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California IOUs Title 20 Workshop Presentation 4-15-15

Additional submitted attachment is included below.

Electronic Displays

Response to Standards Proposal

Presented to the California Energy Commission

April 15, 2015

PG&E

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

SDGE
A Sempra Energy utility

The Gas Company
Sempra Energy utility

Why Standards?

- Despite progress, still significant energy savings opportunities
- Cost-effective and technically feasible solutions
- State policy goals

Computer Monitors

Energy use is significant and growing in some sectors

- Sales growth in commercial markets of larger (> 20 in), more energy consumptive monitors
- Sales growth in higher resolution (> 2.07 MP), more energy consumptive models
- An inefficient model can consume over 5X more energy than a similar sized efficient model

Computer Monitors

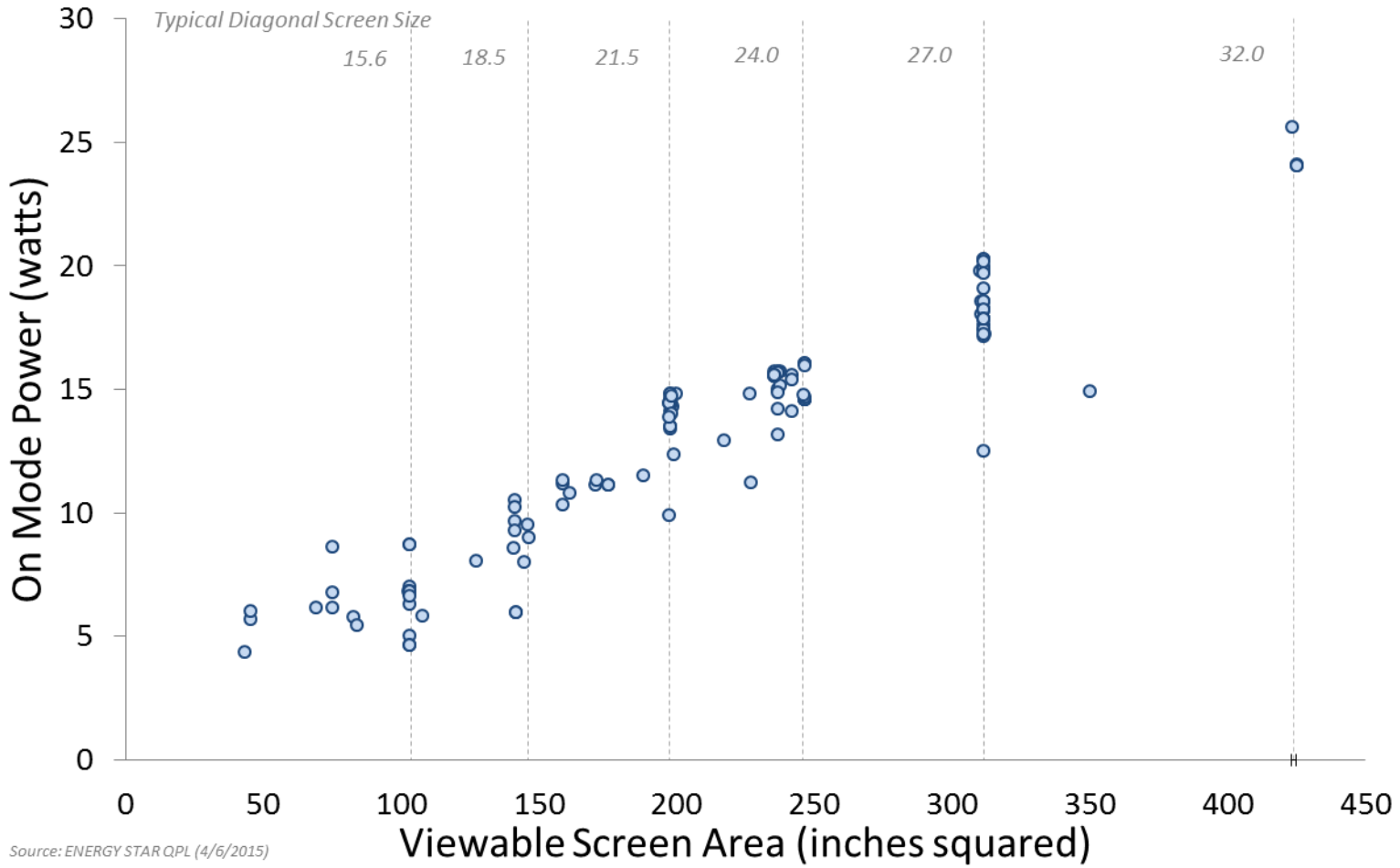
IOUs support CEC proposed On Mode power levels with adjustments for computer monitors

Diagonal Screen Size in inches (d)	On Mode in Watts (P_{ON_MOX})
d<12	(4.2*r) + (0.04*A) +1.8
12″≤d<17″	(4.2*r) + (0.01*A) +3.5
17″≤d<23″	(4.2*r) + (0.02*A) +2.2
23″≤d<25″	(4.2*r) + (0.04*A) +2.4
25″≤d<61″	(4.2*r) + (0.07*A) +10.2

r = Screen resolution (megapixels)
A= Viewable screen area (square inches)

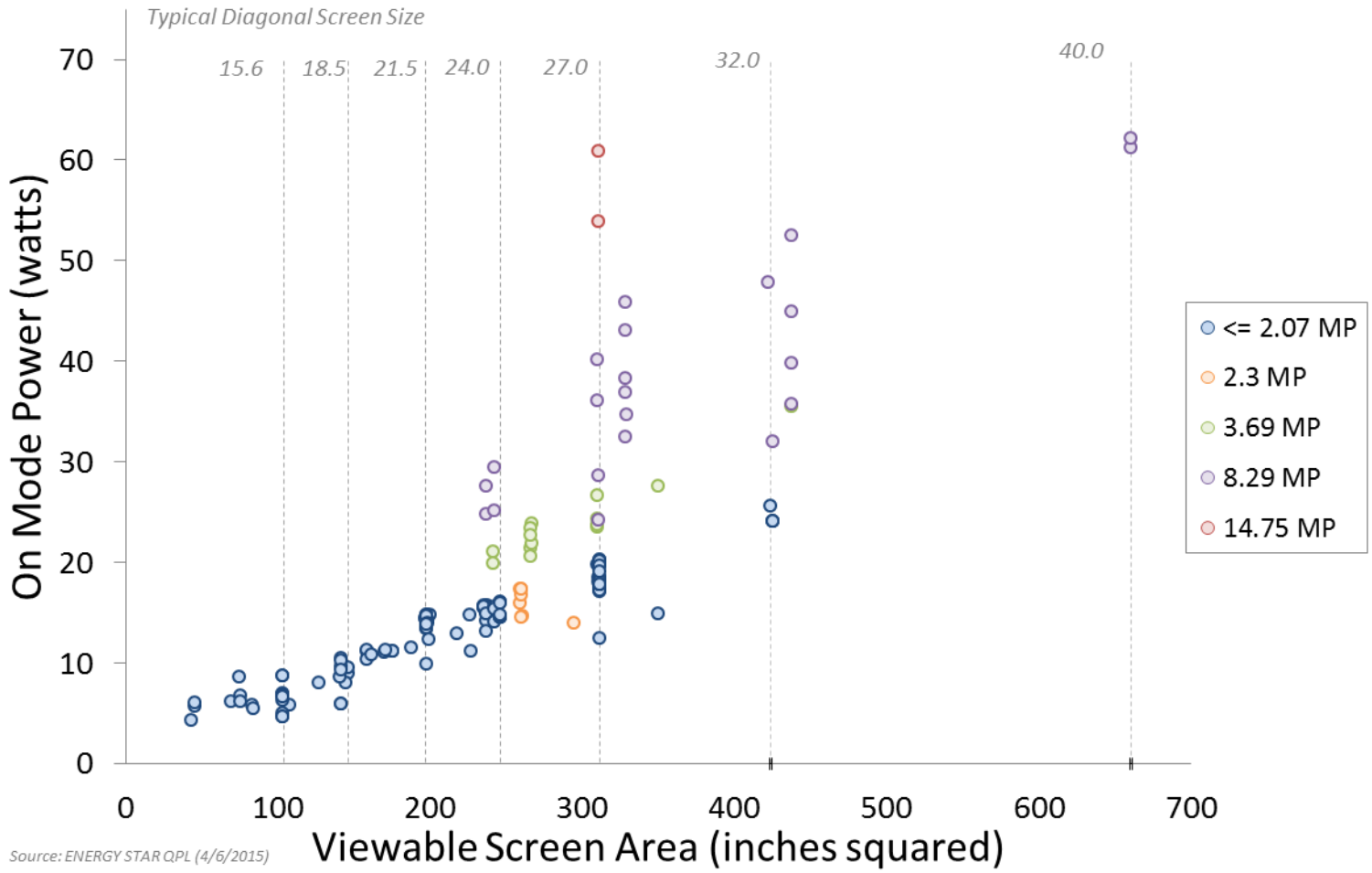
Two significant adjustments: change (+) to (-) for parts of two equations noted

Monitors (0 - 450 in^2): <= 2.07 MP Models That Meet On Mode



On Mode Levels: Models available today across all screen sizes meet proposed levels (with adjustments)

Monitors (0 - 700 in^2): Multiple Resolution Models That Meet On Mode



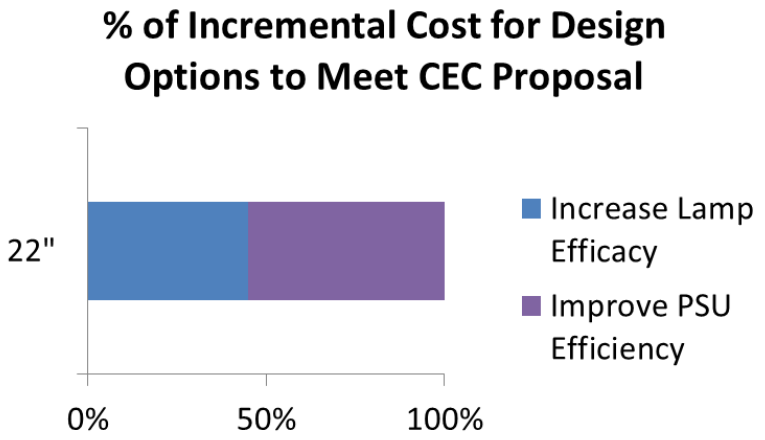
On Mode Levels: Models available today across various resolutions meet proposed levels (with adjustments)

Example low cost pathways to meet CEC proposed On Mode – 22” Monitor

Based on IOU testing and tear down analysis

$5 incremental cost

- Increased lamp efficacy to 110 lm/W
- Reduce default screen brightness (no cost)
- Enable global dimming (no cost)
- Increased PSU efficiency to 87%

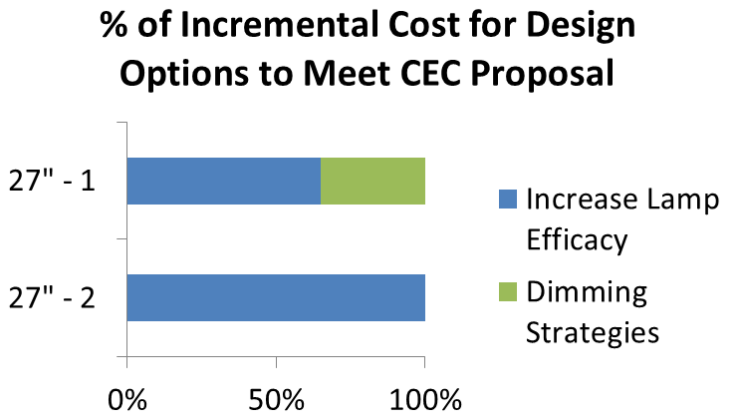


Examples low cost pathways to meet CEC proposed On Mode – 27” Monitor

Based on IOU testing and tear down analysis

1) $2-$3 incremental cost

- Increased lamp efficacy to 107 lm/W
- Reduce default screen brightness (no cost)
- Add global dimming capability



2) $5 incremental cost

- Increase lamp efficacy to 125 lm/W
- Reduce default screen brightness (no cost)

Examples: 22-inch

	Would Meet CEC Proposal	Would Not Meet CEC Proposal
Resolution	1920 x 1080	1920 x 1080
Contrast Ratio	5,000,000:1 (dynamic)	10,000,000:1 (dynamic)
Response Time	5 ms	7 ms
On Mode Power	14.42 W	17.04 W
Retail Price	**$129.00**	**$139.99**
Lifetime Cost	**$162.11**	**$178.90**
		

Examples: 27-inch

	Would Meet CEC Proposal	Would Not Meet CEC Proposal
Resolution	1920 x 1080	1920 x 1080
Contrast Ratio	1,000:1	1,000:1
Response Time	8 ms	4 ms
On Mode Power	18.2 W	22.18 W
Retail Price	**$232.99**	**$229.99**
Lifetime Cost	**$273.69**	**$279.85**
		

Computer Monitors Test Procedure

IOUs support using the ENERGY STAR test procedure (Version 6) with two additions

- Testing to be conducted as shipped (“default”) rather than calibrated to 200 cd/m^2
- Since testing at default, the IOUs propose a requirement that the luminance in default shall be >= 65% of luminance in brightest setting to ensure acceptable picture out of the box

ENERGY STAR is updating the test procedure – the IOUs are tracking any significant modifications

Computer Monitors: Items for further CEC consideration

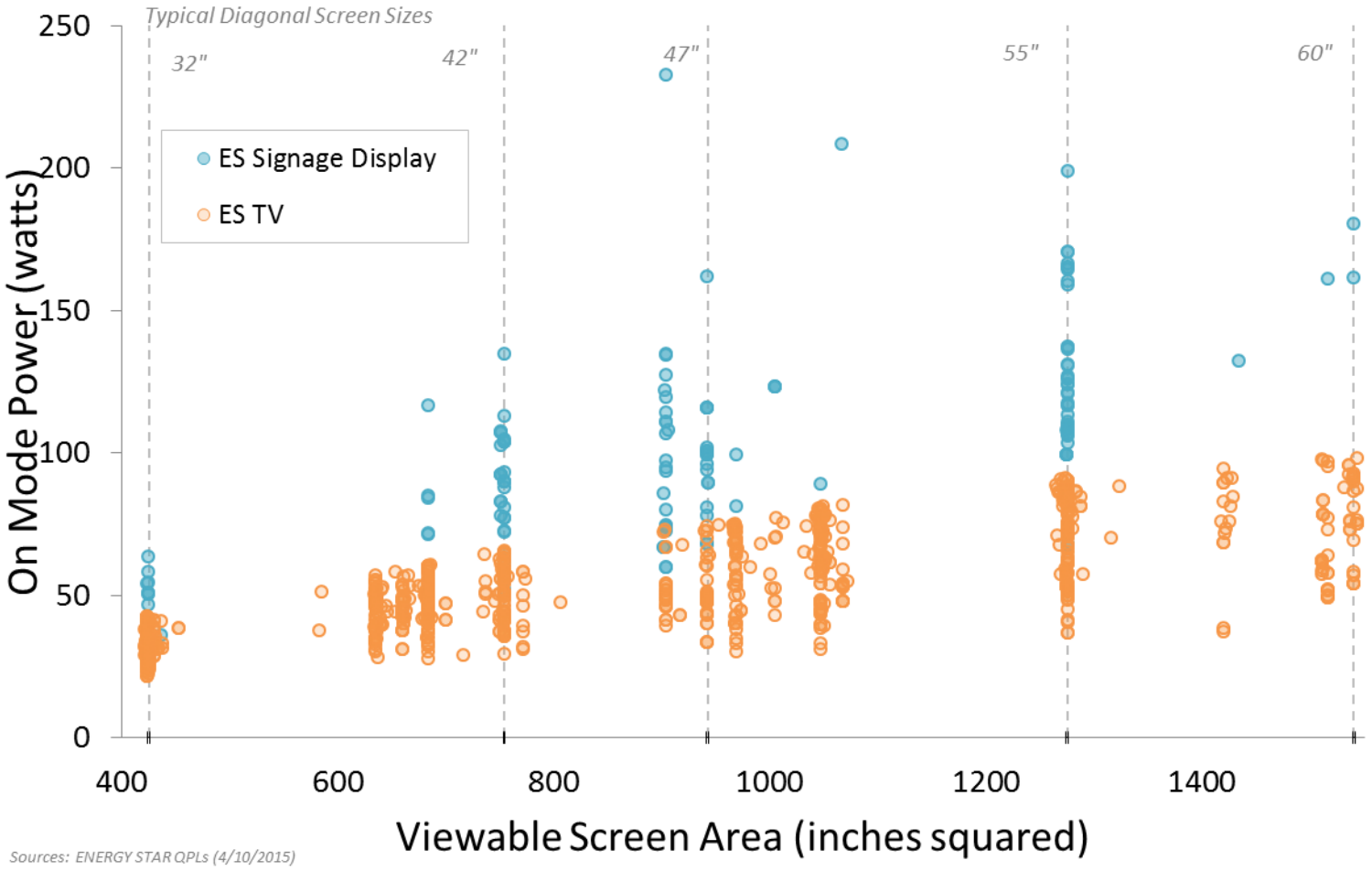
- Lower standby and off mode levels since effectively all models on the market already meet
- Continuous line approach similar to ENERGY STAR V7 draft On Mode
- Flatten the On Mode curve at larger screen sizes similar to ENERGY STAR V7 draft
- Re-examine reducing resolution adder for larger resolutions (e.g., 8.29 MP)
- Include power management requirements
- Consider adder for Enhanced Performance Displays

Signage Displays

Rationale: Energy use is growing and greater than TVs

- Growth of digital signage in recent years (10% annual increase in sales)
- Unlike TVs, signage display installations are typically larger for installations in open/commercial spaces
  - 1/3 of total shipments are greater than 1400 in^2 (unregulated)
- Unlike TVs which are typically “on” 5 hr/d, some signage displays are typically “on” 18-24 hr/d
- Signage displays are typically set at higher brightness settings to draw attention

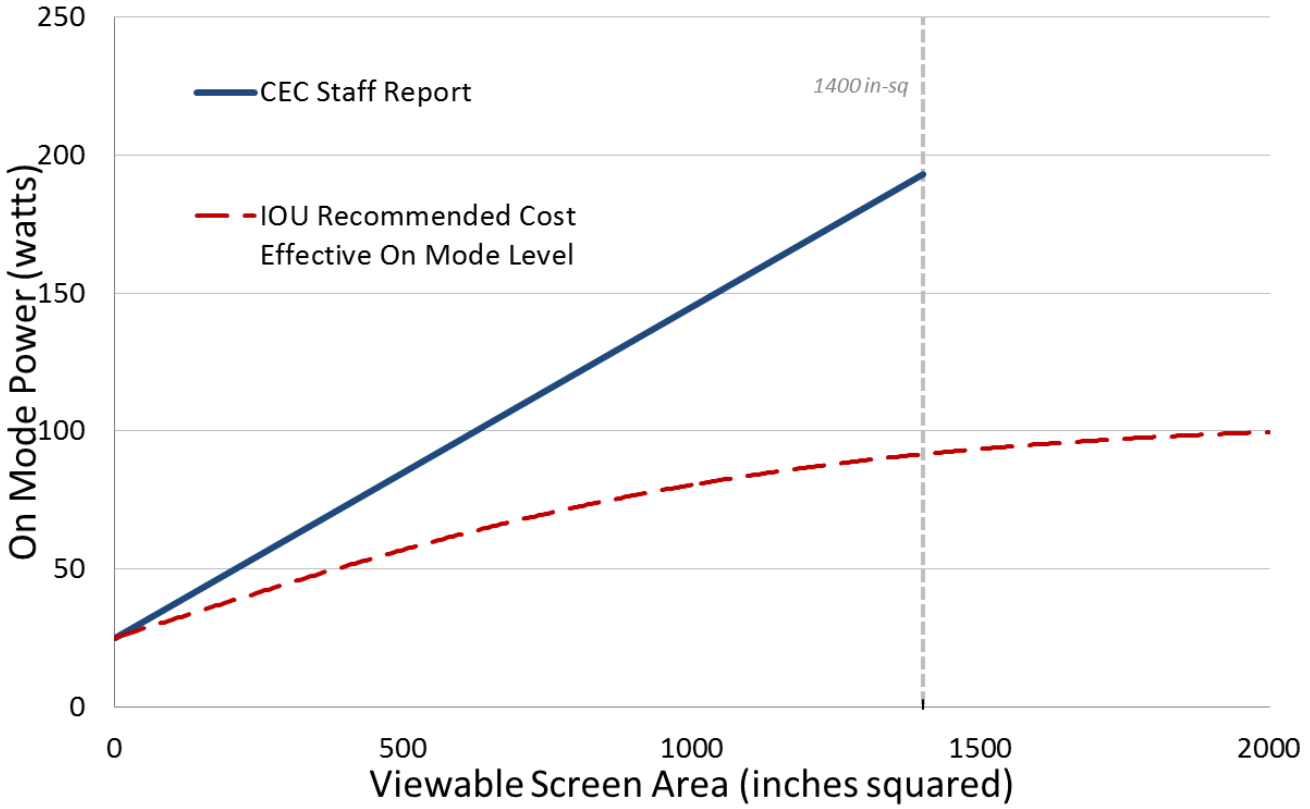
Signage Displays Consume More Power in On Mode than TVs



Signage Displays can consume 4X or greater more power than TVs in On Mode; daily duty cycle additional 3-4X greater

Signage Displays On Mode Level

IOU testing indicate more stringent On Mode levels across multiple screen sizes (incl. > 1400 in^2) are cost effective



On Mode equation should account for luminance and screen area

Summary

Computer Monitors

- CEC's On Mode proposal, with noted adjustments, is technically feasible and cost effective across all sizes and resolutions
- CEC should consider lowering standby and off mode levels
- Testing should be in factory default settings

Signage Displays

- CEC can set more stringent On Mode levels that are cost effective and technically feasible
- Signage Displays larger than 1400 in^2 account for 1/3 of the market and should be included in this rulemaking