February 27, 2017

Mr. Ryan Fogle
ENERGY STAR Program – Product Labeling
U.S. Environmental Protection Agency
Ariel Rios Building 6202J
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Subject: Launch of Version 7.0 ENERGY STAR Computer Specification

Dear Mr. Fogle:

This letter comprises the comments of the Pacific Gas and Electric Company (PG&E), Southern California Gas Company (SCGC), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE) in response to the U.S. Environmental Protection Agency's (EPA) Version 7.0 ENERGY STAR® Computer 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 United States, serving over 35 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 the 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 comments about the next round of specification development for computers. We are supportive of EPA's examination of alternative standards frameworks e.g., a simplified expandability score, and also encourage prioritizing power supply requirements, test procedure adjustments, and other modifications to advance real-world energy savings. We encourage EPA to leverage the research and data that the CA IOUs have docketed as part of the California Energy Commission (CEC) regulatory standards since 2011, some of which are highlighted here in these comments.

1) **We recommend that EPA ensure the version 7.0 specification meets the highest levels of stringency possible through use of both up-to-date data and projections to the effective date.**

   As stated in the ENERGY STAR's *Products Program Strategic Vision and Guiding Principles*, "Experience has shown that it is typically possible to achieve the necessary balance among principles by selecting efficiency levels reflective of the top 25% of models available on the market when the specification goes into effect."[1]

To determine the 25th percentile of models, we encourage EPA to obtain the most current data possible for products and conduct analysis that uses historical data to anticipate future energy

[1] https://www.energystar.gov/ia/partners/prod_development/downloads/guiding_principles_2012.pdf

use, and set levels accordingly to these projections. The result will align with EPA's goals and ensure optimized nationwide energy savings for these products.

2) We recommend that EPA addresses energy use currently unaddressed by ENERGY STAR 6.1 through a low-load efficiency requirement for internal power supplies.

ENERGY STAR's 80-Plus requirements for internal power supply units (PSUs) are important for addressing high-load, active mode energy use at 100, 50, and 20 percent load points. Today's desktop computers typically idle between 5% and 10% load, however, meaning this load range remains unaddressed by the voluntary standard, neither by the PSU requirement or by the test procedure and typical energy consumption (TEC) levels.

As demonstrated by Electric Power Research Institute's (EPRI) data submission in support of the California rulemaking, over half of power can be lost in the PSU at low loads. The data below shows that there are a range of efficiencies within the same badge level at 6 watts (W), and there is not a definitive trade-off between achieving higher efficiency in low loads and higher efficiency in high loads. Moreover, power supply testing and prototype development supported by the IOUs further demonstrates the capabilities of efficiency gains even higher, up to 64% at 6W, and at an incremental cost of less than $1.[2]

Table 5, Measured efficiency of power supplies at various loading.

Sample #	Rated Power	80 PLUS Badge Level	Loading							
			6W Load	1%	3%	5%	10%*	20%*	50%*	100%*
1	200	Bronze	57.99%**	37.54%	58.16%**	67.50%	77.04%	83.27%	86.62%	83.81%
2	300	Standard	53.42%	41.93%	59.05%	65.59%	74.37%	81.63%	85.32%	83.54%
3	350	Bronze	52.78%	43.71%	61.76%	66.98%	77.10%	83.45%	86.57%	85.34%
4	350	Platinum	56.90%	45.17%	69.68%	77.81%	86.10%	91.00%	92.51%	90.18%
5	400	Bronze	59.89%	53.49%	68.28%	74.16%	81.44%	86.05%	87.62%	84.67%
6	400	Bronze	47.68%	37.89%	60.53%	69.93%	79.22%	84.46%	86.82%	85.06%
7	450	Gold	41.97%	35.68%	61.17%	71.47%	83.59%	88.57%	90.80%	88.10%
8	450	Standard	32.51%	27.85%	50.45%	61.72%	73.65%	81.40%	84.85%	82.53%
9	500	Titanium	34.98%	38.94%	83.08%	87.72%	91.98%	94.05%	94.21%	91.88%
10	500	Bronze	44.78%	40.30%	64.96%	73.82%	82.68%	87.17%	88.17%	83.65%
11	500	Bronze	43.19%	40.28%	61.77%	69.74%	79.27%	84.42%	86.32%	83.23%
12	500	Gold	43.76%	43.57%	50.47%	70.95%	83.38%	89.26%	90.77%	88.36%

*Data taken from previous set up, may not be the same device (one of two samples provided).

**Same loading level.

Source: EPRI 2016[3]

We recommend that EPA further examine this opportunity to save energy through improved PSU efficiency at a 'real-world idle' low-load point. EPA should define such a load point either with an absolute wattage or load percentage and establish an efficiency target and other specifications (e.g. power factor), as suggested by EPRI/Ecova during the California rulemaking.[4] At a minimum, EPA should

[2] http://docketpublic.energy.ca.gov/PublicDocuments/14-AAER-02/TN211230_20160425T101319_Aggios_Comments_AGGIOS_Title_20_Workshop_2016_04_26.pdf

[3] http://docketpublic.energy.ca.gov/PublicDocuments/14-AAER-02/TN210102_20160130T110353_Douglas_McIlvoy_Comments_Results_from_laboratory_testing_for_th.pdf

[4] http://docketpublic.energy.ca.gov/PublicDocuments/14-AAER-02/TN211613_20160523T161309_Douglas_McIlvoy_Comments_80_PLUS_Program_Comments.pdf

require the efficiency at a real-word idle load point to be tested and reported to further advance desktop efficiency.

3) We recommend EPA modify the ENERGY STAR desktop test procedure regarding hard drive power management and display brightness for integrated desktops and notebooks.

Hard drive: We recommend that EPA coordinates with the U.S. Department of Energy to modify the test procedure language to align with the adopted California regulations, specifically: "settings regarding hard-disk spinning shall not be altered from the default as-shipped settings." The current language requires the hard-disk to be spinning, and in turn does not encourage the implementation of more responsive, shorter timescale hard drive power management.

Display Brightness: The current ENERGY STAR 6.1 requirements for displays are as follows:

> Calibrate the unit under test (UUT) display brightness to the closest brightness setting that is at least 90 cd/m^2 for Notebook Computers, at least 150 cd/m^2 for Integrated Desktop Computers, Portable All-In-One Computers and Slates/Tablets.

This method is not representative of real-world energy use, and it does not incentivize manufacturers to optimize display brightness settings on their computers. For example, during the California rulemaking, Natural Resource Defense Council (NRDC) measured integrated displays shipped at maximum brightness, even though ENERGY STAR's testing would have measured those displays at much dimmer, calibrated settings.

The CA IOUs, therefore, propose the following:

> If the display is shipped at a fixed brightness that is at least 90 cd/m^2 for notebook computers, and 150 cd/m^2 for integrated desktop computers, test with display brightness as shipped.
>
> If the display is shipped at a fixed brightness that is less than 90 cd/m^2 for notebook computers and 150 cd/m^2 for integrated desktop computers, set the display to 90 cd/m^2 for notebook computers and 150 cd/m^2 for integrated desktop computers. If the UUT's brightest setting cannot achieve the specified brightness, then set the UUT display to the brightest setting (per ENERGY STAR 6.1).

We also recommend maintaining the test procedure requirement that screens be tested with Automatic Brightness Control (ABC) disabled until a complete dataset is available that documents its real-world benefits. We encourage EPA to pursue this data collection.

4) We recommend that EPA further explores coverage of "real-world idle" and/or "active mode" by adding it to the test procedure.

The CA IOUs conducted research and testing that demonstrates that ENERGY STAR's current test procedure for long and short idle does not reflect real-world usage. This problem will only become more pronounced as computing products become more power-scalable. This finding supports the need for a real-world idle / active test procedure, which would enable EPA to set TEC levels based on real-world energy usage and therefore promote greater efficiency.[5] We encourage EPA to further explore this opportunity in this specification revision. Doing so would further address the coverage gap for low-load points and further reduce real-world energy consumption.

[5] http://docketpublic.energy.ca.gov/PublicDocuments/14-AAER-02/TN211731_20160606T163325_California_Investor_Owned_Utilities_Comments_California_Investo.pdf

5) We recommend that EPA maintains the existing ENERGY STAR workstation definition.

While there may be some benefit to having definitions align between ENERGY STAR and the new California regulation, the CA IOUs recommend that EPA maintain the existing Version 6.1 workstation definition. The CA IOUs, Information Technology Industry Council (ITI) and Natural NRDC submitted a shared proposal for modifying the workstation definition to the California rulemaking docket in October 5, 2015, which suggested some minor modifications.[6] Subsequent changes were made to the CA regulation that increase the chances of certain high-end desktops being defined as workstations, especially by 2018. We submitted comments in October 24, 2016 stating our concern with these changes, and we maintain the same concerns for the ENERGY STAR 7.0 specification.[7]

6) We recommend that EPA consider alternate product categorization frameworks, such as a simplified expandability score.

Power supply nameplate rating + simplified expandability score (SES)

Through experimentation with a variety of expandability-related metrics, the CA IOUs have developed an alternative metric for creating desktop categories that results in better grouping of systems compared to the expandability score utilized in the California regulations. It is also simpler, by focusing on three general system attributes (PSU size, expansion slots, and expansion ports) rather than a table of technology-specific connectors and protocols.

Power supply ratings are a direct reflection of a system's expandability needs, but basing system categories on PSU size alone is problematic, because it could unintentionally encourage additional oversizing of power supplies as a mechanism to gain greater TEC allowances. Therefore, we use a second criteria — a "simplified expandability score" — to ensure that a system cannot jump categories by upsizing its power supply alone.

In examining which hardware elements to include in the simplified expandability score, we found that the number of PCI Express (PCIe) lanes associated with motherboard PCIe expansion slots combined with the number of high-speed external data ports approximates actual PSU sizing very well. Specifically, we propose the following definition of simplified expandability score:

Simplified expandability score (SES) = (nPCIe lanes) + 2 x (nHigh-speed data ports).

Here, nPCIe lanes is the total number of PCIe lanes associated with motherboard PCIe slots (as opposed to the total number of PCIe lanes that the motherboard can theoretically control). nHigh-speed data ports represents the total number of externally accessible ports that have a maximum data throughput of ≥ 10 gigabits per second and that can deliver at least 5W of power. Examples of such ports would include Thunderbolt 2 and 3 or USB 3.1 ports.

Table 1 provides the combined criteria for each category based on both PSU size ranges as well as simplified expandability score. Systems must meet both PSU and SES criteria to qualify for a category and its TEC allowance. The TEC allowances proposed are roughly equivalent to Draft 2 levels. Figure 3 illustrates how current systems in our dataset would be assigned to these categories based on a combination of their power supply size and their simplified expandability score.

[6] http://docketpublic.energy.ca.gov/PublicDocuments/14-AAER-02/TN206287_20151006T100251_California_Investor_Owned_Utilities_Comments_CEC_Title_20_Compu.pdf

[7] http://docketpublic.energy.ca.gov/PublicDocuments/16-AAER-02/TN214159_20161024T151731_California_Investor_Owned_Utilities_Comments_California_Investo.pdf

Table 1: Categories Based on PSU Nameplate Rating and Simplified Expandability Score

Category	**PSU Nameplate Rating (W)**	**Simplified Expandability Score (SES) = nPCIe lanes + 2*nHigh-speed external data ports**	**TEC Allowances (kWh/yr)**	**Estimated Share of Desktops and Integrated Desktops**
DT 1	W < 225	Any	0	35%
DT 2.1	W ≥ 225	SES ≥ 10	3	48%
DT 2.2	W ≥ 375	SES ≥ 16	10	15%
DT 2.3	W ≥ 575	SES ≥ 20	20	1%
DT 3	W ≥ 900	SES ≥ 36	N/A, exempt from TEC requirements	1%

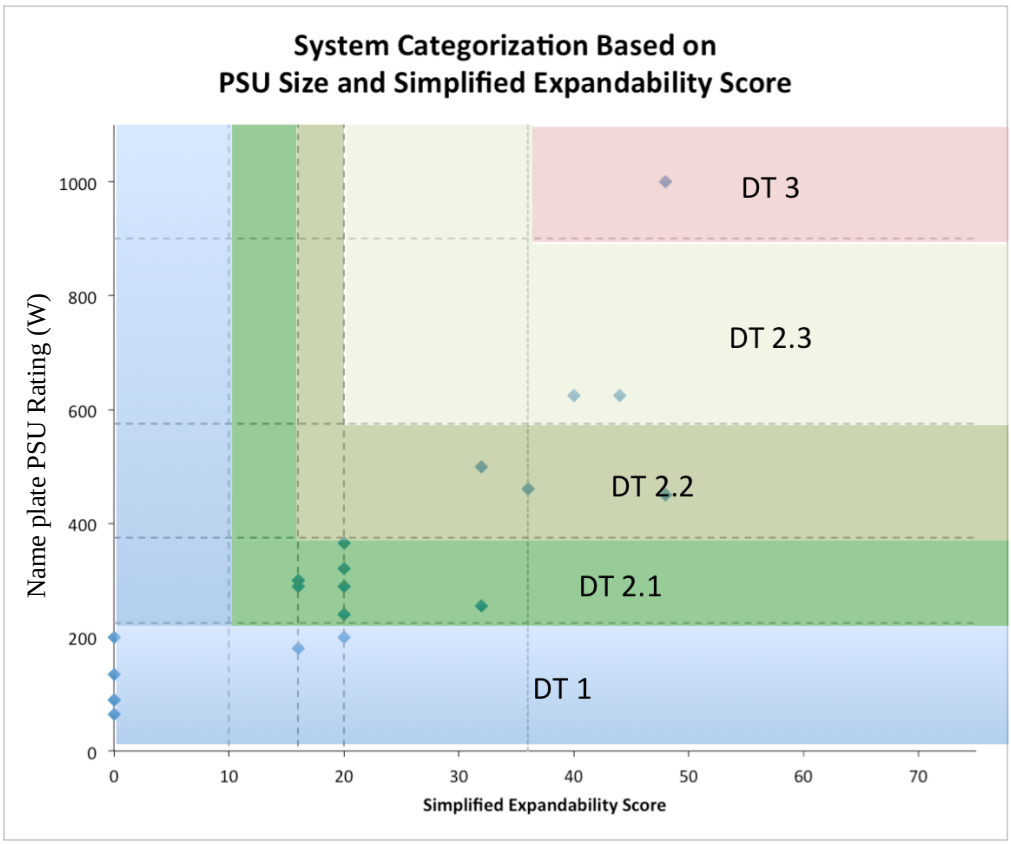

Figure 3: System categories based on PSU size and simplified expandability score

In conclusion, we would like to reiterate our support to EPA for revisiting the test procedure and voluntary standards for computers. We thank EPA for the opportunity to be involved in this process and encourage EPA to carefully consider the recommendations outlined in this letter.

Sincerely,

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