Better Buildings
U.S. DEPARTMENT OF ENERGY

Better Buildings Residential Network Peer Exchange Call Series:

Looking Ahead in 2018: Energy Efficiency Perspectives from Coast to Coast

January 11, 2018

Call Slides and Discussion Summary

U.S. DEPARTMENT OF ENERGY

Agenda and Ground Rules

- Agenda Review and Ground Rules
- Opening Poll
- Residential Network Overview, and Upcoming Call Schedule
- Featured Speakers:
  - **Emily Levin**, Managing Consultant – Program Strategies, Vermont Energy Investment Corporation (VEIC) *(Network Member)*
  - **Kara Jonas**, Residential Program Manager, Midwest Energy Efficiency Alliance (MEEA) *(Network Member)*
  - **Christine Brinker**, Senior Associate, Southwest Energy Efficiency Project (SWEEP)
- Closing Polls and Announcements

Ground Rules:

1. **Sales of services and commercial messages are not appropriate** during Peer Exchange Calls.

2. Calls are a safe place for discussion; **please do not attribute information to individuals** on the call.

Better Buildings Residential Network

Join the Network

Member Benefits:

- Recognition in media and publications
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- Solution Center guided tours

Commitment:

- Members only need to provide *one number*: their organization's number of residential energy upgrades per year

Upcoming calls:

- January 18: Meet the Jetsons: Smart Tech and the Home of the Future
- January 25: Beyond Hunches: Using Science to Drive Behavior Change
- February 1: Achieving Results in the Multifamily Sector: Strategies that Hit Home
- February 8: Going for Gold: Medal-Worthy Approaches to Energy Efficiency from Around the Globe

Peer Exchange Call summaries are posted on the Better Buildings website a few weeks after the call

For more information or to join, for no cost, email bbresidentialnetwork@ee.doe.gov, or go to energy.gov/eere/bbrn & click Join

Emily Levin
Managing Consultant – Program Strategies
Vermont Energy Investment Corporation (VEIC)

U.S. DEPARTMENT OF ENERGY

Energy Efficiency Trends: Perspectives from the Northeast

Emily Levin

Vermont Energy Investment Corporation

DOE Better Buildings Residential Network
January 11, 2018

Vermont Energy Investment Corporation

About VEIC

- 30 years of reducing economic and environmental costs of energy use
- Comprehensive approaches, high-impact results
- Energy efficiency, renewable energy, and transportation
- National and international clients
- Program design and evaluation
- Transformative policy, advocacy, and research
- Clients: utilities, government agencies, utilities, foundations, and advocates

Efficiency Vermont

EFFICIENCY$MART

DC SUSTAINABLE ENERGY UTILITY

veic.org

Key Trends

- Challenges:
  - Pressure on system benefit charges
  - Declining lighting savings
  - Increasing renewables on the grid
- Opportunities:
  - Increase savings from non-lighting measures
  - Use data to find new sources of savings
  - Target EE (and DERs) to address grid needs

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Pressure on System Benefit Charges

- **CT:** Passed a budget taking $127 million from the Energy Efficiency Fund, $20 million from the Regional Greenhouse Gas Initiative, and $28 million from the Green Bank over the next two years
- **RI:** $12.5M budget "scoop" + legislated budget cap
- **VT:** Flat or diminishing Efficiency Vermont budget

Energy efficiency must demonstrate tangible value – to residents, businesses, and the electric grid

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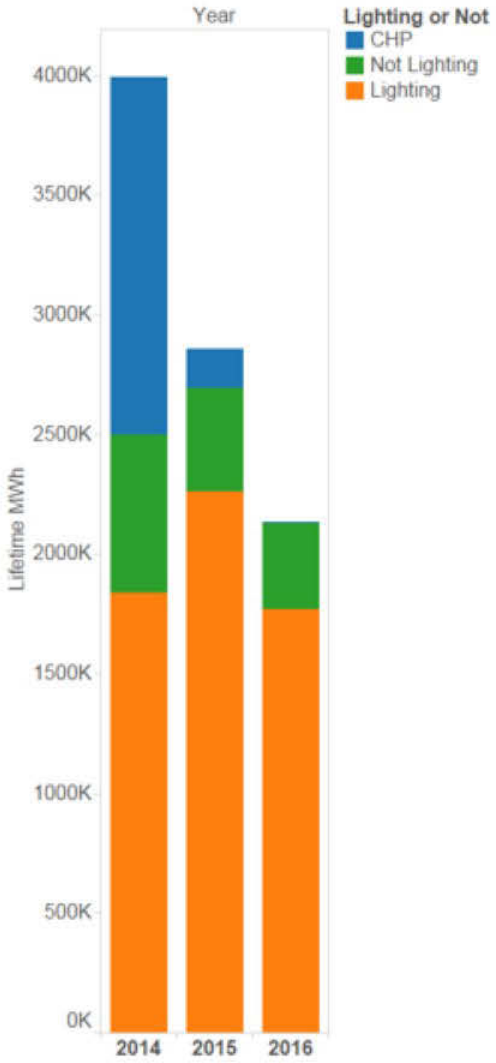
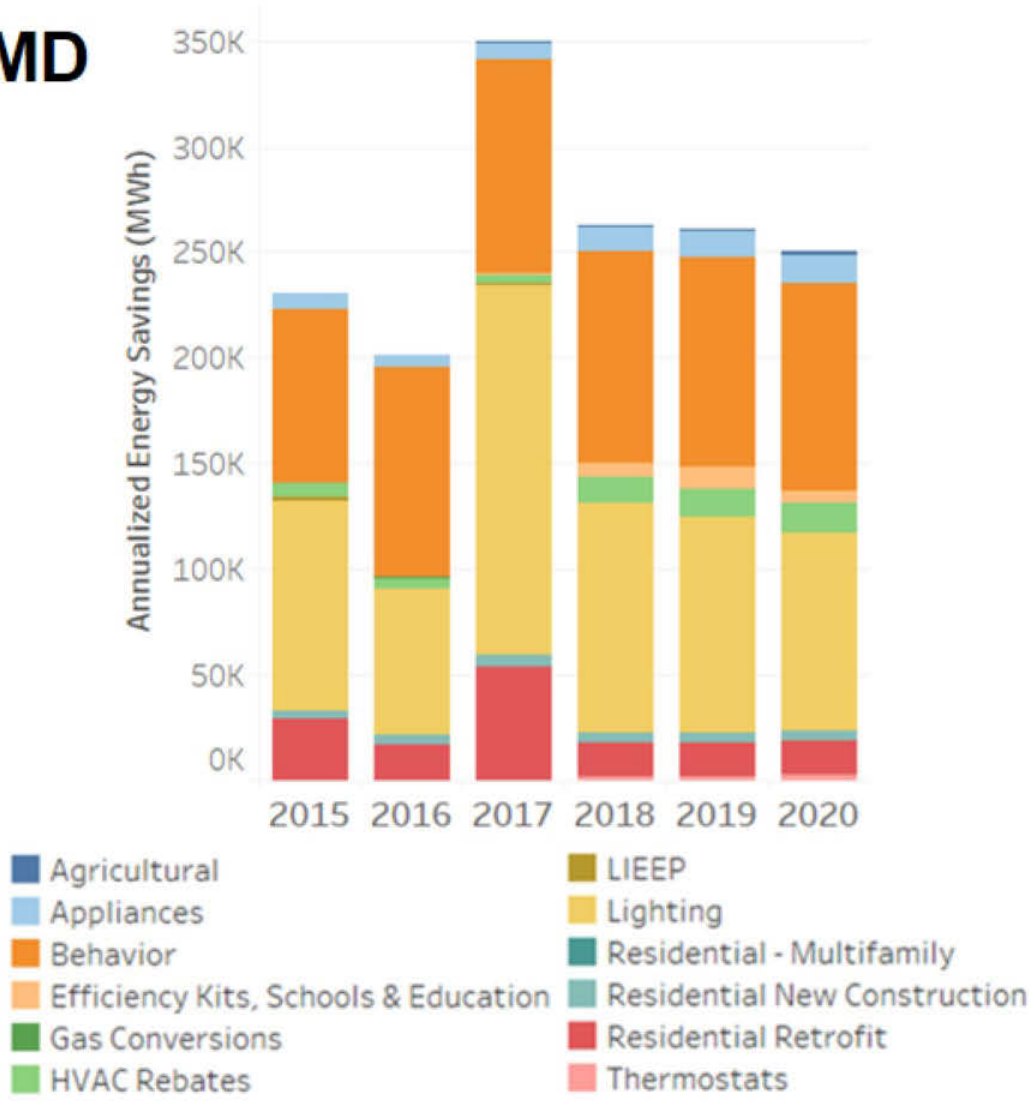
Lighting is Largest Share of EE Savings

RI



MD

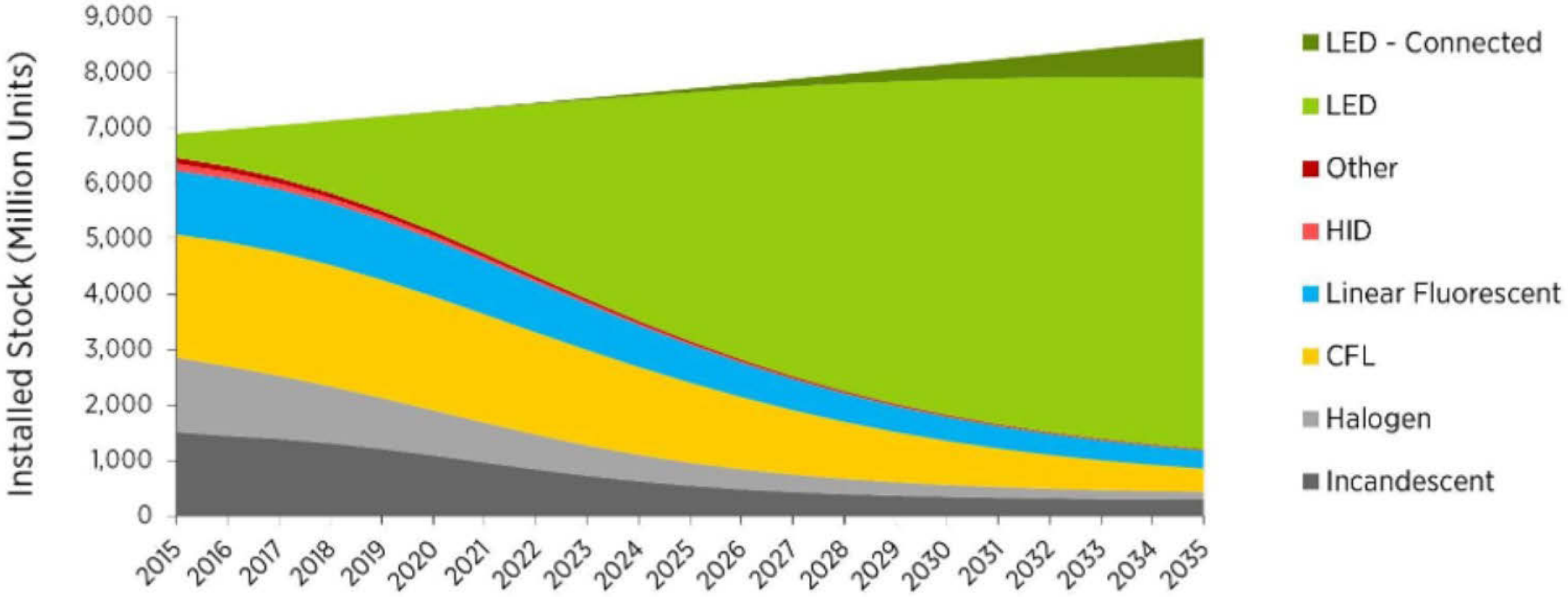


The Lighting Market is Rapidly Changing

Federal legislation:

- Residential: EISA phased out general service incandescent lamps in 2012-2014
- Commercial: DOE rules phased out most T12 and now T8 linear fixtures

DOE Market Forecast for Installed Lighting 2015-2035



Program Savings from Lighting are Diminishing

- Federal standards are setting a new "baseline"
  - Less efficiency savings above baseline
- LEDs are becoming the default choice
  - Prices are falling quickly
  - Rapid advancements in technology
  - Consumers prefer LEDs to CFLs
- Many sockets already have CFLs so there are fewer sockets to fill

Residential Lighting Savings are Projected to Drop Substantially

- Savings peak 2015-2017 and fall 2018-2020
- Minimal lighting savings after 2020

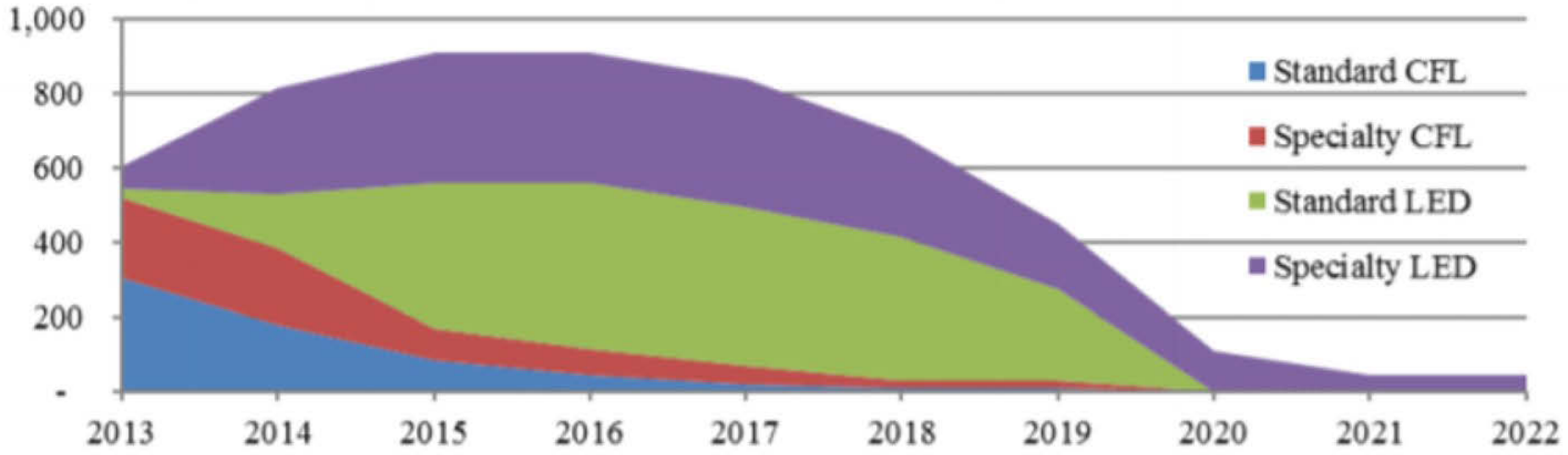


Figure 1. First year savings from residential lighting programs (GWh).

Key Trends

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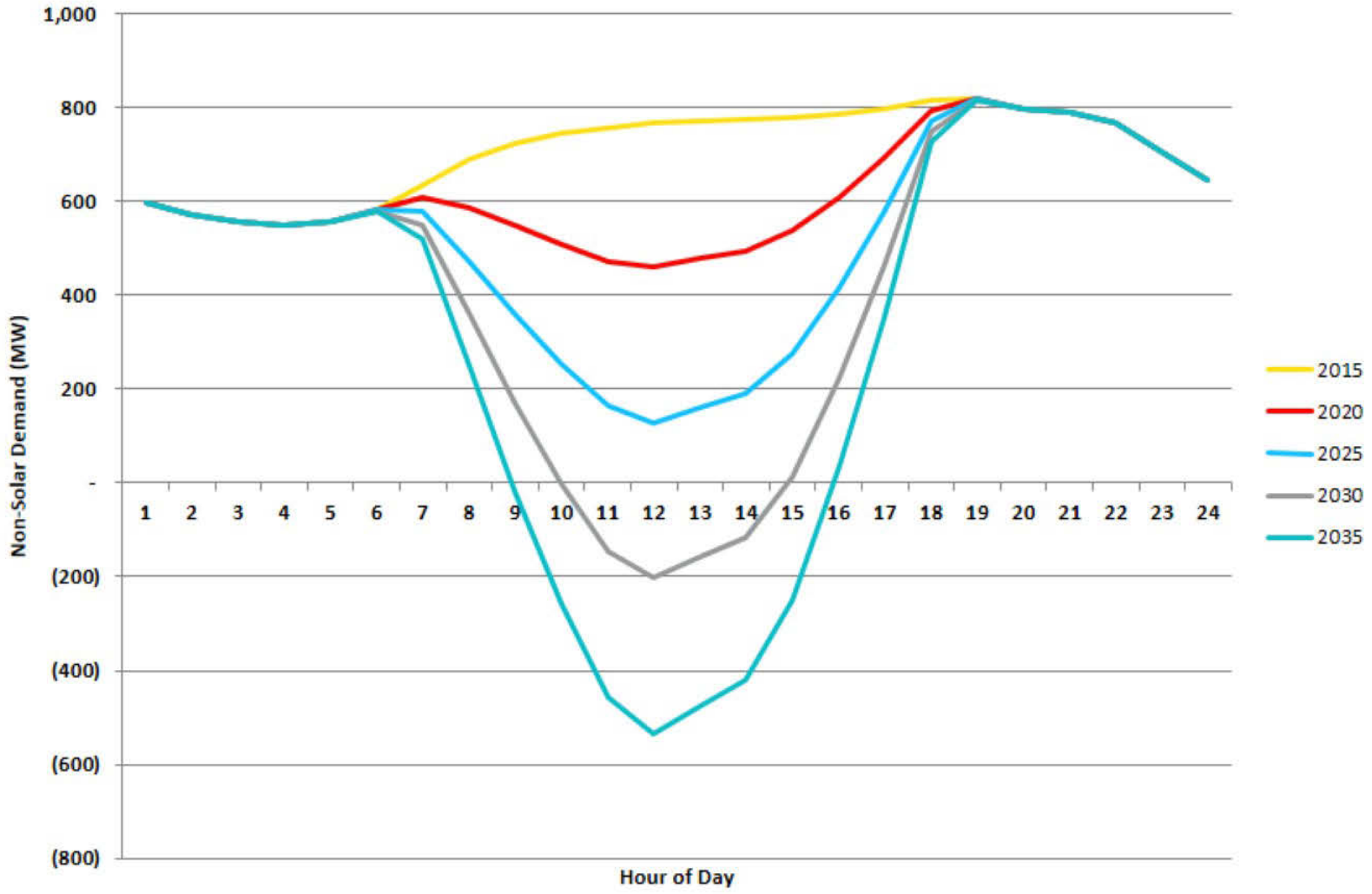
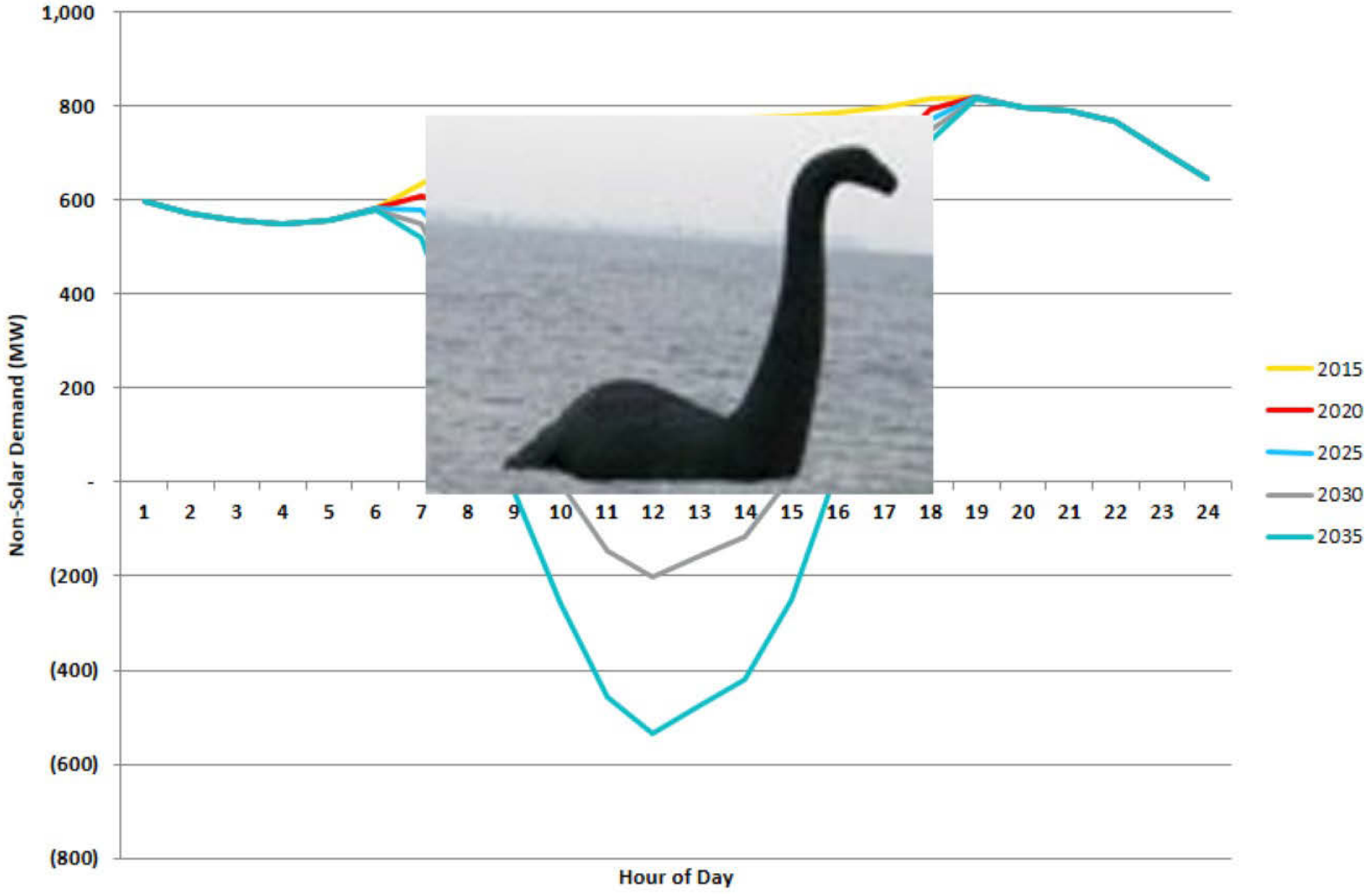
Increasing Renewables on the Grid



Increasing Renewables on the Grid



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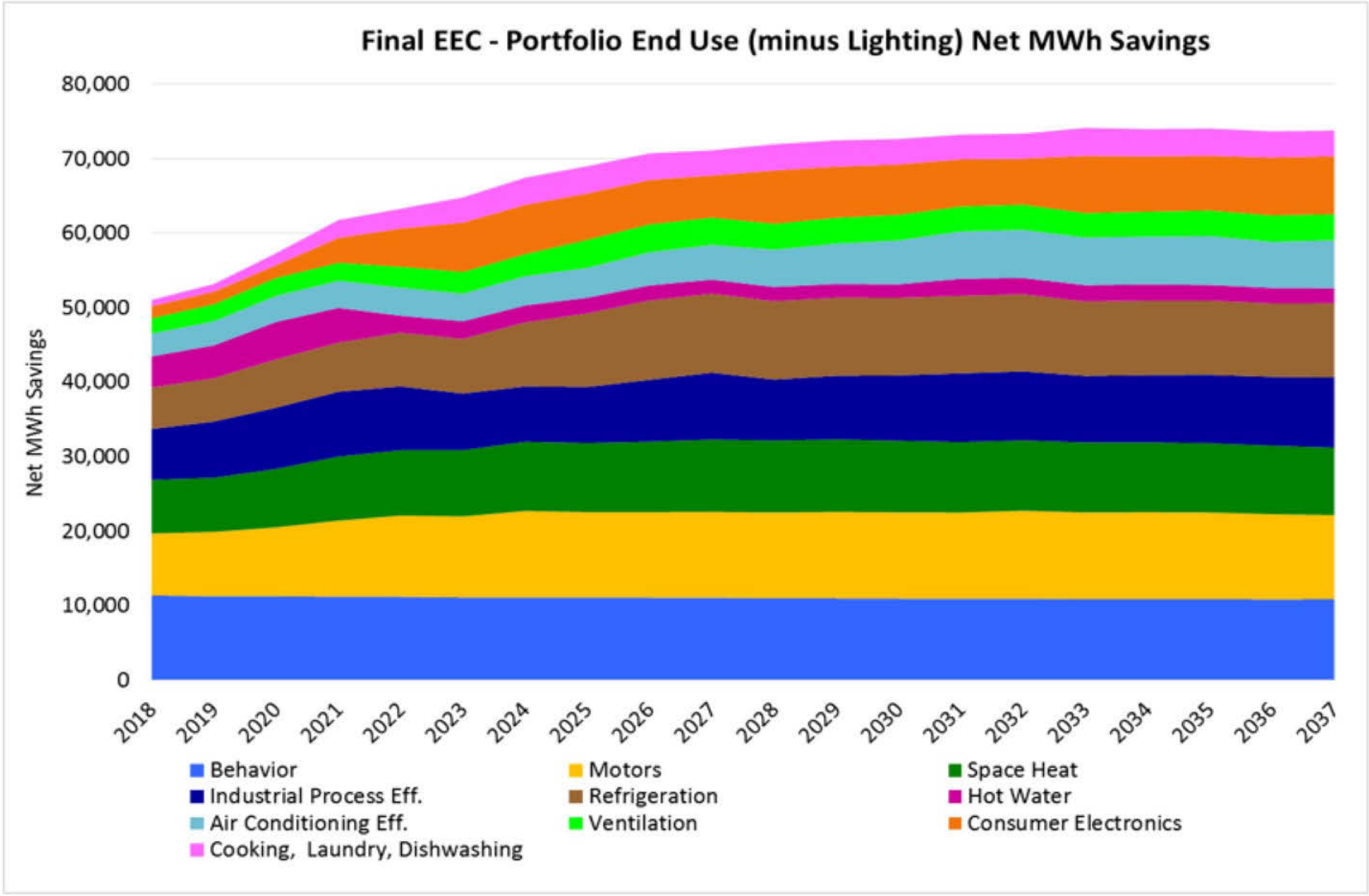
Diversify the Portfolio Beyond Lighting



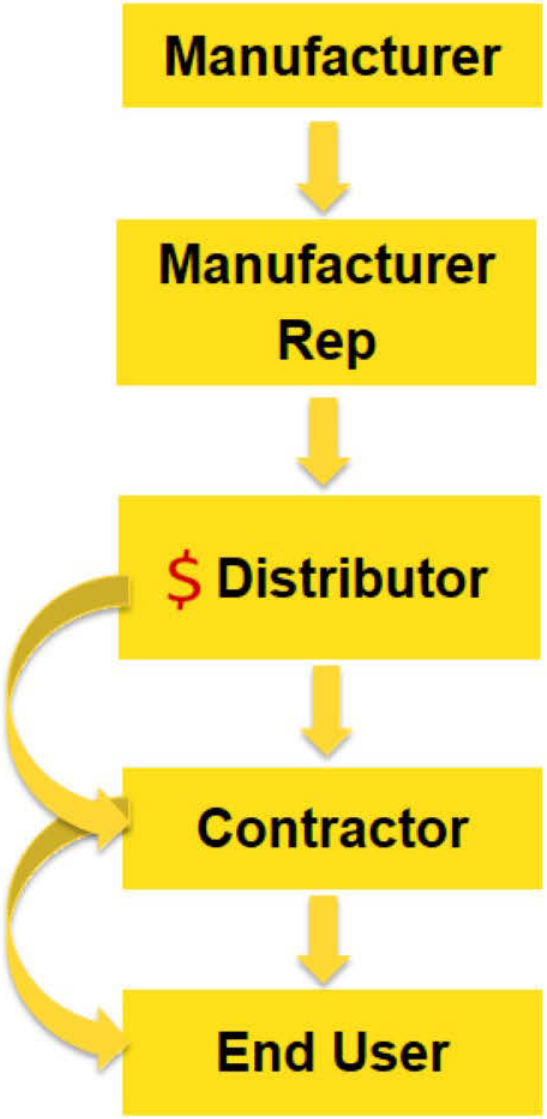
Home Performance: Driving Deeper Savings

- **MD:** Basing HPwES incentives on depth of savings rather than % of project cost
- **NY:** Piloting residential pay for performance (P4P)

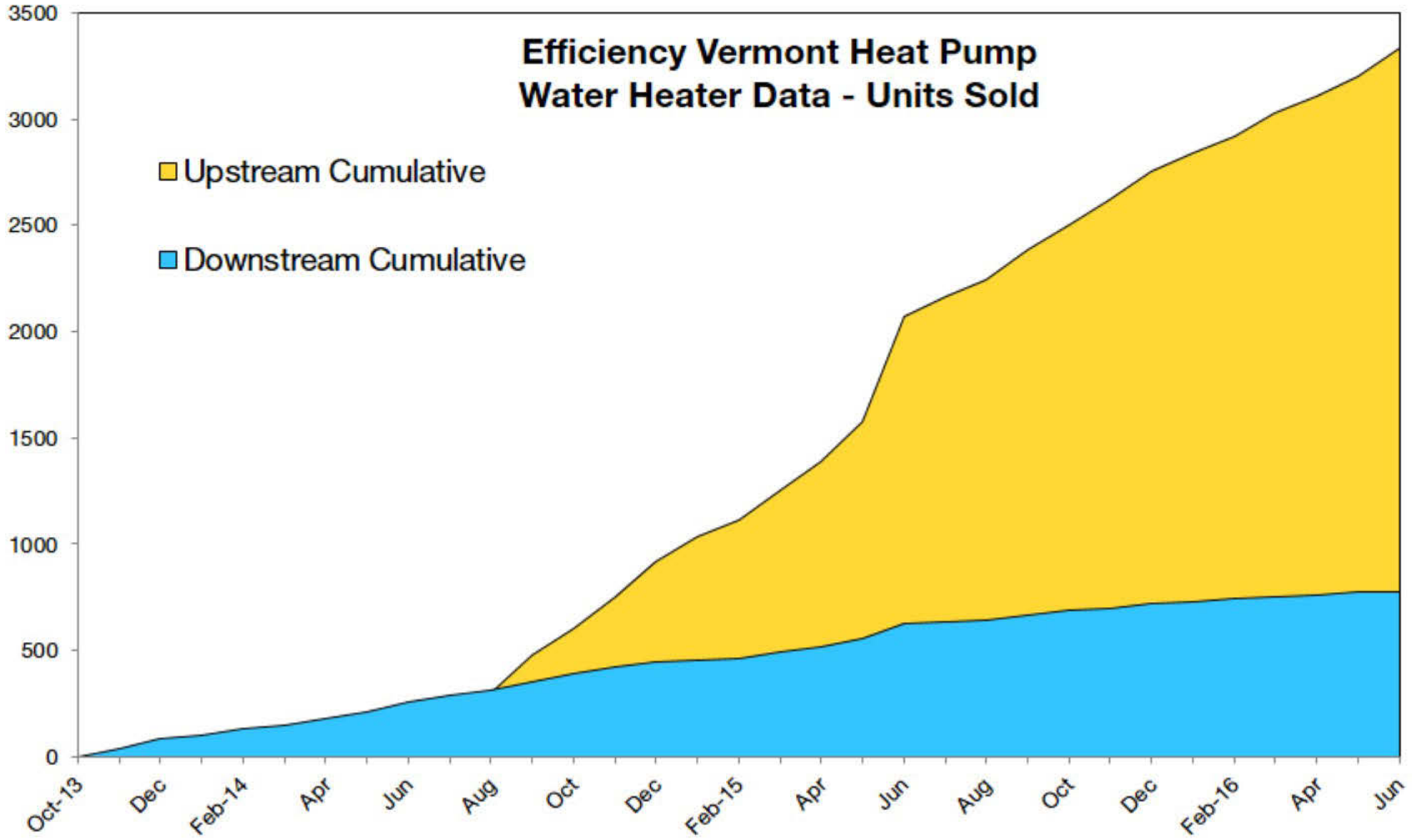
Pay	Performance
Incentives in installments, based on level of savings ($/kWh, $/kW, or $/therm)	Estimate savings over time, as they occur, normalized for weather and other factors

Growth of Upstream Programs

- Upstream programs capture savings from ALL equipment sold by participating retailers & distributors
  - Including emergency replacements
- Upstream programs:
  - Provide instant discount at point of sale
  - Reduce administrative hassle
  - Change stocking practices to make high-efficiency equipment widely available
  - Engage the supply chain in marketing and training
  - Facilitate market transformation



Upstream Programs Dramatically Increase Savings



Key Trends

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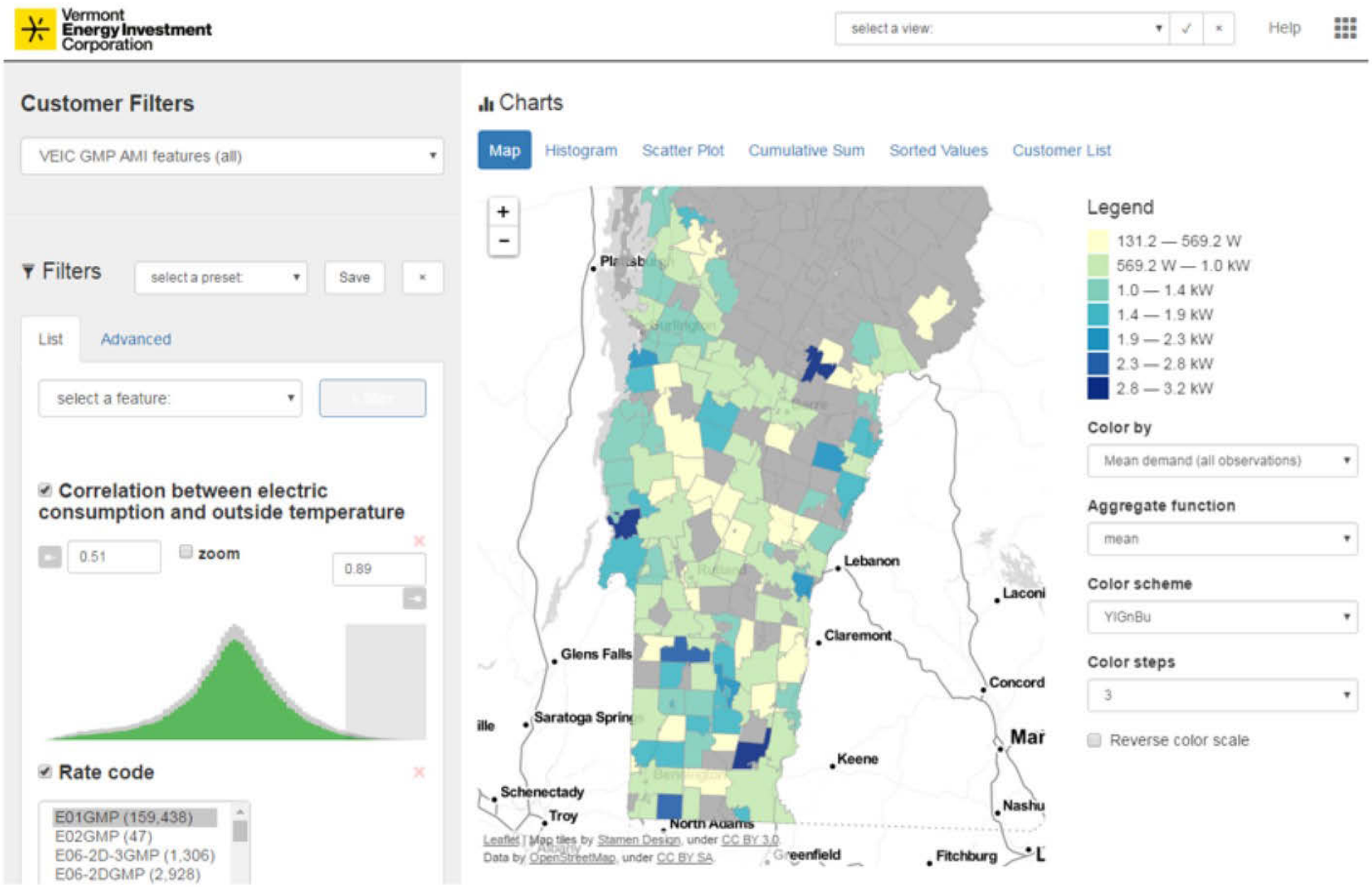
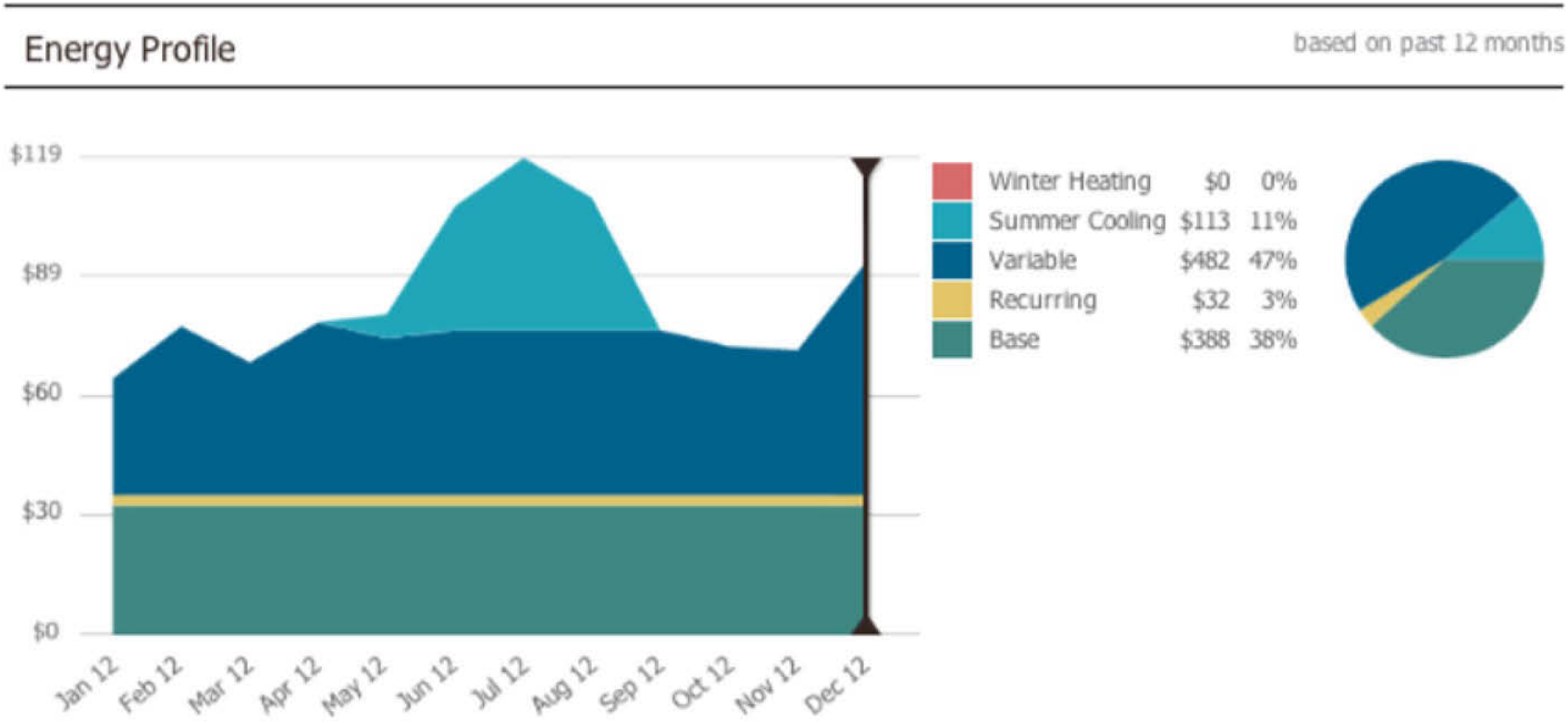
Customer Targeting Using AMI Data



Remote Home Energy Audits



Smart Thermostat Analytics Opportunities

1. Pre-audits from indoor temperature trends
2. Customer engagement and alerting
3. Advanced, continuous M&V
4. Other smart appliances will follow – get ready!

Behavior Beyond Home Energy Reports

https://www.youtube.com/watch?time_continue=1&v=rPR2bio39wM

Key Trends

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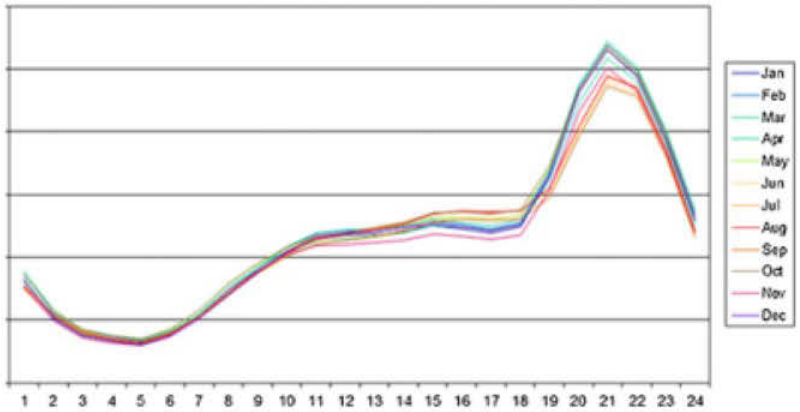
Time-Targeted Efficiency Measures



Average Hourly Residential CFL Weekday

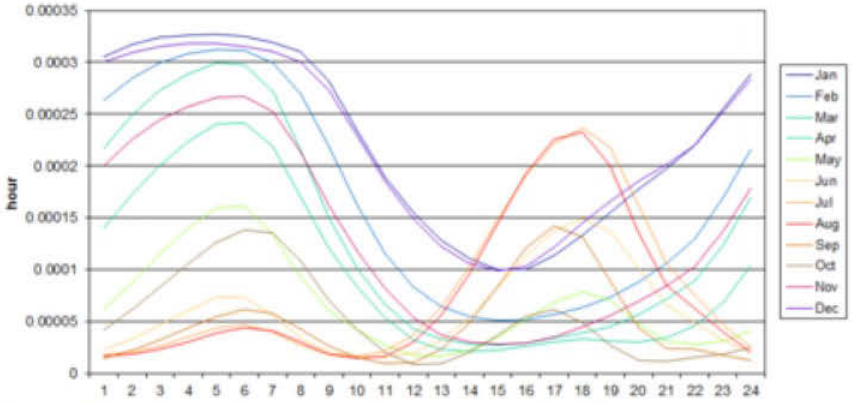


Figure 3. Residential heat pump for an average weekday. *Source*: CPUC/CEC 2013.

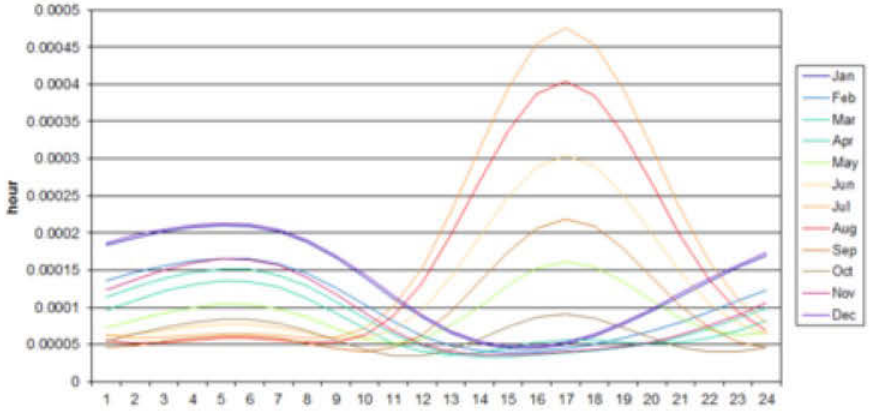


Figure 4. Residential building shell for an average weekday. *Source*: CPUC/CEC 2013.

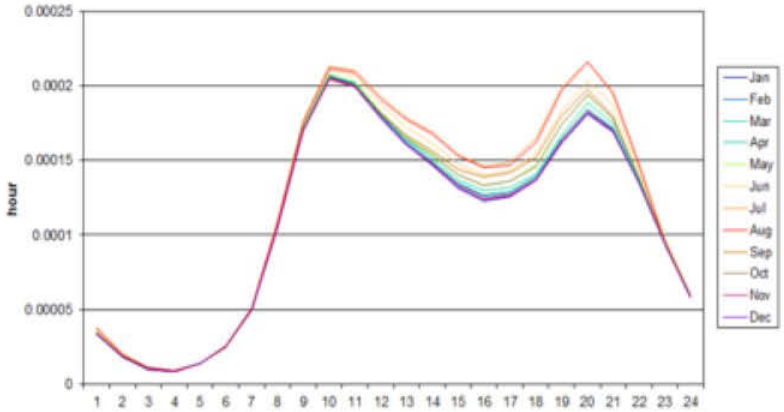


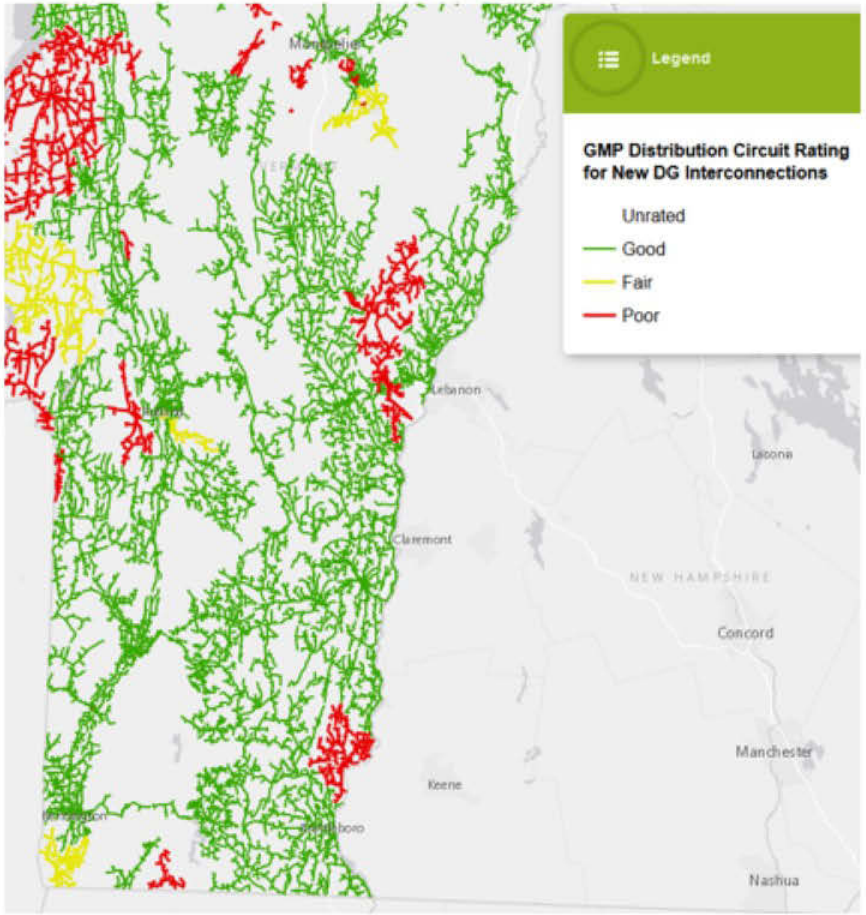
Figure 5. Residential dishwashers and clothes washers for an average weekday. *Source*: CPUC/CEC 2013.

Strategic Electrification

- Electric vehicles
  - Timing of charging matters
  - Bidirectional connections are coming
- Heat pumps
  - Most northeastern states have set “renewable heating” goals
  - NEEP cold-climate spec to support performance
  - Cost-effective compared to heating with oil or propane

Location Targeted EE and Electrification

- Red represents areas with excess supply from renewable energy
  - May be good targets for electrification
- NY, RI, and VT have geographically targeted EE and DERs to areas with distribution constraints:
  - NY: ConEd Targeted DSM
  - RI: System Reliability Procurement
  - VT: Geotargeting



Looking Ahead

- 2018-2020 is a critical period to prepare for the future
- Steps that utilities and programs should consider to prepare for “life after lighting”:
  - Consider updating performance metrics to reward value beyond kWh and therm savings
  - Pilot, pilot, pilot to identify and prove out new sources of savings

Contact

Emily Levin
Managing Consultant, Innovative Programs
Vermont Energy Investment Corporation

Presentation Highlights: VEIC

- **Prepare for "life after lighting."** Lighting upgrades are the largest contributor to energy savings, but as more energy efficient lighting choices are adopted (e.g., LEDs are becoming the default choice), the savings a program can achieve from lighting measures will diminish. The savings possible from residential lighting upgrades are projected to drop by 2020.

- **Changes to the grid are necessary to accommodate the increase in renewables.** Vermont expects that it will have an excess supply of renewable energy by 2035. The same trend could soon be seen in other regions as well.

- **Greater use of smart home connected technologies** will help increase the effectiveness of demand response programs and address the needs of the grid.

- **Upstream programs** that work directly with retailers and manufacturers to include point-of-sale incentives for efficient products are expected to grow.

Kara Jonas
Residential Program Manager
Midwest Energy Efficiency Alliance (MEEA)

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Midwest Residential Perspectives

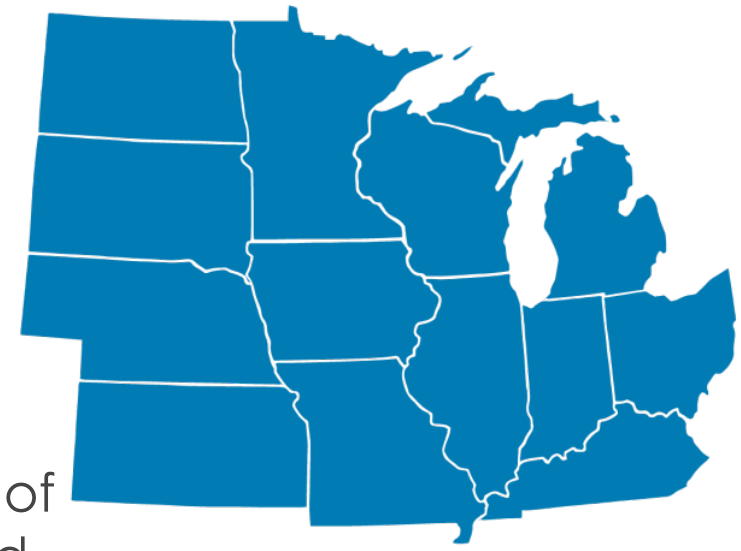
January 11, 2017

MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

Midwest Energy Efficiency Alliance

Overview

- MEEA is a nonprofit membership organization with 160+ members, including:
  - Utilities
  - Research institutions
  - State and local governments
  - Energy efficiency-related businesses
- As the key resource and champion for energy efficiency in the Midwest, MEEA helps a diverse range of stakeholders understand and implement cost-effective energy efficiency strategies that provide economic and environmental benefits.



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Future Energy Jobs Bill (SB 2814)

- Illinois bill signed by Governor Bruce Rauner
- Took effect June 1, 2017
- Energy Efficiency Targets
  - 7.8% cumulative persisting annual electric savings through 2030 for ComEd
  - 7.4% cumulative persisting annual electric savings through 2030 for Ameren Illinois
- Planning Cycles
  - Programs were extended 6 months through the end of 2017 so program implementation efforts align with calendar year.
  - Beginning January 1, 2018 utilities required to file and implement four-year DSM plans with commission (updated from 3 year plans)
- EE programs no longer be administered by DCEO

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Illinois Home Performance

- State of Illinois' version of national Home Performance with ENERGY STAR® program
- Statewide platform for whole home retrofit programs
- Began in 2009 under direction of DCEO
- Existing, 1-4 unit homes throughout Illinois
- Provide support for current whole home work
- Results in Illinois Home Performance with ENERGY STAR Silver and Gold certifications
- Offers contractor suite of services, education and resources.
- Trains realtors and appraisal professionals on energy efficiency.

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Market Analysis Opportunity

- Objective: Identify possible programmatic updates and enhancements
- Work with stakeholders and utilities to review:
  - Current qualifying measures
  - Training and resource needs
  - Targets for outreach and marketing
  - BPI rebates

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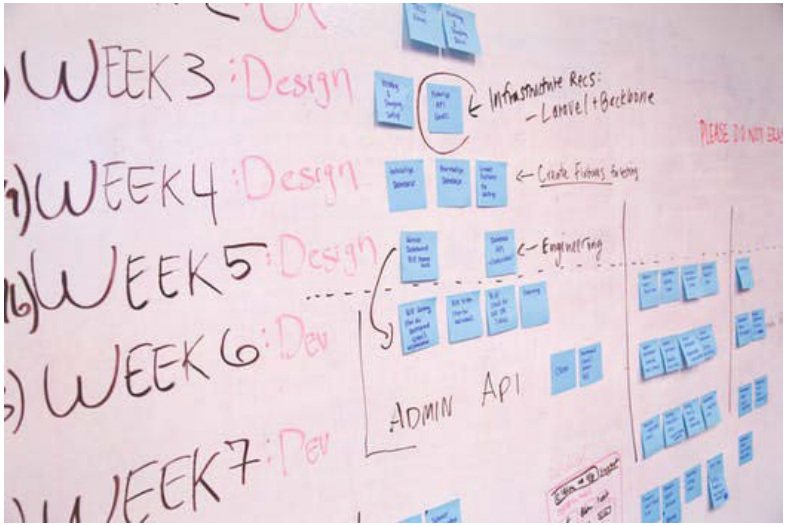
2018 Initiatives



- HPxML Integration
- Real Estate and Appraiser education
  - Including Smart Grid education
- Home Energy Score
- Strategic marketing and outreach initiatives
- HVAC Quality Installation integration

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MIDWEST ENERGY EFFICIENCY ALLIANCE

What is HVAC SAVE?

System Adjustment and Verified Efficiency

- HVAC SAVE (System Adjustment and Verified Efficiency) is a utility program that recognizes:
  - That HVAC equipment operating performance does not equate to rated performance
  - That reasonable losses occur at the installation and in the duct system
  - That those losses can be mitigated and incremental savings captured.

Program Elements:

- Training and Certification
  - MEEA created certification and partnered with ESI
  - Develops pool of trained and certified HVAC professionals
- Field Performance Testing
  - Move classroom into the field
  - Focus on Quality Installation practices
  - Measure, adjust and verify
  - Online reporting tool
    - www.hvacsavessoftware.com

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HVAC SAVE

Process

1. Contractors take initial measurements
2. Measurements recorded into software
3. Software provides HVAC SAVE score and performance metrics
4. Contractor makes adjustments
5. Contractor tests out work completed

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HVAC SAVE

Today

- Certification and testing is required in order for Trade Allies to offer HVAC equipment rebates for Alliant Energy, MidAmerican Energy and Cedar Falls utilities in Iowa.
- Minnesota Energy Resources currently working on an analysis from a previously conducted HVAC SAVE pilot.
- Nicor HVAC SAVE pilot underway.
- ComEd HVAC SAVE pilot to launch this fall.
- Over 2,700 contractors have been trained.
- Over 115,000 Quality Installations have been entered into the software and approved.
- Savings algorithms are in the Iowa (electric and gas) and Illinois (gas) TRMs.
  - 6.4% de-rating factor for gas furnaces
  - 10.5% de-rating factor for air conditioners
- Process and impact evaluation recently completed by Tetra Tech for MidAmerican

MEEA
MIDWEST ENERGY EFFICIENCY ALLIANCE

Thank you!

Kara Jonas

Midwest Energy Efficiency Alliance

MEEA
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Presentation Highlights: MEEA

- **Increased Focus on Quality Installation:** Addressing training gaps through contractor education and certification is critical to ensure energy savings match expectations.
- **More Standardization of home performance data:** To improve program delivery, MEEA and other organizations are transitioning to Home Performance (HP) XML, which standardizes the collection and exchange of data on energy performance.
- **One-stop-shop for Multifamily**: One-stop shops for the whole value chain are becoming the norm in multifamily energy efficiency programs.
- **Greater connection to the real estate market:** MEEA's home energy score program recognizes homes as efficient, and homeowners can use that score when selling their home.

Christine Brinker
Senior Associate
Southwest Energy Efficiency Project (SWEEP)

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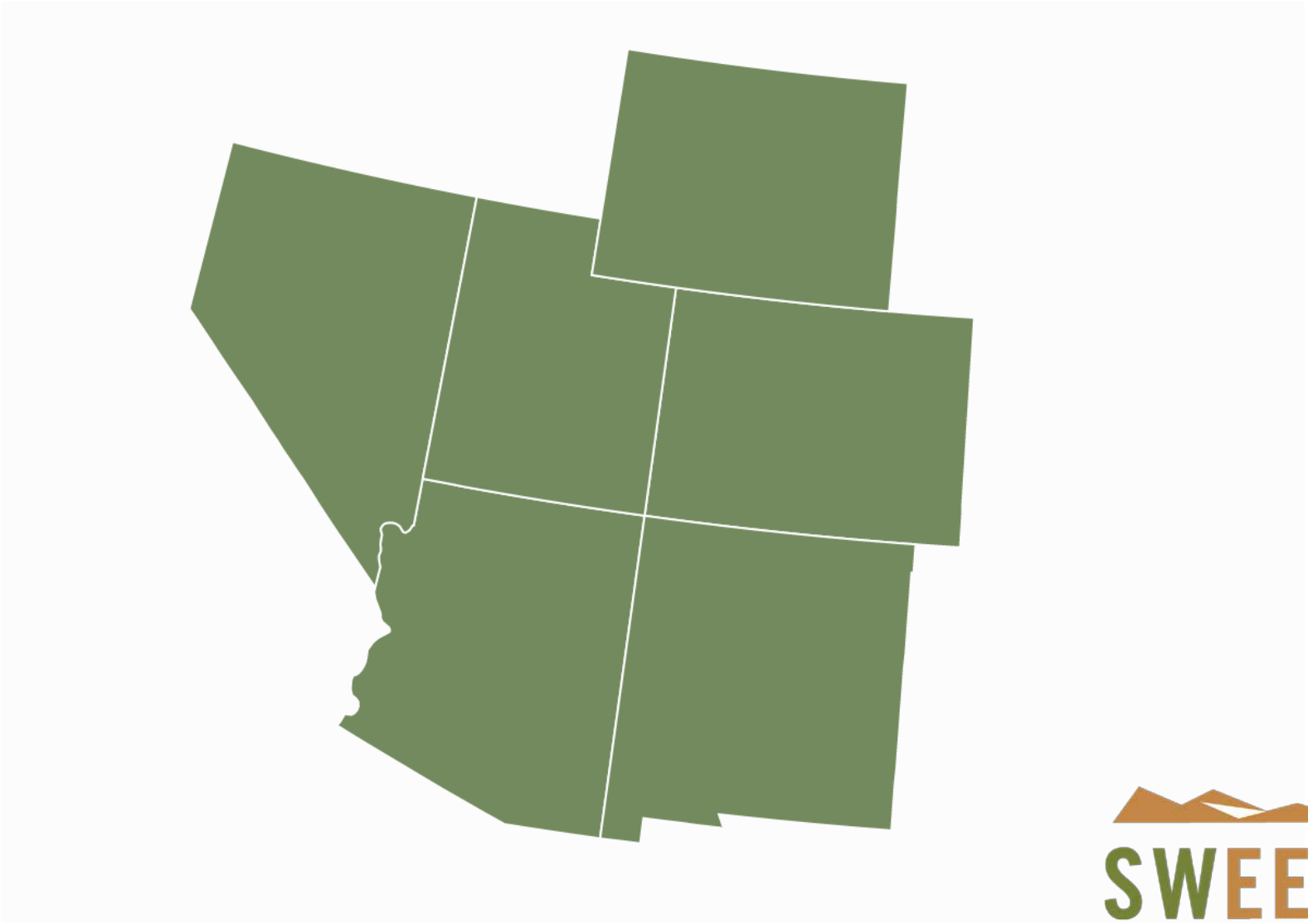
KEY TRENDS & OPPORTUNITIES FOR ENERGY EFFICIENCY IN 2018 IN THE SOUTHWEST

SOUTHWEST ENERGY EFFICIENCY PROJECT

SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT

CHRISTINE BRINKER
DOE BETTER BUILDINGS
RES. NETWORK PEER EXCHANGE
JANUARY 2018

SWEEP Region

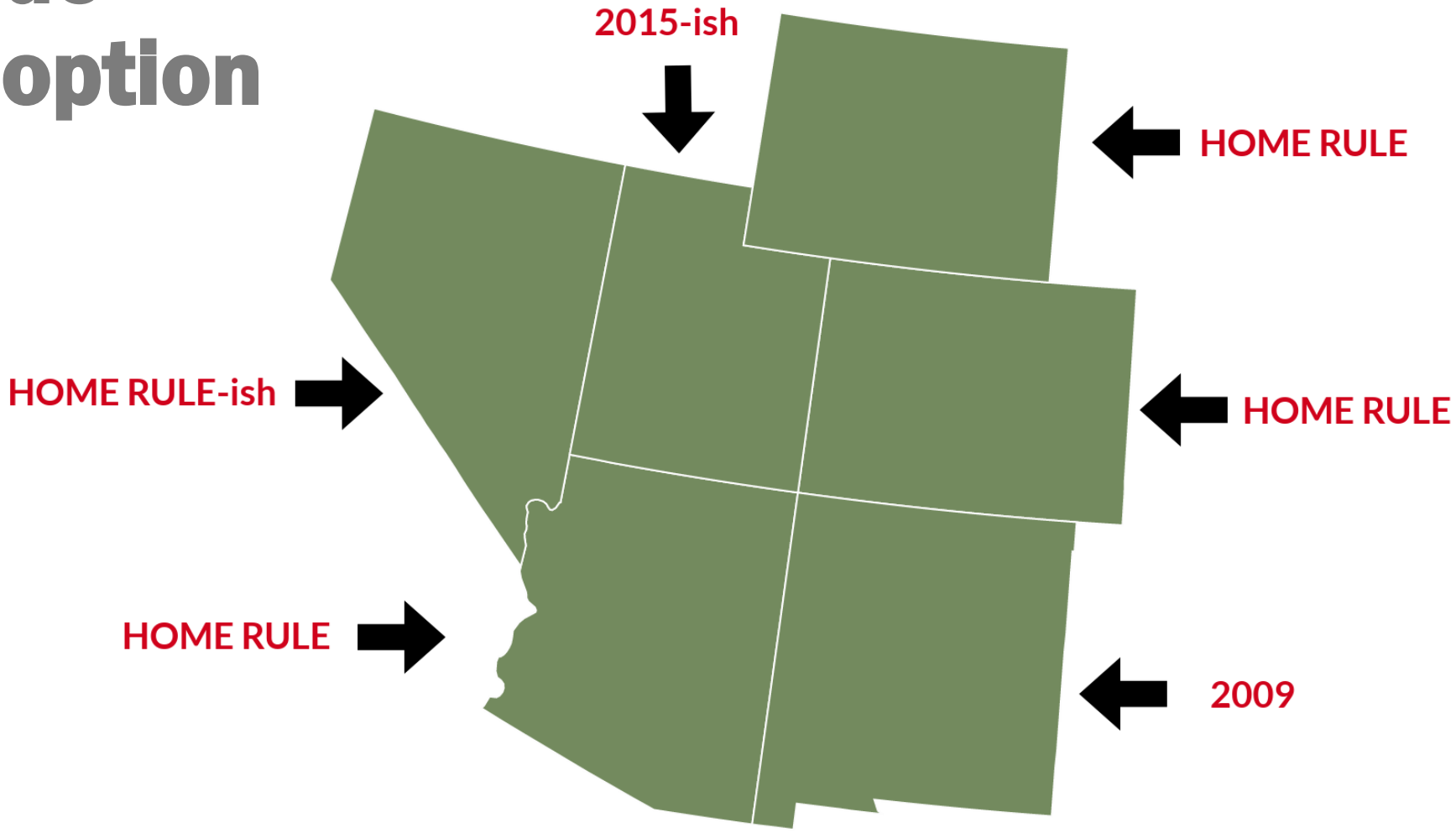


SWEEP

SOUTHWEST ENERGY EFFICIENCY PROJECT

First Trend:
Energy Codes March Forward

Energy Code Adoption



Stuck on old code (<2009)

Up-to-date code (2012, 2015, 2018)

Moving towards net zero

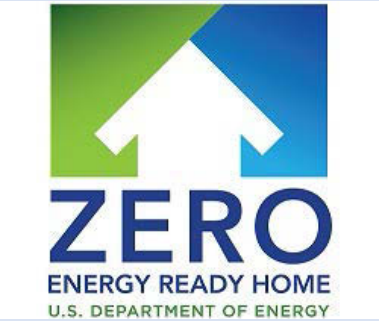
Speaking of Net Zero...

Second Trend:
More Zero Energy-Ready Homes

The Southwest has more Zero Energy Ready homes and homebuilders than anywhere else in the country (nearly two-thirds!)

SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT

Local Government & Utility Support for



- **Accelerated permitting**
- **Reduced permit fees**
- **Utility incentives**

SWEEP
NORTHWEST ENERGY EFFICIENCY PROJECT

Speaking of Utility Incentives...

Third Trend:
Improved Utility Demand-Side Management Programs

Utility Multifamily Programs

SWEEP
NORTHWEST ENERGY EFFICIENCY PROJECT

Utility EV Incentives & Rate Design

SWEEP
SOUTHWEST ENERGY EFFICIENCY PROJECT

LED lights with advanced lighting controls

Wifi-enabled thermostats

Information feedback & other behavioral change strategies

Building code advocacy and support

Mid-stream incentives

Opposing higher monthly fixed charges

On the Horizon

1. Heat Pumps / Beneficial Electrification

2. Residential EE Labeling (HES, HERS)

THANK YOU

SOUTHWEST ENERGY EFFICIENCY PROJECT

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RES. NETWORK PEER EXCHANGE
JANUARY 2018

Discussion Highlights: SWEEP

- **Energy codes moving to new zero:** The southwest has a high proportion of “home rule” energy code states which allow different jurisdictions to adopt different energy code. The key for states is to ensure jurisdictions adhere to the most recent codes, or pursue even more ambitious standards moving towards net zero.

- **To move to net zero, energy efficiency programs need to start integrating electric vehicle connections and renewables.** Colorado, for example, offered up to $10,000 off the cost of certain EVs. Other cities are also building a larger EV charging infrastructure. Currently, almost 2/3 of homes in Southwest are net zero.

- **Multifamily is often neglected in EE programs; one-stop shop can help**: Having one single representative contact that guides the energy upgrade process from start to finish, can boost the efficiency of the model and ensures that program administrators and contractors don’t get lost in the shuffle.

Open Discussion: What research gaps is your region facing in 2018? How would filling these gaps improve your work?

- **More research on the different types of heat pumps and how they work in different climates is needed.** This will enable program administrators to better promote adoption of heat pumps and educate residents around their various applications, advantages, and cost-effectiveness, which varies by region.
- **Further analysis on the impact home certifications have on the market is essential for programs using these tools.** This includes looking at the extent to which homeowners pursue energy upgrades based on certification results, but also at how home certifications and home energy scores impact home sale value in the real estate market.
- **Accelerate the deployment of new technologies** and widespread use beyond pilots.

Addenda: Attendee Information and Poll Results

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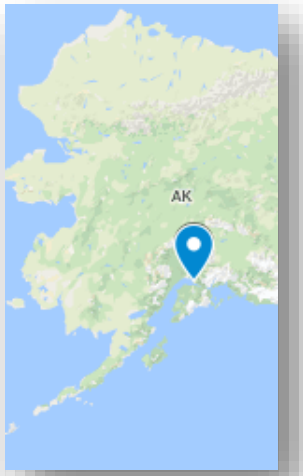
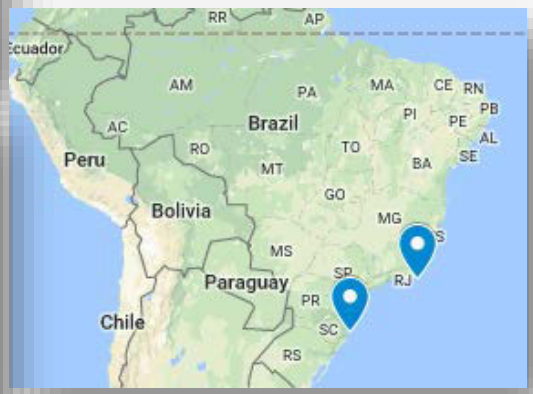
Call Registrant Locations





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Call Attendees: Network Members (1 of 2)

- Affordable Community Energy Services Company (ACE)
- Alaska Housing Finance Corporation
- American Council for an Energy-Efficient Economy (ACEEE)
- Building Performance Institute (BPI)
- Center for Energy and Environment
- Center for Sustainable Energy
- City of Chula Vista Conservation Section
- City of Cleveland
- City of Takoma Park
- CLEAResult
- Cleveland Public Power
- Efficiency Nova Scotia
- GoodCents
- Kalamazoo Valley Habitat for Humanity
- La Plata Electric Association
- Michigan Saves

Call Attendees: Network Members (2 of 2)

- Montgomery County Department of Environmental Protection
- National Association of State Energy Officials (NASEO)
- North Carolina Sustainable Energy Association
- South Burlington Energy Committee
- Southeast Energy Efficiency Alliance (SEEA)
- The Environmental Center
- Vermont Energy Investment Corporation (VEIC)
- Wausau Supply Company

Call Attendees: Non-Members (1 of 4)

- ABCD, Inc.
- AboutSavingHeat.com
- AHP Homeownership Center
- Air Conditioning Contractors of America (ACCA)
- Appalachian Voices
- Ballarat Consulting
- Better Climate
- Bonneville Power Administration
- Boston Housing Authority
- Bracewell LLP
- Brevard Public Schools
- Brooklyn Green Home Solutions
- Cadeo Group LLC
- Cadmus
- California Public Utilities Commission
- CenterPoint Energy
- City of Yuma
- Climate Smart Missoula
- ECS-Aeroseal
- Efficiency First Arizona
- Emerson
- emPower
- Enbridge Gas Distriution

Call Attendees: Non-Members (2 of 4)

- Energy Solutions
- Evolve
- Franklin Energy
- FS Energy
- Green Compass Sustainability
- Habitat Studio & Workshop Ltd.
- Hawaii Energy
- HDR Consulting
- Home Energy Connection, LLC
- Home Ventilating Institute (HVI)
- Honeywell
- How$martKY™/Mountain Association for Community Economic Development (MACED)
- Hunter Douglas
- Hydro-Québec Research Institute (IREQ)
- ICF
- Idaho Power
- Ideal Energy LLC
- Innowatts Inc.
- Leidos Inc
- Local Government Commission

Call Attendees: Non-Members (3 of 4)

- Lockheed Martin Energy
- Louisville Gas & Electric (LG&E)
- Mercy Housing Management Group
- Milepost Consulting
- National Audubon Society
- National Fuel
- National Grid (NY)
- New Jersey Natural Gas
- Northeast Energy Efficiency Partnerships (NEEP)
- Opportunity Council
- Oregon Department of Energy
- Oregon Institute of Technology
- Pennsylvania State University
- Philips Lighting
- Polyisocyanurate Insulation Manufacturers Association (PIMA)
- Proctor Engineering
- ReVireo
- Rheem
- Rmax Operating LLC
- Seattle City Light
- Sim2
- Snohomish County

Call Attendees: Non-Members (4 of 4)

- Solar Habitats, LLC.
- Southwest Energy Efficiency Project
- Steven Winter Associates, Inc.
- Super Insulated Green Building Technologies, LLC
- Sustainable Connections
- The Desner Group, Inc.
- The Energy Coalition
- U.S. Energy Information Administration (EIA)
- U.S. Green Building Council
- UL LLC
- Universidade Federal de Santa Catarina
- Ventura County Regional Energy Alliance (VCREA)
- WE Energies
- Whirlpool Corporation
- Will County (Land Use Department)
- Wisconsin Energy Conservation Corporation (WECC)

Opening Poll

- **Which best describes your organization's experience with regional trends for residential energy efficiency?**
  - Some experience/familiarity – ***50%***
  - Very experienced/familiar – ***27%***
  - Limited experience/familiarity – ***20%***
  - No experience/familiarity – ***2%***
  - Not applicable – ***1%***

Closing Poll

- **After today's call, what will you do?**
  - Seek out additional information on one or more of the ideas – ***64%***
  - Make no changes to your current approach – ***15%***
  - Consider implementing one or more of the ideas discussed – ***11%***
  - Other (please explain) – ***10%***