# ENERGY STAR®
# Data Center Storage
# Version 1.0

## Stakeholder Webinar
## Supplementary Data Set Development

23 February 2011

EPA

# Agenda

- Recap EPA Announcement re: Secondary Data
- Opportunity for Discussion & Comments from Industry
- Review Timeline & Next Steps

# Objective

- Augment current data set (17 products, 42 data points) with a 2nd round of tests, using a consistent test method.

| # Systems (# Configs) | Online | Near-online | Removable Media Library | Virtual Media Library |
|---|---|---|---|---|
| Group 2 | -- | – | 1 (2) | 2 (2) |
| Group 3 | 5 (7) | – | 2 (10) | -- |
| Group 4 | 5 (19) | 1 (1) | 1 (1) | -- |

# Taxonomy of Interest

- Online Systems
  - SNIA Taxonomy Categories 2, 3, 4
- Removable Media Libraries
  - SNIA Taxonomy Categories 2, 3, 4

# Single-Variable Changes

- Further understand relationship between hardware/software configuration and energy performance in both active and idle states.
- Narrow focus to key variables from Round 1:
  - Hard Disk Drive (HDD) selection (e.g., capacity vs. performance)
  - Reliability-Availability-Serviceability (RAS) features (e.g., single vs. redundant controllers, RAID level)
  - Small Form Factor (SFF) and Solid State Disk (SSD) drive technologies
  - Software features ON/OFF
  - Other variables as resources permit

# Areas of Interest

- Variation Across Taxonomy Categories
  - Assess performance of Online Group 2, Removable Media Library Group 2, or Removable Media Library Group 4 systems, for which no data has been submitted to date.
  - Compare Online Group 3 & 4 systems, Removable Media Group 2, 3, and 4 systems.
- Effect of Drive Quantity
  - Change HDD quantity versus a fixed number of controllers on an otherwise equivalent system.
  - Preferably vary drive quantity in multiples of 2 (e.g., test with N, 2N, and 4N, 8N drives).

# Areas of Interest

- Effect of Drive Technology
  - Drive speed (e.g., 7200 vs. 15k RPM) and Small Form Factor (SFF) / Solid State Drives (SSD) versus traditional drive technologies on an otherwise equivalent system.
- Effect of RAS Features (hardware or software)
  - RAS features vs. lack of RAS features on an otherwise equivalent system.
- Isolation of Controller vs. Drawer PSUs
  - Measure loading of individual power supplies (or groups of power supplies) within a system.

# Product Family Approaches

- Continue to pursue a meaningful Product Family definition to ensure program integrity with minimal test burden
- Use data to validate one of the following possibilities:
  - Book-ending: Test ‘smallest’ and ‘largest’ configuration (based on one or more key variables) as boundaries for ENERGY STAR qualification
  - N and *x*N: Test a given configuration with N and 2N (or xN) of a key variable, then extrapolate qualification to smaller or larger configurations

# Simulation Data

- EPA will consider simulated (modeled) data to reduce test burden:
  - Simulators must be robust and capable of identifying meaningful differences in energy performance
  - If simulated data is provided, all tested systems should be run through the simulator to assess simulator accuracy

# Discussion

Questions?

# Timeline

- PSU data may still be submitted for consideration
- Additional test or simulator data received by **April 22, 2011** will be considered by EPA
- Data will be analyzed and results in late April. EPA will make anonymous data available to stakeholders for concurrent analysis
- The 2nd draft product specification will be distributed for comment in May

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