Lightning Session: Residential and Commercial Programs

Moderator: Teresa Daviés, DNVGL
10 Presenters in 100 minutes!

Spark of interest
Bolt of inspiration
Flash of possibilities
Presenters

- Smart Thermostats for the Small Business Gap: **Joe Bickham**, Consumers Energy
- Tariff-Based Utility Financing of Energy Efficiency Measures behind the Meter
  **Walter Nixon**, Arkansas Public Service Commission
- Tuning Programs, Tracking Contractors, and Targeting Inspections with Near Real-time Data: **Sarah Norris**, EnergySavvy
- Optimizing ENERGY STAR® Retail Products Platform through Field Services
  **Alice Liddell**, ICF
- Residential Energy Efficiency: New Technologies and Data to Enable Value-added Savings
  **Steve Dunn**, US Department of Energy
- Keeping Ahead of the Code: Innovation in Commercial New Construction Programs
  **Claire Cowan**, Seventhwave
- Beyond Incentives: Using ENERGY START® to Support the Utility as Trusted Energy Advisor
  **Erin Zayko**, Lockheed Martin Corporation
- A Customer Portfolio Approach Overcomes Lack of Resources and Drives Results:
  **Maged Kafafy**, DNV GL
- From Crickets to Cash Crops: How to Grow Customer Satisfaction and Savings in the Agriculture Market: **Duane Watson**, Franklin Energy
Consumers Energy Pilots
Business Smart Thermostats

Joe Bickham
October 31, 2017
Business Smart Thermostat Pilot

Testing smart thermostats to bridge the gap for Small Business customers

- Small sample - ~400 units at ~150 locations
- Direct Install - ecobee EMS Si commercial and ecobee3 residential models
- Free - customer training/support
- Evaluation - historical usage and engineered modeling of run time data
Pilot Takeaways

Successes:
• Customers happy
• Convenience factor high
• Products reliable
• Data plentiful

Challenges:
• SB Equipment more complex
• WIFI, wiring less available
• Analytics, “meh”
• Products not SB market ready
What comes next?

- Preliminary results indicate 3-6% natural gas savings
- More thermostats (ecobee4) being installed
- Extended run-time data evaluation to establish program persistence
- New commercial products may better match market
Leapfrogging On-Bill Financing (OBF) with Tariff-Based Financing (TBF) of EE Behind the Meter

Wally Nixon
Commissioners’ Legal Advisor
Arkansas Public Service Commission
wnixon@psc.state.ar.us
October 31, 2017

Presented at the 2017 ACEEE National Conference on Energy Efficiency as a Resource
On-Bill Financing (OBF) involves:

- **a loan** to a customer, with all elements that typically implies:
  - property **ownership (no renters need apply)**
  - dealing with a **lender (bank, credit union, utility)**
  - **credit check** (debt-to-income ratio – no low-income customers need apply)
  - incurring **debt** (a loan or note)
  - a **lien** (if the borrower is a property owner)
  - possible **disconnection** for failure to make loan payment
  - possible **collection activity** for nonpayment
  - possible **foreclosure** for failure to retire loan
  - possible **impairment of property sale** if loan not paid,
  - a need for **loan loss reserve**

IOUs frequently object to OBF, citing no interest in being “banks” or collection agencies. If an IOU includes OBF as an EE measure paid for by all customers through an EE cost recovery rider, then all customers finance the loan and any associated losses, increasing costs and reducing cost effectiveness of the utility’s EE portfolio via ratepayer funding pool. Customer must engage and pay contractors for work and enforce warranties in event of repair or replacement need.
Tariff-Based Financing (TBF) involves:

- **No loan** to customer and **no means testing for eligibility** (so most of those elements on the previous slide go away) – Instead, the opt-in tariff provides that **the utility** (so far, electric cooperatives):
  - **takes out the loan** from its low-cost lender (e.g., CFC ~ 4.5%)
  - **invests** in cost-effective EE on the customer side of the meter. This is key,
  - **engages and pays installers** for all EE improvements (LEDs, HVAC replacement, attic insulation, duct and air sealing)
  - **owns and warrants performance of measures** and exercises leverage to obtain extended warranties; enforces quality assurance
  - **finances measures for up to 10-12 years** (when measure costs are retired, ownership transfers to property owner)
  - **repairs or replaces non-performing measures and enforces warranties**
  - **places the costs as a fixed charge onto the customer’s bill, as offset by the kWh and bill savings** (at least 20% of energy and bill savings go to customer), thus reducing the bill in most instances. (Customers have option to do additional measures with a co-pay).
Other TBF features:

- **Renters in good bill payment status are eligible** to participate, with permission of landlord. This is why TBF is called “all inclusive” financing.
- **Landlord has little incentive to say no, since her property gets improved and her tenant’s bills go down, making it easier to pay rent**
- **No credit score or check needed** since no loan to customer
- **No lien** on property since no loan
- **Little risk of disconnect and collection activity** (only for failure to pay utility bills when vacating or selling property – the same as with non-TBF customers). Successor tenant/owner picks up future payments under tariff.
- **No risk of foreclosure or impairment of property sale for failure to pay loan and diminished need for loss reserve** (since there is no loan)
- **No subsidies by other customers, no ratepayer funding pools** – every customer pays own way via the tariff-based charge for measures that lower the bill.
- **Property owners are obliged under the PAYS® program to notify successor owners and tenants of the tariffed charges riding with the meter** (and almost invariably the associated lower bills than otherwise would be the case, owing to reduced energy usage).
Are there real-life examples of TBF?

- Cooperatives increasingly favor TBF because it reduces costs paid to their wholesale (G&T) suppliers (through reductions in peak and energy usage), and lowers bills for their members, while improving affordability, comfort & livability for participants.

- After getting approval for its TBF tariff from the Arkansas Public Service Commission in 2016, Ouachita Electric Cooperative Corp. in southwest Arkansas implemented a Pay-As-You-Save (PAYS®) TBF program called HELP PAYS®. Docket No. 15-106-U.

- Given the age and low efficiency of many rural cooperative members’ homes in OECC’s service territory and the very low-income status of many members, EE measures deliver a big bang for the buck for houses that on average are using over 2,000 kWh per month (vs. an average residential customer of Arkansas IOUs being 1,000 kWh per month).
Ouachita Electric Cooperative Corporation’s TBF Program – HELP-PAYS®

- OECC had a previous OBF loan program (HELP) with low participation (46 member loans in 2015)
- Average HELP loan for single family home = $2,533
- OECC average household median income of ~$29K vs. Arkansas’s $42K, National $52K
- 8500 meters, 6500 Residential
- Housing stock 50-75 years old and very energy inefficient
- Average energy usage of residential customer in 2016: 2,015 kWh per month (non-weather normalized)
First-year Results of OECC’s HELP PAYS ® Program

- Results reported by EEtility, a Little Rock-based Benefit Corporation implementing PAYS® for OECC and across the U.S.:
- Explosive growth (3X more than total loan portfolio of former HELP program), with $1.8 million in EE investments in first 10 months under HELP PAYS®
- Average HELP PAYS® loan for single family home: $6,387 (30% with avg. co-pay of $1,158). Avg. loan period: 12 years.
- 100% of multi-family housing units in OECC service area participated, with landlord approval and participation (including upgrades co-pays)
- 88 participants were multi-family and single family renters
- 173 HVAC units installed (including highly efficient mini-split replacements of window units)
- Early estimates show drop in peak demand averaging nearly 2 kW per participant (~ $250-$300 in annual avoided demand costs per customer paid by OECC to its wholesale supplier)
- Est’d 22% reduction in avg. participant’s kWh usage (non-weather normalized) from 2016 to 2017 (2015 kWh/mo. reduced to 1,559 kWh/mo.)
More Ouachita Results:

- 258 energy assessments => 235 cost-effective offers
  => 224 retrofits (90%) = 3.7% market penetration of customer base
- Supporting 20+ good paying jobs for EE contractors and installers
- Increasing availability of high-efficiency products and equipment, not previously found in the region
- Attracting attention of Arkansas business community.

Headlines:

- *Arkansas Business* magazine (two articles in same issue), September 11, 2017:
  - “No Catch: Lower Electric bills Pay for High-Efficiency Retrofits” and
  - “PAYS: Too Good, But True – Editor’s Note”
Tuning Programs, Tracking Contractors, and Targeting Inspections with Continuous Measurement

Sarah Norris, Director of Client Solutions
October 31, 2017
The Primary Challenges...

- Lack of Timely/Granular Feedback
- Lagging evaluation results are less useful
- Low project quality and dissatisfied customers
- Costly field inspections
- Data collection is time-intensive and costly
- Need for target marketing
- Costly field inspections
- Lack of insight into contractor and project performance
- Lack of granular data
- Lack of actionable data for planning/design
- Planning
- Evaluation
- Implementation
- Design

The Primary Challenges...
Program Results Today

“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”
With Continuous Measurement…

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
Contractor Management Today

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.

**Legend**
- Can they do more?
- Can we transfer best practices?
- Immediate correction necessary!
- Sign them up for training

**Actual Performance (Metered Savings/Expected Savings)**
- Low Volume, High Performance
- Low Volume, Low Performance
- High Volume, High Performance
- High Volume, Low Performance

**Total Expected Savings**
Contractor Management

Challenge
Managing a large network of contractors

Solution
Monitor performance of individual contractors

60+ independent contractors
Continuous monitoring of programs and contractor performance
### Contractor Scorecard

#### Challenge

Contractors are unaware of their project performance

#### Solution

Issue scorecards to contractors to communicate performance of projects

### Contract Scorecard

<table>
<thead>
<tr>
<th>Score Category</th>
<th>Score</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of measure installation</td>
<td>2.5 / 3</td>
<td>Top 25%</td>
</tr>
<tr>
<td>Scope of work</td>
<td>8.4 / 10</td>
<td>Top 25%</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>8.4 / 10</td>
<td>Top 50%</td>
</tr>
<tr>
<td>Savings achieved</td>
<td>78%</td>
<td>Top 50%</td>
</tr>
<tr>
<td>Overall score</td>
<td>9.2 / 10</td>
<td>Top 25%</td>
</tr>
</tbody>
</table>

Your total savings to date: 132,000 kWh

---

Program Manager
John Smith, PMP
(937) 555-1254
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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)
Sarah Norris
Director of Client Solutions
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949-683-7276
Optimizing ENERGY STAR® Retail Products Platform Through Field Services

Alice Liddell and Alex Sloan, ICF
Agenda

- What is the Retail Products Platform (RPP)?
  - Who is participating
  - Product categories

- Field Services & RPP
  - Goals
  - Training
  - Materials
  - Feedback
  - Meeting Multiple Needs

Source:
What is the Retail Products Platform (RPP)

- **COLLABORATION**: An initiative of ENERGY STAR®, energy efficiency program sponsors, and retailer partners. Facilitated by the U.S. Environmental Protection Agency.

- **GOAL**: Transform markets by streamlining and harmonizing energy efficiency programs with retailers, making them less complex and more cost-effective.

- **PROPOSITION**: Increasing availability of ENERGY STAR® products will generate energy savings as customers purchase and install these more efficient models in their homes.
Who is Participating?

<table>
<thead>
<tr>
<th>Participating Retailer</th>
<th>Total U.S. Stores (2016)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Best Buy</td>
<td>1,034</td>
</tr>
<tr>
<td>Home Depot</td>
<td>1,965</td>
</tr>
<tr>
<td>Kmart</td>
<td>869</td>
</tr>
<tr>
<td>Sears</td>
<td>688</td>
</tr>
</tbody>
</table>

Source: https://www.energystar.gov/ESRPP
2017 RPP Products

- Refrigerators
- Clothes Washers & Dryers
- Freezers
- Room Air Conditioners
- Sound Bars
- Room Air Cleaners
# 2017 Product Breakdown By Retailer

<table>
<thead>
<tr>
<th>Retailer</th>
<th>Clothes Dryers</th>
<th>Clothes Washers</th>
<th>Refrigerators</th>
<th>Freezers</th>
<th>Room ACs</th>
<th>Air Cleaners</th>
<th>Soundbars</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEST BUY</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>Sears</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<td>kmart</td>
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<td>✔️</td>
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<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>HOME DEPOT</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
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<tr>
<td>nationwide</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
</tbody>
</table>
Field Services & RPP
Field Service Visits

- Goals
- Provide Training
- Apply Materials
- Receive Feedback
Field Visit Goals

- Representation as an “Energy Partner”
- Shift conversation from rebates to energy efficiency features
- Add a tool to Retail Sales Associate’s (RSAs) “sales toolbox”
Training

- **Training New Retail Sales Associates**
  - Explanation of RPP
  - Utilizing RPP Point of Purchase (POP) materials during customer interactions
  - Discussion of [insert RPP product] energy efficiency features
  - Value of RPP products to customer

- **Reinforcement Training**
  - Have you had the opportunity to test out some of the efficiency messaging?
  - Are there any energy-related questions you’ve received from customers?
  - Deeper dive into efficiency features
Apply & Provide Materials

- Provide Retail Sales Associates with a copy of the ENERGY STAR® Retail Products Platform program summary and talking points
- Strategic application of Point of Purchase (POP) materials
  - Templates are available
Feedback

Associate Feedback
- Retail Sales Associates appreciate information – especially stores with no utility rebates. Particularly those receiving commissions.

Reporting Back
- Newer program concept – translation of field findings to program management is vital
- Examples – new products, placement on end caps, RSA success stories, issues with POP

The use of field teams is essential. These teams help keep associates informed on utility programs and ensure thorough placement of utility signage. We truly appreciate these field teams supporting our sales associates with the tools and resources to help promote qualifying RPP products.”
Art Christianson, Sr. Manager, Utility and Government Rebates, The Home Depot

“It’s great having the [RPP] stickers up; it has been a helpful reminder for me to talk about efficiency with customers.”
– Alicia, Retail Sales Associate, Best Buy/Pacific Sales, Pleasant Hill, CA
Field Services Fills Several Needs
ACEEE Energy Efficiency as a Resource 2017

Residential Energy Efficiency: New Technologies, Tools and Data

Steve Dunn, U.S. DOE, Office of Energy Efficiency and Renewable Energy
Building Technologies Office

October 31, 2017
Overview

• Residential Energy Efficiency Technologies
  – HVAC systems (performance optimization and diagnostic tools)
  – Cold climate air source heat pumps
  – Heat pump water heaters

• NREL ResStock
  – Data, tools and resources on residential energy efficiency measures and savings potential

• Online Resources and Contact Information

• Happy Halloween!
Optimizing HVAC System Performance

3 million HVAC replacements annually

Research indicates 50% to 70% of systems are improperly designed, installed, or maintained

$14 billion HVAC service/repair expenditures annually

Improper installations are estimated to be 10% to 50% less efficient than they should be

Opportunity: Improve field performance of HVAC system installation through use of tools and resources for optimizing HVAC system installation, performance verification and diagnostics
Defining Core Functions:

- **Design**
  Load calculation, sizing, equipment selection, and system design

- **Commissioning and Verification**
  Smart service tools, extended analysis, and airflow direct measurement

- **Performance Monitoring**
  OEM installed or after market sensors and software for capacity and system performance monitoring
Cold Climate Air Source Heat Pumps

• Cold climate heat pump technologies benefits:
  – Capable of displacing 60-80% of heating loads
  – Ductless systems with single, multi-zone configurations
  – Savings potential: up to 1.1 quads / year

• Heat pumps are most cost-effective when replacing:
  – Oil/propane boiler (at end of life)
  – Propane/electric furnace + AC (at end of AC’s life)
  – Electric baseboard (anytime)

• Resources available from the Northeast Energy Efficiency Partnerships (NEEP):
  – Design and installation field guides
  – Cold climate heat pump specification
  – Northeast Region Air Source Heat Pump working group
Heat Pump Water Heaters

• Heat Pump Water Heater (HPWH) technology benefits:
  – use 60-70% less energy than electric-resistance water heaters.
  – New HPWH models have an Energy Factor of 3.5
  – Save $340 and 1,740 kWh annually versus electric-resistance water heater per household
  – National savings potential: up to 1 quad / year

• Key barriers:
  – first costs
  – emergency replacement-driven market
  – trade/consumer awareness
ResStock features and capabilities:

- Cloud-based, open source platform
- Assess baseline housing stock conditions
- Estimate cost-effective savings potential for improvements
- Visualize data by state or portfolio of measures
Example: Attic Insulation (US and Michigan)
Example: Wall Insulation

**Opportunities:**
- Add wall insulation to homes with uninsulated walls or inadequate insulation levels
- Add insulation to wall cavities and insulated sheathing when re-siding
State Fact Sheets (coming soon)

Actionable results for states and cities

Cost-effective savings for Virginia

Top 10 Upgrades

<table>
<thead>
<tr>
<th>Upgrade</th>
<th>Statewide Electricity Savings [TWh/yr]</th>
<th>Per-House Electricity Savings [kWh/yr]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upgrade Electric Furnace (and AC) to High-EF, Heat Pump at wear out</td>
<td>-</td>
<td>5,000</td>
</tr>
<tr>
<td>Drill-and-Fill Wall Cavities</td>
<td>1</td>
<td>10,000</td>
</tr>
<tr>
<td>Ductless Heat Pump (displaces electric baseboard)</td>
<td>2</td>
<td>15,000</td>
</tr>
<tr>
<td>LED Lighting</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Smart Thermostat</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Upgrade Electric WH to HPWH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duct Sealing &amp; Insulating</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foundation Wall Ins. (Bent, Crawl)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-49 Attic Ins.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Sealing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Utility bills 1.5 billion dollars per year
Summary

• The residential sector has significant energy savings potential
  o ResStock modeling finds most states can cost-effectively reduce residential electricity consumption by up to 30%

• Utilities, state and local governments, and home improvement service providers can use DOE / National Lab decision support tools and data to:
  o Estimate savings potential and develop market strategies
  o Identify and implement cost-effective measures
  o Provide technical guidance to trades
  o Communicate benefits and opportunities to households and stakeholders
NEW Online Resources

• Residential Program Solution Center: **Technology Solutions**
  – Efficient HVAC technologies
  – Heat pump water heaters
  – Envelope measures (coming soon)

• ResStock (NREL)
  – Read the [report](#)
  – View the [recorded webinar](#)
  – Access the [Visualization Tool](#) and [State Fact sheets](#) (coming soon)
Contact Information

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ResStock: Eric Wilson, NREL
Eric.Wilson@nrel.gov
Halloween Treats
@Energy Pumpkin Carving Stencils

Available for Download at:


Share on social media at: #energyween
Celebrate ‘Energyween’!

Download the Spooky Infographic and more at:
https://energy.gov/energyween
Geo-Blitzing Direct Install Program

Engaging Underserved Rural and Urban Small Business Customers
Who, What, and Why

- wattsmart Small Business Direct
  - Willdan Energy Solutions chosen to design and implement
- ~65,000 square miles of territory
- ~40,000 eligible customers
- New design offers direct-install services
  - Willdan implements administration and sales to install
- Eligible customers < 200kW past 12 months
- Incentive is 75% and $4,000 cap
- Average savings 8,200 kWh
- Approximately 1,600 projects in 2017
- Rural customer focus on the underserved
  - Historically ~<2% participation
  - Lack of trade allies, upfront costs and time

Cedar City, Utah (2-month geo-blitz)
203 audits, 194 projects sold
1.5 million kWh savings in first year
Successes and Challenges

Success

- Participation - 14% rural and 6% urban
- High percent of savings ~30% of usage
- High level of T-12s removed in rural areas
- High level of community engagement
- Ease of participation for the customer

Challenges

- Geo-blitz duration and locations
- Limited measures and incentive cap
- Each community unique and unknown
- Some Trade Allies are not happy and are unwilling to partner with Willdan
Lessons Learned

- All communities are unique
- Civic and community leaders have different perspectives and priorities
- No project or customer is the same
- Some utility Trade Ally partners view offer as competition
- Duration of geo-blitz was not always long enough
- Savings opportunities left behind
- Multiple utility offers confuse customers and trade allies

Lander, Wyoming (1.5-month geo-blitz)
48 audits, 47 sold projects
413,225 kWh saved in first year

Photo Credit: Brad Christensen, Flicker
Key Takeaways: Looking Forward

- Increase civic and business leadership engagement
  - Incorporation of Small Business Direct into community energy planning
- Increase Trade Ally participation in remote rural communities
- Increase geo-blitz duration, depth of savings increased
- Increase measure offers:
  - Add smart T-stats, refrigeration, and exterior lamp replacement; not fixture and lighting controls
- Increase project size to better serve customers and improve cost-effectiveness

Springdale, Utah - Scheduled for 2018
105 eligible customers
300,000 kWh savings potential
Questions and Contact Info

- Rocky Mountain Power *wattsmart* Small Business Direct Offer
  - [https://www.rockymountainpower.net/bus/se/utah/sb.html](https://www.rockymountainpower.net/bus/se/utah/sb.html)
- Willdan Energy Solutions
- Jason Berry, Principle Program Manager, Willdan Energy Solutions
  - 801-641-7041
Keeping Ahead of the Code
Commercial New Construction Program Innovation

Claire Cowan
Director of Program Design & Delivery
Seventhwave
Energy codes

Source: ACEEE based on analysis from Pacific Northwest National Laboratory
Chicago benchmarking data
“The greatest opportunity to identify and influence deep savings is pre-schematic design, where the program supports quick early simulations and EUI targeting.”

– ACEEE New Horizons for Energy Efficiency: Major Opportunities to Reach Higher Electricity Savings by 2030; Dan York, Steven Nadel, Ethan Rogers, Rachel Cluett, Sameer Kwatra, Harvey Sachs, Jennifer Amann, and Meegan Kelly; September 2015.
3 year Department of Energy initiative to scale performance-based procurement
Accelerate Performance program track

- Engage owners and developers before a design team is selected
- Help owners select an EUI target
- Concept modeling to inform efficiency strategy
Accelerate Performance program track

- Support integration of energy performance requirements in RFP and contract docs
- Validation of M&V plan
- 40% increase in per kWh incentive
<table>
<thead>
<tr>
<th>Planning</th>
<th>RFP</th>
<th>SD</th>
<th>DD</th>
<th>CD</th>
<th>Construction</th>
<th>Operations</th>
</tr>
</thead>
</table>

- **Early outreach:** owner & developer focus
- **Benchmarking concept modeling RFP contracts**
- **Modeling v. code baseline**
- **Pay incentive**

Current practice: "Energy performance based procurement"
Results to date

✓ One completed project has a year of operating performance data

✓ 26 projects currently enrolled in AP

✓ 31 projects in outreach

✓ Ramping up outreach to public sector customers
Building a bridge to MBCx

Building **without** monitoring plan

Building **with** monitoring plan

Additional savings could be found from optimizing performance

Building **with** monitoring plan and optimized with energy model
## Expedited modeling solutions

<table>
<thead>
<tr>
<th>ECM #1 – Upgrade Roof Insulation</th>
<th>Disable Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Roof U-Value: 0.032 BTU/hr ft² °F</td>
<td>Better 0.03</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECM #2 – Upgrade Wall Insulation</th>
<th>Disable Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Wall U-Value: 0.055 BTU/hr ft² °F</td>
<td>Better 0.043</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECM #3 – Improve Glazing U-Value</th>
<th>Disable Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Glazing U-Value: 0.42 BTU/hr ft² °F</td>
<td>Better 0.342</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECM #4 – Improve Glazing SHGC</th>
<th>Disable Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Glazing Solar Heat Gain Coefficient: 0.4</td>
<td>Better 0.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECM #5 – Efficient Interior Lighting</th>
<th>Disable Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline Interior Lighting Power: 0.82 W/ft²</td>
<td>Better 0.73</td>
</tr>
</tbody>
</table>
RESIDENTIAL HIGH RISES
WITH 40% WWR OFFER UP TO:

- 25% LOWER ANNUAL ENERGY COSTS
- 25% LOWER GREENHOUSE GAS EMISSIONS
- 1,000 MORE COMFORTABLE HOURS PER YEAR
- 45% MORE USEFUL DAYLIGHTING

PLUS

- OPTIMIZATION OF PRIVACY AND VIEWS
- MORE HOURS WITH SHADES OPEN
- INITIAL HVAC COST REDUCTIONS
- THERMODYNAMIC RADIANT HVAC FEASIBILITY
- A PATH TOWARD ARCHITECTURE 2050

ACHIEVE HIGH PERFORMANCE
Window-to-Wall Ratio in High Rise Residential Buildings

There is an expectation that continuous floor-to-ceiling glass in residential units will yield better daylighting and views. It turns out this is not always the case. In an extreme climate like the one we have in Northern Illinois, occupants of residential units with continuous floor-to-ceiling glass are likely to be less comfortable and have less privacy. Glazing upgrades and exterior window shading provide adequate solutions to these problems and may further compromise daylighting and visual comfort.

The same multi-family building designed with 85 percent WWR will have higher annual energy costs (and carbon footprint) than a comparable building with the prescriptive energy code maximum of 40 percent glazing. In fact, the quantity of exterior glazing is likely to have a greater impact on energy consumption and occupant comfort than any other decision in the design of a Chicago residential high rise.
Lessons learned

✓ Keep innovating your program approach
✓ Stay focused on what building owners care about
✓ Find new ways to improve technical service delivery
✓ Deliver high quality education to reach deeper engagement with key stakeholders
Thank you

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Beyond Incentives: Using ENERGY STAR ® to Support the Utility as Trusted Energy Advisor

Erin Zayko, Lockheed Martin Energy
Tracy Narel, U.S. EPA ENERGY STAR

ACEEE 2017 National Conference on Energy Efficiency as a Resource
Oct. 30 – Nov. 1
The biggest little label in energy efficiency

- 5.5 billion products
- 30,000 buildings
- 130 industrial plants
- 1.7 million homes
To date, the ENERGY STAR program has helped Americans:

- Save $430 billion
- Save 4.5 trillion kWh of energy
- Avoid 2.8 billion tons of GHG emissions
ENERGY STAR for Buildings and Plants
Assess whole building energy and water consumption


energystar.gov/benchmark
Find Utilities that Provide Energy Data for Benchmarking

www.energystar.gov/utilitydata
Current Situation for Utilities

- Face increasing EE goals
- Tight budgets
- Hard-to-reach sectors
- Customer interest in more than prescriptive incentives
- Small % of customers = majority of load

Source: Energy Efficiency, Demand-Side Management and Conservation Programs at Public Power Utilities, January 2017, American Public Power Association
Eversource Hypothesis:

Deep engagement of the largest customers could yield significant success, while more self-service customer engagement platforms could complement mass market programs.

Comprehensive Approaches Emerging

Utilities Offering Strategic Energy Management
(8 of top 10)

Utilities Offering Whole Building Retrofit
(5 of top 10)
Centered on strategic energy management and a path to continuous performance improvement.
BPwES Program Elements

1. Target Marketing/Recruiting
BPwES Program Elements

2 Benchmarking

[Chart showing EPA Benchmark Scores for Portfolio]
BPwES Program Elements

Strategic Energy Management Plan

3

- Establish an Energy Team
- Benchmark Facilities
- Energy Management Action Plan
- Whole-building Assessments
- Facility Action Plans
- Implement Upgrades
- Re-Benchmark Facilities
Whole-building performance assessment is used by Building Performance with ENERGY STAR (BPwES) program sponsors to identify opportunities for energy efficiency improvements within a building. Sponsors agree to conduct at least one performance assessment per program participant. To optimize program cost effectiveness, program sponsors can work with participants that have multiple facilities to prioritize buildings within their portfolio for appropriate levels of assessment. This Performance Assessment Checklist outlines the components that should be included in an assessment in order to meet BPwES program criteria. The intent is to take an integrated approach to whole-building performance assessments, in order to identify and achieve the highest possible level of cost-effective savings across all building systems.

Process
A whole-building performance assessment should start with an analysis of whole-building energy consumption and the building’s BPI energy performance rating. With this information in mind, a walk-through visit of the building should be conducted to identify energy efficiency opportunities. An investment-grade audit is not necessary, in terms of the level of detail required for savings calculations, but the assessment should be comprehensive in scope. It should evaluate savings opportunities available through operations and maintenance, behavior change, and capital improvements. The assessment should also address all fuel types (e.g., electricity, natural gas, fuel oil). Sponsors agree to provide customers with an assessment report that includes all information in this Performance Assessment Checklist.

Checklist of Report Components
The Assessment Report should include the following components, preferably in the order listed below. Reports may vary from this general outline as long as they include the required components.

1. Executive Summary - Assessment reports should begin with a concise summary that will convey key findings to executives or other high-level decision makers. This information should include the building’s current energy performance rating and energy costs, prospective cost savings and energy performance rating after implementation of measures, and some measure of the overall financial impact of these measures (e.g., simple payback, return on investment, internal rate of return, net present value).

2. Facility Description - The assessment report should include a short description of the building itself, including the type of facility, size of the facility (square footage and number of floors), year built, and number of occupants. Assessment providers should also give a brief summary of existing building systems, including lighting, HVAC equipment, refrigeration, and any relevant observations about the building envelope. This summary does not need to include details such as lighting events or equipment nameplate information; however, it will be useful to indicate types of equipment present, in order to provide context for the rest of the report. It is also appropriate to list in this section any ongoing energy management activities or operational procedures that may help to explain building performance.
New Jersey’s Pay for Performance Program Uses Innovative Incentive Structure to Encourage Whole-Building Savings

Pre-approved P4P vendors work with customer to develop an energy reduction plan to meet a minimum threshold of 15% savings across the whole building.

Performance-based incentives are provided at key milestones:

(1) Submittal of an energy reduction plan
(2) Installation of measures
(3) Achievement of 15% savings, as verified by Portfolio Manager (12 months after project completion)

Incentives for the energy reduction plan range from $5,000 to $50,000. Incentives for the next two stages range from $0.09-$0.11/kWh, and $0.90 to $1.25/therm at each stage, with a total incentive cap equal to 50% of the project cost.
BPwES Program Elements

6 Monitoring and Verification

Savings achieved by participating buildings in the Focus on Energy Building Performance with ENERGY STAR pilot, as tracked in Portfolio Manager.
Barriers Addressed

• Lack of understanding of building performance
• Lack of management commitment and strategic energy planning
• Lack of up-front capital
• Trade ally business model driven primarily by equipment sales
Some Benefits of BPwES

• Customers like packaged solutions for energy management
• Leverage the full power of the ENERGY STAR program
• Benchmarking drives participation in utility programs
• Achieve greater savings through a strategic, whole building approach
• Customer loyalty and satisfaction
Consumers Energy Case Study

• Pilot Program (2012 – 2014)
• Full BPwES Program (2015 – Present)
• Experience to Date
  • The Pilot:
    • Enrolled more than 30 organizations; benchmarking 270 buildings
    • Overall school district-wide savings between 3-7 percent for participants in the first year
    • The pilot created 50 low-cost, no-cost projects for Consumers Energy, which achieved 420,000 kWh and 7,400 Mcf in savings
  • Results to Date of Pilot & Program:
    • Engaged 65 participants; representing over 600 buildings benchmarked
    • Leading to over 280 CapX projects
    • Resulting in over 9,000 MWh of electric and 88,000 Mcf of natural gas savings
More information about Consumers Energy’s experience with BPwES

Leveraging Whole-Building Performance Programs to Drive Deeper Savings: Consumers Energy and Building Performance with ENERGY STAR®

Amy Glapinski, Consumers Energy, Jackson, MI
Tracy Narel, U.S. Environmental Protection Agency, ENERGY STAR®, Washington, DC
Nora Lovrien Buehler, ICF, Washington, DC
Kyle Crosby, ICF, Washington, DC
Lockheed Martin Lessons Learned from Implementing ENERGY STAR

1) Clearly explain ENERGY STAR Score and other metrics

2) Be clear in how benchmarking is a benefit

3) The less work the customer has to do, the more willing they are to participate.

4) Portfolio Manager an accountability tool

5) The space between benchmarking and measures can be murky
ENERGY STAR is recruiting BPwES partners to learn from the utility experience to adapt the model.

Contact:

Tracy Narel
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Customer Portfolio Approach
Overcome lack of resources and drive results
Challenges

- Med-size Energy users do not have specific programs
- Med-size Energy users do not have assigned resource to manage their EE
- Not enough utilities resources
- Tiered Offer with an add-on Energy Management Bonus
Portfolio Approach

Portfolio Approach Offer

Tiered Offer
- Standard measures within options
- Additional incentives for larger projects

Energy Management Offer (Bonus)
- Energy Manager
- Additional incentives by following Energy Manager Plan
Tiered Option – two years to complete all projects

Tier 1
Select 3 options
20% additional incentive

Tier 2
Select 4 options
25% additional incentive

Tier 3
Select 5 options
30% additional incentive
Energy Manager option

Step 1  Facility Assessment
- Energy Manager conducts facility assessment

Step 2  Energy Management Plan
- Includes a list of measures to implement along with road map

Step 3  Implementation
- Incentive payment flexibility

Step 4  Closeout
- Final report detailing next steps
Current Results

16 customer projects submitted and approved ($1,571,584 in incentives, 13.8 GWh saved) using only 0.2 of an FTE minimum marketing spending.
Observations and Recommendations

- Offices are the highest participants (Jurisdiction Related)
- Some segments such as groceries have applied for three times larger projects
- Tier 2 and Tier 3 three have minimal participation
  - Tiers were recommended to become one flat offer
- Energy Management bonus is going to be picked up by another program
From Crickets to Cash Crops: How to Grow Customer Satisfaction and Savings in the Agricultural Market

2017 ACEEE National Conference on Energy Efficiency as a Resource
Duane Watson- Agriculture Program Specialist
CONSUMERS ENERGY

- Largest Utility in Michigan
- Electric and Natural Gas Distribution in Rural Territories
- Agriculture is the 2nd Largest (Usage) Sector
  - 55,000 C&I + Many More Residential Agriculture Accounts
- Business Energy Efficiency Program - Agriculture
  - Piloted in 2011, Transitioned to a Specialty Program in 2014
Who Helps Drive the Program?
WHO HELPS DRIVE THE PROGRAM

• Trade Allies
• Michigan State University-Extension and Biosystems & Agricultural Engineering Department- Trained and Certified (USDA Tier II) Farm Energy Auditors
• Farm Bureau, Michigan Agribusiness Association
• Agricultural Business Account Manager and Ag Services Consumers Energy- many leads are generated.
• Michigan Milk Producers Association, Dairy Farmers of America & Others
UNDERSTANDING A DIVERSE CUSTOMER GROUP:
ADAPTING/ADDING PROGRAM MEASURES

• Commercial Refrigeration
• LED Lighting Incentive- Cricket Farm
• Grain Dryer Heat Recovery Retrofits
• Spectrum-Shift Poultry Lighting
• Increased VFD and Dairy Incentives
APPLE STORAGE EE POSSIBILITIES??
Increased from 7/10 in 2012 to 9.2/10 in 2016

Source: J. D. Power
AG SPECIALITY PROGRAM GROWTH REBATES PAID 2014-2017 (to date)

Incentive $ Paid To Ag Customers

- 2014: $1,207,558.00
- 2015: (amount not shown)
- 2016: (amount not shown)
- 2017: $1,207,558.00 (total to date)

Legend:
- Resid Elect
- Comm Elect
- Comm Gas
CURRENT AGRICULTURAL COMMODITY PRICES ARE CHALLENGING FOR EE PROJECTS

Class III and Michigan mailbox milk price, 2014-2016 - Sept. 2017 Christopher Wolf MSU-Extension
THANK YOU

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Questions and Discussion
Thank You

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