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March 4, 2021

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Washington, DC 20460

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Washington, DC 20585

Topic: Final Draft Version 4.0 ENERGY STAR® Specification and Final Draft Test Method to Validate Demand Response for Residential Water Heaters

Dear Ms. Daken and Ms. Rivest:

This letter comprises the comments of the Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE) in response to the United States (U.S.) Environmental Protection Agency (EPA) Final Draft Version 4.0 ENERGY STAR Specification and Final Draft Test Method to Validate Demand Response (DR) for Residential Water Heaters (Res WHs).

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 U.S., serving over 32 million customers. As energy companies, we understand the potential of appliance efficiency standards to cut costs and reduce consumption while maintaining or increasing consumer utility of products. We have a responsibility to our customers to advocate for standards that accurately reflect the climate and conditions of our respective service areas, so as to maximize these positive effects.

We appreciate this opportunity to provide the following comments on these final drafts. We support EPA's decision to define two new product categories and raise the minimum Uniform Energy Factor (UEF) levels for electric Res WHs. EPA's decision sends a clear message that electric heat pump water heater (EHPWH) technology is maturing and diversifying, and that ENERGY STAR will continue to point toward the future. We are disappointed that EPA has not chosen to send a similarly clear message about gas water heater (GWH) technology and recommend that ENERGY STAR significantly modify the qualification requirements for this category of Res WHs. Additionally, we appreciate the clarifications made to the test method to validate DR in response to our prior comments, and we recommend further clarifications to facilitate the application of the DR validation test to more products.

**1. The CA IOUs support the increased minimum UEF levels and the definition of new product categories for split-system and 120-volt EHPWHs.**

The CA IOUs support EPA in defining product classes for split-system and 120-volt integrated EHPWHs. Additionally, the CA IOUs support the increased UEF level of 3.3 for EHPWHs regardless

of tank size. These changes will enable utility energy efficiency programs to more accurately account for energy savings and continue to allow for innovative emerging technologies.

**2. The CA IOUs recommend that EPA either increase the efficiency requirements for GWHs or sunset the categories.**

The CA IOUs note that at six percent of the gas storage Res WH market, the market penetration of these ENERGY STAR qualified water heaters remains low.<sup>1</sup> This is despite the program’s requirements having remained virtually unchanged (see Table 1) since Version 1.0 introduced a minimum recognition requirement of 0.67 Energy Factor (EF) in 2010. ENERGY STAR market penetration for storage GWH has not changed since Version 3.1 became effective in April 2015.<sup>2</sup> Currently, the only ENERGY STAR qualified storage GWHs with tanks larger than 55 gallons are commercial “residential duty” units. There are no qualified storage GWHs over 55 gallons that meet DOE’s definition for a consumer water heater.<sup>3</sup> Given the history of the gas side of this specification, there is no reason to believe that maintaining these energy efficiency requirements for GWHs will lead to increased ENERGY STAR penetration or new product development. Removal of qualification criteria for storage GWHs is more than warranted.

**Table 1: History of ENERGY STAR Specification for Gas Storage Res WH**

ENERGY STAR for Res WHs	Effective Date	Metric	Minimum	Capacity (gal)
Version <a href="#">1.0</a>	September 1, 2010	EF	0.67	20-100
Version <a href="#">2.0</a>	June 1, 2013	EF	0.67	20-100
Version <a href="#">3.0</a>	April 16, 2015	EF	0.67	20-55
			0.77	55-100
Version <a href="#">4.0</a>	TBD	UEF	0.64 for Medium	≤55 by draw pattern
			0.68 for High	
			0.78 for Medium	>55 by draw pattern
			0.80 for High	

Source: CA IOU recreation of historical EPA specifications for Res WHs.

The current efficiency requirements for storage GWHs also do not deliver significant energy savings for consumers; a representative 40-gallon, high draw pattern product has a federal minimum efficiency standard of 0.64 UEF. Therefore, a similar product meeting ENERGY STAR’s 0.68 UEF requirement provides only a modest four percent improvement over the minimum standard. In comparison, the proposed ENERGY STAR requirements for electric water heaters represent a more than 300 percent improvement in efficiency. Therefore, while ENERGY STAR qualified electric storage Res WHs also have low market penetration, the ENERGY STAR label offers consumers a large potential energy saving opportunity. The ENERGY STAR requirements for electric water heaters recognize that EHPWHs have improved tremendously over the life of the program, with current models approximately twice as efficient as models that met the Version 1.0 recognition criteria of 2.0 EF. As noted previously, this is in marked contrast to the low energy savings and lack of improvement from ENERGY STAR qualified storage GWHs. The current ENERGY STAR label for storage GWHs fails to meet the ENERGY STAR brand tenets.

<sup>1</sup> ENERGY STAR Unit Shipment Data - <https://www.energystar.gov/sites/default/files/asset/document/2019%20USD%20Summary%20Report.pdf>.

<sup>2</sup> Historical Unit Shipment Data - [https://www.energystar.gov/partner\\_resources/products\\_partner\\_resources/brand\\_owner\\_resources/unit\\_shipment\\_data/archives](https://www.energystar.gov/partner_resources/products_partner_resources/brand_owner_resources/unit_shipment_data/archives).

<sup>3</sup> eCFR 430.2 and ENERGY STAR Qualified Products List [search](#).

Res WHs are an infrequent purchase; therefore, water heater technologies and features are generally unfamiliar to consumers. In addition, an estimated 80 percent of Res WH installations are emergency replacements that are typically heavily mediated by installers. As a result, the ENERGY STAR for Res WHs label is mostly relevant as a threshold requirement for energy efficiency program incentives. EPA's proposed minimum requirements for GWHs also do not provide significant value for energy efficiency program administrators as the same limited energy savings and challenging cost-effectiveness that limits consumer adoption also applies to energy efficiency programs. This poor performance is reflected in the low number of programs offering incentives for storage GWH products. The Consortium for Energy Efficiency (CEE) reports that, in 2019, only 22 of their member program administrators provided incentives for ENERGY STAR qualified storage GWHs. In comparison, 63 CEE members offered incentives for ENERGY STAR qualified EHPWHs, and 46 CEE members offered incentives for qualified gas furnaces.<sup>4,5</sup>

The CA IOUs recommend that if EPA is not willing to increase the UEF requirements for all new GWHs, it should sunset the ENERGY STAR for Res WHs label for storage GWHs until significantly more efficient, cost-effective gas technologies become available on the Res WH market.

**3. The CA IOUs recommend testing the expiration of the consumer DR override feature by initiating an override that expires in a short period of time.**

The CA IOUs appreciate the updates made to the specification and to the test method in line with our prior comments regarding the validation of DR, including limiting temporary overrides to a duration of 72 hours before returning to the previous operating mode. Although manufacturers may provide customers with the ability to set shorter override expiration time periods at their discretion, the proposed test method does not verify the functionality of this feature to avoid an undue increase in test burden.

The end goal of DR capability is to allow the water heater to respond to remote signals, balancing Demand Response Management System (DRMS) requests with the water heater state, consumer settings, and override conditions at the time of the event. The seamless interaction of these automatic states results in a predictable system in aggregate, and erroneously persistent or non-expiring overrides in DR controllers could result in unexpected aggregate behavior across water heater fleets in DR programs, and could have a significant impact on DRMS managed load. Additionally, persistent override states could diminish consumer benefits from having purchased a connected water heater (as opposed to a non-connected product). We, therefore, recommend that products be tested to verify that this override expiration functions correctly, particularly for products that allow users to set short override intervals (e.g., one hour or less).

**4. The CA IOUs recommend further information be given on how to utilize Open Automated Demand Response (OpenADR) independent of CTA-2045 communications interface.**

The CA IOUs appreciate the addition of OpenADR 2.0b Operational State Reporting information to support implementations of OpenADR 2.0b communications where desired. Although the information provided will help translate CTA-2045-A messages to an OpenADR-compatible report for use by an OpenADR system, this information will not sufficiently clarify how the specification or test method would operate for an OpenADR 2.0-only system without a CTA-2045 communications module and without initial operational state reporting that aligns with CTA-2045. Although many

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<sup>4</sup> <https://library.cee1.org/content/2019-residential-water-heating-initiative-impact-overview/>.

<sup>5</sup> <https://library.cee1.org/content/2019-residential-hvac-initiative-impact-overview/>.

water heater manufacturers may plan to offer CTA-2045 connectivity, we recommend a revision to clearly address OpenADR 2.0-only devices in the specification and test method so that ENERGY STAR connected water heaters can more easily take advantage of OpenADR 2.0 connectivity if desired.

**5. The CA IOUs recommend that OpenADR 2.0a remains an option for DR communication.**

The CA IOUs support EPA’s assessment that extended feature sets of OpenADR 2.0b and CTA-2045-B will be needed for advanced<sup>6</sup> (e.g., price responsive) DRMS and DR program implementation, both in California and nationwide. The evolution of flexible load programs will accelerate the adoption of these extended open standards over the simple command frameworks of OpenADR 2.0a and CTA-2045-A. In the interim, for ADR programs in California and elsewhere, many existing DRMSs primarily support OpenADR 2.0a devices. Therefore, we recommend that EPA encourage backwards compatible implementations of OpenADR 2.0b to ensure that ENERGY STAR connected water heaters are broadly compatible with both new and existing DRMS implementations and DR programs.

In conclusion, the CA IOUs reiterate our support for EPA’s creation of two new electric water heater product classes and for EPA’s decision to increase the minimum UEF levels for EHPWHs in the Final Draft Version 4.0 ENERGY STAR Specification for Res WHs. We believe that ENERGY STAR should take a more definite stance on the future of minimum storage GWH efficiency levels and modify the connected test procedure to make DR validation more assessable for a variety of technology types. We thank EPA and DOE for the opportunity to be involved in this process.

Sincerely,



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<sup>6</sup> See for example: <https://www.energystar.gov/sites/default/files/Comments%20ENERGY%20STAR%20Water%20Heater%20Version%204.0%20Draft%201%20Specification.pdf> , Comment 6-7 (p. 5-6). Note that price responsive functionality would be a factor in DRMS support of CTA 2045-B and/or Open ADR 2.0b.