



**ENERGY STAR®**  
**Uninterruptible Power Supplies:  
Final Draft Test Method and  
Specification Proposed Changes**

**Stakeholder Webinar**  
February 15, 2012

**U.S. Department of Energy  
U.S. Environmental Protection Agency**

  Learn more at [energystar.gov](http://energystar.gov)

**Webinar Details**



- Webinar and related materials will be available on the UPS web page:
  - [www.energystar.gov/newspeccs](http://www.energystar.gov/newspeccs)
  - Follow link to “Uninterruptible Power Supplies”
- Audio provided via teleconference:
  - Call in:** +1 (877) 423-6338 (U.S.)  
+1 (571) 281-2578 (International)
  - Code:** 456-417
  - Phone lines will remain open during discussion
  - Please keep phone lines on mute unless speaking
  - Press \*6 to mute or un-mute your line
  - Refer to the agenda for approximate discussion timing

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## Agenda



| Time (EST)    | Topic                               |
|---------------|-------------------------------------|
| 9:30 – 9:40   | Meeting Introduction                |
| 9:40 – 10:40  | Proposed Changes to the Test Method |
| 10:40 – 10:50 | Specification Scope & Definitions   |
| 10:50 – 11:15 | Revised Efficiency Levels           |
| 11:15 – 11:25 | Metering Incentive & Requirements   |
| 11:25 – 11:40 | Qualification Processes             |
| 11:45 – 11:50 | Next Steps                          |
| 11:50 – 12:00 | Open Items & Questions              |



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## Activities To Date



- Late 2010: Development of Draft Test Method
- January–March 2011: Data assembly conducted
- May 5, 2011: Draft 1 Specification
- July 15, 2011: Draft 2 Specification & Test Method
- Oct. 25, 2011: Draft 3 Specification & Test Method
- Nov. & Dec. 2011: Draft 3 comment review
- **Today, Feb. 15th:** Discussion of proposed changes for the Final Draft specification & test method



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## Written Comments



- In addition to making verbal comments during the meeting, stakeholders may submit written comments.
- Please send all comments to: [ups@energystar.gov](mailto:ups@energystar.gov)

### Comment Deadline

|  |
|--|
|  |
|--|

- EPA and DOE will release the Final Draft specification and test method in early March followed by a 2-3 week comment period



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## Webinar Objectives



1. Overview of proposed revisions for the Final Draft specification & test method
2. Final opportunity for group discussion on unresolved specification and test method issues
3. Discuss next steps for manufacturers, labs, and certification bodies (CBs)



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## Opening Comment



- Moving toward Final Draft
- Memo issued to discuss some remaining items
- Do not want to enter Final Draft with these items open, or unexamined by stakeholders
- Memo contains proposals
  - No fait accompli
  - We need to explain them, discuss them, and understand their impact

## Proposed Changes to the Test Method



| Time (EST)          | Topic                                      |
|---------------------|--|
| 9:30 – 9:40         | Meeting Introduction                       |
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## Introduction



- Draft 3.0 Test Method published October 25, 2011
- Stakeholder comments received November 22, 2011
- Changes made to updated Draft Test Method based on stakeholder comments



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## Final Draft Changes Overview



- 1 Providing Testing Guidance
- 2 Energy Storage System Alarm Suppression
- 3 Steady state Check
- 4 Energy Accumulation Sampling Method
- 5 Efficiency and Average Power Calculations
- 6 Supplemental Information



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## Final Draft Changes Overview



|   |   |
|---|---|
| 1 | Providing Testing Guidance                |
| 2 | Energy Storage System Alarm Suppression   |
| 3 | Steady state Check                        |
| 4 | Energy Accumulation Sampling Method       |
| 5 | Efficiency and Average Power Calculations |
| 6 | Supplemental Information                  |



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## Stakeholder Comment #1: Testing Guidance



- Draft 3.0 Test Method
  - Guidance provided to test labs must be available in product user manuals
- Stakeholder Comment
  - Many UPSs require specific testing guidance
  - Recommend allowing manufacturer guidance on UPS models
  - Guidance made available in publicly available documents and referenced in reporting



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## Proposed Change #1: Testing Guidance



- Manufacturers may provide guidance on particular UPS models in publicly available documents
  - Example guidance – initial configurations, disconnecting the battery, disabling alarms
  - Guidance referenced in PPDS and documented in test reporting template<sup>1</sup> (subject to change/revision)
- Will ensure lab-to-lab repeatability throughout qualification testing, off-the-shelf testing, etc.

<sup>1</sup> The test reporting template is to be completed by laboratory.



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## Final Draft Changes Overview



|   |   |
|---|---|
| 1 | Providing Testing Guidance                |
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| 5 | Efficiency and Average Power Calculations |
| 6 | Supplemental Information                  |



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## Stakeholder Comment #2: Energy Storage System



- Draft 3.0 Test Method
  - UPS tested in as-shipped condition
  - UPS tested with energy storage system disconnected only if allowed by user manual
- Stakeholder Comments
  - Testing the UPS with the battery connected overly burdensome
  - Recommend allowing configuration changes, as long as controls to do so are natively present on UPS

## Proposed Change #2: Energy Storage System



- Allow necessary actions to suppress alarms, indications, and fault detection mechanisms that result from removing the energy storage system
- Controls necessary to do so natively present on UPS
- Will ensure repeatable testing throughout qualification testing, off-the-shelf testing, etc.

## Final Draft Changes Overview



|   |   |
|---|---|
| 1 | Providing Testing Guidance                |
| 2 | Energy Storage System Alarm Suppression   |
| 3 | <b>Steady state Check</b>                 |
| 4 | Energy Accumulation Sampling Method       |
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| 6 | Supplemental Information                  |



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## Stakeholder Comment #3: Steady-state Check



- Draft 3.0 Test Method
  - Performed after IEC 62040-3, Ed. 2.0 stabilization period (125% temperature rise time)
  - Compare two 5-minute average power calculations
- Stakeholder Comments
  - Proposed method increases test burden, has not been tested on large UPSs
  - Recommend using only the thermal stability requirement detailed in IEC 62040-3, Ed. 2.0



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## Proposed Change #3: Steady-state Check



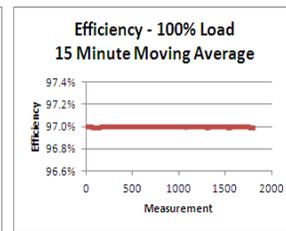
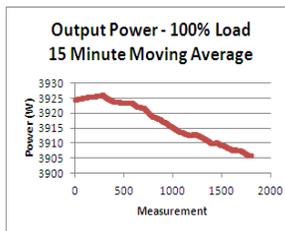
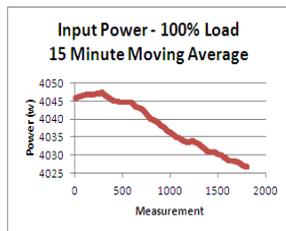
- Perform stability check in final 20 minutes of the stabilization period (125% of temperature rise time)
  - Minimizes additional test time



## Proposed Change #3: Steady-state Check



- Evaluate efficiency instead of average power
  - Power may drift, but efficiency stays constant
  - Reduces steady-state requirements, regardless of UPS size



## Final Draft Changes Overview



|   |  |
|---|--|
| 1 | Providing Testing Guidance                 |
| 2 | Energy Storage System Alarm Suppression    |
| 3 | Steady state Check                         |
| 4 | <b>Energy Accumulation Sampling Method</b> |
| 5 | Efficiency and Average Power Calculations  |
| 6 | Supplemental Information                   |



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## Stakeholder Comment #4: Accumulated Energy Sampling Method



- Draft 3.0 Test Method
  - Determine average power from 15-minute accumulated energy measurement
- Stakeholder Comments
  - Not defined in detail
  - Has not been widely used
  - Adds test burden



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## Proposed Change #4: Accumulated Energy Sampling Method



- Accumulation sampling method:
  - Suppresses effects of outlier data
  - Taken over duration of test and displayed on power meter
    - 1 measurement instead of the 3 required in IEC 62040-3, Ed. 2.0
  - Avoids the need for data acquisition programs

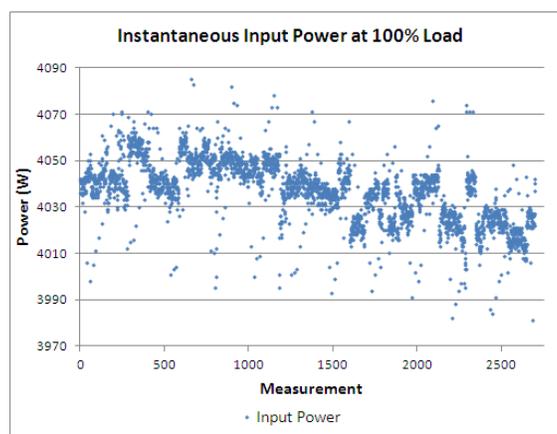


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## Proposed Change #4: Accumulated Energy Sampling Method



- Outlier data example



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## Proposed Change #4: Accumulated Energy Sampling Method



- Clarification made to add definition to sampling method
  - The rate at which the power meter calculates the accumulated energy (Wh) shall be at least 1 Hz



## Final Draft Changes Overview



- 1 Providing Testing Guidance
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- 5 **Efficiency and Average Power Calculations**
- 6 Supplemental Information



## Proposed Change #5: Efficiency and Average Power Calculations



- Equations for the average power and efficiency calculations have been added:
  - $P_{AVG} = \text{Total Energy (Wh)} / \text{Duration of Test (hours)}$
  - $\text{Efficiency} = P_{AVG\_OUT} / P_{AVG\_IN}$



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## Final Draft Changes Overview



|   |   |
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## Supplemental Information



- The following have been added to the test reporting template:
  - Battery part numbers, quantities, and connection status
    - Ensures the manufacturer-specified battery is tested
  - Section for documenting any unit-specific configuration steps taken
  - Firmware revision and configuration number



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## Summary of Proposed Changes



| Topic                        | Draft 3.0 Test Method  | Final Draft Test Method  |
|------------------------------|--|--|
| Testing Guidance             | Guidance must be provided in user manual   | Testing guidance must be provided in publicly available documents, referenced in the PPDS, and documented by the lab   |
| Energy Storage System        | 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      |
| Stability Check              | <ul style="list-style-type: none"> <li>• Performed after stabilization period</li> <li>• Two <b>average power calculations</b> compared</li> </ul> | <ul style="list-style-type: none"> <li>• Performed in the final 20 minutes of stabilization period</li> <li>• Two <b>efficiency calculations</b> compared</li> </ul> |
| Energy Accumulation Method   | Not specified  | Accumulation rate of 1 Hz or greater   |
| Efficiency and Average Power | Not specified  | Equations for average power and efficiency added   |



## Specification Scope & Definitions



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## Rotary UPS



- Following Draft 3, EPA & DOE received comments concerning the applicability of the test method & specification to Rotary UPS
- Based on comments received, EPA has found:
  - No prohibitive differences between Rotary UPS test procedures per IEC 88528-11 and the ES test method
  - Procedures are more precisely specified in IEC 62040-3 & ES Test Method than in the IEC 88528-11
- Rotary UPS stakeholder commented that IEC 62040-3 is easily applicable and was previously used for Rotary UPSs prior to IEC 88528-11



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## Rotary UPS



- Technology neutrality similar to the energy storage system (flywheels, batteries, etc. permitted)
  - Provides consumers with a wide variety of efficient products for comparison
    - Only the most efficient Rotary UPSs will likely meet specification requirements
    - For some purchasers, Rotary UPSs offer system wide savings benefits
- ▼
- EPA and DOE propose to maintain Rotary UPS within the scope with a few modifications



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## Rotary UPS Definitions



- Include definitions for the two major Rotary UPS designs:
  1. Rotary UPS (RUPS) without Diesel
  2. Diesel-coupled rotary UPS (DRUPS)
- Clarify condition for Stored Energy Mode:
  - “All power is derived from the energy storage system or, in case of a DRUPS, from the integrated Diesel engine or a combination of both.”



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## Test Method: Rotary UPS Request for Comment



- DOE and EPA would like to ensure a repeatable and technology neutral test method
- The language of the updated Draft Test Method has been modified to be technology neutral
- DOE and EPA welcome all comments on Rotary UPSs, particularly:
  - What changes, if any, could be made to make the test method language more technology neutral?
  - Do all measurement methods adequately address Rotary UPSs?



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## Bypass Clarification



Bypass: Power path alternative to the ac converter.

- Maintenance Bypass (path): Alternative power path provided to maintain continuity of load power during maintenance activities.
- Automatic bypass: Power path (primary or stand-by) alternative to the indirect ac converter capable of control without human intervention, in response to the occurrence of predetermined conditions
  - Mechanical Bypass: Control is via a switch with mechanically separable contacts.
  - Static Bypass (electronic bypass): Control is via an electronic power switch, for example transistors, thyristors, triacs or other semiconductor device or devices.
  - Hybrid Bypass: Control is via switch with mechanically separable contacts in combination with at least one controlled electronic valve device.

Per IEC 88528, allow for manual, automatic, or combination of both



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## Power Factor



- Per stakeholder comments, include definition:
 

**Power Factor:** ratio of the absolute value of active power  $P$  to the apparent power  $S$
  - VFD: Load is connected directly to the source, such that UPS does not impact power factor
  - Power factor still obtained for all modes in Test Method
- 
- EPA proposes that only VFI and VI modes meet the power factor minimum requirement of **0.90**

## Reference Test Load: Injection Into the AC Supply



- In Draft 1 & 2, EPA aligned with IEC backfeeding provisions
  - IEC 62040-3:**  
Reference Test Load: Load or condition in which the output of the UPS delivers the active power (W) for which the UPS is rated.\*
    - \*Footnote: “This definition permits when in test-mode and subject to local regulations, the UPS output to be injected into the input a.c. supply”
  - Draft 1 & 2 ENERGY STAR specification:**  
 “This definition permits the UPS output to be backfed into the input AC supply when in test-mode and subject to local regulations.”

## Reference Test Load: Backfeeding



- In Draft 3, EPA removed the backfeeding allowance based on stakeholder comment that there is lower repeatability compared to a dedicated test load
- Further stakeholder comments indicated that prohibiting backfeeding is a potential burden, requiring test houses to purchase large, dedicated test loads
- EPA proposes to revert back to IEC 62040-3 and allow backfeeding/injecting into the ac supply during test for UPS systems > 100 kW.

## Revised Efficiency Levels



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|----------------------|-------------------------------------|
| 9:30 – 9:40          | Meeting Introduction                |
| 9:40 – 10:40         | Proposed Changes to the Test Method |
| 10:40 – 10:50        | Specification Scope & Definitions   |
| <b>10:50 – 11:15</b> | <b>Revised Efficiency Levels</b>    |
| 11:15 – 11:25        | Metering Incentive & Requirements   |
| 11:25 – 11:40        | Qualification Processes             |
| 11:45 – 11:50        | Next Steps                          |
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# Overview



- EPA received several stakeholder suggestions for
  - Modified efficiency levels
  - Modified loading profiles
- Each stakeholder proposal was examined against the existing dataset
- EPA also re-examined its levels in light of stakeholder suggestions
  - This resulted in a loading profile change
  - Loading profile change resulted in two level changes to maintain estimated market share



# Draft 3 Ac-output Efficiency Requirements



- Efficiency Requirement:

Minimum Average Efficiency Requirement ( $Eff_{AVG MIN}$ ), Where:  
 • P is the Output Power in watts (W), and  
 • ln is the natural logarithm.

| Output Power                               | Input Dependency |      |                                |
|--|------------------|------|--------------------------------|
|  | VFD              | VI   | VFI                            |
| $P \leq 1500 \text{ W}$                    | 0.97             |      |                                |
| $1500 \text{ W} < P \leq 10,000 \text{ W}$ | 0.97             | 0.96 | $0.0099 \times \ln(P) + 0.805$ |
| $P > 10,000 \text{ W}$                     | 0.97             | 0.95 |                                |

- Loading Profile:

| Output Power, P, in kilowatts (kW)      | Proportion of Time Spent at Specified Proportion of Reference Test Load, $t_{n\%}$ |      |      |      |
|---|--|------|------|------|
|   | 25%  | 50%  | 75%  | 100% |
| $P \leq 1.5 \text{ kW}$                 | 0.2  | 0.2  | 0.3  | 0.3  |
| $1.5 \text{ kW} < P \leq 10 \text{ kW}$ | 0  | 0.3  | 0.4  | 0.3  |
| $P > 10 \text{ kW}$                     | 0.25   | 0.50 | 0.25 | 0    |

- 2% Metering Incentive for UPSs > 10 kW



## Proposed Loading Profile Adjustment



| Output Power, P, in kilowatts (kW) | Proportion of Time Spent at Specified Proportion of Reference Test Load, t <sub>n</sub> % |      |      |      |
|------------------------------------|---|------|------|------|
|                                    | 25%   | 50%  | 75%  | 100% |
| P ≤ 1.5 kW                         | 0.2   | 0.2  | 0.3  | 0.3  |
| 1.5 kW < P ≤ 10 kW                 | 0   | 0.3  | 0.4  | 0.3  |
| P > 10 kW                          | 0.25  | 0.50 | 0.25 | 0    |

| Output Power       | Input Dependency | Proportion of Time Spent at Specified Proportion of Reference Test Load, t <sub>n</sub> % |     |      |      |
|--------------------|------------------|---|-----|------|------|
|                    |                  | 25%   | 50% | 75%  | 100% |
| P ≤ 1.5 kW         | VFD              | 0.2   | 0.2 | 0.3  | 0.3  |
|                    | VI or VFI        | 0   | 0.3 | 0.4  | 0.3  |
| 1.5 kW < P ≤ 10 kW | VFD, VI or VFI   | 0   | 0.3 | 0.4  | 0.3  |
| P > 10 kW          | VFD, VI or VFI   | 0.25  | 0.5 | 0.25 | 0    |

- EPA received a stakeholder proposal to alter the loading profile for commercially-oriented products in the <1.5kW range.
  - EPA re-examined data set in light of proposal
  - Examined market data
- EPA proposes to adopt this new loading profile



## Proposed Level Adjustments



Minimum Average Efficiency Requirement (Eff<sub>AVG MIN</sub>), Where:

- P is the Output Power in watts (W), and
- ln is the natural logarithm.

| Output Power          | Input Dependency |      |                        |
|-----------------------|------------------|------|------------------------|
|                       | VFD              | VI   | VFI                    |
| P ≤ 1500 W            | 0.97             |      |                        |
| 1500 W < P ≤ 10,000 W | 0.97             | 0.96 | 0.0099 × ln(P) + 0.805 |
| P > 10,000 W          | 0.97             | 0.95 |                        |

|                    | VFD  | VI          | VFI                         |
|--------------------|------|-------------|-----------------------------|
| P ≤ 1.5 kW         | 0.97 |             | 0.0099*ln(P) + <b>0.815</b> |
| 1.5 kW < P ≤ 10 kW | 0.97 | <b>0.97</b> | 0.0099*ln(P) + <b>0.815</b> |
| P > 10 kW          | 0.97 | 0.95        | 0.0099*ln(P) + <b>0.815</b> |

- In conjunction with load profile change.
- Tightening up
  - VFI: +1%
  - VI (1.5 – 10kW): +1%



## Proposed Adjustments



- Three areas of concern:
  - Projected VFI qualification rates
  - VI qualification, 1.5 – 10kW
  - VFD qualification rates, <1.5kW

## VFI Qualification Rates



- With Draft 3 levels:
  - <1.5kW and >10kW market shares are balanced
    - Highlight efficiency while allowing range of products on the market.
  - But the 1.5 – 10kW range has high market share
- Applied new loading profile (<1.5kW VFI)
  - Effect: Raises reported efficiency of <1.5kW range
  - Raises market share of this range to high level
  - New loading profile restored some balance to the line—“higher” balance in the 0 – 10kW range.
- EPA proposes increasing VFI level (+1%) to bring total VFI market share back into balance
- Total market share of VFI given new loading profile:
  - Old level: 50%
  - New level: 30%

## VI Qualification Rates



- Proposed: Change 1.5 – 10kW
  - Level moves from 96% → 97%
- Overall Draft 3 market share of VI was on target
  - Some under/overshoot between <1.5kW and 1.5 – 10kW ranges
- New loading profile for <1.5kW
  - Now on-target/overshoot
  - Raises our overall market share
- Proposed levels are a correction to make this on-target across full range of UPS output power.



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## VFD Qualification Rates



- VFD:
  - Data in the <1.5kW range is quite tight
  - Small changes to levels result in large swings in market penetration
  - Ex.: 97.5% → 97.0 %
    - From raw data, 10% → 48% market share from a 0.5% level change.
  - Difficult to predict market share based on any level.
    - Heavily dependent on assumptions about:
      - Unit-to-unit variation, test repeatability, accuracy of data.



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## Overall Market Share



| VFD            | VI  | VFI |
|----------------|-----|-----|
| 25% (17 – 54%) | 27% | 30% |

- With new loading profile, plus level changes
- VFD level difficult to forecast due to data clustering
  - Very likely to be closer to mid-20s



## Proposed Changes to Efficiency Requirements



- To maintain the value of the ENERGY STAR mark as a differentiator, EPA proposes to revise the efficiency requirements in Final Draft

|                           |   |
|---------------------------|---|
| <b>Efficiency</b>         | Higher efficiency requirements for: <ul style="list-style-type: none"> <li>• VFI: +1%</li> <li>• VI (1.5 kW &lt; P ≤ 10 kW): +1%</li> </ul>                                     |
| <b>Loading</b>            | Promote a wide range of qualifying VI and VFI UPSs ≤ 1.5 kW by: <ul style="list-style-type: none"> <li>• Applying stakeholder-proposed (commercial) loading profiles</li> </ul> |
| <b>Metering Incentive</b> | <ul style="list-style-type: none"> <li>• Reduce metering incentive for UPSs &gt; 10 kW (datacenters) to 1%</li> </ul>   |



## Proposed Changes to Efficiency Requirements



- Efficiency Levels:

| Output Power       | VFD  | VI   | VFI                  |
|--------------------|------|------|----------------------|
| P ≤ 1.5 kW         | 0.97 | 0.97 | 0.0099*ln(P) + 0.815 |
| 1.5 kW < P ≤ 10 kW | 0.97 | 0.97 | 0.0099*ln(P) + 0.815 |
| P > 10 kW          | 0.97 | 0.95 | 0.0099*ln(P) + 0.815 |

- Loading Profiles:

| Output Power       | Input Dependency | Proportion of Time Spent Load, t <sub>n</sub> % |     |      |      |
|--------------------|------------------|---|-----|------|------|
|                    |                  | 25%   | 50% | 75%  | 100% |
| P ≤ 1.5 kW         | VFD              | 0.2   | 0.2 | 0.3  | 0.3  |
|                    | VI or VFI        | 0   | 0.3 | 0.4  | 0.3  |
| 1.5 kW < P ≤ 10 kW | Any              | 0   | 0.3 | 0.4  | 0.3  |
| P > 10 kW          | Any              | 0.25  | 0.5 | 0.25 | 0    |

- Efficiency Levels with Metering Incentive:

| Output Power | VFD  | VI   | VFI                    |
|--------------|------|------|------------------------|
| P > 10,000 W | 0.96 | 0.94 | 0.0099 * ln(P) + 0.805 |



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## Multiple-normal-mode UPS



- EPA proposes to modify the requirement that “Multiple-normal-mode UPS systems shall ship with their highest-input dependency mode enabled by default”



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## Multiple-normal-mode UPS



- Per stakeholder comments, EPA proposes to include the following clarification:
  - **ALL supported normal modes shall still be tested and reported** on the PPDS regardless of whether the Multiple-normal-mode average efficiency calculation is applied in the model's qualification
  - however -
  - UPSs meeting efficiency requirements in their lowest input dependency mode (i.e., without benefit from the weighted equation) **shall not be required to ship in the highest input dependency mode**



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## Multiple-normal-mode UPS Reporting Requirements



- In Draft 3, EPA proposed that the **longest transfer time** between normal modes be reported on the PPDS
  - Transfer time is not measured by the ENERGY STAR UPS Test Method
  - One stakeholder commented that only data relevant to efficiency should be reported on the PPDS
  - Consumers may refer to the vendor website via PPDS link
- In considering these points, EPA proposes to remove transfer time from reporting requirements and the PPDS



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## Metering Incentive & Requirements



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|----------------------|--|
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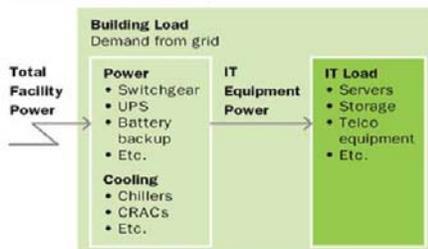


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## Metering: Goals



- Support measurement of data center Power Usage Effectiveness (PUE) =  $\frac{\text{Data center energy}}{\text{IT energy}}$ 
  - Promote consistent measurement
  - Promote ease of measurement



(Source: The Green Grid)



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## Metering: Draft 3 Proposal



- In Draft 3, EPA proposed an efficiency incentive for UPSs with a meter possessing the following characteristics:
  - Meter either installed internally or shipped as an independent, external component bundled with the UPS system at the point-of-sale
  - The meter must at a minimum measure kWh
- EPA asked stakeholders to comment on the incentive proposal, with specific attention paid to accuracy, communications, display, and reporting requirements



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## Metering: Scope



- Remote monitoring and measurement is already commonplace in Dc-output UPS environments
  - Telecommunications industry does not fall under the ENERGY STAR Buildings Program
  - Dc energy measurement accuracy standards are not widely available
- 
- EPA proposes that the metering incentive only apply to Ac-output UPSs > 10 kW



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## Metering: Accuracy



- Stakeholders proposed a 5% energy measurement accuracy level
  - EPA is concerned that resulting measurement errors may be too great for meaningful PUE calculations
  - EPA is unaware of any standard reference that determines an energy measurement accuracy of 5%
- EPA proposes that internal and bundled external meters meet Class 2 accuracy requirements per IEC 62053-21

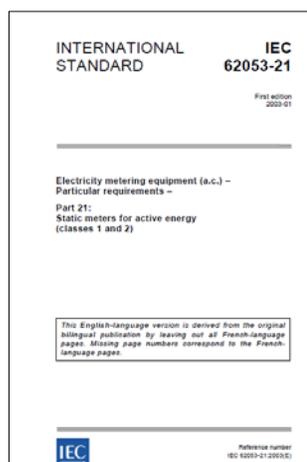
## Metering: Accuracy



- EPA believes included meters should have an accuracy comparable to those available on the market



Meters available on the market with Class 1 and Class 0.5s accuracy in the \$200-400 range



## Metering: Communication Protocols



- Stakeholders agreed that the meter should communicate via a common protocol
- ▼
- EPA proposes that the UPS and/or bundled external meter communicate measurement information via at least one of the following protocols:

**Modbus RTU, Modbus TCP, or SNMP (v1, 2, or 3)**



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## Metering: Display



- EPA is not aware of any standardized display parameters or requirements applicable to a range of UPS and metering products
  - One stakeholder suggested EPA forgo a display requirement in the interest of limiting cost and encouraging greater adoption of meters
- ▼
- EPA proposes that physical displays are not required for the incentive, provided that the UPS or external meter is capable of transmitting information to a software based interface



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## Metering: PPDS



- EPA proposes that the following metering characteristics be reported on the PPDS for each qualified model:

|  |  |
|--|--|
| <b>Internal Output Energy Meter</b>            | (Yes/No)                                       |
| <i>IEC 62053 Accuracy Class</i>                | Class 1,2,0.2s,0.5s, N/A                       |
| <i>Physical Display</i>                        | (Yes/No)                                       |
| <i>Data Provided via Network Communication</i> | (Yes/No)                                       |
| <i>Network Protocols</i>                       | Modbus RTU, Modbus TCP, SNMP (v1,2,or3), Other |
| <i>Data Available via Web Browser</i>          | (Yes/No)                                       |
| <b>External Meter Manufacturer</b>             |  |
| <b>External Meter Model Number</b>             |  |

## Qualification Processes



| Time (EST)           | Topic                               |
|----------------------|-------------------------------------|
| 9:30 – 9:40          | Meeting Introduction                |
| 9:40 – 10:40         | Proposed Changes to the Test Method |
| 10:40 – 10:50        | Specification Scope & Definitions   |
| 10:50 – 11:15        | Revised Efficiency Levels           |
| 11:15 – 11:25        | Metering Incentive & Requirements   |
| <b>11:25 – 11:40</b> | <b>Qualification Processes</b>      |
| 11:45 – 11:50        | Next Steps                          |
| 11:50 – 12:00        | Open Items & Questions              |

## Modular Ac-output UPS



- In Draft 3, EPA proposed that manufacturers shall test at the min and max capabilities of the chassis
  - Stakeholders commented that the minimum configuration may not actually be available for sale on the market
  - More valuable to test configurations that consumers will actually use



- Thus, EPA proposes that manufacturers **may determine the minimum configuration** as it is unlikely that the model will be used in a configuration with less modules than those installed at purchase



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## Modular UPS



- EPA also proposes that manufacturers specify the **maximum** configuration
  - EPA is concerned that testing the **chassis maximum** would mandate testing a configuration that may not pass
  - All intermediate configurations are then expected to meet the requirement



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## Modular UPS



- Where intermediate models within the Modular UPS Product Family do not meet efficiency requirements, each unique output power configuration may be tested and qualified individually
  - Modular UPS provisions are intended to decrease qualification burden, but EPA acknowledges that it may not be practicable in all cases.



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## Power and Performance Datasheet (PPDS)



- Stakeholders had the following comments on the PPDS:
  - Develop and test a prototype to ensure PPDS is helpful and easy to use
  - Prioritize the following characteristics:
    - topology,
    - input dependency,
    - input and output voltage,
    - modularity,
    - runtime at several load conditions, and
    - number of outlets (for UPSs  $\leq$  1500 W)
  - Also include test information and communication abilities
  - Do not include mode transition time in the PPDS
    - Outside of scope



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## Power and Performance Datasheet (PPDS) (cont.)



- EPA will include stakeholder feedback in the development of the PPDS:
  - Publication of prototype PPDS following finalization of Specification
  - Opportunity for written and verbal feedback to ensure usefulness
  - Completion and testing of PPDS before Specification effective date to ensure ease of use

## Specification Effective Date



- Effective date allows for a 3-month period for EPA to recognized certification bodies and laboratories

### Proposed Specification Effective Date

Late June 2012

## Timeline



|  |             |
|--|-------------|
| Comments Due on Proposed Changes to Final Draft  | February 24 |
| Final Draft Released<br>• Along with Data Fields for Qualification                           | Early March |
| Final Draft Comments Due   | Late March  |
| Final Specification Released<br>• Along with Manufacturer Partnership Agreements             | Late March  |
| Preparation for Program Start<br>• CB trainings<br>• Lab accreditation                       | April—May   |
| Specification becomes effective<br>• First products posted on Qualified Products List online | Late June   |



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## Next Steps



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## Written Comments



- Please send all comments to: [ups@energystar.gov](mailto:ups@energystar.gov)

### Comment Deadline

February 24, 2011

- EPA and DOE will release the Final Draft specification and test method in early March following by a 2-3 week comment period



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## Manufacturer Resources



- Once the final Version 1.0 specification is published, manufacturers may submit a Partnership Agreement
- For resources and information, please visit: [http://www.energystar.gov/index.cfm?c=manuf\\_res.pt\\_manuf](http://www.energystar.gov/index.cfm?c=manuf_res.pt_manuf)
- If you have any questions, please email [ups@energystar.gov](mailto:ups@energystar.gov)



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## Open Items & Questions



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## Open Items and Questions



- The line is now open for any items or questions that have not been addressed previously.

## Thank you!



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