Integrated Resource Planning Stakeholder Outreach Meeting March 17, 2017

Energy Waste Reduction and Demand Response

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MPSC
Michigan Public Service Commission

Agenda

9:00-10:15 Energy Waste Reduction Potential

10:15-10:30 Break

10:30-Noon Demand Response Potential

PA341 – EWR Potential

- PA 341 Section 6t.(1)(a)-(h) – Describes process for obtaining, and components of, the statewide modeling parameters for IRP.

- Section 6t. (a) Conduct an assessment of the potential for energy waste reduction in this state, based on what is **economically and technologically feasible**, as well as what is **reasonably achievable**.

To be reassessed every 5 years

Formal IRP Proceeding

Between August 18 - December 18, 2017

- Commission-initiated docket in August
  - Expected to direct Staff to post initial drafts
  - Announcement of Sept 2017 public hearing dates/locations
  - Expected deadline for written comments in the docket through the end of October
  - Expected to direct Staff to file a report summarizing written and verbal comments and making any recommended revisions to the initial Straw Man proposal by mid-November
  - Expected Commission Order in December

Informal IRP Proceeding

Between March 17, 2017 - July, 2017

Goal: Develop a Straw Man proposal with as much consensus as possible prior to the formal proceeding

How:

→ Divide into workgroups

→ Workgroups will develop recommendations for, and receive feedback from, the larger stakeholder group (all of you)

→ Workgroups may revise recommendations based upon stakeholder feedback

→ MPSC Staff will assimilate all of the workgroup recommendations and combine into a Straw Man proposal that would be available for review and comment by stakeholders in July (PRIOR to the formal proceeding)

Michigan's Potential

How to determine Michigan's energy efficiency potential for IRP process with funding and time constraints

Update Michigan EE Potential Study conducted in 2013, by GDS Associates, Inc.

Leverage current studies completed by GDS Associates, Inc. for Consumers Energy and DTE Energy for EWR programs.

Overview of Prior EE Studies

GDS – Dick Spellman
Overview of 2013, 2016 Potential Studies

GDS Associates, Inc.
ENGINEERS & CONSULTANTS

Consumers Energy and DTE Energy Energy Efficiency Potential Studies

March 17, 2017

ENERGY EFFICIENCY

Consumers Energy and DTE Energy

Energy Efficiency Presentation

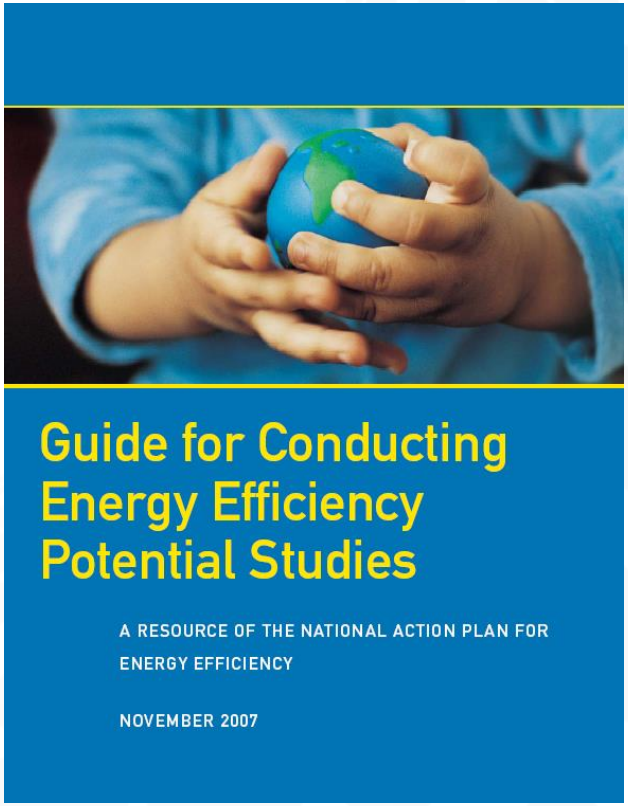
Presentation Overview

- What is a Potential Study?
- Energy Efficiency Potential Study Objectives
- Study Methodology
- Study Results
- Q & A

What is a Potential Study?

Simply put, a potential study is a quantitative analysis of the amount of energy savings that either exists, is cost-effective, or could be realized through the implementation of energy efficiency programs and policies.

-National Action Plan for Energy Efficiency



EE Potential Study Objectives

- Conduct a 20-year energy efficiency (EE) potential study to determine the technical, economic and achievable EE potential
- Identify the costs and benefits of all cost-effective EE programs

STUDY METHODOLOGY

Consumers Energy and DTE Energy

2016 Energy Efficiency Potential Studies

Measure Development

- Over 560 total measures considered
- Key data source: Michigan Energy Measures database (MEMD)
- Over 6,207 measure permutations
- Measure List reviewed by DTE Energy and Consumers Energy Staff

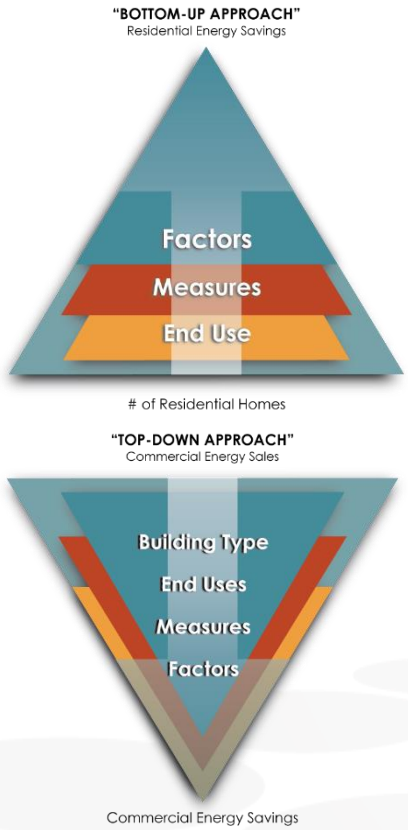
Key Assumptions

- Electric and Natural Gas Avoided Cost
- Inflation
- Discount Rate
- Planning Reserve Margin
- Line Loss Assumptions
- Detailed values for Global Assumptions for DTE and Consumers can be found in the Appendices of their Full Potential Study Reports

Data Sources

- **Baseline Data Sources**
  - 2014 Consumers Energy Residential Appliance Saturation & Home Characteristics Study
  - 2015 Consumers Energy Commercial Market Assessment Study
  - Energy efficiency baseline studies conducted by DTE Energy
  - 2009 EIA Residential Energy Consumption Survey (RECS)
  - 2012 EIA Commercial Building Energy Consumption Survey (CBECS)
  - 2010 EIA Manufacturing Energy Consumption Survey (MECS)

Quantifying Efficiency Opportunities



Residential Equation:

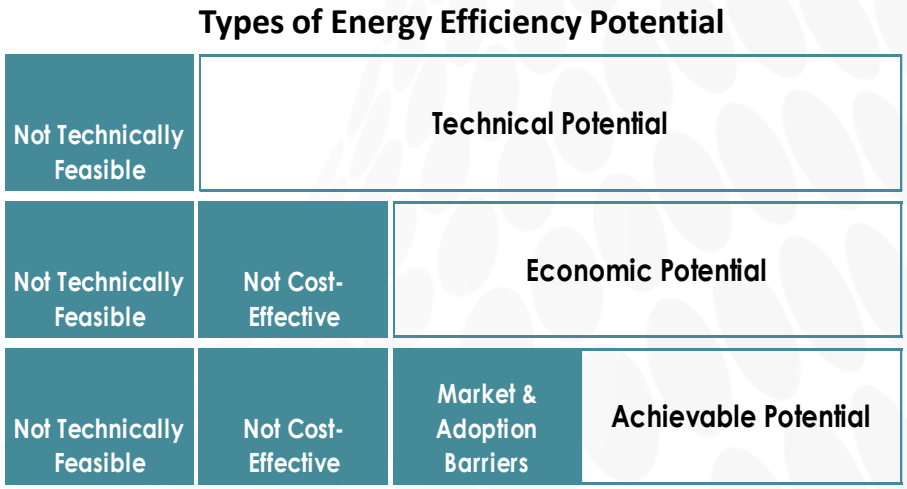
Technical Potential of Efficient Measure = Total Number of Households × Base Case Equipment End Use Intensity × Saturation Share × Applicability Factor × Savings Factor

Non-Residential Equation:

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

Types of Energy Efficiency Potential

- **Technical Potential:** All technically feasible measures are incorporated to provide a theoretical maximum potential.
- **Economic Potential:** All measures are screened for cost-effectiveness using the UCT Test. Only cost-effective measures are included.
- **Achievable Potential:** Cost-effective energy efficiency potential that can practically be attained in a real-world program delivery scenario, assuming that a certain level of market penetration can be attained.



Achievable Potential

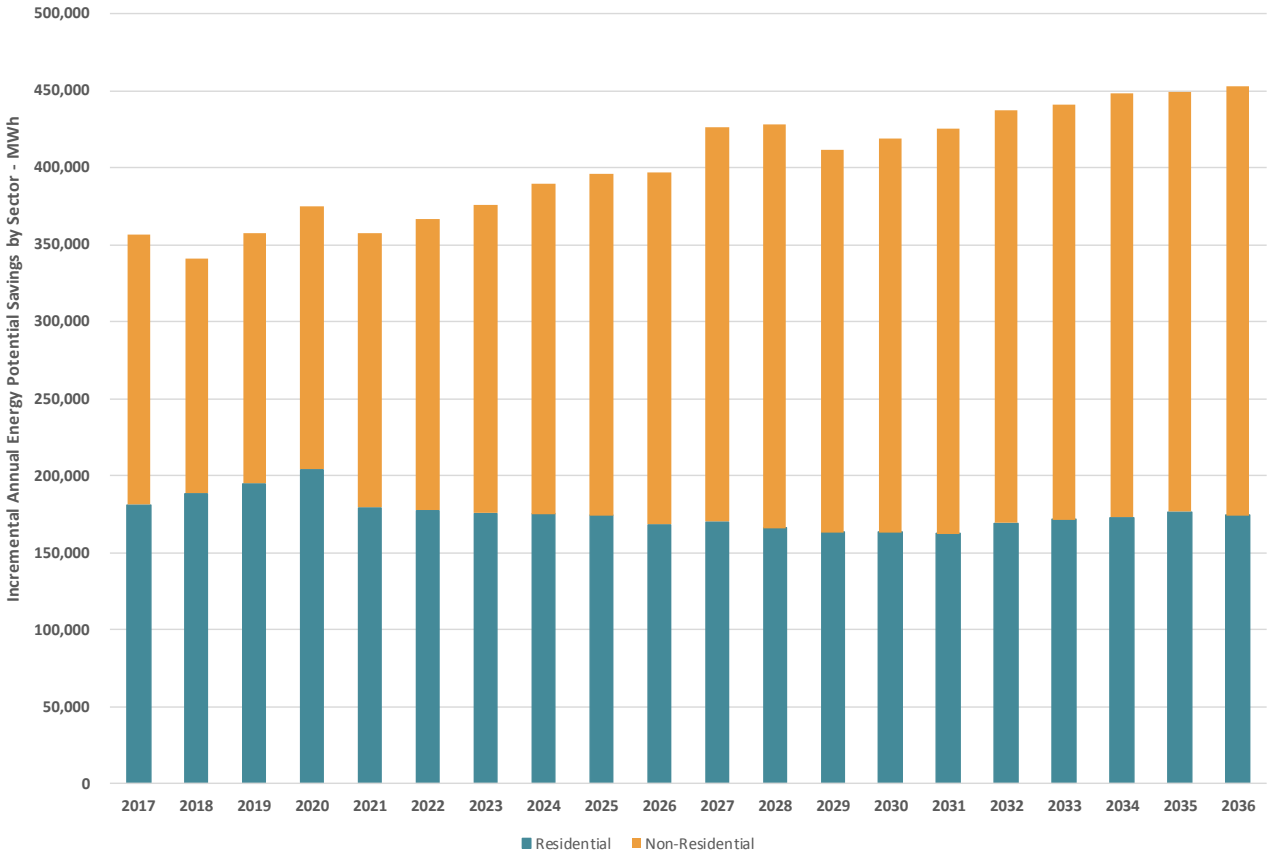
- **Achievable Potential**
  - Assumes incentives for program participants set at 50% of incremental measure costs and no budget constraints
  - Year-by-year estimates of achievable potential for a 20-Year period were estimated by applying market penetration curves to this long-term penetration rate estimate
  - Measure adoption rates based on prior DSM research regarding willingness to pay data collected through market adoption rate surveys and other utility program benchmarking
  - Adoption typically ramps up over time, until reaching maximum long term adoption rate determined by incentive levels

STUDY RESULTS

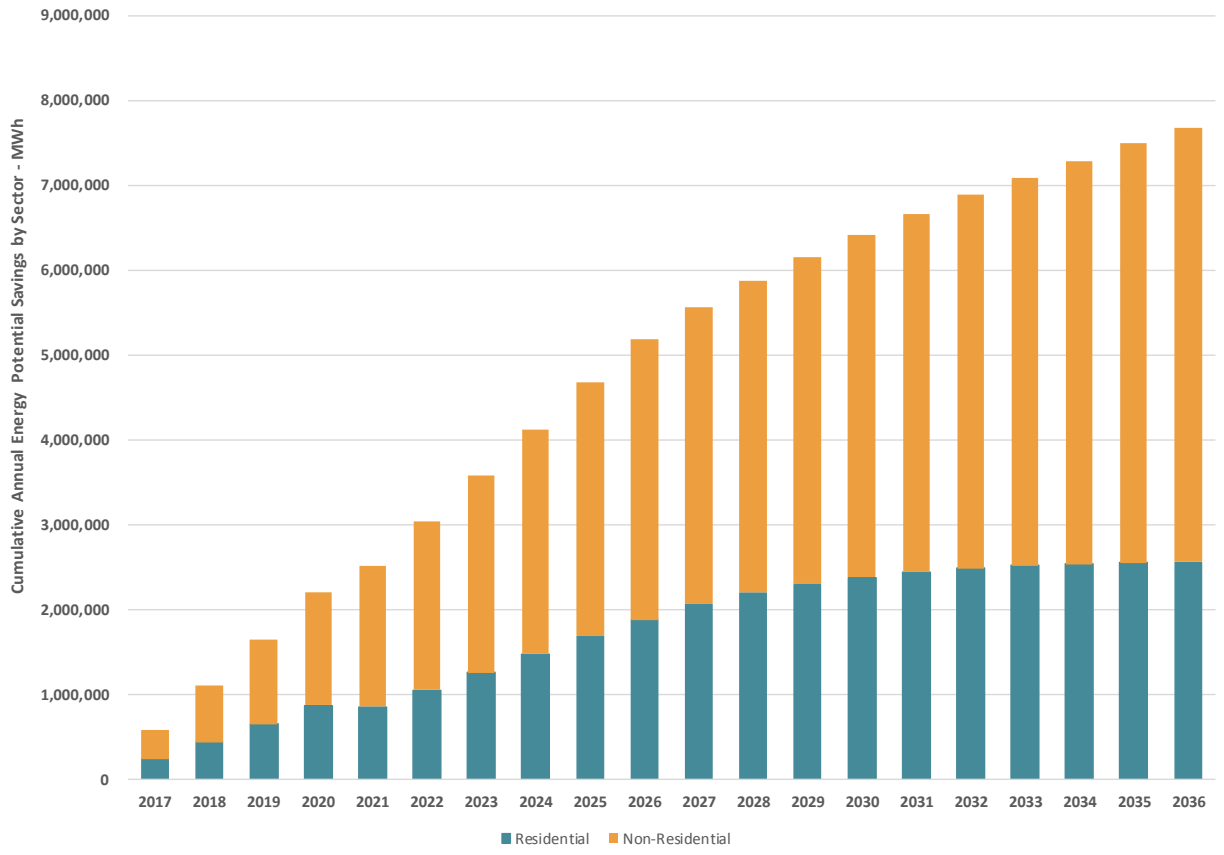
Consumers Energy and DTE Energy

Energy Efficiency Potential Studies

Consumers Energy Achievable Potential
Incremental Annual MWH



Consumers Energy Achievable Potential
Cumulative Annual MWH



Consumers Energy
EE Potential Study Results 10 and 20-Years

First 10-Years 2017-2026	Technical Potential	Economic Potential (UCT)	Achievable Potential (UCT)
Electric MWh Savings as % of Sales Forecast			
Savings MWh - Total	14,353,475	11,514,579	5,191,133
Savings % - of Total Sales	40.9%	32.8%	14.8%
Full 20-Years 2017-2023			
Electric MWh Savings as % of Sales Forecast			
Savings MWh - Total	14,685,802	11,770,925	7,684,742
Savings % - of Total Sales	39.1%	31.3%	20.5%

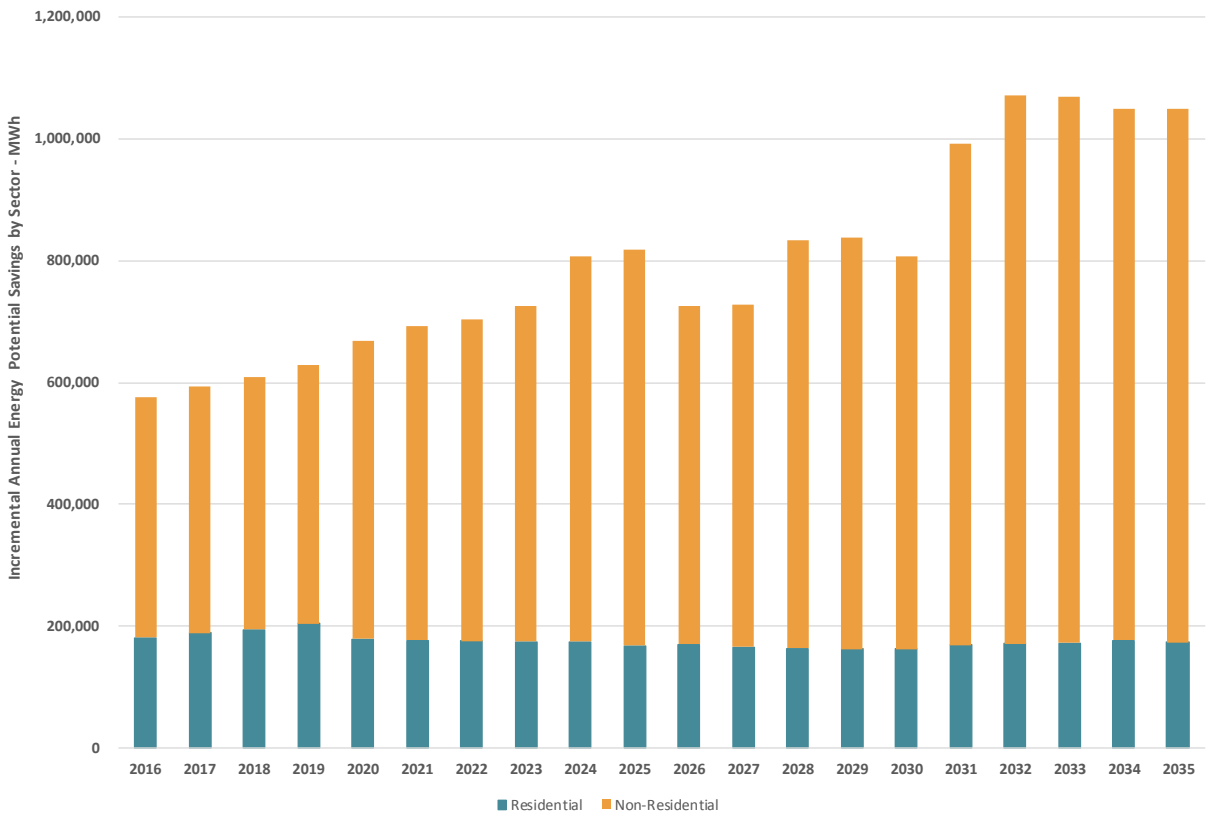
Consumers Energy
UCT Cost Effectiveness Results

UCT Benefit Cost Ratios for 2017 to 2026 Time Period				
Sector	**NPV $ Benefits ***	**NPV $ Costs ***	**Benefit/Cost Ratio**	**Net Benefits ***
Residential	$835,064	$429,731	1.94	$405,333
Commercial	$1,500,059	$377,835	3.97	$1,122,224
Industrial	$702,796	$156,269	4.50	$546,526
Total	**$3,037,919**	**$963,836**	**3.15**	**$2,074,083**

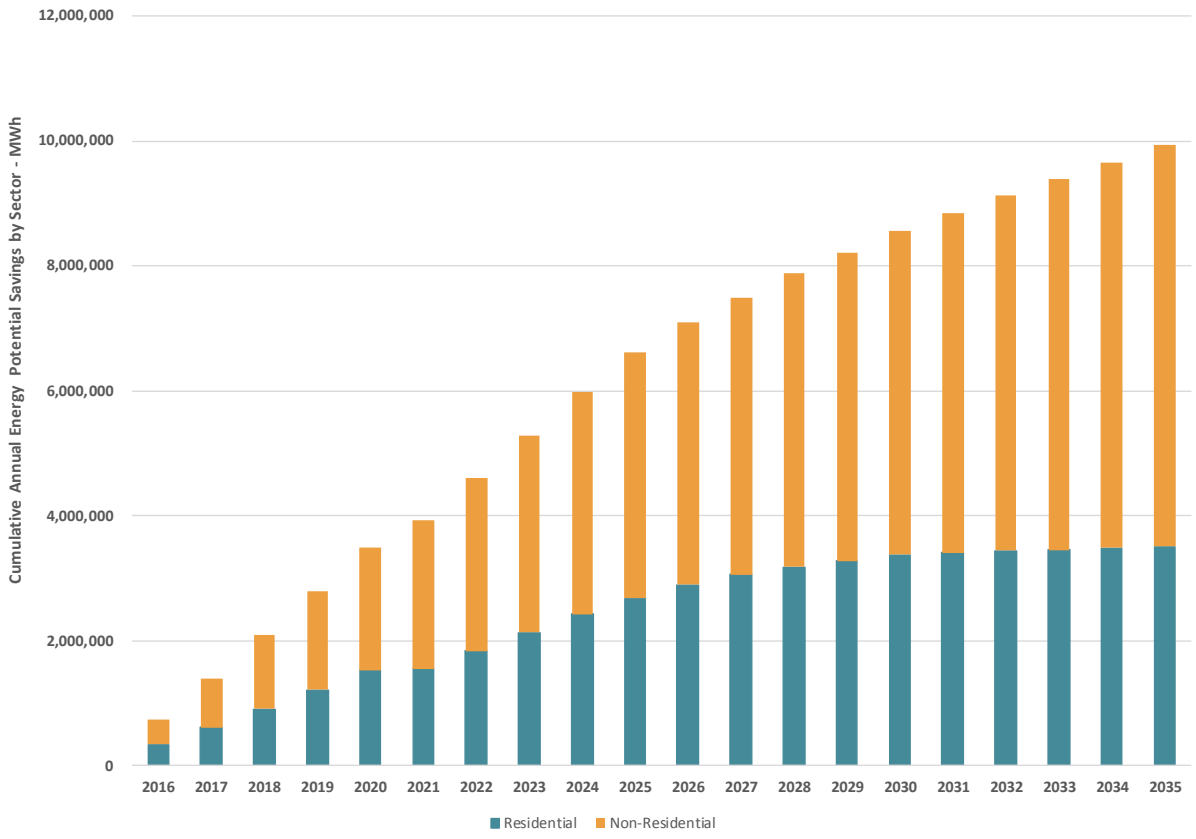
UCT Benefit Cost Ratios for 2017 to 2036 Time Period				
Sector	**NPV $ Benefits ***	**NPV $ Costs ***	**Benefit/Cost Ratio**	**Net Benefits ***
Residential	$1,449,797	$676,854	2.14	$772,944
Commercial	$2,723,451	$587,409	4.64	$2,136,042
Industrial	$1,332,670	$268,624	4.96	$1,064,046
Total	**$5,505,919**	**$1,532,887**	**3.59**	**$3,973,032**

*In thousands of dollars

DTE Energy Achievable Potential
Incremental Annual MWH



DTE Energy Achievable Potential
Cumulative Annual MWH



DTE Energy EE Potential Study Results
EE Potential Study Results 10 and 20-Years

First 10-Years 2016-2025	Technical Potential	Economic Potential (UCT)	Achievable Potential (UCT)	Constrained Achievable (UCT)
Electric MWh Savings as % of Sales Forecast				
Savings MWh - Total	21,516,078	18,347,737	6,614,952	4,670,013
Savings % - of Total Sales	40.8%	34.8%	12.5%	8.9%
Full 20-Years 2016-2035				
Electric MWh Savings as % of Sales Forecast				
Savings MWh - Total	22,332,621	18,867,765	9,932,173	7,135,944
Savings % - of Total Sales	42.2%	35.6%	18.8%	13.5%

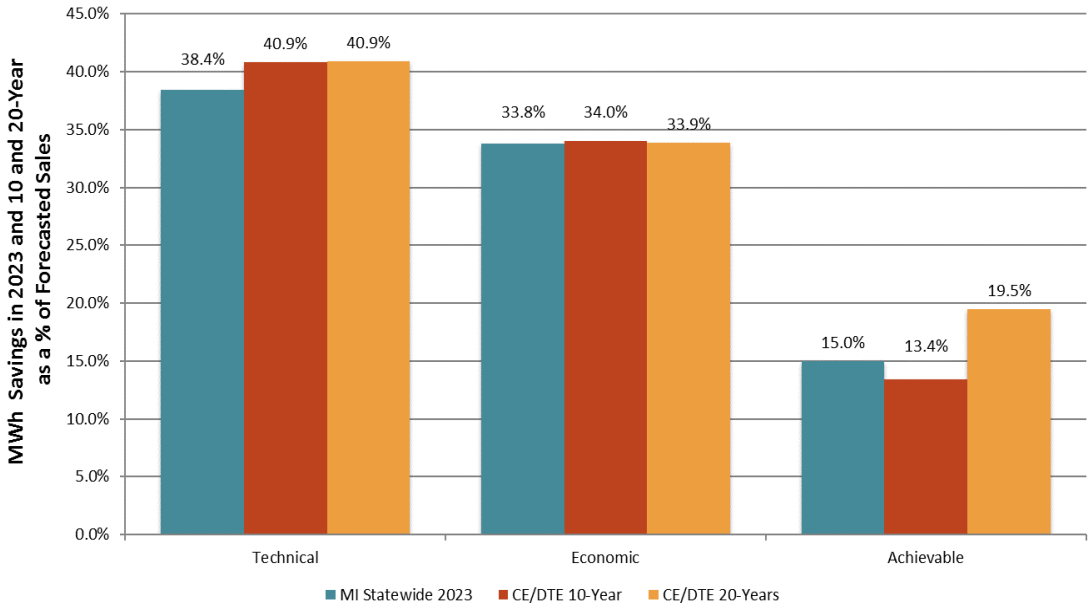
DTE Energy
UCT Cost Effectiveness Results

UCT Benefit Cost Ratios for 2016 to 2025 Time Period				
Sector	**NPV $ Benefits ***	**NPV $ Costs ***	**Benefit/Cost Ratio**	**Net Benefits ***
Residential	$1,063,036	$574,126	1.85	$488,910
Commercial	$2,060,595	$469,717	4.39	$1,590,878
Industrial	$560,789	$178,402	3.14	$382,387
Total	**$3,684,420**	**$1,222,244**	**3.01**	**$2,462,176**

UCT Benefit Cost Ratios for 2016 to 2035 Time Period				
Sector	**NPV $ Benefits ***	**NPV $ Costs ***	**Benefit/Cost Ratio**	**Net Benefits ***
Residential	$1,583,267	$802,561	1.97	$780,705
Commercial	$3,619,559	$745,562	4.85	$2,873,998
Industrial	$933,488	$275,838	3.38	$657,650
Total	**$6,136,314**	**$1,823,961**	**3.36**	**$4,312,353**

*In thousands of dollars

Comparison to MI Statewide - 2013



- Technical & Economic Potential higher in 2016 Studies due to inclusion of all lost opportunity measures in future potential regardless of current efficiency level *(i.e. every time a customer is in the market, it is an opportunity)*
- *The CE & DTE Potential Studies used Market Penetration Assumptions as developed in the MI Statewide Study in 2013 along with other penetration data from other more current studies*
- *Achievable Potential for CE & DTE Projection compares favorably to MI Statewide in 2023*

QUESTIONS AND ANSWERS

Consumers Energy and DTE Energy

Electric Energy Efficiency Potential Analysis

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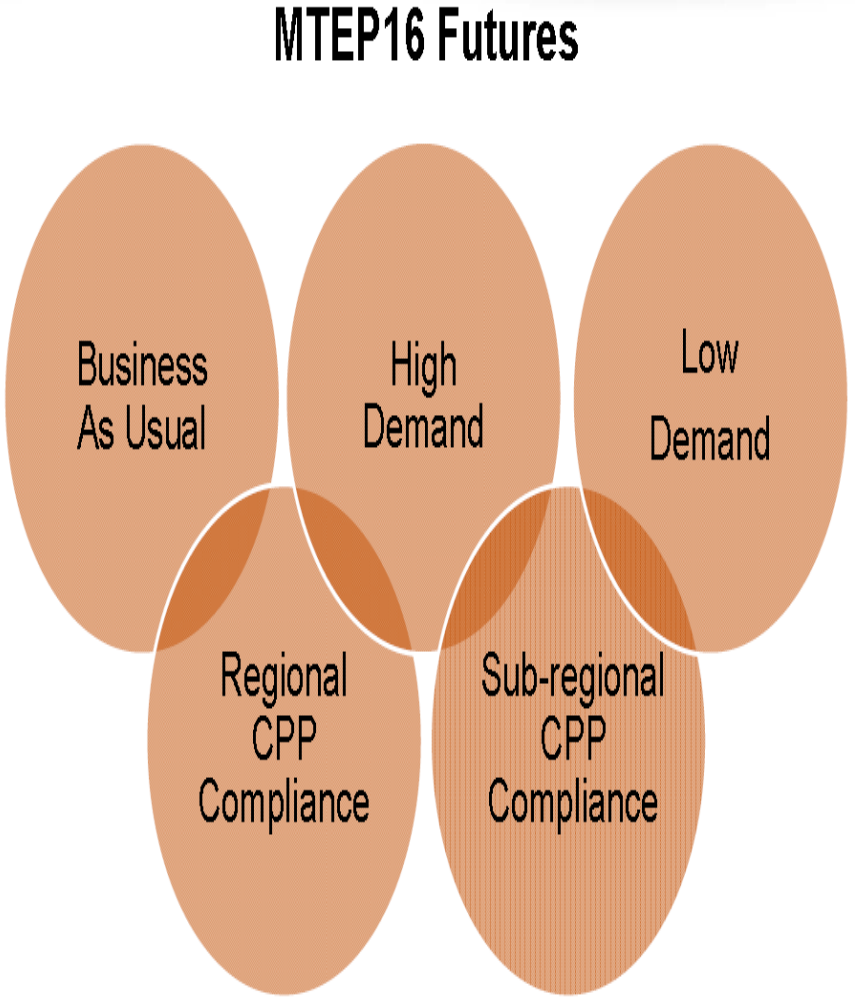
Sensitivity Scenarios to consider

- Take Rates
- Incentive Levels
- Avoided Costs
- NTG Ratios
- UCT Threshold
- Sales Forecast
- Additional Codes and Standards
- Financing
- Rate design modifications
- Environmental compliance
- Extreme weather
- Other



EWR Stakeholder Engagement Timeline Mar/Apr

MAR 17 – MAR 30	
	Review studies and Q&A
MAR 21	Monthly EWR Collaborative Meeting
APR 7	Stakeholders propose to staff additional assumptions/scenarios with rationale
APR 12	Staff's initial request for questions & alternate model run. Provide to WG via conference call.
APR 17	Joint EWR/DR WG meeting – discuss model runs
APR 18	Monthly EWR Collaborative Meeting
APR 26	GDS provides responses to first round of requests

EWR Timeline Cont. May

MAY 1	EWR, DR (and other workgroups) present progress report to IRP Stakeholder Workgroup. Shares GDS results.
MAY 2 (tentative date)	EWR Workgroup confirms additional scenarios and provides to GDS
MAY 16 (tentative date)	GDS provides results of additional scenarios to EWR Workgroup
MAY 18	EWR Collaborative – discuss GDS results?
MAY 22	Final questions?
MAY 24	Larger IRP Stakeholder Workgroup Meeting

EWR Timeline Cont. June

JUN X IRP Stakeholder Workgroups make consensus revisions based on stakeholder feedback

JUN 12 Larger IRP Stakeholder Workgroup Meeting

JUN 19 IRP Stakeholder Workgroup's final recommendations due to staff

JUN 20 Monthly EWR Collaborative

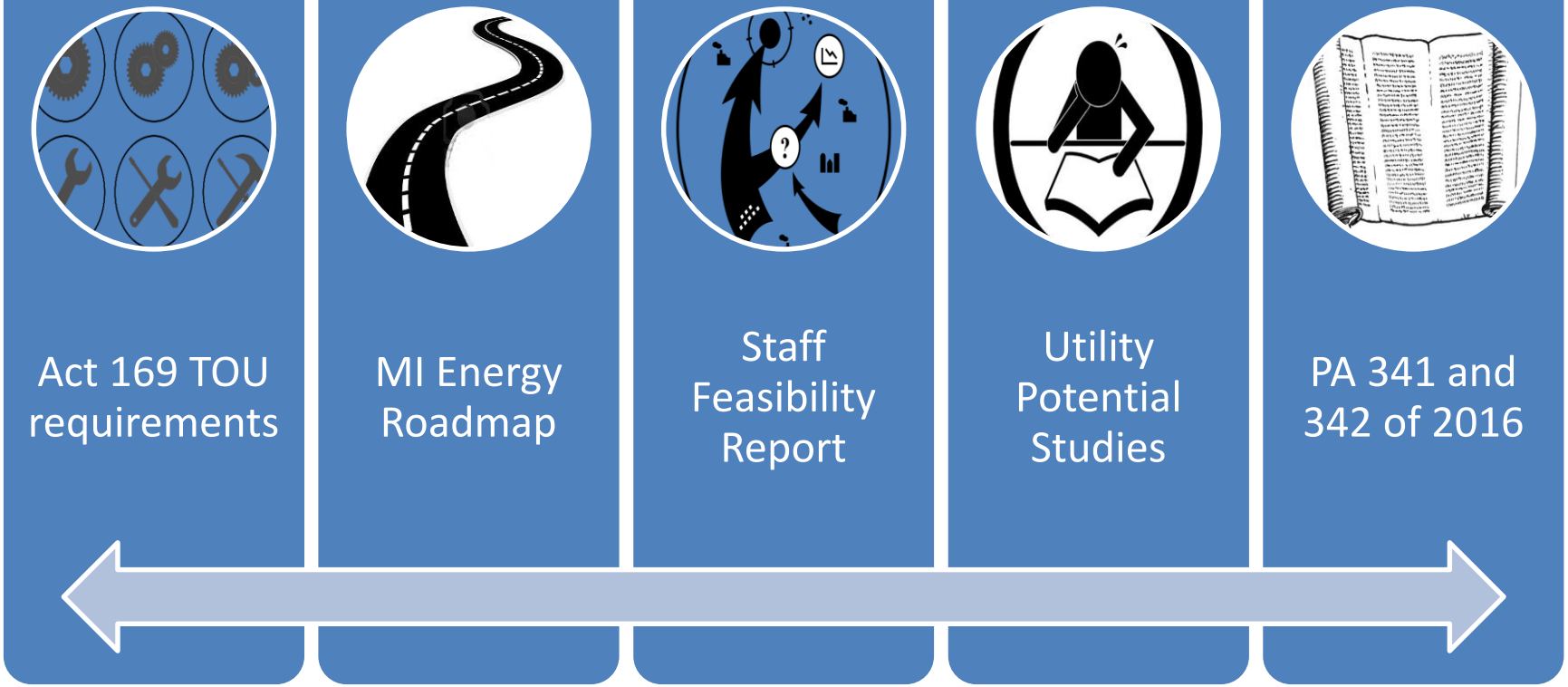
IRP Workgroup Timeline Jul/Aug/Sep

JUL 7	1st draft of IRP Straw Man proposal due for one last round of informal comments before the commencement of the formal proceeding
AUG	Commission docket initiated
SEP	Public Hearings to take place in east Michigan, west Michigan and Upper Peninsula

Get Involved: Michigan.gov/energylegislation

Demand Response Potential Study Workgroup

Recent History of DR Potential Study



Stakeholder Engagement for DR

- Today – discuss and comment on Staff's proposed DR potential study scopes
- March 22 – written comments on scopes due to Staff
  - March 24 – Staff submits RFPs to LARA/DTMB for processing
- April 17 – discuss DR scenarios and sensitivities for use in IRP modelling
- May 1 – report workgroup's initial recommendations to stakeholders
- June/July – discuss DR provisions of PA 341 and 342
  - **These topics will be separate from IRP modelling scenario work**
- August – review results of statewide potential study, adjust IRP recommendations if necessary

PA 341

Section 6t. (b) Conduct an assessment for the use of demand response programs in this state, based on what is **economically and technologically feasible**, as well as what is **reasonably achievable**. The assessment shall expressly account for advanced metering infrastructure that has already been installed in this state and seek to fully maximize potential benefits to ratepayers in lowering utility bills.

Two-Part Plan for DR Potential Study

1. Potential Study– all customers

- Similar process to utilities' studies and studies from other states
- Estimates potential based on number of possible customers, amount of possible demand reduction, and program costs

2. Market Assessment– large commercial and industrial customers (LCI)

- Survey and direct discussions with customers regarding their DR potential
- Used to inform the results from the Potential Study
- Added benefit of gaining insight on optimal program design for LCI customers

Today's Priorities

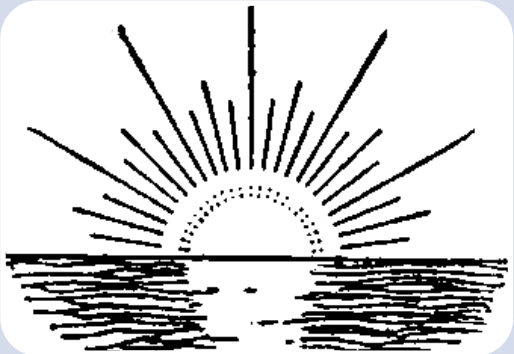
Review summary of scopes

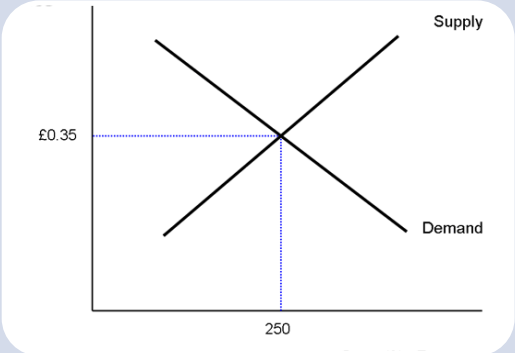
Review proposed study deliverables

Discuss study assumptions

Written Comments due Wednesday, March 22nd

Potential Study Definitions





Technical Potential is the total potential that could be realized without consideration of customer willingness to adopt measures and without consideration of the cost effectiveness of all available technology.

Economic Potential is a subset of the technical potential that is considered to be cost effective as compared to building new energy resources such as new generation.

Achievable Potential is the subset of the technical potential that is considered realistically achievable when taking into consideration real world constraints, including market barriers

Potential Study Scope

Study purpose:

> Assess the technical, economic, and achievable potential for shifting on-peak electricity usage to off-peak times through demand response programs, to help meet capacity needs with the current resources available.

The expectation is that pre-existing demand response programs will not be favored and customers should be able to participate in multiple programs where feasible.

The study will estimate demand response potential for the 20 year period beginning in 2018.

Potential Study Deliverables

Quantify the potential demand (MW) savings at system peak for each demand response program

Identify best program designs and costs that maximize on-peak MW savings and customer participation

Discuss opportunities and considerations for low-income residential customers

Potential Study Deliverables

Discuss barriers to achieving potential and their affect on program designs

Assess how to fully maximize demand response potential using existing AMI in Michigan

Identify cost per MW of potential demand savings

- Provide net present value costs over the program life
- Itemize costs per MW of potential demand savings by program type

Potential Study-Program Types

Behavioral

- Time varying rates with:
  - On/off peak rates
  - Critical peak rates
  - Rebates
  - With or without enabling technology
- Program w/o price signals

Direct Load Control

- Air conditioning interruption
- Electric water heater interruption
- Pool pump interruption
- Volt/VAR optimization at circuit level

Market Assessment

Study purpose:

Evaluate the customer's capability, desire, and motivation to participate in demand response programs by gathering that information directly from those customers

The study shall be inclusive of all LCI customers. The study will be conducted by contacting customers, discussing their interest and capability for participating in demand response programs.

Questions should be tailored for particular industries or customer segments.

Market Assessment Outcomes

Identify the most effective demand response program(s) for various types of LCI customers.

- Identify program designs that would maximize customer participation and per customer DR potential
- Evaluate customer engagement using a variety of potential program designs

Identify parameters important to LCI customers to participate in demand response programs (by industry segment)

Market Assessment Outcomes

Identify barriers that may keep customers from participating in demand response programs

Identify program costs for the utility for administering LCI demand response programs as well as costs faced by LCI customers for participating

If possible, provide a reasonably achievable demand response estimate for each LCI customer based on their ideal participation level and program design.

Needs Discussion

- How do we define achievable potential?
  - What, if any, restrictions should be in place?
- Should we ask for more deliverables in either study?
- Should the study timeframes match the EWR studies?
- Do we need to define any more assumptions based on EWR study results?

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Thank You

Contact Information:

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DR Potential Study Workgroup,
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Get Involved:
Michigan.gov/energylegislation