Response to CEC Standards Proposal

CalPlug Workshop

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Why Standards?

Desktop

All-in-One

Notebook

Thin-client

Workstation

Small-scale server

- Despite progress, still significant wasted energy.
- Cost-effective and feasible solutions.
- Help Achieve State EE & GHG policy goals.

- IOUs generally support the CEC's proposal.
- Several areas for improvement.

Usage For Computers & Displays

4-5%	8 – 12 TWh[1]	$1.5-2 Billion	4-5 MMT million MT/y
Statewide Electricity Use	Electricity Use	Annual Utility Bills	GHGs

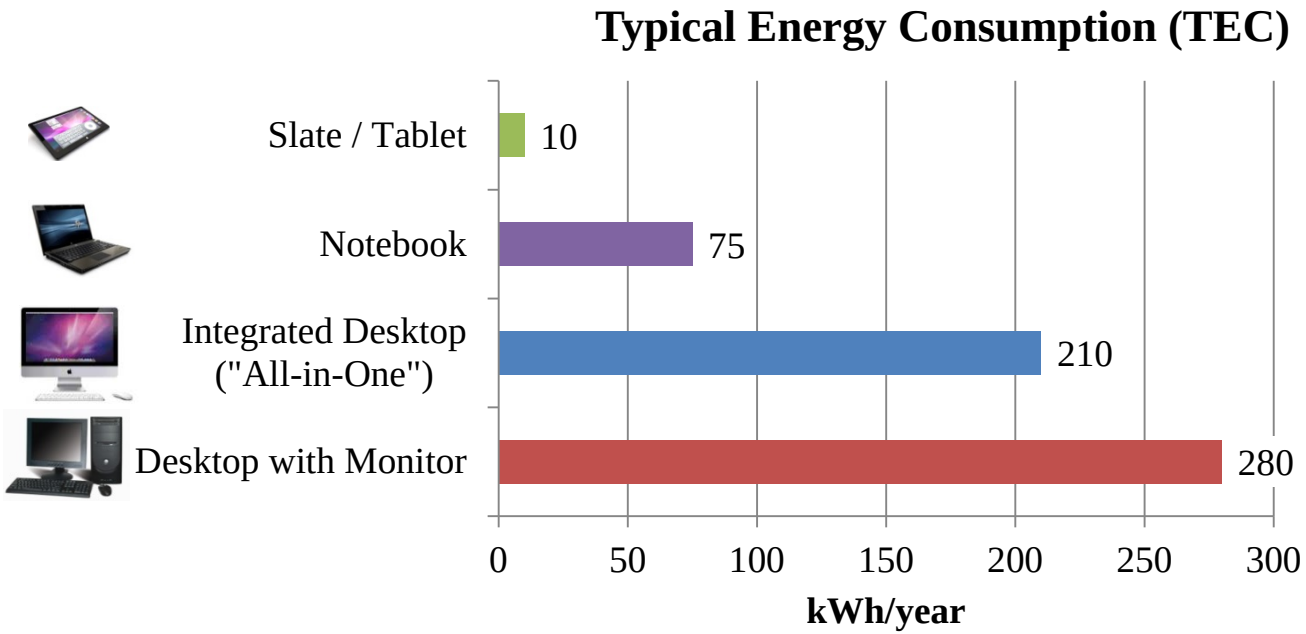
Incremental Cost Effective Savings Potential (when adjusted for real-usage[2])

Desktop	+ 15%
Integrated Desktop	+ 25%
Notebook	+ 40%

1. CEC Staff Proposal 2015, EIA Miscellaneous Loads - 2013
2. CA IOUs, Real World Adjustment Factor, Oct 2014 CASE report addendum, Docket #12-AAER-2A

Large Efficiency Gap Between Computer Form Factors

Battery-powered devices of similar capabilities and price have radically lower power use



Source: Fraunhofer 2014, plus real-world adjustment factor.

Supporting Data from IOUs: Proposed Standards are Feasible & Cost-Effective

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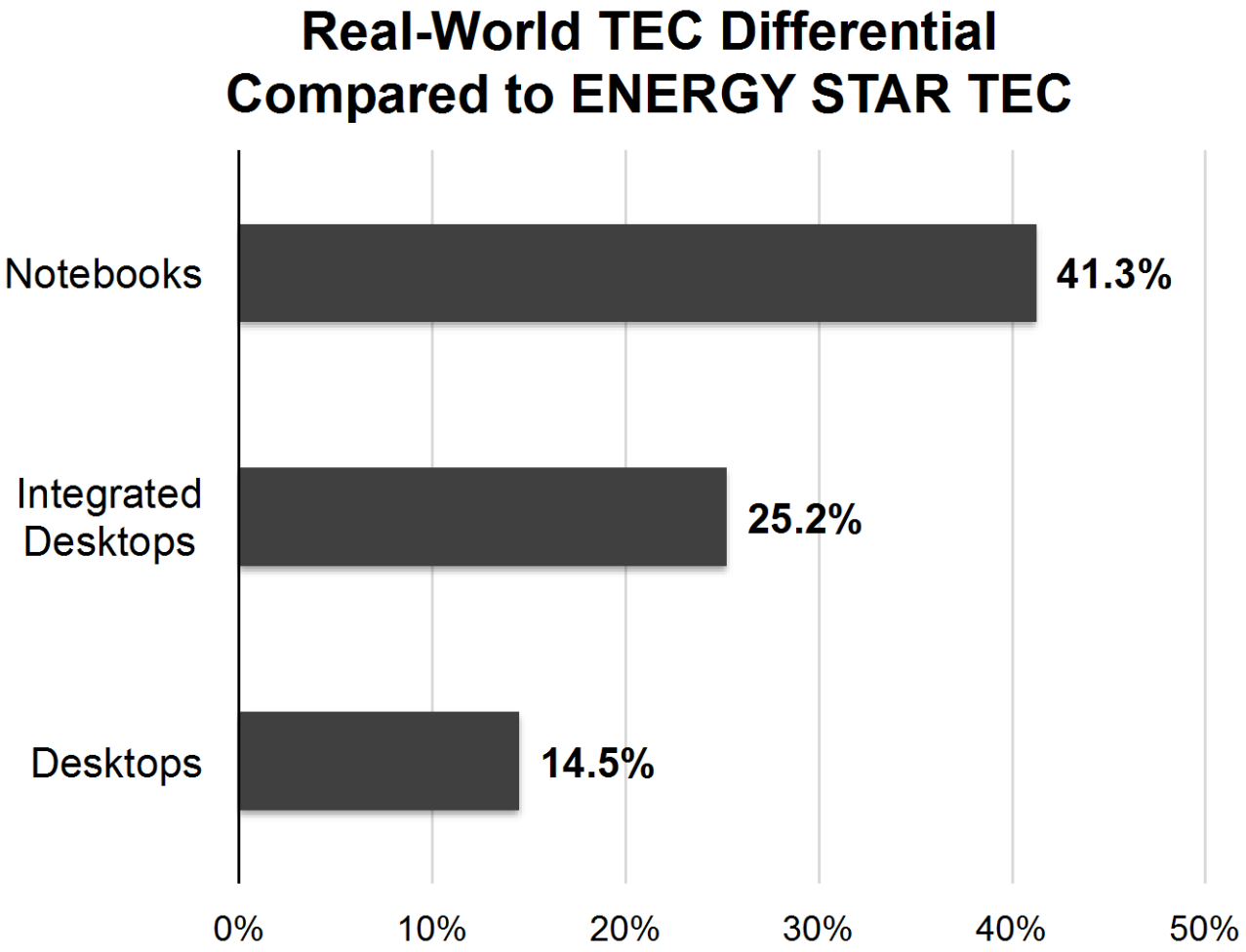
Research	Supporting Entity	Key Findings
PSU Teardown Analysis	IOUs	Cost-effective & feasible savings
Desktop & Notebook Cost-Effectiveness	PG&E, SCE	Cost-effective & feasible savings
Real-World Adjustment Factor	SCE	ENERGY STAR test method underestimates real-world computer energy consumption.
Product Price Analysis	SCE	Cost-effective and feasibility savings
Notebook Real-time Power Management	SCE	Cost-effective & feasible savings
Storage and Memory analysis	SCE	ENERGY STAR 6.0 adders are excessive
Two Graphics Card Studies, \Additional Study in Progress	PG&E, SCE	ENERGY STAR 6.0 adders are excessive

Real-World Use and Savings Potential is Even Higher



CA IOUs, Real World Adjustment Factor, Oct 2014 CASE report addendum, Docket #12-AAER-2A

Savings Potential for Notebook Computers

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Real-World Study allows for higher savings.

EXAMPLE SAVINGS

TEC (ENERGY STAR estimated): 24 kwh/yr

- Under-estimated activity in idle mode.
- No peripherals, e.g., docking stations, printers.

TEC (w/ Real-world Adjustment Factor): 34 kwh/yr

- Accounts for actual power draw when not actively being used.
- Peripherals
- Proposed Code
- Impact on cost-effectiveness and statewide savings.
- No proposed revision to test procedure or reporting.

CA IOUs, Real World Adjustment Factor, Oct 2014 CASE report addendum, Docket #12-AAER-2A

Notebooks present an opportunity.

Example

Same:

- System Performance
- Weight & Screen Size
- Operating system

Source: Online retailers, Feb. 2015

Notebooks present an opportunity.

Example

TEC: 29.5 kwh/yr

Price: $513.99

TEC: 19.4 kwh/yr

Price: $509.99

Same:

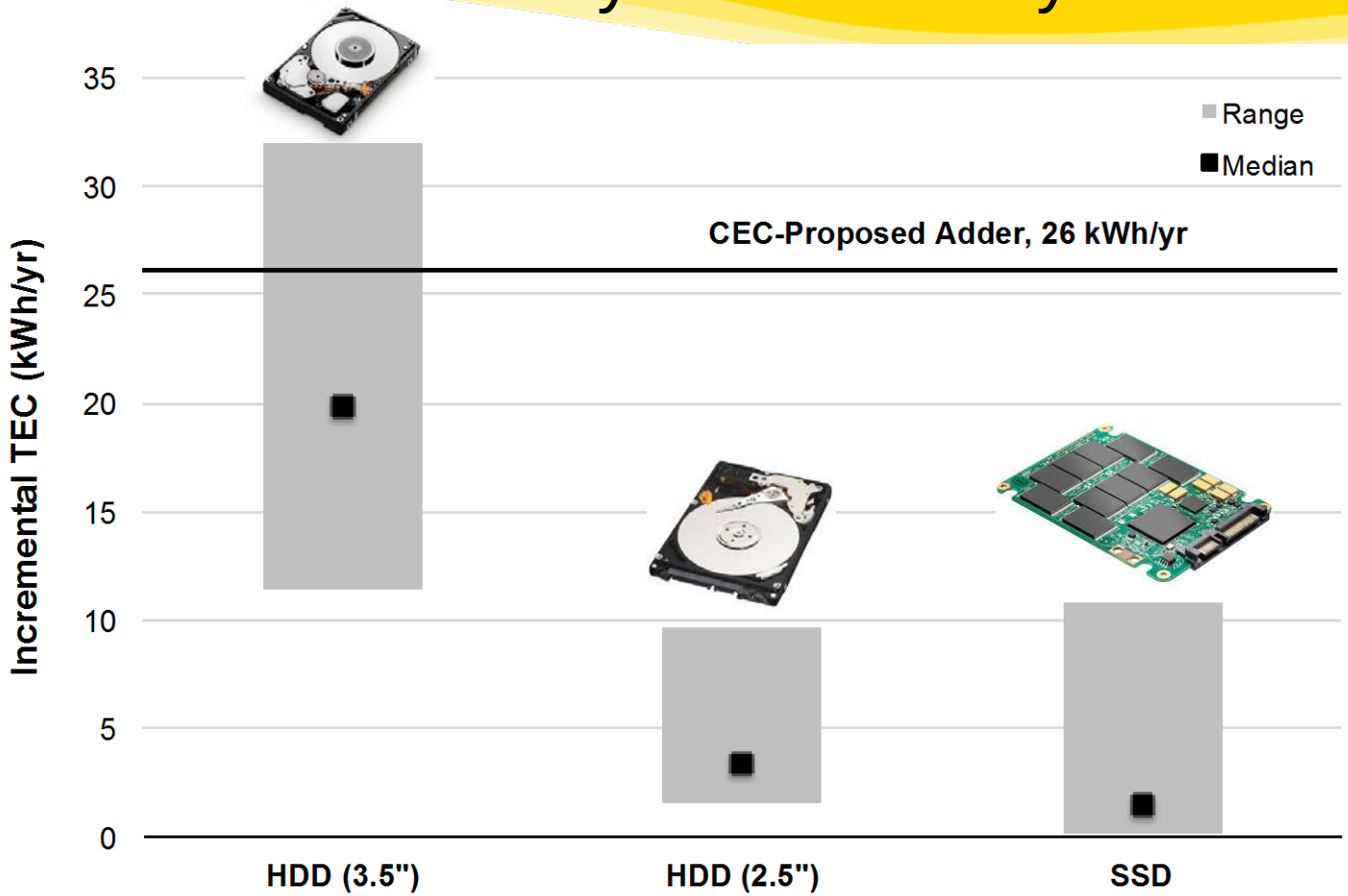
- Lower Cost
- Lower TEC

Source: Online retailers, Feb. 2015

Desktop (& Notebook) Adders

- Many Storage Solutions Meet proposed CEC Adders
- Many Memory Solutions Meet Proposed CEC Adders
- Graphics In Desktops show Downward Trends in Energy Impact

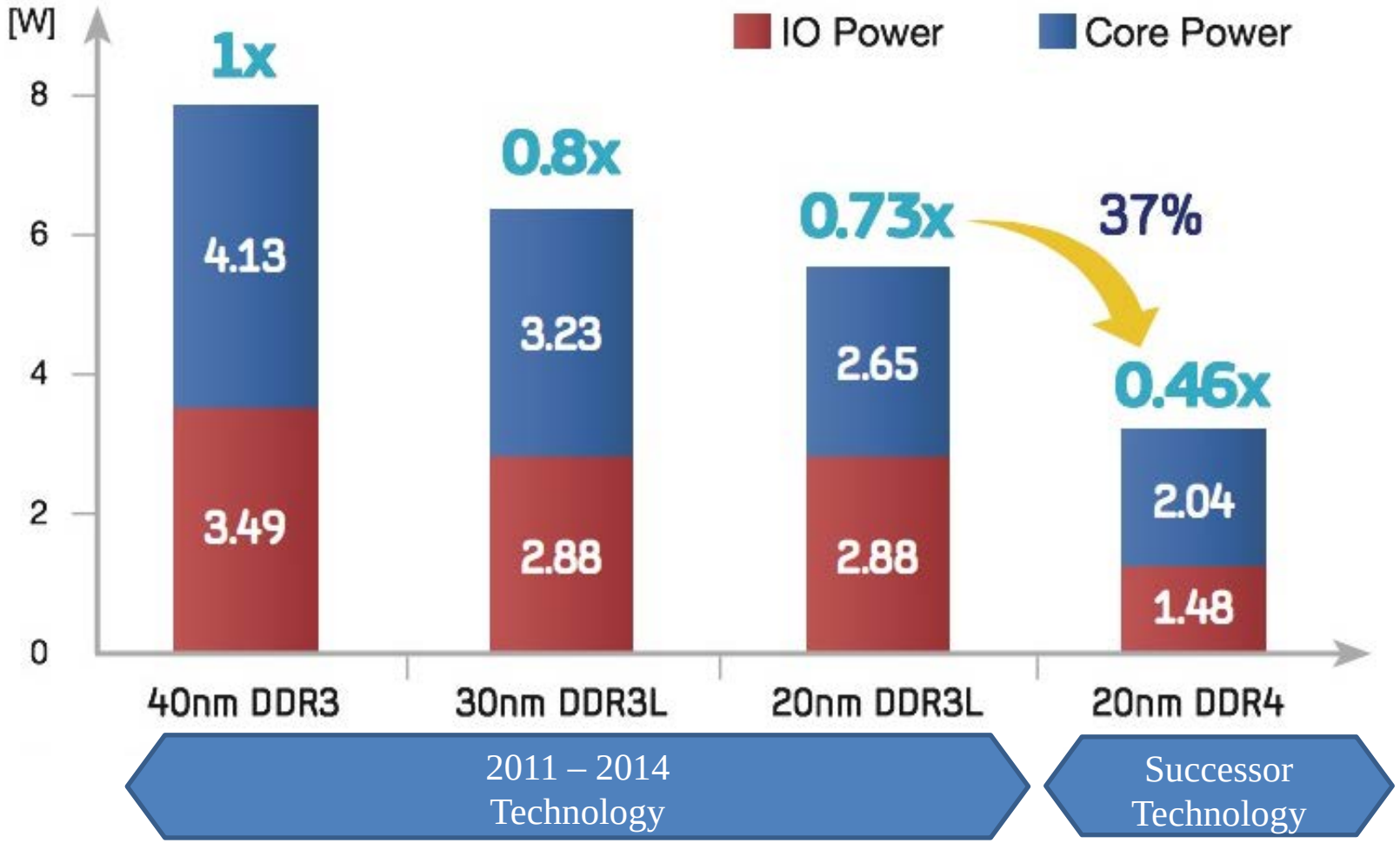
Secondary Storage Adders:
Generous and Potentially Unnecessary



Tom's Hardware 2013-2014 data.

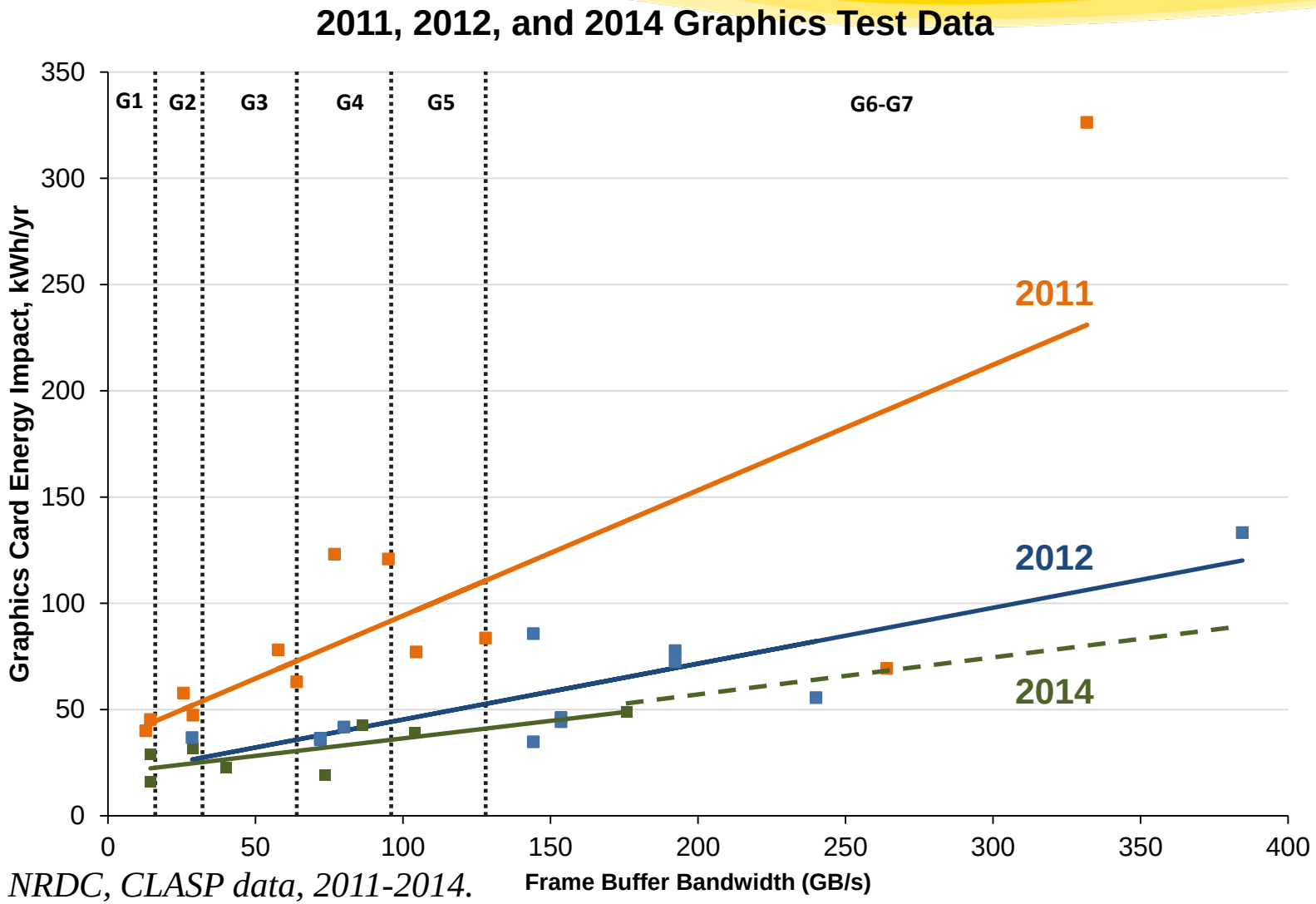
- 2.5" hard drives and solid-state drives can easily meet proposed storage adder with room to spare.

Memory adder ignores advent of DDR4, which brings 20-40% power savings



Active power for a 4 X 4 GB memory configuration. Samsung, 2013.

Rapid, multi-year trend downwards, not including graphics switching in desktops



IOU, NRDC, CLASP data, 2011-2014.

New Proposed Standards - Summary


Desktop


All-in-One


Notebook


Thin-client


Workstation


Small-scale server

- Opportunities for Incremental, Cost Effective Savings.
- Future EE progress is not guaranteed.
- Sales are significant, even for desktops.
- Helps Meet Aggressive California Goals
- CEC Savings Est. 2,117 GWH/yr

CEC Proposal (Staff Report)

Efficiency Levels (Base Allowance)

- Desktops (Traditional and Integrated) and Thin Clients: **50** kWh/yr
- Notebooks: **30** kWh/yr
- Workstations & Small-Scale Servers: **80+ Gold PSU**

Graphics Adders

- No adder

Test Procedure, Power management, Display, Storage and Memory Adders:
Aligns with ENERGY STAR