market segment).

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Compressed Air System Management	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Compressed Air - Advanced Compressor Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Process Cooling & Refrigeration																				
Sensors & Controls	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Energy Information System	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Improved Refrigeration	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Michigan Industrial Measure Database - Natural Gas

Measure Savings, Cost and Useful Life

Measure Name	Annual MMBTU Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	UCT	TRC
Conventional Boiler Use							
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	1.00	2	$/MMBtu	$55.64	20	2.11	1.18
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	1.00	2	$/MMBtu	$55.59	18	1.98	1.10
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	1.00	2	$/MMBtu	$68.14	25	1.97	1.10
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	1.00	2	$/MMBtu	$21.20	25	6.33	3.53
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	1.00	2	$/MMBtu	$24.91	18	4.41	2.46
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	1.00	2	$/MMBtu	$46.99	25	2.85	1.59
Boiler Tune-Up	1.00	1	$/MMBtu	$7.79	2	2.29	1.27
Boiler Pipe Insulation	1.00	1	$/MMBtu	$24.25	15	4.00	2.23
Boiler Reset Controls	1.00	1	$/MMBtu	$47.63	20	2.47	1.38
Boiler O2 Trim Controls	1.00	1	$/MMBtu	$129.30	20	0.91	0.51
Electronic Parallel Positioning Controls (linkage less)	1.00	1	$/MMBtu	$187.48	20	0.63	0.35
Boiler Blowdown Heat Exchanger (Steam)	1.00	1	$/MMBtu	$51.68	20	2.27	1.27
Repair Malfunctioning Steam Traps	1.00	1	$/MMBtu	$5.86	5	7.03	3.90
Insulate Steam Lines / Condensate Tank	1.00	1	$/MMBtu	$14.43	15	6.72	3.74
Process Heating							
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	1.00	2	$/MMBtu	$21.20	25	6.33	3.53
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	1.00	2	$/MMBtu	$24.91	18	4.41	2.46
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	1.00	2	$/MMBtu	$46.99	25	2.85	1.59
Direct Fired Make-up Air System	1.00	1	$/MMBtu	$59.01	20	1.99	1.11
Direct Contact Water Heater	1.00	1	$/MMBtu	$24.98	20	4.70	2.62
Boiler Tune-Up	1.00	1	$/MMBtu	$7.79	2	2.29	1.27
Boiler Pipe Insulation	1.00	1	$/MMBtu	$14.05	15	6.90	3.85
Boiler Reset Controls	1.00	1	$/MMBtu	$47.63	20	2.47	1.38
Boiler O2 Trim Controls	1.00	1	$/MMBtu	$129.30	20	0.91	0.51
Electronic Parallel Positioning Controls (linkage less)	1.00	1	$/MMBtu	$187.48	20	0.63	0.35
Waste-Heat Recovery	1.00	1	$/MMBtu	$163.93	10	0.44	0.24
Regenerative Thermal Oxidizer vs. STO	1.00	1	$/MMBtu	$4.06	10	17.61	9.81
Regenerative Thermal Oxidizer vs. CTO	1.00	1	$/MMBtu	$34.38	10	2.08	1.16
Improved Sensors & Process Controls	1.00	1	$/MMBtu	$34.29	5	1.20	0.67
Refrigeration Heat Recovery	1.00	1	$/MMBtu	$20.40	15	4.75	2.65
Facility HVAC							
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	1.00	2	$/MMBtu	$19.31	18	5.69	3.17
Gas Unit Heater - Condensing	1.00	2	$/MMBtu	$65.27	22	1.91	1.06
Infrared Heater (low intensity - two stage)	1.00	2	$/MMBtu	$18.83	17	5.61	3.13
Insulate and Seal Ducts (New Aerosl Duct Sealing)	1.00	1	$/MMBtu	$501.67	20	0.23	0.13
Stack Heat Exchanger (Standard Economizer)	1.00	1	$/MMBtu	$16.54	20	7.10	3.96
Stack Heat Exchanger (Condensing Economizer)	1.00	1	$/MMBtu	$11.16	20	10.53	5.87
Heat Recovery: Air to Air	1.00	1	$/MMBtu	$163.93	20	0.72	0.40
Direct Fired Make-up Air System	1.00	1	$/MMBtu	$59.01	20	1.99	1.11
Building Envelope							

Michigan Industrial Measure Database - Natural Gas

Measure Savings, Cost and Useful Life

Measure Name	Annual MMBTU Savings	Cost Type: 1=Full 2=Inc.	Cost/Unit Descriptor	Cost/Unit	Effective Measure Life	UCT	TRC
Energy Efficient Windows	11.97	2	100SF	$2,250	20	0.63	0.35
Cool Roofing	-1.64	2	1000 sq ft roof area	$665	20	-0.29	-0.16
Ceiling Insulation R-11 to R-42	15.51	1	1000 sq ft roof area	$600	20	3.04	1.69
Below Grade Insulation	2.07	1	1000 sq ft basement wall area	$273	20	0.89	0.50
Wall Insulation R-7.5 to R13	123.42	1	1000 sq ft wall area	$100	20	145.02	80.84
Roof Insulation R-11 to R-24	7.07	1	1000 sq ft roof area	$1,000	20	0.83	0.46
Ventilation							
Enthalpy Economizer	-0.05	2	ton	$75	10	-0.05	-0.03
Demand-Controlled Ventilation	37.16	2	1000 sq ft cond floor area	$75	15	48.04	26.77
Variable Speed Drive Control, 15 HP	-11.98	1	per Unit	$2,339	10	-0.37	-0.20
Variable Speed Drive Control, 5 HP	-3.99	1	per Unit	$780	10	-0.37	-0.20
Variable Speed Drive Control, 40 HP	-31.96	1	per Unit	$6,238	10	-0.37	-0.20
Improved Duct Sealing	2.53	2	ton	$108	18	2.58	1.44
Electronically-Commutated Permanent Magnet Motors (ECPMs)	0.00	2	per motor	$78	15	0.00	0.00
Destratification Fan	8.66	1	1000 sq ft cond floor area	$375	15	2.24	1.25
Controled Ventilation Optimization	17.52	2	LF of Sash	$986	12.7778	1.53	0.85
High Performance Air Filters	0.00	2	1000 cfm	$70	3	0.00	0.00
HVAC Controls							
Programmable Thermostats	20.75	1	1000 sq ft cond floor area	$50	9	27.45	15.29
EMS install	1.37	1	1000 sq ft cond floor area	$7	15	18.81	10.48
EMS Optimization	8.71	1	1000 sq ft	$17	16.6667	53.43	29.78
Hotel Guest Room Occupancy Control System	3.05	2	per unit	$250	8	0.73	0.41
Zoning	4.28	2	1000 sq ft cond floor area	$500	15	0.83	0.46

Michigan Industrial Measure Database - Natural Gas

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Conventional Boiler Use																				
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Tune-Up	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Pipe Insulation	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Reset Controls	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler O2 Trim Controls	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Electronic Parallel Positioning Controls (linkage less)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Blowdown Heat Exchanger (Steam)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Repair Malfunctioning Steam Traps	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Insulate Steam Lines / Condensate Tank	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Process Heating																				
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Direct Fired Make-up Air System	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Direct Contact Water Heater	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Tune-Up	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Pipe Insulation	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler Reset Controls	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Boiler O2 Trim Controls	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Electronic Parallel Positioning Controls (linkage less)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Waste-Heat Recovery	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Regenerative Thermal Oxidizer vs. STO	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Regenerative Thermal Oxidizer vs. CTO	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Improved Sensors & Process Controls	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Refrigeration Heat Recovery	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Facility HVAC																				

Michigan Industrial Measure Database - Natural Gas

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Gas Unit Heater - Condensing	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Infrared Heater (low intensity - two stage)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Insulate and Seal Ducts (New Aerosl Duct Sealing)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Stack Heat Exchanger (Standard Economizer)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Stack Heat Exchanger (Condensing Economizer)	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Heat Recovery: Air to Air	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Direct Fired Make-up Air System	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%	60.0%
Building Envelope																				
Integrated Building Design	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%	82.6%
Energy Efficient Windows	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%
Cool Roofing	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
Ceiling Insulation R-11 to R-42	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%
Below Grade Insulation	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%	54.0%
Wall Insulation R-7.5 to R13	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Roof Insulation R-11 to R-24	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%	51.0%
Ventilation																				
Enthalpy Economizer	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%	97.0%
Demand-Controlled Ventilation	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%
Variable Speed Drive Control, 15 HP	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%
Variable Speed Drive Control, 5 HP	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%
Variable Speed Drive Control, 40 HP	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%	89.1%
Improved Duct Sealing	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%	90.0%
Destratification Fan	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%	93.0%
Controled Ventilation Optimization	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%
High Performance Air Filters	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
HVAC Controls																				
Programmable Thermostats	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%
EMS install	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
EMS Optimization	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%	99.0%
Hotel Guest Room Occupancy Control System	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Zoning	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%	82.0%
Machine Drive																				
Sensors & Controls	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%
Energy Information System	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%
Advanced Lubricants	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%
Pump System Efficiency Improvements	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%
Fan System Improvements	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%

Michigan Industrial Measure Database - Natural Gas

Remaining Factor:
Is the fraction of applicable kWh or therm sales that are associated with equipment that has not yet been converted to the energy efficiency measure; that is, one minus the fraction of the market segment that already have the energy-efficiency measure installed.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Compressed Air System Management	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%
Compressed Air - Advanced Compressor Controls	71.1%	71.1%	72.1%	72.1%	72.1%	76.2%	63.8%	63.8%	72.1%	72.1%	80.2%	82.6%	73.7%	73.7%	76.4%	77.3%	77.3%	80.9%	72.1%	72.1%
Process Cooling & Refrigeration																				
Sensors & Controls	71.6%	71.6%	86.2%	86.2%	86.2%	77.9%	63.8%	63.8%	86.2%	86.2%	82.2%	82.6%	76.2%	76.2%	78.3%	80.3%	80.3%	84.0%	86.2%	86.2%
Energy Information System	71.6%	71.6%	86.2%	86.2%	86.2%	77.9%	63.8%	63.8%	86.2%	86.2%	82.2%	82.6%	76.2%	76.2%	78.3%	80.3%	80.3%	84.0%	86.2%	86.2%
Improved Refrigeration	71.6%	71.6%	86.2%	86.2%	86.2%	77.9%	63.8%	63.8%	86.2%	86.2%	82.2%	82.6%	76.2%	76.2%	78.3%	80.3%	80.3%	84.0%	86.2%	86.2%

Michigan Industrial Measure Database - Natural Gas

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Conventional Boiler Use																				
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%	5.8%
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%	15.8%
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%
Boiler Tune-Up	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Boiler Pipe Insulation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Boiler Reset Controls	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Boiler O2 Trim Controls	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Electronic Parallel Positioning Controls (linkage less)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Boiler Blowdown Heat Exchanger (Steam)	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%
Repair Malfunctioning Steam Traps	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Insulate Steam Lines / Condensate Tank	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Process Heating																				
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%	10.3%
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%	13.3%
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%	4.8%
Direct Fired Make-up Air System	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%
Direct Contact Water Heater	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%	34.0%
Boiler Tune-Up	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Boiler Pipe Insulation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Boiler Reset Controls	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Boiler O2 Trim Controls	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Electronic Parallel Positioning Controls (linkage less)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Waste-Heat Recovery	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%	5.6%
Regenerative Thermal Oxidizer vs. STO	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%	95.0%
Regenerative Thermal Oxidizer vs. CTO	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%	69.0%
Improved Sensors & Process Controls	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Refrigeration Heat Recovery	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%	50.3%
Facility HVAC																				
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%	15.2%
Gas Unit Heater - Condensing	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%

Michigan Industrial Measure Database - Natural Gas

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Infrared Heater (low intensity - two stage)	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%	25.5%
Insulate and Seal Ducts (New Aerosl Duct Sealing)	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%	6.5%
Stack Heat Exchanger (Standard Economizer)	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Stack Heat Exchanger (Condensing Economizer)	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
Heat Recovery: Air to Air	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%	13.0%
Direct Fired Make-up Air System	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%	16.0%
Building Envelope																				
Integrated Building Design	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%	40.0%
Energy Efficient Windows	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%	64.6%
Cool Roofing	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
Ceiling Insulation R-11 to R-42	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Below Grade Insulation	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%	0.7%
Wall Insulation R-7.5 to R13	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%
Roof Insulation R-11 to R-24	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%	8.0%
Ventilation																				
Enthalpy Economizer	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%	22.0%
Demand-Controlled Ventilation	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Variable Speed Drive Control, 15 HP	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Variable Speed Drive Control, 5 HP	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Variable Speed Drive Control, 40 HP	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Improved Duct Sealing	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Electronically-Commutated Permanent Magnet Motors (ECPMs)	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%	47.9%
Destratification Fan	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%
Controled Ventilation Optimization	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%	42.8%
High Performance Air Filters	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%	32.4%
HVAC Controls																				
Programmable Thermostats	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
EMS install	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
EMS Optimization	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%	6.9%
Hotel Guest Room Occupancy Control System	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%	30.0%
Zoning	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Machine Drive																				
Sensors & Controls	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Energy Information System	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Advanced Lubricants	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%	2.6%
Pump System Efficiency Improvements	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%	16.4%
Fan System Improvements	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Compressed Air System Management	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%	17.0%
Compressed Air - Advanced Compressor Controls	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Process Cooling & Refrigeration																				
Sensors & Controls	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

Michigan Industrial Measure Database - Natural Gas

Savings Factor:
Is the percentage reduction in electricity or gas consumption resulting from application of the efficient technology.

Measure Name	FOOD	BEVERAGE	TEXTILE MILLS	TEXTILE MILL PRODUCTS	APPAREL & LEATHER	WOOD	PAPER	PRINTING	PETROLEUM	CHEMICALS	PLASTICS & RUBBER	NONMETALLIC MINERAL	PRIMARY METALS	FABRICATED METALS	MACHINERY	COMPUTER & ELECTRONICS	ELEC. EQUIP.	TRANS. EQUIP.	FURNITURE	MISC.
Energy Information System	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Improved Refrigeration	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%

Michigan Industrial Measure Database - Natural Gas

Natural Gas Measure Sources

Source Number	Source
1	Michigan Master Database of Deemed Savings - 2013 - Non-Weather Sensitive Commercial
2	Michigan Master Database of Deemed Savings - 2013 - Weather Sensitive
3	Federal Energy Management Program (FEMP), Energy Cost Calculator for Electric and Gas Water Heaters
4	GDS Associates estimate based upon review of various customer and vendor surveys, baseline studies and potential studies conducted by GDS in other states
5	Therma-Stor Return On Investment Calculation Form, http://www.thermastor.com/Heat-Recovery-water-Heaters/Heat-Recovery-ROI-Form.pdf
6	Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006, Appendix C
7	US DOE- Federal Energy Management Program (FEMP): Heat Recovery from Wastewater Using a Gravity-Film Heat Exchanger
8	Food Service Technology Center, Pre-Rinse Spray Valve/Water Cost Calculator
9	Energy Efficiency Potential of Gas-Fired Commercial Hot Water Heating Systems in Restaurants, An Emerging Technology Field Monitoring Study, FSTC Report 5011.07.04, Food Service Technology Center, April 2007
10	US DOE - Energy Efficiency And Renewable Energy - Estimating a Solar Water Heater System's Cost
11	Gene Dedick - East Coast VP Sales - AquaRecycle - ph: 210-325-9258: 1,248,000 lbs/yr = 30 gpm washer-extractor system with lint shaker.
12	http://www.aquarecycle.com/laundry-water-energy-savings.php
13	Commercial Laundry Conservation Technologies, Bill Hoffman, James Riesenberger
14	Trevor Brown Southeastern Laundry/Commercial Laundry Conservation Technologies - Bill Hoffman, James Riesenberger
15	US DOE - Energy Efficiency And Renewable Energy - Determining Gas Swimming Pool Heating Efficiency - http://apps1.eere.energy.gov/consumer/your_home/water_heating/index.cfm/mytopic=13170
16	NYSERDA Deemed Savings Database, Rev 09-082006.
17	Revised DEER Measure Cost Summary (05_30_2008) Revised (06_02_2008)
18	Gas Solutions for the Foodservice Industry, http://www.gfen.info/pdf/cookinggas0107.pdf
19	CALIFORNIA STATEWIDE COMMERCIAL SECTOR NATURAL GAS ENERGY EFFICIENCY POTENTIAL STUDY, Study ID #SW061, Prepared for Pacific Gas & Electric Company, Prepared by Mike Rufo and Fred Coito KEMA-XENERGY Inc., May 14, 2003; Questar 2006 DSM Market Characterization Report, Nexant, Appendix D (sq ft) & E (cost/sq ft).
20	Cost of the most common type of steam trap (Inverted bucket trap) according to Grainger catalog ranges from $125 - $147, plus one hour of labor @ $100/hr. http://www.grainger.com/Grainger/ecatalog/N-bkg/No-16/Ntt-inverted+bucket+trap?Ns=List+Price%7C0
21	Greenheck sales representative cost and measure life information on 5,000 CFM model. ($4,500 materials, $1,000 labor, and $400 crane rental (to lift onto roof))
22	http://www.cleanboiler.org/Eff_Improve/Efficiency/Boiler_Reset_Control.asp
23	Measure information from Nexant's "Gas Energy Efficiency Measure Analysis to Support NYSERDA's Con Edison Gas Efficiency Program" reported in August 2005. Savings unit is MMBtu/unit. Baseline efficiency from DOE
24	Natural Gas Boiler/Burner Consortium - http://www.energysolutionscenter.org/boilerburner/Eff_Improve/Efficiency/Oxygen_Control.asp
25	Found a wide range (4% - 16%) of savings estimates based on literature review Used a mid-range savings estimate factor of 10%
26	5% - 10% improvement in energy associated with losses (Optimizing Steam Systems: Saving Energy and Money in Mexican Hotels, by David Jaber, Alliance to Save Energy) GDS estimates that poor insulation represents 15%- 20% of total gas input.
27	Review of various internet sites including Zoo Fans (25%), Big Ass Fan Company (30%) and Energy Wales (20%)
28	Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006 - Appendix C -MD ENERGY SAVINGS FRACTIONS
29	Flex Your Power, Demand Ventilation Control Reduces Kitchen Fan Energy Consumption by 50% to 70% and makeup air heating energy by 25%: http://www.fypower.org/news/?p=682
30	Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006 Appendix C - RET ENERGY SAVINGS FRACTIONS. (Average across all building types - varies significantly based on occupancy and ventilation requirements)
31	ACEE, Emerging Energy Saving Technologies & Practices for the Buildings Sector, 2004 (6 zones at $575 per zone) p 102.
32	Assessment of Energy and Capacity Savings Potential in Iowa', Prepared for The Iowa Utility Association February 15, 2008. In Collaboration with Summit Blue Consulting, Nexant, Inc., A-TEC Energy Corporation, and Britt/Makela Group; Natural Gas Energy Efficiency Resource Development Potential in New York, Final Report for NYSERDA, by Optimal Energy, ACEEE, VEIC, Resource Insight and Energy & Environmental Analysis, October 2006 Appendix B p 40-44
33	Actual average project cost provided by NGRID for NY projects
34	ACEE, Emerging Energy Saving Technologies & Practices for the Buildings Sector, 2004
35	Energy Efficiency and Renewable Energy Resource Development Potential in New York State - Final Report, Volume 5 Energy Efficiency Technical
36	http://www.toolbase.org/Technology-Inventory/HVAC/hvac-smart-zoning-controls
37	Energy Star Cost Calculator, Energy Star Website, www.energystar.gov.
38	GasNetworks Aug08update - "Validating the Impacts of Programmable Thermostats." GasNetworks, January 2007
39	EIA, 2003 CBECS, New England, Non Mall saturation, square footage
40	For Combo Heating / Water Heating Units costs and savings add up similar separate equipment from water heating tab and space heating tab. Literature claims combined system equipment costs are higher, installation costs lower compared to separate systems.
41	Gas Fired water Heater Screening Tool http://bea.ugi.esource.com/BEA1/PA/PA_WaterHeating/PA-41_calc
42	Building Commissioning - A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions. Lawrence Berkeley National Laboratory. Report Prepared for: California Energy Commission Public Interest Energy Research (PIER) - July 21, 2009
43	GDS Natural Gas Energy Efficiency Potential in Massachusetts - April 2009
44	MEMD Support Documentation - 2014 - Workbooks and Algorithms
45	Michigan Baseline 2011: Commercial Baseline Report

Michigan Industrial Measure Database - Natural Gas

Natural Gas Measure Sources

Source Number	Source
46	Codes and Standards Enhancement Initiative for PY2004: Title 20 Standards Development, Analysis of Standards Options for Portable Electric Spas, Davis Energy Group Energy Solutions, May 12, 2004
47	Massachusetts Farm Energy Guides by Farm Sector: Best Management Practices for Greenhouses, 2010
48	Public Service New Mexico Electric Energy Efficiency Potential Study; Itron, Inc., September 2006
49	DTE Energy Commercial Baseline Study; Opinion Dynamics Corporation, October 2010
50	GDS Maine Potential Study (GDS Engineering Estimates)
51	U.S. Energy Information Administration, Model Documentation Report: Industrial Demand Module of the National Energy Modeling System, May 2013.
52	GDS Maryland Gas Potential Study, 2011.

Michigan Industrial Measure Database - Natural Gas
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Natural Gas Source List

Measure Name	Annual MMBTU Savings	Cost/Unit	Effective Measure Life	Savings Factor	Remaining Factor
Building Envelope					
Energy Efficient Windows	2	2	3	4	45
Cool Roofing	2	2	3	2	45
Ceiling Insulation R-11 to R-42	4	4	3	4	45
Below Grade Insulation	2	2	3	4	45
Wall Insulation R-7.5 to R13	2	2	3	4	45
Roof Insulation R-11 to R-24	2	2	3	4	45
HVAC Controls					
Programmable Thermostats	38	37	3	43	45
EMS install	2	2	3	48	45
EMS Optimization	4	35	3	35	4
Zoning	4	36	3	48	4
Conventional Boiler Use					
High Efficiency Hot Water Boiler (<=300,000 Btu/h) (AFUE = 85%-90%)	52	52	52	52	51
Condensing Boiler (<=300,000 Btu/h) (AFUE>90%)	52	52	52	52	51
High Efficiency Steam Boiler (<=300,000 Btu/h) (AFUE >=82%)	52	52	52	52	51
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	52	52	52	52	51
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	52	52	52	52	51
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	52	52	52	52	51
Boiler Tune-Up	52	52	52	52	51
Boiler Pipe Insulation	52	52	52	52	51
Boiler Reset Controls	52	52	52	52	51
Boiler O2 Trim Controls	52	52	52	52	51
Electronic Parallel Positioning Controls (linkage less)	52	52	52	52	51
Boiler Blowdown Heat Exchanger (Steam)	52	52	52	52	51
Repair Malfunctioning Steam Traps	52	52	52	52	51
Insulate Steam Lines / Condensate Tank	52	52	52	52	51
Process Heating					
High Efficiency Hot Water Boiler (>300,000 Btu/h) (Th. Eff. =85%-90%)	52	52	52	52	51
Condensing Boiler (>300,000 Btu/h) (EF>90%) (Th. Eff. >=90%)	52	52	52	52	51
High Efficiency Steam Boiler (>300,000 Btu/h) (Th. Eff. >=80%)	52	52	52	52	51
Direct Fired Make-up Air System	52	52	52	52	51
Direct Contact Water Heater	52	52	52	52	51
Boiler Tune-Up	52	52	52	52	51
Boiler Pipe Insulation	52	52	52	52	51
Boiler Reset Controls	52	52	52	52	51
Boiler O2 Trim Controls	52	52	52	52	51

Michigan Industrial Measure Database - Natural Gas
Measure Savings, Cost and Useful Life, Savings Factor, Remaining Factor Sources
Reference numbers designate source for information from Natural Gas Source List

Measure Name	Annual MMBTU Savings	Cost/Unit	Effective Measure Life	Savings Factor	Remaining Factor
Electronic Parallel Positioning Controls (linkage less)	52	52	52	52	51
Waste-Heat Recovery	52	52	52	52	51
Regenerative Thermal Oxidizer vs. STO	52	52	52	52	51
Regenerative Thermal Oxidizer vs. CTO	52	52	52	52	51
Improved Sensors & Process Controls	52	52	52	52	51
Refrigeration Heat Recovery	52	52	52	52	51
Facility HVAC					
High Efficiency Furnace (<=300,000 Btu/h) (AFUE >=92%)	52	52	52	52	51
Gas Unit Heater - Condensing	52	52	52	52	51
Infrared Heater (low intensity - two stage)	52	52	52	52	51
Insulate and Seal Ducts (New Aerosl Duct Sealing)	52	52	52	52	51
Stack Heat Exchanger (Standard Economizer)	52	52	52	52	51
Stack Heat Exchanger (Condensing Economizer)	52	52	52	52	51
Heat Recovery: Air to Air	52	52	52	52	51
Direct Fired Make-up Air System	52	52	52	52	51

General Modeling Assumptions Avoided Costs

UCT GLOBAL ASSUMPTIONS - NO CARBON TAX ADDER

Analysis Start Year	2014		*Nominal Discount Rate*	6.405%
Length of Analysis	10	Years	*Inflation Rate*	2.0%
			Reserve Margin Multiplier	14.2%
			Carbon Tax Adder ($/kWh)	$0.0000
			Carbon Tax Adder ($/MMBtu)	$0.0000

Avoided Costs (Nominal Dollars)

	Natural Gas Wholesale Forecast
Data Year	**$/MMBTU**
2013	4.58
2014	4.58
2015	4.63
2016	4.76
2017	4.94
2018	4.32
2019	4.41
2020	4.49
2021	4.62
2022	4.84
2023	5.03
2024	5.15
2025	5.23
2026	5.38
2027	5.45
2028	5.58
2029	5.66
2030	5.77
2031	5.89
2032	6.01
2033	6.13
2034	6.25
2035	6.37
2036	6.50
2037	6.63
2038	6.76
2039	6.90
2040	7.04
2041	7.18

	Winter Peak Energy	Winter Off-Peak Energy	Summer Peak Energy	Summer Off-Peak Energy	Summer Capacity	Winter Capacity	Avoided T&D
Data Year	**$/kWh**	**$/kWh**	**$/kWh**	**$/kWh**	**$/kW-yr**	**$/kW-yr**	**$/kW-yr**
2013	0.033	0.033	0.033	0.033	164.55	0.00	36.24
2014	0.036	0.036	0.036	0.036	166.66	0.00	36.96
2015	0.034	0.034	0.034	0.034	168.34	0.00	37.70
2016	0.035	0.035	0.035	0.035	170.18	0.00	38.46
2017	0.035	0.035	0.035	0.035	171.42	0.00	39.23
2018	0.034	0.034	0.034	0.034	172.34	0.00	40.01
2019	0.035	0.035	0.035	0.035	173.91	0.00	40.81
2020	0.036	0.036	0.036	0.036	175.64	0.00	41.63
2021	0.037	0.037	0.037	0.037	176.94	0.00	42.46
2022	0.038	0.038	0.038	0.038	178.24	0.00	43.31
2023	0.038	0.038	0.038	0.038	179.59	0.00	44.18
2024	0.039	0.039	0.039	0.039	181.11	0.00	45.06
2025	0.041	0.041	0.041	0.041	182.95	0.00	45.96
2026	0.043	0.043	0.043	0.043	185.06	0.00	46.88
2027	0.044	0.044	0.044	0.044	187.01	0.00	47.82
2028	0.045	0.045	0.045	0.045	188.63	0.00	48.77
2029	0.045	0.045	0.045	0.045	190.09	0.00	49.75
2030	0.046	0.046	0.046	0.046	191.77	0.00	50.74
2031	0.047	0.047	0.047	0.047	193.66	0.00	51.76
2032	0.048	0.048	0.048	0.048	195.56	0.00	52.79
2033	0.050	0.050	0.050	0.050	197.72	0.00	53.85
2034	0.051	0.051	0.051	0.051	199.88	0.00	54.93
2035	0.053	0.053	0.053	0.053	201.89	0.00	56.03
2036	0.055	0.055	0.055	0.055	204.05	0.00	57.15
2037	0.056	0.056	0.056	0.056	206.22	0.00	58.29
2038	0.058	0.058	0.058	0.058	208.33	0.00	59.46
2039	0.060	0.060	0.060	0.060	210.44	0.00	60.64
2040	0.061	0.061	0.061	0.061	212.60	0.00	61.86
2041	0.063	0.063	0.063	0.063	216.85	0.00	63.09

Electric Line Losses

	Winter On Peak	Winter Off Peak	Summer On Peak	Summer Off Peak
Residential	1.08	1.08	1.08	1.08
C&I	1.08	1.08	1.08	1.08

Demand Line Losses

Winter Gen.	Summer Gen.	T&D Capacity
1.09	1.09	1.09
1.09	1.09	1.09

TRC GLOBAL ASSUMPTIONS - INCLUDES A CARBON TAX ADDER

Analysis Start Year	2014		*Nominal Discount Rate*	6.405%
Length of Analysis	10	Years	*Inflation Rate*	2.0%
			Reserve Margin Multiplier	14.2%
			Carbon Tax Adder ($/kWh)	$0.0139
			Carbon Tax Adder ($/kWh)	$0.9600

Avoided Costs (Nominal Dollars)

	Natural Gas Wholesale Forecast
Data Year	**$/MMBTU**
2011	
2012	
2013	5.060
2014	5.070
2015	5.129
2016	5.269
2017	5.460
2018	4.850
2019	4.951
2020	5.041
2021	5.182
2022	5.414
2023	5.615
2024	5.747
2025	5.839
2026	6.001
2027	6.083
2028	6.226
2029	6.319
2030	6.445
2031	6.574
2032	6.706
2033	6.840
2034	6.977
2035	7.116
2036	7.258
2037	7.404
2038	7.552
2039	7.703
2040	7.857
2041	8.850

	Winter Peak Energy	Winter Off-Peak Energy	Summer Peak Energy	Summer Off-Peak Energy	Summer Capacity	Winter Capacity	Avoided T&D
Data Year	**$/kWh**	**$/kWh**	**$/kWh**	**$/kWh**	**$/kW-yr**	**$/kW-yr**	**$/kW-yr**
2011							
2012							
2013	0.040	0.040	0.040	0.040	164.55	0.00	36.24
2014	0.043	0.043	0.043	0.043	166.66	0.00	36.96
2015	0.042	0.042	0.042	0.042	168.34	0.00	37.70
2016	0.042	0.042	0.042	0.042	170.18	0.00	38.46
2017	0.042	0.042	0.042	0.042	171.42	0.00	39.23
2018	0.041	0.041	0.041	0.041	172.34	0.00	40.01
2019	0.042	0.042	0.042	0.042	173.91	0.00	40.81
2020	0.044	0.044	0.044	0.044	175.64	0.00	41.63
2021	0.045	0.045	0.045	0.045	176.94	0.00	42.46
2022	0.046	0.046	0.046	0.046	178.24	0.00	43.31
2023	0.047	0.047	0.047	0.047	179.59	0.00	44.18
2024	0.048	0.048	0.048	0.048	181.11	0.00	45.06
2025	0.049	0.049	0.049	0.049	182.95	0.00	45.96
2026	0.052	0.052	0.052	0.052	185.06	0.00	46.88
2027	0.053	0.053	0.053	0.053	187.01	0.00	47.82
2028	0.054	0.054	0.054	0.054	188.63	0.00	48.77
2029	0.054	0.054	0.054	0.054	190.09	0.00	49.75
2030	0.056	0.056	0.056	0.056	191.77	0.00	50.74
2031	0.057	0.057	0.057	0.057	193.66	0.00	51.76
2032	0.058	0.058	0.058	0.058	195.56	0.00	52.79
2033	0.060	0.060	0.060	0.060	197.72	0.00	53.85
2034	0.062	0.062	0.062	0.062	199.88	0.00	54.93
2035	0.063	0.063	0.063	0.063	201.89	0.00	56.03
2036	0.066	0.066	0.066	0.066	204.05	0.00	57.15
2037	0.068	0.068	0.068	0.068	206.22	0.00	58.29
2038	0.069	0.069	0.069	0.069	208.33	0.00	59.46
2039	0.071	0.071	0.071	0.071	210.44	0.00	60.64
2040	0.073	0.073	0.073	0.073	212.60	0.00	61.86
2041	0.075	0.075	0.075	0.075	216.85	0.00	63.09

Electric Line Losses

	Winter On Peak	Winter Off Peak	Summer On Peak	Summer Off Peak
Residential	1.08	1.08	1.08	1.08
C&I	1.08	1.08	1.08	1.08

Demand Line Losses

Winter Gen.	Summer Gen.	T&D Capacity
1.09	1.09	1.09
1.09	1.09	1.09