Better Buildings Residential Network Peer Exchange Call Series: *Einstein and Energy Efficiency: Making Homes Smarter (301)*

February 4, 2016

Call Slides and Discussion Summary

Call Attendee Locations

Agenda

- Agenda Review and Ground Rules
- Opening Polls
- Brief Residential Network Overview
- Featured Speakers
  - Dave Hanna, Senior Principal Energy Consultant, Itron
  - Matt Carlson, CEO, Sunnovations, Inc. *(Network Member)*
  - Jacob Stoll, Senior Program Manager, ComEd
- Discussion
  - Is your program currently using or considering smart home technologies? What kinds of technologies are you using?
  - Are there challenges to deploying smart home technologies and/or analyzing the data? What are strategies for overcoming those challenges?
  - What strategies are programs using to integrate smart home technologies for greater energy savings?
  - How can programs increase customer awareness and demand for smarter home heating and cooling technologies?
  - Are there other questions related to smart home technology in the residential energy efficiency sector?
- Closing Poll and Upcoming Call Schedule

Poll 1: Experience

- Which of the following best describes your organization's experience with the call topic?
  - Some experience/familiarity **– *45%***
  - Limited experience/familiarity **– *32%***
  - Very experienced/familiar **– *18%***
  - No experience/familiarity **– *5%***
  - Not applicable **– *0%***

Opening Poll 2: Future Call Topics

- What other topics related to smart homes would you like to see on a future peer exchange call?
  - Emerging technologies **– *41%***
  - Leveraging smart home and appliance data **– *39%***
  - Smart metering **– *20%***
  - Other (please chat in!) **– *0%***

Better Buildings Residential Network

Better Buildings Residential Network: Connects energy efficiency programs and partners to share best practices and learn from one another to increase the number of homes that are energy efficient.

Membership: Open to organizations committed to accelerating the pace of home energy upgrades.

Benefits:

- Peer Exchange Calls 4x/month
- Tools, templates, & resources
- Recognition in media, materials
- Speaking opportunities
- Updates on latest trends
- Voluntary member initiatives
- Residential Program Solution Center guided tours

Commitment: Provide DOE with annual number of residential upgrades, and information about associated benefits.

For more information or to join, email bbresidentialnetwork@ee.doe.gov

The Opportunity:

Dave Hanna, Senior Principal Energy Consultant, Itron

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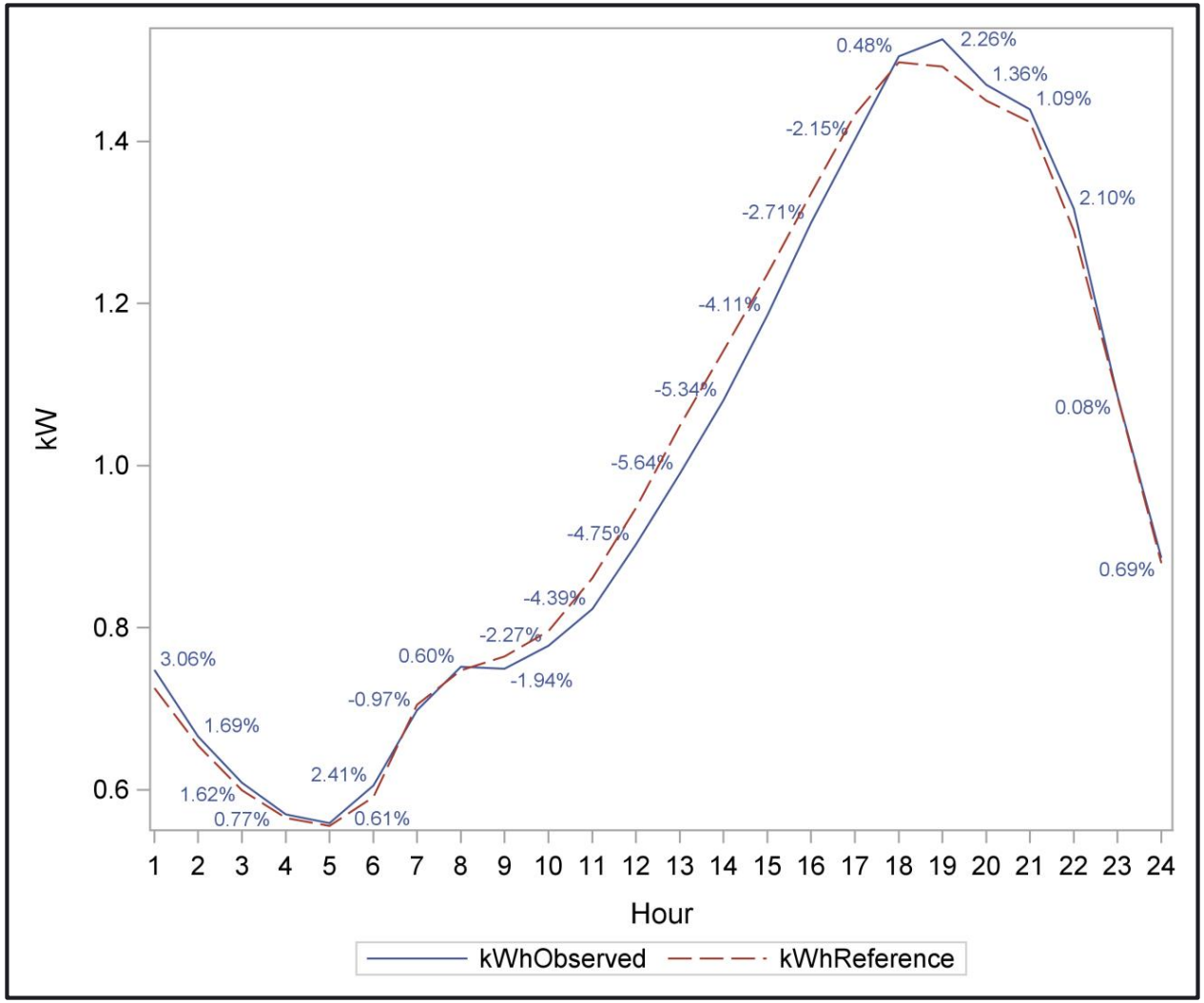
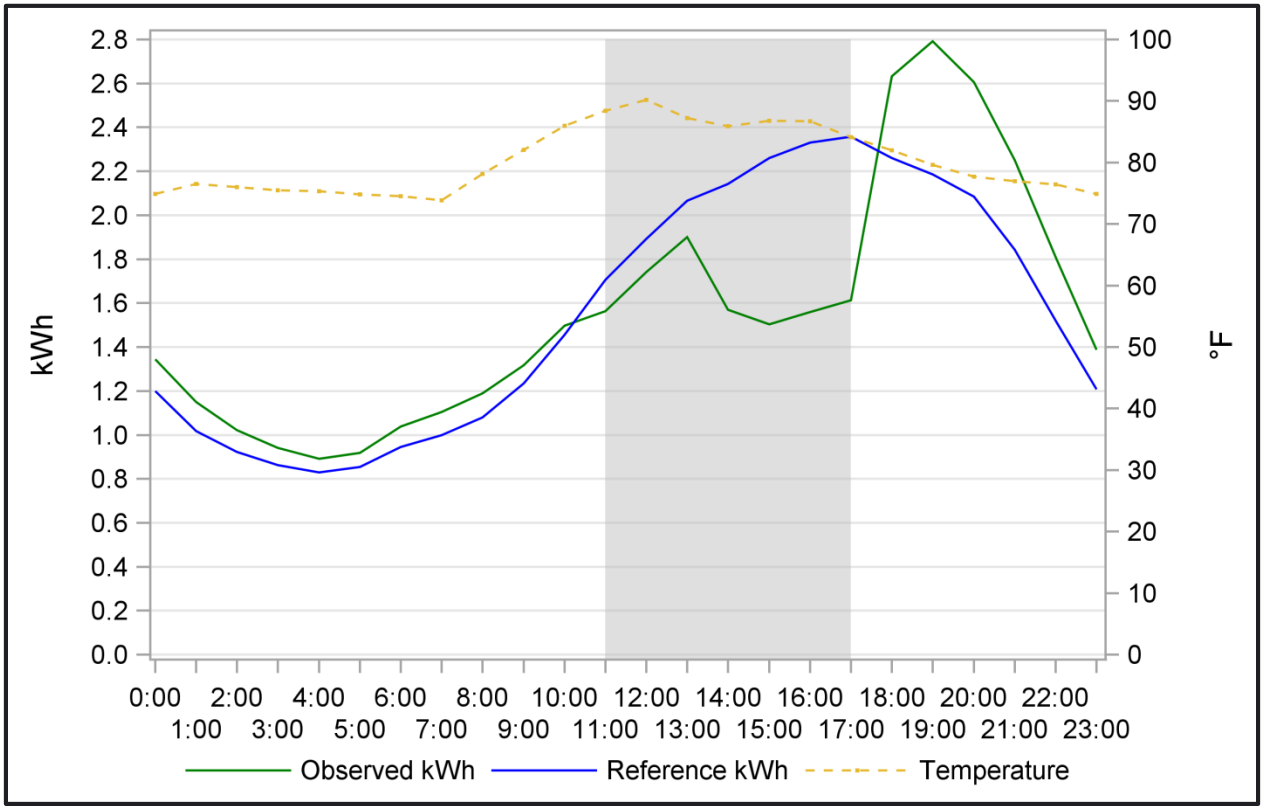
SCTD – ENERGY SAVINGS – WEEKDAY HOURS

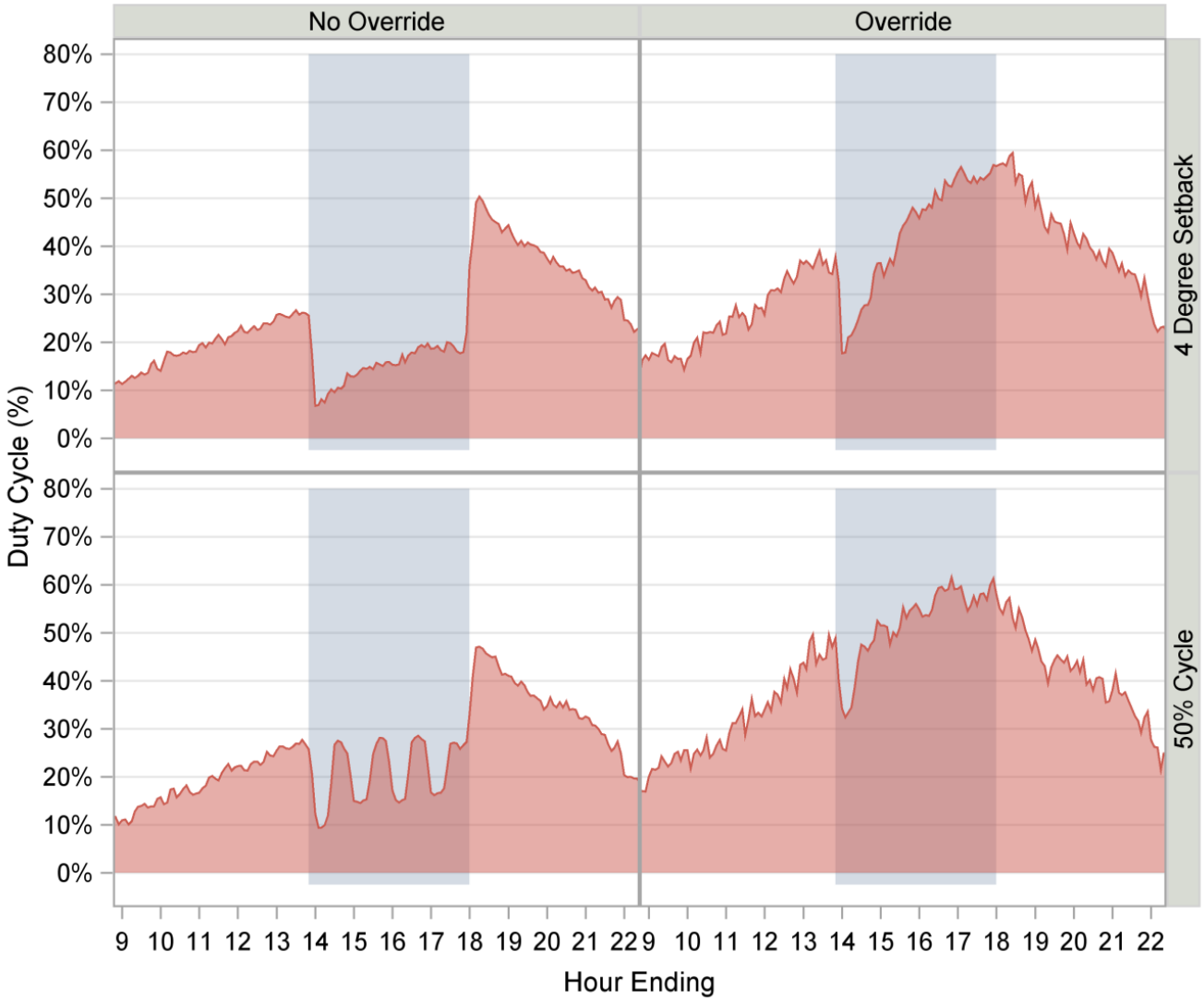


SCTD - PTR EVENT RESULTS

- Average Participant Event Hour Load Reduction : 0.61 kW (22.9%)
- Average Aggregate Event Hour Load Reduction : 1.16 MW



SCTD OVERRIDES IN THERMOSTAT DATA



Presentation Highlights: Itron

- A **free programmable Ecobee thermostat** helped San Diego Gas & Electric's energy load reduction effort.
- **Midday hours** saw the greatest reduction in energy use, indicating that customers were using the programmable thermostats to their advantage.
- **Average load reduction** was 6 kWh per customer, which was 23% of the load during those hours: a very significant impact.
- **Overrides** by customers were not a major concern; only 15% of customers overrode PTR/cycling events.
- The program **continues to grow**. At the end of 2014 there were 2,000 customers; now 7,000. SDG&E may expand to a "bring your own thermostat" program.
- The program did not do any polling during the test period, so **discomfort levels** are not known (other than through overrides).

The Technology:

Matt Carlson, CEO, Sunnovations, Inc.

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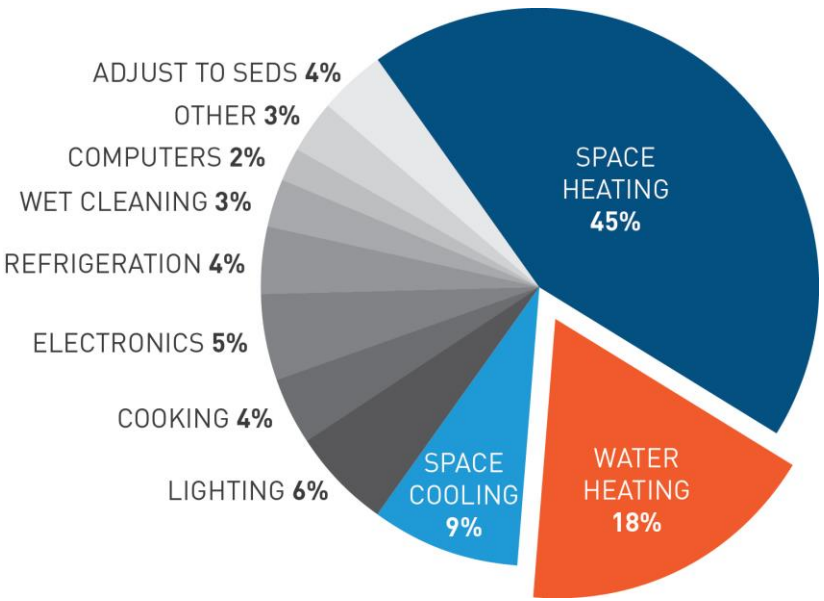
INTRODUCING

cool technology for hot water.

WH Energy: An Untapped Opportunity

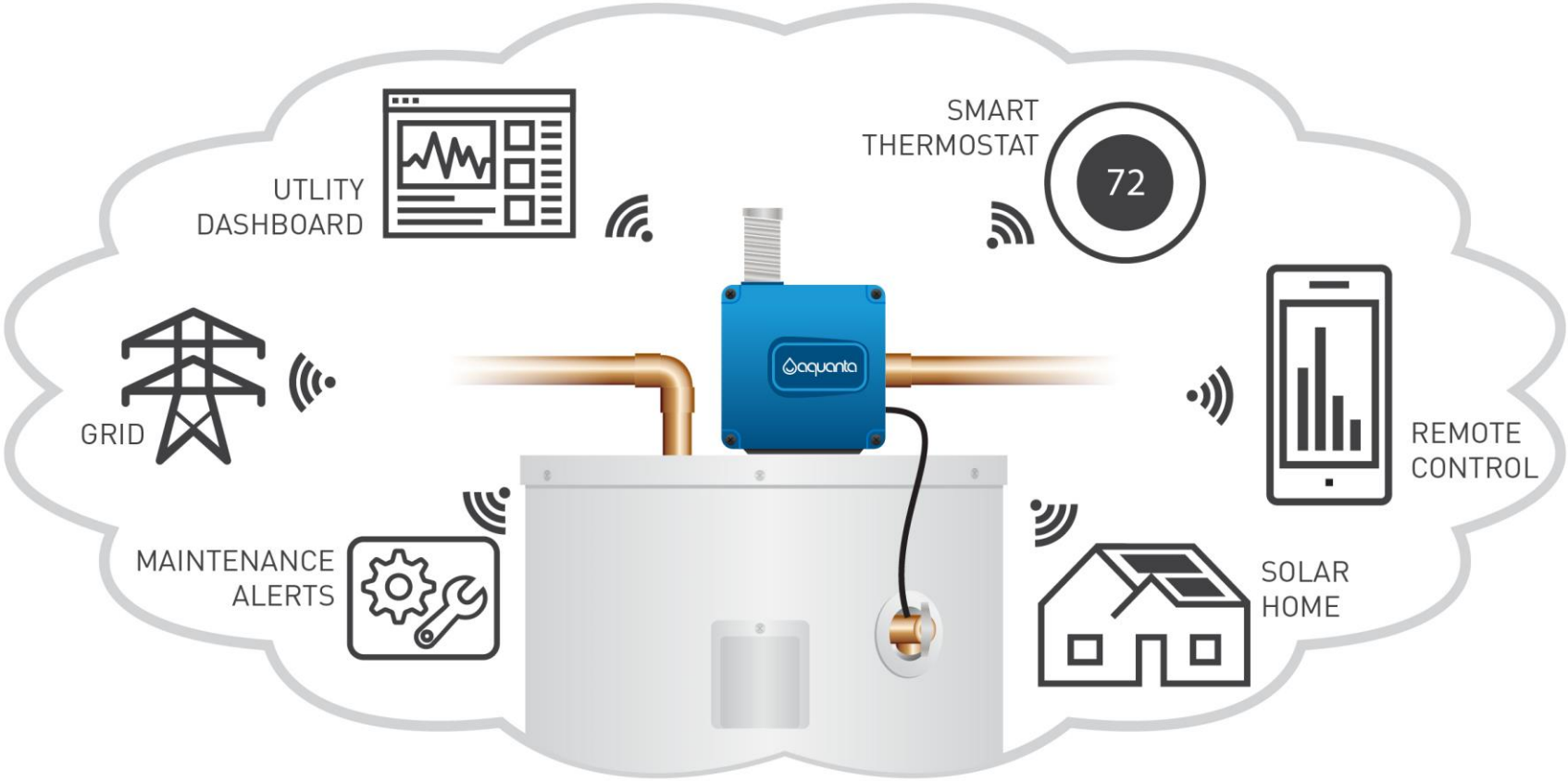
A BIGGER SLICE THAN MOST THINK



MACRO OPPORTUNITY

- 110mm+ Residential WH Installed Base
- Annual Residential WH Energy
  - $33B
  - 2.9 Quads
- 20-50% Of Energy Input Lost Via Standby Loss, Inefficient Heating
- RMI: WHs as $2-5B/Yr Economic Opportunity Through "Demand Flexibility"

Water Heaters & the Future Grid



Value Proposition

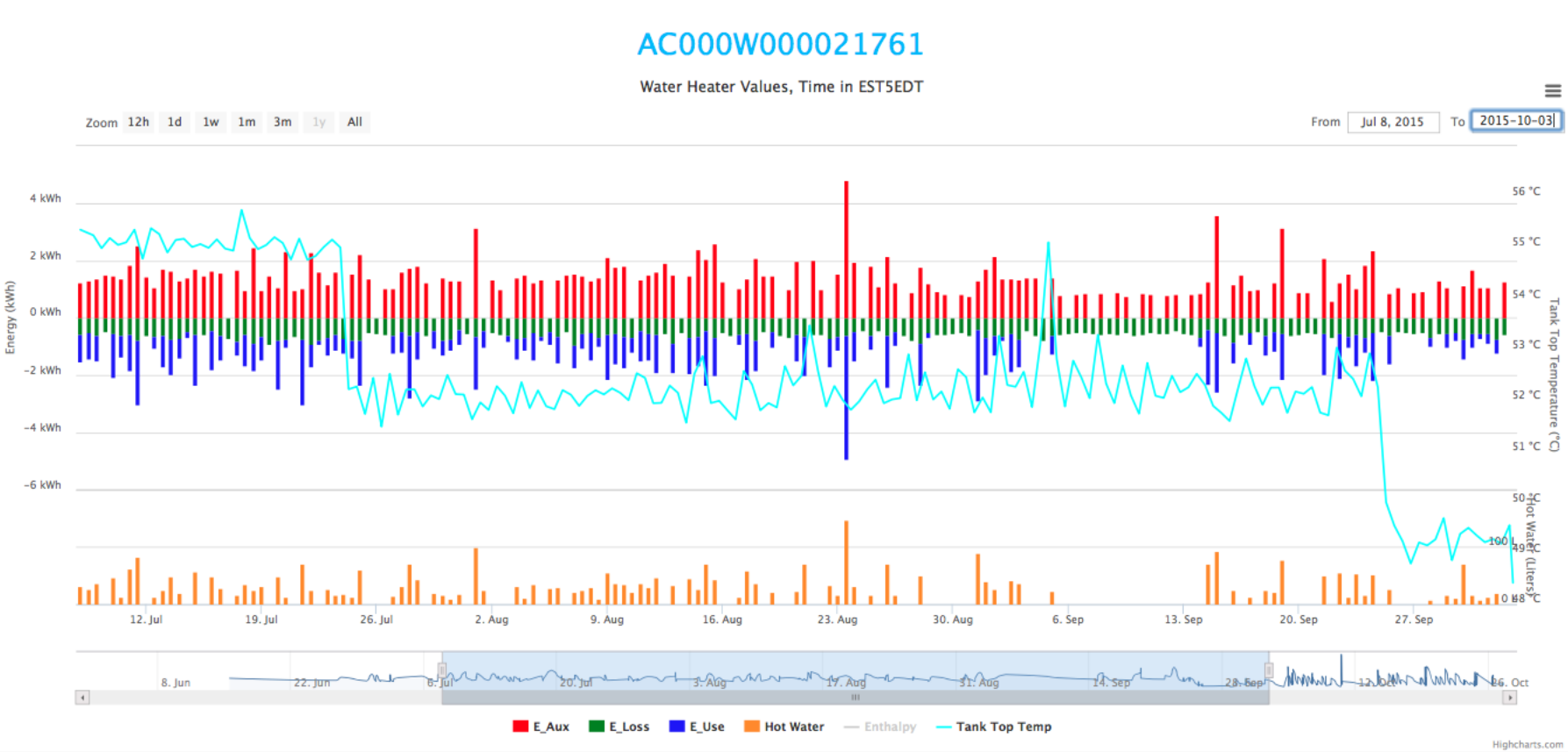
END USER

- Intelligent Controls
  - Predictive algorithm matches heat cycling to usage patterns
  - Remote visualization/control
- Cost Savings
  - Smart thermostat/heating control
  - Energy savings suggestions
  - Comparisons to peers
- Convenience & Comfort
  - Measures hot water availability
  - Remote turn off feature
  - Maintenance alerts, e.g. leak detection

UTILITY

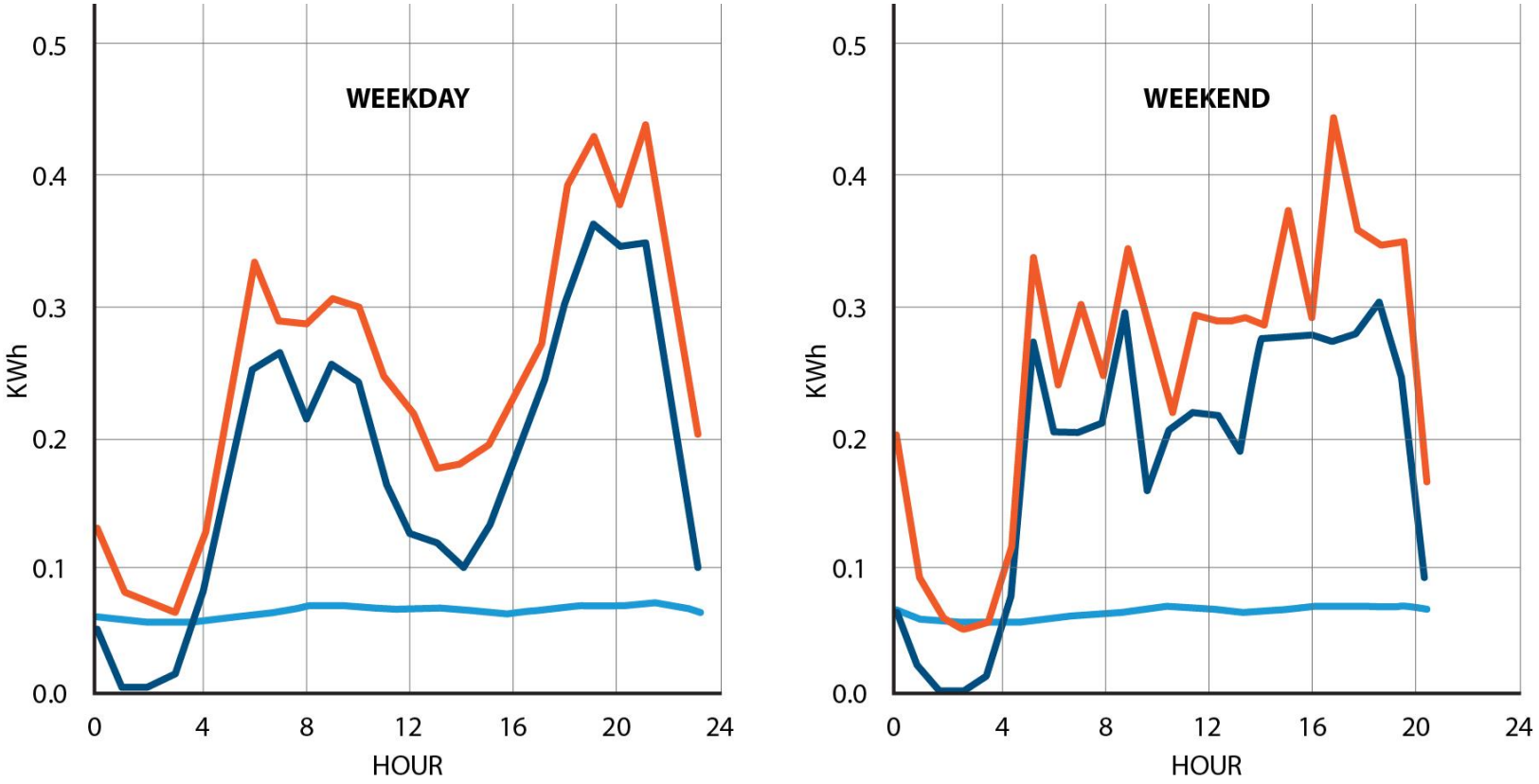
- Customer Engagement
  - Integration into individualized energy dashboard
  - Alerting around maintenance, TOU and other events
- Energy Efficiency
  - Away auto-setting
  - Virtual thermostat control
  - Learning controls
- Enhanced DR Resource
  - Real time *and* predictive analytics
  - Unique data sets

Aquanta Analytic Capability



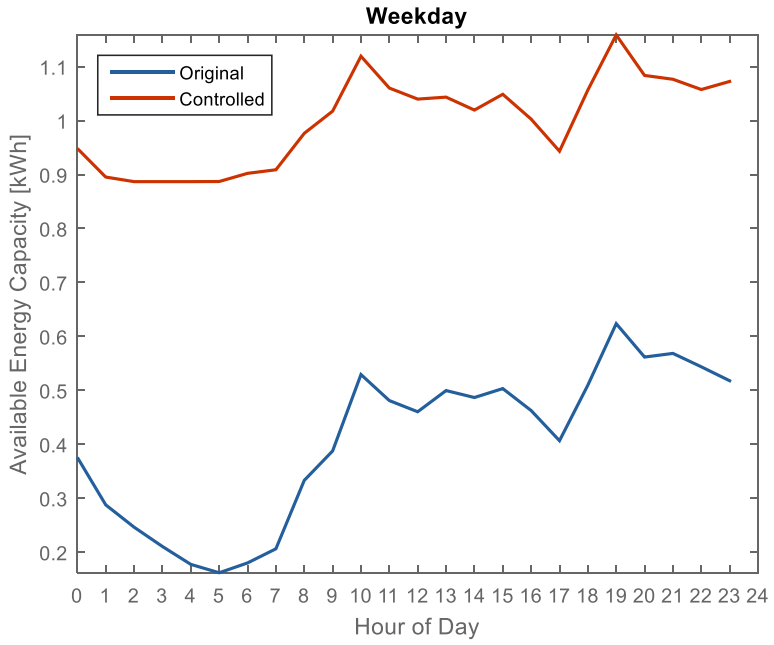
E_Aux	E_Loss	E_Use	Hot Water
205.08 kWh	-102.94 kWh	-101.69 kWh	3,596 L

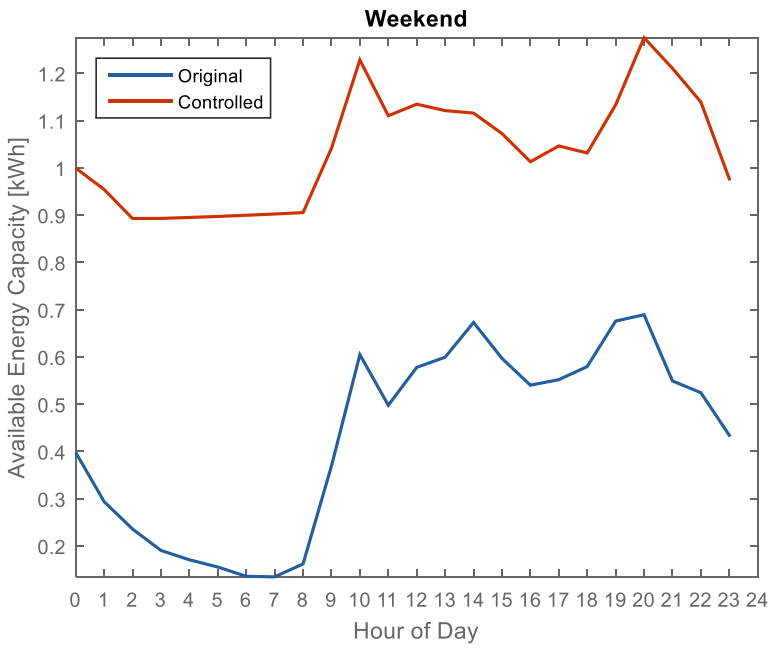
Correlating Water Heating Energy & Grid Load



- Actual data from Aquanta trial sites

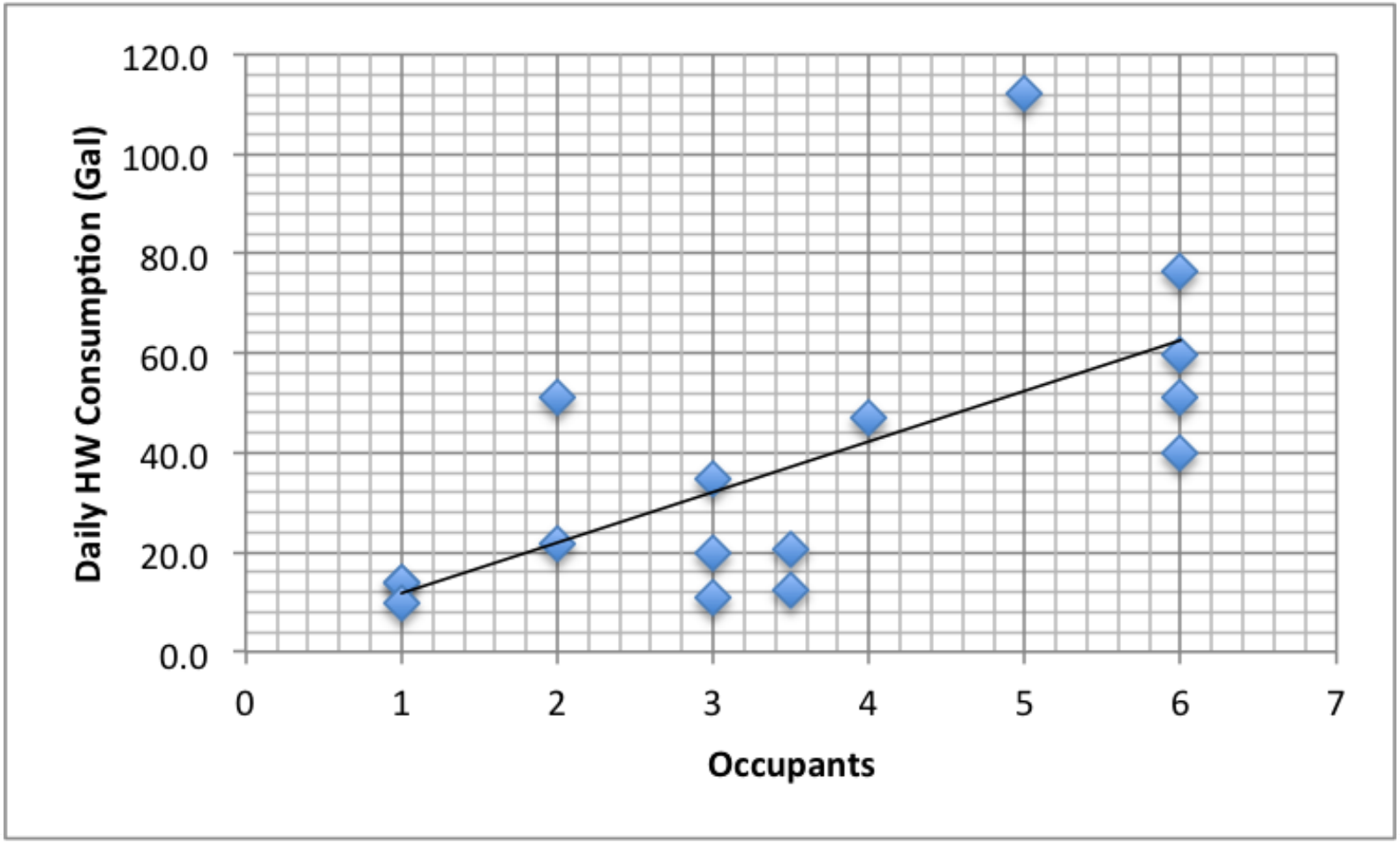
Intelligent Heating Control Enables Utility Grid Management Opportunities





- Traditional Demand Response
- TOU/Critical Peak Pricing
- Peak Shaving
- Load Balancing
- Load Shedding
- Thermal Storage/DG Integration

More Field Trial Data: HW Consumption (Summer)



Thank You!

Matt Carlson

CEO, Sunnovations Inc.

Presentation Highlights: Sunnovations

- **Water heating is the 2nd largest source of energy load** in homes. Much of that (20-50%) is wasted keeping water stored hot.
- **Large untapped economic opportunity** exists in considering water heaters as part of the smart grid ecosystem.
- **Remotely controlled thermostat turn-downs** showed that customers' comfort was not impacted. On a particular site, this represented a deemed savings of 1 kWh per day ($50-100/year).
- **Water energy consumption patterns** will help build a knowledge base to predict where further energy savings can be found once more units are in the field.
- Water heaters are like **modest batteries** for excess distributed generation.
- More intelligent control of water heaters represents a multi-billion dollar opportunity to **cut our carbon footprint.**
- **Aquanta** will be available in Q2 2016.

Program Experience:

Jacob Stoll, Senior Program Manager, ComEd

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ComEd® Energy Efficiency Program

SMART THERMOSTAT PROGRAM OVERVIEW

JACOB STOLL, ComEd

ComEd®

An Exelon Company

Overview

Currently program year (PY8) runs 6/1/2015 – 5/31/2016

Launch Dates:

- Contractor-Installed rebates – 7/6/2015
- Utility-Installed – 8/3/2015
- Self-Installed rebates – 10/5/2015

Potential First Year Volume Estimates

- 2,000 Direct Installs through the existing Utility Home Assessment Offerings (based on 10% of assessment participants)
- Estimated 20,000 – 22,000 units through Professional and self install (“DIY”) channels

TARGET CUSTOMERS

Residential Customers

- Single Family Homeowners
- Condo & Townhome Owners
- 2-flat Owners (Peoples Gas and North Shore Gas Territory)
- 2-, 3-, 4-flat Owners (Nicor Gas Territory)

Equipment

- Central air conditioner and furnace
- Electric resistance heating (with or without a central air conditioner)
- Electric heat pump

DELIVERY CHANNELS AND INCENTIVES

smart ideas
ComEd Energy Efficiency Program

THREE WAYS TO GET YOUR SMART THERMOSTAT

ComEd Smart Ideas® Energy Efficiency Program offers rebates and discounts on smart thermostats.*

SMART THERMOSTATS	
Self-installed Purchase and install your qualifying smart thermostat and receive a $100 rebate from ComEd.	ecobee3, Nest Learning Thermostat $100 rebate
Contractor-installed Use a professional contractor to install your qualifying smart thermostat and receive a $125 rebate from ComEd.	ecobee3, Honeywell Lyric, Nest Learning Thermostat $125 rebate
Utility-installed Receive a smart thermostat at the discounted price of $150, including free installation during your Home Energy Assessment.	ecobee3 $150 discounted price

*Some restrictions may apply.
Additional rebates may be available from Nicor Gas, North Shore Gas and Peoples Gas. Visit gas utility websites for details.

For more information call 855-433-2700 or visit ComEd.com/Rebates or ComEd.com/Assessment

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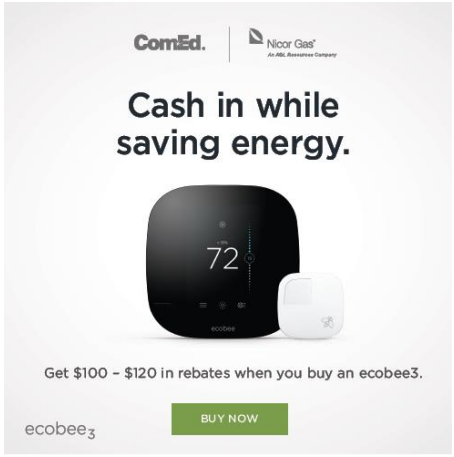
MARKETING EFFORTS

Participation driven primarily by manufacturers & ComEd marketing

- Nest – TV, radio, Home Page takeovers, digital ads, paid social media and search, print magazine ads, in-store advertising, Out of Home
- ecobee – digital advertising
- ComEd – in-store POP, field reps, add'l low cost tactics, Spring marketing campaign, social media, event coordination



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Contact Information

Jacob Stoll

Senior Program Manager

www.ComEd.com/rebates

Presentation Highlights: ComEd

- Nest, Ecobee 3, and Honeywell programmable thermostats provide customers with options via direct install or rebate initiatives.
- To qualify for the thermostat rebate, homeowners must have electric resistant heating.
- The success of smart thermostat initiatives relies on effective marketing. Black Friday and the holiday season provide great opportunities to spread interest, through collaborations/cobranding with manufacturers and big box stores, and advertising via billboards, TV, radio, and Hulu.
- Criteria for selecting thermostat manufacturers to partner with included: continuous 24V power source, wi-fi enabled via remote device, incorporates setback during unoccupied times, and ability to download new software updates.
- A Rush Hour Rewards program will move from its current pilot phase to an annual basis once legislation is passed.
- Some customers in the ComEd program have responded negatively to the smart thermostats, but overall negative feedback has been limited.

Explore planning, implementation, & evaluation strategies in the Residential Program Solution Center

- Handbooks - explain *why* and *how* to implement specific stages of a residential program.
- Quick Links - provide easy access to resources on the key issues that many programs face.
- Proven Practices posts - include lessons learned, examples, and helpful tips from successful programs.
  - See the latest post on Streamlined Loans.
- Sample Smart Home Resources
  - Insights from Smart Meters: The Potential for Peak-Hour Savings from Behavior-Based Programs
  - April 9, 2015 Peer Exchange Call Summary: The Future is Here: Smart Home Technology

www.energy.gov/rpsc

The Solution Center is continually updated to support residential energy efficiency programs—**member ideas are wanted**!

Discussion Questions

- Is your program currently using or considering smart home technologies? What kinds of technologies are you using?
- Are there challenges to deploying smart home technologies and/or analyzing the data? What are strategies for overcoming those challenges?
- What strategies are programs using to integrate smart home technologies for greater energy savings?
- How can programs increase customer awareness and demand for smarter home heating and cooling technologies?
- Are there other questions related to smart home technology in the residential energy efficiency sector?
- Thoughts/reactions to the 1/25/2016 SCOTUS decision upholding the FERC's 'demand response' rule, implying that energy efficiency should be valued as much as buying energy wholesale?

Discussion Highlights

- **Excess heat generation** can be stored as the smart thermostat can see how much theoretical capacity is available.
- **Privacy concerns** have not been a significant issue.
- Smart systems create an **opportunity to communicate public health and emergency situations,** such as heat waves or alerting homeowners about air quality and indoor ventilation.
- **Smart tablets and mobile devices** can visualize real-time usage data via Aquanta. Smart thermostats offer more of an aggregated view.

Peer Exchange Call Series

We hold one Peer Exchange call every Thursday from 1:00-2:30 pm ET

Calls cover a range of topics, including financing & revenue, data & evaluation, business partners, multifamily housing, and marketing & outreach for all stages of program development and implementation

Upcoming calls:

- **March 3:** The Intersection of Energy Efficiency and Health (301)
- **March 10:** Addressing Barriers to Upgrade Projects at Affordable Multifamily Properties (201)
- **March 17:** Rainbows and Leprechauns: Finding Gold in Partnerships (101)
- **March 24:** High Impact Catalyst: Sequencing Upgrades and Engaging Homeowners over Time (201)

Send call topic ideas to peerexchange@rossstrategic.com

LET'S ALL MEET IN MAY!

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BETTER BUILDINGS SUMMIT
Washington, DC · May 9-11, 2016

SAVE YOUR SPOT NOW:

HTTPS://WW2.EVENTREBELS.COM/ER/REGISTRATION/STEPREGINFO.JSP?ACTIVITYID=14611&STEPNUMBER=1

This Summit will bring together Better Buildings partners and stakeholders to exchange best practices and discuss future opportunities for greater energy efficiency in America's homes and buildings.

There will be time set aside for a specific Residential Network discussion and meet-up!