This Is Your Program, This Is Your Program on Data

Wednesday
9:30 am
Panelists

- Tim Guiterman, EnergySavvy
- Jeff Perkins, ERS
- Michael Li, U.S. Department of Energy
CONTINUOUS, EMBEDDED AND AUTOMATED

Leveraging data for your programs…with a spotlight on Advanced M&V

Tim Guiterman, EnergySavvy
May 17, 2017
A Shift in the Market

Shaping the right experience
The customer conundrum in the utilities industry

REV GOALS
- Making energy more affordable for all New Yorkers.
- Building a more resilient energy system.
- Empowering New Yorkers to make more informed energy choices.
- Creating new jobs and learning opportunities.
- Improving our existing initiatives and infrastructure.
- Supporting cleaner transport.

REV is a strategy to build a clean, resilient, and affordable energy system for all New Yorkers.

REV is transforming New York State’s energy policy and initiatives to make energy efficiency and clean, locally produced power at the core of the state’s energy system.

REV is changing the way government and utilities work to make clean energy financially beneficial to everyone. Most importantly, REV is placing customers first by designing new incentives to impact real people and places. Communities will have the opportunity to take an active role in achieving the following state energy goals by 2030:

- 40% Reduction in GHG emissions from 1990 levels

Reducing greenhouse gas (GHG) emissions from the energy sector—power generation, industry, buildings, and transportation—is critical to protecting the health and welfare of New Yorkers and reaching the longer-term goal of decreasing total carbon emissions 80% by 2050.

No time to think: How utilities are handling the deluge of grid data

More Utilities Are Offering Services That Allow Customers to Self-Consume Their Solar Power

Leading utilities are looking at how to make money from self-consumption service offerings, not just the sale of more electrons.

by Andy Stone
August 03, 2016
Changing Expectations

Improve customer experience and increase relevancy

Deliver new revenue streams

Manage growing costs of customer operations
What We Do

CUSTOMER EXPERIENCE TRANSFORMATION

CUSTOMER INSIGHTS

CUSTOMER ENGAGEMENT

CUSTOMER OPERATIONS

CUSTOMER CLOUD
It starts by getting data into one place…

This can be complicated…

- Program Participation
- Assessment data
- Project Data

Customer Cloud

- Internal
  - CIS
  - DSM Tracking
  - Core Logic
  - Experian
  - Billing
  - Outage Mgmt
  - Usage
  - Etc

- External
  - Axiom

OR

Utility Data Lake

- Program Participation
- Assessment data
- Project Data
...And turning it into actionable customer intelligence

Holistic view of the customer

Integrates 3rd-party data (property, psychographics, etc.)

Integrate data from disparate systems
Advanced M&V
(aka M&V 2.0 or Program Optimization…)
This is Your Program...

Lack of timely feedback

- Lack of granular data
- Data collection is time-intensive and costly
- Lack of actionable data for planning/design

- Evaluation
- Design
- Implementation
- Planning

Lack of insight into contractor and project performance

- Low project quality and dissatisfied customers
- Costly field inspections
- Need for target marketing

This is Your Program…
This is Your Program…

“Your program has been over for a year, now we can tell you how it did…”

“It’s Dec 2016, and we’re happy to report that in 2015 this measure saved 770 kWh per premise”
This is Your Program on Data…

Reliable indicators of savings performance during implementation*

“It’s only July of 2015, and this measure is obtaining ~700 kWh per premise

*Example is for a cooling measure-dominated program. Programs with heating and cooling measures have shown earlier results.
This is Your Program…

Photo from investigation by Boston based TV news team on State EE Program

- Insulation spilling from walls after residential retrofit.
- Mold found in attic after insulation installation.
Comparing savings at the meter to expected savings reveals good, bad and ugly.

- **Can they do more?**
  - Low Volume, High Performance
  - Low Volume, Low Performance

- **Can we transfer best practices?**
  - High Volume, High Performance
  - High Volume, Low Performance

- **Immediate correction necessary!**
  - Low Volume, Low Performance

**Legend**
- Contractor
- Manager action

This is Your Program on Data…
M&V 2.0 Defined…

A defining criterion for automated M&V software is that it continuously analyzes data as it becomes available.


Floating Names

M&V 2.0
Advanced M&V (NY REV / RMI)
EM&V 2.0
Automated M&V (NEEP)
ICT-Enabled EM&V (ACEEE)
RMI: The Status and Promise of Advanced M&V

Collaborative Study involved DOE, Utilities, Evaluators, and Analytics Firms

Automated analytics that can provide ongoing, near-real time savings estimates

Increased data granularity in terms of frequency, volume, or end-use detail

M&V 2.0 benefits evaluators, program administrators, regulators, grid operators and others.

“Advanced M&V can increase the value of evaluation, reduce costs through automation, enhance program targeting, allow for early adjustments to program designs and budgets, and increase accuracy of savings estimates to support EE as a resource.”
Case Studies
Contractor Scorecard

**Challenge**
Contractors are unaware of their project performance

**Solution**
Issue scorecards to contractors to communicate performance of projects
**Challenge**
Reduce costs and intrusiveness of QA/QC process

**Solution**
Use intelligent monitoring to reduce and target # of QA/QC inspections

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**Attic Inspections**

**2015**

- **40%**

**2016**

- **20%**

**2017 Goal**

- **10%**

**APS shifted approximately 25% of the overall inspection budget to directly improve the program.**

*All percentages are the percent of total annual projects (assumes 2,000 projects/year)*
Validating M&V 2.0

M&V 2.0 is accurate.

**VALIDATION PLAN:**
Outlined specific criteria by which M&V 2.0 would be judged

**GOAL:**
Determine if M&V 2.0 produced replicable, accurate results

- **Residential HVAC Program—energy savings (kWh):**
  - 2015 program-wide realization rate within 10 percentage points?

- **Residential HVAC Program—coincident peak demand (kW):**
  - 2015 program-wide realization rate within 10 percentage points?

- **Insight Behavioral Program:**
  - 2015 average per-premise kWh savings have overlapping 90% confidence intervals?

Validating M&V 2.0

M&V 2.0 can produce reliable savings estimates mid-way through a program year.

One of the promises of M&V 2.0 is that it allows for program impacts to be understood during the program year due to:

- Measure-as-you-Go nature of the analysis
- High volume of projects that are directly analyzed
- Large one-to-many comparison group methodology

The pilot indicates that this is indeed possible.

Validating M&V 2.0

M&V 2.0 can measure low-level energy savings (1-2% of annual energy use) & coincident peak demand reduction.

- M&V 2.0 is a good fit for behavioral programs
- Methodology can include a control group
- Tangible EE and PDR difference between lower- and higher-engagement customers

SEEING IS BELIEVING
SEEING IS UNDERSTANDING

NYC Energy Data Mapping

Heat Maps
THE EVOLVING GRID…
DATA
RETIRING POWER PLANTS

U.S. nuclear power plants already closed or closing

Retiring coal plants: Yellow/Closing, Red/Closed
Indian Point Closing: What Solution?

New York Has No Idea How to Keep the Lights On When Indian Point Closes
03/04/2017

Replacing the Indian Point Nuclear Power Plant with Energy Efficiency
03/06/2017

What Happens When We Shut Down Indian Point?
03/13/2017
Can Energy Efficiency Compare with:
- Distributed Generation?
- Renewable Energy?
- T&D Upgrades?

Typically, system planners have not included efficiency impacts at a substation level.
SCE: PREFERRED RESOURCES

The Pilot is exploring the intensive use of DSM to meet local area reliability needs caused by the SONGS closure.

Objectives Include:

- Demonstrate DSM can be used to meet local capacity & reliability needs
- Measure grid impact of DSM
- Implement a Preferred Resources portfolio to address local peak needs
- Minimize/eliminate the need for gas-fired generation at these locations
- Identify lessons learned to apply to other grid areas

The Pilot will provide “real time, real world” experience to reduce the performance uncertainty associated with Preferred Resources.
REAL-TIME EXAMPLES

Closing Indian Point Nuclear Plant

- 2 GW to replace:
  - 1 GW Hydro-Quebec
  - Renewables
  - 25 MW of CHP
  - Energy Efficiency
    - 100 MW of Efficiency Upgrades
    - Targeted 2-6 pm, Jun-Sep
    - Demand Management Program (DMP)

- And – BQDM “non-wires” distribution solution
  - Install $200 million customer side resources to defer building a $1 billion substation
IDENTIFYING MOST DESIRABLE DSM

- Feasible: 500 MW
- Economical: 400 MW
- Marketable: 300 MW
- Desirable: 100 MW
INCREASED VALUE OF EFFICIENCY

- Temporal & Locational Premium
- Incentives at the time of the program (2016)

DEMAND MANAGEMENT PROGRAM

In addition to the current program offerings, increased incentive rates will be offered to eligible Con Edison electric customers for energy improvements that provide summer on-peak demand reduction.

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Current Offering</th>
<th>New Offering</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal Storage</td>
<td>$600/kW</td>
<td>$2,600/kW</td>
</tr>
<tr>
<td>Battery Storage</td>
<td>$600/kW</td>
<td>$2,100/kW</td>
</tr>
<tr>
<td>DR Enablement</td>
<td>$200/kW</td>
<td>$800/kW</td>
</tr>
<tr>
<td>Chiller/HVAC/BMS/Controls</td>
<td>$0.16/kWh</td>
<td>$0.16/kWh + $1,250/kW</td>
</tr>
<tr>
<td>Lighting</td>
<td>$0.16/kWh</td>
<td>$0.16/kWh + $800/kW</td>
</tr>
</tbody>
</table>
REAL-TIME M&V

- Efficiency can target specific objectives
  - savings 2-6pm June – September
- No room for error: reliability, resiliency…
- Specific knowledge needed:
  - Which measures match needs
  - In which sectors
  - Which incentives to adjust
  - Measures to add/delete
  - How to target marketing
REAL TIME DASHBOARD

Planning & Forecasting

<table>
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<tr>
<th>Multifamily</th>
<th>Installed MW</th>
<th>Cost</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>10.0</td>
<td>$14,830,000</td>
</tr>
<tr>
<td>SBDI</td>
<td>12.8</td>
<td>$17,003,800</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>22.8</td>
</tr>
</tbody>
</table>

Fictional values!
For Illustrative Purposes Only.

To Download the Results: Select the top right of the server browser. In the view you can export the data to a csv for further analysis.

Detail: Slider maximum values based on 100% penetration relative to already installed projects.

Detail: Grey static areas are based on current M&V results and currently targeted program goals.
McGraw-Hill (2013) survey of property owners with non-residential buildings:

Significant benefits from healthy buildings

- 47% — Healthcare cost reduction of 1% to 5%
- 66% — Improved employee satisfaction
- 56% — Lower absenteeism
- 21% — Higher employee productivity
BUILDING HEALTH

Schools and learning outcomes...

THE 9 FOUNDATIONS OF A HEALTHY BUILDING
forhealth.org

SCHOOLS FOR HEALTH
FOUNDATIONS FOR STUDENT SUCCESS
HOW SCHOOL BUILDINGS INFLUENCE STUDENT HEALTH, THINKING AND PERFORMANCE
SOURCES OF DATA
HAPPENING TODAY

- Advancements in wireless metering
- Multi-function data gathering devices

- Energy
- Demand
- Light
- Occupancy
- Temperature

- Noise
- Indoor air quality
- Vibration
- IR
- Etc.
THIRD PARTY DATA SYSTEMS

- Residential
- Commercial
USES FOR GRANULAR DATA

- Increase understanding of demand side resources
- Temporal and locational targeting of DSM
- Spot changes in use and potential negative shifts
- Heat mapping of attributes, within buildings, across neighborhoods and territories
- Better understanding of facility usage
- Workplace analytics
- Correlation of conditions to productivity
THANK YOU!

CONTACTS:

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