



NORTHEAST ENERGY EFFICIENCY PARTNERSHIPS

The Hidden Potential of HEMS: A Workshop

In-Person Workshop hosted by:
Northeast Energy Efficiency Partnerships (NEEP)
June 15th, 2015 10am-3pm

ABOUT NEEP



MISSION

Accelerate energy efficiency in homes, buildings and industry in the Northeast - Mid-Atlantic region.

VISION

The region wholly embraces energy efficiency policies and solutions as a cornerstone of a sustainable energy policy, a vibrant economy, and a healthy environment for people to live and work in.

APPROACH

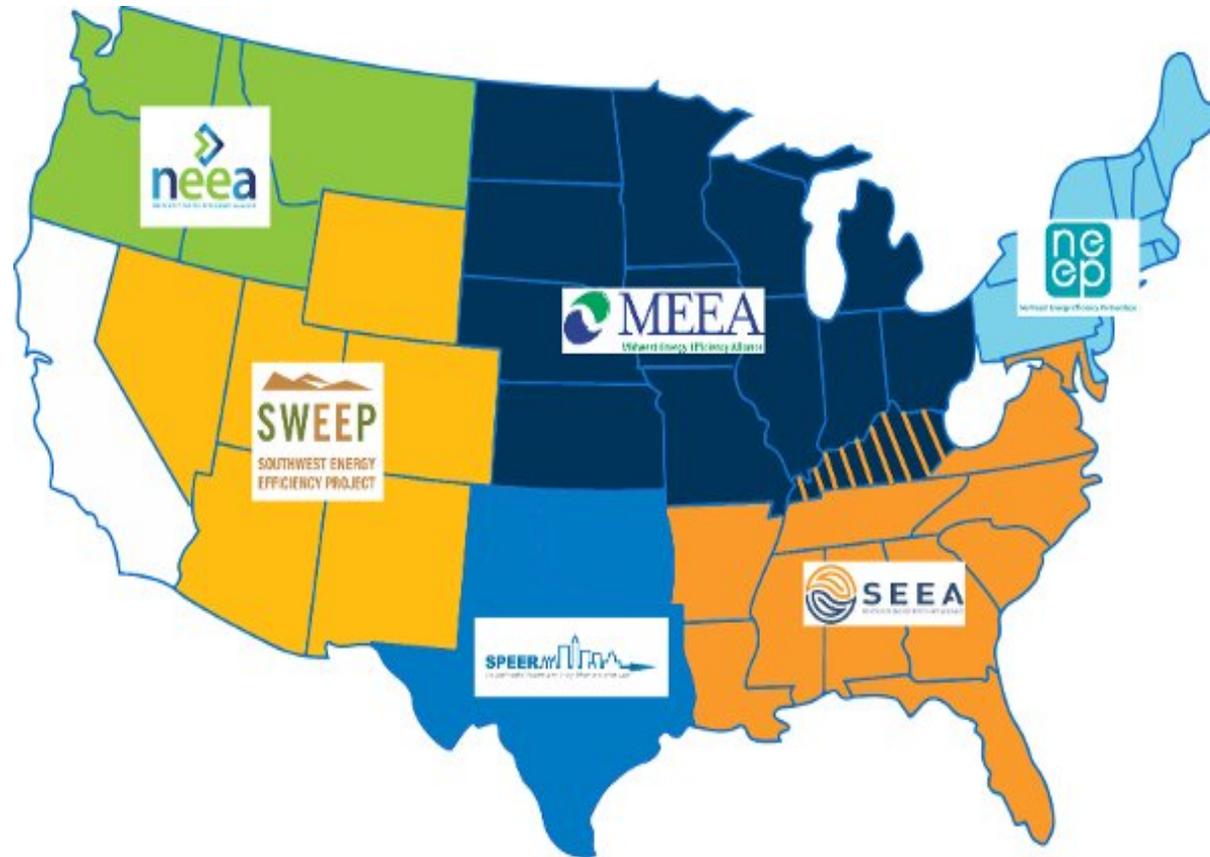
NEEP brings key stakeholders together with expertise and leveraged resources to innovate and apply best practices across the region.

Serving the Northeast & Mid-Atlantic states since 1996

ABOUT NEEP



A Regional Energy Efficiency Organization (REEO)

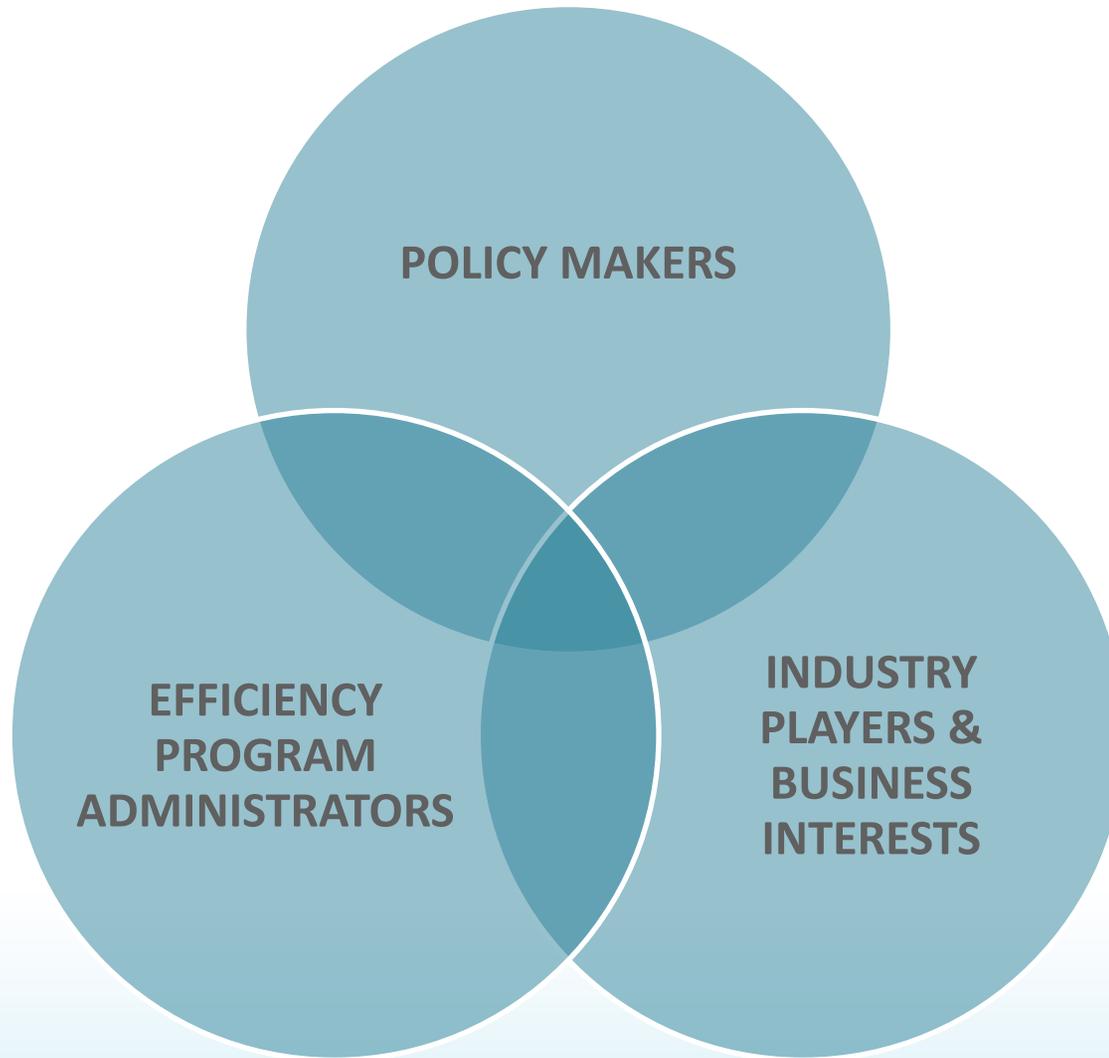


One of six REEOs designated by U.S. DOE to support state efficiency policies.

ABOUT NEEP



PRIMARY AUDIENCES: WHO WE SERVE

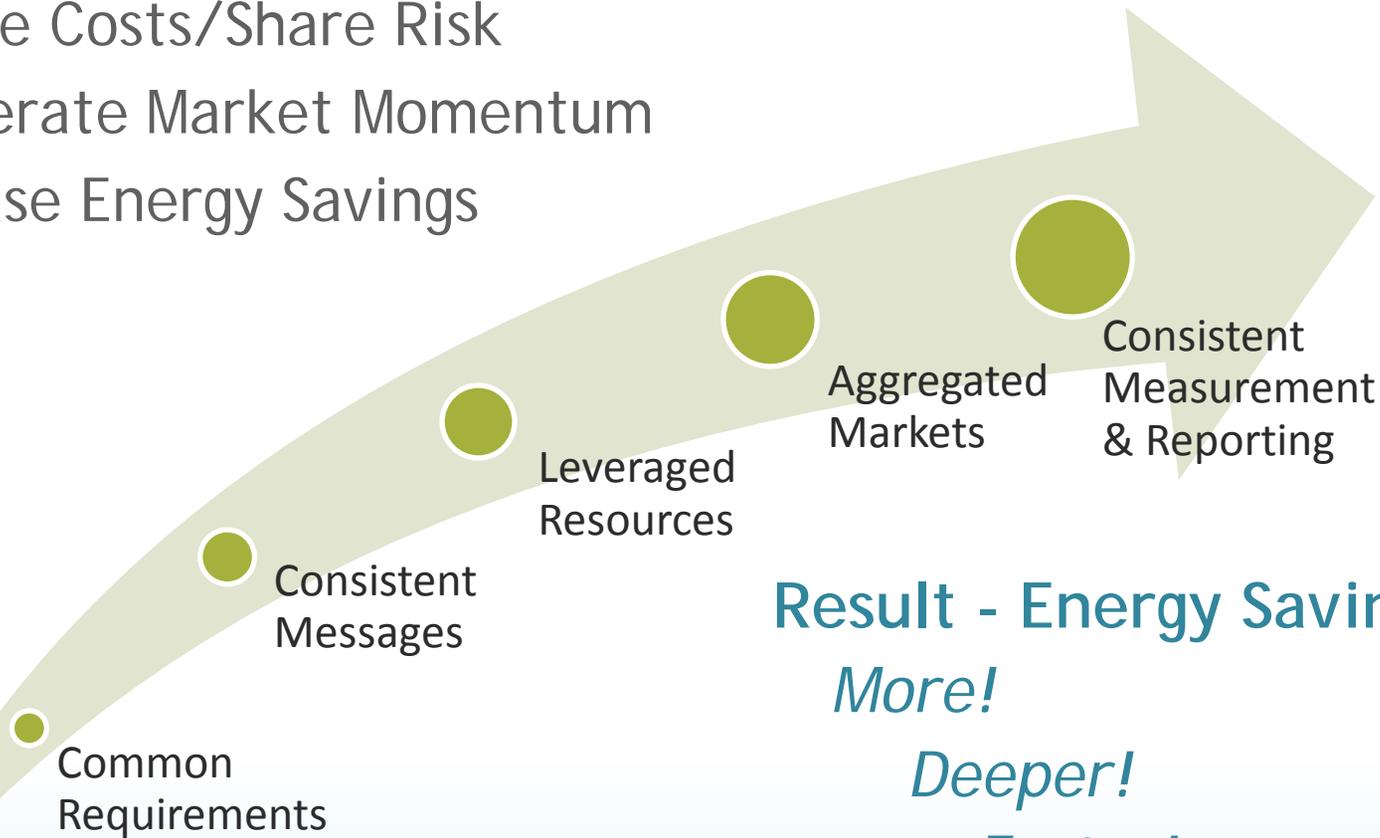


ABOUT NEEP



NEEP'S REGIONAL VALUE PROPOSITION

- ✓ Identify/Promote Innovation & Best Practices
- ✓ Reduce Costs/Share Risk
- ✓ Accelerate Market Momentum
- ✓ Increase Energy Savings



Result - Energy Savings:

More!

Deeper!

Faster!

Cheaper!

THE NEEP APPROACH: CORE VALUES



COLLABORATION

- Bringing people and organizations together to work effectively and creatively to advance energy efficiency

ADVOCACY

- Promoting best practice efficiency programs and policies, and regional coordination to realize efficiency's full potential value

EXPERTISE

- Fostering and applying expert skills and knowledge to advance energy efficiency

NEEP STRATEGIES & PROJECTS



2015 BUSINESS PLAN

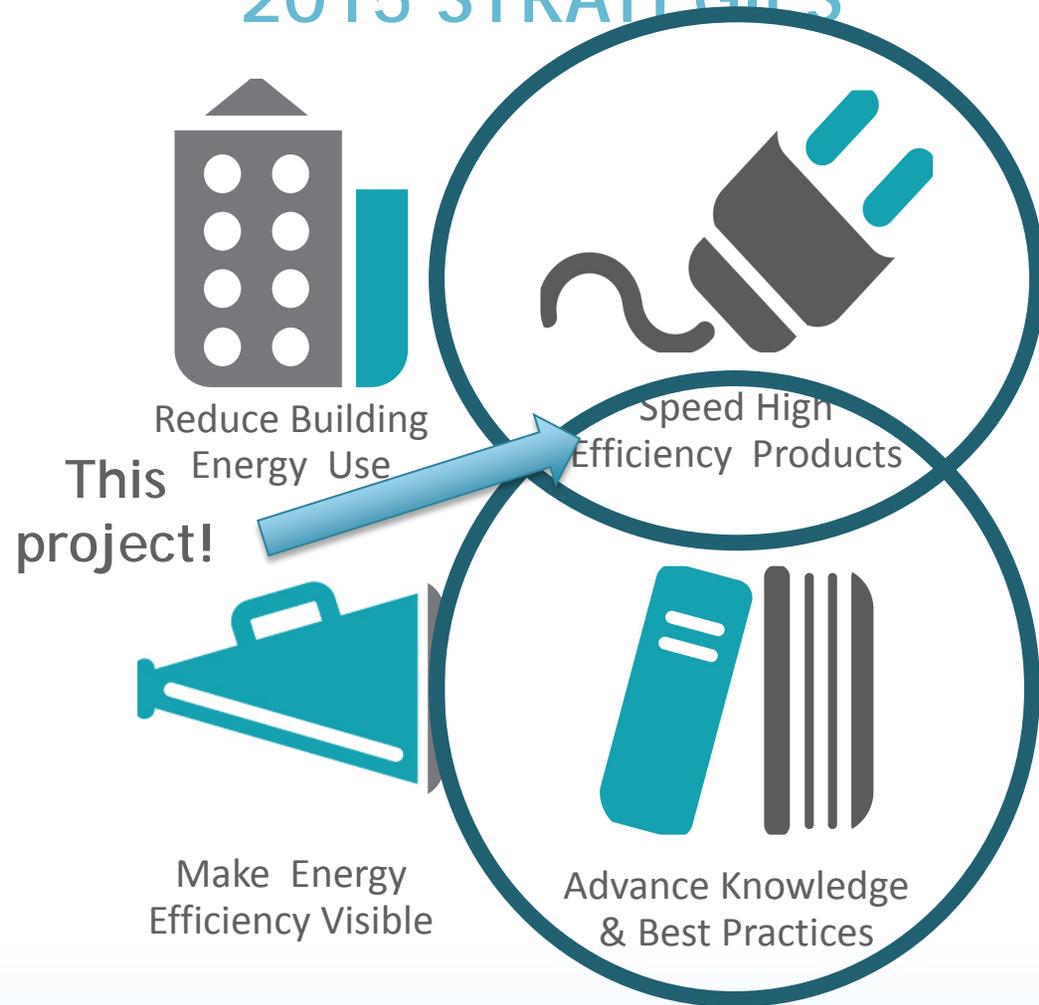
NEEP MISSION

Accelerate energy efficiency in homes, buildings & industry in the Northeast - Mid-Atlantic region.

2015 GOAL

Keep the region a national efficiency leader by advancing innovation and best practices, and leading-edge policies, programs and strategies that deepen, broaden and accelerate energy efficiency on a regional scale.

2015 STRATEGIES



MEETING OVERVIEW



Agenda

- Morning Session 10am-12pm
 - Introductions
 - Tech Assessment Discussion
 - COFFEE BREAK
 - Program Activity Assessment
 - M&V Potential of HEMS
 - Discussion, Q&A
- LUNCH 12pm-1pm
 - optional tour of Schneider Electric 12:15-1
- Afternoon session 1pm-3pm
 - Activity overview/Break into groups
 - Facilitated opportunity activity
 - COFFEE BREAK
 - Report out on Findings
 - Conclusion
- (optional) Tour of Schneider Electric facility, 3:15-4

MORNING SESSION

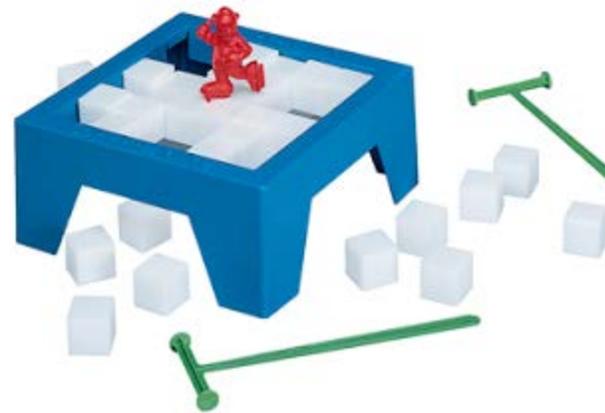


10am-12pm

INTRODUCTIONS



- NEEP Team
- CLEAResult Team
- Participants
 - » Organization
 - » Your role
 - » Your interest in HEMS
 - » Icebreaker



TECH ASSESSMENT DISCUSSION: LEVEL SETTING



Definition of HEMS

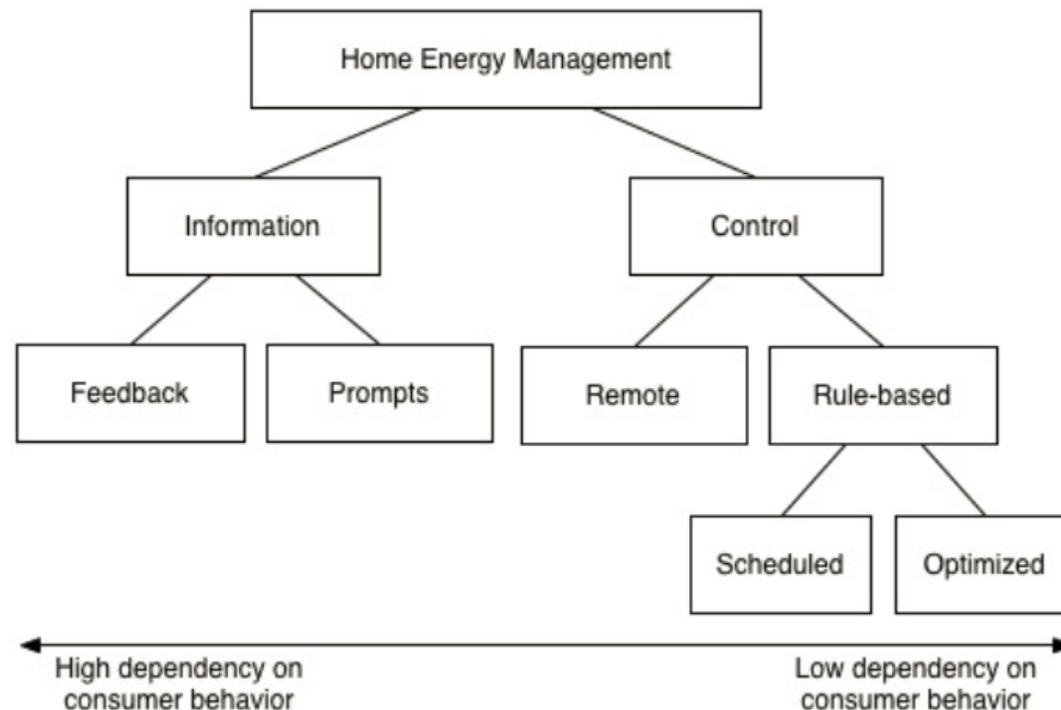
- PG&E Report Definition: “HEMS can be broadly defined as those systems (including both hardware and software linked together via a network) that enable households to manage their energy consumption.”
- HEMS Working Group will confirm their definition at July meeting.

TECH ASSESSMENT DISCUSSION: LEVEL SETTING



From PG&E Report:

- Information-based HEMS rely heavily on behavior
 - In this way, HEMS can be an *enabling tool* for feedback, which yields savings
- Control-based HEMS remove behavior from the equation
 - More like a “measure”



TECH ASSESSMENT DISCUSSION: LEVEL SETTING



Categories of HEMS Products from PG&E Report

Category	Short Definition	Count of Each Category
Smart Lighting	Lighting bulbs, controls, and fixtures that have automated control functionality	9
Smart Plug	Proxy hardware piece that controls or provides feedback about connected energy consuming devices	44
Smart Hub	Device that enables and manages interaction between existing smart hardware within a single home	14
Smart Hub and Smart Switch	Dual function wall mounted smart switch that also enables and manages interaction between existing smart hardware within a single home	1
Smart Switch	Wi-fi enabled wall switch that controls or provides feedback about connected energy consuming devices	1
Smart Appliance	Communicating appliance which can be controlled remotely via various interfaces	8
Smart Thermostat	HVAC wi-fi enabled control utilizing remote or rule based mechanisms	16
Energy Portal	Online dashboard that is consumer or utility facing	46
Data Analytics Platform	Cloud based analytics platform that analyzes large volumes of data collected from existing smart hardware	14
In-Home Display	Physical display that collects data from existing hardware and provides real time feedback and/or prompts	38
Load Monitor	Single non communicating piece of hardware that displays energy consumption data of the connected appliance or devices	17
Load Monitor + Smart Plug	Single communicating piece of hardware that displays energy consumption data of the connected appliance or devices	1
Smart Home Platform	Software platform that enables multiple different hardware devices to operate as a home automation system	23
Web Service Platform	Cloud-based platform that focuses on more than just energy	2
Total		234

Information Based	Control Based
	X
	X
	X
	X
	X
	X
	X
X	
X	
X	
X	
X	X
	X
X	

TECH ASSESSMENT DISCUSSION: LEVEL SETTING



Given these overall categories, what is possible?

- Smart Hardware, Devices, & platform = Control?
- Portals, Displays, Data analytics platforms = Information?

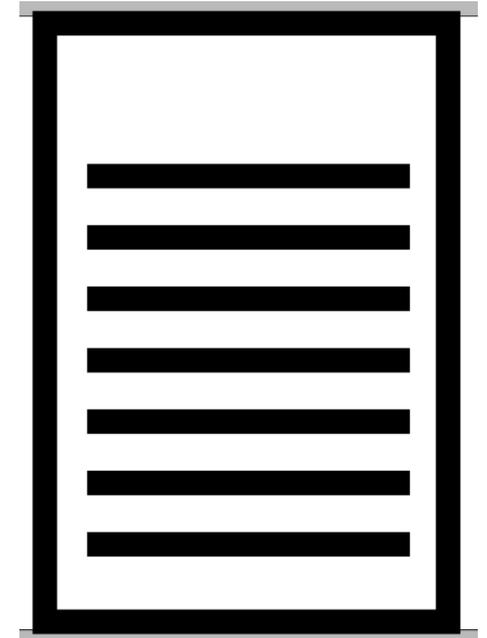
Table 2. Examples of Potential Partnerships for HEMS-enabled programs

Category	Technology "Families", Alliances, & Strategic Partnerships							
Smart Home Platform (Home Automation & Control)	iControl Networks	Lowe's Iris	SmartThings	Apple HomeKit?				Revolv?
Smart Hardware (Lighting, Plugs, Hub, Switch, Appliances, or Thermostats)	iControl One	Iris	Samsung + SmartThings	Honeywell		Energy Aware, Carrier	Schneider Electric Wiser Air	Nest
Customer-Facing Energy Portal (Energy Monitoring & Feedback)	iControl				Tendril Energize	Silver Spring Networks Customer IQ	Schneider Electric Wiser	MyEnergy?
Utility-Facing Energy Portal (Energy/DR + Data Analytics)	iControl + EcoFactor			Opower?	Tendril ESM	Silver Spring Networks + Bidgely	Schneider Electric	Nest Seasonal Savings / Rush Hour Rewards (Google)

TECH ASSESSMENT REVIEW



- CLEAResult has delivered Tech Assessment, an updated list based on PG&E Report of 234 products
- Includes:
 - Company
 - Product
 - Description
 - Product Category (as defined by PG&E Report)
 - Availability
 - Cost (when available)
 - Updated information on product (i.e. out of business, bought by google, etc.)
- Tech Assessment Memo also included information about partnerships and compatibility between products/manufactures



TECH ASSESSMENT REVIEW



- Snapshot:

Worksheet in S EM&V Forum PROJECT COMMITTEES RE PROJECTS RE15-3 HEMS Project Deliverables NEEP HEMS Tech Assessment Memo_DRAFT.docx

	A	B	C	D	E	F	G
1	HEMS Technology Assessment						Updated: 5/18/2015
2	Company	Product	Description	Product Category	Availability	Cost	Updates
3	1B First Build	Chill hub Smart refrigerator control	Chill Hub Smart refrigerator and smart refrigerator control hub	Smart Appliance	US consumers	\$800-\$2000	just teamed up with GE appliances
4	Aclara	Customer Care Solutions	Unique content and analytics that improve the effectiveness of customer care and billing, enhances customer energy management and increases customer satisfaction by helping customers better understand and manage their bills	Energy Portal	US consumers		
5	ADT	ADT Pulse	The ADT Pulse® portal provides secure access so you can monitor and manage your home's energy and security via most web-enabled devices.	Smart Home Platform	US consumers	\$50/mo +\$100-\$1000 install cost	
6	Aeon Labs Aeotec	DSB09104-ZWUS	Z-Wave Smart Energy Meter , uses CT clamps to monitor power and relay it back to z-wave hub	Energy Portal	US consumers	\$25-\$100	
7	Aeon Labs Aeotec	DSC06106-ZWUS	Z-Wave Smart Energy Switch	Smart Plug	US consumers	\$30-\$40	
8	Aeon Labs Aeotec	DSC24-ZWUS	Smart Switch Z-Wave Appliance Module	Smart Plug	US consumers	\$45	
9	Aeon Labs Aeotec	DSC11-ZWUS	Z-Wave Smart Energy Power Strip	Smart Plug	US consumers	\$100	
10	Aeon Labs Aeotec	Gen 5 ZW100-A (Aeon hub)	Gen5 Z-wave Plus 6-in-1 Multisensor 6	Smart Hub	US consumers	\$50	
11	Aeon Labs Aeotec	Z-Wave LED Light Bulb, Gen5	Smart LED lightbulb with 16 million different color shades	Smart Lighting	US consumers	\$50	
12	Alarm.com	smart thermostat	Geofencing enabled alarm.com communicating smart thermostat	Smart thermostat	US consumers	\$46/mo basic security service. \$75 for smart thermostat	Apple watch compatible
						\$46/mo basic security	

- In a sortable workbook form, would be distributed to all project members

TECH ASSESSMENT DISCUSSION: BENEFITS/BARRIERS (FLIPCHART)



Benefits:

- To household
 - Example: Fault detection on equipment
- To program administrators & utilities
 - Example: Enables demand reponce
- Who else do they benefit?



Barriers:

- To growth
- To implementation
 - Example: Cost of the systems



COFFEE BREAK



5 MINUTES

PROGRAM ACTIVITY ASSESSMENT



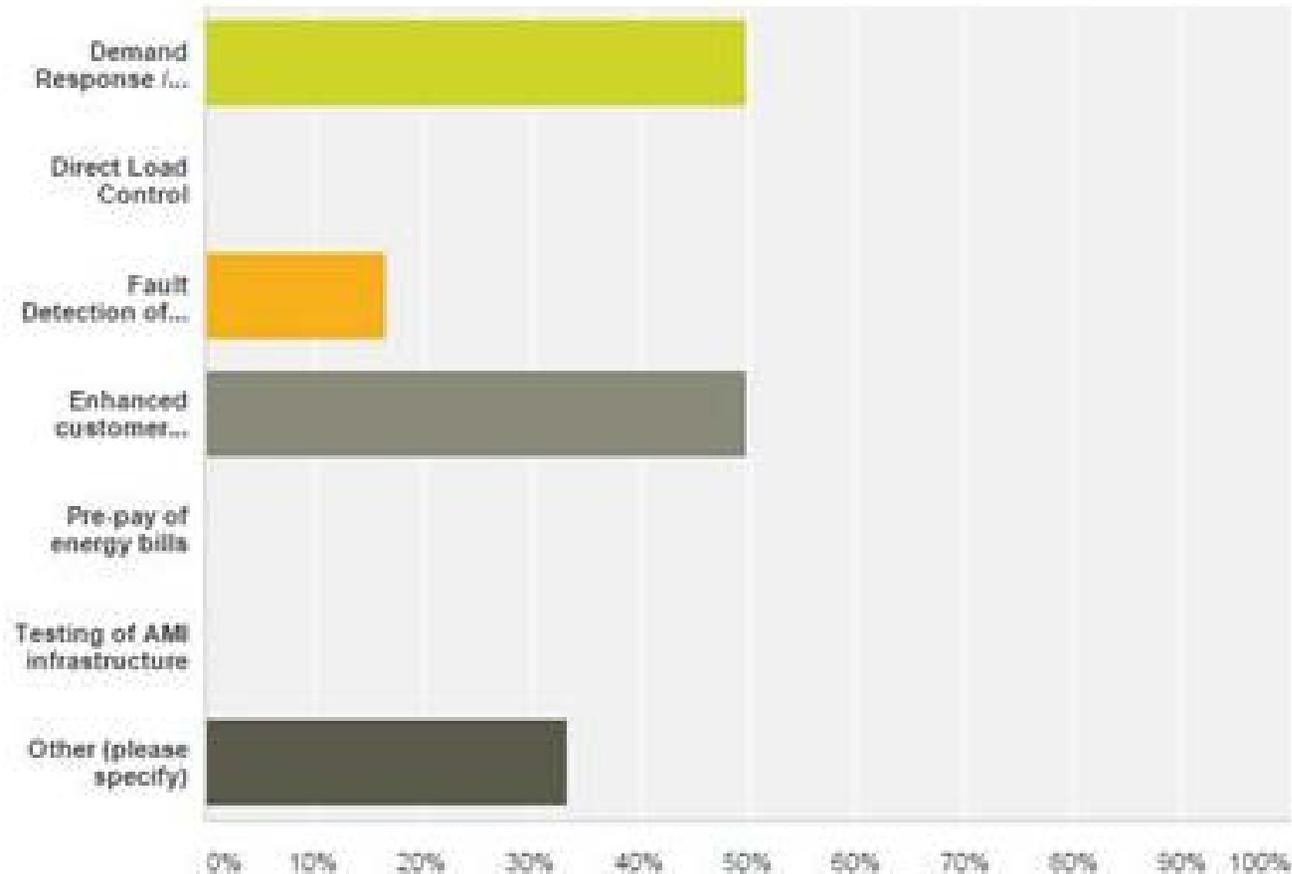
Update

- What's been done in programs thus far? Survey results

Were/are there additional goals for the project beyond energy efficiency? Please check all that apply.

Answered: 8 Skipped: 6

Answer Choices
<input type="checkbox"/> Program Imple
<input type="checkbox"/> Program or Pil groups
<input type="checkbox"/> Program or Pil
<input type="checkbox"/> Research proj participants
<input type="checkbox"/> Other (please
Total Respondents



PROGRAM ACTIVITY ASSESSMENT

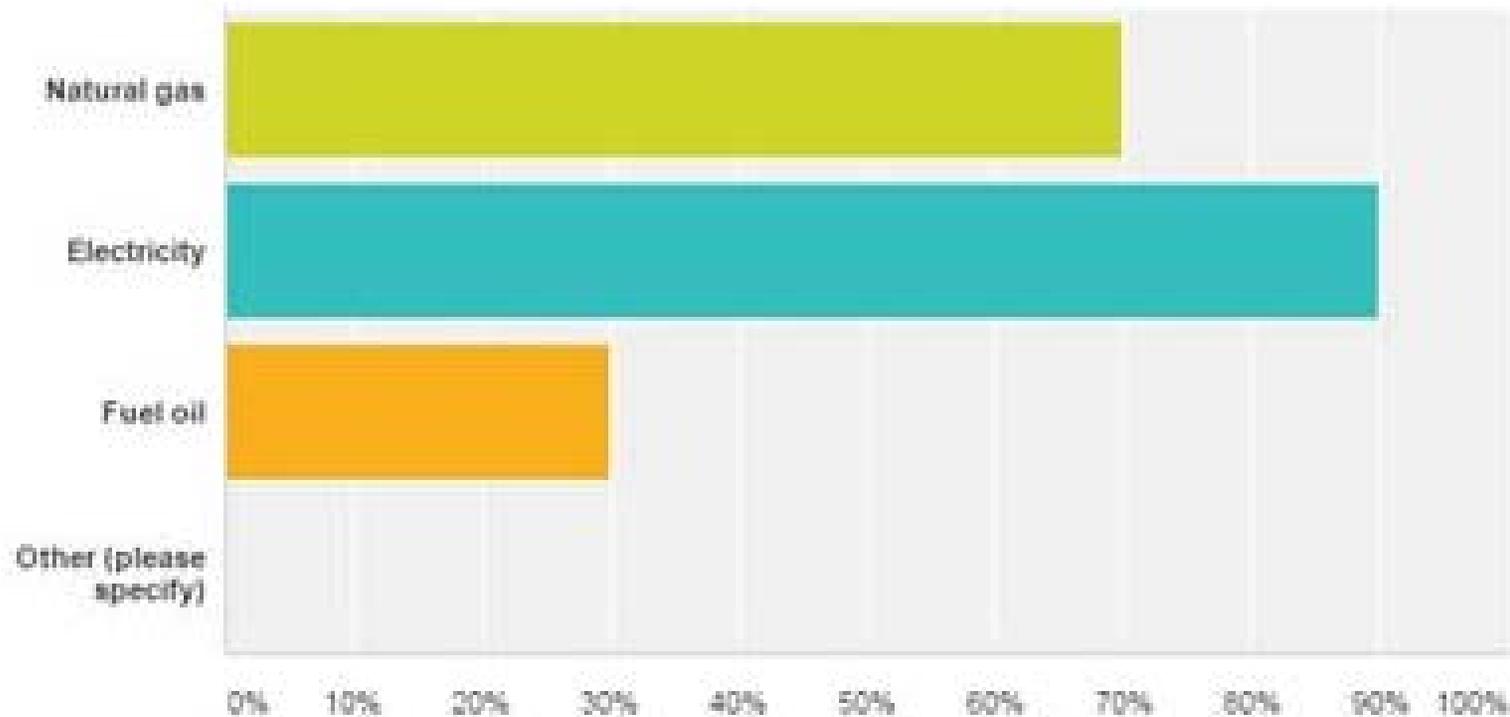


Update

- What's been done in programs thus far?

Which fuel types were/are included in the project?

Answered: 10 Skipped: 2



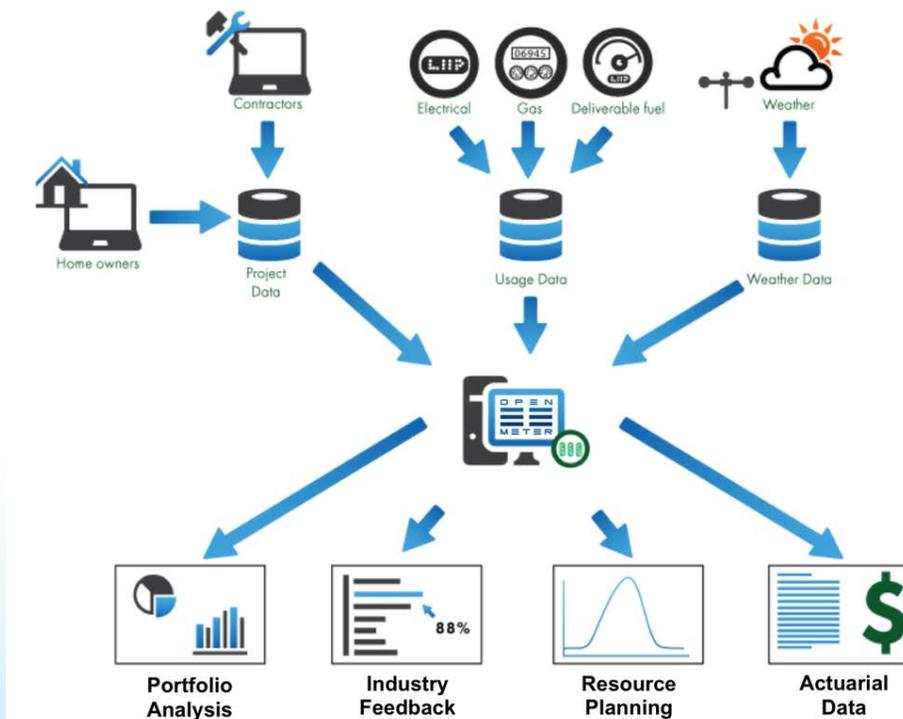
- Your experiences?

M&V POTENTIAL OF HEMS



OpenEEmeter Update

- Led by Matt Golden with help from Matt Gee
- Described as a “scale” for EE, it aims to level the playing field for measuring energy savings so that it can be treated much more like a resource
- OpenEEmeter is open source code that is NOT proprietary - anyone can download and work with it

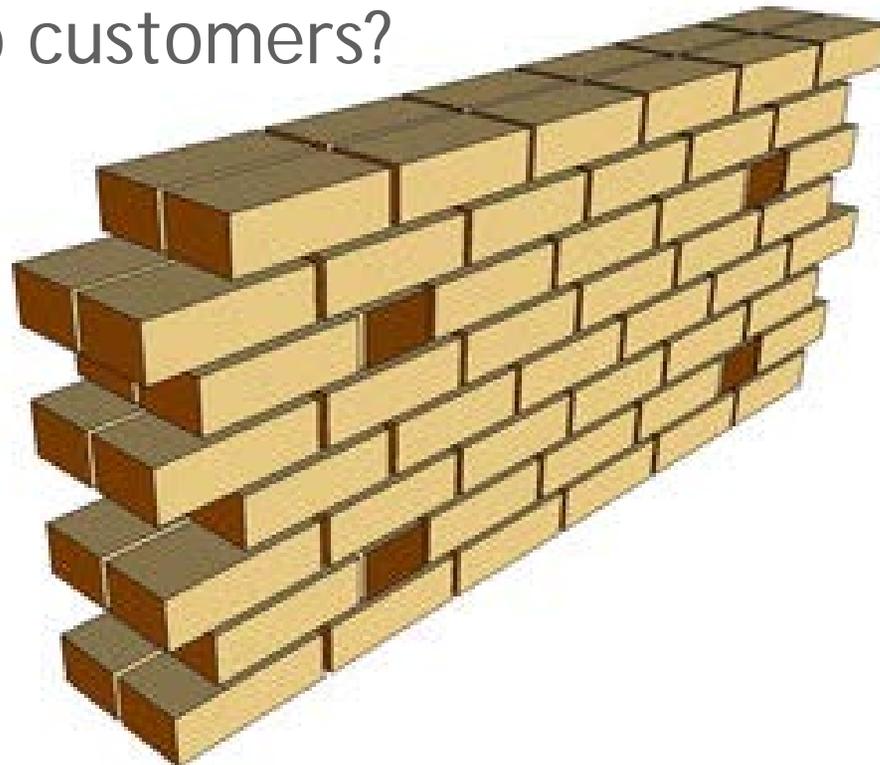


M&V POTENTIAL OF HEMS (FLIPCHART)



Barriers to interval data

- What do we mean when we say “using interval data to measure energy savings within a HEMS”?
 - What does OpenEEmeter have to do with this?
- Per the PG&E Characterization, is this capability relevant to customers?



DISCUSSION, MORNING Q&A

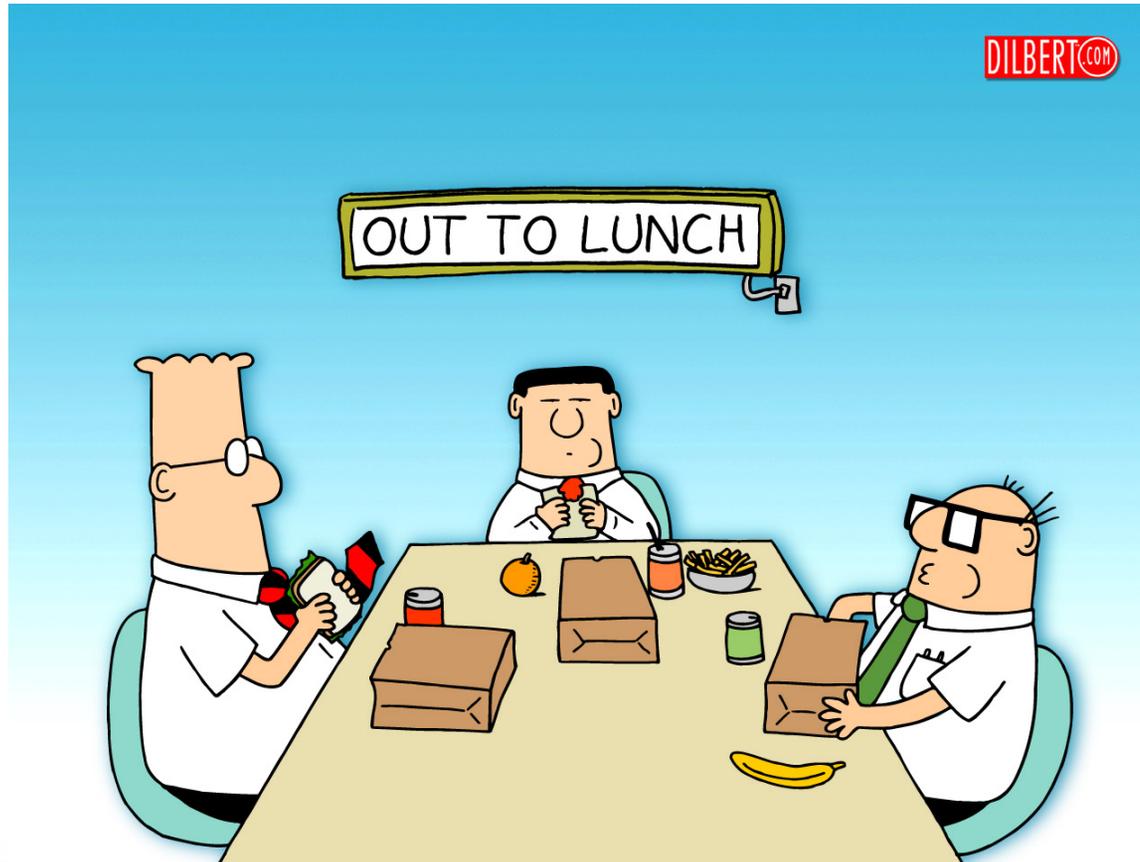


Questions?

- Answers.



LUNCH



12pm-1pm

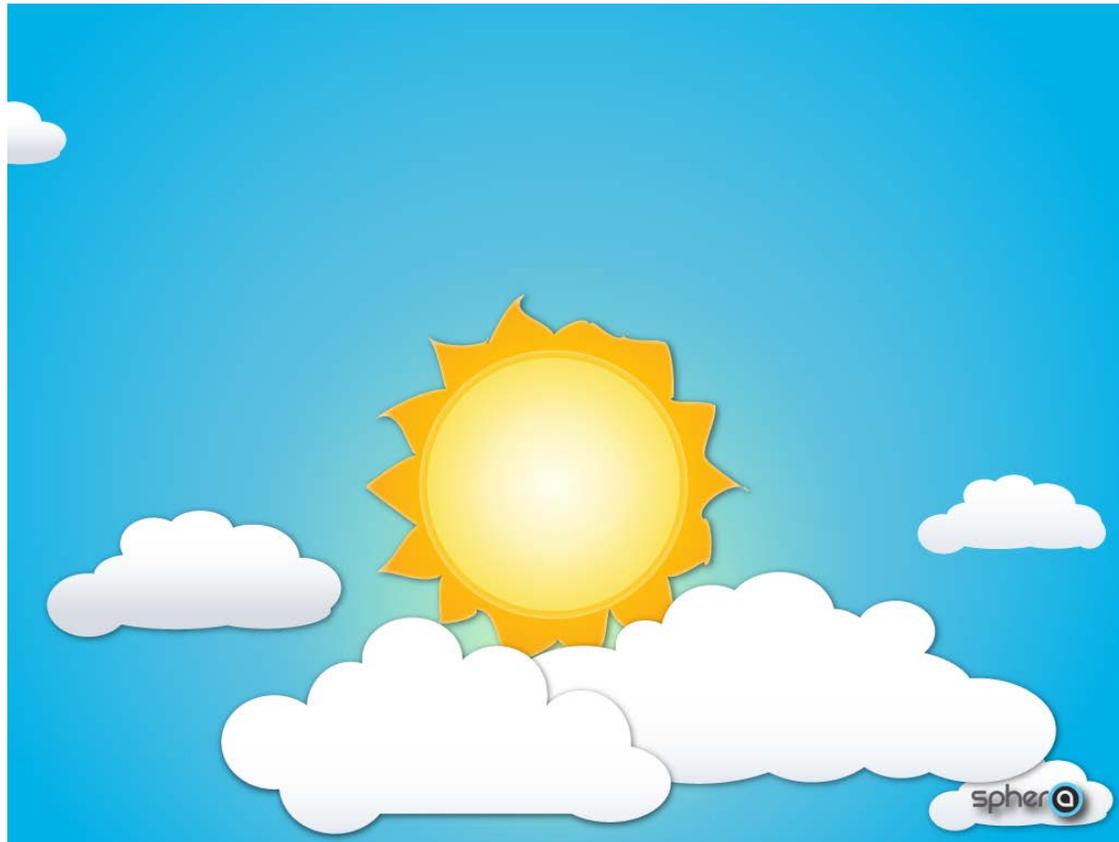


OPTIONAL TOUR: 12:15-1PM

Schneider
 **Electric**

The Schneider Electric logo is centered on the page. It features the word 'Schneider' in a large, bold, green sans-serif font. Below it is a stylized green logo symbol, which is a circle containing a white 'S' with a horizontal line through it. To the right of this symbol is the word 'Electric' in a smaller, green, sans-serif font.

AFTERNOON SESSION



1 pm - 3 pm

OPPORTUNITY ASSESSMENT ACTIVITY



Introduction: the Rules of the Game

- Self-select into groups:
 - Behavioral and HEMS--information
 - HEMS in home performance
 - EE programs and evaluation--control
- Each group gets a facilitator
- Emily, Dain, & James



OPPORTUNITY ASSESSMENT ACTIVITY



Introduction: the Rules of the Game

- Answer these questions:
 1. What are options to get HEMS into homes through programs?
 2. What types of behaviors should be impacted?
 3. What consumer education barriers exist and what are strategies to overcome them?
 4. What is the role of smart meters, and how little or how much will we rely on them?
 5. What data points do we need to make HEMS programs successful?
 6. What is the role of demand response in HEMS program implementation?
 7. How are HEMS saving energy? What inputs should be used for savings estimation? What methodology would establish confidence in savings estimates for planning purposes?

COFFEE BREAK



5 MINUTES

OPPORTUNITY ASSESSMENT ACTIVITY



Report out on findings

- Each group presents (15 min)



OPPORTUNITY ASSESSMENT ACTIVITY



Question (write down answer)

- In a dream world, what is your ideal implementation of HEMS in a program?
 - i.e. using load disaggregation software for DR
- Discussion/volunteers to share

CLOSING DISCUSSION



- **Final Q&A**
- NEEP will be incorporating these findings into report due out in August focused on opportunities for HEMS in Programs
- What else does this space need?
- Is there a regional play for HEMS?
- What key barriers still exist?
- Any final questions or concerns?

CONCLUSION/NEXT STEPS



- Reminder to complete the HEMS survey
 - Contact emily.kemper@clearesult.com with any questions
- Upcoming meetings, HEMS Working Group, 1-2:30pm EDT on Wednesday, 7/8
- Upcoming conferences
 - Realizing the Potential of Smart Home Technology, Austin October 14-16
 - Intelligent Efficiency, Boston December 6-8
- Webinar: Making Energy Efficiency Visible in the Real Estate Market, Wednesday June 24, 2015
 - 10am - 11am EST, [Register Today!](#)



OPTIONAL TOUR: 3:15-4PM

Schneider
 **Electric**

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Thank you!

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Have a great day!