



# ENERGY STAR® Electronics Product Update

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# Televisions



- Key Dates
  - Nov 1, 2008: V3.0 Tier 1 effective
  - Jan 2009: Tier 2 in progress.
  - Sep 2010: V3.0 Tier 2 originally scheduled effective date
    - Tier 2 has been accelerated, anticipated to become effective sooner.
- Market Data
  - V3.0 Products
    - 464 qualifying products from 22 manufacturers:
      - 367 LCD, 86 Plasma, 11 Rear Projection
      - 78 with Automatic Brightness Control
    - 2007: ~ 17 million units, 53% ENERGY STAR V2.2 market penetration\*
  - Sales Forecast: ~ 36 million units (US, 2009)\*\*
- Savings Potential\*\*\*
  - ENERGY STAR V3.0 products are up to 30% more efficient than conventional models.
  - ENERGY STAR V3.0 products offer up to \$1 billion per year in energy savings, with GHG emissions reduction equivalent to taking 1 million vehicles off the road each year\*\*\*\*



\*2007 Unit Shipment Data / \*\*CEA 2012 Forecast / \*\*\*ENERGY STAR Assessment / \*\*\*\*Assumes 100% ENERGY STAR market penetration

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The Version 3.0 ENERGY STAR program requirements for Televisions took effect on November 1, 2008. V3.0 is notable for the inclusion of

- On Mode power consumption limits, defined as a function of screen size and resolution.
- 1W maximum Standby Mode power consumption requirement.

V3.0 requirements are also designed to encourage manufacturers to adopt energy-saving features such as Automatic Brightness Control.

Due to the speed at which the TV market is transforming to meet the V3.0 requirements, EPA has already begun work on defining the more stringent Tier 2 limits for On Mode power consumption requirements, planned for an effective date of September 2010.

This represents an acceleration of the process, and may result in delivering V3.0 Tier 2 in advance of the planned effective date.

# Displays / Monitors



- Key Dates
  - Jan 30, 2009: V5.0 finalized (products < 30" diagonal screen size)
  - Mar 30, 2009: V5.0 finalized (all products)
  - Oct 30, 2009: V5.0 Tier 1 effective (all products)
  - Oct 2011: V5.0 Tier 2 effective (all products)
- Market Data
  - V4.0 Products
    - 2224 qualified products from 53 manufacturers
    - 2007: ~ 40 million units, 92% ENERGY STAR market penetration (up from 35% in 2006)\*
  - Sales Forecast:
    - Digital Photo Frames: ~ 10 million units (US, 2009)\*\*
    - Displays <30" Diagonal: ~ 42 million units (US, 2009)\*\*\*
    - Displays >30" Diagonal: ~ 9 million units (N. America, 2011)\*\*\*\*
- Savings Potential\*\*\*\*\*
  - Digital Photo Frames: 52 kWh; 80 lbs CO2 over product lifetime
  - Displays <30" Diagonal: 46 kWh; 71 lbs CO2 over product lifetime
  - Displays >30" Diagonal: TBD pending data collection



\*2007 Unit Shipment Data / \*\*CEA 2012 Forecast / \*\*\*LBL Memo / \*\*\*\*iSuppli / \*\*\*\*\*ENERGY STAR Assessment

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The ENERGY STAR V5.0 specification for displays/monitors represents

- An expansion of the original spec from traditional computer monitors to other types of displays: the very small (photo frames), to the very large (professional displays)
- Reflects product convergence
- Responds to the resulting need for harmonized test procedures in the TV and Display product categories, as they now employ the same technologies.

The V5.0 specification for displays was distributed on December 5, 2008; Stakeholder comments on the Draft Final specification were due on January 5, 2009.

In addition to the expanded scope of the specification, the Draft Final version defines On Mode power consumption limits as a factor of both screen area and display resolution.

As of this latest V5.0 draft, additional data is required to set power consumption limits for the professional display category (> 30" diagonal screen size). Therefore, EPA has requested additional data from product manufacturers, and the final specification limits for professional displays will be delayed by two months. The specification effective date will remain October 30, 2009.

EPA plans to revise the specification (Tier 2) for a planned effective date of October 2011, as informed by market conditions and technological advancement.

# Audio / Video



- Key Dates
  - Nov 21, 2008: V2.0 revision announcement
  - Dec 17, 2008: Kickoff Web meeting
  - Jan 10, 2009: Meeting at Consumer Electronics Show
  - Feb 2009: Draft 1 release
- Market Data
  - V1.1 Products
    - 933 qualified products from 25 manufacturers
    - 2007: ~ 10 million units, 36% ENERGY STAR market penetration\*
  - Sales Forecast (US, 2009)\*\*
    - DVD and Blu-ray Disc Players: ~ 22 million units
    - Home Audio Products: ~ 9 million units
- Savings Potential\*\*\*
  - ENERGY STAR V1.0 products are up to 40% more efficient than conventional models.
  - ENERGY STAR V1.0 products offer average lifetime savings of more than 120 kWh and 180 lbs CO<sub>2</sub>.



\*2007 Unit Shipment Data / \*\*CEA 2012 Forecast / \*\*\*ENERGY STAR Assessment

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On November 21, 2008, EPA launched the specification revision process for the Audio/Video product category.

The existing Version 1.0 ENERGY STAR specification for Audio/DVD products, which has been in effect since 2003, was designed to address Standby energy use in the limited set of product types available at the time.

Further, rapid turnover of products and technologies and changes in usage patterns within the category calls for a new, more inclusive, and more flexible specification to promote greater energy efficiency in today's diverse market for audio/video products.

EPA is working with stakeholders to assess both new opportunities for increased product efficiency and the potential to address new product categories (i.e. digital audio/video systems) and technologies currently available in the marketplace. AV products for professional/commercial markets are also under consideration for the V2.0 specification.

# Computers



- Key Dates
  - Jul 1, 2009: V5.0 effective
  - July 2010: V5.0 Game Console requirements effective (proposed)
    - Requirements to be finalized Q1 2009
- Market Data
  - V4.0 Products
    - 2574 qualified products from 86 manufacturers
      - 1389 laptops, 1139 desktops, 46 workstations
    - 2008 Unit Shipment Data for V4.0 will be published in mid-2009.
  - Sales Forecast (US, 2009)\*
    - Desktop PCs: ~ 9 million units
    - Notebook PCs: ~ 22 million unit
- Savings Potential\*\*
  - ENERGY STAR V4.0 computers will use 20% to 50% less energy than conventional models depending on how they are used.
  - For every 100 ENERGY STAR V3.0 computers a business replaces with computers meeting the new ENERGY STAR V4.0 specification, it will save \$200 to \$2,000 per year on energy bills.



\*CEA 2012 Forecast / \*\*ENERGY STAR Assessment

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The latest round of work on this product category began as a planned Tier 2 revision to the V4.0 Computers specification. However, the changes to the specification were significant enough to warrant a full specification revision, creating the V5.0 Computers specification, which was finalized on November 14, 2008. The V5.0 specification includes:

- Power consumption limits for notebook and desktop computers
- Power consumption in off, sleep, and idle modes is evaluated using a Total Energy Consumption (TEC) calculation based on standard usage cycles. The TEC calculation has been refined such that the energy consumption data provides a better representation of what would be expected in actual end-use applications.
- Data from stakeholders and other sources was used to define standard usage patterns in off, sleep, and idle modes for these products.
- For small-scale servers and workstations, V5.0 specification defines new, more stringent energy efficiency requirements. V5.0 also defines qualification criteria for thin clients, a new product type in the computers category.

EPA has extended the timeline for developing requirements for game consoles to allow for additional development work with stakeholders. Criteria for game consoles will be added to the Version 5.0 computers specification once vetted with interested stakeholders and finalized.

# Set-Top Boxes



- Key Dates
  - Apr 23, 2009: V1.0 Svc. Provider Partnership Requirements effective
  - Jan 1, 2009: V2.0 Tier 1 Product Requirements effective
  - Jan 1, 2011: V2.0 Tier 2 Product Requirements effective
- Market Data
  - Service Providers Partners: AT&T, DirecTV
  - 17 qualified products from 3 manufacturers
    - Manufacturer Partners: Cisco, Motorola, Pace PLC (UK)
- Savings Potential\*\*
  - ENERGY STAR V1.0 STB products are on average 25% more efficient than conventional models.
  - ENERGY STAR V1.0 STB products offer up to \$2 billion per year in energy savings, with GHG emissions reduction equivalent to taking 2.5 million vehicles off the road each year\*



\*Assumes 100% ENERGY STAR market penetration / \*\*ENERGY STAR Assessment

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EPA suspended the early version of the STB specification as of December, 2004, until the role of service providers could be effectively addressed.

EPA performed a broad revision of the requirements in the move to V2.0 to accommodate advances in technology and power management techniques that were not available at the time of the previous specification. Notably, the V2.0 requirements address:

- energy-efficiency criteria
- detailed guidance on labeling qualified products, and
- requirements for service providers to commit to purchasing and deploying ENERGY STAR qualified set-top boxes.

V2.0 Unit Shipment Data and ENERGY STAR market penetration for 2009 will be available in mid-2010.

# Enterprise Servers



- Key Dates
  - Nov 4, 2008: Draft 3 distributed to industry
    - Continuing to work on idle and power management requirements
  - Late Jan 2009: Draft 4 distributed to industry
  - Feb 2009: V1.0 Tier 1 effective (date likely to be pushed back)
  - Oct 2010: *Proposed* Tier 2 effective date
- Market Data
  - Sales Forecasts (US, 2009)\*\*
    - Volume servers (1&2P): 3.5 million units
    - Mid-range servers (4P): 54,000 units
  - The data center sector consumed ~61 billion kWh in 2006, ~1.5% total U.S. electricity consumption and ~\$4.5 billion in energy costs.\*
  - Without efforts to curb demand, current projections show worldwide carbon emissions from data centers will quadruple by 2020.\*\*\*
- Energy Efficiency Potential – Power Supplies\*\*\*\*
  - Volume Server: 82 kWh/year, 247 kWh over lifetime (3 years)
  - Mid-Range Server: 142 kWh/year, 425 kWh over lifetime (3 years)
  - Savings per Data Center (assume 200 servers - including infrastructure savings)
    - 99,800 kWh/year, 300,000 kWh saved over lifetime (3 years)



\*EPA Data Center Energy Efficiency Report to Congress (8/2007) / \*\*IDC Market Research / \*\*\*McKinsey & Company / \*\*\*\*EPA Preliminary assessments 7

Enterprise Servers are a new product category in the ENERGY STAR program.

Data centers represent a large and growing portion of energy consumption around the globe, so even small improvements in data center product efficiency can lead to significant worldwide energy savings and CO<sub>2</sub> emissions reductions.

Enterprise servers are the core component to any data center and consume roughly a third of the total electricity. Any improvement in server efficiency leads to a reduction in generated heat, and thus a reduction cooling and auxiliary infrastructure needs, further compounding the net environmental benefits.

EPA released a Draft 3 specification on November 4, 2008. The Draft 3 proposal includes

- minimum power supply efficiency (AC-DC and DC-DC) levels
- maximum Idle power levels categorized by the number of processors
- power supply redundancy, and amount of memory
- Various performance reporting requirements.

The Draft 3 comment period ended December 3, 2008. The planned effective date for this specification is in February, 2009, with a revision planned to be effective in October 2010.

# Imaging Equipment



- Key Dates
  - Oct 1, 2008: V1.1 finalized
  - Jul 1, 2009: V1.1 effective
- Market Data
  - V1.0 Products
    - 4035 qualified products from 44 manufacturers
    - 2007: > 50% ENERGY STAR market penetration for some product types.
  - In 2007, approximately 225 million imaging equipment products will consume more than \$8.5 billion in energy, accounting for 3% of U.S. electricity expenditures.\*\*
- Savings Potential\*\*
  - ENERGY STAR V1.0 imaging equipment products are on average 25% more efficient than conventional models.
  - ENERGY STAR V1.0 imaging equipment products offer \$3 billion per year in energy savings, with GHG emissions reductions equivalent to taking more than 4 million cars off the road.\*



\*Assumes 100% ENERGY STAR market penetration / \*\*ENERGY STAR Assessment

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V1.0 ENERGY STAR requirements for Imaging Equipment became effective in April, 2007.

The specification used both Total Electricity Consumption (TEC) and Operational Mode (OM) approaches to determining power consumption requirements for a variety of products, including copiers, digital duplicators, mailing machines, multifunction devices (MFDs), printers, fax machines, and scanners. A TEC or OM approach was selected for each covered product

The V1.1 specification was finalized in October of 2008, for an effective date of July 1, 2009.

V1.1 defined Tier 2 power consumption requirements for the products covered by the V1.0 specification, and the list of qualifying products was expanded to include mailing machines and large-format printers.

# Digital-to-Analog Converters



- Key Dates
  - Jan 31, 2007: V1.0 effective
  - Feb 17, 2009: Deadline for Digital TV transition
    - Note: Obama has proposed a delay due to lack of program funding for converter box rebates. The FCC, CEA, and others have proposed alternatives. Transition date TBD.
- Market Data
  - V1.0 products
    - 57 qualified products from 12 manufacturers.
  - EPA estimates 22 million DTA converter boxes will be sold during the digital TV transition\*\*
  - EPA estimates energy usage from conventional DTA products to be greater than 3 billion kWh per year, or \$270 million annually in additional electricity bills.\*\*
- Savings Potential
  - ENERGY STAR V1.0 DTA products are up to 50% more efficient than conventional models.
  - ENERGY STAR V1.0 DTA products offer energy savings of 13 billion kWh and \$1 billion in energy costs over the life of the product, with GHG emissions reductions equivalent to taking more than 1 million cars off the road



\*Assumes 100% ENERGY STAR market penetration / \*\*ENERGY STAR Assessment

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EPA developed a DTA specification to address the February, 2009 mandatory transition to all-digital television broadcasts, acknowledging the unique market for DTA products, as sole-purpose DTA boxes have limited life and have been created in response to government action.

The ENERGY STAR Digital-to-Analog Converter specification defines On mode, Sleep mode, and auto-power down requirements for DTA products. ENERGY STAR DTAs must

- Consume no more than 8W in On Mode
- Consume no more than 1W in Sleep Mode and
- Automatically power down after 4 hours or less of user inactivity.

# Additional Scoping



- Enterprise Data Storage
  - Scoping initiated Jan 1, 2009
  - Specification development to commence pending Scoping results
- Home Network Equipment
  - Scoping initiated Jan 1, 2009
  - Specification development to commence pending Scoping results
- Additional Product Scoping Planned in 2009
  - Uninterruptible Power Supplies (UPS)
  - Data Center Network Equipment
  - Home Storage
  - Point of Sale Devices
  - Standby Power Switch / Smart Power Strips



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EPA has identified two additional electronics product categories as promising candidates for ENERGY STAR in 2009

Enterprise Storage products are used side by side with Enterprise Servers in data center applications, presenting similar opportunities for significant energy savings. This fact, together with EPA's experience, industry contacts, and accumulated expertise with data center energy efficiency, makes Enterprise Storage a natural target for a new ENERGY STAR specification at this time. EPA will make a decision to move forward with full specification development after scoping is complete.

In response to interest on the part of ENERGY STAR partners and other stakeholders, EPA has identified Home Network Equipment as a candidate for scoping in 2009. Home Network Equipment products are in wide use throughout homes in the US, and since these products are rarely turned off it is believed that there is opportunity for significant energy savings to be realized through ENERGY STAR. EPA will make a decision to move forward with full specification development after scoping is complete.

EPA will also be researching Uninterruptible Power Supplies (UPS), Data Center Network Equipment, Home Storage, Point of Sale (POS) Devices, and Standby Power Switches in 2009, as candidate product categories for future ENERGY STAR specification development.

# Resources



- [www.energystar.gov/products](http://www.energystar.gov/products)
  - Qualified product lists
  - Special deals finder
  - Store locator
  - Eligibility requirements and partnership commitment information
- [www.energystar.gov/productdevelopment](http://www.energystar.gov/productdevelopment)
  - Specs at-a-Glance document
  - Product development reports
  - New spec development and spec revision timelines, process guidance, documentation and contacts
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