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September 29, 2016

Mr. Steven Hanson
US Environmental Protection Agency
Ariel Rios Building 6202J
1200 Pennsylvania Avenue
Washington, D.C. 20460
Dear Mr. Hanson:

The Consortium for Energy Efficiency (CEE) respectfully submits the following comments in response to Draft 1 Version 3.0 ENERGY STAR® Computer Servers Specification, released by the Environmental Protection Agency (EPA) on July 27, 2016.

CEE is the binational organization of energy efficiency program administrators and a staunch supporter of the ENERGY STAR Program. CEE members are responsible for ratepayer-funded efficiency programs in 46 US states, the District of Columbia, and seven Canadian provinces. In 2014, CEE members directed over $6.7 billion of the $8.7 billion in energy efficiency and demand response program expenditures in the two countries. These comments are offered in support of the local activities CEE members carry out to actively leverage the ENERGY STAR brand. CEE consensus comments are offered in the spirit of strengthening ENERGY STAR so it may continue to serve as the national marketing platform for energy efficiency.

CEE highly values the role ENERGY STAR plays in differentiating energy efficient products and services that the CEE membership supports locally throughout the US and Canada. We appreciate the opportunity to provide these comments.

Program Administrators Would Benefit from Additional Data and Market Intelligence to Evaluate Labeled Products for Inclusion in Programs

CEE supports the EPA in its objective to address energy savings opportunities in the enterprise computer server market by recognizing top performing products. However, additional data and market intelligence would better enable program administrators to evaluate the full scope of the energy savings opportunity to determine whether these labeled products would be valuable

additions for incorporation into their existing program portfolios and therefore be able to offer incentives for the products. In particular, program administrators would benefit from:

- Information on the expected energy savings or range of savings for servers meeting the proposed ENERGY STAR criteria versus their equivalent, non-ENERGY STAR qualifying counterparts, the basis and assumptions used to generate the savings range, and the significant variables, for example, configuration, application, etc., that impact the actual energy savings or range of savings that can be expected.
- Estimates of national data that indicates the relative market share of products meeting the proposed ENERGY STAR Specification versus the overall server market. These data could be national unit shipment data, for example or other relevant data used to develop this proposal. Program administrators typically require market share data to characterize the cumulative savings potential and demonstrate that the efficiency measure is not standard practice and therefore merits the use of ratepayer funds for incentives.
- Information to inform the expected amount of incremental product cost, if any, associated with a more energy efficient server versus its energy inefficient counterpart. Efficiency programs often base their financial incentive amounts on the incremental cost of an efficient product versus a standard efficiency product.

CEE requests that EPA share its approach and relevant assumptions for calculating server energy savings, market penetration, and cost information with stakeholders when it releases the Draft 2 proposal.

CEE Recommends EPA Develop More Stringent Idle Energy Requirements to Effectively Differentiate Top Performing Products Based on Idle Energy Use

On the August 12, 2016 stakeholder webinar, EPA staff indicated that approximately two-thirds of the servers in their dataset met the proposed Idle State efficiency requirements. According to the Draft 1 proposal, EPA intends to set levels such that the revised Idle State energy efficiency requirements, "when combined with the upcoming Active State energy efficiency requirements in Draft 2, will result in recognizing approximately the top quartile of most efficient computer server products on the market." Multiple studies have found that a significant portion, ten percent to thirty percent, of installed servers are inactive (also referred to as "comatose" or "zombie" servers), operating in Idle State continuously[1], indicating the importance of idle state efficiency metrics. Studies also show that average server utilization rates range from ten percent to fifteen percent in many data centers. Although virtualization host servers may spend reduced time in Idle State operation compared to dedicated application servers, they may still spend a significant amount of time in Idle State, particularly if housed in an internal corporate owned data center.

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[1] Shehabi, A., Smith, S.J., Horner, N., Azevedo, I., Brown, R., Koomey, J., Masanet, E., Sartor, D., Herrlin, M., Lintner, W. 2016. *United States Data Center Energy Usage Report*. Lawrence Berkeley National Laboratory, Berkeley, California. LBNL-1005775, p 31.

We believe given the appropriate allowances for memory and additional components used by virtualization host servers, EPA can lower idle energy requirements and qualify a sufficient number of servers suitable for use as virtualization hosts. While CEE supports the development of Active State efficiency requirements, CEE recommends EPA also develop more stringent Idle State efficiency requirements that effectively differentiate products based on Idle State and low-load energy. In the absence of taking this approach, there is the risk that up to thirty percent of labeled servers would be operating inefficiently in idle mode, which could add up to significant energy waste.

Furthermore, a more stringent idle state efficiency requirement may also serve as a more reliable basis for savings estimates than active state metrics. Server environments, applications, and workloads are diverse, and server demand within data centers is highly dynamic. Given these factors, it is likely that there will be high levels of uncertainty around active state energy use estimates and therefore, it is questionable whether program administrators will be able to have sufficient confidence to offer incentives and claim energy savings. Because Idle State efficiency may provide a more reliable basis for savings for program administrators, and it is a mode that many servers operate in, or close to, for significant periods of time, CEE recommends that EPA use Idle State efficiency requirements to effectively differentiate products in addition to their focus on developing active state requirements.

CEE Recommends EPA Consider Giving Greater Weight to Low Load Points in Power Supply Efficiency Requirements

CEE recommends EPA consider increasing the stringency of the ten percent load and twenty percent load efficiency requirements in the Version 3.0 power supply requirements to reflect the low average load of servers in real world operation. For single output power supply units (PSUs), EPA should consider increasing the efficiency requirements at ten percent and twenty percent load above the current levels of 83 percent and 90 percent efficiency, respectively.

For multioutput PSUs, we recommend EPA consider creating an efficiency requirement at the ten percent load point similar in stringency to the other load points in the 80 PLUS Platinum specification. Average server utilization rates in internal corporate owned data centers, which house the majority of servers, are estimated to range from ten percent to twenty percent. For example, a recent report by the US Department of Energy (DOE) on data center energy use estimates that a significant majority of servers are in internal data centers and assumes average server utilization to be between ten percent and fifteen percent. While the report estimates that the share of servers in hyperscale, for example, large colocation and cloud data centers, to increase rapidly from 2016 to 2020, it estimates internal data centers will continue to house over

half of all servers, and the volume of servers installed in internal data centers will remain roughly constant.[2]

CEE would once again like to thank the EPA for the opportunity to comment on Draft 1 Version 3.0 ENERGY STAR Computer Servers Specification. Please contact CEE Program Manager Bjorn Jensen at 617-337-9280 with any questions about these comments.

Sincerely,

Ed Wisniewski
Executive Director

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[2] Ibid. Table 1, "Average Active Volume Server Utilization Rates", p 10, and Figure 20 "Total Server Installed Base by Data Center Space Category", p. 23