



October 26, 2016

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

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

Dear Ms. Daken:

This letter comprises the comments of the Pacific Gas and Electric Company, San Diego Gas and Electric Company, Southern California Edison and Southern California Gas Company in response to the United States Environmental Protection Agency (U.S. EPA) request for comments on the draft 2 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 this draft.

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 voluntary program requirements that accurately reflect the climate and conditions of our respective service areas, so as to maximize their positive effects.

The CA IOUs appreciate that U.S. EPA has undertaken a significant challenge to develop an effective ENERGY STAR specification for connected thermostats. We are very supportive in the concept of U.S. EPA's attempts to create an innovative new data-driven methodology to verify that using a control system (i.e., connected thermostat) can result in real-world energy benefits. Since the main benefits of these devices are highly dependent on real-world usage, collecting field data offers significant potential benefits.

While we are encouraged to see U.S. EPA working to evolve voluntary specifications, we recommend that U.S. EPA address a number of issues with draft 2 of the Method for Demonstrating Field Savings V1.0 before the ENERGY STAR program is established for this product. This new data-driven framework offers the potential to set a significant, new precedent for appliance specifications, which underscores the importance of resolving the outstanding issues so that the connected thermostat specification can become an appropriate model for future specifications. In particular, strengthening verification and reporting requirements, as discussed in detail below, are important prior to launching this new program. The CA IOUs also

recommend that U.S. EPA address as many as possible of the additional issues that are discussed below prior to approving the final Method for Demonstrating Field Savings V1.0. Any issues that U.S. EPA cannot address before approval should be addressed in the next update. The CA IOUs appreciate U.S. EPA's efforts to address CA IOU concerns and will continue to work with U.S. EPA.

1) Verify Service Providers' Energy Savings Claims

As noted in our prior comment letters, one strength of the ENERGY STAR Program is providing independent verification of energy savings claims. As U.S. EPA explores new data-driven approaches to verify that energy benefits are achieved, it is critical that the ENERGY STAR Program maintain the benefit of providing independent verification of savings. Without independent verification, it is harder for utilities and other stakeholders to have confidence in savings claims from the ENERGY STAR brand.

The draft 2 Method for Demonstrating Field Savings V1.0 is not consistent with the principle of independent verification, because it does not require independent verification of service providers' energy savings claims or the underlying data used to establish savings claims. The draft does not allow U.S. EPA to obtain the information necessary for verification. Objectives of the verification process include ensuring completeness of raw data, representative sampling, data accuracy, and data integrity. While we appreciate and support U.S. EPA's proposed addition of a requirement for manufacturer data retention in section 4.8 as a step in the right direction, data retention alone is not sufficient. Therefore, we recommend that U.S. EPA also require that manufacturers provide the data to U.S. EPA and/or a third party representative of U.S. EPA upon request (subject to customer privacy protections). Furthermore, we recommend removing the following statement: "EPA does not plan to audit savings submissions associated with the Version 1.0 ENERGY STAR CT specification." In addition to providing verification, audits may yield insights that help ENERGY STAR partners improve good faith efforts to implement this complex method and inform future ENERGY STAR improvements.

2) Model Validation

As noted in the December 23, 2015 CA IOUs comment letter, we have concerns regarding the assumptions underlying the method for demonstrating field savings. On one hand, the CA IOUs recognize the significant potential benefits of collecting field data to help determine natural gas, electric demand, and electric power savings. On the other hand, we are concerned that the proposed model to estimate energy savings has not been validated against real-world energy usage data. U.S. EPA assumes that variables such as building orientation, insulation levels, solar heat gain, 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, the type of heating and cooling equipment as well as the presence or absence of wood heating may vary regionally in different markets within a climate zone and affect data filtering and/or calculated savings levels. Finally, U.S. EPA is proposing to estimate baselines run times for heating and cooling equipment using a statistical analysis of current set points and weather data as opposed to actual measured run-time values.

The CA IOUs recommend that U.S. EPA conduct studies to validate that the proposed modeling approach results in accurate estimates of energy savings. The studies should include an evaluation of the accuracy of modeling assumption relative to real-world installations, a sensitivity analysis to identify how model assumptions impact the resulting savings estimates, and a comparison of modeled energy savings to measured energy savings. These studies are critical to demonstrate to utilities and others who rely on the ENERGY STAR Program that U.S. EPA aims to establish a data-driven process that produces accurate results. We encourage U.S. EPA to work with utilities and third party research entities 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. We also recommend that U.S. EPA establish a process that would provide utilities with access to anonymized data within their service territory to facilitate these types of studies.

3) Enhance Data Sampling and Completeness

We agree with comments stakeholders made during the October 13, 2016 public webinar that U.S. EPA should specify sample sizes (i.e., the number of customers) for model input data. For instance, the [Oregon Energy Trust Nest Thermostat Heat Pump Control Pilot Evaluation](#) found that estimated savings can have a high level of uncertainty. The study found that the mean estimated savings was 4.7 percent with an estimated range of 1.9 percent to 7.5 percent with a 90 percent confidence interval. These findings indicate the importance of robust sample sizes to help mitigate uncertainty in energy savings estimates. In addition, we understand that allowing minor changes in the sample size will change the sampling procedures in ways that could result in an entirely different data set being fed into the model. Setting specific input sample sizes could help minimize the opportunity for service providers to tweak sample sizes and game the system by selecting data that maximizes the calculated savings estimates.

We also agree with comments stakeholders made during the October 13, 2016 public webinar that sample sizes could be binned by the number of customers per service provider. This approach would allow smaller companies with a lower market presence in general (or a lower presence in certain regions) to gain entrance to the ENERGY STAR Program. As companies grow, they would be required to buttress their savings claims with larger sample sizes.

Finally, we recommend establishing rules that reward data completeness by reducing savings estimates for incomplete data. We recommend starting from a presumption of zero savings during periods where data is missing or incomplete, beyond a small allowance for the unpredictability of internet access to the home or other reasonable allowances. Data loss due to poor signal or compatibility issues with home routers and reliance on mobile hotspots that travel outside of the home are examples of issues that could diminish benefits from “connected” functionality. Service providers should be incentivized to maintain connectivity with their customers and to collect complete data sets. Manufacturers could request exceptions for unusual events outside a service provider’s control, such as an extended electric power blackout.

4) Require Periodic Reassessment of Manufacturer Energy Savings Claims

The CA IOUs support U.S. EPA's proposal, as stated during October 13, 2016 webinar, to require on-going periodic data collection and estimation of energy savings. The [Oregon Energy Trust Nest Thermostat Heat Pump Control Pilot Evaluation](#) indicates that communications and other issues during installation and on-going operation can significantly reduce actual energy savings from connected thermostats.¹ Ongoing reporting should capture the effect of connected thermostat installation practices, attrition in the field, and potential product enhancements on energy savings.

5) Strengthen Proposed Reporting Requirements

The CA IOUs agree that the proposed reporting requirements in section 4.4 of the specification should be included. We also recommend a number of enhancements to this section. First, we recommend establishing a process wherein the software tool automatically reports the results of all software runs to both U.S. EPA and the service provider. For instance, service providers could upload their raw data to a secure platform hosting the energy saving calculation tool. When the service provider runs the software tool, results would be automatically transmitted to U.S. EPA and the service provider (raw data would not be delivered to U.S. EPA during this process). This process would help U.S. EPA identify attempts to incrementally tailor input data based on multiple model runs to achieve a desired output score.

Second, we agree with U.S. EPA that reports generated by the software tool should provide the list of information included section 4.4, though we recommend that these reports also describe information about the data attrition rate. The report should include a summary of the data that was excluded from the sampled data due to filtering rules at all steps in the model for each climate region. This information will help assess the strengths and weaknesses of the modeling approach and whether data that was excluded from the model could potentially bias the results.

Finally, we recommend that U.S. EPA require that service providers give U.S. EPA a report on their data handling procedures including:

- Processes to ensure data completeness and integrity;
- The number of units that were installed but did not function properly or were not operational for the full sampling period (U.S. EPA should adjust savings estimates based on this information); and
- The total number of customer records in raw data and the data sample. If any records were excluded, provide the justifications, and the number of records excluded due to each rationale. For instance, the [Oregon Energy Trust Nest Thermostat Heat Pump Control Pilot Evaluation](#) describes data attrition rates for all causes.² Information, such as the total number of customer records, could be redacted from publically available information and exclusion rates could be reported as percentages to protect business confidential information.

¹ [Oregon Energy Trust Nest Thermostat Heat Pump Control Pilot Evaluation](#). October 10, 2014, (p.5-18, p.5-22).

² [Oregon Energy Trust Nest Thermostat Heat Pump Control Pilot Evaluation](#). October 10, 2014, (p.4-7, p.4-8).

In conclusion, the CA IOUs appreciate U.S. EPA efforts to develop an ENERGY STAR Connected Thermostat Method for Demonstrating Field Savings. We thank U.S. EPA for the opportunity to be involved in this process and encourage U.S. EPA to consider the recommendations outlined in this letter carefully and to take steps to address the remaining issues with this draft Method for Demonstrating Field Savings.

Sincerely,



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