



October 26, 2017

Mr. Ryan Fogle
United States Environmental Protection Agency
ENERGY STAR Program
1200 Pennsylvania Ave NW
Washington, DC 20460

Subject: NRDC Comments on ENERGY STAR Computers Version 7.0 Draft 2 Specification

Dear Mr. Fogle,

On behalf of the Natural Resources Defense Council (NRDC) and our more than 1.3 million members and online activists, and the Appliance Standards Awareness Project (ASAP), we respectfully submit the following comments in regard to the ENERGY STAR Computer Program Discussion Guide Version 7.0, January 27, 2017.

NRDC has been an active participant in the development of ENERGY STAR specifications for computers for over a decade. Computers are the second largest electricity end-use among electronic devices after televisions, roughly on par with all data centers in the United States. Large and cost-effective energy saving opportunities remain for computers, particularly in desktops but also in notebooks as demonstrated in NRDC's 2016 study "[Slashing Energy Use in Computers and Monitors While Protecting Our Wallets, Health, and Planet](https://www.nrdc.org/resources/slashing-energy-use-computers-and-monitors-while-protecting-our-wallets-health-and-planet)".¹ As such, improving computer energy efficiency is an important way to save American consumers and businesses money on their utility bills, make America's economy more competitive, and support job growth, all while reducing greenhouse gas emissions.

NRDC and ASAP strongly support EPA's initiative to revise the ENERGY STAR specification for computers -- Computer technology evolves very rapidly. The ENERGY STAR for computers version 6 specification was finalized in 2013, based on a data from computers developed between 2010 and 2012. By 2017, according to EPA, 95 percent of notebooks and 40 percent of desktops had achieved ENERGY STAR efficiency levels. In addition, the California Energy Commission (CEC) recently adopted mandatory efficiency standards for computers that are more stringent than ENERGY STAR version 6.1, and will make that specification obsolete in the California market when the standards go into effect on January 1, 2019.

¹ Delforge P., July 2016, <https://www.nrdc.org/resources/slashing-energy-use-computers-and-monitors-while-protecting-our-wallets-health-and-planet>

We appreciate the opportunity to provide input into the ENERGY STAR process and offer the following comments:

Discrete Graphics definition: We recommend that EPA keep the revised definition for discrete graphics proposed in Draft 1 of version 7.0 of the ENERGY STAR for computers specification. Draft 2, which reverts to the version 6 definition, would provide an unwarranted allowance for the emerging technology of packaging GPUs with a local memory controller interface and local graphics-specific memory on the same chip. These “packaged GPUs” can easily implement power management techniques that are more challenging with discrete GPUs plugged into an extension card. Such power management techniques include graphics switching and panel self-refresh, already used in many notebook models. Because packaged GPUs can easily access such effective power management solutions they do not require a graphics adder, as would be allowed under the proposed discrete graphics definition in Draft 2. EPA’s proposed changes to the discrete graphics definition in Draft 2 would also weaken the workstation and mobile workstation definitions that refer to it.

As a voluntary, performance-based specification, it would be reasonable for ENERGY STAR to require the same levels of efficiency obtainable by products that implement graphics switching or panel self-refresh (though not necessarily these specific technologies). As an alternative to EPA’s proposal in Draft 2, we propose the following compromise solution:

- Create a separate “packaged GPUs” definition, such as: *“Packaged GPU” means a graphics processing unit (GPU) that is situated on the same substrate as the CPU with a local memory controller interface and local graphics-specific memory that is not accessible by the CPU*, and
- Give half of the value of the discrete graphics adder to packaged GPUs, in line with CEC’s 45-day language proposal of September 22, 2017.²

Should EPA decide not to create a new definition for packaged GPUs as recommended above, we recommend that EPA alternatively:

- Define the scope of the graphics adder so that it applies only to GPUs that meet the packaged GPU definition (as in CEC’s proposal), and
- Keep the version 7.0 Draft 1 definition for discrete graphics to set the precedent that packaged GPUs can get an appropriate adder, while avoiding impacts on the workstation definitions.

Memory adder: EPA’s proposed memory adders in Draft 2 remain much higher than necessary to accommodate current memory technology. The slope of the equation used to calculate the TEC_{MEMORY} variable is 2.6x steeper than in the CEC’s proposed standard and 10x steeper than was observed for currently available server memory in NRDC’s recent analysis on server memory.³ In addition, the Qualified Product List (QPL) is a snapshot of the past market, whereas EPA’s [Guiding Principles for Establishing New or Revised ENERGY STAR Specifications](#) stipulate that

² http://docketpublic.energy.ca.gov/PublicDocuments/17-AAER-15/TN221297-1_20170922T100454_Express_Terms_45Day_Language_Appliance_Efficiency_Rulemaking_f.pdf

³

<https://www.energystar.gov/sites/default/files/NRDC%20Supplemental%20Comments%20on%20Memory%20and%20PSUs.pdf>

ENERGY STAR should set efficiency levels “that are reflective of the top 25% of models available on the market *when the specification goes into effect*”.

The combination of these overly generous memory adders and natural market evolution between the dataset date and effective date, will result in a significantly higher pass-rate than EPA’s target of 25%.

To avoid setting levels that will fail to differentiate products ENERGY STAR qualified computers in the market, EPA should at a minimum tighten up the memory adders as suggested, and aim for a pass-rate based on the current QPL that is lower than 25%, to counter the compound biases in the level selection process. We believe that taking these steps would improve the odds of ENERGY STAR achieving a 25% pass-rate for computers when version 7.0 comes into effect.

On the October 12 webinar, EPA indicated that a lower adder may be too stringent for low-end configurations. This issue could be addressed by using a base offset, or a linear equation with an inflection point, for the memory adder.

Internal power supplies (IPS): We support EPA’s decision to move from 80 PLUS Bronze to Gold level equivalent requirements in version 7.0 for IPS rated more than 500 watts. However, we disagree with reverting back with 80 PLUS Bronze for IPS rated less than 500 watts. The 80 PLUS database shows a large number of sub-500-watt power supplies. Retail component prices are not a good indicator of wholesale prices for OEMs and shouldn’t be used as a basis for determining ENERGY STAR requirements. If ENERGY STAR set the standard to Gold, Gold IPS would become standard and their price would fall in line with current Bronze IPS prices, as happened with servers.

Low-load efficiency requirements: the evidence is clear that typical operating conditions for computers are not consistent with the 80-PLUS efficiency requirements at 20%, 50% and 100% load. These load levels are not representative of the most typical IPS operating load point when computers are idle or performing other common low-intensity tasks such as word processing, web browsing, reviewing social media, or video and audio streaming which comprise the vast majority of computer usage. Modern desktop computers typically operate between 3 percent and 10 percent IPS load for these tasks, far below the 20 percent 80-PLUS test point. For example, a typical mainstream desktop computer may have a 300-watt power supply, and idle between 10 and 20 watts.

ENERGY STAR’s IPS efficiency requirements should better align with real-world loads to realize energy savings from computer manufacturer investments in IPS efficiency. We encourage EPA to seek input from stakeholders to choose IPS load test points at either additional load percentages, or at fixed load points (e.g. 15 watts), based on test data that the 80PLUS team collected for the CEC computer rulemaking in 2016, and is currently further developing. EPA should then include revised power supply efficiency requirements in drafts of the specification for ENERGY STAR for computers version 8.

Display brightness: A 2015 study by Aggios and NRDC tested an all-in-one computer shipped with display set at maximum brightness which used 60% more energy than a comparable all-in-one computer shipped with auto-brightness control turned on. However, the test procedure calibrated both displays to 200 nits, which resulted in both computers qualifying for the ENERGY

STAR label with little difference in reported annual energy use. In a notebook or all-in-one computer the display is often the component responsible for the most power consumption. Calibrating the display for testing ignores the impact of manufacturer shipping practice on the energy use of a top energy using component, and misses an energy-saving opportunity.

We urge EPA to either:

- 1) Update the ENERGY STAR for computers test procedure to require testing with the display brightness set as shipped, with a minimum brightness level to avoid shipping at very low brightness simply to qualify for ENERGY STAR, or
- 2) Make it more explicit in the specification that manufacturers must ship ENERGY STAR labeled computers with display brightness set as tested.

Thank you for the opportunity to participate in this specification development process and for your consideration of our comments.

Sincerely,



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Director, High Tech Sector Energy Efficiency
Natural Resources Defense Council



Chris Granda
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