

DOCKETED

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NRDC's Comments on CEC's Proposed Computer Energy Efficiency Standards



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October 10, 2016

One additional risk of loophole compared to monitors

Adders

- Same as monitors

Exemptions

- Same as monitors

Categorization

- CEC proposal has 4 desktop categories, based on expandability score
- Risk of loophole comes from unwarranted expandability allowance that move computers to higher category
- Higher categories get a higher allowance, or even exempted (Cat 4)

Computer proposal also has major potential holes due to overly generous/unwarranted expandability budgets, adders, and exemptions

- **Risk compounding:** High chance that at least one, if not several loopholes will become significant by Tier 2
- **Additive impacts:** contrary to monitors, most of these adders can co-exist, adding their impacts

Feature	Potential loophole	CEC proposal	Risk level
USB 2.0/3.x ports and headers	Categorization	2x USB standard	High
High expandability exemption	Exemption	400/600 GB/s	High
256-bit memory interface	Categorization	100 exp. points	High
4-channel memory	Categorization	100 exp. points	Medium
HBM adder	Adder	Up to 10 kWh	Medium
EPD for All-in-Ones	Adder	Same as monitors	Medium
Secondary storage “other”	Adder	26 kWh for undefined tech	Medium
COMPOUNDED RISK			VERY HIGH






Computers: USB 2.0/3.x ports and headers

- CEC proposal:
 - Draft standards give $\approx 2x$ necessary budget for USB 2.0 & 3.x ports and headers (5 and 10 watts)
- Inconsistent with USB standard
- ITI July 2015 comments agree!

PSU Sizing option power allocation	Power ea (W)	Qty.
USB 2.0 connectors	2.50	6
USB 3.x	4.50	4

Impact:

- 10-15% unwarranted boost to expandability score
- Enough to push some desktops to higher allowance category (+20-30 kWh/y)

		
Lenovo ThinkCenter M83	HP EliteDesk 705 SFF	Alienware Aurora R5
220 (Cat 1) → 255 (Cat 2)	257 (Cat 2) → 290 (=)	410 (Cat 2) → 460 (Cat 3)

- Loophole test:

How many products by effective date	Most
Impact per product	High
Not warranted by effective date	100%
OVERALL RISK	HIGH

- NRDC recommendation:

- Align with USB technical standard (details in written comments)

Computers: High-expandability exemption



- CEC proposal:
 - **Exempts** computers with 600 W power supply and graphics > **400 GB/s** (Jan. 2019), and **600 GB/s** (Jan. 2020)
- Threshold easy to achieve with HBM (high-bandwidth memory)
 - AMD’s R9 Fury X 4GB has **512 GB/s**
 - AMD Vega, **1,000 GB/s** in 2017
 - Samsung HBM2 at **2,048 GB/s** in 2017
 - **400 GB/s will be mainstream by 2019**
- Exemption unwarranted:
 - R9 Fury X 4GB has one of lowest idle power on market (< 5W)
 - Lower than graphics adder, no need for exemption
- Impact:
 - Would unnecessarily exempt high-end gaming computers with HBM graphics (highest energy using segment)
 - Would encourage power supply upsizing, increasing energy use

- Loophole test:

How many products by effective date	All HBM graphics
Impact per product	High
Not warranted by effective date	100%
OVERALL RISK	HIGH

- NRDC recommendation:
 - Tier 2: no exemption for high-end graphics
 - Tier 1: open to exemption for GDDR5 memory only, but with much higher threshold: 1,000 GB/s

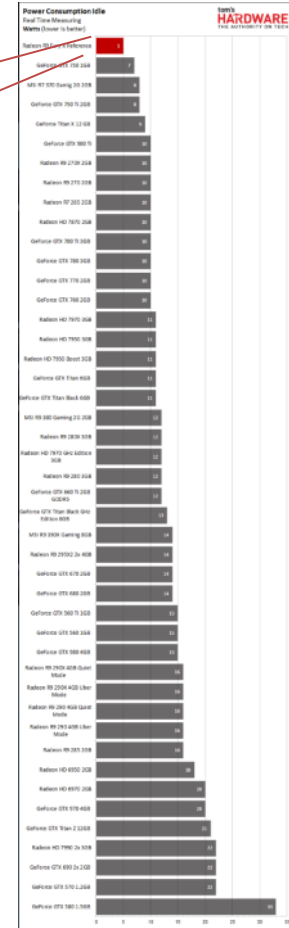
Computers: High-expandability threshold



Power Consumption Idle
Real Time Measuring
Watts (lower is better)

tom's
HARDWARE
THE AUTHORITY ON TECH

Radeon R9 Fury X Reference



- Radeon R9 Fury X, one of the first cards to use HBM, also has lowest idle power (2015 testing)
- High-bandwidth cards don't need an exemption, graphics adder sufficient



Computers: 256-bit memory interface



- CEC proposal:
 - 100 expandability points for ≥ 256 bit memory interface
- Threshold easy to achieve with HBM (high-bandwidth memory)
 - Every computer with HBM2 will achieve this threshold
 - Mainstream platforms expected to integrate HBM on chip / 2 years
- Unwarranted:
 - HBM does not correlate with higher-expandability
- Impact:
 - Most HBM computers would jump to higher category (+20-30 kWh/y) or get exempted

- Loophole test:

How many products by effective date	Most HBM computers
Impact per product	High
Not warranted by effective date	100%
OVERALL RISK	HIGH

- NRDC recommendation:
 - Provide extra-expandability points to system memory only, not chip-integrated memory

What's to do?

Close major potential loopholes to preserve savings



CEC should take two actions to minimize risk of major loophole and preserve savings:

1. Tighten top potential loopholes:

- As recommended in this presentation

2. Post-adoption off-ramp:

- Monitor the market (CEC database)
- Open sub-rulemaking within 3 months if exempted function or adder accounts for > 10% of models registered in database over last 6 months.
- Outcome - Sunset or reduce exemption/adder within 12 months.

If **half** of projected savings did not materialize due to various loopholes, this would deprive Californians from **\$1B over 6 years**, and result in **2 million tons** of unnecessary CO2 emissions

Summary

- ❑ Potential for significant benefits to Californians if savings are preserved
- ❑ NRDC not challenging overall framework, dates, or major levels in standards, only reasonable tweaks to ensure savings materialize
- ❑ NRDC hopes to be able to support adoption of revised standards by end of the year

THANK YOU!

