A Proposal to Expand the Calibration Research Agenda

Presentation to Energy Optimization Collaborative
September 2015
Agenda

1. MEMD Evolution & Calibration History
2. Collaborative Research Needs & Opportunities
3. Prioritization Process
4. Collaborative Research Opportunities
5. Next Steps
Calibration History

• Major research efforts completed:
  • Residential lighting hours of use studies
  • C&I lighting controls study
  • Recycled appliances metering study
  • Domestic water heating use metering study
  • Upstream lighting impact attribution study
  • Commercial thermostat study
  • C&I lighting hours of use study

• Recalibration studies
  • Appliance Recycling Savings Update
  • Home Energy Reports Modeling Update

• Results have been incorporated into the MEMD

• Calibration research has represented 10-15% of evaluation budgets
State of the MEMD

- Calibration has occurred for 70-80% of historical portfolio savings
- Some of the calibration studies are considered industry benchmarks and are being used in other states (e.g., water metering study)
- Most of the large savings measures have been addressed
  - Assumptions borrowed from other states have been replaced with Michigan specific characteristic data
- New measures introduced into the MEMD are subjected to a rigorous review and often utilize calibration research for key inputs to savings calculations
Expanded Collaborative Research Opportunities

Assess changes in baseline consumption characteristics since the EO effort began

Understand barriers to adoption of efficiency measures, particularly for hard-to-reach customers

Identify emerging technologies to create a pipeline for sustained energy efficiency impacts

Inform future program design

Assess the broader impact of utility programs on the energy efficiency market in the state

Calibration
# Collaborative Research Ideas

<table>
<thead>
<tr>
<th>Residential LED Net-to-Gross Research</th>
<th>Emerging Technology Studies</th>
<th>Baseline Study</th>
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<tbody>
<tr>
<td>What is the DTE/Consumers program influence or program-attributable sales of LED program-incented bulbs?</td>
<td>What are potential emerging technologies in MI? What is holding adoption back? What can be done to further advance these technologies?</td>
<td>What is the current saturation of baseline and energy efficient measures? What is the current market share of high efficiency energy consuming equipment?</td>
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<tr>
<th>Market Transformation Research</th>
<th>Program-Specific Research Studies</th>
<th>Issue-Specific Research Studies</th>
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<td>What has been the impact of driving the market and adoption of emerging measures, outside of direct participation in a utility rebate program?</td>
<td>Are there any program-specific challenges across utilities that could benefit from further research?</td>
<td>For example: A joint study related to 111(d) planning/compliance options, related directly to the role of EE.</td>
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<th>Gas Measure Savings Study</th>
<th>Potential Analysis</th>
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<td>Assess the baseline for the income-qualified housing stock in order to assess the savings potential. Assess bill savings and arrearage impacts of income-qualified projects.</td>
<td>Identify new gas measures that can be adopted to address uncertainty in gas portfolio. What other strategies may Michigan's largest gas consumers employ?</td>
<td>What is the residential and commercial technical, economic and program potential for efficiency in Michigan based on current saturation of baseline and energy efficient measures?</td>
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Prioritizing Collaborative Research

• Expand upon the current framework used for prioritizing calibration research
  • Magnitude of the savings opportunity
  • Degree of uncertainty

• Other criteria could include:
  • Operational excellence/continuous improvement
  • Study difficulty/cost
  • Need for a collaborative study

• Annual review process would be similar

• Like calibration, other collaborative research studies will be multi-year efforts
Collaborative Prioritization Process

1. Identify collaborative research opportunities
2. Screen for high impact opportunities
3. Prioritize opportunities with EO Collaborative feedback
4. Select collaborative research study
## Prioritization Framework

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### DTE and Consumers Prioritization

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<td>2.5</td>
<td>2.0</td>
<td>2.5</td>
<td>1.5</td>
<td>3.0</td>
<td>2.3</td>
</tr>
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<td>Potential Analysis</td>
<td>2.0</td>
<td>2.0</td>
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<td>MEMD Calibration</td>
<td>2.5</td>
<td>1.0</td>
<td>2.0</td>
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</tr>
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<td>Emerging Technology Studies</td>
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<td>1.0</td>
<td>3.0</td>
<td>2.1</td>
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**Key**
- 3-High Priority
- 2-Medium Priority
- 1-Low Priority
- NA-Not Applicable

*DTE Energy, Consumers Energy and evaluators independently prioritized and ranked study criteria, therefore the scores reflected above are averages, and do not reflect whole numbers.*
Proposal

- Expand current calibration research framework to include other opportunities for collaboration to support
  - Industry leadership and innovation
  - Deployment of best practices
  - Establishment of compliance paths with federal or state policies
- Leverage current process to identify, prioritize, and deploy joint research initiatives
- Seek EO Collaborative input on research ideas and approaches
Collaborative Feedback (Discussion & Decision)

- Proposal: Provide an opportunity for EO Collaborative to review proposed collaborative studies and provide feedback on study prioritization.

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<td>Working group session to discuss study prioritization ranking and finalize research topic</td>
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<td>Present high level research proposal on final research topic</td>
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Collaborative Homework

- Review objectives, research approach, and considerations for five potential collaborative studies.
- Complete prioritization matrix for five studies and prepare to discuss during the October EO Collaborative meeting.

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# MEMD Measure Calibration

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<th>Objectives</th>
<th>Ensure MEMD savings values, within an acceptable level of precision, represent the actual energy savings being realized through measure installation.</th>
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| Research Approach | • Review and prioritize MEMD measures based on past evaluations and upcoming program plans  
• Calibration efforts vary by measures but can include:  
  • Collecting primary data collection via metering/on-sites (high cost)  
  • Leveraging existing evaluation data (low cost) |
| Considerations: + and − | • Established protocol with MPSC and other stakeholders, provides assurance to interveners  
• MEMD measures account for the majority of savings currently realized through the EO programs  
• A majority of measures have been calibrated during the EO program five year history -> future studies are calibrating measures at the margins  
• Expensive research efforts |
## Market Transformation

### Objectives

- Develop framework for attribution for market transformation resulting from utility programs and efforts.
- Develop methodology for forecasting baseline changes without utility programs and attribution for improvements above the forecasted baseline.
- Identify high potential technologies and end-uses where combined Michigan utility programs are likely to transform the market.

### Research Approach

1. Develop framework
2. Identify key transformation opportunities
3. Develop methodology for attribution

#### Lifecycle Stages of a Market Transformation Initiative

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<th>Stage</th>
<th>Description</th>
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<tr>
<td>Early Initiative Planning Period</td>
<td>Ideation &amp; Concept Development</td>
</tr>
<tr>
<td>Initiative Market Implementation Period</td>
<td>Implementation Plan Development</td>
</tr>
<tr>
<td>Initiative Transition Period</td>
<td>Market Implementation (Full Market or Initial Test Market)</td>
</tr>
<tr>
<td>Evaluation and Process Improvement</td>
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</tr>
<tr>
<td>Market Sustainability Assessment</td>
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<tr>
<td>Transition to Support Market Momentum</td>
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### Considerations:

All utility energy efficiency programs seek to cause long-term and lasting change in the market for energy efficiency. Market transformation requires concerted and coordinated efforts from all utilities in the state. A framework and metrics for attribution is required so that the utilities can fund and pursue market transformation.

Market transformation may be driven by many exogenous factors. Attribution may be hotly contested. DTE and Consumer’s have ongoing work in this area, so there may be duplication.

Some commissions have been unwilling to accept and support market transformation attribution.
Statewide Potential Analysis

| Objectives | Forecast of technical, economic, and achievable energy efficiency potential in the state based on:  
|            | • Current use of energy  
|            | • Expected economic conditions  
|            | • Available efficient technology performance and cost  
|            | • Market acceptance and adoption of efficient technologies |

| Research Approach | ![Flowchart showing the steps of the Research Approach](chart.png) |
|                  | Baseline End-Use Consumption Estimates  
|                  | Technical Potential by Measure/End-Use  
|                  | Technical Potential  
|                  | Economic Potential  
|                  | Achievable Potential  
|                  | • Measure savings  
|                  | • Measure applicability  
|                  | • Measure interactions  
|                  | • Fuel shares  
|                  | • Equipment/efficiency saturation  
|                  | • Measure costs  
|                  | • Avoided costs  
|                  | • Economic screens  
|                  | • Market acceptance  
|                  | • Infrastructure capacity  
|                  | • Institutional constraints |

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**Considerations:**
- Common assessment of potential will guide establishment of savings targets, further refinement of the MEMD, collaborative program opportunities. Modest investment if recent baseline research has been conducted and a robust technology database exists.

**A statewide study may not support individual utility Integrated Resource Plan development. Recent statewide baseline data is required for the study.**
Emerging Technologies

| Objectives | • Identify and characterize commercialized emerging energy efficiency technologies that offer significant potential in Michigan for savings in the 2017 to 2020 time frame.  
• For high potential technologies, develop work papers supporting savings values for inclusion in the MEMD. |
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<td>Research Approach</td>
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<tr>
<td>Screen and prioritize</td>
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Scan commercially available with high potential in Michigan | Assess market potential (high level) Collect data on customer accepted and proven performance | Develop work papers supporting inclusion of measures into the MEMD |
| Considerations: | | |  
| - With changing baselines, it is becoming increasingly difficult to meet energy savings goals with established technologies. There are multiple emerging, commercialized technologies with high savings. Collaborative research on identifying and qualifying these measures could reduce costs and accelerate acceptance into utility programs. | |  
DTE and Consumer’s have ongoing work in this area, so there may be duplication. The technologies may not have sufficiently demonstrated performance to warrant inclusion in the MEMD. Many emerging technologies include controls and behavior components and may be not be suitable for a deemed or “a calculated deemed” value. |
| + and | | |  

## Issue Specific Research

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<td>• Explore topics related to energy efficiency potential, program design and implementation, state or federal policies that impact implementation</td>
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<tr>
<td>• Generate common understanding of current issues that impact energy efficiency program implementation.</td>
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<td>• Would vary depending on topic but would likely include literature review, stakeholder and/or technical expert interviews, scenario development, and summary reporting.</td>
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| Considerations: Collaborative research on key topics would allow provide an unbiased review of key topics. The collaborative research model would allow consolidation of resources to examine multiple perspectives of key issues. | Some of the issues impacting energy efficiency are complex and evolving; this may make it difficult to conduct discrete research on a topic that remains relevant for a significant length of time. |
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- Yellow: 2-Medium Priority
- Red: 1-Low Priority
- Gray: N/A-Not Applicable