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Energy Efficiency Standards for Computers and Computer Monitors

Art Rosenfeld Hearing Room

December 14, 2016

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Appliances and Outreach and Education Office

Efficiency Division

Significant Statewide Use

Desktops	Notebooks	Small-Scale Servers	Workstations	Monitors
				
20.91 million	23.12 million	0.3 million	0.53 million	25.2 million

- In California:
  - There are more than 44 million computers and more than 25 million computer monitors.
  - Computers and monitors use 5,610 GWh/yr

Significant Statewide Benefit

- Reduced electricity demand by **2,332 GWh/yr**:
  - Computers: 1,636 GWh/yr
  - Monitors: 696 GWh/yr
- Consumer utility bill savings of over **$3.5 Billion** from 2019-2030.
- Greenhouse gas reduction of **0.73 MMT** of CO_2 equivalent per year.
- Computer regulations apply to idle, sleep and off modes and **do not** set a limit for active mode; Performance **is not** impacted.
- Proposed standards are cost effective and provide the flexibility to comply in the most cost effective way.
  - For example: ~$10 incremental cost to desktops results in life cycle savings of about $40.

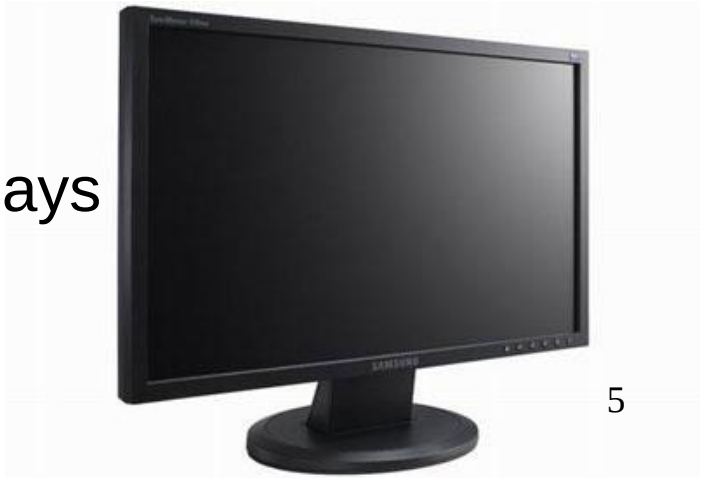
Initial Study/Proposed Negative Declaration

- The proposed negative declaration for the environmental impacts of adopting the proposed standards for Computers, Computer Monitors, and Signage Displays shows no adverse environmental impacts.
- Written comment period for negative declaration ended on October 24, 2016.
- No comments were received during or after the comment period.

Scope

Computer Monitors

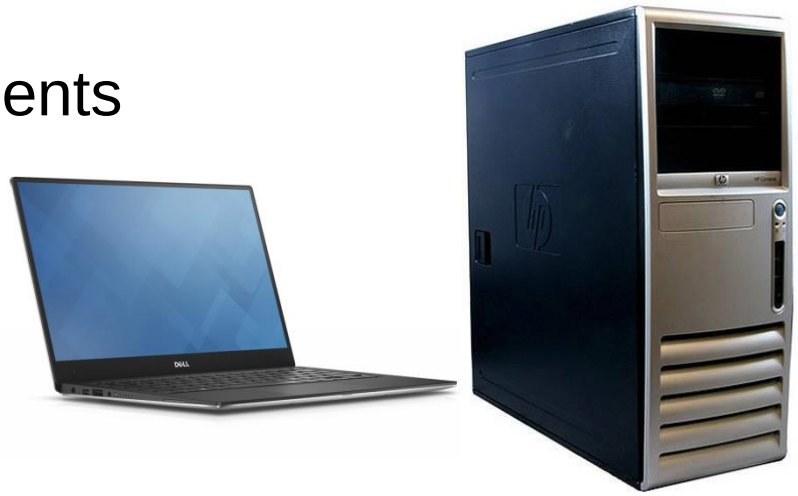
- 17” ≤ Diagonal Screen Size ≤ 61”
- Includes:
  - Enhanced Performance Displays
  - Gaming Monitors
  - Curved Monitors
  - Organic Light-Emitting Diode (OLED) Monitors
- Does not include:
  - Televisions or signage displays
  - Computing devices



Scope

Computers

- Includes:
  - Desktops and Thin-Clients
  - Notebooks
  - Small-Scale servers
  - Workstations



- Does not include:
  - Tablets
  - Small computing devices (like smart phones)
  - Game consoles
  - Large-scale servers

Modes of Operation

Monitors

- Operate in 3 modes: on, sleep, and off.
- Proposed standards limit energy consumption in each of these modes.

Computers

- Operate in 5 modes: active (on), short-idle, long-idle, sleep, and off.
- Some systems combine long-idle and sleep modes into an “alternative sleep” mode.
- Proposed standards focus on limiting **idle-mode** consumption.

Performance Requirement: Monitors

- On Mode power consumption limit is a set of formulas based on the diagonal screen size, resolution, and screen area.
- Sleep and off modes combined must consume less than 1.2 Watts.
- Allowances are provided for enhanced performance displays (EPDs), curved, OLED, touch, and gaming features.
  - Monitors with multiple features may combine allowances.

Performance Requirement: Desktops

- Performance standard based on annual energy consumption targets in short-idle, long-idle, sleep, and off modes.
- Adders for additional features & functions.
- Targets are determined based on the computer's "expandability score."
- Expandability score approximates how much energy a computer needs for specific functions.

Performance Requirements: Notebooks

- Performance standard based on annual energy consumption in short-idle, long-idle, sleep, and off modes
- 30 kWh/yr + adders
- Adders for additional features & functions

Performance Requirements: Small-scale Servers & Workstations

- Prescriptive standard
- 80+ Gold Power Supply and Energy Efficient Ethernet

Power Management: Computers

- All computers are required to transition displays into sleep mode after 15 minutes or less of user inactivity.
- All computers are required to transition into a sleep mode after 30 minutes or less of user inactivity.
- Does not apply to small-scale servers, rack-mounted workstations, and computers with no operating system or with only a limited capability operating system.

Effective Dates

Computer Monitors Effective Dates:

Standards and Tier 1 Allowances	Standards and Tier 2 Allowances
July 1, 2019	January 1, 2021

Computers Effective Dates:

Desktops	Small-Scale Servers and Workstations	Notebooks
Tier 1: January 1, 2019	January 1, 2018	January 1, 2019
Tier 2: July 1, 2021		

Technical Feasibility: Monitors

- Technologies, such as higher efficiency LED backlights and more efficient power supplies, are available today to improve efficiency.
- About 20% of monitors already meet the proposed standards.
- About 80% of monitors already meet the sleep and off mode requirements.

Technical Feasibility: Computers

Desktops and Notebooks:

- Proposed standards provide flexibility to comply in the most cost effective way.
- Technologies to meet the proposed standards exist.
- Some notebook and desktop products that meet or are close to meeting the proposed standards exist today.

Small-Scale Servers and Workstations:

- Requires use of components that are widely available in the market.

Unit Cost Effectiveness

Product Type	Life Cycle Savings (kWh)	Life Cycle Savings ($)	Incremental Cost ($)
Desktop (Tier1)	272.4	$43.58	$9.55
Desktop (Tier2)	365	$58.39	$14.00
Notebook	14.4	$2.30	$1.00
Small-Scale Server	120	$19.20	$13.00
Workstation	187	$29.92	$13.00
Monitors	194	$31.08	$5.00

Small Volume Manufacturers (SVM)

- Manufacturers with total annual gross revenue of $2M or less who assemble and sell the computers at the same location.
- Computers manufactured by SVMs are exempted from complying with the proposed standards, with the exception of power management.
- If an SVM manufactures desktops or workstation in quantities of 50 units or more of a basic model, those units must fully comply.
- Basic models have the same chassis, power supply, motherboard, and expandability score.

Clarifying Changes

- Proposed language clarifies that Signage Displays are required to meet existing television efficiency standards.
  - Professional signage displays, such as those used in stadiums, continue not to be covered.

- Proposed language clarifies that certain non-consumer battery chargers are not covered under the battery charger standard.

Post Adoption Activities

- **Monitoring the market:**
  - Monitor for shifts in the market and adjusting regulations to ensure that projected energy savings are achieved.
  - Propose regulations for new technologies or features upon petition for rulemaking.
- **Tools for market monitoring:**
  - Data collected through certification to the Appliance Efficiency Database.
  - Third-party data, scaled to California population.
- **Outreach and education**

Questions & Comments