From Past to Present: Energy Efficiency Programs and Industry Trends

CEE 2019 Annual Industry Report
Preliminary Data

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Director of EE and DR, DTE
CEE Board Chair
October 2, 2019
Fort Worth, TX
Evolution of DSM

Where is the Industry going?

- Preliminary Annual Industry Report Insights
- CEE Program Performance Benchmarking
Evolution of DSM

- **1970s**
  - Energy crisis

- **1980s**
  - Least cost planning

- **1990s**
  - Deregulation
  - EE Resource Standards

- **2000s**
  - Industry maturing to serve a host of objectives in a more sustaining way

- **2010s**
  - Acknowledgement of host of influencing factors
Some Dynamics Utilities Face

Declining Electric Load
- Energy efficiency and conservation have become a part of the general culture
- Growth of customer self-generation
- Increases to codes and standards

Need for Increased Investment
- Customers desire greater reliability, resiliency after Superstorm Sandy, etc.
- Generally aging infrastructure
- Use control technologies, Smart Grid
- Cybersecurity

Disruptive Trends
- Communicating products
- Dynamic products
- Energy storage and accessibility to renewable sources
- New market entrants

Grid Quality
Credit Quality

Utilities are challenged under the existing regulatory model

Historical & Forecasted Electricity Growth

History 2010 Projections

3-year moving average
Trendline
What is emerging integrated demand-side management (IDSM)?

- Integration of technologies at end user homes and facilities
- Integration of programs, delivering customer solutions
- Integration of DSM for power planning, acquisition, transmission planning, and reliability

Demand-side management refers to, and encompasses, both energy efficiency and demand response programs.
Creating the IDSM Platform—CEE View

CEC CONSENSUS CONNECTED PRINCIPLES

- Ensure Secure Data and Privacy
- Controllable, Responsive
- Utility Specified Data
- Standard Information Protocols
- Multiple Connection Pathways

COOPERATION WITH

- ENERGY INTENSIVE PRIORITY PRODUCT CATEGORIES
  - Central HVAC
  - Appliances
  - Pool Pumps
  - Water Heating
  - Centralized HEMS
  - Lighting
  - EVS and Charging Stations

Managing for Grid Value
Managing for Customer Value
Managing for EM&V Value
Potential Benefits of Integration

CUSTOMER BENEFITS
- Enhanced engagement
- Financial savings from new DSM opportunities
- Nonenergy benefits: remote control, comfort, safety, convenience, health, wellness, etc.

GRID BENEFITS
- Grid balancing and load management
- Grid signals, e.g. spinning reserve, load delay, etc.
- Program M&V data
- Enhanced customer engagement
- New IDSM Program Offerings

ENVIRONMENTAL BENEFITS
- Enhanced air quality
- Carbon reduction
State and provincial regulatory policy is in motion

Key considerations:

• Emerging utility business models
• Inclusion of non energy benefits
• Increased grid resiliency and efficient use of grid capital

Where policy is tied to obligation and funding
Ramping Determinants of New Value, Cost, and Risk
Evolution of DSM

Where is the Industry going?

• Preliminary Annual Industry Report Insights

• CEE Program Performance Benchmarking
Purpose

Scope

Collaboration

Preliminary Data
US and Canadian Expenditure Trends

Preliminary data as of September 20, 2019
US Electric Energy Efficiency and Demand Response Expenditures

Preliminary data as of September 20, 2019

BILLONS USD


$3.8 $4.8 $5.7 $6.1 $6.0 $6.7 $6.7 $6.8 $6.9 $6.9

Demand Response
Energy Efficiency

CEE
Canadian Electric Energy Efficiency and Demand Response Expenditures

Preliminary data as of September 20, 2019

MILLIONS USD

2009: $615
2010: $745
2011: $712
2012: $696
2013: $700
2014: $626
2015: $562
2016: $572
2017: $552
2018: $603

Demand Response
Energy Efficiency
US and Canadian Natural Gas Expenditures

Preliminary data as of September 20, 2019
US & Canadian Electric and Gas Expenditure Breakdown by Customer Class

Preliminary data as of September 20, 2019

**Electric**
- Residential: 30%
- C&I: 23%
- Cross-sector: 11%
- Low Income: 10%
- Industrial: 6%

**Gas**
- Residential: 47%
- Commercial: 22%
- Low Income: 21%
- Other Cross-cutting: 5%
- Multifamily: 4%
- Industrial: 1%
- Multifamily: 4%

Preliminary data as of September 20, 2019
CEE Program Performance Benchmarking

Extended Phase I – Proof of Concept
Define Metrics and Framework
• Indicators to measure Program Performance
• Structure of organizing key metrics to analyze program performance

CERES 2011 Benchmarking
Data lacks comparability and quality, and has limited availability

Framework and Dataset
• 6 program areas
• 3 program years
• 12 PAs

Phase II Scaling
1. Enhance framework’s comparative value through increased participation
2. Support continuous improvement of priority metrics as industry evolves

Levels of Value...
CEE Program Performance Benchmarking Framework

Descriptive Modules describe the program administrator and their environment

Performance Modules describe portfolio and program performance
# Metric Refinement

- Define and prioritize metrics to create comparability

<table>
<thead>
<tr>
<th>400+ metrics</th>
<th>balance value and cost</th>
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<tbody>
<tr>
<td>- Avoided Costs</td>
<td>- Savings goals</td>
</tr>
<tr>
<td>- Benefit Cost Tests</td>
<td>- Savings by measure</td>
</tr>
<tr>
<td>- Discount Rates</td>
<td>- Conversion rate</td>
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<tr>
<td>- Non-energy impacts</td>
<td>- Program maturity</td>
</tr>
<tr>
<td>- Performance incentive</td>
<td>- At-risk characteristics</td>
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<tr>
<td>- Performance penalty</td>
<td>- Staffing levels</td>
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<tr>
<td>- Program cost recovery</td>
<td>- Cost profile</td>
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<tr>
<td>- Program cost/ budget limit</td>
<td>- Participation by measure</td>
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</tbody>
</table>

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<tr>
<th>138 metrics</th>
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<td>- Total headcount → Normalized headcount</td>
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- Refine metrics to reduce variability

- Identify use cases to ensure usability
Reducing Variation – Eliminating Noise

Costs as percentage of total program expenditures

Incentives. Initial Survey: 14%–89%; Follow-up Survey: 43%-89%

Delivery Costs. Initial Survey: 2%–77%; Follow-up Survey 2-41%

Incentive costs

- Program expenditures in the form of cash, credit, buydowns, discounts, rebates, or other means of payment, as well as in kind services, that lower the cost(s) of efficient goods and services in the marketplace, or that otherwise improve the financial attractiveness of efficiency measures offered through the program to customers, contractors or other market actors.
- For the purposes of this survey, you should only include costs for “incentives” that are payments to customers or other market actors that lower the cost of efficiency measures.
- Incentive costs do not include incentive processing costs.
Want to learn more about the CEE Benchmarking Project?

We are seeking participation commitments for the 2020 Work Cycle.

Please contact us by Nov. 1st 2019 for more information

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Q&A

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Watch for full Annual Industry Report on www.cee1.org