

April 12, 2013

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

To whom it may concern:

This letter includes the comments of Southern California Edison (SCE) in response to the Environmental Protection Agency (EPA) ENERGY STAR Program Requirements Product Specification for Residential Refrigerators and Freezer Eligibility Criteria Final Draft Version 5.0.

SCE supports the EPA's effort to introduce demand response and "smart" capabilities in ENERGY STAR appliance specifications; smart products will be a useful tool for utilities and consumers alike to manage their energy use and costs.

From a utility perspective, the financial benefits and peak demand savings of smart, DR capable appliances will depend on a number of variables which are not under utility control. It is important to a utility that, despite these variables, DR programs enjoy as much reliability and certainty as possible. When a utility or third party sends a signal for a DR event, the DR-capable product, as authorized by the consumer, will respond according to the signal sent and its own capabilities. While the actual response will depend on a number of factors, it is essential that utility DR programs be able to estimate and depend on a reliable response. These factors motivate our comments in this letter.

Comments regarding the Product Specification for Residential Refrigerators and Freezers Eligibility Criteria Final Draft Version 5.0

1. Test Data

Knowledge gained from recent SCE testing of DR capable appliances can provide insight to DOE/EPA test method and specification development efforts.

SCE recently conducted several tests of DR-capable refrigerators, clothes washers, and dishwashers at SCE's Technology Test Centers. These tests validated device performance in response to DR events as compared to normal operation. We would like to make our findings available to DOE and EPA as well as share insight associated with development of test standards to be followed by manufacturers.

In the near future, we will be installing several connected appliances at customer homes as part of a demonstration project. Data collected will allow much more insight into consumer usage patterns and impacts of DR events on the consumer experience. We will make this data available to DOE and EPA as well.

2. Inclusion of freezers

SCE supports the continuation of Energy Star for freezers.

The Energy Star program plays a vital role in promoting the most efficient products available in the market. SCE supports inclusion of all appliances, including freezers, for which energy efficiency is achieved

cost-effectively.

3. Connected

Allowing multiple methods of connectivity will significantly impact utility DR program design.

The Final Draft Specification requires: “A product that enables economical and direct, on-premises, open-standards based interconnection is the preferred option for meeting this requirement, but alternative approaches are also available.” We request that reference to a known open communication protocol for DR (such as SEP 2.0) be included in this statement. As previous utility comments have indicated, allowing multiple methods of communication could be problematic for utility DR program design. For example, it is feasible that a utility would offer more attractive rebates to a customer who purchases a refrigerator with direct communication through the utility meter, as compared to a consumer who purchased refrigerator communicating through a manufacturer’s cloud-based solution. Thus, the value to consumers is diminished in the second instance, likely affecting uptake of DR-capable devices.

4. Delay Defrost

Delay defrost capability should not be automatically disabled upon enrollment in a DR program.

The Final Draft Specification states that the delay defrost capability shall be disabled once the consumer enrolls in a DR program. This exception should be re-stated to require that the delay defrost be updated with the peak demand periods appropriate for the relevant utility. If the language remains as-is, refrigerators that were prevented from defrosting during peak periods would suddenly be allowed to do so when they are enrolled in a program.

5. 24 hour lockout

A Connected refrigerator should be able to respond to as many DR signals as it is able to and not be limited to one response within a 24-hour period.

The Final Draft Specification requires that a Connected refrigerator or freezer responding to a DR signal “be able to provide *at least one*” response (DAL or TALR) in a rolling 24-hour period. This language means that the unit does not need to respond to additional DR signals if called within a rolling 24-hour period, even if the unit *is capable* of responding (i.e. within the allowable temperature range). The practical implications of this are great.

It is highly likely that a utility would call more than one event in a 24-hour period. For example, during a heat wave an event may be initiated at 3:00 PM on Tuesday. On Wednesday, the heat may set in sooner and require that an event be called at 1:00 PM. Given the current language, the refrigerator would not have to respond to the Wednesday event if it had responded on Tuesday.

Our concern is that manufacturers will design their units to respond to only one DR signal in a 24-hour period. This practice has been confirmed in our testing. In reality, the refrigerators have recovered to normal operation only a few hours after the DR event. After recovery, they should be able to respond to additional events without compromising functionality. Allowing units to ignore additional signals within a 24-hour period is unnecessary and significantly compromises the value of the DR functionality.

We ask the EPA to modify this requirement, and require that units respond to at least one event in a rolling 8-hour period. This will provide sufficient time for the refrigerator to return to normal operation and alleviate concerns about temperature maintenance. In the alternative, the existing language should be modified to require response to “*at a minimum*, one DR signal within 24 hours, but shall not limit the ability to respond to additional events, so long as functionality and safety are not jeopardized.”

6. Demand Response Definitions

Definitions of Delay Appliance Load (DAL) and Temporary Appliance Load Reduction (TALR) may prove ineffective at achieving their goal of DR load shedding.

The Final Draft Specification uses DAL and TALR definitions and response requirements from the AHAM/ACEEE Joint Petition to DOE. After thorough review in light of our testing, we believe these definitions and responses may be problematic and not actually provide sufficient DR capacity to make DR programs cost-effective.

The current structure ties responses to event duration. In many instances, duration is not commonly known when an event needs to be called. Furthermore, we cannot foresee a case where an event would be called with duration less than 15 minutes, thus nullifying the TALR unless multiple units were cycled through successive TALR events.

Additionally, many events will last six hours or more to cover our peak time period of 12 PM to 6 PM. These events would fall outside of the 4 hour maximum defined DAL duration, meaning no response is required. Rather, multiple shorter events would have to be called and cycled through available DR resources. When combined with the 24 hour restriction noted above, scheduling individual resources could become a massive undertaking.

As currently defined, the refrigerators will provide larger DR reductions (~100W per unit) for short TALR events, and smaller reductions (~10-20W per unit) for DAL events. Thus, significant market penetration would be required to provide significant grid-level benefits. The instantaneous DR potential of all available units on a utility grid would be significantly impacted when the scheduling implications are taken into account.

Comments regarding the Product Specification for Residential Refrigerators and Freezers Final Draft Test Method to Validate Demand Response Rev. March-2013

7. "Signal" definition

The test method "signal" must be more precisely defined to ensure that laboratory test results will be repeated in response to triggers by utility DR programs.

The Final Draft Test Method defines "signal" in terms of the action that results from the signal (e.g. "indicate that it should modify its operation"). Furthermore, the DAL and TALR commands provide "the start time and duration of the delay load (or temporary load reduction) time period." These definitions do not include sufficient detail about the specific packets of information that must be included in the signal sent to the Unit Under Test.

In recent testing of DR capable appliances conducted at SCE, it was discovered that the various manufacturers trigger their appliance responses based on different components of the DR signal. One responds only based on the duration part of signal, while another looks only to the criticality (or price) level part of the signal. The one responding to criticality levels would not respond to a signal that conforms to the Test Method definitions.

The test method must define exactly what signal is sent to test out functionality for both Temporary Appliance Load Reduction and Delay Appliance Load scenarios, using a known protocol such as SEP 2.0. If this change does not happen and existing response schemes are further deployed, a signal broadcast to appliances in a utility's service territory would have to include ALL of the tags (unique bits of information contained in the signal) required to activate ALL manufacturers DR signals.

8. Anti-sweat heater (ASH)

The ASH should be active in both the baseline and DR tests to mimic normal consumer operation.

The goal of the Test Method should be to mimic normal operation that would be seen in consumer homes. Turning the anti-sweat heater off deviates from normal operation and eliminates a significant portion of the load, as well as a significant portion that could be reduced during a DR event. In testing conducted at SCE, refrigerators have performed significantly different when ASHs are turned on compared to when they are off (e.g. multiple degree shift in temperature throttling range and different compressor cycling patterns). The ASH should be active in both the baseline and DR tests.

Turning ASH off will also improperly increase the Percent Delay Load Average Power Reduction (sec 9.3) and the Percent TALR Average Power Consumed (sec 9.5) calculations.

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

Sincerely,



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