



ENERGY STAR®
Audio/Video
Specification Development

Kick-off Webinar
17 December 2008

Agenda



- **Introductions** 5 min.
- **ENERGY STAR Overview** 15 min.
Kathleen Vokes, U.S. EPA
- **V 1.0 Audio/DVD Review** 10 min.
Kathleen Vokes, U.S. EPA
- **V 2.0 Audio/Video: Product Considerations** 10 min.
Steve Pantano, ICF International
- **V 2.0 Audio/Video: Technical Considerations** 15 min.
Tom Bolioli, Terra Novum, LLC
- **Open Discussion** 45 min.
- **Preliminary Timeline** 5 min.
Steve Pantano, ICF International
- **Review Action Items & Adjourn** 15 min.
Steve Pantano, ICF International

Introductions



- Kathleen Vokes (EPA)
- Tom Bolioli (Terra Novum)
- Steve Pantano (ICF)
- Sophia Peters (ICF)

ENERGY STAR Overview



- What is ENERGY STAR?



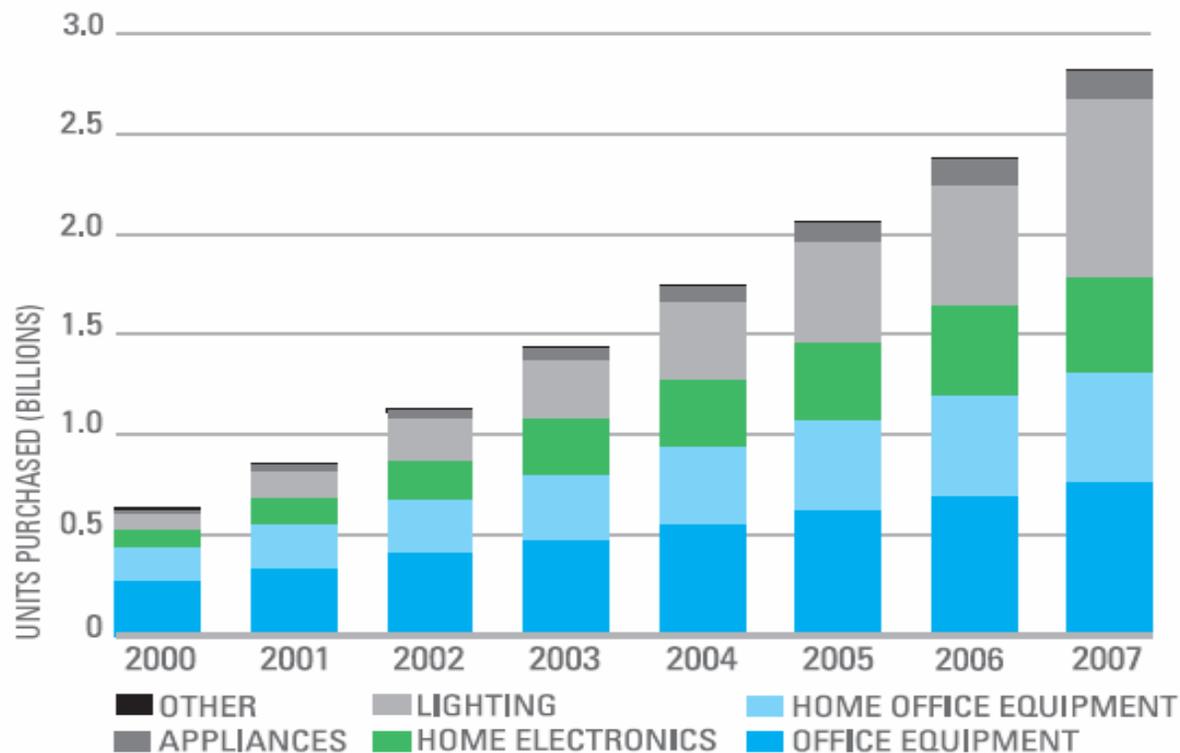
- A voluntary public-private partnership program
- A strategic approach to energy management
- Recognized by over 70% of Americans
- An internationally recognized brand



ENERGY STAR Overview



- ENERGY STAR Impact



More than 2.5 Billion ENERGY STAR qualified products purchased since 1992⁵

ENERGY STAR Overview



- Guiding Principles of Specification Development
 - Cost-effective efficiency
 - Performance maintained or enhanced
 - Significant energy savings potential
 - Efficiency improvements are achievable with non-proprietary technology
 - Product differentiation and testing are feasible
 - Labeling can be effective in the market

ENERGY STAR Overview



Specification Development Cycle



V1.0 Audio/DVD Review



- Version 1.0, Phase II effective in 2003
- Energy efficiency requirements only specified for Standby mode. No Sleep mode defined.
- Test procedures not harmonized with ENERGY STAR specifications for other product categories.
- Qualifying products:
 - DVD Products (includes Blu-ray Disc players)
 - Audio Equipment: cassette decks, CD players/changers, CD recorders/burners, clock radios, equalizers, laserdisc players, mini- and midi-systems, minidisc players, powered speakers, rack systems, stereo amplifiers/pre-amplifiers, stereo receivers, table radios, and tuners
 - Specifically excludes professional, automotive, or solely battery-powered products. No low-voltage DC products included.

V1.0 Audio/DVD Review



- Projected 2008 Savings

	Sales (1000s)	Market Penetration	Carbon Avoided (MMTC)
Audio Equipment <ul style="list-style-type: none"> • Mini-Systems • Home Theater • Receivers, Amplifiers, Speakers • CD Players 	3,903 2,720 2,062 598	9% 25% 37% 0%	0.2
DVD Players	19,394	45%	0.2

V1.0 Audio/DVD Review



- Current Usage Patterns (hrs/day)
 - Important to consider how much time products spend in different modes
 - Data below is based on the TIAX 2007 Report – Energy Consumption by Consumer Electronics in US Residences and an ECOS 2006 study
 - Usage patterns for professional products and other products may differ

	Active	Idle	Off
Mini-Systems	2	2	24
Home Theater-in-a-Box	4	2	18
DVD Players	1-5	0-2	19-24

V2.0 Audio/Video



- Goals for V2.0:
 - Revise qualification criteria to recognize only top 25% performers for energy efficiency.
 - Update product list to include products not available in 2003.
 - Digital media, low-voltage DC, etc.
 - Include On-mode power consumption in energy efficiency calculations.
 - Encourage adoption of auto power-down and other energy-saving features.
 - Update specification to include latest ENERGY STAR best practices, lessons learned, etc.

V2.0 Audio/Video



- Goals for V2.0 (continued):
 - Update test procedures to harmonize with other ENERGY STAR and international specifications, where possible.
 - Update operational mode definitions to harmonize with other ENERGY STAR and international specifications, where possible.
 - On-, Sleep-, Ready-, Off-Mode, etc.
 - Ensure clear differentiation with Set-top Box (STB) specification. Consistent test procedures, definitions, and power consumption limits will ensure harmonization and continuity with the STB spec.
 - STB devices come with service-provider agreements, A/V devices do not. Some products may overlap.

V2.0 Audio/Video: Products



- Preliminary Product List

Home Consumer / Retail

- *Receivers*
- *Audio Components*
 - Amplifier, Tuner, Equalizer
- *Removable Media Players*
 - CD Player, DVD Player, Blu-ray Disc Player
- *Home Theater in a Box*
- *Self-powered Speakers / Subwoofers*
- *Digital Media Servers & Distribution Systems*
 - Satellite/HD Radio Receivers
 - Digital Audio (e.g. Slim Devices, Sonos, Russound)
 - Digital Video (e.g. Slingbox, AppleTV, Vudu, etc.)

Pro Consumer / Commercial

- *Receivers*
- *Audio Components*
 - Single/Multi-Channel Amplifier, Equalizer, Mixer
- *Self-powered Speakers / Subwoofers*
- *Microphone & Recording Systems*
- *Videoconferencing Systems*
- *Video Distribution & Switching*
 - Video Over Cat-5, etc.

V2.0 Audio/Video: Products



- Notes:
 - Interconnected Devices
 - Ensure front-end units stop outputs when not in use to allow downstream components to power down.
 - Encourage technologies to reduce data/network link power during times of low/no utilization
 - Explore methods for devices to retain full network connectivity in sleep.
 - Standardize HDMI CEC (Consumer Electronics Control) protocols to facilitate auto power-down of peripherals.
 - Small/Portable Devices (primarily battery-powered)
 - Can qualify as End-use Products if they use a qualified External Power Supply Adapter.

V2.0 Audio/Video: Technical



- Modal Approach
 - Criteria specified in Watts
 - Each mode has a budget
 - For example: Off = 1 Watt, On = 10 Watts, Sleep = 3 Watts
 - Every product needs to meet or exceed every mode's levels
 - Doesn't allow for trade-offs and assumes a great deal about design and form

V2.0 Audio/Video: Technical



- TEC (Total Energy Consumption) Approach
 - Criteria specified in kWh/year rather than Watts.
 - Two possible approaches:
 - *Calculated*: Employs measurements of average power under key operations, applied to a duty cycle representing a typical user, e.g.,

$$\text{TEC (kWh/year)} = P_{\text{on}} * \text{Hours}_{\text{on}} + P_{\text{sleep}} * \text{Hours}_{\text{sleep}}$$

- *Measured*: Power consumption is measured for specific operating modes over a specified time, then extrapolated out to predict yearly totals.

V2.0 Audio/Video: Technical



- TEC Approach – Benefits
 - Goal of any ENERGY STAR specification is to save kWh, thus criteria better match desired outcome.
 - Gives manufactures flexibility in reaching savings targets.
 - Allowances in kWh/year can be added for additional functionality, regardless of form.
 - Does not need to prescribe requirements for components (e.g., power supply) or energy savings features (e.g., auto power down) to ensure energy savings.
 - Less likely to result in perverse outcomes than criteria based on Watts for various power states – i.e. products that meet the criteria but actually use more energy than other products that don't meet the criteria.

V2.0 Audio/Video: Technical



- TEC Approach – Hypothetical Perverse Outcome

Mode	Criteria (Watts)	Model A PASS	Model B FAIL
On	14	12	18
Standby	10	10	4

- If both On and Standby criteria are required, then Model A passes and Model B fails.
- However, typical usage model is 5 hours/day in On Mode and 19 hours/day in Standby.
- Model A uses more energy than Model B (91 kWh/year vs. 61 kWh/year)!

V2.0 Audio/Video: Technical



- TEC Approach – Measured vs. Calculated
 - Measured
 - Ideal approach.
 - More precise estimates of annual energy use.
 - Requires new and novel test procedures.
 - Calculated
 - Can employ, with some modification, current test procedures such as CSA C380-06, CEA-2022, CEA-2013A, IEC 62301, IEC 62087, etc.
 - Duty cycles for power states need to be established.

V2.0 Audio/Video: Technical



- Function over Form
 - Typical characterization schemes bucket devices based on the form they take. Convergence in CE devices precludes this approach.
 - Instead, characterize devices by what function they perform and set energy budgets per function.
 - A device with X & Y functions gets $A + B$ kWh energy allowances.
 - A device with X, Y & Z functions gets $A + B + C$ kWh energy allowances, etc.

Preliminary Timeline



- 17 December 2008
 - Kickoff web meeting
 - Publish preliminary list of products to be considered
- 10 January 2009
 - Stakeholder meeting at CES
- Late January 2009
 - EPA to host web meeting to discuss Draft 1
- Mid February 2009
 - Publish Draft 1 specification
- Mid March 2009
 - Comments due on Draft 1 specification

Open Questions



- Current Specification:
 - Barriers to implementation?
- Products:
 - Include Pro/Commercial products?
 - Include docking stations/radios?
 - How to cover combo products?
 - What specific functions might merit energy/power allowances?
- Industry Trends:
 - What are short- and long-term industry trends that effect power consumption?

Open Discussion



Comments?

Next Steps



- Visit the [Audio/Video PD website](#)
- Review this presentation and send feedback to AudioVideo@energystar.gov
- Attend the stakeholder meeting at CES
 - Saturday, January 10th, 9:30 AM to Noon
 - LVCC Room S206
 - *Note: You must be registered for CES to gain access to the Convention Center.*
- Contact Kathleen or Steve to arrange a face-to-face meeting at CES.
- Participate in development of Draft 1 specification

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