Summary

In this document, Climate Savers Computing Initiatives has highlighted recommendations and justifications for revising the ENERGY STAR™ for Computer Server v2.0 draft 1 document, dated 4/9/10. Our input focuses primarily on power supply requirements and monitoring as well as blade servers. We hope these comments and recommendations will be useful to EPA's plans and targets for the ENERGY STAR for Servers Tier 2 specification. We welcome the opportunity to discuss these topics further as the ENERGY STAR™ team develops the details in the iterative process towards the final Tier 2 specification for servers.

Climate Savers Computing Initiatives Power Supply Requirements Recommendations

Climate Savers Computing supports ENERGY STAR's proposed power efficiency and power factors specifications listed in tables 2 and 3 respectively. The requirements are aligned with both Climate Savers Computing and 80Plus's specifications. This alignment reduces consumer confusion in the market place and drives consistent power supply roadmaps for manufacturers and system vendors.

Although we support the power supply efficiency and power factor specifications, we are opposed to the proposed AC power monitoring requirement for non-redundant pedestal servers. In Section 5 lines 757-762, ENERGY STAR proposes that qualifying computer servers must "provide data on input power consumption, (W), inlet air temperature (°C), and utilization of all logical CPUs." ENERGY STAR's reasoning for including the requirement for all qualifying servers, from desktop pedestal servers to datacenter rack-mounted servers, stems from server operator requests for data availability. Stakeholders request monitoring data to improve datacenter efficiency. In the ENERGY STAR notes, the specifications claims that the "EPA is aware of some pedestal servers with capability to operate in standard managed data center facilities". Climate Savers Computing would like to better understand the application of these pedestal servers, specifically an explanation of the features that permit them to operate in a standard managed data center. Are they single socket or dual socket systems, redundant or non-redundant powered systems?

Our experience shows that few if any power supplies installed in non-redundant pedestal servers have AC power monitoring capability nor will they need it in the near future. In 2009 pedestal systems accounted for roughly 60% of the single socket server systems and about 15% of the dual socket server systems. We estimate that < 20% of these pedestal systems were used in data centers and this number is expected to further drop as data centers adopt rack systems that are better optimized for the data center environment.

Climate Savers Computing recommends dropping the AC power monitoring and reporting requirements on pedestal system servers with non-redundant power supply capabilities. Climate Savers Computing's primary concern is that the ENERGY STAR specification will drive new features at increased cost that do not necessarily improve efficiency into markets that will not take advantage of them. There is an incremental increase in cost and power losses to support the AC power monitoring capabilities. Eliminating the power monitoring requirement for pedestal servers would optimize both the cost and the efficiency of these Energy Star systems where very few customers take advantage of these monitoring and reporting features. Instead Climate Savers Computing encourages ENERGY STAR to drive the usage of AC power monitoring in servers by requiring it on systems with redundant power capability and including rack non-redundant power capable systems in the AC monitoring requirement. If ENERGY STAR has reservations with this proposal, Climate Savers Computing proposes partnering together to resolve our expectations for servers used in data center environments versus those used for non-data center applications.

Climate Savers Computing opposes power monitoring requirements on all non-redundant pedestal servers not only due to cost and utilization reasons, but also due to the current ErP Lot 6 requirements. Some lower end, non-redundant pedestal servers can be classified as Class B systems, putting these systems in the scope of Energy Related Products Lot6 requirements. These EMI requirements cannot be met if the power supply is required to

have components that allow for AC power monitoring. To foster global regulatory alignment, Climate Savers Computing proposes eliminating the AC power monitoring requirement for non-redundant pedestal servers.

In lines 809-810, ENERGY STAR has requested stakeholder feedback on measurement resolution. Climate Savers Computing proposes that resolution does not need to be specified. The key requirement for systems is accuracy which includes the measurement resolution. In addition, ENERGY STAR should add a method for testing AC power monitoring accuracy. Climate Savers Computing recommends comparing system reported data to a power meter while the system is setup for 1 minute averaging and 15 minute averaging. The system should be run at idle and 100% utilization using a predefined workload able to run for a minimum of 15 minutes at a sustained power level.

In lines 811-817, ENERGY STAR lists input power, processor utilization and inlet air temperature sampling requirements for ENERGY STAR server products. Climate Savers Computing requests greater explanation of the sampling rate. Does the sampling rate refer to the point of measuring AC power or the polling rate of the system from the power supply? Climate Saver Computing also requests greater clarity regarding the rolling average. Is ENERGY STAR referring to the point of measurement inside the power supply or rolling average performed by the system? Clarification in these two areas is requested.

In light of the uncertainty regarding ENERGY STAR's sampling rate requirements, Climate Savers Computing recommends that AC power monitoring requirements follow data center poll system rates for accuracy and averaging periods. These rates typically range from once per minute to once per every 15 minutes. Systems should be required to average over this range while maintaining a required accuracy. Systems can poll the power supplies at various rates while maintaining the same accuracy over the averaging period. Systems should be allowed to use preferred averaging methods (simple average, rolling average, weighted average, IIR filter) while still collecting legitimate averaged power data. Stating requirements for averaging methods and sampling rates of the AC power data is unnecessary. Additional requirements for sampling rates and averaging methods beyond our proposed recommendations forces design requirements and limits system manufacturer flexibility.

In the testing set up condition in Table 6 (lines 957), ENERGY STAR specifies that the ambient temperature range during testing is 18°C-27°C. This range is very wide. Over this temperature range the fan speeds in the system may vary drastically causing inconsistent testing results. We recommend that the temperature range be held to 21°C-25°C. This proposed temperature range is a typical room temperature range, thereby eliminating excessive temperature management during testing. This temperature range matches the acoustic testing standard from ISO0779 and ECMA 74.

Climate Savers Computing recommends dropping the proposed moisture spec requirement during testing. It has a negligible impact on power and is difficult to control especially in humid geographies. This specification would thus significantly limit testing locations. However, we recommend that testing locations be limited to <900m in elevation so as not to disadvantage systems tested at higher elevations. Altitude can impact the thermal performance; about 1C per 300m, which is the ASHRAE de-rating value.

In Line 945 to 948, ENERGY STAR specifies the required measurement accuracy. As stated, the meter requirements equate to a power meters having accuracy of 0.1%. Line 947 requires 0.1W accuracy at 100W. Line 948 requires 1W accuracy if measuring 1000W. The most accurate power meters can only achieve ±0.2% accuracy when considering current, voltage, and power factor contribution. The lower cost precision meters employed by most manufacturers today for ENERGY STAR- and SpecPower-compliance testing generally have an accuracy of ±0.5% when considering current, voltage, and power factor contributions. Climate Savers Computing therefore recommends stating a meter accuracy of ±0.5% or 1W whichever is larger, at the tested voltage, current, and power factor condition. Climate Savers Computing requests that both ENERGY STAR and SpecPower allow additional power analyzers to be used for SERT testing. Some acceptable examples include Yokogawa WT1600 and WT3000.

Climate Savers Computing Initiatives Blade and Multi-Node Server Recommendations

ENERGY STAR is seeking comment on how to populate the blade chassis for testing (lines 548-552) Climate Savers Computing supports testing a single blade for compliance in addition to a partially-populated chassis in order to provide a representative configuration. However the Initiative feels that ENERGY STAR should create a separate category for blade systems, rather than comparing performance directly to rack-mounted servers. ENERGY STAR does not compare a four socket server to a single socket server as they have different utilization and performance expectations. In addition, we oppose ENERGY STAR's proposal to require blade chassis thermal measurement (lines 573-576). Thermal management would have to be on a per blade measurement to be meaningful. A single chassis measurement would be meaningless. Thermal data will vary throughout the chassis as a function of the number of blades, blade location and the types of blades. Given the confusion, Climate Savers Computing requests clarification on what is meant by real time chassis temperature monitoring.

In lines 197-213 and 247-251, ENERGY STAR distinguishes a multi-node and a blade server by the hot-swappable capability of the server. Recently, multi-node servers with hot-swappable motherboard/node capability have entered the market. Therefore blade and multi node systems cannot be differentiated by the presence of hot swappable nodes. Instead the difference between these two segments is the capability of a switch in a blade system. Blades have the capability for a chassis level switch that is shared between the blades, whereas multi node systems do not have the capability for switches inside the chassis. Climate Savers Computing recommends distinguishing between blade and multi-node servers by the capability of the switch in the chassis rather than hot swap-ability of the server**.**

In lines 758-762 of the server specification, ENERGY STAR requires input power consumption, inlet air temperature, and utilization reporting for all CPUs. ENERGY STAR allows blade servers and systems to provide data aggregated at the chassis level. Climate Savers Computing recommends that multi node systems be treated similarly to blade systems for power reporting. Both systems share power supplies. Multi node system should therefore be allowed to report total chassis power similar to blade servers.

Climate Savers Computing Initiatives Power Supply Definitions Recommendations

Climate Savers Computing encourages ENERGY STAR to seek alignment on power supply definitions for multi and single o/p units. Both 80Plus and Climate Savers Computing are in the process of redefining power supply units to better incorporate storage power supply units, which tend to install multi o/p rails. These units are installed in redundant configurations and use high line AC input, compounding the testing requirements, PSU efficiency, and power factor requirements across all computing applications. To stream line the definitions without creating numerous new categories and subcategories, Climate Savers Computing proposes the following revisions to power supply definitions.

Non-redundant power supplies are those power supplies used in non-redundant applications, typically for desktop PCs or small business unit server systems. They operate at low line AC input, typically 100Vac-127Vac. These power supplies should meet the power supply efficiency and power factor requirements of the current multi o/p power supply requirements listed in the specification. In addition, the fans should be included when testing for unit efficiency and power factor.

Redundant power supplies are those power supplies used in redundant applications, typically in datacenters for rack mounted servers and storage units. They operate at high line AC input, typically 200-240Vac. These power supplies should meet the power supply efficiency and power factor requirements of the current single o/p power supply requirements listed in the specification. In addition, the fans should be excluded when testing for unit efficiency and power factor.

Changes to Current ENERGY STAR Program Verification Requirements

In light of the recent US Government Accountability Office (GAO) irregular audit findings, Climate Savers Computing recognizes the need for changes to ENERGY STAR's administrative programs and supports the decision to review product data prior to assigning a product as ENERGY STAR-compliant. By allowing product review, many of the product irregularities identified in the GAO audit will be prevented from achieving labeling status. Climate Savers Computing supports ENERGY STAR's proposed recommendations requiring results from an ISO17025 certified lab. This internationally recognized standard specifies general requirements for competence to complete lab tests, calibrations and sampling methodologies. It is applicable to all organizations performing tests and/or calibrations and may apply to internal or third-party laboratories.

In addition, Climate Savers Computing recommends that the program continue with providing testing results for the bookends of a family of products rather than for all product configurations as ENERGY STAR is now considering. This requirement is especially burdensome in light of the countless configurations for desk top, work station, notebook and server families.

Climate Savers Computing, however, disagrees with the proposed requirements that laboratory personnel's compensation and bonuses not be tied to financial performance of the parent company and that they cannot seek career advancement from the parent organization. Regulating compensation and career planning does not necessarily further the program's objectives. The standards already recognize that the data must not be compromised or influence by the financial impact to the parent company. The current ISO17025 laboratory accreditation has a successful track record and ensures scientific practices which preclude data adjustments based on personnel impact. Other regulating bodies such as FCC, have successful processes for maintaining compliance by incorporating 17025 accredited labs and their accreditation bodies to self regulate without overly restrictive conflict of interest measures.

Climate Savers Computing Initiative

The Climate Savers Computing Initiative is a non-profit group of eco-conscious consumers, businesses and conservation organizations working to decrease computing energy consumption. As participants in the Initiative, manufacturers commit to producing energy-efficient PCs, servers and software, and members commit to using computer power management and purchasing energy-efficient computers. The Initiative is also a resource for consumers and IT personnel to learn more about reducing the power footprint of their computers—without any resulting loss of productivity. Climate Savers Computing is global consortium, operating in 53 countries through nearly 600 members of large commercial buyers, consumers, industry stakeholders and conservation organizations dedicated to increasing the energy efficiency of IT computing equipment, increasing the adoption and deployment of power management, and shifting user behavior to smart computing practices through development, deployment and adoption of higher efficiency standards, criteria, technology and best practices.