Home Energy Management Systems Workshop Summary
June 15, 2015

Like most emerging technologies, the true potential of Home Energy Management Systems (HEMS) and associated energy savings has not yet been established. Efficiency leaders convened for a day-long workshop in Andover MA at Schneider Electric to discuss the hidden potential of HEMS with a focus on NEEP's HEMS research project set to be released this year.

NEEP staff and research project contractors, CLEAResult, presented early findings and gathered additional insights from key stakeholders in attendance through breakout discussion. The discussion centered on efficiency program opportunities with HEMS and key metrics and requirements to legitimize and uncover the potential of HEMS.

First Name	Last Name	Organization/Company
Carlyn	Aarish	Cadmus Group
Junes	Bakkar	NEEP
Hannah	Bascom	Nest Labs
Emilie	Bolduc	Ecova
Lara	Bonn	Efficiency Vermont
Emanuella	Dias	NEEP
James	Domanski	CLEAResult
Lieko	Earle	National Renewable Energy Lab
Aaron	Ganick	Sylvania
Mark	Hutchins	Conservation Services Group
Emily	Kemper	CLEAResult
Gregory	Krantz	National Grid
Peter	Kuhn	Eversource
Julie	Michals	NEEP
Claire	Miziolek	NEEP
Dain	Nestel	CLEAResult
Frank	Nitti	ICF International
Bradley	Piper	Lockheed Martin
Jenna	Pugliese	Efficiency Vermont
Glenn	Reed	Energy Futures Group
Jasmine	Rivest	Efficiency Vermont
Joe	Van Gombos	Unitil
David	Weitz	Conservation Services Group
Danielle	Wilson	NEEP

After a brief introduction by NEEP, Emily Kemper (CLEAResult) presented definitions and level setting for HEMS as outlined in the CLEAResult technical assessment, which included a review of at PG&E HEMS report. This technical assessment will be completed along with the final report and includes over 200 smart home technologies. The group then reviewed benefits, e.g. demand response coordination and comfort, as well as barriers, e.g. creepiness and security, that households and program administrators encounter with HEMS. Next Emily presented an assessment of HEMS program activity based on survey results and also an update on the measurement and verification potential of HEMS specifically around OpenEEmeter efforts. See the workshop presentation for more details.

After lunch, attendees split into small groups for an opportunity assessment activity. The small groups discussed and shared experiences around: how to get HEMS into homes through programs, types of behaviors HEMS needs to impact, consumer education barriers and strategies to overcome them, the role of smart meters, what data points are necessary for HEMS programs success, the role of demand response in program implementation, and inputs and methodologies required for savings estimation. Some of the ideas to emerge from that group discussion include opportunities for HEMS to serve as the conductor for solar or other distributed generation and storage systems, challenges and opportunities to integrate HEMS in multifamily housing with a shared wifi network and individual meters, and the limitations in new emerging HEMS vendors to manage the technical

support end of their products; with utility incentives, that responsibility may fall to the program administrator.

Finally, attendees shared their ideal implantation of a HEMS program. Responses included: use HEMS as a vehicle for green innovation and entrepreneurship implementation, ensure seamless and automated communication within the home as well as with the grid, present a simple to use out-of-the-box system for widespread adoption, and offer "HEMS as a DR program strategy."

The day concluded with an optional tour of the Schneider Electric facility, which was very appropriate given the day's focus on efficient buildings. The tour provided attendees the opportunity to learn about the efficiency and management systems Schneider had in place, as well as a chance to ask questions of Schneider Electric staff.

Overall, attendees provided positive remarks and ratings in a post-workshop evaluation. Some of the evaluation highlights include:

General workshop flow, tone, and organization: Average score 8.54 (out of 10)
Audience Participation and General Engagement: Average score 8.58 (out of 10)
Networking and discussion opportunities: Average Score 7.25 (out of 10)

Specific sample comments:

- Very efficiently run.
- Well organized!! SO glad you did this & pulled everyone together
- (favorite session) Group breakout exercise. I learned a lot from my other group members.
- (favorite session) Breakout groups-able to drill down to specifics and speak w/ multiple knowledge leaders in industry collaboratively
- (least favorite session) It was all good.
- (Audience participation and general engagement) I think it was the right group size so anyone who wanted to talk could. And everyone seemed engaged.
- (general comments) The space was very conducive to the discussion and group setting

One potential area of improvement NEEP will bring forward to future meeting was providing more changes for networking opportunities. Multiple attendees mentioned this, with one attendee exclaimed that between the tour of Schneider Electric and the 5 min coffee breaks, there wasn't much of a chance for networking.

Particularly of note was the attendee's views on NEEP's role in HEMS in the future, with comments including:

- Leadership
- Work to both address concerns with the energy efficiency industry and work with non-energy efficiency stakeholders to make sure efficiency is addressed
- Translation of market activities to direct, actionable items (i.e. NEEP report)
- Input on specifications, advocate for savings potential, continue the HEMS working grp
- Continue to be a facilitator of discussion, difficult to get all the players in the same room sometimes, NEEP seems to get that to happen frequently

As next step, NEEP and CLEAResult are working to complete a research report that will include the aforementioned technology assessment, looking into the potential of HEMS as M&V tool, cataloguing HEMS programmatic activity, a robust exploration of the various opportunities for HEMS within

efficiency programs, a discussion of policy opportunities and recommendations, and recommendations for further study. This report is due in August/September, 2015. Visit NEEP.org's HEMS page for more information.