March 20, 2009

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CC:  Andrew Fanara
     United States Environmental Protection Agency

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Re:  Hewlett-Packard Response to Preliminary Draft 4 of *ENERGY STAR® Program Requirements for Computer Servers*

From: Hewlett-Packard Company, Enterprise Storage and Servers Business Unit

This document may be published on the Energy Star website.

Hewlett-Packard (HP) welcomes this opportunity to once again provide comments on *ENERGY STAR® Program Requirements for Computer Servers* (hereafter in this feedback document called "Energy Star for Computer Servers") — Draft 4.  HP is proud to continue its long-standing association with the *ENERGY STAR®* program.  The comments and issues in the Draft 4 document fall into two major categories and are covered in the two sections of this review:

1.  Draft 4, Energy Star Partner Commitments
2.  Draft 4, Energy Star Product Eligibility Requirements

Several key issues are detailed on the pages below, but here is a brief summary of four critically important points of feedback:

1.  2 socket servers with only 1 processor installed (1P/2S) must change to base idle power on the 2P/2S server categories, subtracting the idle power of the un-installed processor, instead of comparing them directly and unfairly with 1P/1S servers.

2.  The feedback below provides two solutions to enable blade inclusion in version 1.0.

3.  Servers should be certified "as-tested" and not "as-shipped" with defined restrictions such that Energy Star servers as-shipped may be a limited superset of the as-tested SKU.  E.g. I/O card variability is too complex to use in a "base plus adders" approach.  If an SKU is Energy Star compliant, then adding option cards should not take away its Energy Star certification.  Similar feedback applies to certified Energy Star Blade Systems when shipping with optional non-certifiable blades (e.g. storage and networking blades).

4.  Systems with small and/or "right-sized" power supply solutions should not have to meet measurement accuracy, efficiency and power factor @ 10% power supply load.

5.  If Tier 2 is going to drive significantly different power supply requirements, then those requirements need to be communicated 18 months ahead of the effective date

of Tier 2, such that systems manufacturers can develop power supplies that meet the needs of their Tier 2 products.

# 1. Draft 4, Energy Star Partner Commitments

1.1.    HP supports the change to labeling requirements, where physical Energy Star labels are not required on servers or on blade system enclosures..

1.2.    **Lines 115-124**: While we agree with the spirit of the rule requiring VARs to not make substantial changes to the basic Energy Star server platform, HP disagrees with the Draft 4 approach.  E.g., given the inadequate power adders and lack of detail for I/O cards, a VAR combining a solution with an otherwise Energy Star server and additional I/O cards could easily configure hardware that exceeds the idle power limit but in reality provides the most energy-efficient solution.

Under-provisioning servers will lead to higher total data center power consumption if Energy Star restrictions force more servers (than otherwise would be necessary) to be deployed to meet the I/O needs (or computational needs) of the solution.

# 2. Draft 4, Energy Star Product Eligibility Requirements

The following is a compiled list of HP comments, referenced to the sections numbers or line numbers listed in the document.  Comments are broken into two general lists.  The *Substantive Feedback* section lists substantial changes to the approach documented in Draft 4, while the *Editorial Feedback* section details issues that are important to clarify the intent of the document or to eliminate errors.

## 2.1. Substantive Feedback

### 2.1.1. Definition Issues

**2.1.1.1.** After Section 1.C. There needs to be additional definitions of other types of blades that could be shipped in a blade enclosure.  In some cases, these new definitions define additional categories for exclusions, and in other cases the definitions help to define categories that either need power adders or idle power exclusions for required functionality.

- o "Blade Storage" devices need to be defined.  A certified Energy Star blade system should still be able to ship as energy Star if a storage blade is installed.
- o "Blade Network Switch (or Router)" needs to be defined.  One or more blade switches or routers are required on most blade systems.  Their power consumption impact on the data center is less than it would be if it was excluded from the blade system and put into an equivalent rack-mount switch (or router).  So Energy Star should encourage the use of blade network switches and routers.  If shipped with one or more blade

network switches or routers, a blade system certified as Energy Star without this switch or router should not lose its Energy Star certification, regardless of the power consumed by the switch or router. Examples of switches and routers could be for Ethernet, Fibre Channel, InfiniBand, I/O virtualization, or several other types of network switching or routing functions.

o "Management Blade" should be defined. One "Management Blade" is most often required for the operation of a blade system, but a second Management Blade is required for redundancy in reliable data centers. Additional Management Blades either need an idle power adder or their additional idle power needs to be ignored.

**2.1.1.2.** The term Processor is used in many different contexts and it is not defined. There are many different types of processors in almost every device in the server, including power supplies. Without getting overly detailed (and risking an inaccurate generalized description) there should be a specific term for the processors used to run the application workload of the server, in contrast to the processors that handle I/O, management or system controls.

**2.1.1.3. Line 313**: There is a wide variety of capabilities in management controllers and service processors. Even most "Standard Servers" will have some kind of management controller.

## 2.1.2. Technical Issues

**2.1.2.1. Line 632:** The specification must add two Computer server system types, e.g.:
**Category A1: Standard Single Installed Processor (dual sockets) 75 Watts**
**Category B1: Managed Single Installed Processor (dual sockets) 85 Watts**

Dual socket servers that ship with one processor (1P/2S) must not be required to be certified to the exact same wattages as 1P/1S servers. 1P/1S servers are de-featured in several minor ways that make it impossible for a 1P/2S server to be Energy Star certified. The EPA should not be able to tell customers that they cannot have the server features that they require. If 1P/2S had the same exact features as 1P/1S, then the idle power would be the same, but the data proves they are not the same.

Customers are compelled to buy the servers that meet their needs and those will be non-Energy Star certified. This no net impact on HP, since no one else can sell competitive Energy Star 1P/2S servers either. But ignoring this change request will have a major negative impact on the impact of the Energy Star program by having a large negative impact on the sales volume of Energy Star computer

servers.  Providing the ability for manufacturers to produce 1P/2S Energy Star servers, rewards selling low-power processor and memory SKUs.

**2.1.2.2.**  Rack-mount servers and pedestal servers have different requirements and capabilities.  Given that there may be only one or two in an entire department, a managed pedestal server should not require power measurement.

**2.1.2.3.**

394 P. Single-Output Power Supply: A power supply which delivers most of its rated power through one
395 primary DC output for the purpose of powering the Computer Server. Single-Output power
396 supplies may include one or more standby outputs which remain active whenever connected to an
397 input power source. There may be additional outputs besides the primary output and standby
398 output(s), however, the combined power from all additional outputs must be no greater than 20
399 watts.

*[This is OK for a single server instance, but this limit should be scaled with the number of installed blade servers or multi-node servers.  Best if described as no greater than a percentage of the power supply rated capacity (e.g. 10%), even for typical rack server types.]*

**2.1.2.4.**

575

Table 2: Power Factor Requirements for Computer Server Power Supplies

| Power Supply Type | Rated Output Power | 10% Load | 20% Load | 50% Load | 100% Load |
|---|---|---|---|---|---|
| DC-DC (All) | All Output Levels | N/A | N/A | N/A | N/A |
| AC-DC Multi-Output | All Output Levels | N/A | 0.80 | 0.90 | 0.90 |
| AC-DC Single-Output | ≤ 500 Watts | 0.65 | 0.80 | 0.90 | 0.90 |
| | 501 - 1,000 Watts | 0.65 | 0.80 | 0.90 | 0.90 |
| | > 1,000 Watts | 0.80 | 0.90 | 0.90 | 0.90 |

o   The power factor requirement needs to be removed for all power supplies ≤750W.
o   At a minimum, for power supplies currently available in the industry and in the foreseeable future, the power factor for a 10% load on single-output power supplies less than 500 watts needs to be lowered to **0.6**.
o   Also, the added circuitry to boost power factor at low output loads (e.g. <75W) causes excess power drain and lower efficiency at higher loads.

**2.1.2.5.**

633

| Table 4: Additional Power Allowances for Extra Components | |
| --- | --- |
| **System Characteristic** | **Additional Idle Power Allowance** |
| Additional Power Supplies (Greater than one for the purposes of power redundancy) | 20 Watts/PSU |
| Additional Hard Drives (Greater than one) | 8 Watts per Drive |
| Additional Memory over (4 Gigabytes) | 2 Watts / GB |
| I/O Devices (Greater than 1Gbit)* | |
| Base: One or two port onboard Ethernet <=1 Gbit | No Allowance |
| Additional Ethernet less than 1Gbit | No Allowance |
| Additional 1 Gbit Ethernet | 2 W per Active Port |
| Additional 10 Gbit Ethernet | 8 W per Active Port |
| Fibre Channel or Infiniband | 5W per Device |

634

730 EPA is not considering any additional allowances at this time. The proposed allowances in Table 4,
731 above, represent the most common functionalities that affect the power use and performance of Computer
732 Servers. EPA is confident that Computer Servers with other capabilities for which additional allowances
733 have been requested (e.g., RAID controllers) will still be able to qualify under this specification because
734 the base system requirements and/or adders proposed in this Draft 4 were developed from a data set that
735 includes models containing these features. For example, the incremental power required by a RAID
736 controller is likely to have affected the higher power level for Managed Systems and additional hard drives
737 since these products are more likely to contain this capability. In addition, EPA has not proposed an
738 additional allowance for redundant fan capability. Using intelligent designs for redundancy and enabling
739 technologies such as variable speed fan control, Computer Servers should be able to qualify for this
740 specification with redundant cooling capability.

Below are a few notable issues with this sections shown above:

- There is no clear distinction between port and device. A single cable could have multiple ports, so would that example be one port, or does it count as multiple ports? Also, Fibre Channel and InfiniBand come in multi-connection devices as well, so there must be a consideration for these as well.

- The 1Gb and 10Gb Ethernet allowances are low.

- Fibre Channel and InfiniBand devices also vary in speed. A 10Gb Fibre Channel should be allowed more than 5W for the entire device.

- Need a clarification as to what 'active' means. It is not clear.

- What about power for other types of I/O devices?

- Power adders are required for external storage controllers.

- Power adders are required for battery-backed write caches

There is a deeper problem with this approach, however, in that a general purpose server configured for the I/O that is necessary to deliver the service level and functionality may have lots of I/O cards installed and the idle power of those devices is not an indication of the server's "energy efficiency".

**HP requests that the idle power for I/O cards be ignored for the purposes of Energy Star certification, such that if the server is Energy Star compliant without a particular I/O card, then the addition of one or more I/O cards should not cause the server to become non-compliant.**

**To support this, the Definitions section needs to define "I/O Card" with enough specificity and generalization to encompass current and future types of I/O devices**

**2.1.2.6.**

| 886 | **Required Accuracy:** All measurements should meet the following accuracy levels within typical |
| 887 | operating conditions of the Computer Server: |
| 888 | |
| 889 | Input power measurements: +/-10% accuracy |
| 890 | |
| 891 | Processor utilization measurements: +/-5% accuracy for CPU utilization less than 90%. |
| 892 | |
| 893 | Input air temperature measurements: +/- 3° C |
| 894 | |

- o This is too stringent a power measurement requirement. The requirements here need different thresholds for <50W, <100W and >100W (for example).
- o 10% accuracy is possible above 100 watts, but below 100 watts it makes more sense to specify accuracy as ± wattage and not ± percentage.
- o Requiring ±10% accuracy at 100 watts on a 1000 watt power supply is the same as requiring ±1% accuracy.

**2.1.2.7.**

| 1334 | b. | UUTs with multiple power supplies must have all power supplies connected and operational |
| 1335 | | during the test. If necessary, a PDU, or Power Distribution Unit (such as a simple plug |
| 1336 | | multiplier or power strip), may be used to connect multiple power supplies to a single source. |
| 1337 | | In this case, any overhead electrical use from the PDU must be included in the |
| 1338 | | measurement of Idle power for the UUT. |

- o The requirement to include PDU power losses makes no sense.
- o This is a server specification, not a rack specification.
- o PDU losses will exist for single power supply systems as well.

**2.1.2.8.**

| 969 | **(4) Energy Efficient Ethernet:** EPA intends to require Energy Efficient Ethernet (IEEE 802.3az) for |
| 970 | all external physical layer Ethernet interfaces that are covered by the standard as it is ultimately |
| 971 | approved by IEEE, most importantly, 1 Gb/s and 10 Gb/s wired Ethernet. More information on the |
| 972 | developing standard can be found at http://grouper.ieee.org/groups/802/3/az/. |
| 973 | |

While the final IEEE 802.3az specification may be released by October 1, 2010, there will be limited device availability and deployment of IEEE 802.3az in that timeframe. The EPA cannot predict the future of standards bodies it does not control. Also, without network switches installed that support Energy Efficient Ethernet, the feature in network adapters provides no benefit. HP requests to NOT make the IEEE 802.3az feature a requirement for Tier 2 servers, but consider it for an eventual Tier 3.

**2.1.2.9.**

| | |
|---|---|
| 1301 | <u>Blade Systems</u> must be tested in three configurations with all three sets of data reported under this |
| 1302 | test procedure. These configurations include: |
| 1303 | |
| 1304 | • A Single Blade Server installed in the Chassis. The single Blade Server should be identical in |
| 1305 | configuration to the Blade Servers used in the half and fully populated configurations provided |
| 1306 | below, including all hardware components and software/power management settings. |
| 1307 | • The Chassis half populated with Blade Servers (rounding up for chassis with an uneven number of |
| 1308 | blade slots, e.g., a seven slot chassis would test with four Blade Servers for this condition). |
| 1309 | • With the Blade Chassis fully populated with the maximum number of identical Blade Servers. |
| 1310 | |
| 1311 | In addition, a test procedure has been included for the optional test for testing the empty Blade |
| 1312 | Chassis with no installed Blade Servers. |
| 1313 | |
| 1314 | The configurations of both the individual Blade Servers and the Chassis should remain constant for all |
| 1315 | tests, including all hardware components and software/power management settings. |

This blade system test procedure makes no sense.

Due to the complexity of blade systems and the many types of blades that can be installed, HP requests that blade system requirements be crafted similar to 4 socket servers. Chiefly, no idle power pass/fail thresholds. This avoids the problem of how to measure idle power on a complicated blade system and still provides certifiable requirements for the enclosure and the overall blade solution.

If idle measurement for blades cannot be deleted, then HP proposes the following:
1.     The basis for blade server compliance should be by direct comparison to power consumption of a similar non-blade server.
2.     Since blades can be plugged into a variety of enclosures, Energy Star for blade systems must be specific about the blade, the enclosure and the minimum number of blades that must be in a specified enclosure, with a specified number of fans, power supplies, etc. to achieve compliance and parity with non-blade similar servers. A change in quantities or types of fans or power supplies defines a different enclosure configuration and requires a different certification.
3.     Once certified, additional compute blades, storage blades, switch blades and management blades added to the enclosure will not affect the Energy Star compliance of the solution.

## *2.2. Editorial Feedback*

### 2.2.1. Clarifications

#### 2.2.1.1.

| 309 | G. | Managed Server: Computer Servers designed for mission-critical applications in a highly managed |
| 310 | | environment. A Managed Server **must have all** of the following characteristics: |
| 311 | | |
| 312 | | • Capability to operate with redundant power supplies. |
| 313 | | • An installed dedicated management controller (e.g., service processor). |

The definition of 'capability' in the first bullet needs to be elaborated upon. One concern is that entry level servers that can have one power supply, or the option exists to change out the backplane and part of the chassis to allow a redundant power supply option. If the single power supply option is used, there is no space for a redundant power supply, but the server could optionally have one.

#### 2.2.1.2.

| 378 | M. | Computer Server Power Supply: A self-contained Computer Server component which converts a |
| 379 | | voltage input to one or more different DC voltage output(s) for the purpose of powering the |
| 380 | | Computer Server. The input voltage can be from either an AC or DC source. A Computer Server |
| 381 | | power supply must be separable from the main computer board and must connect to the system |
| 382 | | via a removable or hard-wired male/female electrical connection, cable, cord or other wiring (i.e. |
| 383 | | separate from, and not integrated with, the system motherboard). |

The last sentence is confusing. It mentions hard-wiring, but also that it must be separable.

#### 2.2.1.3.

| 895 | **Sampling Requirements:** Hardware polling rates of the embedded sensors must meet a minimum of |
| 896 | one sample per second. Data must be averaged on a rolling basis over a specific time period. A |
| 897 | default rolling average of 30 seconds is recommended. |

Please delete the first sentence. The EPA should not define the methodology for how servers determine the accuracy of their meters.

#### 2.2.1.4.  Lines 1407-1408:  Does the rest of the world have an ability to report to a governing body other than the EPA or European Commission?

## 2.2.2. Typographic errors and other *[clarifications of meaning]*  (line numbers in the Draft 4 specification are shown):

**265** designed to for technicians to easily add or replace multiple Computer Server boards in the field.
*["to for" is an obvious typo.  Also, blade systems don't typically replace bare "boards."  They replace various kinds of blades, and modules for power supplies, fans, etc.]*

**335** designed and built as a single enclosure and are not designed to for technicians to easily add or
*["to for" is an obvious typo]*

**417** Devices include: Ethernet, InfiniBan, and Fibre Channel.
*[should be "InfiniBand"]*

**438** components may vary withing the family):
*[should be "within"]*

**445** considered as part of a qualified Product Family. For example, a configurations without an
*[ "a configurations" is an obvious typo]*

**604 B. Active Power Requirements**
*[This should either be "Idle" or "Active Idle"]*

**632**
**Table 3: Base System Idle Power Requirements**

| Computer Server System Type | Idle Power Limit |
|---|---|
| Category A: Standard Single Installed Processor (1P) | 55 Watts *[add the word "Servers"]* |
| Category B: Managed Dual Installed Processor (1P) | 65 Watts *[should be "Single"]* |
| Category C: Standard Dual Installed Processor (2P) Servers | 100 Watts |
| Category D: Managed Dual Installed Processor (2P) Servers | 150 Watts |

**633**
**Table 4: Additional Power Allowances for Extra Components**

| System Characteristic | Additional Idle Power Allowance |
|---|---|
| Additional Power Supplies (Greater than one for the purposes of power redundancy) | 20 Watts/PSU |
| Additional Hard Drives (Greater than one) | 8 Watts per Drive |
| Additional Memory over (4 Gigabytes) | 2 Watts / GB |
| I/O Devices (Greater than 1Gbit)* | |
| Base: One or two port onboard Ethernet <=1 Gbit | No Allowance |
| o   Additional Ethernet less than 1Gbit | No Allowance |
| o   Additional 1 Gbit Ethernet | 2 W per Active Port |
| o   Additional 10 Gbit Ethernet | 8 W per Active Port |
| o   Fibre Channel or Infiniband | 5W per Device |

*[InfiniBand capitalizes the "B".  What is the definition of a Device?  What about other types and complexities of I/O to meet the needs of the solution?]*

**641** • Devices with speeds less than 1 Gbit <mark>may</mark> not qualify for any additional allowances.
*[the word "may" is a weak word, which invites interpretation.  If you mean this to be a definitive statement, then use a word like "shall" or "will"]*

**881** containing the relevant sensor information must be provided in <mark>user manuals</mark> and online
*[add the text, ", if any," after the words "user manual", since physical manuals are rarely produced.  This reads like a requirement to produce a user manual.]*

**1059** decimal place (e.g. 85.2%) and three decimal points (e.g., <mark>.856</mark>), respectively.
*[the decimal number less than one should be written "0.856"]*

**1096** management features enabled by the operating system by default. <mark>Manufactures</mark> must also clearly
*[typo…this word should be" Manufacturers"]*

**1389** <mark>SEPCpower_</mark>ssj2008 benchmark, such as warming up the system and ensuring the system is operating
*[typo…this word should be" SPECpower"]*

## 2.2.3. Observations

### 2.2.3.1.

| | |
|---|---|
| 845<br>846<br>847<br>848<br>849<br>850<br>851<br>852<br>853<br>854<br>855<br>856<br>857<br>858<br>859<br>860<br>861<br>862 | **Note:** EPA has changed the Standard Information Reporting Requirements to harmonize with the new definition for Product Families in this specification.<br><br>EPA has also included text that a template for the Power and Performance Data Sheet will be posted on the ENERGY STAR products page for Computer Servers.  A revised draft of the Power and Performance Data Sheet has also been included with this Draft 4 specification.  **EPA encourages all stakeholders to review this latest version and provide comments to EPA.**<br><br>The revised data sheet includes a few key changes that EPA would like to make stakeholder aware of:<br>• Since SPECpower is no longer being referenced for Idle power testing, manufacturers are not required to report SPECpower test results on the data sheet.  However, EPA is still requiring testing and reporting of at least one benchmark, of the manufacturer's choosing, for inclusion on the data sheet.<br>• EPA is requiring that Full Load (100%) power be tested and reported along with the method used to determine Full Load power indicated on the data sheet.  EPA believes this will provide buyers the necessary information on the full power range of the Computer Server while also allowing EPA to collect valuable data which may be useful in the development of the Tier 2 specification. |

Each server datasheet requires a full load power value from a benchmark. It does not specify which benchmark.  Benchmarks like SPECpower_ssj 2008 do not exercise I/O or storage, so power and performance related to those features are not measured.

**2.2.3.2.**

```
1220    Required Power Analyzer Attributes
1221    Approved analyzers will include the following attributes:
1222
1223      •  Ability to measure true power for all AC sources;
1224      •  An available current crest factor of 3 or more at its rated range value;
1225      •  Frequency response of at least 3 kHz; and
1226      •  Calibration with a standard that is traceable to the U.S. National Institute of Standards and
1227         Technology (NIST) or similar relevant standards for other countries. Calibration must be current
1228         and within the past year.
1229
1230    Approved analyzers also must have the capability to either:
1231      •  Average power accurately over any user selected time interval (this is usually done with an
1232         internal calculation dividing accumulated energy by time within the analyzer, which is the most
1233         accurate approach), or
1234      •  Be capable of integrating energy over any user selected time interval and integrating time
1235         displayed with a resolution of 1 second or less.
1236
```

Requires bandwidth up to 50$^{th}$ harmonic and averaging ability.  Is this the intent?

## 2.2.4. Miscellaneous Suggestions

**2.2.4.1.** Tier 2 power supply goals, features and requirements need to be defined in the version 1.0 (or version 1.1) release.  The design cycles for 2010 power supplies need to begin now.

**2.2.4.2.** In addition to power supply efficiency and power factor "curves" versus load and power supply capacity, Tier 2 should define a similar set of curves for inlet power measurement accuracy.  Input power measurement accuracy required at different power delivery levels is an important aspect of future power supply designs.

**2.2.4.3.**

```
378    M.  Computer Server Power Supply: A self-contained Computer Server component which converts a
379        voltage input to one or more different DC voltage output(s) for the purpose of powering the
380        Computer Server.  The input voltage can be from either an AC or DC source. A Computer Server
381        power supply must be separable from the main computer board and must connect to the system
382        via a removable or hard-wired male/female electrical connection, cable, cord or other wiring (i.e.
383        separate from, and not integrated with, the system motherboard).
384
385    N.  AC-DC Power Supply: A power supply which converts line voltage AC input power into one or
386        more different DC output(s) for the purpose of powering the Computer Server.
387
388    O.  DC-DC Power Supply: A power supply which converts a DC voltage input to one or more different
389        DC voltage output(s) for the purpose of powering the Computer Server.  Any DC-to-DC converters
390        (also known as voltage regulators) internal to the product and used to convert low DC voltage
391        (e.g. 12 V DC) into other DC voltages for use by the individual Computer Server components are
392        not considered DC-DC power supplies under this specification.
```

We suggest removing everything past the first sentence in the DC-DC definition and add a sentence stating that it also must meet the definition of a computer server power supply.
This sentence could also be added to the AC-DC power supply definition.

**2.2.4.4.**

| 498 | In addition to those products that do not meet the strict definition provided in Section 1.A, the following |
| --- | --- |
| 499 | product types (as defined in Section 1, above) are **explicitly ineligible** for ENERGY STAR |
| 500 | qualification: |
| 501 | • Fully Fault Tolerant Servers |
| 502 | • Network Equipment |
| 503 | • Server Appliances |
| 504 | • Storage Equipment |
| 505 | • Multi-Node Systems |

"Multi-Node Systems" are not actually defined in the specification

**2.2.4.5.**

| 845 | **Note:** EPA has changed the Standard Information Reporting Requirements to harmonize with the new |
| --- | --- |
| 846 | definition for Product Families in this specification. |
| 847 | |
| 848 | EPA has also included text that a template for the Power and Performance Data Sheet will be posted on |
| 849 | the ENERGY STAR products page for Computer Servers. A revised draft of the Power and Performance |
| 850 | Data Sheet has also been included with this Draft 4 specification. **EPA encourages all stakeholders to** |
| 851 | **review this latest version and provide comments to EPA.** |
| 852 | |
| 853 | The revised data sheet includes a few key changes that EPA would like to make stakeholder aware of: |
| 854 | • Since SPECpower is no longer being referenced for Idle power testing, manufacturers are not |
| 855 | required to report SPECpower test results on the data sheet. However, EPA is still requiring |
| 856 | testing and reporting of at least one benchmark, of the manufacturer's choosing, for inclusion on |
| 857 | the data sheet. |
| 858 | • EPA is requiring that Full Load (100%) power be tested and reported along with the method used |
| 859 | to determine Full Load power indicated on the data sheet. EPA believes this will provide buyers |
| 860 | the necessary information on the full power range of the Computer Server while also allowing EPA |
| 861 | to collect valuable data which may be useful in the development of the Tier 2 specification. |
| 862 | |

HP applauds the ability to let the server manufacturers choose the benchmark that they want to feature in achieving performance per watt results. However, too much latitude in choosing a benchmark could lead to everyone choosing a different benchmark and making the data useless. Perhaps a limited set of specific approved benchmarks should be listed on the Tier 2 specification (benchmarks to be defined during the development of Tier 2 and subsequent revisions). It makes sense to develop a process for approving benchmarks without revising the Energy Star specification.

Benchmark certification and reporting rules must be followed if they are published in an Energy Star report.