ENERGY STAR® Computer Stakeholder Meeting

Draft 1 Specification

February 15, 2006

Washington, DC

Meeting Agenda

- Overview and Rationale for Draft 1 Specification
- Environmental Benefits of Draft 1 Requirements
- Industry Presentations and Group Discussions
  I. Low Power Modes
  II. Power Supply Efficiency
  III. Idle State Testing Categorization and Requirements
  IV. Tier II Idle / Performance Benchmarking Specification
  V. Power Management
- Timeline and Action Items

Overview and Rationale

Key elements of the draft 1 specification

- Products covered –
  - Notebooks & tablets
  - Desktops, multimedia computers and integrated computers (basic and high performance)
  - Game consoles
  - Workstations
  - Desktop-derived servers

Overview and Rationale (cont'd)

Key elements of the draft 1 specification (cont'd)

- Specification focuses on guaranteed savings
  - Power supply efficiency for savings in all modes of operation
  - Idle state specification for significant active mode savings
- Continues to address low power modes
  - Standby (off mode) specification
  - More rigorous sleep requirements

Overview and Rationale (cont'd)

Key elements of the draft 1 specification (cont'd)

- Power management
  - Default times for low power modes
  - User education requirement
  - Requires WOL to be enabled
- Tier II requirements
  - Energy performance benchmark, or
  - Stricter provisional idle state levels

Overview and Rationale (cont'd)

Key elements of the draft 1 specification (cont'd)

- Test procedures

Standby (off mode)	IEC 62301
Sleep Mode	Existing ENERGY STAR test procedure (from MOU v3)
Idle State	Draft idle test procedure (Appendix B)
External Power Supplies	Existing ENERGY STAR external power supply test methodology
Internal Power Supplies	Draft test procedure developed by California's PIER program (available at www.efficientpowersupplies.com)

Overview and Rationale (cont'd)

Key elements of the draft 1 specification (cont'd)

- Effective Dates
  - Tier I Target effective date of January 1, 2007
  - Tier II Target effective date of January 1, 2008

Noah Horowitz, NRDC – Environmental Benefits of Draft 1

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I. Low Power Modes

Draft Specification Requirements

Product Type	Standby	Sleep
Desktops	≤ 2 W	≤ 5 W
Integrated Computers	≤ 3 W	≤ 7 W
Notebooks	≤ 1 W	≤ 5 W
Workstation	≤ 2 W	≤ 5 W

Industry Presentations
Erik Peter, Intel - WOL
David Cassano, Apple - Workstations

Questions for Discussion

- Does the WOL function require additional power for sleep and standby? How much? Is there data to support this?
- Do workstations require more power in low power modes? If so, why and how much? Is there data to support this?
- Do levels need to be set for game consoles? If so, why and what should they be? Is there data to support this?

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II. Power Supply Efficiency

Draft Specification Requirements

- External PS: ENERGY STAR EPS Specification
- Internal PS:
  - Desktops, Integrated, Workstations: ≥ 80%
  - Desktop Derived Servers: 75% at 20% rated output; 80% at 50%; 77% at 100%
- Power Factor: 0.9 at 100% rated output

Industry Presentation
Robert White, Dell – Power Supply Efficiency

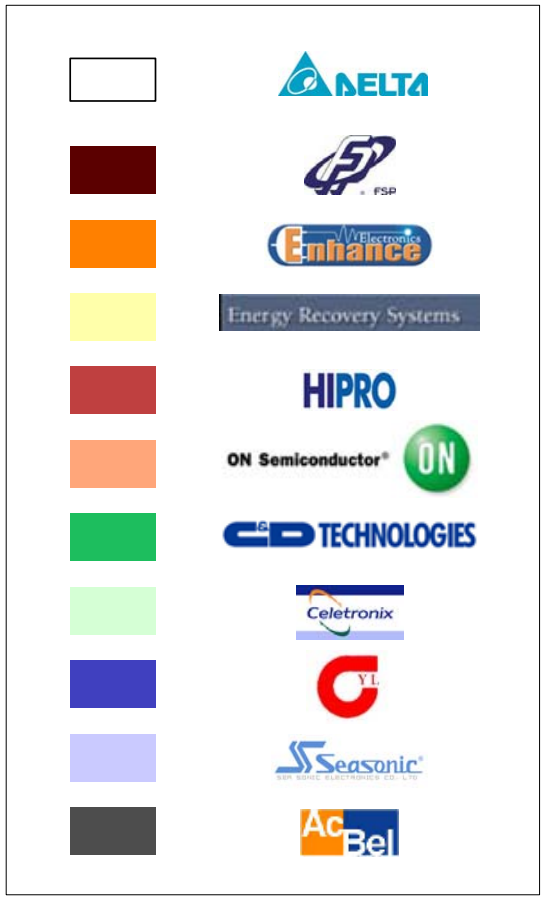
EPA Presentation:
Power Supply Update

Progress on Efficient Power Supplies to Date

- ENERGY STAR has identified 11 computer PSU manufacturers who *already* have the capability to produce compliant PSUs

- Top-tier manufacturers like FSP/Sparkle, Hipro, and Delta have the capability

80% Technology Achieved in Wide Range of PSU Models and Manufacturers



- 11 qualifying manufacturers
- 21 qualifying desktop and server power supplies

Qualifying ENERGY STAR Qualifying PSUs

Enhance Electronics ENH-0480A 400W EPS1U
Enhance Electronics ENP-3648F 480W ATX12V
Enhance Electronics ENP-5136GH ATX12V
Delta Electronics DPS-400 400W ATX12V
Enhance Electronics ENP-3927B 275W TFX12V
FSP Group FSP300-60GND 300W ATX12V
Enhance Electronics ENP-5130GH 300W ATX12V
Enhance Electronics ENP-5150GH 500W ATX12V
Enhance Electronics ENP-5146GH 460W ATX12V
Enhance Electronics ENP-5140GH 400W ATX12V
Energy Recovery Systems ERS-PC365 365W ATX12V pre-production sample
Hipro HP-W366PA3 366W ATX12V pre-production sample
Celetronix 250W ATX12V prototype
C&D Technologies D1U-W-1200-12-HC2 1600W 1U server form factor
ON Semiconductor 250W ATX12V reference design
Crown Young Industries 400W ATX12V
Seasonic SS-300SFD 300W ATX12V
Seasonic SS-600HT 600W ATX12V
Seasonic SS-500HT 500W ATX12V
Seasonic SS-400HT 400W ATX12V
Acbel API12FS34 600W custom form factor

2/05 3/05 4/05 5/05 6/05 7/05 8/05 9/05 10/05 11/05 12/05 1/06 2/06 3/06

1/05 3/06

Why Power Factor is Included…

- Recent study shows that an additional 15% - 20% electricity savings as a result of reduced line losses due to PFC (soon available: www.EfficientPowerSupplies.org)

- Utilities and international stakeholders support power factor correction in high-power devices

Questions for Discussion

- Is the proposed January 1, 2007 Tier I effective date reasonable?

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Lunch Break

12:30 p.m. – 1:15 p.m.

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III. Idle State Testing, Product Categorization, and Requirements

Draft Specification Requirements

Idle State

- Desktops
  - Basic Performance: ≤ 49 W
  - High Performance: ≤ 74 W
- Integrated Computers: TBD
- Notebooks: ≤ 21 W
- Workstations: ≤ 115 W
- Desktop Derived Servers: TBD
- Game Consoles: TBD

Desktop Categorization

Basic Performance
- Processor < 2.7 GHz

or
- SPECInt Score < 22

High Performance
- Processor ≥ 2.7 GHz
- Multi-core / Multiple Processor

or
- SPECInt Score ≥ 22

Industry Presentation
Steve Ortmann, HP – Power Management and Idle

Questions for Discussion

- Is SPEC preferred by industry for product categorization over number of processors and speed? If so, is the proposed cutoff of 22 appropriate?
- Are there other methods of categorizing desktops based on performance and power needs?
- Can industry provide data on workstations and desktop-derived servers to inform appropriate specification levels?
- How should idle levels for gaming consoles be determined?

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IV. Tier II Idle / Performance Benchmarking Specification

EPA Presentation:
Rebecca Duff, ICF Consulting

Draft Specification Requirements

Proposed Effective Date: January 1, 2008

- Provisional Tier II **OR**
- Performance Benchmark

Proposed Provisional Tier II Levels

Desktops/Integrated Computers	≤ 46 W Basic Performance ≤ 65 W High Performance
Notebooks	≤ 19 W
Workstations	≤ 105 W
Desktop-Derived Servers	TBD
Game Consoles	TBD

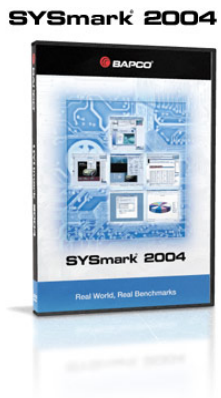
Performance Benchmark

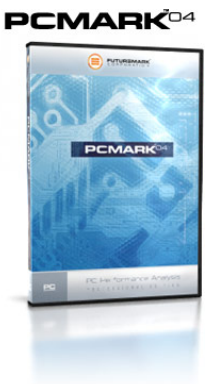
- A successful metric will:
  - Represent the amount of energy used by computer during typical usage pattern
  - Provide for a fair comparison across multiple platforms
  - Allow for scaling with increased performance

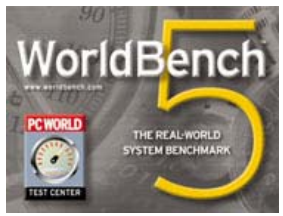
- Provide manufacturers flexibility to address energy use while ensuring performance

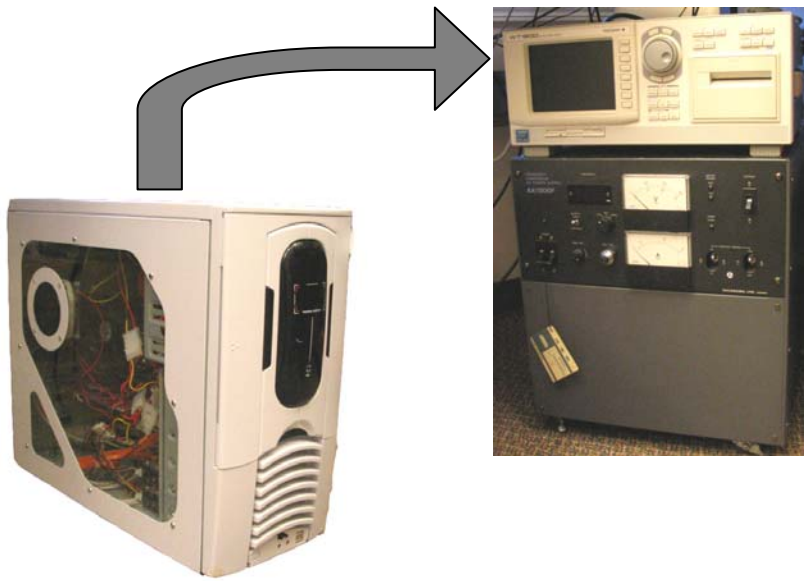
Test Procedure

- Computer plugged into meter/energy use recording begins
- Benchmark is run (SYSmark/Worldbench/PCMark)
- Energy use recorded over the course of the benchmark and paired with benchmark score









Benchmark Software Challenges

- Challenges with existing benchmarks:
  - Defining the Test Period
  - Shutting Down Over the Course of the Benchmark
  - Inherent bias favoring certain hardware
  - Some operational modes not represented
  - Cross Platform Testing

Questions for Discussion

- Are there other benchmarks available that would be appropriate to use to measure energy performance?
- What are other resources or strategies that could support the development of a benchmark?

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V. Power Management

Draft Specification Requirements

Power Management

- Default to activate the display's low-power mode within 15 minutes of user inactivity
- Default to activate the computer's low-power mode within 30 minutes of user inactivity
- User education requirement
  - Include information on the benefits of power management in the user manual and box insert
- Units shipped WOL enabled

Questions for Discussion

- How can EPA and industry collaborate on efforts to increase power management enabling rates?

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Break

3:20 p.m. – 3:35 p.m.

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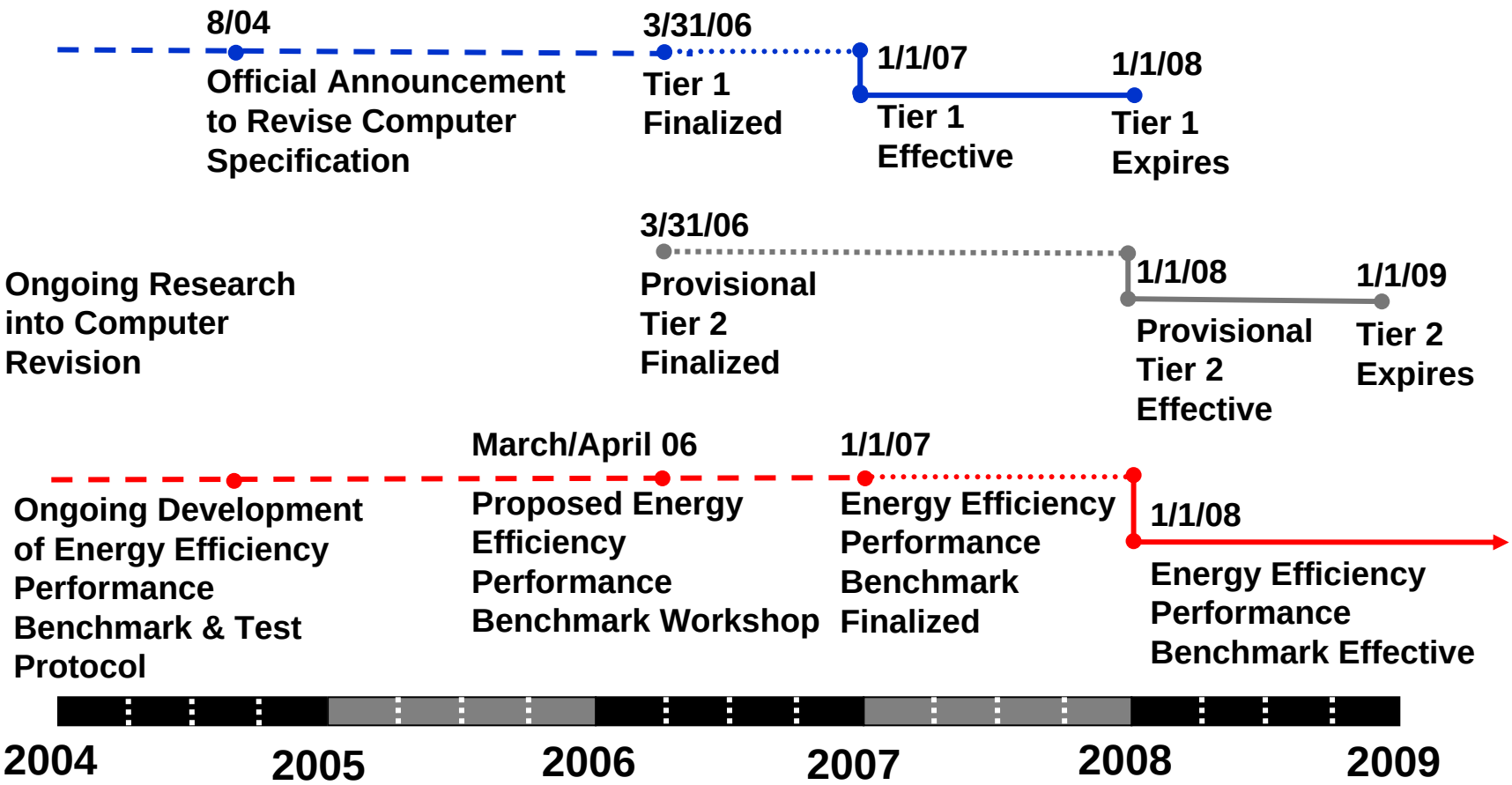
Timeline and Summary of Action Items Taken from the Meeting

Specification Timeline



Action Items

Overall

- EPA determines how to deal multiple configurations re: testing and reporting.
- EPA will reach out to manufacturers of gaming consoles to engage them in this process. Stakeholders can share any contacts to help with process.

Low Power Modes (WOL & Workstations)

- Stakeholders share data with EPA regarding WOL and low power modes for workstations to justify position.
- EPA will continue to refine workstation definition to clearly differentiate from high end desktops.
- Investigate the use of sliding scale for sleep mode based on MB of RAM.
- Stakeholdes share data to justify increase of NB off mode to 2w.

Workstations

- EPA, EC, and industry refine Workstation definition. First step, industry shares comments on definition in draft.
- Determine appropriate approach for these products (i.e., consider proposal for PS only Tier I).

Power Supply Efficiency

- EPA will share information on which they based Tier I PS requirement.

Action Items (Continued)

Idle

- Industry will flag concerns re: specific portions of EPA data set-points that seem counter-intuitive. EPA will provide greater detail, to the degree we have it, re: these points.
- Industry will supply complete data of current models for a more current and complete data set to set levels-for all product types.
- EPA with other interested parties (e.g., HP, AMD, Dell, EC) will develop questions for SPEC and will relay info from conversation with SPEC to larger group. First step, EPA to initiate conference call early next week then will report out.
- EPA will investigate ECMA initiatives.

Action Items (Continued)

Power Management

- EPA to host cc 2/28, 1-3. Will distribute call in info this week.

Tier 2 / Benchmarking

- EPA to share design and logistics by 2/28 re: benchmarking meeting in March/April

Thank You / Contact Information

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

Please address all further questions and comments to:

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