Taylor Jantz-Sell & Abigail Daken
U.S. EPA ENERGY STAR Products
US Environmental Protection Agency Office of Air and Radiation
1200 Pennsylvania Avenue NW
Washington, DC 20460

July 27, 2018

Dear Ms. Jantz-Sell and Ms. Daken,

Northeast Energy Efficiency Partnerships (NEEP) appreciate the opportunity to provide comments to ENERGY STAR on the Smart Home Energy Management Systems (SHEMS) guidance document. NEEP is incredibly supportive of ENERGY STAR and this effort, which we believe can play an important role in advancing the efficiency of homes, particularly by helping to ensure that the smart devices being installed by service providers are those that will have the best energy savings potential. In our 2016 market transformation report on the smart energy home,[1] we identified a key strategy to success to "seriously engage with service providers in IoT space, especially home security." As our research and the work reviewed by EPA shows, the service providers of the world are playing a very active role in the smart home space, but may not be doing so for energy optimization. The SHEMS effort spearheaded by EPA represents a critical step forward towards partnerships with and engagement of service providers to yield a better energy outcome. After review of the SHEMS memo, discussion guide, and slides from 7/11 webinar, we respectfully submits the following comments.

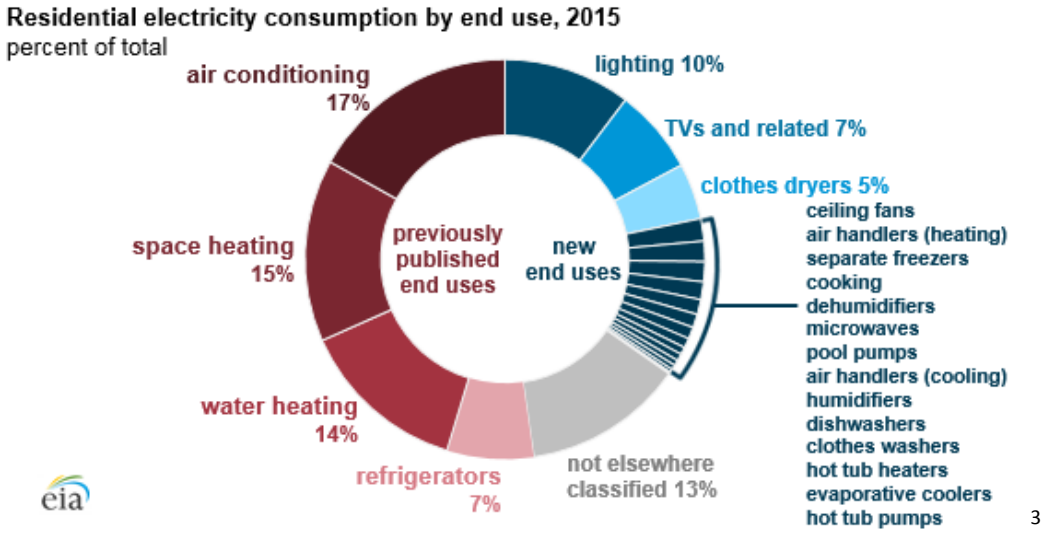
Approach

As this is a new and innovative approach for ENERGY STAR, NEEP feels the starting package of products is strong and more or less appropriate to start off with. The level of inclusion for smart water heating, however, seems inconsistent in this discussion document. Through NEEP's research, we've found smart water heating has enormous potential, both from an efficiency and a demand management perspective. That being said, we understand that at present, not every water heater is able to be easily controlled and retrofit controllers are still emerging. NEEP would recommend a more consistent approach towards dealing with water heating and encourages smart water heating to continue to play role in the specification.

One suggestion for restructuring the offering would be to require the thermostat, lighting, and **either** the plug load controllers **OR** the smart water heating element. If a service provider came to a home with a CTA 2045 capable water heater and could easily install the attachment and integrate the water

[1] http://neep.org/smart-energy-home-strategies-transform-region

heater into an occupancy-based control scheme, that could be a quick and easy way to yield a lot of energy benefit. For homes where it is feasible, we've found the magnitude of benefit from smart water heating to be significantly greater than for plug load controls.[2] As the 2015 Residential Energy Consumption Survey (RECS) data shows, while MELs are using more energy than they used to, water heating is still reliably 13% of a home's electricity consumption. Smart plug load controllers, while beneficial, can only effectively control certain household end uses (from the chart below, that includes TVs, dehumidifiers, humidifiers, as well as other products such as computers and small electronics). For homes where smart water heating was not an easy option, service providers could elect to install the plug load controls.



3

Additionally, as smart water heating is a very large opportunity, NEEP strongly encourages the SHEMS and any other related specification to do whatever they can to support uptake of smart, controlled water heating. Some options include encouraging the integrated of connectivity within new equipment (which could potentially be achieved through the ENERGY STAR Water Heating Specification), encouraging use of CTA 2045, and supporting retrofit water heater controls.

Diving more deeply into MELs, we know home entertainment systems can use a lot of energy. Thinking beyond just the plugs or outlets, if an internet connected smart TV were hooked into a Tier 1 or Tier 2 advanced power strip (APS)[4] and was powered down when the house was unoccupied (TV receiving the signal from the service provider's occupancy scheme), the APS could turn off any peripherals based

[2] http://neep.org/opportunities-home-energy-management-systems-hems-advancing-residential-energy-efficiency-programs
[3] https://www.eia.gov/consumption/residential/
[4] http://neep.org/initiatives/integrated-advanced-efficiency-solutions/advanced-power-strips

on the electrical signal from the TV going off. This could be one strategy to bring in ENERGY STAR certified smart televisions into the product offerings to address one of the major electrical loads in a home.

Another MELs strategy could be focused on the home office; a computer connected to the master occupancy scheme could potentially yield energy savings from the power down of the computer as well as any associated peripherals (such as printers, scanners, fax machine, etc). Again, this may be a role for an Advance (but not necessarily internet connected) power strip: the computer could receive the power-down signal from the service provider, power down, and that act of turning off through the APS could signal to any other peripherals associated with that computer to power down. Efficiency programs and some service providers such as DirecTV have extensive experience with advanced power strips that may be transferable to this occupancy-based model.

An additional consideration could be a home's router or modem, which possibly could be powered down by a smart plug when the house was unoccupied. In theory, these devices are operating 24/7 when in reality a homeowner is not using their wifi for even half that amount of time. A wrinkle with this strategy is that as homes become more connected, if the wifi router is what's enabling the other devices to be connected and receive those occupancy signals, then wifi would be needed throughout the day. Many smart devices, however, use other communications protocols not reliant on a home's wifi network. This would need to be explored further.

Finally, while thermostats and lighting are two of the most straightforward products to include in the offering, since the ENERGY STAR program has the stated 11 products with connected capabilities, NEEP would encourage EPA to consider offering optional or more advanced recognition for service providers who integrate with other ENERGY STAR certified connected products, such as laundry products or electric vehicle service equipment.

Qualification criteria:

In general, the qualifying approach seems sound. A few considerations that NEEP wanted to add to the discussion:

- In the case of MELs, it would be very helpful to understand which products are being plugged in and into what type of smart controller. The smart plug load world is not very well studied and this information could be very informative.

- In a DOE Technical Specification for APS,[5] standby load was established as <1W. Additionally, for a 2016 research project,[6] PG&E coded hundreds of smart home products across many attributes. While the full dataset was not published, researchers may be able to assist ENERGY STAR in assessing attributes, including standby loads, across a range of products considered by SHEMS.

Regarding the evaluation, NEEP feels that some of the data collected could be reported to EPA for the entire population (i.e. total # of products installed of which type and distribution across climate zones), but the statistical analysis could be run for a sub-section. Since the smart thermostat is a key feature of the SHEMS Specification, a similar climate-zone based analysis to that in the smart thermostat specification would make good sense. For public reporting, the number of total products across all service providers would make sense to share (as would be published in the annual shipment data summary by EPA). Within the "product listing" for these service providers, initially NEEP finds that information on the following headings would be useful, though as the specification process develops there may be more or fewer categories for reporting that make sense.

Service Provided (name)	Smart thermostat brands included	Smart lighting brands included	Smart plug brands/ models included	Smart water heating offering included	Mean numbers of (lighting, MELs, etc) included in installation	Average hours subject to optimization	Percentage of users overriding	Is offering including demand response (yes/no)
Company name	List here	List here	List here	List here	(#s for each)	X hrs	X%	Yes/no

Overarching

At this time in the process, NEEP believes the ENERGY STAR SHEMS recognition would be based on participation, not necessarily performance. Service providers who offer and install a bundle of these products, as defined by the SHEMS specification, would be recognized but would not be asked to perform at a certain level. This is a way to bring high quality, energy saving smart products into more homes and to better understand how occupancy signals relate to smart home energy savings. It is possible that in the future, if a particular mechanism or set-up is identified as being particularly

[5] https://betterbuildingsinitiative.energy.gov/sites/default/files/attachments/Advanced_Technical_Power_Strips_FINAL%20040915_508.pdf

[6] https://www.etcc-ca.com/reports/assessing-players-products-and-perceptions-home-energy-managment

successful, more constraints could be added to the specification. For now, however, it seems appropriate to set inclusion requirements and data/reporting requirements. To this end, it seems appropriate for the ENERGY STAR label and brand to be included in the marketing material for the bundle of products, but not necessarily on the individual products within the home (subject to each product's labeling requirements).

NEEP appreciates the opportunity to provide comment to this guidance document and is very excited for ENERGY STAR's leadership in this area. ENERGY STAR is and must continue to serve in a leading role in recognition of high performing products, and we look forward to continuing to support ENERGY STAR's efforts into the future. Please don't hesitate to contact me with any follow up questions or clarifications.

Sincerely,

Claire Miziolek
Technology and Market Solutions Senior Manager
Northeast Energy Efficiency Partnerships (NEEP)
cmiziolek@neep.org
781-860-9177 x115