



Pacific Gas and
Electric Company®



A Sempra Energy utility®



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December 23, 2015

Abigail Daken
United States Environmental Protection Agency
Climate Protection Partnerships Division
Washington DC 20460

Subject: Draft ENERGY STAR® Connected Thermostats Specification and Method for
Demonstrating Field Savings – V1.0

Dear Ms. Daken:

This letter comprises the comments of the Pacific Gas and Electric Company, Southern California Gas Company, and San Diego Gas and Electric Company in response to the United States Environmental Protection Agency (U.S. EPA) request for comments on the draft 2 ENERGY STAR® Connected Thermostats Specification V1.0 and draft 1 Method for Demonstrating Field Savings V1.0. The signatories of this letter, collectively referred to herein as the California Investor Owned Utilities (CA IOUs), appreciate the opportunity to provide feedback on these documents.

The CA IOUs represent some of the largest utility companies in the western United States, serving over 35 million customers. As energy companies, we understand the potential of energy conservation and energy efficiency programs to cut costs and reduce consumption while maintaining or increasing consumer utility of products. We have a responsibility to our customers to advocate for requirements of voluntary programs that accurately reflect the climate and conditions of our respective service areas, so as to maximize their positive effects.

We appreciate U.S. EPA's efforts to develop an ENERGY STAR specification for connected thermostats and service providers to help utility consumers realize energy efficiency benefits from connected thermostats, though we also have significant concerns as noted below. The CA IOUs recommend that U.S. EPA make a number of important revisions to improve the draft 2 Connected Thermostats Specification V1.0 and the draft Method for Demonstrating Field Savings V1.0. We will continue to work with U.S. EPA to address these concerns, and would welcome opportunities to provide additional utility technical expertise to support U.S. EPA's efforts.

1) Verify the Accuracy of the Proposed Energy Savings Method Before Finalizing the ENERGY STAR Specification

We share the concerns noted in the October 27, 2015 Consortium for Energy Efficiency letter regarding the proposed avoided run time metric. CA IOUs recognize the potential benefits of collecting field data to help determine natural gas, electric demand, and electric power savings, and understand that this approach may be more practical than requiring a specific set of energy

savings features given different strategies in the market. However, we believe that the draft specification is premature until the scientific basis for the proposed method for determining energy savings based on the metric of avoided HVAC run-time has been verified and documented.¹

The CA IOUs also recommend that U.S. EPA validate that the proposed methodology for estimating run times results in accurate estimates of energy savings. A number of factors that influence the methodology, including data collection techniques and modeling assumptions, complicate the correlation of energy savings with run time. For instance, U.S. EPA assumes that variables such as building orientation, insulation levels, number of occupants, and occupancy hours will average out across a given geographic region. While this may be true given a sufficiently large random sample size, the customer base for a given service provider is not necessarily a random sampling for these variables. In addition, U.S. EPA is proposing to estimate baselines run times using a statistical analysis of current set points and weather data as opposed to actual measured run-time values. CA IOUs recommend that U.S. EPA evaluate how these and other factors impact savings before issuing ENERGY STAR certification to thermostats or service providers. We also recommend that U.S. EPA use measured energy data to verify that the proposed avoided run-time methodology results in accurate estimates of energy savings.

We encourage U.S. EPA to work with utilities and the Electric Power Research Institute to assess existing studies, determine what additional studies and/or pilots are needed, and where utility or other pilot projects and studies can help address these needs.

2) Develop a Process to Verify Service Providers' Energy Savings Claims Before Finalizing the ENERGY STAR Specification

As noted in our August 6, 2015 comment letter, one of the ENERGY STAR Program's strengths is that it provides customers and utilities with independent verification of energy savings claims. The current version of the Methodology for Determining Energy Savings does not provide independent verification of service providers' energy savings claims and underlying data. Unless U.S. EPA adds a mechanism to validate data collected by service providers and used to determine energy savings claims, the ENERGY STAR certification will not provide the unbiased verification of energy savings that utilities and customers expect from an ENERGY STAR label. Objectives of the verification process include ensuring representative sampling, data accuracy and data integrity. In addition, we encourage U.S. EPA to consider also comparing reported avoided run-time and associated energy savings estimates to field measurement of energy usage at a sub-set of customer facilities in the future.

¹ The CA IOUs understand that U.S. EPA intends to require that service providers input data collected from a sub-set of their users into a software module that will then calculate aggregate HVAC run-times from buildings after connected thermostats are installed to manage HVAC systems. The software module will also estimate baseline run-times from a statistical analysis of weather data and current temperature set-points provided by manufacturers. The software module will then calculate the estimated avoided run-times.

3) Propose a More Specific Test Method

The draft Method for Determining Energy Savings contains very little information beside a reference (section 4) to a software module, and the software module does not include a document that explains the test method to users in plain English. U.S. EPA should revise the proposed Method for Determining Energy Savings so it clearly describes the approach for calculating energy savings, the input variables, the obligations of service providers, and the equations used in the software module. The following list includes examples of information that should be transparent, and is not intended to be comprehensive:

1. Data inputs, the calculations that will be performed, and resulting outputs;
2. The process for selecting a representative sample;
3. What data will be collected, and how;
4. A verification process for manufacturer data inputs;
5. Minimum requirements for data completion; and
6. Procedures to address minor data gaps that are within allowable levels.

The draft Specification (Section C.3) appears to authorize manufacturers to use tailored test methods for estimating energy impacts as long as U.S. EPA staff find the approach to be acceptable after completing a review of manufacturer studies. We support U.S. EPA's typical practice of updating ENERGY STAR test methods and specifications to address new information and market trends through an open public process that results in a revised specification and/or test method. We recommend that U.S. EPA address any future revisions to the connected thermostat Method for Demonstrating Field Savings through a similar process. Therefore, we recommend removing this section from the draft Method for Demonstrating Field Savings.

4) Strengthen Stand-by Power Requirements

As noted in our August 6, 2015 letter, the CA IOUs support the inclusion of proposed requirements for stand-by power losses in section 3.A of the draft specification. We appreciate that U.S. EPA has included stand-by power limits and a requirement that devices promptly re-enter network stand-by mode after user interactions. We recommend that U.S. EPA consider further improvements to the stand-by requirements as noted below.

First, the CA IOUs recommend that the specification including a requirement that devices enter network standby promptly after service provider communications as noted in our August 6, 2015 letter - such as one minute or less.

We also recommend that U.S. EPA reduce the standby limit to 1.0 or 1.4 watts when the device is not actively communicating. The European Union's Ecodesign Requirements for Standby and Off-mode Electric Power Consumption of Electrical and Electronic Household and Office Equipment limits device stand-by power use to 0.5 watts or 1.0 watts, depending on the functions that are in use when the device is in standby mode.² Existing ENERGY STAR specifications allow stand-by power to exceed base levels for devices that include a remote activation feature.

² Commission Regulation (EC) No 1275/2008 of 17 December 2008 implementing Directive 2005/32/EC of the European Parliament and the Council with regard to ecodesign requirements for standby and off mode electric power consumption of electrical and electronic household and office equipment.
http://www.eceee.org/ecodesign/products/standby/1_33920081218en00450052.pdf.

For instance, the ENERGY STAR Computers Specification V6.1 allows a 0.4 watt adder for small routers with the capability for remote activation (defined as “Wake-Up On LAN”). We recommend that U.S. EPA reduce the proposed level based on these specifications, or else address any unique connected thermostat features requiring higher levels.

5) Strengthen Requirements for Grid Communications

As noted in our October 23, 2015 comment letter, we recommend that U.S. EPA promote the use of devices and service providers that are capable of communicating using open standards. Open standards will facilitate transactions necessary for demand response and other grid interactions and can help mitigate the risk of stranded assets if a service provider exists the market.³

Specifically, the CA IOUs recommend that U.S. EPA modify section 5a to address the following points:

1. Connected thermostat devices should be capable of receiving signals that have been transmitted through a non-proprietary, open physical communications interface⁴ (e.g., Wi-Fi, Zigbee).
2. Connected thermostat devices should be “certified” to an open non-proprietary logical communication standard⁵ (e.g., OpenADR) and be capable of two-way communication with the utility or service provider.
3. Service providers must have the capability of communicating with the utility using open standards.
4. Service providers should have the capability of communicating with customers using open standards.
5. Exceptions to the grid communication requirements in section 5a should be clarified. An exception listed under section 5b (open access) is unclear because it discusses adherence to open standards requirements, which are included in section 5a (grid communication), rather than adherence to open access requirements, which are included in section 5b.
6. California is making efforts to develop the market for connected thermostats in a way that is beneficial to end users and grid operators and/or utilities. To help accomplish this goal, California has established minimum requirements to which Occupant Controlled Smart Thermostats must adhere if they are to be used to meet California Building Energy Efficiency Standards (Part 6 of Title 24). *Title 24 Joint Appendix 5 (JA5) – Technical Specifications For Occupant Controlled Smart Thermostats*⁶ details the minimum requirements. The CA IOUs recommend that U.S. EPA review the latest requirements in JA5 and make an effort to align the ENERGY STAR specification with requirements in JA5, as appropriate, to minimize the burden on manufacturers that wish to adhere to JA5 requirements and ENERGY STAR specifications.
7. “Open standards” should be defined within the specification. Section 5a of the draft specification indicates that “open standards” is defined in the specification, but the

³ We encourage U.S. EPA to also evaluate other options to protect against stranded assets, such as placing certain service provider code in escrow in case the service provider exits the market.

⁴ The physical communications interface describes the physical connection through which the thermostat receives signals from the customer, service provider, utility, or grid operator.

⁵ The logical communications interface describes the messaging protocol and information model used to represent and interpret signals.

⁶ California Energy Commission. “2016 Reference Appendices for 2016 Building Energy Efficiency Standards.” <http://www.energy.ca.gov/2015publications/CEC-400-2015-038/CEC-400-2015-038-CMF.pdf>.

definition is omitted from this draft. The CA IOUs understand that U.S. EPA intends to add a definition for this term. We would like to work with U.S. EPA to review the definition before it is included in the final specification. U.S. EPA can refer to JA 5 for examples of “open standards.”

6) Clarify Requirements for Open Access

The requirements in Section 5b regarding “open access” are not clear. The CA IOUs recommend that U.S. EPA either revise the language so the requirements are easier to understand or strike the open access requirement from this draft specification until sufficient market development has occurred to include more specific requirements. If the language is not improved, there is a risk that manufacturers or other stakeholders will interpret the requirement inconsistently. Specific recommendations to improve the language include:

1. The CA IOUs recommend that U.S. EPA define all terms used in the requirement. For example, the term “interface specification” is not currently defined or explained.
2. The CA IOUs recommend that U.S. EPA clarify which entities would have access to the interface specification or application programming interface (API). Will the interface specification or API be made readily available to any interested stakeholder, just ENERGY STAR staff, or to some other entity?
3. The CA IOUs recommend that U.S. EPA re-write or delete the note under section 5b, which states that “Products that enable direct, on-premises, open-standards based interconnection are preferred, but alternatives approaches, where open-standards connectivity is enabled only with use of off-premise services, are also acceptable”. This note is not clear, and could lead to confusion and compliance challenges. Currently, the terms “direct interconnection” and “off-premise services” are not defined. In addition, as noted earlier, this note could be interpreted to over-ride the requirements for the capability to use open standards.

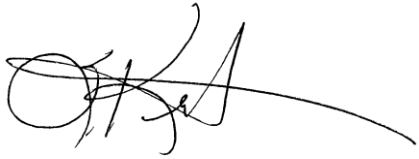
7) Add Requirements for Minimum Demand Response Functionality

Previous versions of the specification included detailed requirements for default responses to demand response events. While the CA IOUs are generally supportive of simplifying the minimum requirements for demand response functionality as proposed in the current draft, we encourage U.S. EPA to add several additional requirements. The CA IOUs recommend that the specification require that connected thermostat devices at a minimum have the capability to:

1. Automatically adjust temperature setpoints after receiving a demand response signal;
2. Maintain the modified temperature setpoints for a given period of time;
3. Automatically cycle the compressor for a certain level for a given period of time after receiving a demand response signal;
4. Automatically default back to the previously programmed control settings after receiving a signal that the demand response period has concluded; and
5. Automatically default back to the previously programmed control settings in the event of a power outage or communication signal disconnect.

In conclusion, we recognize U.S. EPA efforts to develop an ENERGY STAR Connected Thermostat Specification and a Method for Demonstrating Field Savings, but we have significant concerns with the current draft. We thank U.S. EPA for the opportunity to be involved in this process and encourage U.S. EPA to carefully consider the recommendations outlined in this letter prior to releasing a complete specification.

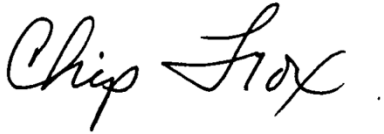
Sincerely,



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