US Environmental Protection Agency
ENERGY STAR Program
Ariel Rios Building 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

May 11, 2012

To whom it may concern:

This letter includes the comments of Southern California Edison (SCE), San Diego Gas and Electric (SDG&E), Southern California Gas Company (SCGC), and the Pacific Gas and Electric Company (PG&E) in response to the Environmental Protection Agency (EPA) ENERGY STAR Program Requirements for Residential Climate Controls Draft 3 Version 1.0 and its Appendices (Performance Based Ease of Use Criteria, Test Method Version 1.0 for Performance Based Ease of Use Criteria, and Test Method for Power Consumption of Climate Controls).

We support the EPA's effort to develop climate controls, particularly communicating climate controls, which will enable better consumer management of home HVAC energy use.

Demand Response and Remote Management for Communicating Climate Controls

Connectivity Standards: We recommend that this specification provide detailed examples of communication protocols that would comply with the connectivity standard.

> The document currently identifies standards which are supported by various protocols, but stops short of identifying these protocols. The identification of specific protocols, such as ZigBee SEP or OpenADR, would greatly benefit this effort. The protocols have well defined test protocols that can be leveraged by this specification, as well as identifying methods for providing price or demand response (DR) event signals. Leveraging these efforts, which have reached agreement through lengthy development processes, should reduce the burden on the EPA.

Testing the response of the communicating climate control to demand response events: We recommend that this specification leverage existing procedures to include a test method that determines a communicating climate control's ability to respond to external requests or commands.

> While the EPA defines a communicating climate control as having the "ability to communicate with sources external to the HVAC system for purposes of energy management and remote control", and specifies communication requirements for data reporting and remote management (lines 336-364), it does not include a method to verify the communicating capabilities of these controls. In particular, we are concerned that the EPA does not verify the

ability of communicating climate controls to respond to utility or third party DR events or price signals.

The test procedure(s) selected should also maintain some level of consistency across Energy Star Connected devices. It is important to note that a test procedure was drafted by the EPA for the ENERGY STAR Connected Residential Refrigerator and Freezer specification.[1] We urge the EPA to ensure consistency across devices, to minimize testing burden.

If desired, this test method could also test the response of the unit to specific Remote Management requests (lines 352-364).

This test method could be incorporated into the Test Method for Power Consumption for communicating climate controls (Appendix C), or could be included as a separate appendix. It would be required as part of the Test Criteria (lines 550-560) for communicating climate controls.

Regarding the communication of energy rate tiers or instantaneous time-of-use energy prices: We strongly support the communication of price signals to consumers through communicating climate controls, as an essential part of demand response and load management.

The communication of price signals to the consumer is very important, and it will be a necessary and essential component of future DR and energy management programs that use communicating thermostats and other communicating home energy equipment. We urge the EPA to reconsider including a requirement for energy rate tier indication in the core prescriptive ease of use criteria (lines 418-438).

As SCE has previously commented to the EPA,[2] utilities are moving towards using time-based pricing for residential customers, particularly to help implement demand response programs. We believe that, in the near future, demand response signals to consumer equipment will be more likely to be price-based signals, not reliability-based signals.

We disagree with the observation that energy rate tiers may not be widely available throughout the U.S.; the California investor-owned utilities are currently offering residential time-of-use (TOU) rates.[3] In order for a communicating climate control to be effective for demand response programs and take advantage of TOU rates, it must be able to communicate pricing events to consumers. It is not necessary to include a complicated LED pricing tier system to indicate this

[2] http://www.energystar.gov/ia/partners/prod_development/revisions/downloads/refrig/SCE_Comments_Energy_Star_Refrigerator_Freezer_DR_Criteria_and_Test_Method.pdf?cdc9-9f23

[3] http://www.sce.com/residential/rates/special-time-of-use.htm, http://pge.com/myhome/saveenergymoney/energysavingprograms/smartrate/, http://sdge.com/save-money/reduce-your-use/reduce-your-use-rewards

information; it could be communicated as simply as through an image or text on the display screen that indicates whether a DR event is occurring, or whether a pricing event is currently in effect. This would accomplish the primary intent of informing the consumer when a DR event is occurring.

Therefore, we strongly recommend that this specification include a requirement for communication of a price event and/or demand response event. For example, in the core prescriptive ease of use criteria (lines 418-438), insert language such as the following:

> "The product shall incorporate in its display an indication that a Demand Response or price event is currently in progress."

As noted previously, the communication protocols which many of these devices are likely to use already have provisions for communicating both price and reliability events. If the EPA is to leverage these protocols, including price signals in this specification is a necessary step.

Title 24 Occupant Controlled Smart Thermostats

Harmonization with California 2013 Title 24 Joint Appendix 5: Technical Specifications for Occupant Controlled Smart Thermostats: We recommend that the EPA review and reference the Occupant Controlled Smart Thermostats Technical Specifications developed for California Title 24.

In general, we recommend that the EPA review and utilize the Technical Specifications for Occupant Controlled Smart Thermostats (OCST) developed for the 2013 update to California's Title 24.[4] These specifications have been developed through a long and rigorous process that has included feedback from numerous industry, utility, and regulatory parties. In order for ENERGY STAR qualified Climate Controls to be eligible for use in California, it is essential that these specifications be compatible.

Specifically, we recommend the following language modifications and additions (additions underlined):

- Definitions Lines 160-167: "Communicating Climate Control: A Climate Control with the ability to communicate<u>, through a two-way communications interface,</u> with sources external to the HVAC system for purposes of energy management and remote control."
- Definitions Line 192+: <u>"Price Signal: A signal or message by which the utility or another entity selected by the occupant can prompt the communicating climate control to provide pricing information to the occupant and initiate a response for the Demand Response Period utilizing a Demand Response Signal."</u>

[4] Joint Appendix 5, http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/current/Express_Terms/45-Day_2013_Joint_Appendix_JA.pdf
Section 110.2, http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/current/Express_Terms/45-Day_2013_Title_24_Part_6_Building_Efficiency_Standards.pdf

- Definitions Line 192+: "Demand Response Period: An event during which a utility or another entity selected by the occupant to initiate a response for the Demand Response Period utilizing a Demand Response Signal."
- Definition Line 192+: "A Demand Response Signal shall trigger the climate control to adjust the thermostat setpoint by either the default number of degrees or the number of degrees established by the occupant; or to place the climate control settings into Energy Saving Mode."
- Data Reporting Requirements Line 351+:
  "Current Humidity reading and control mode
  Current Demand Response Period status (on, off)"
- Remote Management Requirements Line 364+:
  "Select active program schedule
  Initiate a Demand Response Period through a Demand Response Signal or Price Signal"

The OCST specifications require that the OCST be able to program separate set points for a minimum of four periods per 24 hours; the Climate Control specification is consistent with this requirement (lines 284-287). The OCST specifications also require that heating and cooling set points be set back by at least 4 degrees F during DR event periods; the Climate Control requirement for setback of 7 or 8 degrees F (lines 291-293) will meet this requirement if enabled during DR events (in response to a Demand Response Signal or Price Signal).

Definition of Climate Control (lines 153-159)

We support the EPA's current definition: "device that controls heating, ventilation, and air-conditioning (HVAC) equipment to regulate the temperature and humidity of the room or space in which it is installed." This definition is consistent with the ASHRAE Handbook definition of thermostat ("A device that automatically regulates temperature, or that activates a device when the temperature reaches a certain point"), and to the Title 24 proposed definitions.

These definitions maintain direct control between space conditions and occupant comfort, and HVAC equipment performance.

Power Consumption Requirement

Power Consumption requirements for connected climate controls: We recommend that the EPA not include an average power requirement for connected climate controls.

Connected climate controls provide a variety of new functions that a non-connected climate control does not. The energy savings potential associated with these new functions far outweighs the potential energy consumption by the communication module. Further, given the variety of communication methods, the power consumption requirement may limit innovation

within the market and preclude the use of certain technologies (i.e. perhaps one signal type lends itself towards less power consumption than another, and would be favored).

The communication module is vital to the realization of the connected benefits (e.g. participation in DR programs). A limit on the power consumption may inadvertently impact the ability of the communication module to perform adequately. For instance, the limit on power consumption may lower the range of the communication module's antenna, forcing the climate control to be located closer to a meter or requiring the purchase of a gateway device.

The concerns on testing modular communication climate controls would be mitigated through the elimination of this requirement. If the climate controls are no longer held to a maximum, they would not need to be tested. This would foster a competitive environment as modular, or upgradeable, climate controls would not be held to a different standard.

We recognize the importance of power consumption requirements for non-communicating climate control. It is recommended that the EPA consider testing connected climate controls with all communication turned off, to ensure that the basic functions of the connected climate controls are performed as efficiently as possible.

.

Labeling for Upgradeable to Communicating Climate Controls

We recommend that the EPA require a label or mark for products that are not communicating but are upgradeable by installation of a communications module, to better inform consumers of their options. For example, a statement like the following could be included in the Other Criteria (lines 510-530).

> "This product requires installation of a communications module in order to be able to enable connection with an energy management system, smart utility meter, or another external device."

Performance Based Ease of Use Test Procedure and Criteria (Appendices A and B)

Regarding the test for Performance Based Ease of Use with Remote Interface (RI): We recommend that the usability test procedure for climate controls with a RI test the original climate control on all usability tasks, to ensure that the climate control can operate standalone without the RI.

We support the testing and use of RI with climate controls as a means to enable better consumer information and control over their device. However, we are concerned that the 3rd

usability compliance path (Alternate Performance-Based Ease of Use, lines 497-507) does not adequately test the climate control as the controlling device for the HVAC system.

We recommend that the communicating climate control should be tested on all performance based tasks 1 through 6, and that the RI be tested on tasks 2 through 6. Even if the RI is the main consumer interface, the RI is not the controlling device for the HVAC system. In the event that a RI is lost, disconnected or malfunctioning, the consumer must be able to access and operate the climate control fully.

Conclusion

We thank the EPA for the opportunity to participate in this process and encourage the EPA to carefully consider the recommendations outlined in this letter.

Sincerely,

Anthony Hernandez

Manager

Design and Engineering Services

Southern California Edison

Albert Chiu

Lead Product Manager

DR Technology Solutions

Pacific Gas and Electric Company

Lance DeLaura

Southern California Gas Company

San Diego Gas and Electric