

To: Energy Star Team and Server and Data Center Stakeholders

From: Ronald Croce – Chief Operating Officer Validus DC Systems, LLC.

**Validus DC Systems, LLC.
Response to EPA Energy Star
Program Requirements for Computer Servers**

As an interested party in defining the specifications and requirements for energy efficiency of data centers and the equipment used therein, Validus DC Systems has prepared the following response for your review and consideration.

Understanding the current “Partner Commitments” is in draft mode, Validus is submitting new content and edits to existing material in the hope that a more comprehensive Tier 1 requirement document can be released in its final form.

Validus recognizes this program coordinates a wide variety of activities from the DOE Industrial Technologies Program - Save Energy Now Initiative, the DOE Federal Energy Management Program (FEMP), and the EPA ENERGY STAR program, and appreciates the opportunity to provide comments to improve the accuracy of information utilized in drafting the program requirements.

Comments related to Section 1 A - the Blade Server and Blade Chassis Definitions:

Energy Star Definitions:

Blade Server: A computer consisting of, at minimum, a processor, memory and hard drive that relies on certain shared resources, contained in a blade chassis, such as power supply(s), cooling, networking, system management, and storage. Blade servers are incapable of operating independent of the blade chassis.

Blade Chassis: A collection of shared resources (such as power supply(s), cooling, networking, system management, and storage) contained in a form factor specific to certain blade servers. Blade chassis contain multiple slots which can be populated with a number of blade servers.

Validus Comment: Although a Blade Server must be housed within a Blade Chassis in order to function properly, the two components are independent. It is well understood that the Chassis and the Server could be manufactured by different companies, and for that matter, a Chassis can be relatively generic and accommodate Blade Servers from a variety of manufacturers as well as multiple models from the same manufacturer. The important point here is that a given Blade Server will operate with different efficiency characteristics, depending on the specifications of the Chassis in which it resides and the power supplies included in the Chassis.

Thus, a Blade Server should not qualify for an ENERGY STAR rating as a stand alone product and cannot be properly rated under the Energy Star rating system without full knowledge of the Blade Server specifications to be operated in a specific Blade Chassis. The inverse is also true, in that the Blade Chassis should not receive a separate Energy Star rating without a specific Blade Server populating the Blade Chassis. Many Blade Chassis' will accept Blade Servers from various manufacturers thus making a myriad of possible combinations, all of which will have different power efficiency characteristics and make application of the Energy Star requirements impractical.

Comments related to Section 1 B - the Computer Power Supply Definitions:

Energy Star Definitions:

Computer Server Power Supply: A component designed to convert AC voltage to lower voltage DC voltage(s) for the purpose of powering the server. A server power supply must be separable from the main system and must connect to the system via a removable or hard-wired male/female electrical connection, cable, cord or other wiring. DC-to-DC converters internal to the product used to convert a single DC voltage into other DC voltages for use by the server are not considered computer server power supplies under this specification.

Validus Comment: It is a well known fact that in the current PC, server and blade server product lines of computer OEM's, performance tested power supplies have been available for many years in a variety of models and sizes including AC to DC power supplies as well as DC to DC power supplies.

It is well understood that POL (point of load) converters are often referred to as power supplies, though considered a different type of power supply than what is generically referred to as a Silver Box PSU (power supply unit).

As these components are all integral in the delivery of power from a source to a load, and may be logistically separated with the PSU in the Chassis, and the POL in the Blade, they are all integral components in measuring the overall efficiency and performance of the server/blade power supply chain.

It would be limiting for any U.S. EPA specification to define "conversion" as AC to DC only, particularly when the "conversion" of AC-to DC or DC-to-DC is the point at which energy is lost to the inefficiency of the PSU or Converter design and/or its components.

In fact, well regarded industry experts have concluded that over the full spectrum of loads, DC to DC conversion is routinely more efficient especially at lower load levels than the notoriously inefficient AC-to-DC converters.

Our informed opinion and strong recommendation is to modify the proposed definition of a Computer Server Power Supply to clearly identify and include DC to DC power supplies as a viable option for energy efficient Computer Server Power Supplies.

Comments related to Section 2 - Qualifying Products:

Energy Star Definitions:

Qualifying Products: Computer servers must meet the definitions provided in Section 1, above, to be eligible for ENERGY STAR. **Note:** DC-powered servers are not eligible for ENERGY STAR under this specification.

Validus Comment: The exclusion being proposed for DC powered servers defeats the purpose of the DOE Energy Star rating system – which we understand to be a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy to influence computer purchasing behavior to select the most energy efficient computer products and practices.

The exclusion of DC power supplies in blade and other servers voids Energy Star application within the existing and growing product base currently servicing the telecommunications and data center markets – a significant share of the entire data center market. Additionally, this restriction would unfairly and unjustifiably penalize established server OEM product lines that are powered with DC power supplies.

As telecommunication and computing platforms continue to converge, it will become necessary for the EPA to broaden the Energy Star rating requirements to include DC power supplies. In order to eliminate potentially redundant requirements and the associated expense of developing a separate and unnecessary set of rating requirements, we strongly recommend that DC power supplies be recognized in the Tier 1 requirements.

EPA may consider additional product categories in subsequent versions of this specification based on stakeholder interest, available test procedures, clear definitions, performance data, model differentiation, and ease of implementation.

Note: EPA recognizes the potential energy savings from using DC-powered servers. However, including these server types under this Tier 1 specification poses a challenge based on several factors:

(1) DC-powered servers are a new and emerging technology with few models currently available in the marketplace;

Validus Comment: It is an established fact that hundreds of thousands of -48VDC powered servers and blade servers are deployed worldwide. This equipment has been designed, manufactured, and sold by major Server/Blade OEMs such as Sun, HP, Intel, IBM, and Rackable Systems for many years. DC powered servers remain an important element of IT strategy as network, IT and Telecommunication architecture converge.

It is our understanding that demand for DC power servers continues to increase at a rapid pace.

(2) some industry concern has been expressed regarding the lack of an industry standard for connecting DC power to servers; and

Validus Comment: This is a factually inaccurate statement. The National Electrical Code prescribes guidance for connecting any power source, AC or DC, to a server or other equipment component. Further, DC power supplies for servers have existed for many years and have all of the required UL and other required regulatory approvals for the power supplies, connectors and plug strips commonly used to connect the power source to the server/blade at the server or chassis level.

To directly address the claim regarding DC powered servers, and as stated above, there are many models and manufacturers of DC powered servers available and installed in the market at present. If there is concern, it may be present with those unfamiliar with current technology.

(3) there is no clear approach for comparing DC power supply efficiency, especially given that there is no existing industry standard test method available for measuring the efficiency of DC power supplies.

Validus Comment: The procedure used to evaluate the efficiency of the AC power supplies should be the same criteria and procedure used to evaluate the efficiency of the DC power supplies. To reduce it to its simplest terms, if efficiency is measured based upon the amount of power that enters the power supply compared with the amount of power exiting the power supply, measured over various load levels, then the comparison of AC and DC power supplies should be identical.

It is our belief that the intent of the Energy Star rating program for Computer Servers is to condition purchasing behavior towards more energy efficient compute solutions and, therefore, it should extend equally and fairly to all computing equipment and platforms whether powered by AC or DC power supplies.

If the stakeholders in the Energy Star rating program for Computer Servers are truly attempting to develop a comprehensive approach to energy management of computer equipment that can result in significant reductions of consumed power, then the EPA's ENERGY STAR program for servers must be comprehensive enough to change purchasing behavior without prejudice to the power supply type.

Thank you for the opportunity to express our interests and contribute to a more comprehensive Energy Star requirements document.