



Integrated Energy Resources

Alternative Energy Savings Goals in Michigan: Promoting Longer Term Savings and Addressing Small Utility Challenges

Prepared for:

Michigan Public Service Commission



By:

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September 17, 2013

Agenda

Interaction between Savings Goals and Longevity of Savings

- ▶ Conceptual review of the issue
- ▶ Analysis of MI 2012 Program Data & 2013-2015 Forecast Trends
- ▶ Jurisdictional Comparison of Average Portfolio Measure Lives
- ▶ Options for Alternative Ways to Express Energy Savings Goals

Reasonableness of Aggressive Goals for Smaller Utilities

- ▶ Goal Achievement as a Function of Utility Size

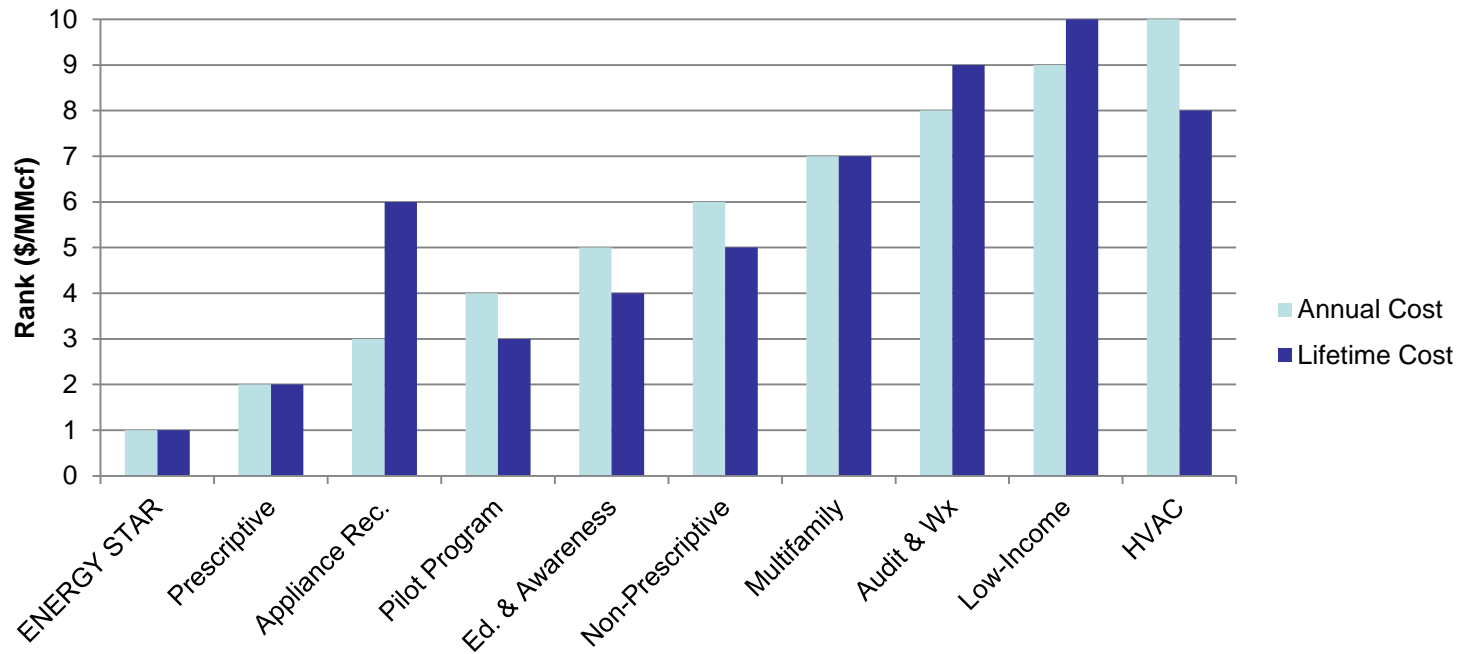
Savings Goals Structure and Measure Life – How They Interact

- ▶ In MI and other jurisdictions, goals expressed in terms of first year savings. This fails to recognize or reward the full value of savings based on longevity
- ▶ Utilities are encouraged to maximize first year savings rather than lifetime savings or value over the entire life of the measure, given other resource constraints
- ▶ Hypothetical Example:

	Savings/ Year	Measure Life	Cost	Cost/unit of 1 st year savings	Cost/unit of lifetime savings
Measure 1	20 therms	1	\$10	\$0.50	\$0.50
Measure 2	100 therms	20	\$200	\$2.00	\$0.10

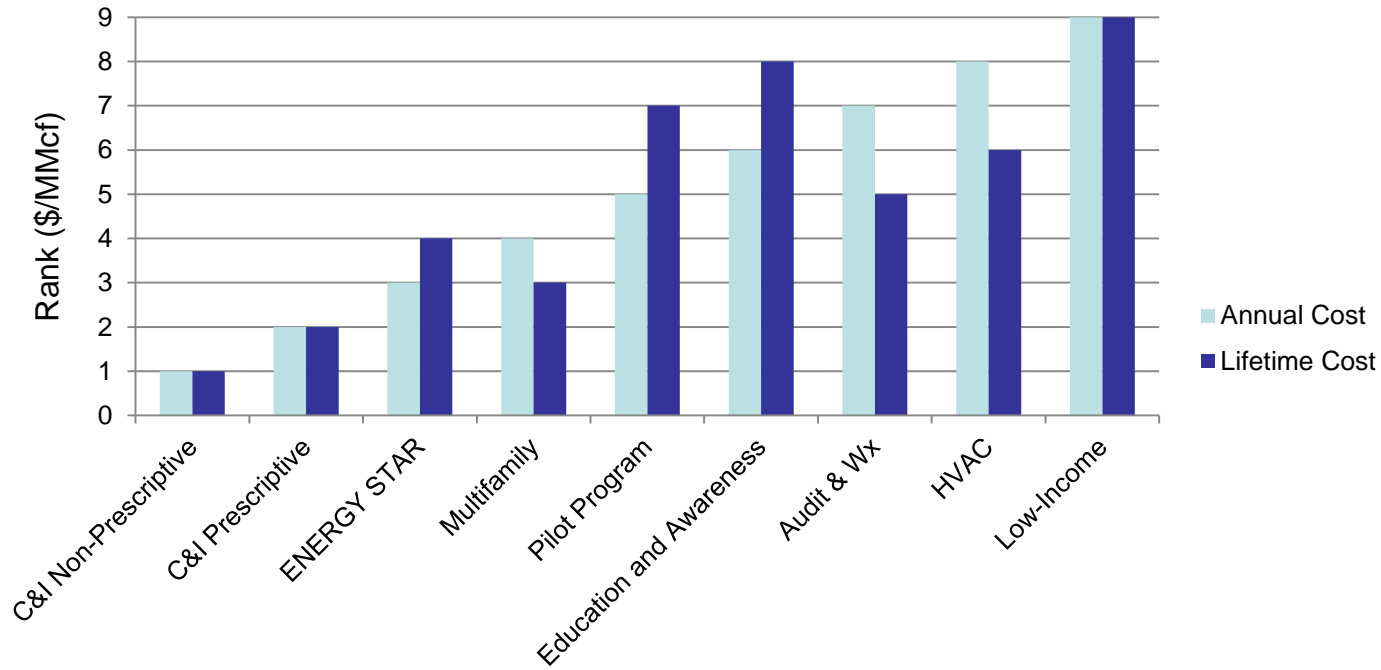
2012 Program Data—DTE Electric

DTE 2012 Program Cost per MWh - Rank by Program



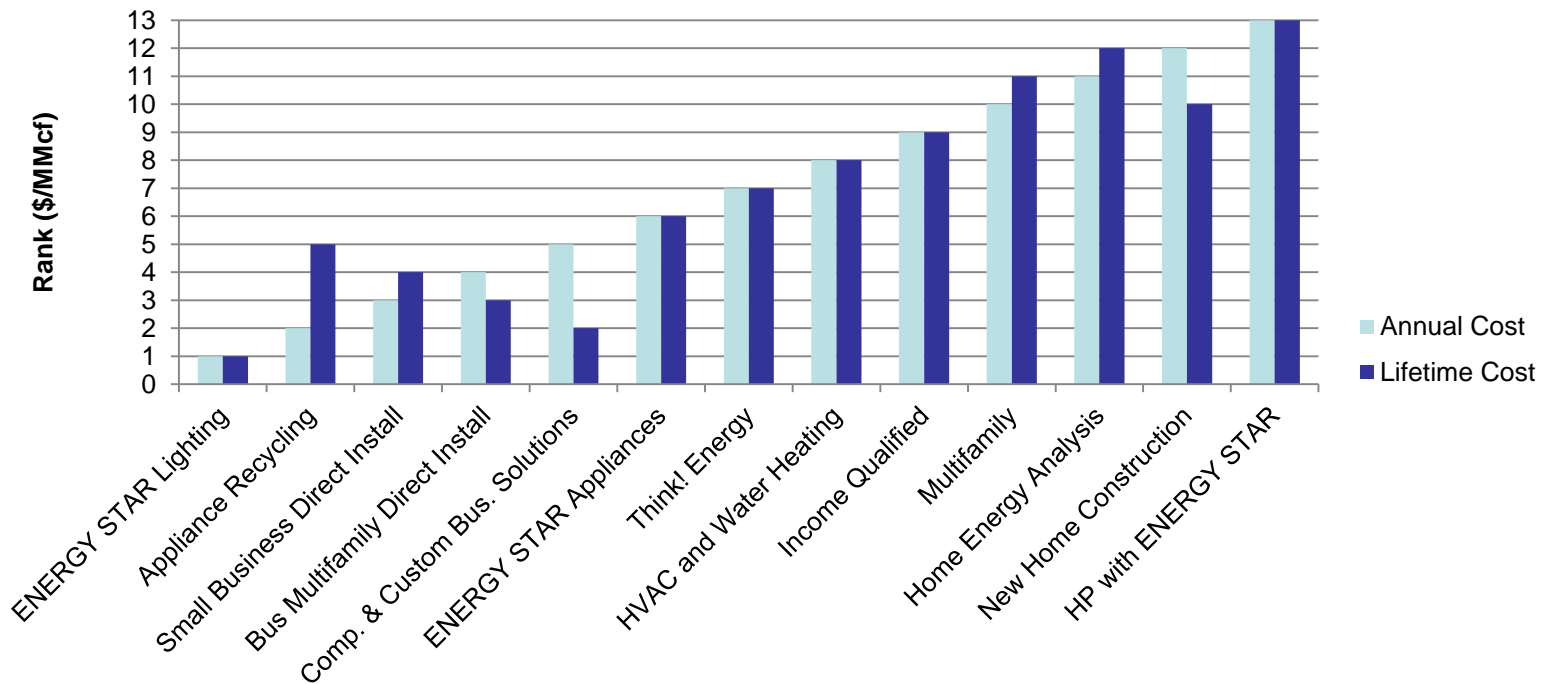
2012 Program Data—DTE Gas

DTE 2012 Program Cost per Mcf - Rank by Program



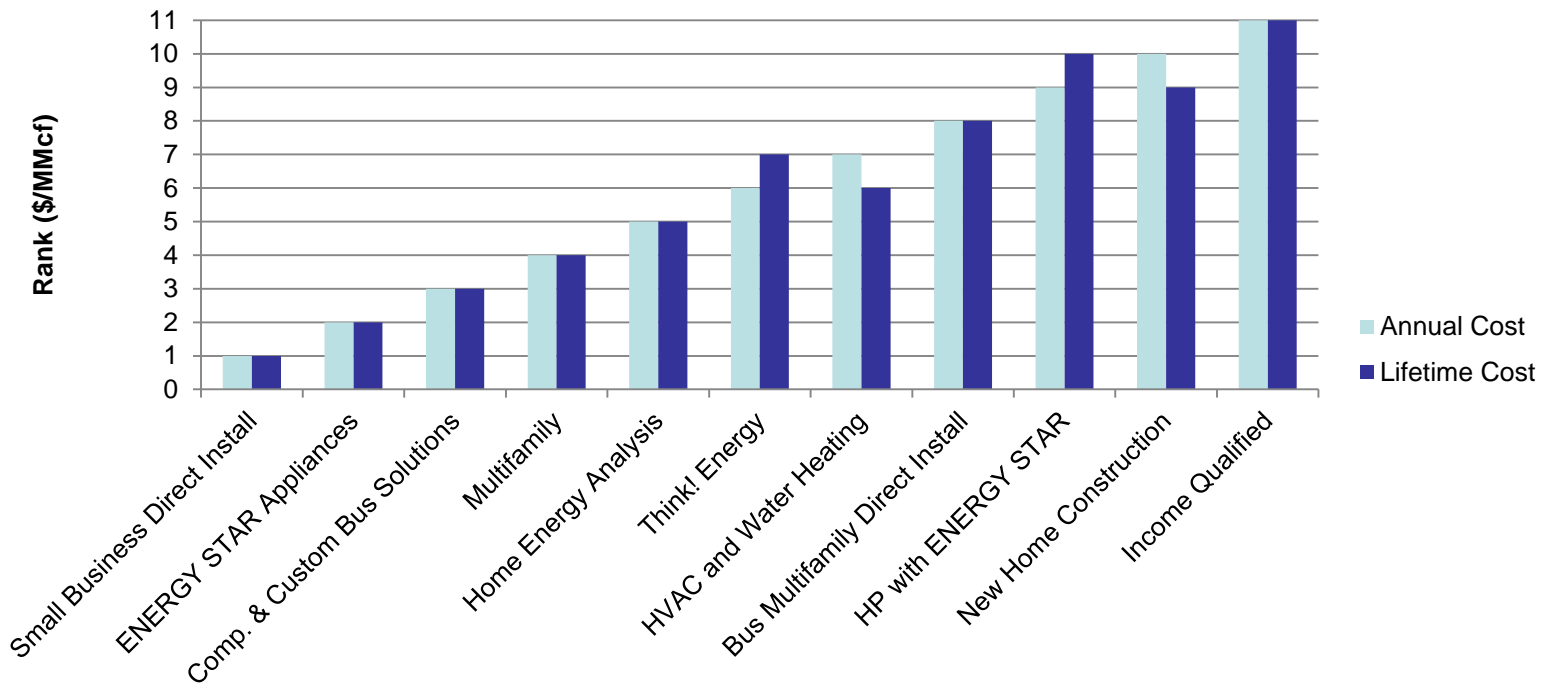
2012 Program Data—Consumers Energy Electric

CE 2012 Electric Cost per MWh - Rank by Program



2012 Program Data—Consumers Energy Gas

CE 2012 Gas Cost per Mcf - Rank by Program



2013-2015 Forecast Trends—DTE*

- ▶ The average measure life of DTE’s efficiency portfolio savings is forecast to be about 10% lower in the 2013 than it was in 2012 .
- ▶ In general, the mix of savings forecast by DTE for 2014 and 2015 is very similar to the mix shown above for 2013.

DTE Portfolio-Level Electric Average Measure Life, 2012 - 2015

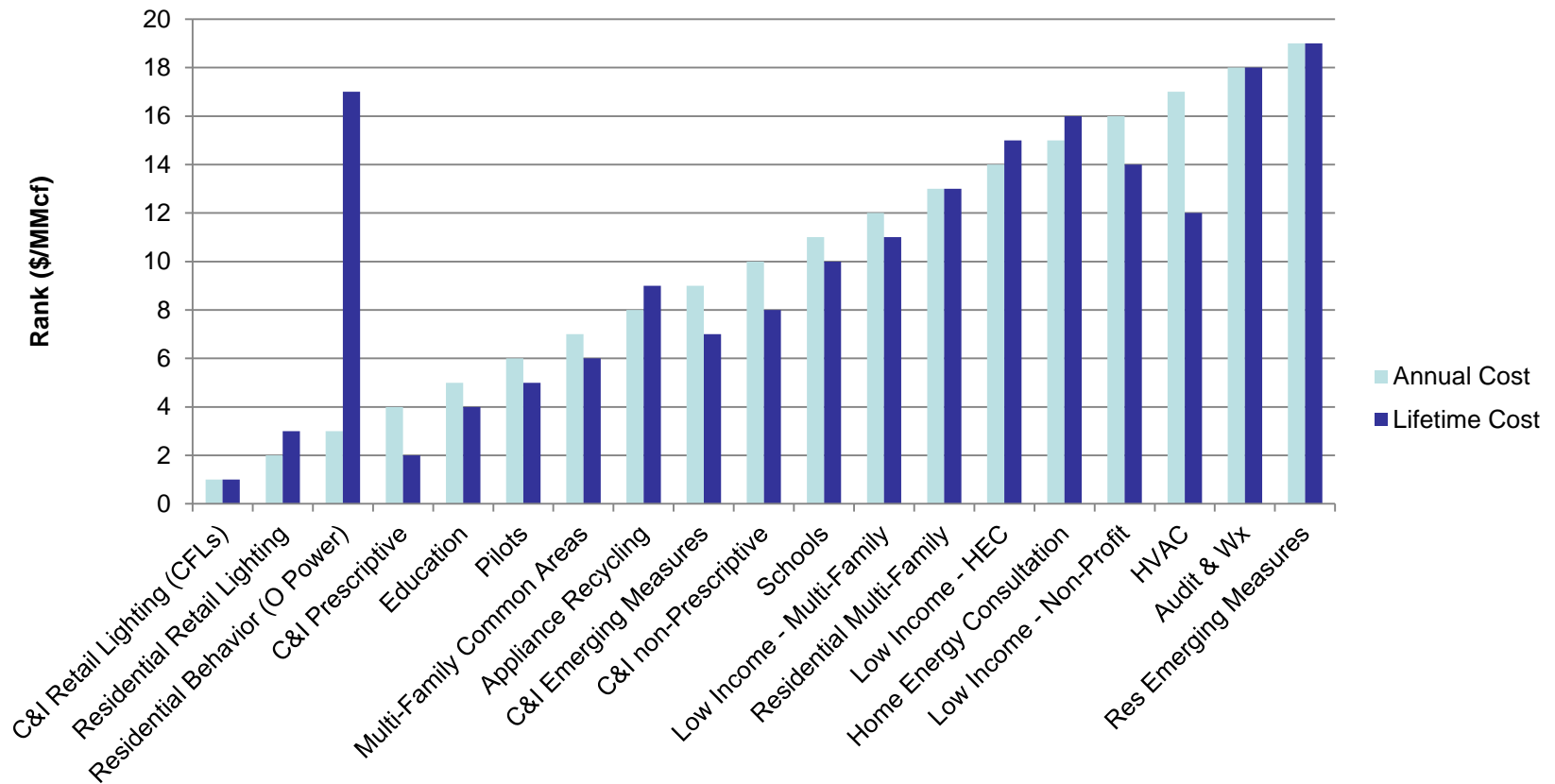
Year	2012	2013	2014	2015
Average Life	10.1	9.0	9.2	9.2

- ▶ The decrease is largely driven by addition of residential behavior and Commercial CFL programs.

* We have not verified that the assumptions used by the utilities in their forecasts are accurate or consistent with the Michigan Efficiency Measures Database.

2013 Program Forecast — DTE Electric

DTE 2013 Electric \$/MWh - Rank by Program



2013-2015 Forecast Trends—Consumers

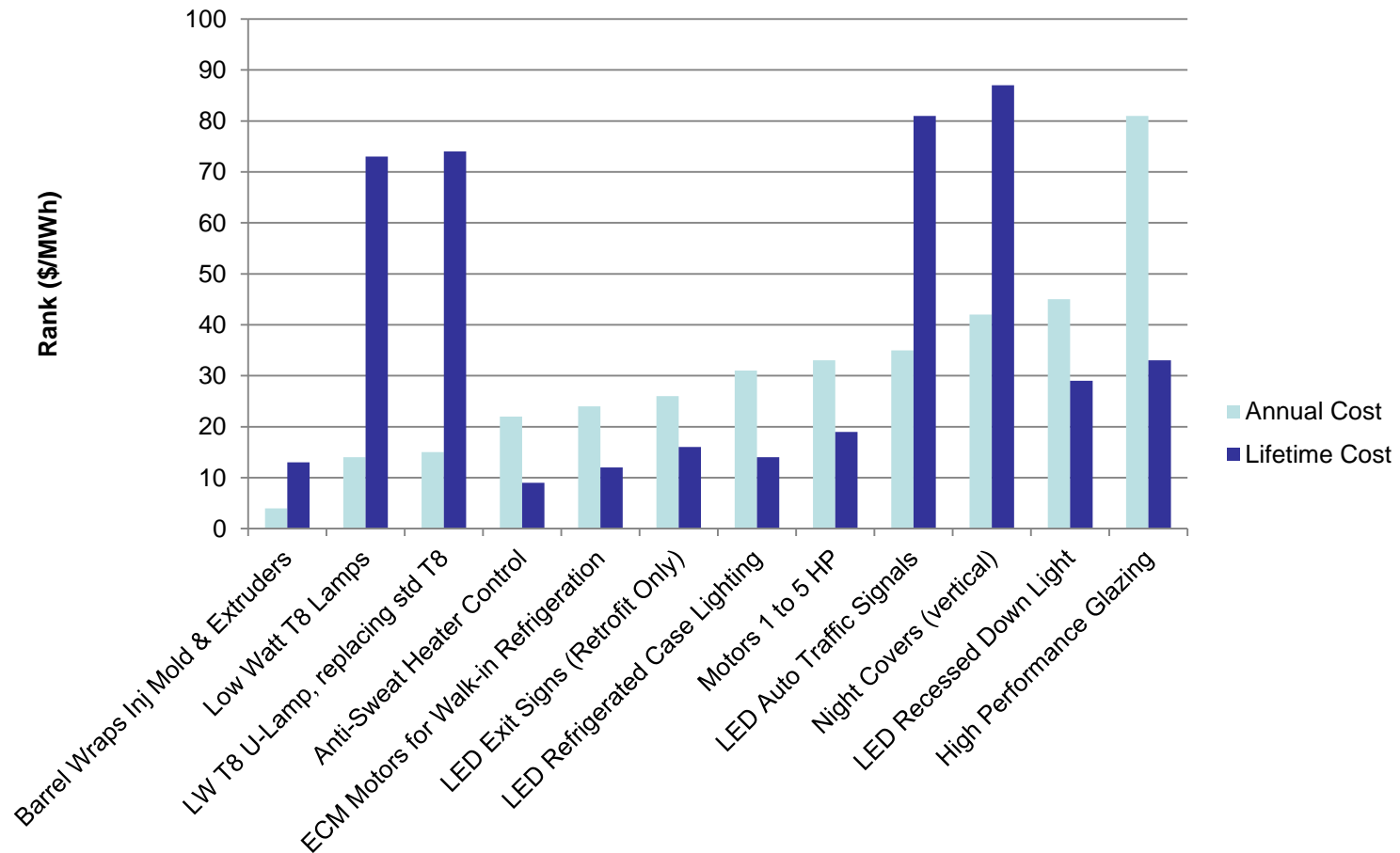
- ▶ In general, the mix of savings forecast by Consumers for 2013-2015 is very similar.
- ▶ As a result, CE forecasts the average measure life for the portfolio of savings to be nearly identical in 2014 and 2015 to what it is forecast to be for 2012
- ▶ For both electricity and gas it appears as if CE projects the average measure lives to increase modestly over 2012 levels.

Portfolio-Level Average Measure Life, 2012 - 2015

Year	2012	2013	2014	2015
Average Life (Electric)	10.5	11.1	11.1	11.1
Average Life (Gas)	11.8	12.4	12.3	12.2

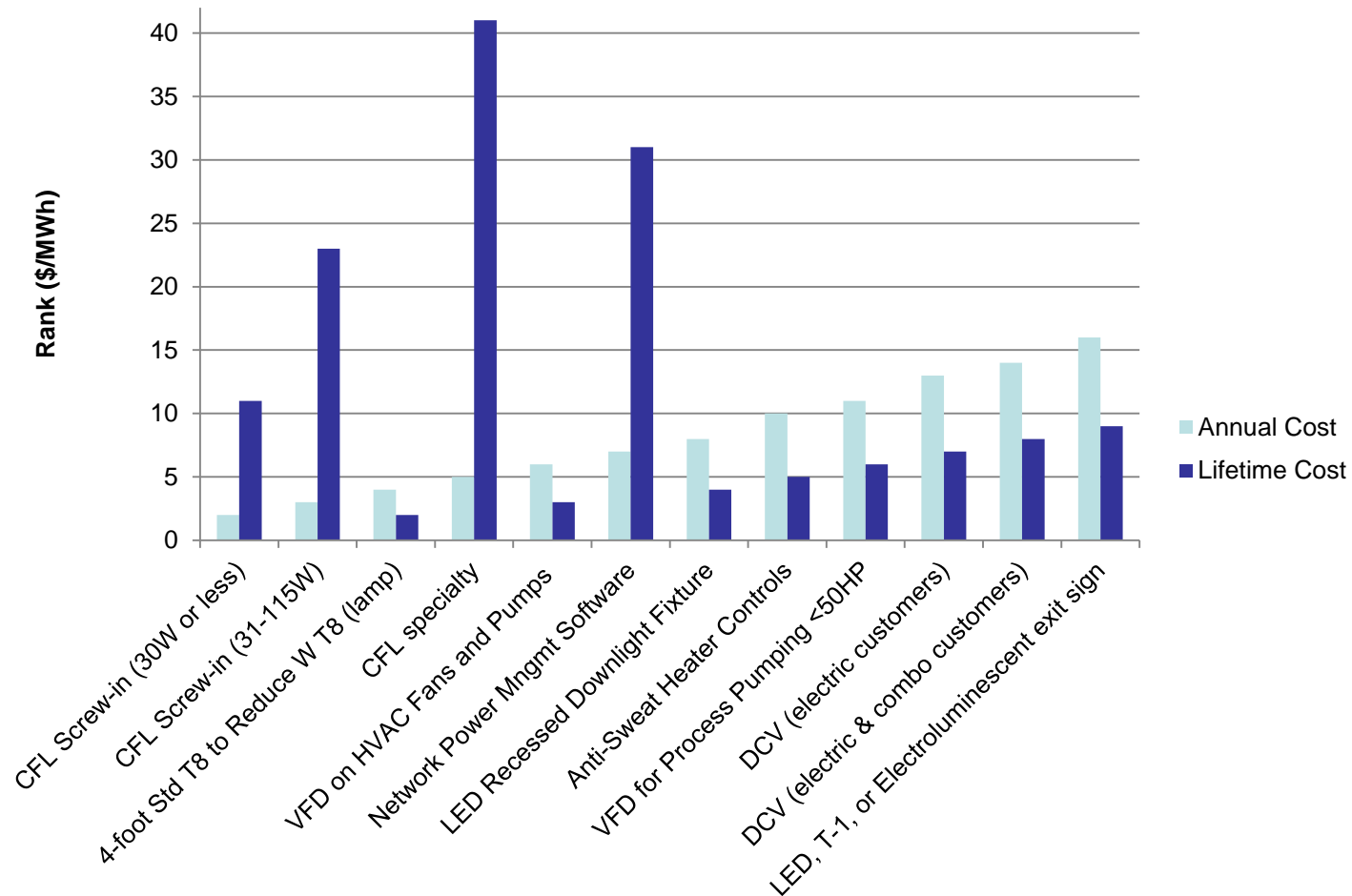
Measure-Level Analysis – DTE 2013 C&I Prescriptive Program

DTE Selected C&I Prescriptive Measures \$/MWh - 2013 Forecast
(Rankings out of 117 Measures)



Measure-Level Analysis – CE 2013 C&I Prescriptive Program

CE Selected C&I Prescriptive Measures \$/MWh - 2013 Forecast
(Rankings out of 49 Measures)



Measure Life Jurisdictional Comparison

- ▶ Average measure lives range from a little less than 9 years to a little more than 12 years.
- ▶ DTE's forecast average measure life is at the low end of that range and about 20% lower than Consumers' average
- ▶ Consumers' average life appears to be consistent with most of the others.

Electric Average Measure Lives in Various Jurisdictions

Program Administrator	Source	2012	2013	2014	2015
DTE	2012 Actuals, 2013-15 Plan	10.1	8.8	9.0	9.0
Consumers Energy	2012 Actuals, 2013-15 Plan	10.5	11.1	11.1	11.1
Efficiency Vermont	2012 Actuals	11.2	n.a.	n.a.	n.a.
NSTAR (MA)	2012 Actuals	11.7	n.a.	n.a.	n.a.
Commonwealth Edison (IL)	PY4-PY6 Plan 6/2011 to 5/2014)		8.6		n.a.
Focus on Energy (WI)	2012 Actuals	11.0	n.a.	n.a.	n.a.

Data Analysis — Conclusions

- ▶ 2012 program rankings don't change much w/focus on \$/lifetime savings
- ▶ 2013 program portfolios include some programs whose value would change significantly with focus on \$/lifetime savings
- ▶ Program rankings obscure other issues:
 - Rankings of measures within programs can change a lot
 - MEMD measure life assumptions seem problematic in some cases
 - 9 years for CFLs
 - Apparent historic cap of 20 years on other measures (e.g. insulation)
- ▶ Modifying current goal structure to focus on lifetime savings rather than 1st year savings is warranted.
 - Would give utilities proper incentives on how to structure EO portfolios
 - Would provide incentive for equal focus on measure life as on kWh and therms in MEMD

Alternative Energy Savings Goal Options

1. Annual Lifetime Savings
2. Discounted Annual Lifetime Savings
3. Net Present Value of Net Benefits
4. Cumulative Annual Savings Over Multi-Year Period
5. 1st Year Savings Goals with Short-Lived Measure Limits
6. 1st Year Savings Goals with Bonuses/Penalties for Short/Long-Lived Measures
7. 1st Year Savings Goals with Average Measure Life Adjustment Factor

Annual Lifetime Savings

- ▶ Goals set based on lifetime savings achieved each year.
- ▶ PA performance measured relative to the total savings they produce over the life of the efficiency measures installed.
- ▶ Primary metric in WI and Ontario (gas only)

- ▶ Hypothetical:
 - If a furnace saves 100 therms of gas per year for 20 years, then the lifetime savings for that measure installation in a given year would be 2000 therms.

Annual Lifetime Savings

▶ Advantages:

- Conceptually easy to explain and understand
- Preserves annual goal construct, allows for annual “report card” and cost recovery/performance incentives
- Simple to calculate using data that utilities already routinely collect and evaluate
- Values all of the savings that efficiency measures will produce over their lives equally
- Preserves utility flexibility in being able to choose a balanced portfolio that can support short-lived measures as well, so long as they have a plan that meets the overall target

▶ Disadvantages:

- Does not discount the value of future savings—i.e. treats savings 20 years from now as just as valuable as savings this year
- Harder to put goals in context (e.g. relative to annual sales)

Discounted Annual Lifetime Savings

- ▶ Same as the annual lifetime savings metric except that a real discount rate is applied to future year savings (consistent with how we value lifetime avoided cost benefits)
- ▶ No known examples
- ▶ Hypothetical:
 - Using a 5% real discount rate, an efficient furnace that saved 100 therms/year for 20 years would have a discounted lifetime value of 1309 therms. Using a 5% discount rate, 1 unit of savings is worth 13.09 units over 20 years, 10.90 units over 15 years, 8.11 units over 10 years and 4.55 units over 5 years.

Discounted Annual Lifetime Savings

▶ Advantages

- Values all of the savings that efficiency measures will produce over their lives rather than just the first year of savings
- Preserves annual goal construct and other features of undiscounted annual lifetime savings
- *Could* be a better reflection of the economic value of the savings, and aligns with traditional economic valuation of future savings (but maybe not – depends on avoided costs)

▶ Disadvantages

- More complicated. Requires additional calculations and reduces transparency
- Discounting factors could change over time as the real discount rate changes – reduces transparency and consistency, and the value of planning and evaluation data for forecasting and other purposes

Net Present Value of Net or Gross Benefits

- ▶ Goals expressed in terms of NPV net or gross benefits rather than physical units of energy
- ▶ Short and long-lived measures are valued consistently in proportion to the lifetime benefits that they provide to the economy
- ▶ In theory, focuses utilities on maximizing net benefits (or gross benefits with a given budget constraint) which is primary goal of DSM
- ▶ Several jurisdictions in New England have this as one of several performance metrics (for shareholder incentives)

Net Present Value of Net Benefits

▶ Advantages:

- Adjusts for the life of the savings, as well as the value to the system of savings in different years, the value of savings during different seasons and times of day, the time value of future savings, and for the cost of acquiring the savings
- Sends a single, clear, signal with a single metric of dollars that can be used for combined electric and gas goals, where appropriate.

▶ Disadvantages

- Potential for disagreements over calculation of benefits, avoided costs, load shapes, measure costs, etc.
- More burdensome to track
- Setting goals requires more extensive analysis and potentially deeming of values, and reduces transparency

Cumulative Annual Savings over Multi-Year Period

- ▶ Utility performance measured relative to the total annual savings that are still being realized in the final year of a multi-year period
- ▶ Metric of European Union's recent Energy Efficiency Directive

- ▶ Hypotheticals:
 - For efficient furnace that produced 100 therms of savings for 20 years in each of the five years of a program (1 furnace/year, five furnaces total), cumulative annual savings in year 5 would be 500 therms (all savings still existing in year 5).
 - For a behavioral program that produced 10 therms of savings that lasted only one year, cumulative annual savings after five years of implementation would still only be 10 therms (only new year 5 savings still exist)

Cumulative Annual Savings over Multi-Year Period

▶ Advantages

- Focuses utilities on actual cumulative impacts of DSM on loads at end of planning period, rather than annual accounting
- Inherently puts a value to PAs on longer lived measures

▶ Disadvantages

- Metric creates a binary value to savings – either they still exist in end year or not.
- Does not distinguish between the value of measures with moderate lives and the value of those with long or very long lives
- Create perverse incentives both early in the period as well as toward the end of the period, unless it is somehow combined with annual goals (e.g., a 1 year measure life has no value until last year of a period, and then becomes as valuable as a 30 year measure)

First Year Savings Goals with Short-Lived Measure Limits

- ▶ A cap or limit is placed on the share of savings allowable from short lived measures that can be counted towards the first year savings target.
 - Can be done with explicit bans, or a required overall average measure life minimum.
- ▶ Used in several European countries
- ▶ Hypothetical:
 - Require that no more than 10% of savings come from measures with lives of five years or less.

First Year Savings Goals with Short-Lived Measure Limits

▶ Advantages

- Curbs incentives for excessive promotion of inexpensive and very short-lived savings
- First year savings are easy to understand and easy to put into context
- Preserves annual goal setting construct

▶ Disadvantages

- It is a blunt instrument: i.e. no distinction is made between measures with lives of 6 or 7 years and measures with lives of 20 or 30 years if simply a cut-off level.
- Doesn't distinguish between the relative cost-effectiveness and value of different efficiency measures.
- Potentially reduces utility flexibility and could result in suboptimal outcomes.

First Year Savings Goals with Bonuses/Penalties for Long/Short-Lived Measures

- ▶ Provides bonuses for long-lived measures and/or penalties for short-lived measures.
- ▶ Used in Denmark

- ▶ Hypothetical:
 - Require that 1st year savings from measures with lives of 5 years or less be multiplied by 0.5 and savings from measures with lives of 15 years or more to be multiplied by 1.5.
 - An efficient furnace that saves 100 therms/year for 20 years would count as 150 therms towards a first year savings target and a behavior program that saved 20 therms for only one year would count as 10 therms towards the first year savings target.

First Year Savings Goals with Bonuses/Penalties for Long/Short-Lived Measures

▶ Advantages

- Reduces incentives to promote resources that are inexpensive on a first year basis but that are not as cost-effective on a lifecycle basis while increasing incentives for resources that are cheaper on a life-cycle basis
- Preserves construct of annual first year savings which are easy to understand and easy to put into context

▶ Disadvantages

- Still a somewhat blunt instrument--If there is a single threshold for defining a “short-lived measure” and a single penalty multiplier, as well as a single threshold for defining a long-lived measure, some perverse signals can be sent (in theory if every measure life had a unique adjustment this could be avoided).
- Adds data calculation complexity and potential for disagreements about measure lives, particularly those very close to a cut-point level.

First Year Savings Goals with Average Measure Life Adjustment Factor

- ▶ Establish an average measure life expectation and related total savings adjustment factor that is applied at the portfolio level, along with the 1st year savings target.
- ▶ No known examples.
- ▶ Hypothetical:
 - A utility with a first year savings goal of 100,000 MWh with an average life of 10 years achieved only 90,000 but with an average life of 12 years.
 - The savings achieved would be given a 20% bonus (i.e. a multiplier of 12 divided by the expected 10) and the goal would have been exceeded (108,000 MWh after adjustment).

First Year Savings Goals with Average Measure Life Adjustment Factor

► Advantages:

- Scalable nature provides the right level of incentive to all efficiency measures regardless of their useful life
- Retains the communication advantages of a 1st year savings goal while preserving existing annual goals and reconciliation construct
- Preserves utility flexibility to weigh lifetime savings with other objectives and focus on the overall mix of resources that optimizes the portfolio

► Disadvantages

- We do not see any major disadvantages

Applicability of Savings Goals to Small Utilities

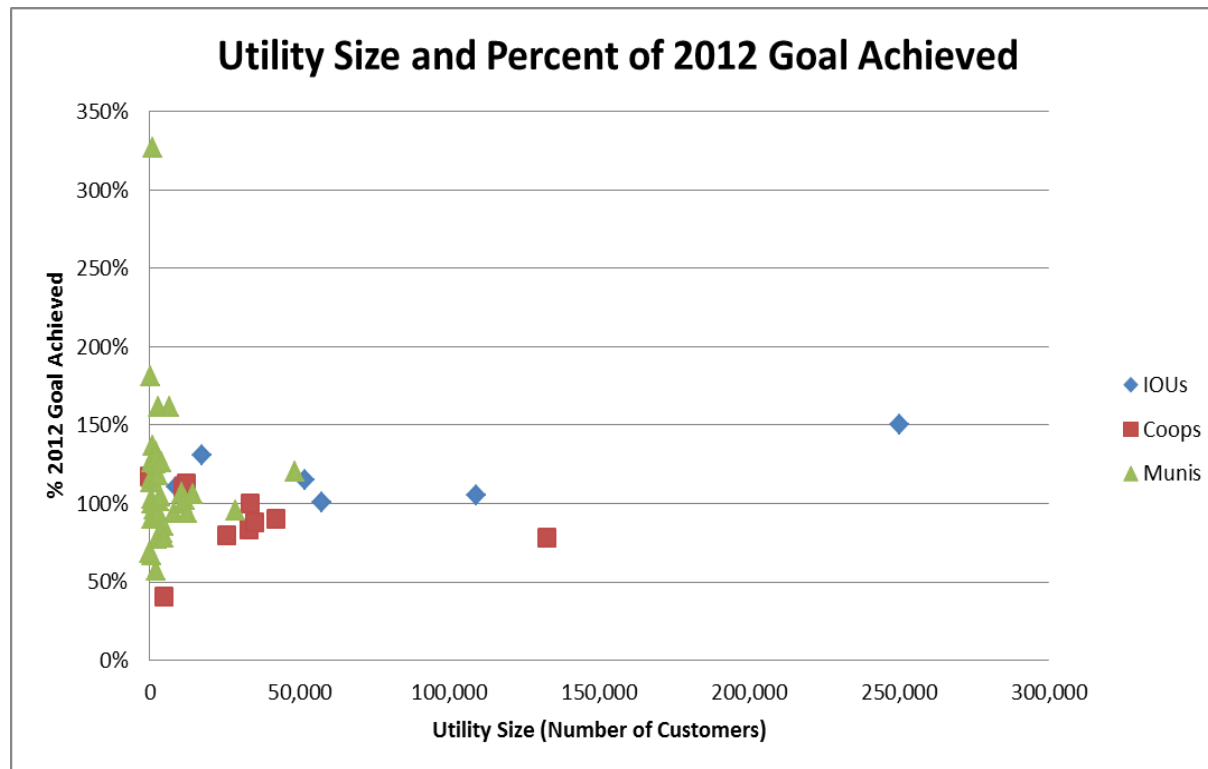
- ▶ MPSC asked us to investigate whether savings goals were a greater and perhaps unreasonable burden on small utilities and whether they should have modified goals that are lower than the IOUs.
- ▶ Analysis of small utilities' efficiency program savings goals and performance data suggests that savings targets similar to those of large utilities are achievable.
- ▶ With a savings goal of 1 percent of sales in 2012 (following a 3 year ramp-up period), the average percent of this goal achieved by the 57 small electric utilities was 111 percent. The 4 small gas utilities achieved an average of 153 percent of a 0.75 percent four year savings target.

Variation in Goal Achievement

- ▶ Savings performance varies by type of small utilities and participation in Efficiency United (EU).
 - Average goal achievement was >100% for IOUs and Munis vs. 90% for Co-ops.
 - Efficiency United members achieved greater savings than the non-EU utilities (122% vs. 105%).
 - Goal achievement was widely variable for non-EU utilities, while every EU utility met over 100 percent of the savings target with a range of 102% to 182%.

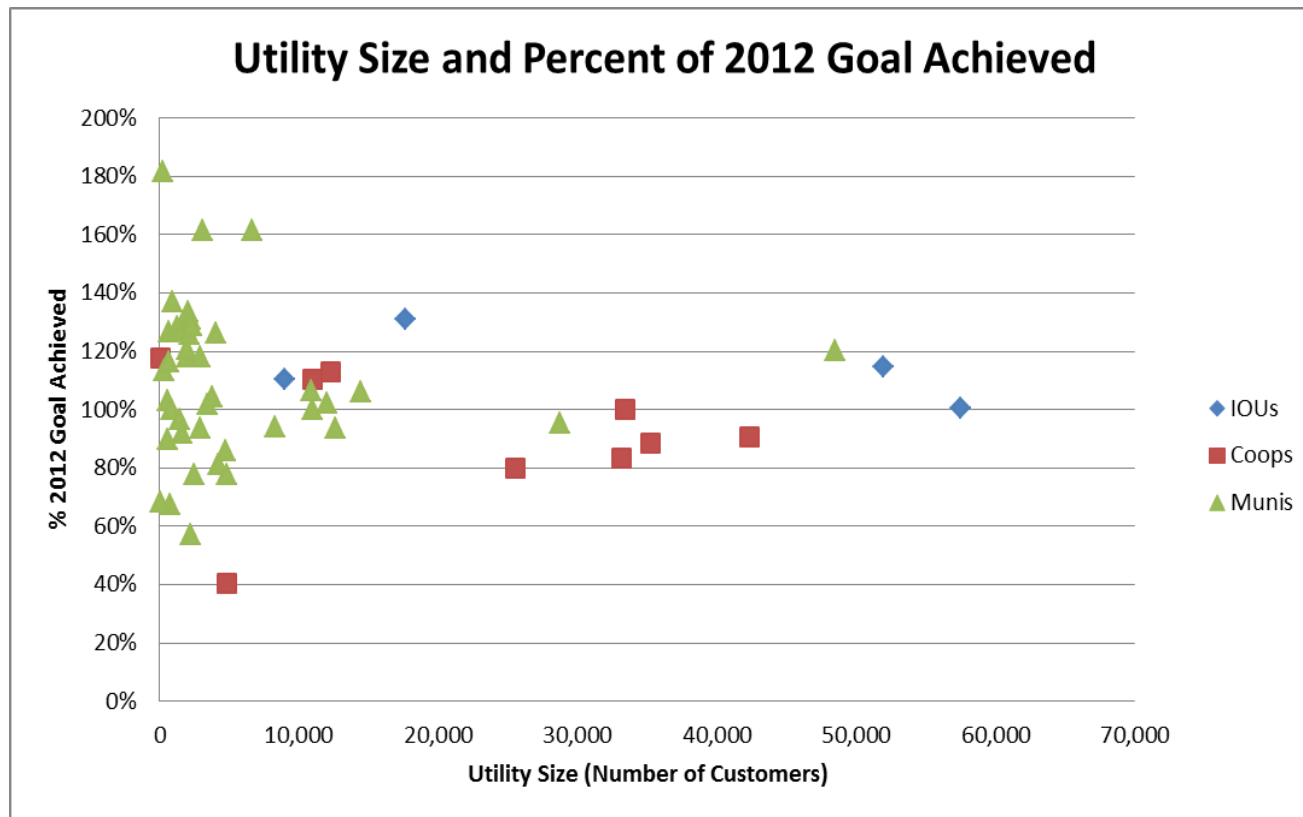
Goal Achievement as a Function of Utility Size

- ▶ Analysis of the data suggests that utility size does not appear to be a primary driver of performance outcomes. However, it does appear that variation tends to increase for small utilities.



Goal Achievement as a Function of Utility Size

- ▶ Removing the three largest utilities and the utility that achieved over 300 percent of its saving goal



Small Utility Performance Beyond Michigan

- ▶ Performance outcomes from communities participating in Efficiency Smart in Ohio (consortium of numerous small municipal utilities) largely corroborate the results in Michigan
- ▶ The three-year service period, beginning in 2011, was designed to save participants 81,000 MWh by the end of 2013
- ▶ Achievements
 - 2012, the program achieved more than 140 percent of its performance target for that year and almost 75 percent of its three-year energy savings goal
 - Exceeded three year goal in March of 2013

Recommendations

- ▶ Use 1st year savings goal with average measure life adjustment factor at the portfolio level
- ▶ Revisit MEMD measure life assumptions for some measures
- ▶ Maintain consistent goals for all utilities independent of size. Given the greater chance for significant variation from year-to-year, consider multi-year goals that allow small utilities to handle ups and downs.
 - Worth considering for larger utilities too (more flexibility)



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Thank You

Questions?

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