

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



OFFICE OF
AIR AND RADIATION

February 3, 2012

Dear ENERGY STAR® Uninterruptible Power Supply Stakeholder:

On behalf of the U.S. Environmental Protection Agency (EPA), I would like to thank all stakeholders for their continued participation and invaluable contributions to the Version 1.0 ENERGY STAR Uninterruptible Power Supply specification.

With development of the Version 1.0 ENERGY STAR Uninterruptible Power Supplies specification nearing completion, the EPA would like to provide stakeholders with an additional opportunity to review and discuss potential changes that EPA anticipates incorporating into the Final Draft. In particular, this memo outlines proposals for limited changes to metering adder requirements, rounding test results, efficiency levels, and the test method. In addition to this memo, an updated test method that incorporates stakeholder feedback on Draft 3 is currently available for stakeholder review on the ENERGY STAR UPS Product Development website.

EPA will hold a stakeholder webinar on **February 15th, 2012, from 9:30 AM to 12 PM EST** to discuss these topics in further detail and address stakeholder questions. To RSVP, please send an email to UPS@energystar.gov. Although the webinar is the focal point for discussing the changes outlined in this memo, **stakeholders are welcome to submit written comments to ups@energystar.gov on the matters presented here no later than February 24, 2012.**

Shortly after the webinar, EPA and DOE will release the Final Draft specification and test method, incorporating stakeholder feedback on both Draft 3 and this memo. After consideration of comments on the Final Draft specification, EPA will distribute the Final specification.

Metering Adder & Requirements

In Draft 3, EPA proposed an efficiency adder for UPSs that ship with meters, allowing the measurement of data center energy consumption and calculation of Power Usage Effectiveness (PUE). EPA proposes the following revisions and clarifications pertaining to meters.

- **Metering adder to apply only to Ac-output UPS > 10 kW:** The data that EPA received from stakeholders indicates that a metering adder applied to UPSs below 10 kW will be difficult to support while maintaining ENERGY STAR's role as a differentiator of highly efficient products in this size category. EPA therefore proposes to continue to limit the applicability of the adder to UPSs with output power greater than 10 kW. Furthermore, EPA also proposes to continue to limit the metering adder to Ac-output UPSs, since remote monitoring and measurement is already

commonplace among Dc-output UPSs used in the telecommunications industry and dc measurement accuracy standards are not widely available.

- **Metering adder reduced to 1 percentage point:** Per review of the efficiency dataset and available models, EPA has determined that a metering adder of 1 percentage point appropriately balances the intent to incentivize use of meters with maintaining appropriate ENERGY STAR qualification rates.
- **IEC 62053-21 Class 2 energy measurement accuracy:** In the interest of balancing the need for both metering accuracy and a reasonable cost for this metering, EPA proposes that meters eligible for the adder meet the Class 2 accuracy requirements specified in IEC 62053-21¹, equivalent to a 2 percent error in the current measurement at full-scale, among other requirements. Several stakeholders suggested that meters should have an accuracy level of 5 percent, but EPA believes the resulting measurement errors may be too great for meaningful PUE calculations. Furthermore, EPA is not aware of any standard reference that determines an energy measurement accuracy of 5 percent.
- **Common communication protocols:** Per stakeholder suggestions, EPA proposes that, in order to be eligible for the metering adder, UPSs and/or bundled external meters communicate measurement information via at least one of the following common protocols: Modbus RTU, Modbus TCP, or SNMP (v1, 2, or 3).
- **No display requirement:** In the interest of limiting cost and encouraging greater adoption, EPA proposes that physical displays of metered efficiency on the UPS are not required for a unit to receive the adder, provided that the UPS is capable of transmitting measurement information to a software-based interface. Additionally, EPA is not aware of any standardized display parameters to set a straightforward and appropriate requirement for the wide range of UPS and metering products.
- **Power and Performance Data Sheet reporting requirements:** EPA proposes that metering and communications information for each qualified model or Product Family shall be reported on the ENERGY STAR Power and Performance Data Sheet. This requirement applies for all Ac-output and Dc-output UPSs irrespective of the optional metering adder outlined above. EPA intends for the PPDS to inform end-users about available energy measurement capabilities across all UPS product types.

Significant Digits and Rounding

- **Adding an additional digit:** A stakeholder noted that Appendix J of IEC 62040-3 requires reporting of efficiency to the third digit after the decimal point (or when expressed as a percentage, to the first digit). As a result, EPA has expanded the efficiency requirements to the third decimal place; per the significant digits and rounding requirements, all data shall be reported to the same level of accuracy as found in IEC 62040-3.

¹ IEC 62053-21:2003, Ed. 1.0, *Electricity metering equipment (a.c.) – Particular requirements – Part 21: Static meters for active energy (classes 1 and 2)*.

Revised Efficiency Levels

- **Revisions to loading profiles:** EPA received a stakeholder proposal to modify the loading profiles of VI and VFI units with less than 1.5 kW output to account for the commercial use of many of these products. EPA has reviewed this proposal with the existing data set and has found that it provides a more appropriate and accurate fit to the data. EPA therefore proposes the adoption of this modified loading profile.
- **Revisions to efficiency requirements:** EPA proposes two minor revisions to the minimum efficiency levels to ensure that the ENERGY STAR requirements identify high efficiency products and allow for an adequate selection in each output power bin. The requirement for VI UPSs between 1.5 kW and 10 kW has been raised from 0.96 to 0.97, eliminating a step-function discontinuity with the <1.5 kW VI range. Additionally, the VFI line fit has been shifted upward by 1 percentage point so it now reads $0.0099 \times \ln(P) + 0.815$, where $\ln(P)$ is the natural logarithm of the output power expressed in watts.

Backfeeding Definition

- **Reinstatement of backfeeding:** EPA previously removed language enabling the use of backfeeding during testing based on a stakeholder comment on Draft 2, which recommended removing it based on the lower repeatability of backfeeding in comparison to a dedicated test load. However, other stakeholders offered that backfeeding could require test houses to purchase dedicated test loads, which would increase the test burden for larger UPS products. In light of these competing viewpoints and the absence of additional information quantifying this repeatability/test burden tradeoff, EPA suggests reverting back to IEC 62040-3 and allowing backfeeding during testing as long as it meets the IEC definition of a Reference Test Load.

Test Method

- **Test method modifications:** Based on stakeholder comments, DOE proposes the following modifications from the Draft 3 Test Method. For further discussions of the rationale for these proposed changes, stakeholders are encouraged to examine the updated test method available on the ENERGY STAR UPS Product Development website.

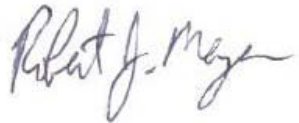
Final Draft Test Method Section	Draft 3 Test Method	Proposed Final Draft Test Method
Testing Guidance (4.2.E)	Guidance must be provided in user manual	Testing guidance must be provided in publicly available documents, referenced in the PPDS, and documented in the reporting template.
Energy Storage System (4.2.F.2)	UPS tested in as-shipped configuration in accordance with user manual	Changes to as-shipped configuration are allowed as long as the controls are natively present on UPS and test guidance reporting guidelines (above) are followed
Efficiency and Average Power (5.A)	Not specified	Added equations for average power and efficiency

Final Draft Test Method Section	Draft 3 Test Method	Proposed Final Draft Test Method
Stability Check (5.B)	Performed after stabilization period	Performed in final 20 minutes of stabilization period
Stability Check (5.B)	Two average power calculations compared	Two efficiency calculations compared
Energy Accumulation Method (5.C.2)	Not specified	Accumulation rate of 1 Hz or greater

For further information on specification development activities to date, please visit the ENERGY STAR Product Development website at www.energystar.gov/NewSpecs and follow the link to “Uninterruptible Power Supplies.” Please direct any specific questions to RJ Meyers, EPA, at Meyers.Robert@epa.gov, or 202-343-9923, Matt Malinowski, ICF International, at mmalinowski@icfi.com or 202-862-2693; or Bryan Berringer, DOE, at Bryan.Berringer@ee.doe.gov.

Thank you for your continued support of the ENERGY STAR program.

Sincerely,



Robert Meyers

U.S. Environmental Protection Agency, Climate Protection Partnerships Division

ENERGY STAR Program