



**Pacific Gas and
Electric Company**[®]



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July 27, 2018

Ms. Daken and Ms. Jantz-Sell
Climate Protection Partnerships Division
U.S. Environmental Protection Agency
Washington DC 20460

Dear Ms. Daken and Jantz-Sell:

This letter comprises the comments of the Pacific Gas and Electric Company, San Diego Gas and Electric, and Southern California Edison in response to the Environmental Protection Agency (EPA) Smart Home Energy Management Systems (SHEMS) Discussion Guide.

The signatories of this letter, collectively referred to herein as the California Investor-Owned Utilities (CA IOUs), represent some of the largest utility companies in the Western United States, serving over 32 million customers. As energy companies, we understand the potential of the ENERGY STAR[®] program to cut costs and reduce energy consumption while maintaining or increasing consumer utility of the products. We have a responsibility to our customers to advocate for sensible test procedures, specifications, and standards that accurately reflect the climate and conditions of our respective service areas to maximize the positive effects of these efforts.

We appreciate this opportunity to provide some initial comments about this Discussion Guide. We encourage the EPA to continue efforts to investigate a method to recognize and promote energy management features in smart home systems that optimize energy savings. The requirements arising from the specification could be helpful for consumers seeking to improve the operational efficiency of their homes, and to utility-sponsored programs that leverage the ENERGY STAR distinction to identify and incentivize efficient products and building systems. We look forward to continuing to engage with EPA and provide additional feedback into this effort.

General Comments

Under current practice, different manufacturers or service providers may supply or control equipment types, such as lighting, climate control, water heating, and plug loads. Manufacturers may not want to integrate with controls from other manufacturers due to risk that another company could cause a negative experience for their consumer. ENERGY STAR has done a commendable job of promoting the ENERGY STAR brand as a mark of both efficiency and quality. We encourage EPA working with stakeholders to ensure a SHEMS Specification has a positive consumer experience and results in further efficiency.

If it is determined that the market is not ready for the SHEMS Specification now, we encourage EPA to monitor the market and provide general guidelines to manufacturers and service providers on the steps that would be needed to issue a specification.

EPA should encourage demand response (DR) and grid interaction capabilities in a SHEMS Specification. These functionalities will save energy by helping integrate intermittent renewable

resources, which are increasingly prevalent not only in California, but around the country. It will also unlock the potential for customers to participate in financial savings from these type programs, both through bill savings and potential utility program incentives.

The CA IOUs encourage EPA to promote open standards in SHEMS. The ENERGY STAR Program in its July 11, 2018, webinar acknowledged its general support in past labeling efforts for connected devices that support open communication standards and protocols. Interoperability between connected devices through open standards is crucial to ensure that consumers are not unnecessarily "locked into" proprietary smart home systems. Open standards will provide broader consumer choice in smart home energy management options and reduce the potential for stranded assets. Support and adoption for open communication interfaces like CTA-2045¹ or DR protocols like OpenADR also helps utilities to more easily integrate with flexible loads.

Responses to Specific EPA Questions

Below are the CA IOU responses to some of the specific questions listed in the Discussion Guide.

Scope

Question 1: Which products or product capabilities should be included in the basic package?

In addition to the products mentioned in the Discussion Guide, such as lighting, HVAC (heating, ventilation, and air conditioning) controls, and major plug loads, the CA IOUs encourage EPA to consider including electric vehicle supply equipment (EVSE) with connected functionality as an optional equipment type. EVSE support clean air transportation, and EVSE shipped with connected functionality can support load shifting, DR, and other grid interaction services.

We also encourage EPA to consider stationary battery storage equipment as an optional equipment type to better help integrate renewable energy in to the grid.

*Question 4: Are there any specific products or product capabilities that should expressly **excluded** from scope?*

Communicating hot water heaters with storage could be a useful feature in specific geographic locations (for instance, electric hot water heater DR has been implemented in Hawaii). The ability of a hot water heater with storage to save energy based on occupancy sensor controls has not been researched, since most homeowners are not likely to wait for hot water. EPA should also keep in mind that tankless water heaters will likely not benefit from this capability either.

Qualification Criteria

Question 2: What strategies are effective to address MELs, using the devices and/or capabilities you mentioned in response to the Scope Feedback Request section, question 2?

While we had no additional input at this time to question 2 in the Scope Feedback Request section, the CA IOUs agree with EPA (page 3 of the SHEMS Discussion Guide) that the energy requirements of "smart" features themselves should be evaluated in addition to the potential energy savings that they could enable.

¹ Modular Communications Interface for Energy Management. Consumer Technology Association (Formerly CEA), 03/03/2018.

Many Miscellaneous Electric Loads (MELs), particularly electronics, have auto power down, so the occupancy control may provide minimal additional savings. In addition, users may already turn off their electronics and lights when not needed, but vendors are unlikely to have insight into this baseline impacting behavior. EPA and stakeholders should consider how to ensure that the benefits of occupancy control are not overestimated by first including energy savings measures and behaviors that are already in place.

Question 3: What is the range of power use of smart switches when they are supplying power independent of what is plugged in?

The CA IOUs are not aware of a dataset that illustrates the range of power draw of smart switches. However, Power Integrations has produced a reference design with Bluetooth Low Energy (BLE) that draws less than 60 milliwatt (mW) in standby mode.² Although we expect this measurement is on the low range of smart switch power draw today, the figure illustrates a very low, technically achievable power level. More data is required to characterize range of power requirements of the smart switches available on the market.

Question 4: What is the range of power use of smart plugs when they are not supplying power?

Similar to smart switches, the CA IOUs are not aware of a dataset that illustrates the range of power draw of smart outlets. Power Integrations has also produced a smart outlet reference design that uses Wi-Fi communication. Its no-load input power draw (no plugs populated) is less than 300 mW.³ Power Integrations notes that the design does not optimize Wi-Fi transmission by batching data and transmitting it periodically to allow circuitry to enter low power mode for much of the time. More data is required to characterize the range of power of smart switches on the market.

Question 5: Are other measures needed to address this concern?

The CA IOUs appreciate the savings potential of a system of products that work together to orchestrate energy use based on occupancy or other factors. We stress, however, that system level savings should not come at the expense of low-power designs at the individual product level. Consumers expect their ENERGY STAR certified products, whether individually or as part of a system, to save energy and money. Each individual component of the system, therefore, should be efficient, particularly in its low power mode. This includes efficient communication, and careful design and implementation of the communications technology.

Question 6: What other data and statistical measures would be helpful to analyze savings potentials realized by the population?

CA IOUs agree with considering all the metrics listed in the Discussion Guide. In addition, we suggest also considering: decile bins in addition to means, the number and power requirements of additional hubs or bridges in the system, whether control takes place locally or in cloud, and evidence of the persistence of energy savings.

EPA should also consider a point system if combining different types of products and features into a single energy savings metric becomes overly complex. ENERGY STAR has established a very specific

² <https://led-driver.power.com/design-support/reference-designs/design-examples/der-622-two-wire-no-neutral-wide-range/>

³ Personal communication with David Chen, Power Integrations, July 18,2018.

metric and methodology for achieving a certain expected level of energy savings from connected thermostats based on continuous HVAC data collection, however similar levels of detailed data collection may not be available for lighting and MELs. Furthermore, the metrics used to evaluate lighting and MELs are different from those used to evaluate HVAC. Providing points for various products and features could provide a way to give credit for different equipment types that are evaluated using different metrics.

Potential Evaluation Methodology

Verification: We understand that EPA is considering a specification based on collection of field data like the Connected Thermostats Specification. As noted in previous CA IOU comments (dated October 26, 2016)⁴ one strength of the ENERGY STAR Program is providing independent verification of energy savings claims. However, the Connected Thermostat Method for Demonstrating Field Savings does not require independent verification of service providers' energy savings claims, nor does it require that service providers allow a neutral third party to access the underlying necessary to verify savings claims.

We do not recommend establishing a new SHEMS Specification that relies on Connected Thermostats Specification without a means of independently verifying energy savings claims. A non-performing ENERGY STAR SHEMS could be perceived as a negative indication of the overall home quality, and cause a significant burden on homeowners when they want to sell their home.

Question 2: Is there a way to characterize energy savings from optimized unoccupied hours in terms of how deep the energy savings are (e.g., short term away optimization versus long term vacation modes, periods with pets at home, etc.)?

We agree that EPA should address potential savings that are realized on different time scales for different product types. For example, lights may turn off whenever a space is unoccupied, but water heaters might only be controlled during extended (greater than one day) unoccupied periods like vacations. Vendor partners may need to evaluate different end uses on different time scales.

Question 3: There are a wide range of ways to determine occupancy, some which require user interaction (e.g., geo-fencing, aring an alarm panel) and some which do not. Do data show a difference in frequency of use, depth of energy savings, or total time optimized based on the type of occupancy detection?

We understand EPA's interest in occupancy-based savings and recommend carefully considering whether the benefits of occupancy-based control be isolated from other services that these devices may also provide, such as DR and user-controlled scheduling. This is an important question that must be addressed for verification purposes. The CA IOUs encourage EPA to identify which control methods (i.e., occupancy, DR, Time-Of-Use, other utility programs or signals) might be present in a potential SHEMS and ensure that their benefits are evaluated distinctly from one another.

⁴ <https://www.energystar.gov/sites/default/files/CA%20IOU%20Comments-EStar-Connected%20Thermostats%20October%2026%202016.pdf>

In conclusion, we would like to reiterate our support to EPA for this effort on SHEMS. We thank EPA for the opportunity to be involved in this process and encourage EPA to carefully consider the recommendations outlined in this letter.

Sincerely,



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