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# **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

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

# ENERGY STAR Overview



- What is ENERGY STAR?



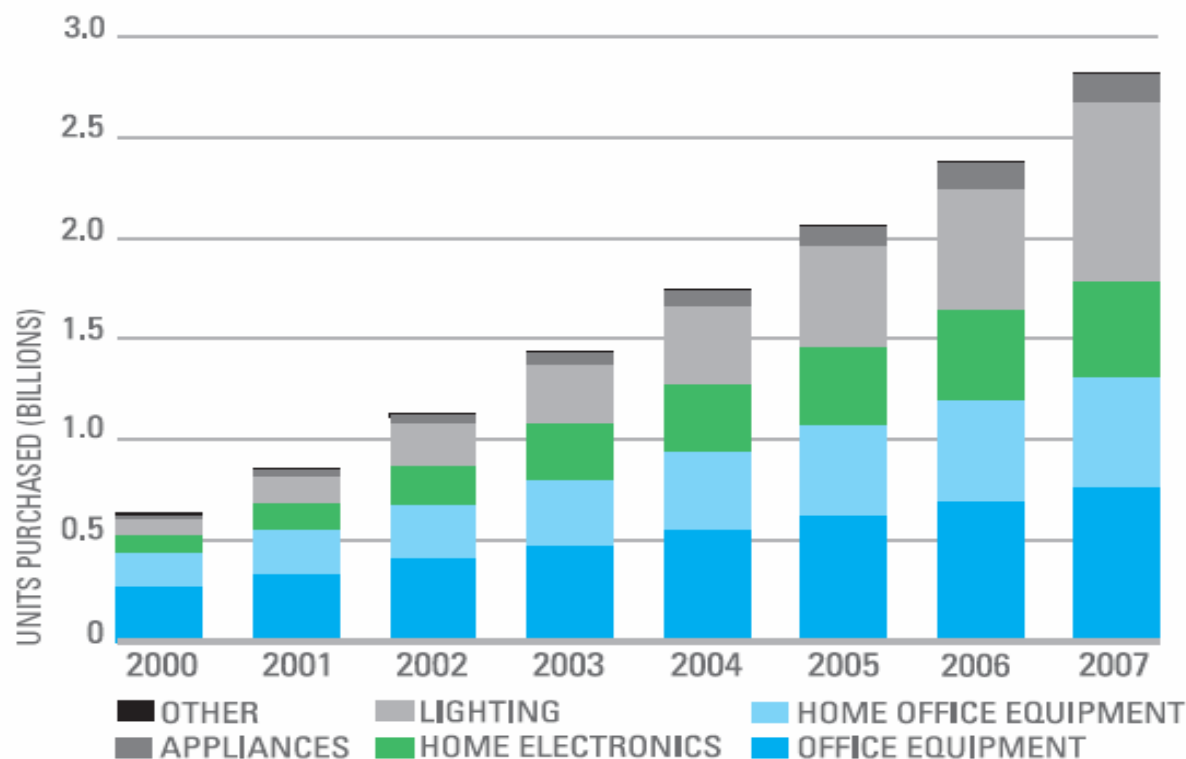
- A voluntary public-private partnership program
- A strategic approach to energy management
- Recognized by over 70% of Americans
- An internationally recognized brand



# ENERGY STAR Overview



- ENERGY STAR Impact



*More than 2.5 Billion ENERGY STAR qualified products purchased since 1992*

# ENERGY STAR Overview

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- 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)
<b>Audio Equipment</b> <ul style="list-style-type: none"><li>Mini-Systems</li><li>Home Theater</li><li>Receivers, Amplifiers, Speakers</li><li>CD Players</li></ul>	3,903 2,720 2,062 598	9% 25% 37% 0%	0.2
<b>DVD Players</b>	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

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## 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

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- 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 <b>PASS</b>	Model B <b>FAIL</b>
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

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- 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

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- 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

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Comments?

# Next Steps

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- Visit the [Audio/Video PD website](#)
- Review this presentation and send feedback to [AudioVideo@energystar.gov](mailto:AudioVideo@energystar.gov)
- Attend the stakeholder meeting at CES
  - Saturday, January 10<sup>th</sup>, 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



# Contact Information



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