An Industry Perspective on Energy Star

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AGENDA

- IT, Energy Star, and Energy Efficiency
- Maximizing Energy Savings:
  - Inclusive vs. Exclusive
  - Utilizing Sleep Modes
  - Power Management Enabling
- A Path Forward

Key Messages

- Energy Star program should attempt to maximize energy savings
- IT industry is a leader in energy saving technologies
- ITI Committed to continue progress
  - Methods to maximize savings
  - Maximize opportunity for savings

Defining the Goal

- The ITI Members and EPA share a common goal:

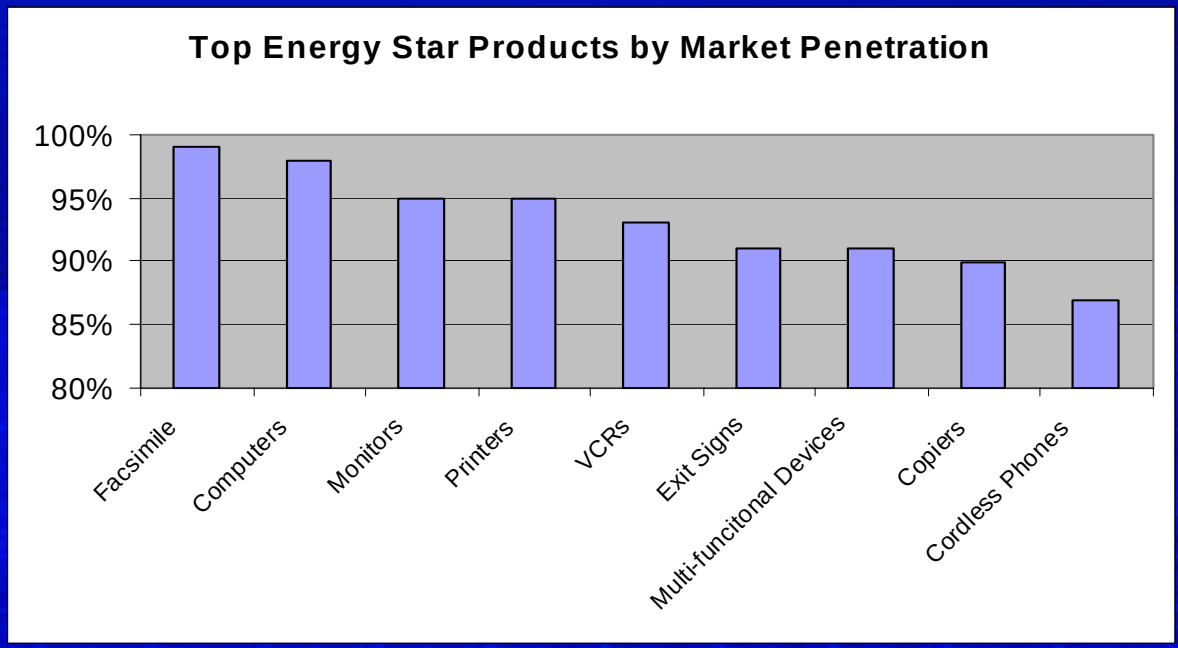
  Save energy by improving the energy efficiency of IT products

- Principles for meeting the goal should include:
  - Promote innovation
  - Provide flexibility
  - Technology neutral

- Challenge: What path allows maximum energy reduction?

IT Industry & Energy Star

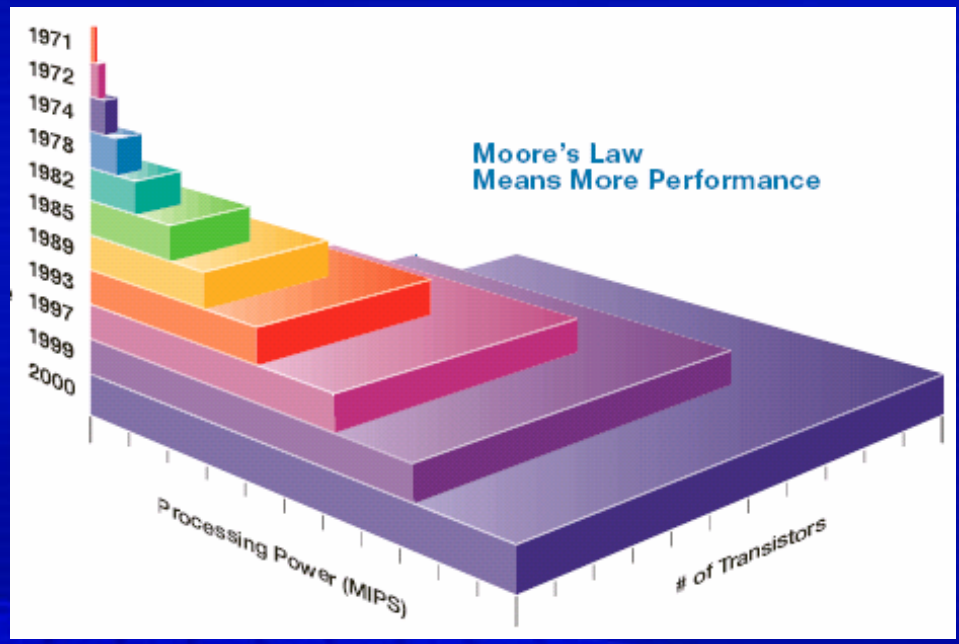
- The IT industry has been a strong supporter of Energy Star.
  - Actively designs to Energy Star requirements
  - Advocate for Energy Star internationally



8 of 9 top products are IT/CE products

PC Power In Perspective

- PC computing performance has increased by >1000x since ’82
- PC power consumption has remained largely flat during this timeframe



- Despite tremendous growth in PCs and IT equipment, all IT office equipment combined is ~2% of US electricity consumption (LBNL).
- Productivity and GDP gains decoupled from energy growth – largely due to IT use (DoE).

Improving Energy Efficiency

- Key Opportunities
  - Inclusive Adoption Strategy
    - Maximize PC Adoption Rate
  - Idle Management
    - Get to the lowest power mode more often

Opportunity #1: Inclusive vs. Exclusive

- ITI Members question the proposed strategy of making Energy Star an “exclusive” label for IT equipment.

Reasons:

- Less effective in accomplishing the goal - Energy Savings
- Inclusive approach has resulted in broad participation and significant energy savings
- Market pull for Energy Star PC in the consumer space is questionable
- Consistency with WW regulatory efforts

Analysis: Inclusive vs Exclusive

- Desktop PC in office environment

Mode/State of Operation	Baseline Power Consumption (Watts)[1]	% Time in Mode[1]	Exclusive Scenario[2]	Inclusive Scenario[3]	Regressive Scenario[3]
Off	2.9	27%	2	3	5
Sleep	11.2	3%	5	10	15
Idle	55	67%	50	-[4]	-[4]
Active	80	3%	-[4]	-[4]	-[4]
Power Supply Efficiency	70%	-	80%	75%	65%

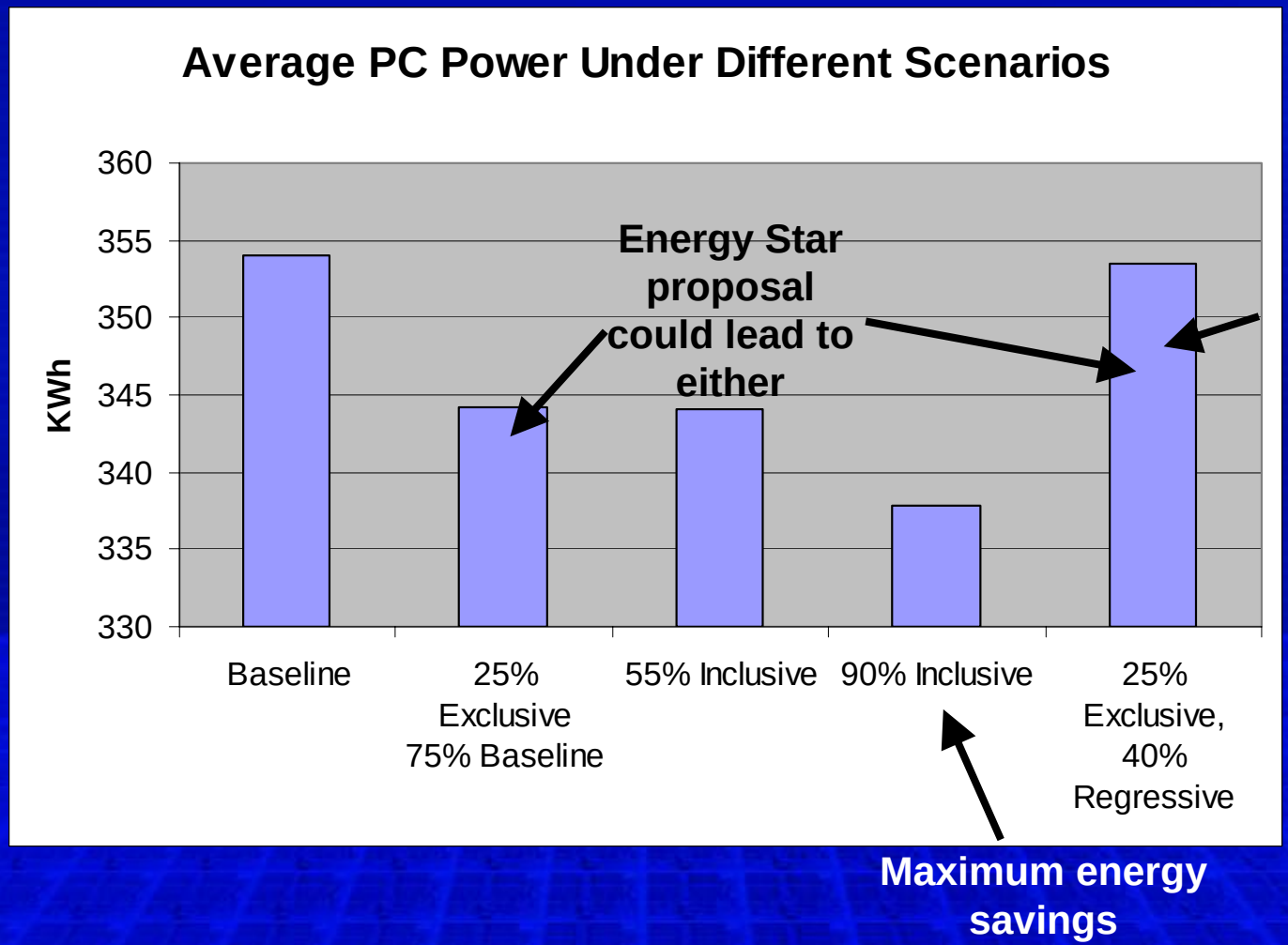
[1]Source: Data used by NRDC/Ecos/EPA – slide 30 – preliminary draft

[2]Source: EPA preliminary draft spec

[3]Inclusive & regressive scenarios for example purposes only – not an ITI proposal

[4]No limits set, but energy savings realized through improved power supply efficiencies.

Comparison of Approaches



Risk of no savings or even increases in energy consumption

Including larger number of PCs saves more energy

Benefits of Inclusive Approach

- Saves more energy
  - Over 260 million kWh additional savings* achieved over Energy Star's proposed draft
  - Equivalent to electricity use of 25,400 US households

    *assumes 40 million PCs (2004 PC sales – Source: IDC)
- Builds on existing Energy Star support and momentum
- Provides flexibility

ITI strongly recommends approach applicable to large percentage of PCs

Opportunity #2: Idle Management

- ITI Members question the proposed strategy of adding power limits for idle mode

Reasons:

- Less effective in accomplishing the goal - Energy Savings
  - Sleep mode saves more energy
- Difficult to define and administer idle mode limits
- Potentially limits future technologies

Analysis: Idle vs. Sleep

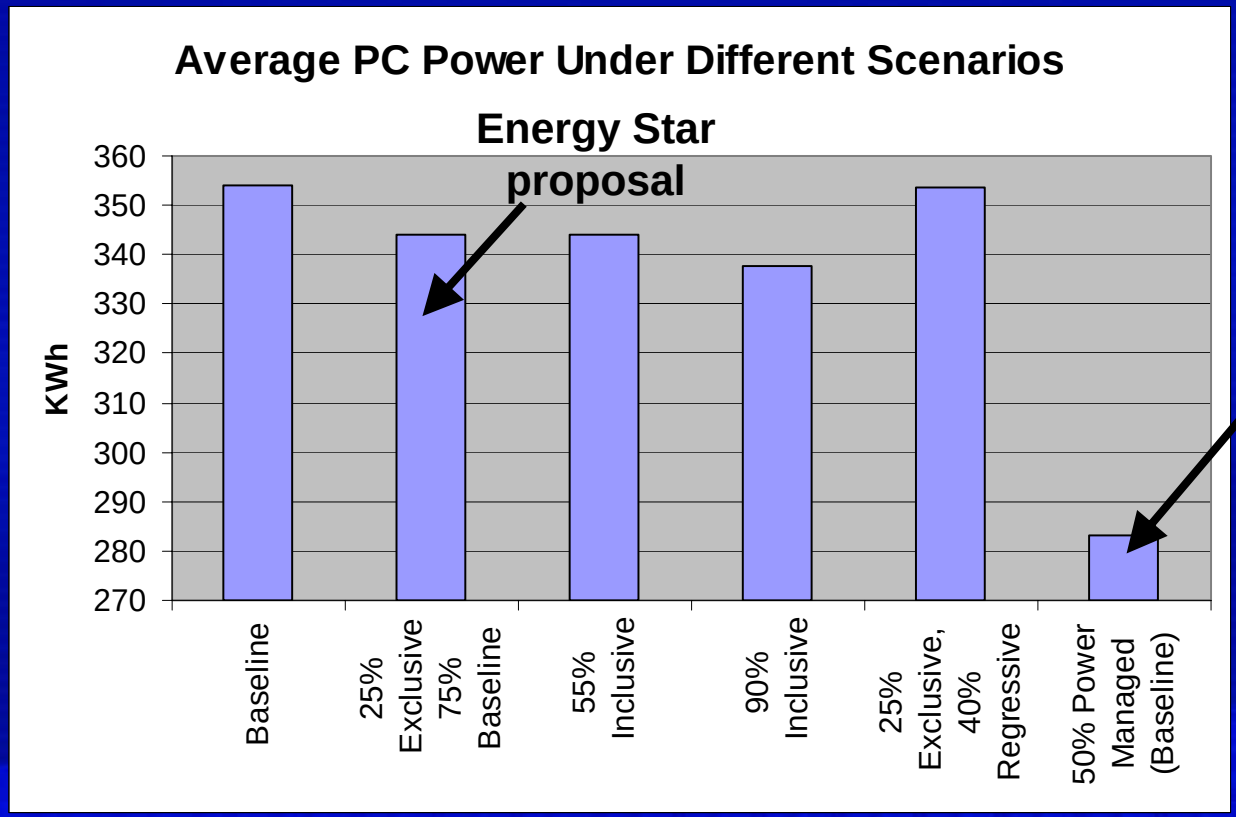
- Desktop PC in office environment

Mode/State of Operation	Baseline Power Consumption (Watts)[1]	% Time in Mode[1]	Exclusive Scenario[2]	Power Management Enabling (% Time in Mode)
Off	2.9	27%	2	27%
Sleep	11.2	3%	5	40%
Idle	55	67%	50	30%
Active	80	3%	-	3%
Power Supply Efficiency	70%	-	80%	70%

[1]Source: Data used by NRDC/Ecos/EPA – slide 30 – preliminary draft

[2]Source: EPA preliminary draft spec

Comparing Approaches



Increased power management - no other changes to baseline

- Saves more energy
  - Enabling power management saves 2.4 billion* more kWhrs each year than the proposed draft by Energy Star
  - Equivalent to electricity use of 239,000 US households

*assumes 40 million PCs (2004 PC sales – Source: IDC).

Enabling power management yields the greatest energy savings by far

Sleep and Typical PC Usage Models

Weekly usage models:

	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Business	Mon-Fri: 8 hours active*, 16 hours Sleep(S3)*					24hrs sleep* /day	
Consumer	Everyday: 3 hours active*, 21 hours in Sleep (S3)* per day						
Digital Home	Everyday: 6 hours active*, 18 hours in Sleep (S3)* per day						

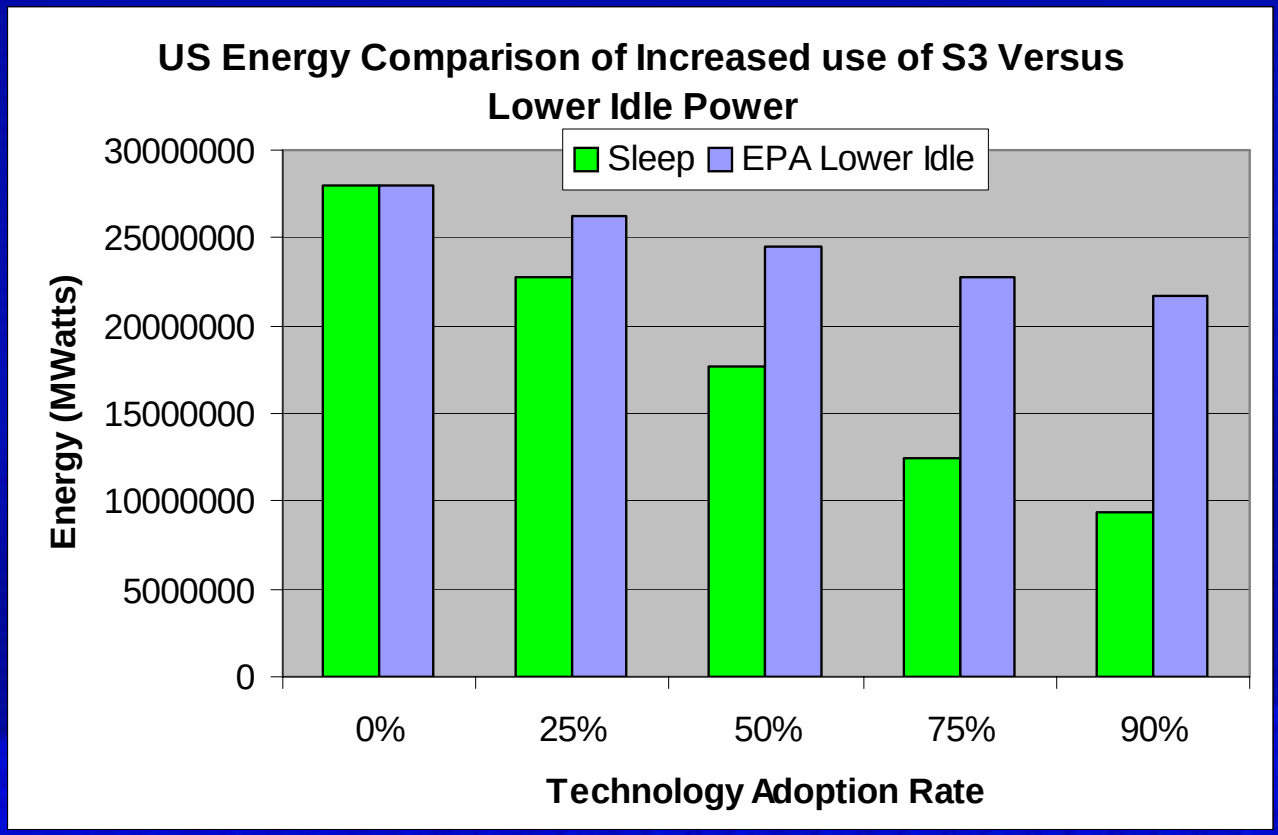
*Active mode is the platform powered on and doing work. Assumed to be idle for these calculations. Sleep or S3 (suspend to RAM) replaces Off state and consumes ~5W.

Weekly energy consumption:

	Legacy Platforms Plus Sleep			EPA Idle Plus Sleep			
Usage Model	ON 24/7 (kWh)	Add S3 (kWh)	Savings w/Sleep	Proposed Idle (kWh)	Savings w/lower idle	Add S3 (kWh)	Savings w/Sleep
Business	13.4	3.5	74%	10.1	25%	2.7	73%
Consumer	13.4	2.4	82%	10.1	25%	2.0	80%
Digital Home	13.4	4.0	70%	10.1	25%	3.2	69%

Dramatic Energy Reductions by Supporting Sleep Mode

More Energy is saved with Sleep mode



- 25% Adoption of Sleep ~= 90% adoption of lower idle
- 50% Adoption of Sleep saves 4Million Megawatts over 90% adoption of lower idle energy

Enabling Power Management

- ITI Member companies agree that power management disabling is a critical issue.
- However, we disagree that it is a Tier II issue – should be a Tier I issue.
- Why? Does more to address the goal – Energy Savings – than any other single action that could be taken.

Power Management Enabling Issues

- Issues w/ Sleep mode usage (PM of Computers, Cadmus Grp, Korn, 2004)
  - Past Reliability Issues
  - Issues w/Networked environments
  - Inconvenient to centrally manage – administrator can't change PM settings when PC is on but logged-out
  - Compatibility with certain SW – some screen savers, older drivers, older custom SW for commercial sector
  - Myths about PM, End users unaware of PM

Future Presentation will detail these issues

ITI Proposed Approach to PM Disabling

- Assemble industry/government team to research and provide guidance
  - Investigate
    - What are all the issues? Additional studies needed?
    - Comprehend new usage models
    - Applicable with new technology innovations
  - Co-Develop proposal
    - Smarter NIC's
    - OS and SW vendor engagement
    - End user education
    - Future PC Manageability
    - Ensure wider adoption
    - Ensure industry and international stakeholder inputs

Develop approach that will maximize energy savings and be widely adopted

Improving Network Connectivity in Sleep Mode

- IT shops want access to platforms while they are in low power states
  - Current Wake Support has problems with either too many wake events or non-standard wake message
- Magic Packet WOL protocol is non-common (on TCP/IP)
  - Magic packet blocked at routers due to security concerns
  - Security more important than WOL support

Technology Example: Intel AMT

- Intel providing platform technology that allows network connection to be maintained during sleep and off modes
  - There is a power trade-off
- Intel AMT uses TCP/IP based communication protocol
  - Designed to improve network access during low power states
  - Accepted by IT, Solves router issues, Centrally managed

Technology Example: UPnP Power Management

- UPnP – Universal Plug and Play
  - Technology that promotes management of smart devices in a networked environment
- Makes use of Wake on LAN and Magic packet UPnP protocol to properly manage the home network
  - Tracks PM status of each networked device (on, sleep, wake ID)
  - Allows directed wake of PC and other supporting devices when content is needed
- Example of SW that correctly manages a power managed network environment

Summary

- Innovation in PCs → Continual improvement of energy efficiency
- IT Industry is a strong supporter of Energy Star
- An inclusive approach maximizes energy savings
- Focus on sleep maximizes energy savings
- Must develop approach that will maximize saving of energy and be widely adopted
- Form team to address PM disabling