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June 3, 2021

Mr. James Kwon  
ENERGY STAR for Consumer Electronics  
U.S. Environmental Protection Agency  
William Jefferson Clinton Building  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460

Topic: Draft 2 Version 9 ENERGY STAR® Television Specification

Dear Mr. Kwon:

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) Draft 2 Version 9 ENERGY STAR® Television Specification (Draft 2 TV Specification).

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 the opportunity to provide the following comments about this Draft 2 TV Specification. We applaud and support EPA's effort for revising the existing TV specification, with the goal to make the updated specification more representative of average consumer use of the latest television technologies.

**1. The CA IOUs recommend EPA further evaluate on-mode power of 8K TVs in order to determine adequate power requirement for growing 8K TV market.**

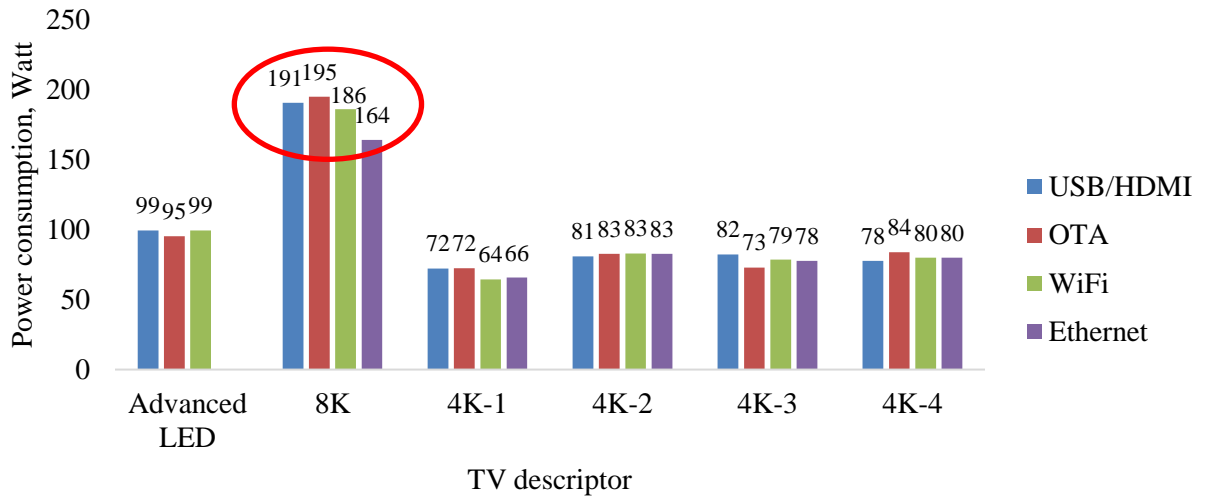
EPA's published dataset<sup>1</sup> includes 38 TV test samples, none of which are 8K models. EPA has noted that data from an 8K TV sample was excluded from the dataset because there was no data from additional 8K TVs for comparison. Even though 8K TVs are a very small market segment today, it is estimated that 8K TVs will likely make up 40 percent and 90 percent of the global market for TVs 70 inches and larger in 2023 and 2025, respectively.<sup>2</sup>

Our test results indicate that the power consumption of 8K TVs can be more than two times the energy consumption of 4K TVs (Figure 1). Therefore, once 8K TVs represent a larger share of the market, the overall pass rate of market TVs may be lower than the 20 percent pass rate targeted by EPA.

<sup>1</sup> [ENERGY STAR Television 9.0 Draft 2 Data and Analysis.](#)

<sup>2</sup> [Report: 8K TVs to Be in 72M Homes by 2025.](#)

Given the fast pace of change in the TV market, particularly with respect to 8K TVs, we recommend that EPA schedule an update of the ENERGY STAR® Television Specification for approximately 2024, with testing of power consumption for a representative selection of 8K TVs completed by approximately 2023. We note that this schedule is similar to the updated schedule between the Version 8 and Version 9 TV Specification.



**Figure 1: Comparison of on-mode power consumption for 8K and 4K TVs**

Source: CA IOUs Test Results Analysis

2. **The CA IOUs support EPA’s proposal of using average on-mode power across a selection of Preset Picture Settings (PPSs) as certification criteria. In addition, we recommend EPA consider using a weighted average of applicable PPSs with weights based on “representative average use.”**

In our comment letter<sup>3</sup> in response to EPA’s Draft 1 TV Specification, we observed that some HDR (High Dynamic Range) capable TVs do not support any kind of HDR PPS, but the HDR10 functionality can be enabled via the TV’s user settings. For these TVs, the HDR10 PPS power requirement ( $P_{HDR}$ ) specified in the Draft 1 TV Specification will not be applicable. Instead, for these TVs, we suggest measuring on-mode power in default PPS with HDR10 user setting enabled. Including this on-mode power with HDR10 user setting as ( $P_{HDR}$ ) in the average will provide manufacturers with more flexibility for design innovation in user settings and user interfaces.

We recommend that EPA consider using a weighted average for average on-mode power and average limit of on-mode power (Equations 4 and 5 in the Draft 2 TV Specification) to make the average on-mode power more representative of real-world use, as shown below:

<sup>3</sup> [CA IOU Comments on Energy STAR Televisions Version 9.0 Draft 1](#)

Equation 4: Average On-Mode Power,  $P_{OA\_Average}$

$$P_{OA\_Average} = N_{Default} \times P_{OA\_Default} + N_{Brightest} \times P_{OA\_Brightest} + N_{HDR} \times P_{HDR}$$

Equation 5: Average Limit of On-Mode Power,  $P_{OA\_Average\_Limit}$

$$P_{OA\_Average\_Limit} = N_{Default} \times P_{OA\_Default\_Limit} + N_{Brightest} \times P_{OA\_Brightest\_Limit} + N_{HDR} \times P_{HDR\_Limit}$$

Where:

$N_{Default}$ ,  $N_{Brightest}$ ,  $N_{HDR}$  are the estimated percentage of operating hours that a typical TV PPS stays at default mode, brightest mode, and HDR mode respectively. Note, the sum of  $N_{Default}$ ,  $N_{Brightest}$ ,  $N_{HDR}$  is 100 percent.

We encourage EPA to investigate the frequency of use of different PPS settings in the market in order to determine representative values of  $N_{Default}$ ,  $N_{Brightest}$  and  $N_{HDR}$ . We are currently conducting a market survey to understand users' TV viewing behavior and user settings. We will share data as soon as it is available to inform  $N_{Default}$ ,  $N_{Brightest}$ , and  $N_{HDR}$ .

**3. The CA IOUs recommend that for TVs where Automatic Brightness Control (ABC) is enabled by default, EPA should include on-mode power with ABC disabled as part of the calculation for power and luminance.**

For TVs where ABC is enabled by default, the calculation of on-mode power and luminance does not include on-mode power with ABC disabled. Our test results (Figure 2) found that TV power consumption when ABC is disabled is approximately 37 percent to 56 percent higher than when ABC is enabled. To encourage manufacturers to continue to advance the energy-savings benefits of the ABC feature and to create an incentive to enable the ABC setting by default in all PPSs, we propose the following modification to Equations 1 and 2 in the Draft 2 TV Specification:

Equation 1: Calculation of Dynamic Luminance for Preset Picture Settings Where ABC is Enabled by Default

$$DL = A_{ON} \times \frac{DL_3 + DL_{12} + DL_{35} + DL_{100}}{4} + (1 - A_{ON}) \times DL_{OFF}$$

Equation 2: Calculation of  $P_{OA}$  for Preset Picture Settings Where ABC is Enabled by Default

$$P_{OA} = A_{ON} \times \frac{P_{OA\_3} + P_{OA\_12} + P_{OA\_35} + P_{OA\_100}}{4} + (1 - A_{ON}) \times P_{OA\_OFF}$$

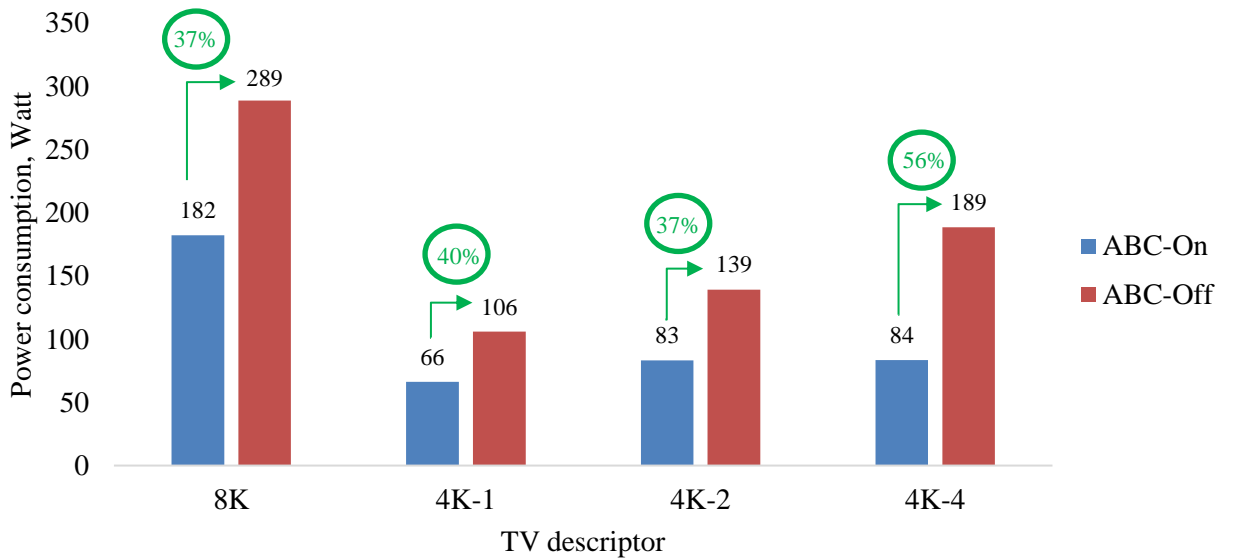
Where:

$DL_{OFF}$  is the dynamic luminance measurement taken with ABC disabled

$P_{OA\_OFF}$  is the on-mode power measurement taken with ABC disabled

$A_{ON}$  is the percentage of the available PPSs with ABC enabled by default. That is, if ABC is enabled by default in every PPS of the test unit, then  $A_{ON}$  is 1 and both equations will be the same

as specified in Equations 1 and 2 of the Draft 2 TV Specification. We note that  $A_{ON}$  would be 1 for a majority of the TVs we tested.

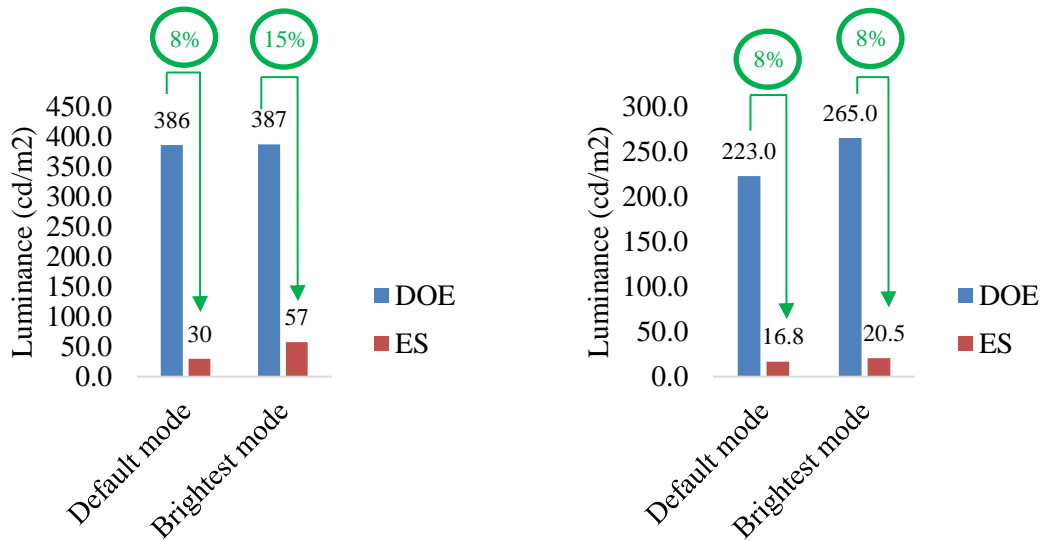


**Figure 2: On-mode power consumption with ABC On vs ABC Off**

Source: CA IOUs Test Results Analysis

4. **The CA IOUs recommend EPA consider the implications of the significantly reduced dynamic luminance measured by using the camera photometer method specified in CTA-2037C: Determination of Television Set Power Consumption and Average Luminance, compared with the spot measurements used by the current federal test method.**

In our tests (Figure 3), we found that the luminance measured by using the camera photometer test method specified in CTA-2037C is only eight percent to 15 percent of the luminance measured by using the federal test procedure. While we agree that measuring the luminance over the entire screen is more representative compared with a single spot luminance measurement, we are concerned that measuring luminance of test clips with a significant number of frames in dark scenes may greatly underestimate the power usage of larger TVs (with screen sizes above 65 inches) and TVs with higher resolution (such as 8K TVs which have four times the pixels of 4K TVs). Therefore, we encourage EPA to explore potential approaches to measure and incorporate the luminance of a fully lit screen in the Final TV Specification.



**Figure 3: Comparison of luminance test results between DOE and CTA 2037C test methods**

Source: CA IOUs Test Results Analysis

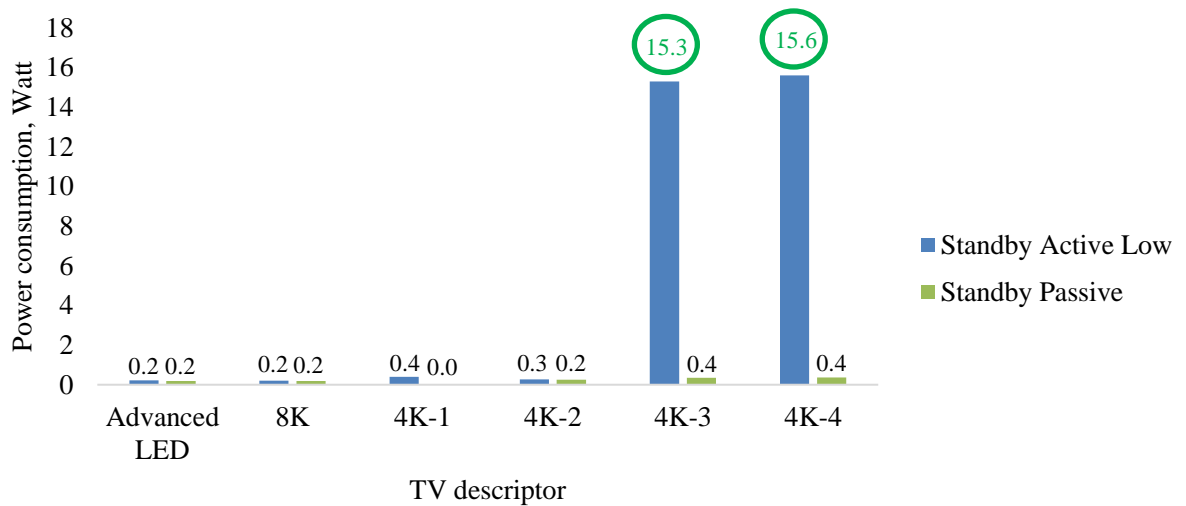
Note: “TV A” is located on the left, “TV B” is located on the right.

**5. The CA IOUs applaud EPA’s proposal to lower the Standby-Active, Low Mode Power requirement from 2.0 Watts to 1.0 Watt. We recommend considering further lowering the requirement to 0.5 Watt.**

Our test results (Figure 4) indicated that four of six test units used less than 0.5 Watts when the TV was placed in standby mode while connected to a networked device and available to support network wake-up mechanisms. In addition, EPA’s published dataset<sup>1</sup> shows that 17 out of 37, or 46 percent, of TVs tested drew no more than 0.5 Watt in Standby-Active, Low Mode. Therefore, we are confident that 0.5 Watt is justifiable for EPA’s 20 percent overall pass rate target.

On May 11, 2021, public webinar, EPA also noted that 12 out of 37, 32 percent of TVs tested drew than 10 Watts in Standby-Active, Low Mode.<sup>4</sup> Similarly, in our testing, two out of six TVs consumed more than 15 watts in the Standby-Active, Low Mode. We agree with EPA’s analysis that the TVs’ operating system likely causes the excessive power draw. We encourage EPA to keep a stringent Standby-Active, Low Mode Power requirement, and collaborate with relevant manufacturers to update their operating systems to meet the requirement.

<sup>4</sup> [ENERGY STAR Televisions Version 9.0 Draft 2 Specification Webinar](#)



**Figure 4: Standby mode power consumption Results**

Source: CA IOUs Test Results Analysis

**6. The CA IOUs request clarification on the criteria to determine whether a test unit is eligible to use the high contrast ratio adjustment factor ( $AF_{HCR}$ ).**

We recommend EPA clearly specify the technical characteristics to be used for determining eligibility to use the  $AF_{HCR}$ . The Draft 2 TV Specification states that eligibility for applying the factor will be determined by reviewing manufacturer-supplied technical material. However, it does not specify which specific technical characteristics (e.g., contrast ratio) will be used for determination. The lack of a clear definition of how to apply this adjustment factor could potentially lead to reduced reproducibility of measurements across labs.

**7. The CA IOUs recommend EPA consider options to include TVs in the most popular sizes in the ENERGY STAR® program.**

In our review of EPA’s published TV dataset<sup>1</sup>, we noticed that none of the seven TVs with screen size between 52.5-inch and 59.5-inch meet both the on-mode and Standby-Active, Low mode power requirements, which suggests a zero percent pass rate for TVs in this segment.

In 2019, market research firm TrendForce<sup>5</sup> found that 65-inch TVs had replaced 55-inch TVs as the most popular size of TV screen in US households, suggesting that 55-inch TVs are likely still one of the top TV choices for American living rooms. Therefore, we are concerned that the Draft 2 TV Specification may exclude from the ENERGY STAR® program a significant share of televisions in this popular size. We encourage EPA to consider options to include TVs in various sizes in the ENERGY STAR® program, especially for the most popular segments such as 50-inch, 55-inch and 65-inch.

<sup>5</sup> [TV Panel Prices Plunge in June, with No Signs of Stopping in July, Says TrendForce](#)

In conclusion, we would like to reiterate our support of EPA's proposals outlines in the Draft 2 TV Specification. We thank EPA for the opportunity to be involved in this process and encourage EPA to consider the recommendations outlined in this letter.

Sincerely,



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