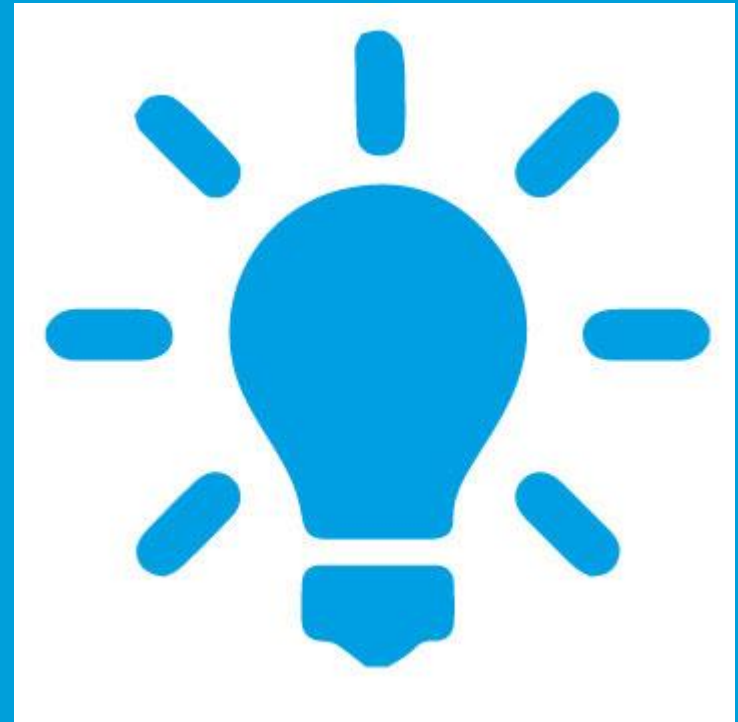


Lightning Session: Residential and Commercial Programs

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
- Geo-Blitzing Direct Install Program: Engaging Underserved Rural and Urban Small Business Customers: **Jason Berry**, Willdan Energy Solutions
- Keeping Ahead of the Code: Innovation in Commercial New Construction Programs
Claire Cowan, Seventhwave
- Beyond Incentives: Using ENERGY STAR® 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.

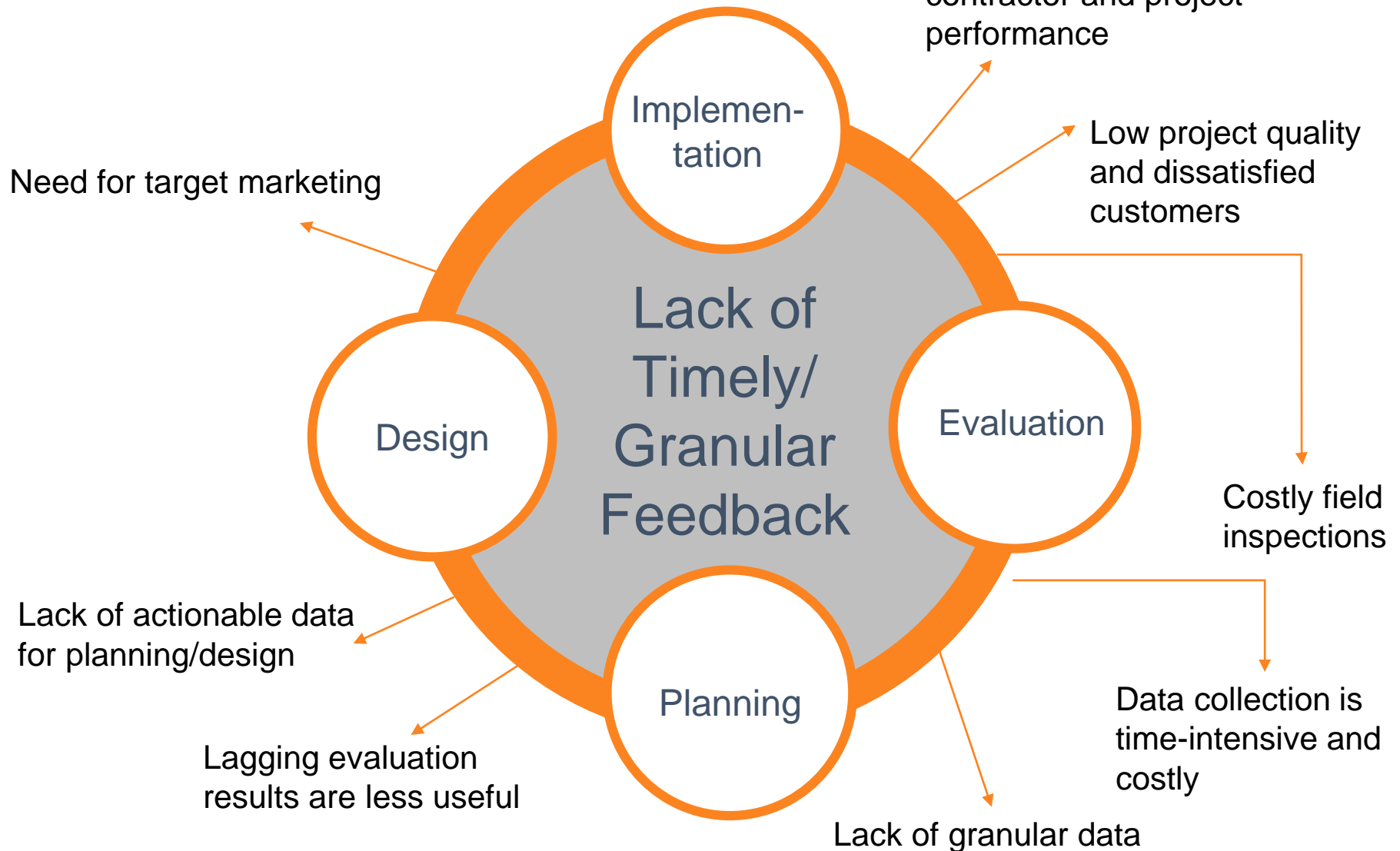
Headlines:

- *Arkansas Times*, September 1, 2017: “Free Energy: In Camden, an Innovative Program is Helping Electric customers Get Expensive, Energy-Efficiency Upgrades, Without Feeling the Pinch on Their Bill”
- *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

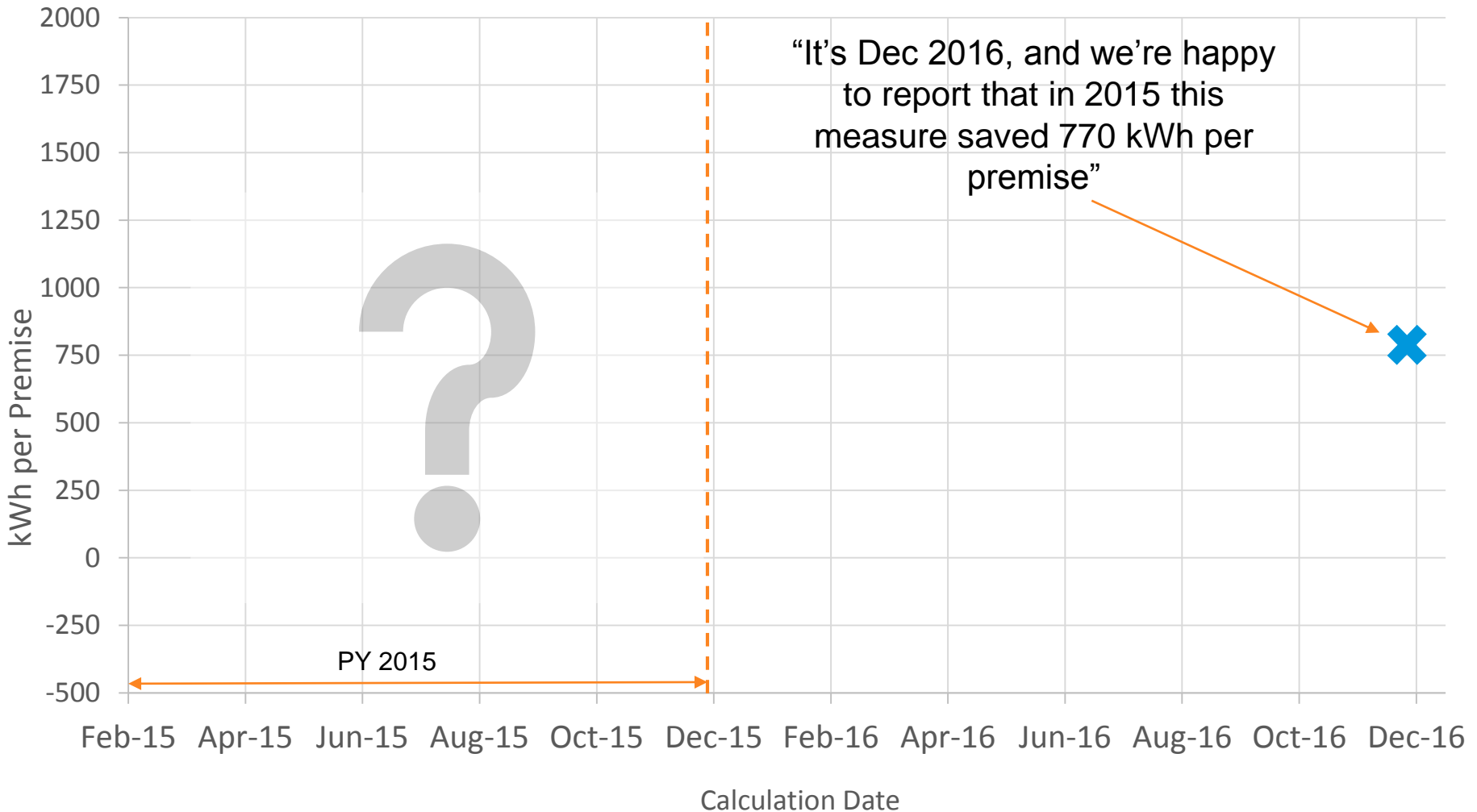
Sarah Norris, Director of Client Solutions
October 31, 2017

The Primary Challenges...



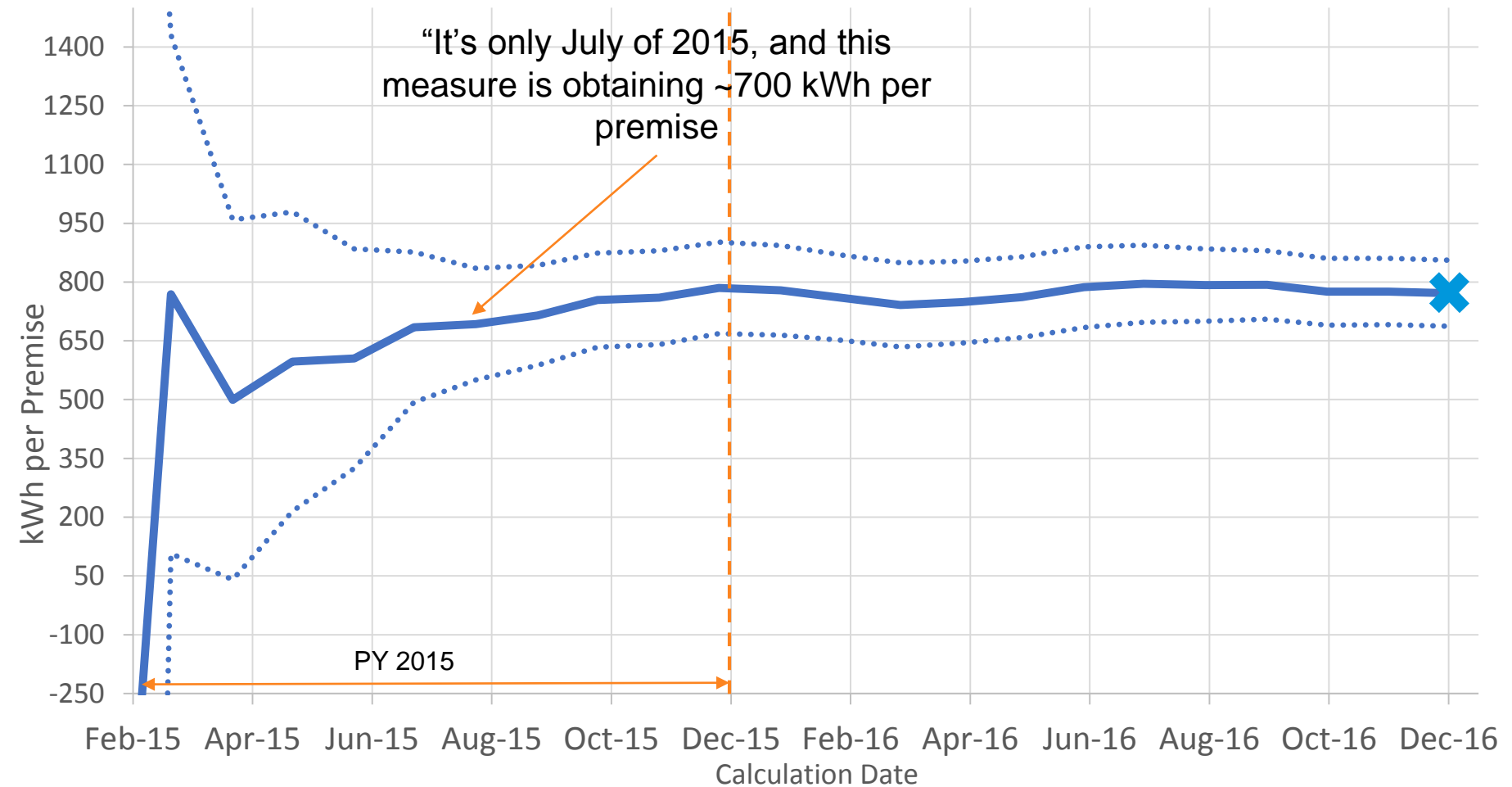
Program Results Today

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



With Continuous Measurement...

Reliable indicators of savings performance during implementation*



*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



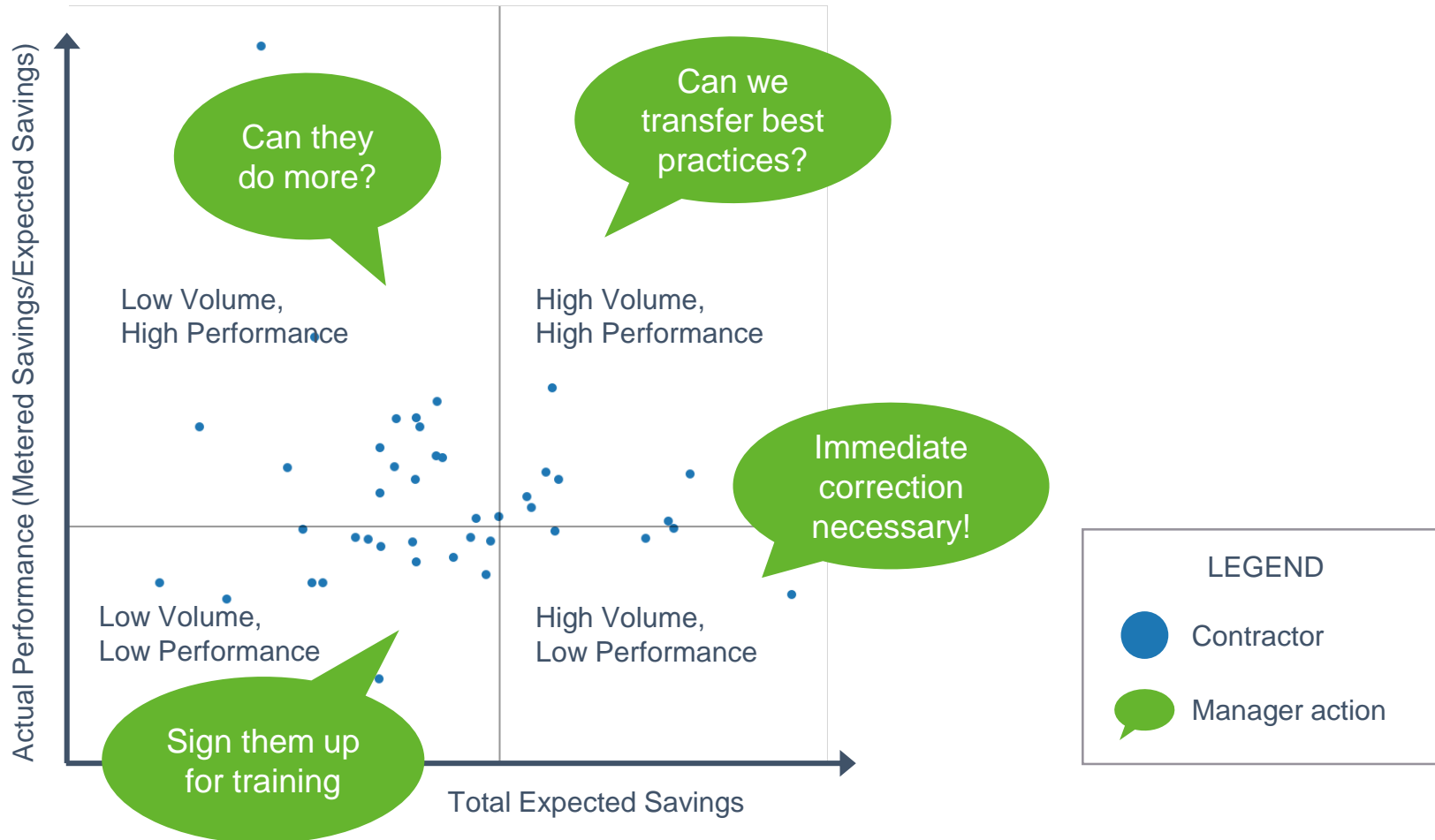
Insulation spilling from walls after residential retrofit.

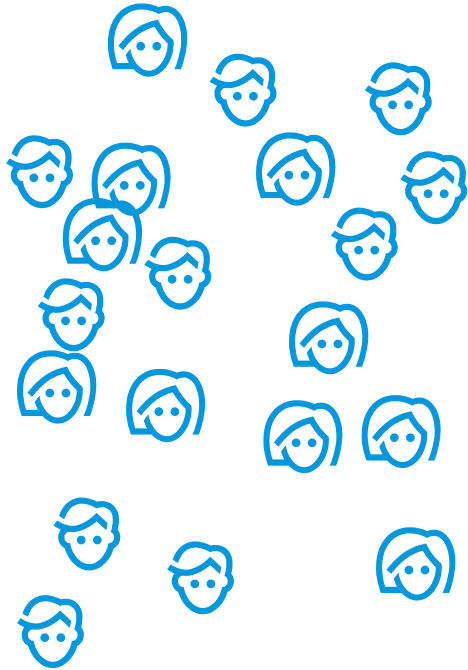


Mold found in attic after insulation installation

With Continuous Measurement...

Comparing savings at the meter to expected savings reveals good, bad and ugly.





Challenge

Managing a large network of contractors

Solution

Monitor performance of individual contractors

60+ independent contractors

Continuous monitoring of programs and contractor performance

aps Contractor Scorecard

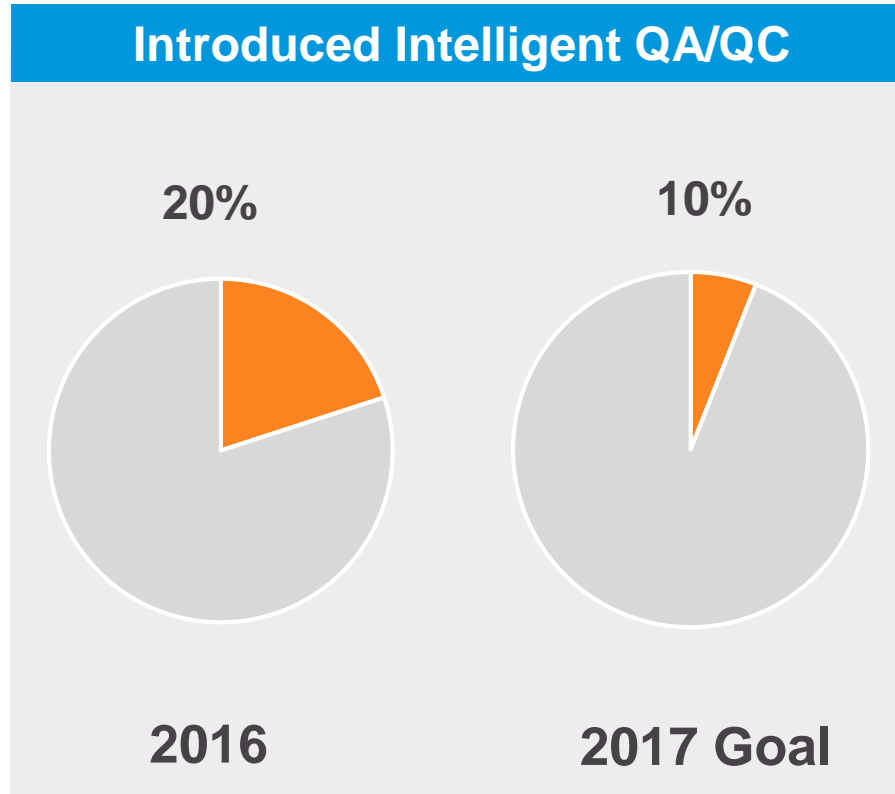


Challenge

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

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
sarah@energysavvy.com
949-683-7276

ENERGYSAVVY

Optimizing ENERGY STAR® Retail Products Platform Through Field Services

Alice Liddell and Alex Sloan, ICF

10/31/2017



Agenda

- **What is the Retail Products Platform (RPP)?**

- Who is participating
- Product categories

- **Field Services & RPP**

- Goals
- Training
- Materials
- Feedback
- Meeting Multiple Needs



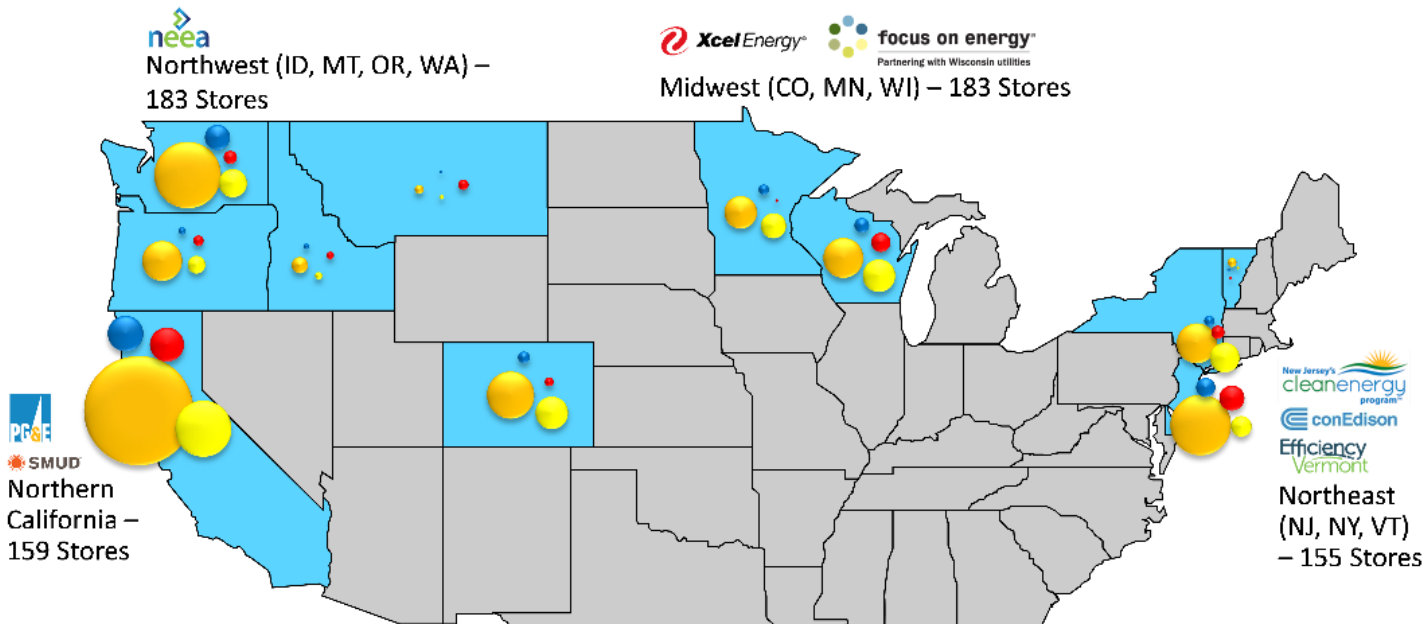
Source:

https://www.energystar.gov/sites/default/files/asset/document/ESRPP%20Pitch%20Deck_Draft_5.26.17%20-%20508%20PASSED.PDF

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?



| Participating Retailer | Total U.S. Stores (2016) |
|------------------------|--------------------------|
| Best Buy | 1,034 |
| Home Depot | 1,965 |
| Kmart | 869 |
| Sears | 688 |

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



| Retailer | Clothes Dryers | Clothes Washers | Refrigerators | Freezers | Room ACs | Air Cleaners | Soundbars |
|---|----------------|-----------------|---------------|----------|----------|--------------|-----------|
|  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
|  | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
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Field Services & RPP

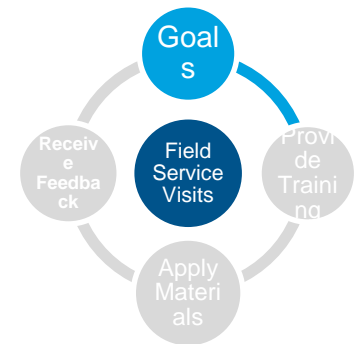


Field Service Visits



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”



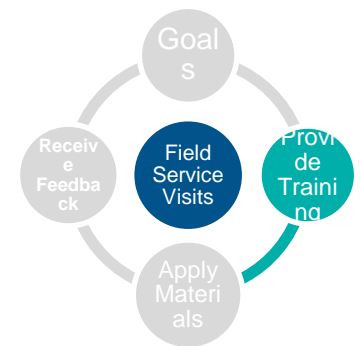
Training

■ 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

|   LEARN MORE AT energystar.gov | |
|--|--|
| Top Selling Points for Clothes Washers | <p>Save energy and money:</p> <ul style="list-style-type: none"> • Clothes washers recognized as the Most Efficient of ENERGY STAR 2017 offer on average 33% energy savings and 32% water savings compared to the federal standard. • The energy savings can save you about \$45 a year on your utility bill. <p>Innovative technology:</p> <ul style="list-style-type: none"> • A full-sized ENERGY STAR certified clothes washer uses 13 gallons of water per load, compared to the 23 gallons used by a standard machine. • ENERGY STAR clothes washers include sensors to monitor water levels and temperature. |
| Top Selling Points for Clothes Dryers | <p>Save energy and money:</p> <ul style="list-style-type: none"> • ENERGY STAR dryers use 20% less energy than conventional models without sacrificing features or performance. • Pair with an ENERGY STAR certified clothes washer for additional savings. <p>Innovative technology:</p> <ul style="list-style-type: none"> • ENERGY STAR clothes dryers use innovative energy-saving technologies, such as advanced moisture sensors that detect when clothes are dry and automatically shut off the dryer. |
| Top Selling Points for Refrigerators | <p>Save energy and money:</p> <ul style="list-style-type: none"> • ENERGY STAR Most Efficient 2017 certified refrigerators are about 15% more energy efficient than models that meet the federal minimum energy efficiency standard. • An ENERGY STAR top-freezer refrigerator uses less energy than a 40-watt light bulb. <p>Innovative technology:</p> <ul style="list-style-type: none"> • Improvements in insulation and compressors, today's refrigerators use much less energy than older models. |
| Top Selling Points for Freezers | <p>Save energy and money:</p> <ul style="list-style-type: none"> • ENERGY STAR certified freezers use 10% less energy than the federal standard. Replacing your old freezer with one that has earned the ENERGY STAR could save you \$175 over the next 5 years. <p>Innovative technology:</p> <ul style="list-style-type: none"> • Improved insulation and compressors mean today's freezers consume much less energy than older models, saving you more on your utility bill if you are replacing an older-model freezer. |
| Top Selling Points for Room Air Conditioners | <p>Save energy and money:</p> <ul style="list-style-type: none"> • Room air conditioners that have earned the ENERGY STAR use about 30% less energy than conventional models and save about \$55 over their lifetime, on average. <p>Innovative technology:</p> <ul style="list-style-type: none"> • High-efficiency compressors and fan motors, as well as improved heat transfer surfaces, insulation and timers, help save money and provide better temperature control. |
| Top Selling Points for Room Air Purifiers | <p>Save energy:</p> <ul style="list-style-type: none"> • ENERGY STAR certified room air purifiers (air cleaners) use 40% less energy than standard models. <p>Save money:</p> <ul style="list-style-type: none"> • Savings could add up to more than \$200 over appliance lifetime. |
| Top Selling Points for Sound Bars | <p>Save energy:</p> <ul style="list-style-type: none"> • ENERGY STAR qualified sound bars are approximately 60% more efficient than conventional products. <p>Innovative technology:</p> <ul style="list-style-type: none"> • There is no sacrifice in sound, quality, harmonics or performance when using ENERGY STAR certified audio products. • ENERGY STAR qualified sound bars can ensure commercials are not louder than show soundtracks. This feature is good for late-night watching and in addition, the lower volumes will save energy. |



FEATURED FOR ENERGY SAVINGS

626-1956907-2
8/1/17-12/31/17
Home Appliances

Supported by  **DTE Energy**
Know Your Own Power™



Laundry done better
For you and our planet



LAUNDRY MADE BETTER
Better for You & the Planet



Partnership

Három guide
szükséges a
szelvény
elérhető re
szekció



Featured For Energy Savings

Supported by:

 **focus on energy**
Partnering with Wisconsin utilities



Feedback

■ Associate Feedback

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

■ Reporting Back

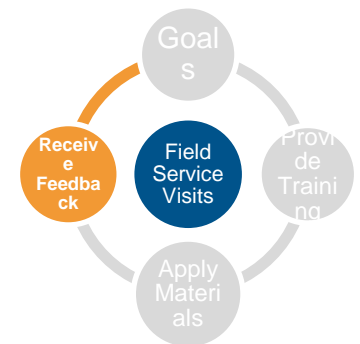
- Newer program concept – translation of field findings to program management is vital
- Examples – new products, placement on end caps, RSA success stories, issues with POP

“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

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



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




\$14 billion HVAC service/repair expenditures annually



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



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**

HVAC Installation Verification Tools: Market Snapshot

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



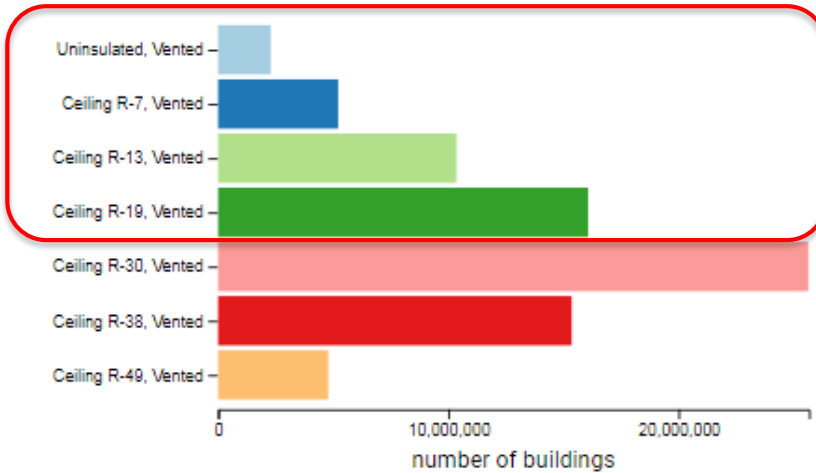
The image shows a browser window displaying the ResStock NREL website. The browser address bar shows 'https://resstock.nrel.gov'. The website header includes the ResStock logo and the NREL logo (National Renewable Energy Laboratory). Below the header, there is a 'Data Viewer' section with a 'Log In' button. The main content area features a large banner with the text 'ResStock Highly granular modeling of the U.S. housing stock' and a background image of people looking at a large data visualization screen. The screen displays various energy-related data, including 'Electricity', 'Fuel Oil', and 'Other Fuel'. Below the banner, there is a diagram consisting of three icons: an atom symbol, a server rack icon, and a cloud icon, all connected by plus signs. Below the diagram is a photograph of a server room with rows of server racks and blue lighting.

ResStock features and capabilities:

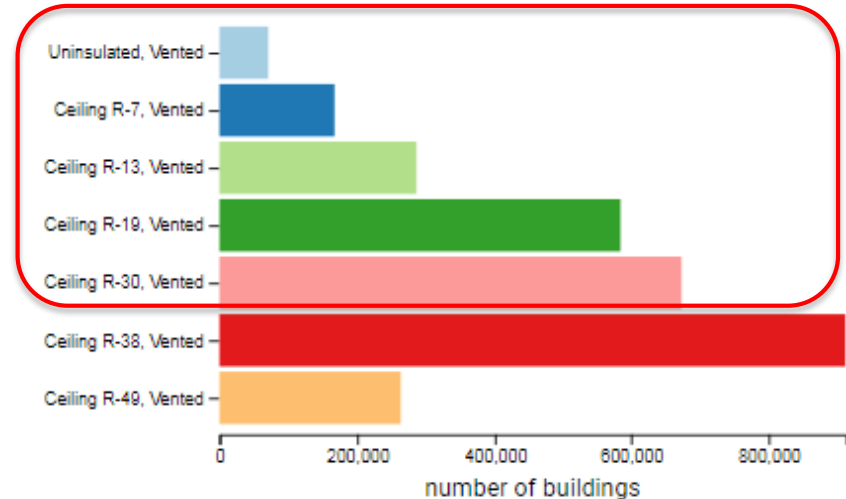
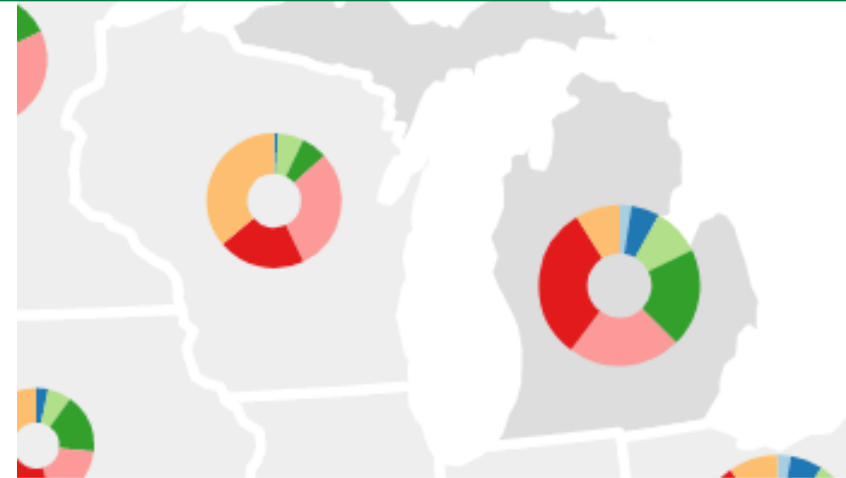
- Cloud-based, open source platform
- Assess baseline housing stock conditions
- Estimate cost-effective savings potential for improvements
- Visualize data by state or portfolio of measures

Example: Attic Insulation (US and Michigan)

Continental US



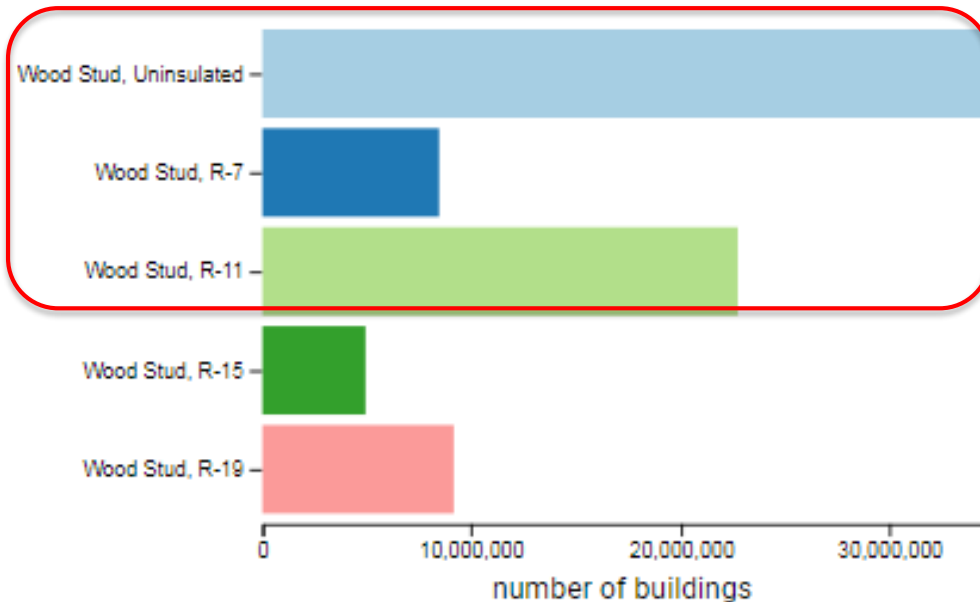
Michigan



Example: Wall Insulation

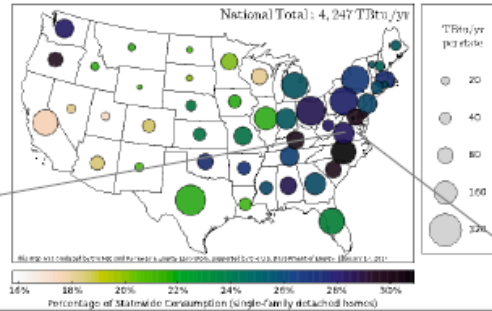
Opportunities:

- Add wall insulation to homes with uninsulated walls or inadequate insulation levels
- Add insulation to wall cavities and insulated sheathing when re-siding



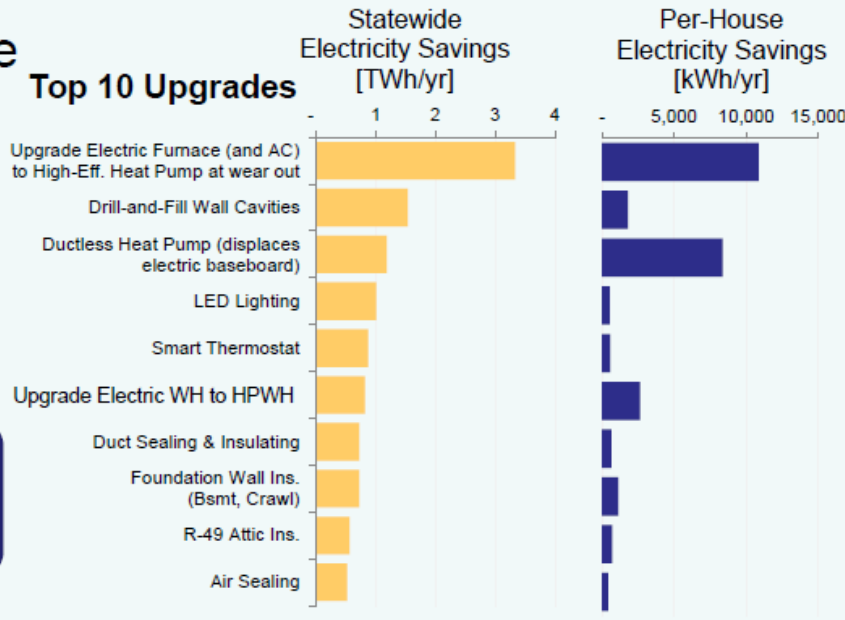
State Fact Sheets (coming soon)

Actionable results for states and cities



Cost-effective savings for Virginia

Utility bills
1.5
billion dollars per year



Summary

- The residential sector has significant energy savings potential
 - 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:
 - Estimate savings potential and develop market strategies
 - Identify and implement cost-effective measures
 - Provide technical guidance to trades
 - 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)

U.S. DEPARTMENT OF ENERGY Energy Efficiency & Renewable Energy Login or sign up to subscribe and save content.

Residential Program Solution Center

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- About
- Handbook Index
- Quick Answers
- Proven Practices
- Technology Solutions**
- Energy Data Facts
- Resource Library
- Glossary

Technology Solutions

Want to know more about the latest innovations for home energy upgrades? Explore these resources to access advanced technologies and help you reach your energy efficiency targets. As you design your program area, explore the latest research on viability, affordability, installation guidance, marketing strategies, and more.

- Heating, Ventilation, & Air Conditioning (HVAC)
- Heat Pump Water Heater
- More Solutions In Progress!

Energy Efficiency Potential

An early step for most energy efficiency planning involves identifying and quantifying energy savings opportunities and how to access this efficiency potential. Explore the [energy efficiency potential](#) for your program area and how to access this efficiency potential.

ResStock

Highly granular modeling of the U.S. housing stock

Physics-based computer modeling + Housing stock characteristics database + High-performance computing

Data Visualization

Explore existing analysis results on ResStock's interactive website. State-level results can be filtered to identify the savings potential in various segments of the housing stock, whether that is homes of a certain vintage, homes with a specific heating fuel type, or homes with a certain type of wall construction type.

Data Viewer

State Fact Sheets **Coming Soon**

State audiences can benefit from the series of fact sheets developed for the 48 contiguous U.S. states. Each fact sheet presents the potential for economic energy and utility bill savings for the state. The top ten energy savings home improvements are highlighted.

Contact Information

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DOE Building Technologies Office

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720.356.1527

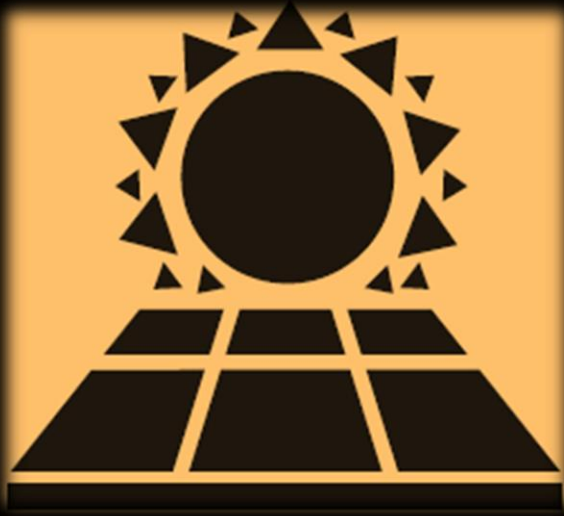
ResStock: Eric Wilson, NREL

Eric.Wilson@nrel.gov

Halloween Treats



@Energy Pumpkin Carving Stencils



Available for Download at:

<https://energy.gov/downloads/download-energy-halloween-pumpkin-carving-stencils>

Share on social media at: #energyween

Celebrate 'Energyween'!

WARD OFF *Energy Waste*

- This Halloween, keep ghosts and goblins at bay -- while saving energy and money -- with these home energy efficiency tricks.



**Download the Spooky Infographic and more at:
<https://energy.gov/energyween>**

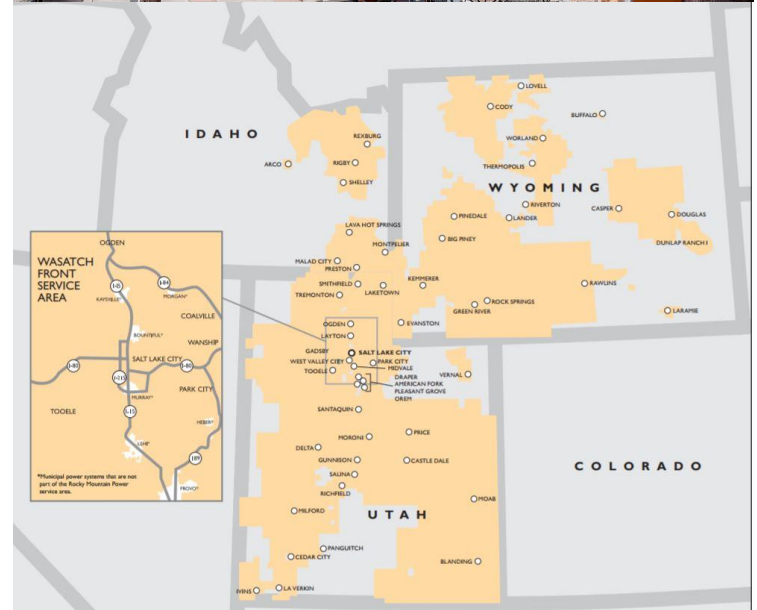
Geo-Blitzing Direct Install Program

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



*Rocky Mountain Power wattsmart Small Business
Direct Commercial Video*

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



Photo Credit: Brad Christensen, Flickr

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

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*

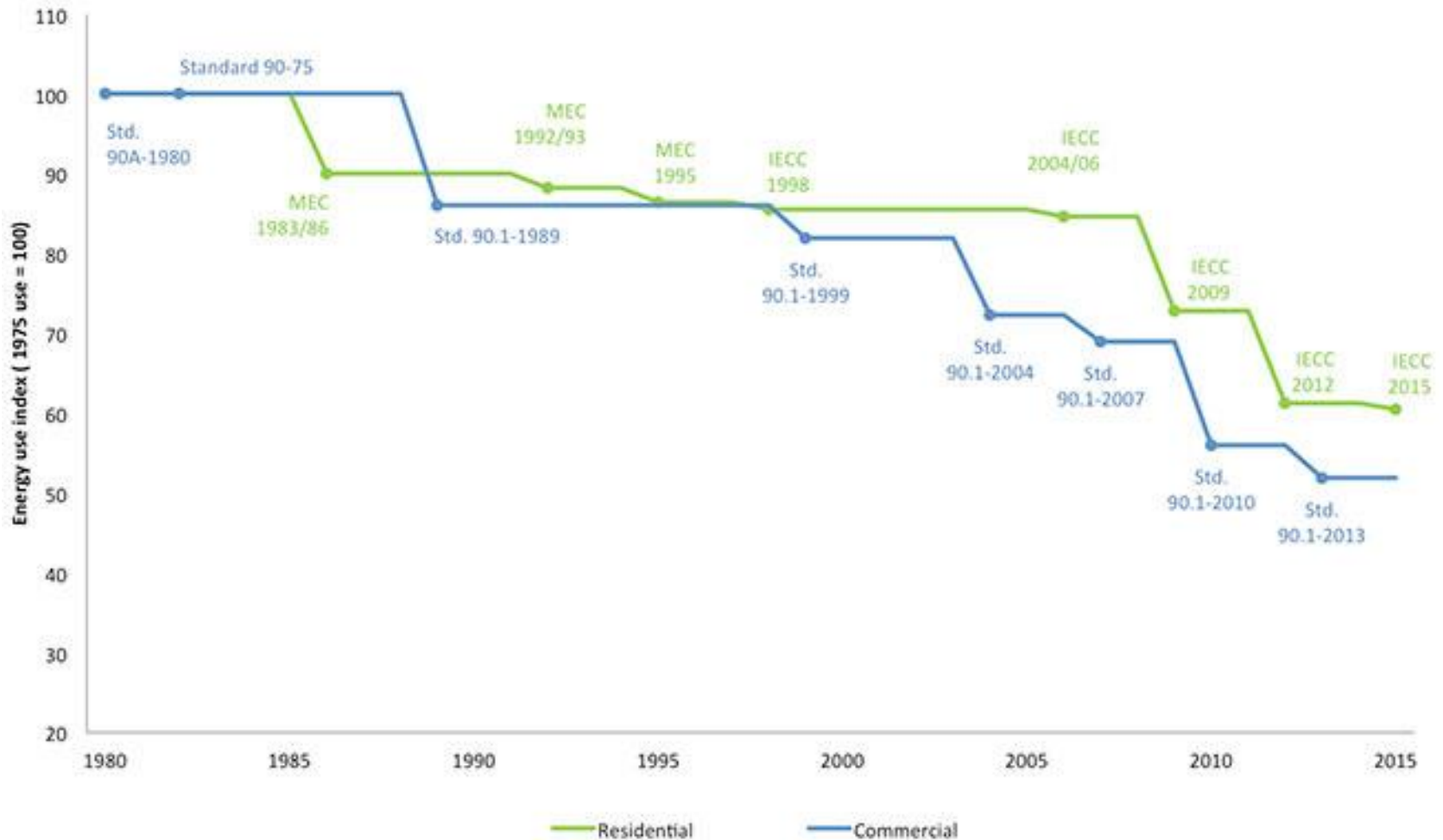
Questions and Contact Info

- Rocky Mountain Power *wattsmart* Small Business Direct Offer
 - <https://www.rockymountainpower.net/bus/se/utah/sb.html>
- Willdan Energy Solutions
 - <http://www.willdan.com/energy/>
- Jason Berry, Principle Program Manager, Willdan Energy Solutions
 - 801-641-7041

Keeping Ahead of the Code Commercial New Construction Program Innovation

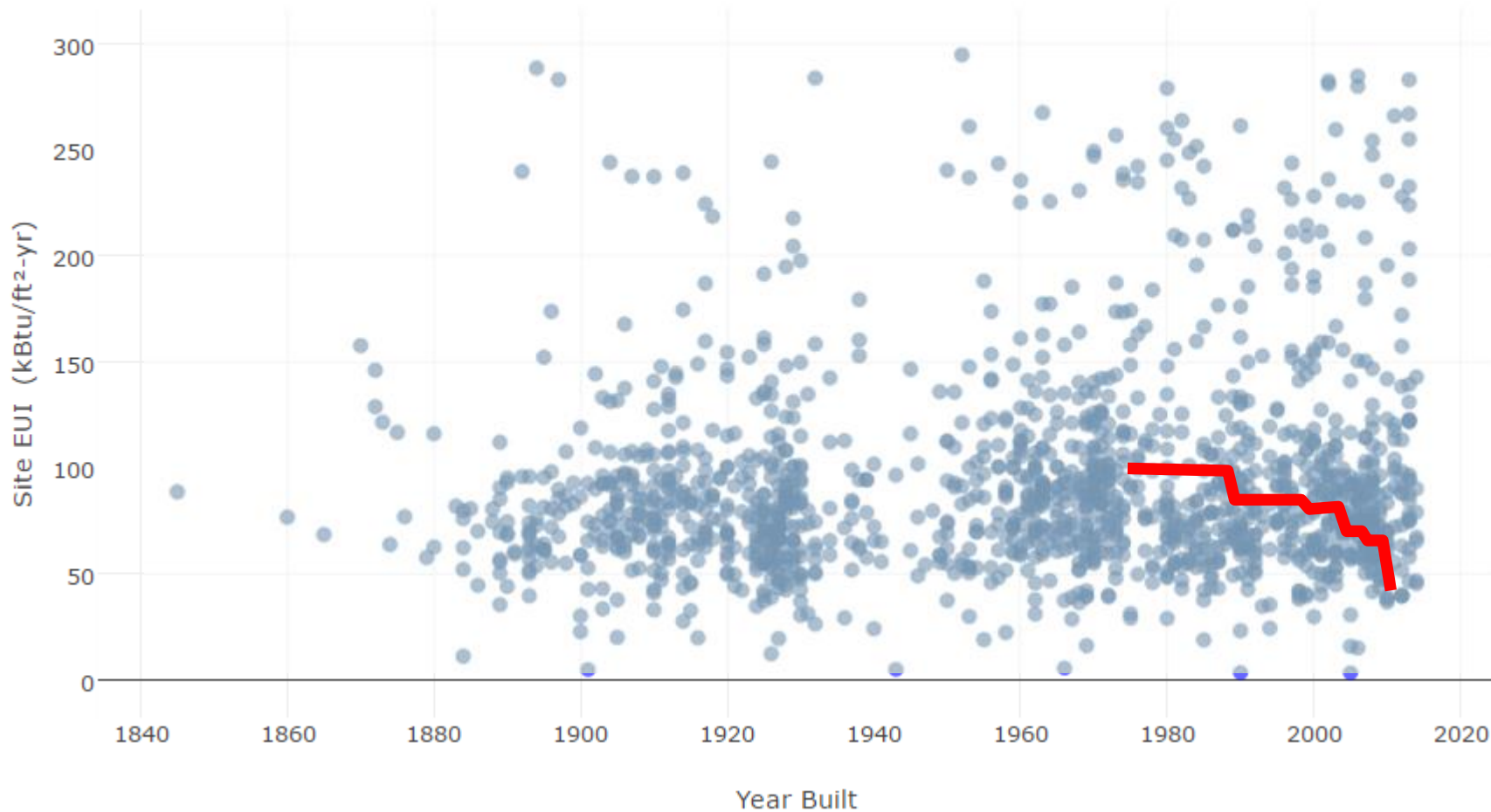
Claire Cowan
Director of Program Design & Delivery
Seventhwave

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 Megan Kelly; September 2015.



seventhwave

| **ACCELERATE PERFORMANCE**

**3 year Department of Energy initiative
to scale performance-based procurement**

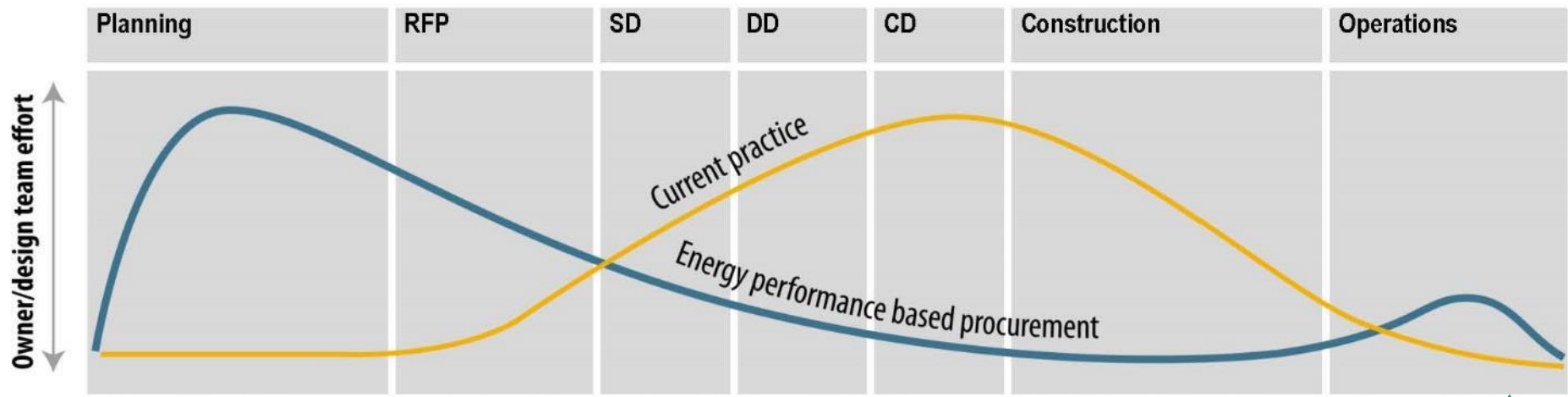


Accelerate Performance program track

- ✓ 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



Early outreach: owner & developer focus

**Benchmarking
concept modeling
RFP
contracts**

**Modeling
v. code
baseline**

**Pay
incentive**

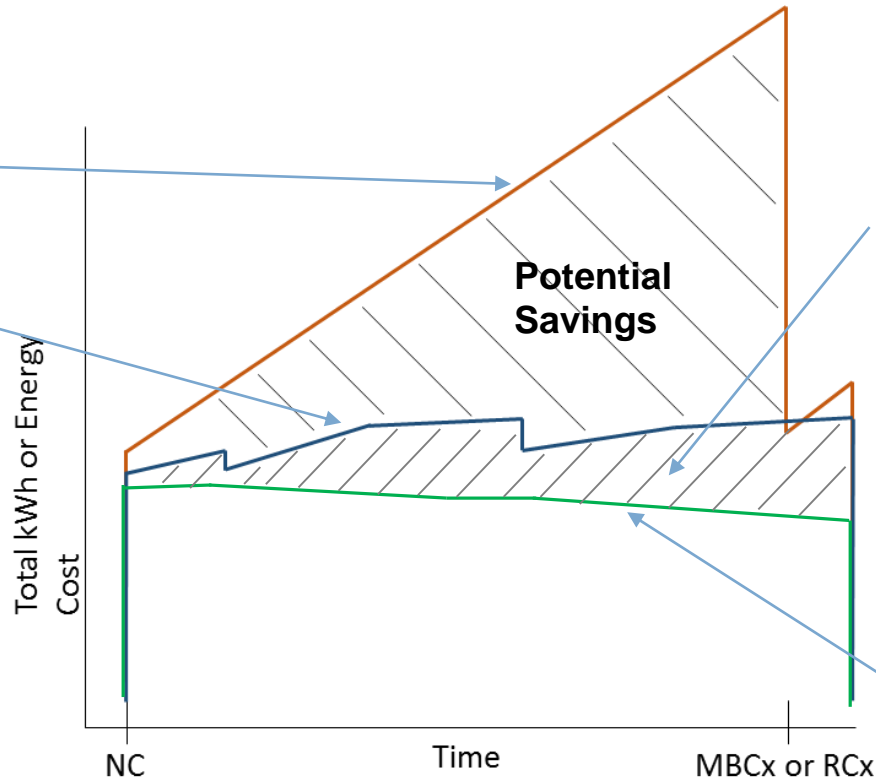
Results to date

- ✓ 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

| ECM #1 – Upgrade Roof Insulation | Disable Measure | | |
|---|------------------------|----------------------|---------------------------------------|
| Baseline Roof U-Value: $0.032 \frac{\text{BTU}}{\text{hr}\cdot\text{ft}^2\cdot\text{°F}}$ | Better 0.03 | Best 0.028 | Custom <input type="text"/> |
| ECM #2 – Upgrade Wall Insulation | Disable Measure | | |
| Baseline Wall U-Value: $0.055 \frac{\text{BTU}}{\text{hr}\cdot\text{ft}^2\cdot\text{°F}}$ | Better 0.043 | Best 0.036 | Custom <input type="text"/> |
| ECM #3 – Improve Glazing U-Value | Disable Measure | | |
| Baseline Glazing U-Value: $0.42 \frac{\text{BTU}}{\text{hr}\cdot\text{ft}^2\cdot\text{°F}}$ | Better 0.342 | Best 0.3 | Custom <input type="text"/> |
| ECM #4 – Improve Glazing SHGC | Disable Measure | | |
| Baseline Glazing Solar Heat Gain Coefficient: 0.4 | Better 0.3 | Best 0.25 | Custom <input type="text"/> |
| ECM #5 – Efficient Interior Lighting | Disable Measure | | |
| Baseline Interior Lighting Power: $0.82 \frac{\text{W}}{\text{ft}^2}$ | Better 0.73 | Best 0.5 | Custom <input type="text"/> |



ComEd.
Energy Efficiency Program



**RESIDENTIAL HIGH RISES
WITH 40% WWR OFFER UP TO:**

- 25% LOWER ANNUAL ENERGY COSTS¹
- 25% LOWER GREENHOUSE GAS EMISSIONS
- 1,000 MORE COMFORTABLE HOURS PER YEAR²
- 15% MORE USEFUL DAYLIGHTING³

PLUS

- OPTIMIZATION OF PRIVACY AND VIEWS
- MORE HOURS WITH SHADES OPEN
- INITIAL HVAC COST REDUCTIONS
- HYDRONIC RADIANT HVAC FEASIBILITY
- A PATH TOWARD ARCHITECTURE 2030

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 inadequate 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.

ComEd. | powering lives
An Exelon Company

ComEd.
An Exelon Company

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

Claire Cowan

Director of Program Design and Delivery

Seventhwave

ccowan@seventhwave.org

608-210-7190



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



ENERGY STAR® PortfolioManager®



Assess whole building
energy and water
consumption

Free. Online. Secure.

energystar.gov/benchmark



Find Utilities that Provide Energy Data for Benchmarking

FIND UTILITIES THAT PROVIDE ENERGY DATA FOR BENCHMARKING

Click on the map or search to quickly determine if your utility provides the energy data you need to benchmark in ENERGY STAR® Portfolio Manager®

Please enter your zip code below to show coverage in your area:

98126

Utility Name: Puget Sound Energy
Fuel Type: Electric, Gas
Data Type: Web Services
Aggregate Whole-Building Data: Yes(5)
Multifamily Included: Yes
Contact Info:
Email: MyData@pse.com
Web Address: Click [here](#) for more information.

Utility Name: Seattle City Light
Fuel Type: Electric
Data Type: Web Services
Aggregate Whole-Building Data: Yes(2)
Multifamily Included: Yes
Contact Info:
Email: sci_portfolio_manager@seattle.gov
Web Address: Click [here](#) for more information.

Google

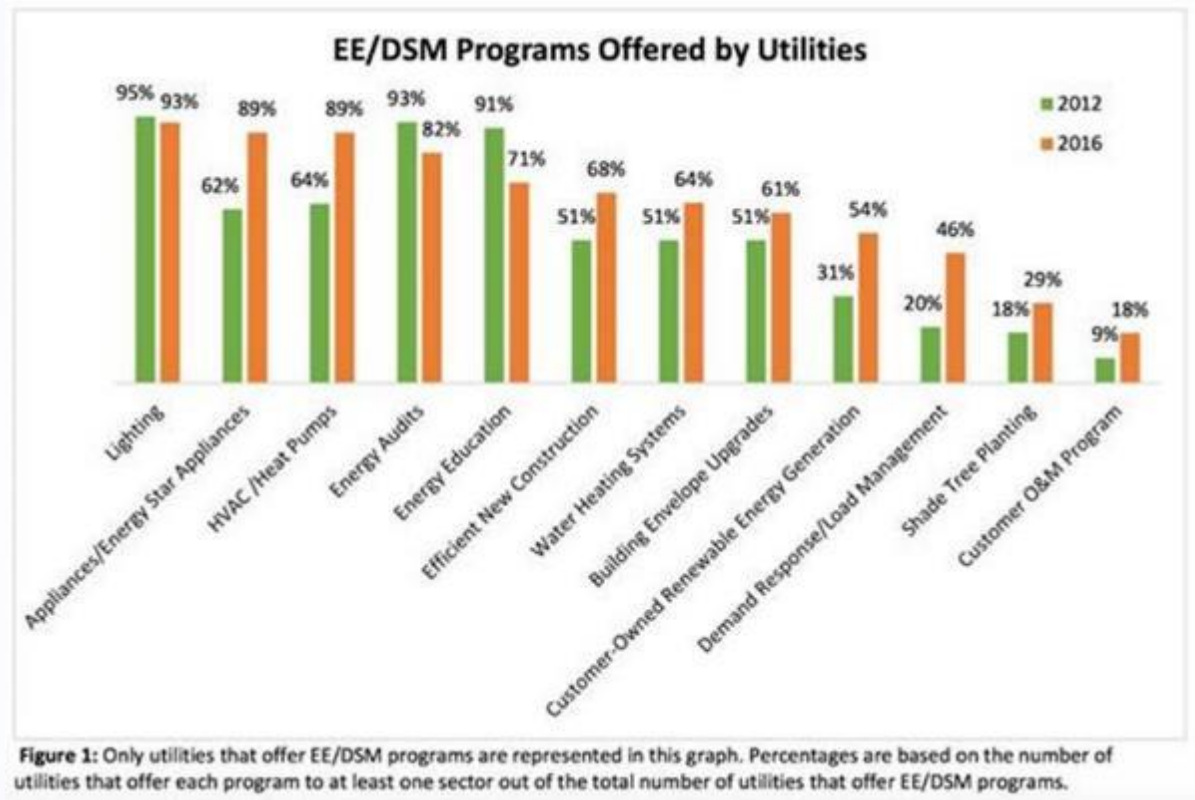
Utilities Providing Energy Data for Benchmarking in ENERGY STAR® Portfolio Manager®

Map data ©2016 Google Terms of Use

www.energystar.gov/utilitydata

Current Situation for Utilities

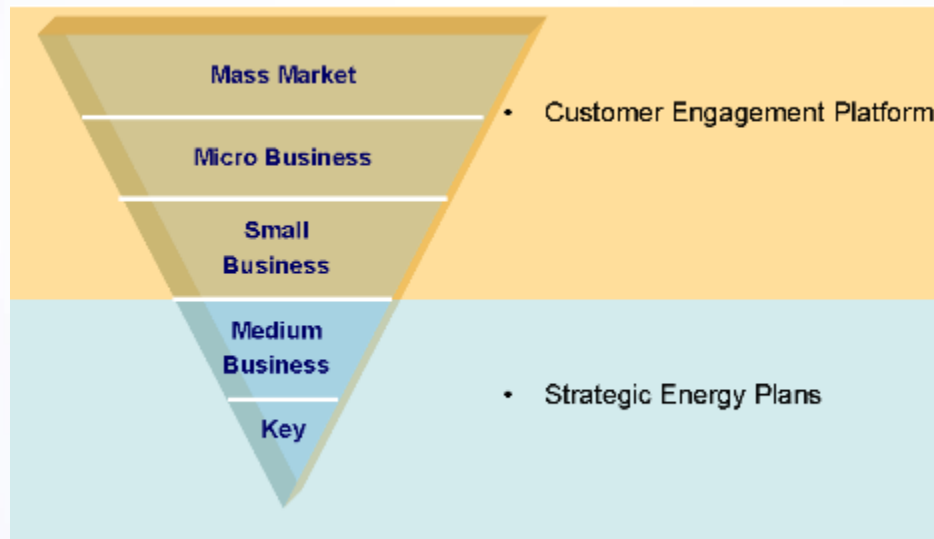
- Face increasing EE goals
- Tight budgets
- Hard-to-reach sectors
- Customer interest in more than prescriptive incentives
- Small % of customers = majority of load



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.



Source: Eversource Energy Presentations to SEE Action 2016 and ACEEE National Symposium on Market Transformation 2014

Comprehensive Approaches Emerging

2017 Utility Energy Efficiency Scorecard

Grace Relf, Brendon Baatz, and Seth Nowak

June 2017

Report U1707

**51 utilities
ranked**

Utilities Offering Strategic Energy Management

(8 of top 10)

20

Utilities Offering Whole Building Retrofit

(5 of top 10)

13



Building Performance with ENERGY STAR® Program Overview

Centered on strategic energy management and a path to continuous performance improvement.

BPwES Program Elements

1

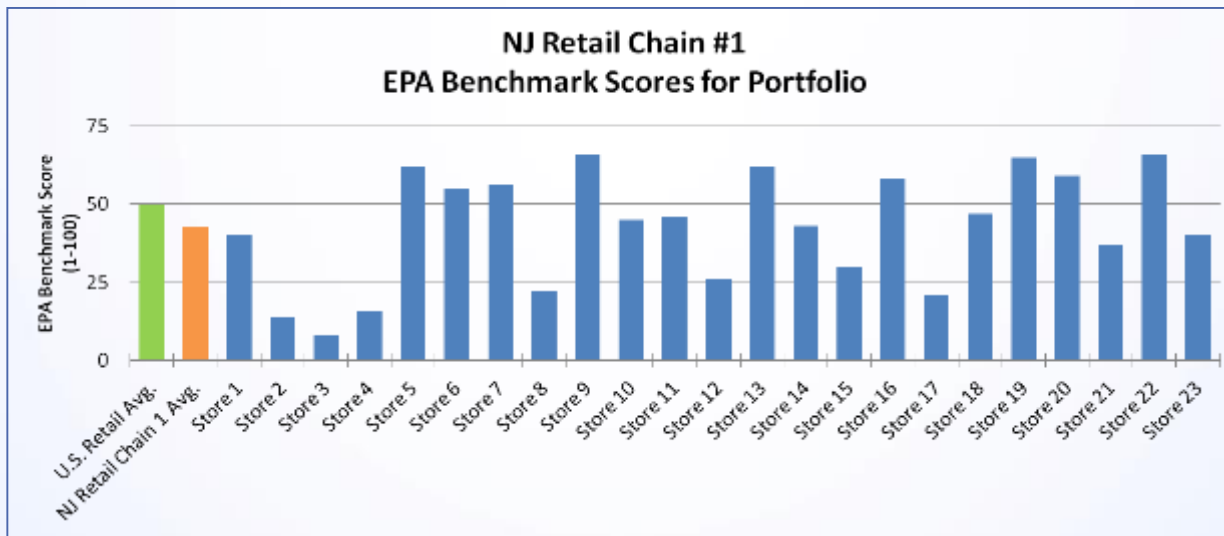
Target
Marketing/
Recruiting



BPwES Program Elements



2 Benchmarking

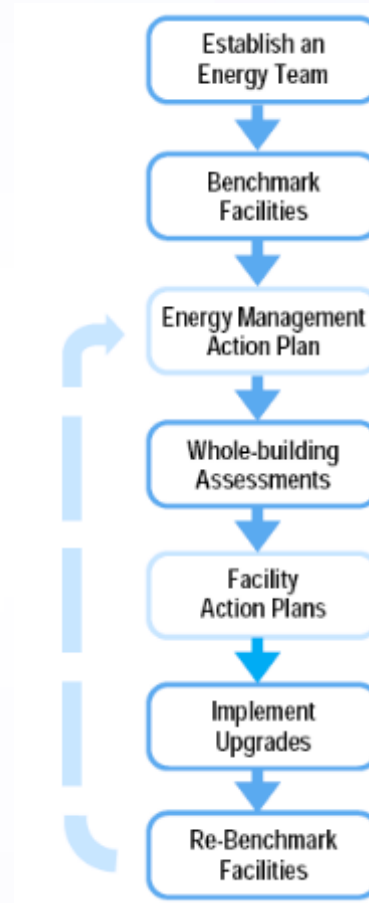


BPwES Program Elements



3

Strategic Energy Management Plan



BPwES Program Elements



Building Performance with ENERGY STAR Performance Assessment Checklist

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 EPA 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.

- **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, projected 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).
- **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 counts 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.

1

February 2, 2010



Whole-building Performance Assessment



BPwES Program Elements



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.



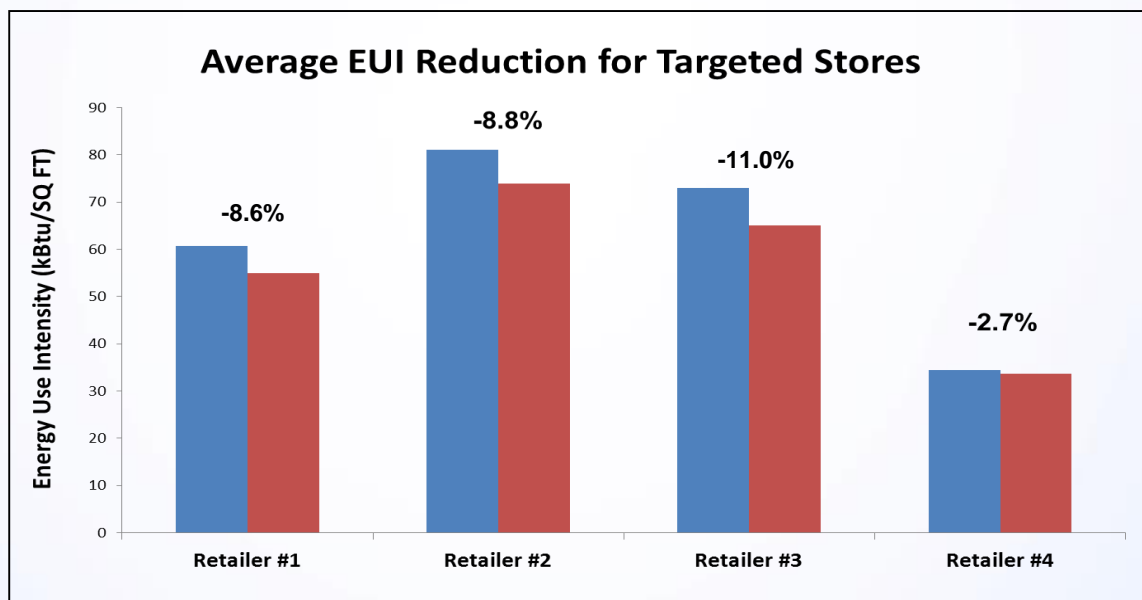
Whole-building Upgrades

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

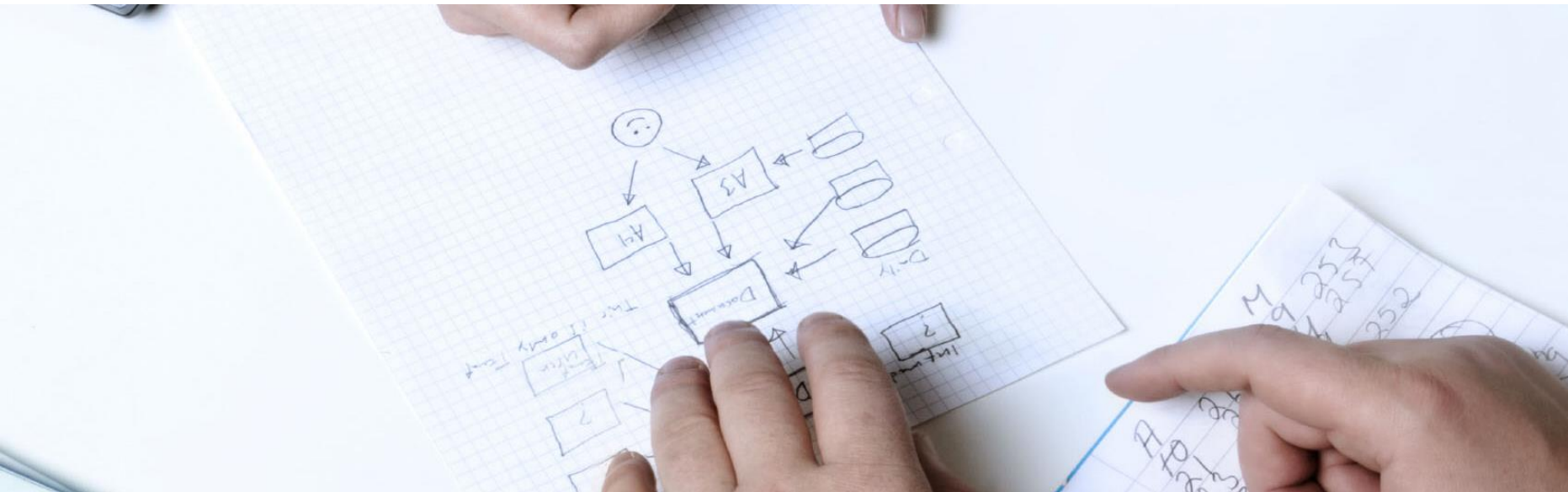
Lockheed Martin Lessons Learned from Implementing ENERGY STAR

- 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
Narel.Tracy@epa.gov



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 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

⑩ Energy Manager conducts facility assessment



Step 2
Energy Management Plan

⑩ Includes a list of measures to implement along with road map



Step 3
Implementation

⑩ Incentive payment flexibility



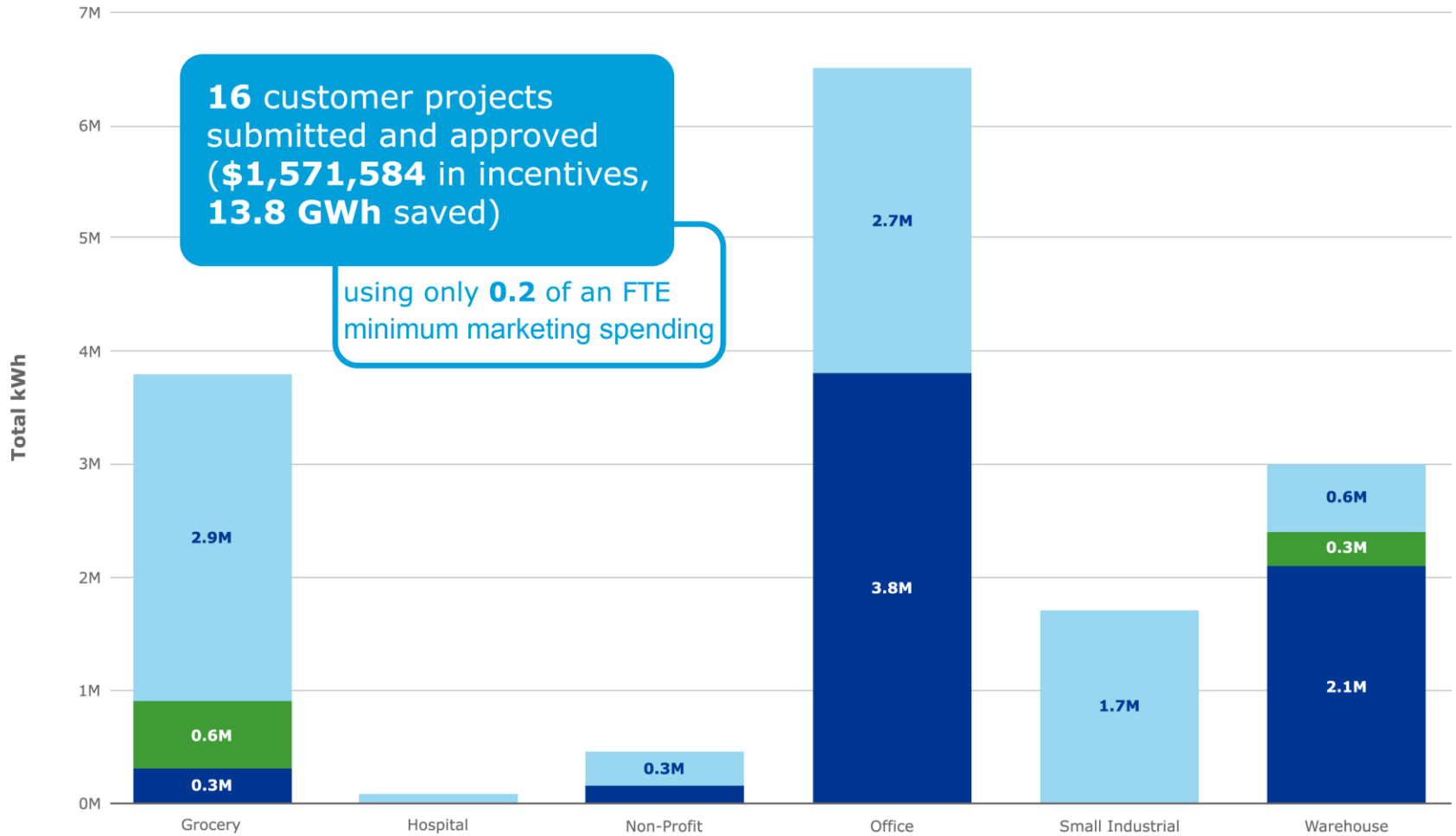
Step 4
Closeout

⑩ Final report detailing next steps



Current Results

Status ● Final Application ● Paid ● Pre-Approval



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



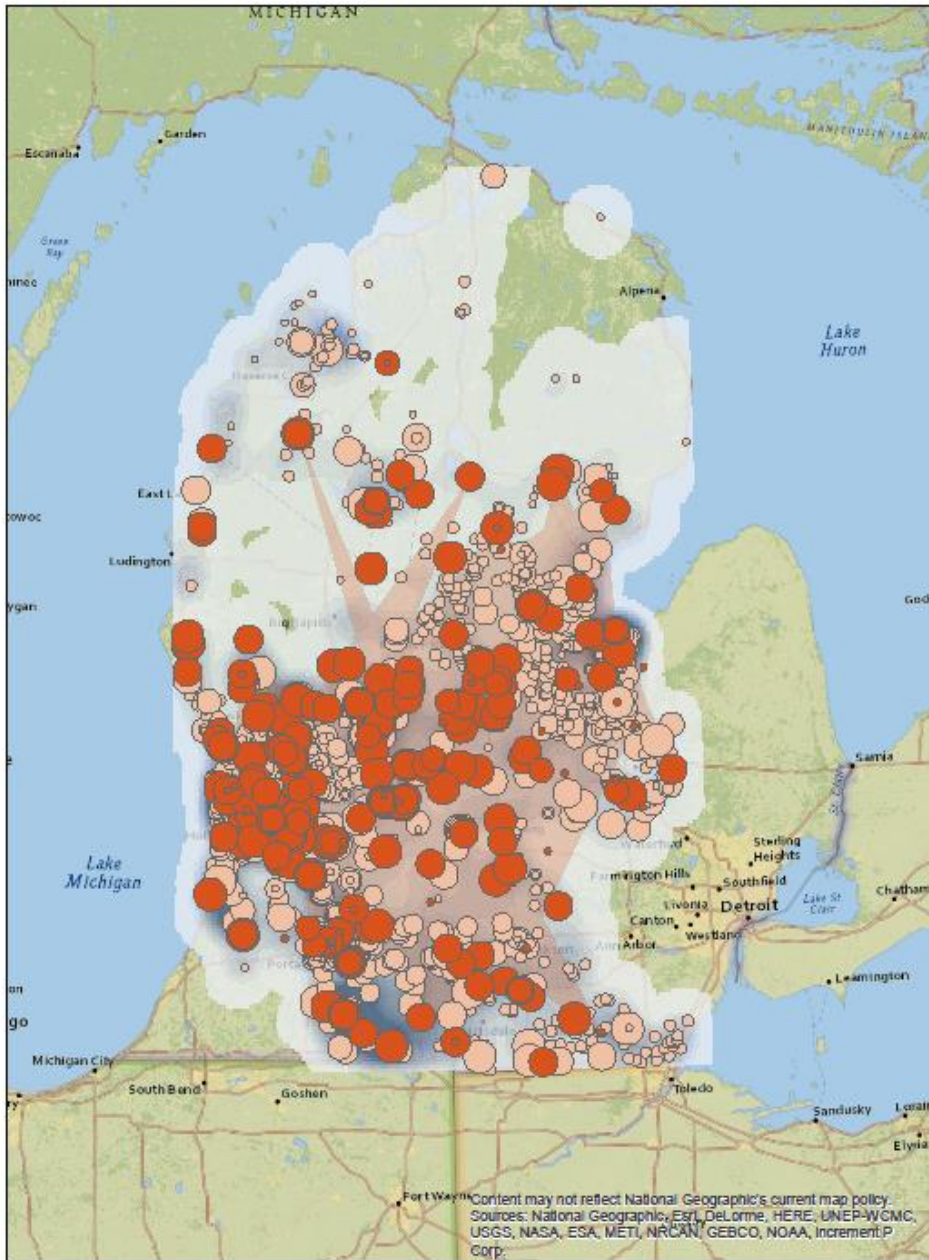
WHEN *Experience* MATTERS

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

2016 Ag EE Project Locations



Who Helps Drive the Program?



WHEN *Experience* MATTERS

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??



WHEN *Experience* MATTERS

CUSTOMER SATISFACTION SCORE IMPROVEMENT



Increased from
7/10 in 2012

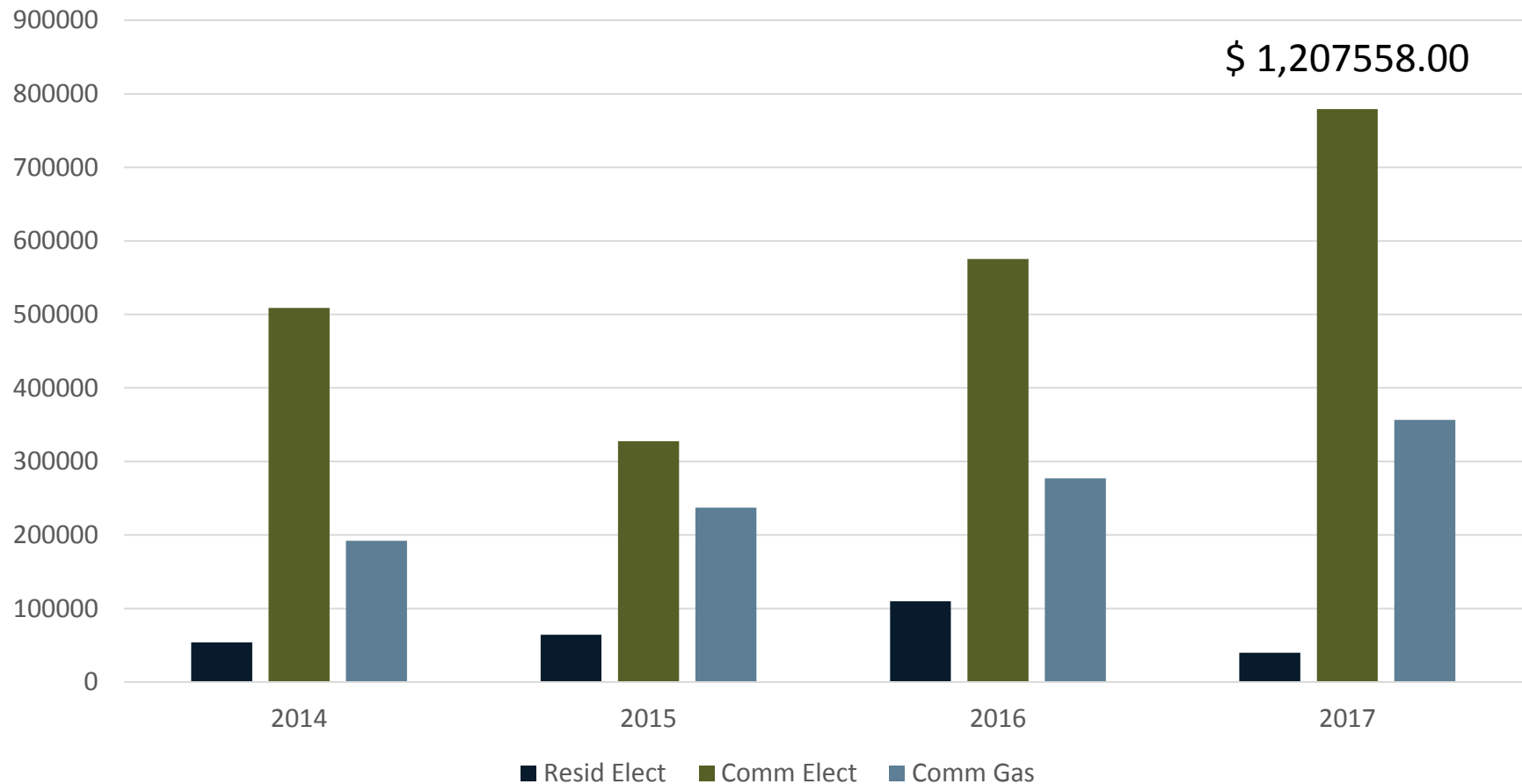
to

9.2/10 in 2016

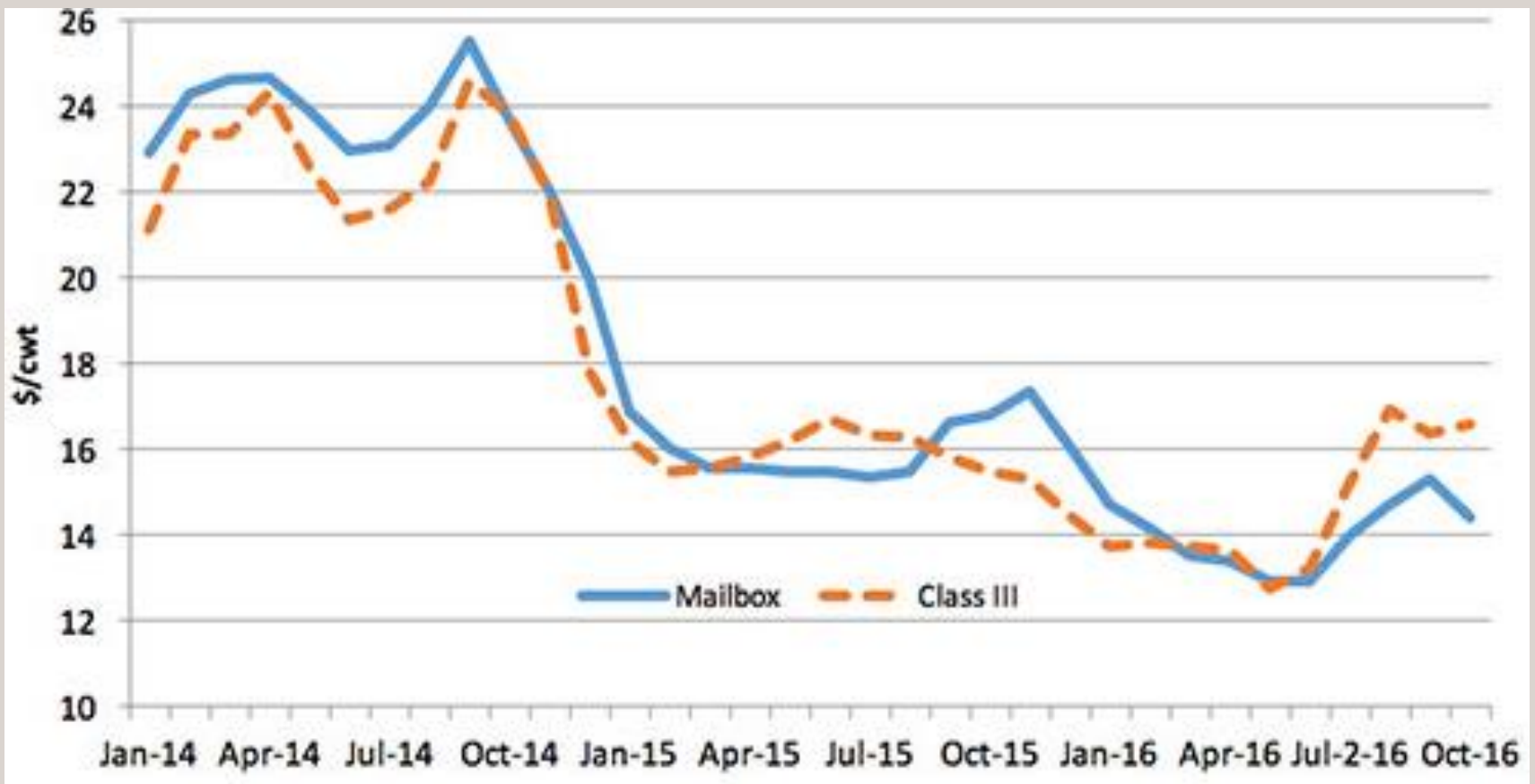
Source- J. D. Power

AG SPECIALITY PROGRAM GROWTH REBATES PAID 2014-2017 (to date)

Incentive \$ Paid To Ag Customers



CURRENT AGRICULTURAL COMMODITY PRICES ARE CHALLENGING FOR EE PROJECTS



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

QUESTIONS?

A photograph of three people in a professional setting. On the right, a man in a green striped shirt is pointing with a black marker at a whiteboard. On the left, a woman with curly brown hair and a man are looking towards the whiteboard. The woman is smiling. The background is bright and out of focus.

WHEN *Experience* MATTERS

THANK YOU

Duane Watson | Agricultural Specialist

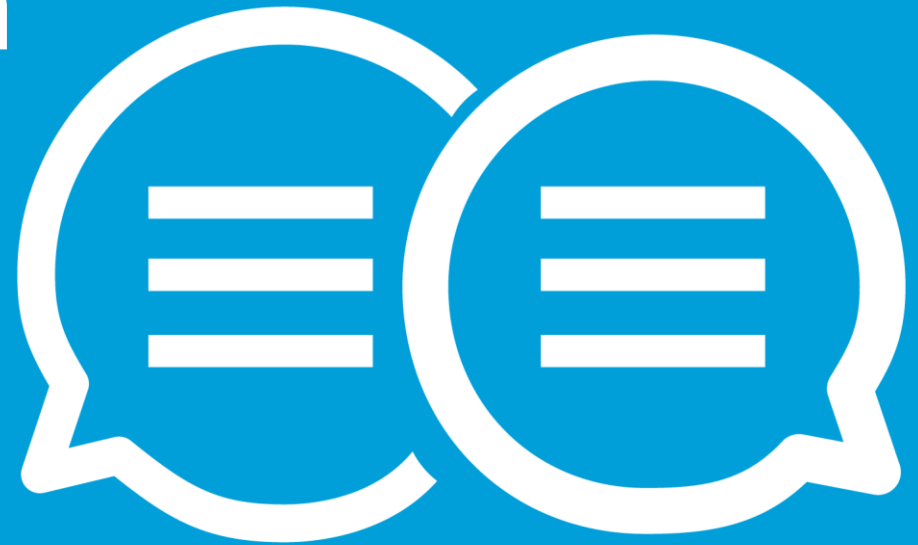
dwatson@franklinenergy.com

Consumers Energy Business Energy Efficiency Programs

3965 Okemos Rd. Suite A-1 Okemos, MI 48864

517-481-2972 ext. 1954 | 877-607-0738 fax | 517-749-6668 mobile

Questions and Discussion



dankegon
kudos mesi
merci děkuji vám
asante cheers nandri eharisto
danke
thanks
gracias
Thank You

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DNV GL Energy
E-mail teresa.davies@dnvgl.com
Mobile +1 510 853 3586**