Commercial and Industrial Concurrent Session

SEM: A Program Platform for Connected Buildings and Plants

Ted Jones
Principal Program Manager
September 19, 2018
New Orleans, LA

Bjorn Jensen
Program Manager
Welcome C&I Program Administrators & Industry Partners!

- Energy Management Systems
- Steam Systems
- Pumping Systems
- Compressed Air Systems
- Air Conditioning and Heat Pumps
- Commercial Lighting Systems
- Refrigeration (ice makers)
Agenda

◆ Strategic Energy Management and Connected Systems
  • Products of Evolving Efficiency Program Needs and Objectives

◆ Program Reality Check
  • Southern California Edison (CA)
  • National Grid (NY, RI, MA)
  • Xcel Energy (CO, MN)

◆ Stretch Break

◆ Small Group Discussion

◆ Wrap-up
Program Administrator Trends in 2009

• multi-year program budgets and programs
• ability to demonstrate cost-effectiveness across a host of measures rather than on a single measure basis
• latitude to support “families of measures” around specific customer segments (e.g., commercial kitchens)
• support for non-traditional measure, such as emerging technologies
• support for “softer” program approaches (e.g., O&M, system-related, process-related, and management-related measures)
Strategic Energy Management

- **SEM** is a continuous improvement approach to reduce energy intensity over time
  - Characterized by:
    - Customer commitment
    - Assessment and planning
    - Systematic measurement and reporting
Potential SEM Benefits

• Operational, maintenance, and behavioral savings
• Accelerate capital project savings
• Lower project transaction costs
• Enhance customer engagement
CEE SEM Initiative, 2014

Role:
- Define SEM from a program perspective
  - The CEE SEM Minimum Elements
- Support knowledge transfer, learning
  - SEM Program Summary, Deep Dive Webinars
- Analyze and develop new approaches
  - Energy Information System Specification (in development)

Impact:
- Accelerated uptake and energy savings
- Recognized value proposition
- Available, effective for small-medium enterprises
Growth of SEM Programs

New SEM Programs 2017-’18
California: PG&E, SCE-SoCalGas, SDG&E
New York: NYSERDA
Tennessee: TVA

Industrial Sites Served To Date

Source: CEE SEM Program Summaries
Challenge: Scale

Sites with SEM Potential (Conservatively): 51,000

Number of Industrial Sites Served by SEM Programs

- 2014: 400
- 2016: 600
- 2017: 1,000
Addressing the Challenge of Scale

• **Targeted SEM:** Leverage member and industry partner experience to identify C&I customer profiles that are likely to succeed with SEM
  • Reduce customization
  • Decrease risk
  • Scale SEM program effectiveness and impact

• **Connected C&I Products and Systems**
  • Enabling energy measurement and reporting right out of the box
Connected Device Deployment

How Might Connected C&I Products Enhance SEM Programs

EM&V

- Communication
- Energy Usage Reductions (where, when, how)
- Data to Share (and for what purpose)

- Behavior Change
- Complement Traditional Efficiency Measures
- Load Shifting/Balancing
- Customer Amenity, Non-Energy Benefits
Strategic Energy Management
Leveraging Connected Devices

Integrated platform for energy performance improvement
- Energy Efficiency
- Demand Response
- Time-based Rates
- Distributed Energy Resources
- Non-energy Benefits

- Customer benefits
- Utility/System benefits
Utility/Grid Benefits of Enhanced SEM

• Load visibility and control
• Grid O&M savings
• Durable, data-driven customer engagement
• Offset grid expansion, new capacity
• Manage time and location-based constraints
• Advance sustainability-climate goals
Customer Benefits of Enhanced SEM

• Greater visibility & control of facility energy performance
• Manage, reduce key operating costs
• Improve productivity, reduce downtime
• Advance sustainability-climate goals
• Enhance corporate image
• Easier to participate in utility energy efficiency programs and demand response events
Automated Strategic Energy Management

Source: allbiz, Integrated Building Automation Systems
CEE IDSM Platform

**Cooperation with**

- Central HVAC
- Appliances
- Pool Pumps
- Water Heating
- Central HEMS
- Lighting
- EVS and Chargers

**Managing for Grid Value**

**Managing for Customer Value**

**Managing for EM&V Value**
GRID BENEFITS
- Targeted customer engagement
- Grid balancing
- M&V data
- Ancillary services

CUSTOMER BENEFITS
Nonenergy benefits:
- Remote control
- Enhanced comfort
- Health and safety

ENVIRONMENTAL BENEFITS
- Enhanced air quality
- Carbon reduction
Thank you

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Program Industry Reality Check

SEM Program Panel

• Mark DiPetrillo, Manager, Technical Sales Support, National Grid
• Steven Warkentin, Portfolio Manager, Xcel Energy
• Jarred Ross, Program Manager, SEM and Energy Advisor Services, Southern California Edison
CEE Strategic Energy Management Panel
SEM from a implementers view

Mark DiPetrillo
September 19, 2018
About National Grid

• We are one of the largest investor-owned energy companies in the world
• We cover Massachusetts, New York, Rhode Island and the UK.
• In the US, we deliver electricity to over 3.3 million customers and natural gas to 3.4 million customers
• We also operate over 9,000 miles (14,000 km) of electricity transmission in the US
How Is Our Program Environment Is Changing

• All regions – Electric and gas saving goals are increasing everywhere
• Cost Consciousness (Internal and external)
• Baselines are going up
• New York – Energy efficiency is going into base rates
• Technology - Vendors are working with our customers to bring real time monitoring and knowledge systems into their facilities
• Renewables
Nationalgrid’s SEM Program today

• New England – Today
  – We have over 10 SEMP currently signed, with over 12 in development
  – Six with Colleges and Universities
  – The other 4 with States, Hospitals and Industrial customers

• NY – Today
  – Working with NYSERDA
  – A few on our own

• Starting to work with National Accts

• All States - We use customized SEM plans to meet the specific customer’s needs. Terms usually include technical assistance, incentive guaranties, savings goals and educational aspects.

• We are now working on developing additional items like EV’s charging stations, PV’s, smart meters, etc.
Changes Needed

- EMS and BMS systems of our customers
  - Ability to log data
  - Ability to monitor and alert operators
- Real time commissioning systems
- Our Meters
  - Budgets
    - It cost $ for pulse signals outputs
    - Some feel why should we give integral meters to all
  - Smart Metering Projects (getting there)
- Communications between all of the above
SEM in the future

Larger variety of ingredients
• Micro-grids
• PV’s
• Demand Response
• CHP

New Segments
• National chains
• Municipals
• Etc.
Thank you
CEE SEM & Connected Buildings Session
September 19, 2018
steve.warkentin@xcelenergy.com
Company Background

**Customers:**
- Electric: 2.0 M
- Gas: 500k
- Gas & Electric: 1.5 M

**Carbon Target:**
- 60% Reduction by 2030
- (is ~74% reduction)

**Population:**
- +12.5%/6yrs

**EE & DR in MN, CO & NM**
- MN DSM
  - 658 GWh
  - 800k Dth
- CO DSM
  - 415 GWh
  - 627k Dth
- NM DSM
  - 41 GWh
A Changing Environment

↑ Goals
↓ Baseline Standards
↓ NTG
↓ Benefits (Avoided Costs)
↔ Torn between two interveners
↑ Limited Field Eng. resources

Need for non-capital savings
Need higher-value savings (load shifting/shedding)
## SEM Today and Tomorrow

<table>
<thead>
<tr>
<th>Customer Commitment</th>
<th>SEM –“PE”</th>
<th>SEM / EIS</th>
<th>“Enhanced”</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Policy &amp; goals</td>
<td>Once</td>
<td>Once</td>
<td>1. Improve SEM for more effective elements</td>
</tr>
<tr>
<td>b) Resources</td>
<td></td>
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</tbody>
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<table>
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<tr>
<th>Planning &amp; Implementation</th>
<th>SEM –“PE”</th>
<th>SEM / EIS</th>
<th>“Enhanced”</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Energy Map</td>
<td>1</td>
<td>annual</td>
<td>2. Introduce lower cost structure for down market and/or geotargeting</td>
</tr>
<tr>
<td>b) Metrics &amp; Goals</td>
<td>1</td>
<td>annual</td>
<td></td>
</tr>
<tr>
<td>c) Project Register</td>
<td>Occasional</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td>d) Employee Engagement</td>
<td>Limited</td>
<td>Limited</td>
<td></td>
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<tr>
<td>e) Implementation PM</td>
<td>Partial</td>
<td>Partial</td>
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<td>f) Reassessment</td>
<td>ICB</td>
<td>annual</td>
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<tr>
<th>Measuring &amp; Reporting System</th>
<th>SEM –“PE”</th>
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</tr>
</thead>
<tbody>
<tr>
<td>a) Measurement</td>
<td>1 + repeat</td>
<td>Continuous</td>
<td>3. Improve regulatory comfort level</td>
</tr>
<tr>
<td>b) Data Collection</td>
<td>1 + repeat</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>c) Analysis</td>
<td>1 + repeat</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>d) Reporting</td>
<td>1 + repeat</td>
<td>Continuous</td>
<td>4. Incorporate DR/Dispatchable DR</td>
</tr>
</tbody>
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Needed from Partners

• Understanding…
  – Customers’ costs matter (to TRC utilities)
  – Evaluator surveys of influence matter
  – Performance contracts don’t have to compete with SEM

• Visibility

• DR, load shifting/shedding capabilities.
CEE Industry Partners Meeting
C&I SEM and Connected Buildings Panel

Jarred Ross
SEM Program Manager
SCE – About Us

While SCE was officially incorporated in 1909, the company was originally formed by the mergers and acquisitions of many small predecessor companies going back to 1886.

- Largest subsidiary of Edison International (EIX)
- Primary electricity supply company for much of So Cal
- 14 million electric customers
- Service territory of approximately 50,000 square miles
SCE Initiatives

SCE Strategy: Build the next generation energy company that delivers superior value to customers and enables a clean energy future, focusing on four areas:

• Cleaning the Power System

• Helping Customers Make Cleaner Energy Choices

• Strengthening & Modernizing The Grid

• Achieving Operational & Service Excellence
A Short Break
Small Group Discussion

• What role do you see connected functionality playing in your market or product area for commercial and industrial customers?

• How do products or services that your companies offer (or are planning to offer) compare to the CEE vision and panelists assumptions?

• What challenges and opportunities do you see for SEM program approaches in the future?
Let’s Hear from You!
Small Group Report Out

• What role do you see connected functionality playing in your market or product area for commercial and industrial customers?

• How do products or services that your companies offer (or are planning to offer) compare to the CEE vision and panelists assumptions?

• What challenges and opportunities do you see for SEM program approaches in the future?
Wrap-Up and Next Steps

- Energy Management Systems
- Steam Systems
- Pumping Systems
- Compressed Air Systems
- Air Conditioning and Heat Pumps
- Commercial Lighting Systems
- Refrigeration (ice makers)
- Commercial Water Heating

- Novel industry-to-industry partnerships to advance shared objectives
- New roles for DSM programs that advance customer benefit from connected functionality
- Significant takeaway or lessons learned coming out of the breakout sessions