

Analysis of Standards Options for Televisions

Presented to:

California Energy Commission



Prepared for:

Pacific Gas and Electric Company



Prepared by:

Alex Chase, Energy Solutions



Last Modified: July 16, 2008

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Section 1

Television Proposal Background

Television Proposal: Background

Codes and Standards Enhancement (CASE) Initiative For PY2008: Title 20 Standards Development

Title:
Analysis of Standards Options for Televisions
Revised Proposal

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Endorsed by:



Version: Revised Proposal Version 1.0

Last Modified: July 3, 2008

This report was prepared by Pacific Gas and Electric Company and funded by the California utility customers under the auspices of the California Public Utilities Commission.

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- PG&E first indicated that it was working on a TV CASE report at the January 15, 2008 CEC Public Workshop
- Submitted formal CASE report in April 1, 2008
- Submitted revised proposal on July 3, 2008
 - Endorsed by all IOUs
 - CA already has a standard for maximum standby power ($\leq 3W$)
 - Recommends an efficiency standard for On Mode power only (two Tiers)

Television Proposal: Dataset

Dataset	Number of TVs	
Energy Star	175	} Dataset used for April 2008 CASE report
CEC PIER (tested at default settings)	70	
<i>subtotal</i>	245	
CEC PIER (tested at other screen settings)	50	} Additional datasets used to inform analysis after April 2008 CASE report
Energy Star (removed TVs)	114	
CNET	94	
EICTA (Europe)	102	
MTP (Europe)	157	
<i>subtotal</i>	517	
<hr/> Grand Total	<hr/> 762	

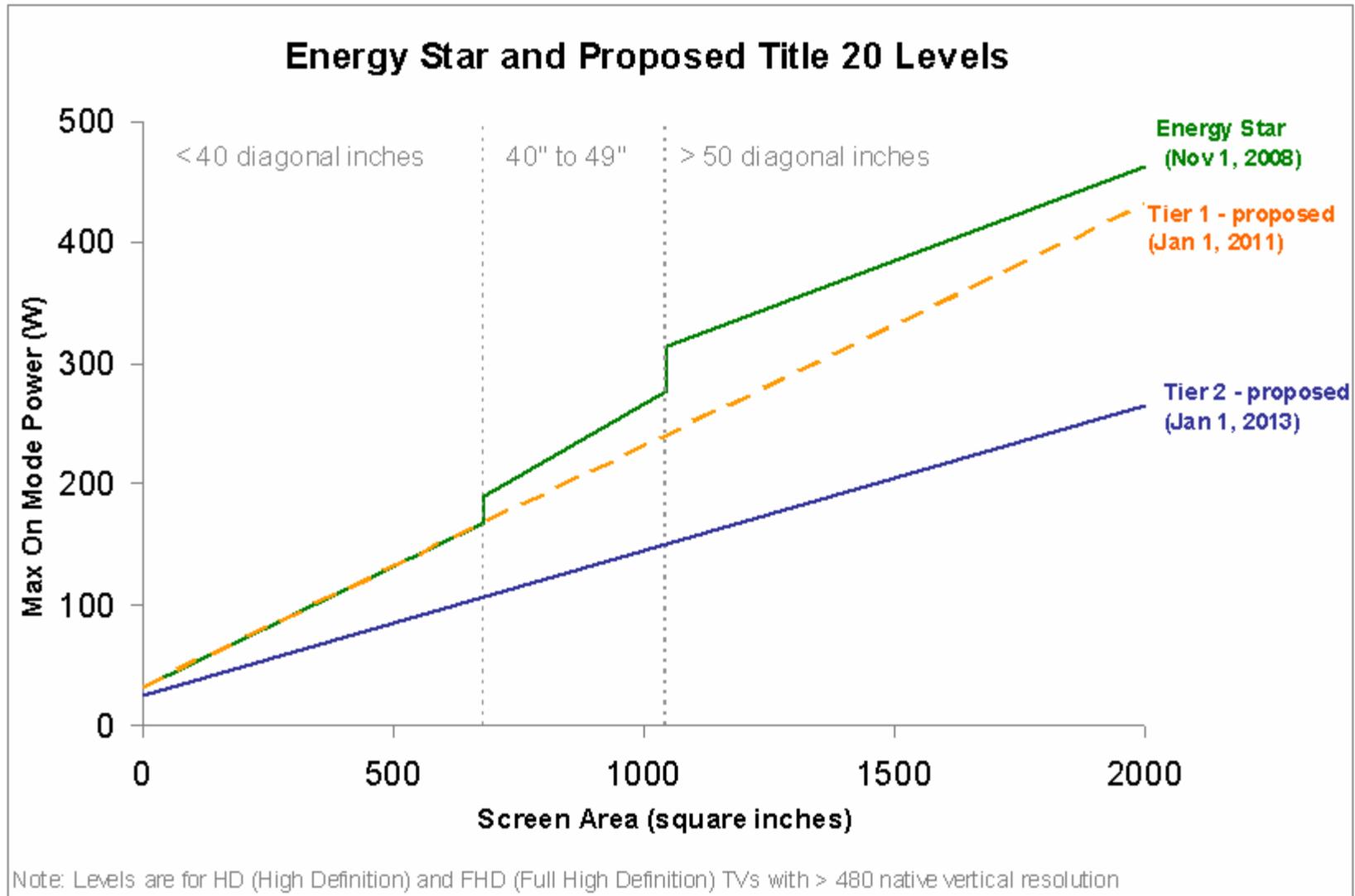
All the datasets are different; therefore, careful consideration during analysis is used to accommodate for different variables, including but not limited to: technologies represented (e.g., LCD, Plasma, rear projection, CRT), screen sizes, test procedure, TV screen settings during test, TV manufacture date, and resolution type. All attempts are made to represent what's available on the market now and in the near future.

Television Proposal: Levels

Native Vertical Resolution	Maximum On Mode Power Consumption (A expressed in inches ²)	
	Tier 1: Effective January 1, 2011	Tier 2: Effective January 1, 2013
≤480 native vertical resolution (i.e., Non-High Definition TVs)	$P_{MAX} = 0.12 \cdot A + 25$	$P_{MAX} = 0.12 \cdot A + 25$
>480 native vertical resolution (i.e., High Definition and Full Definition TVs)	$P_{MAX} = 0.20 \cdot A + 32$	$P_{MAX} = 0.12 \cdot A + 25$

There are no additional changes to the recommendations presented in Section 8 (“Recommendations”) of PG&E’s April 2, 2008 CASE report. Therefore, we continue to recommend that the Commission utilize the same definitions and test procedure as the Final Version 3.0 Energy Star specification for TVs. This includes adopting Energy Star’s guidelines for testing and certifying TVs with Automatic Brightness Control and its guidance for testing TVs at factory default settings.

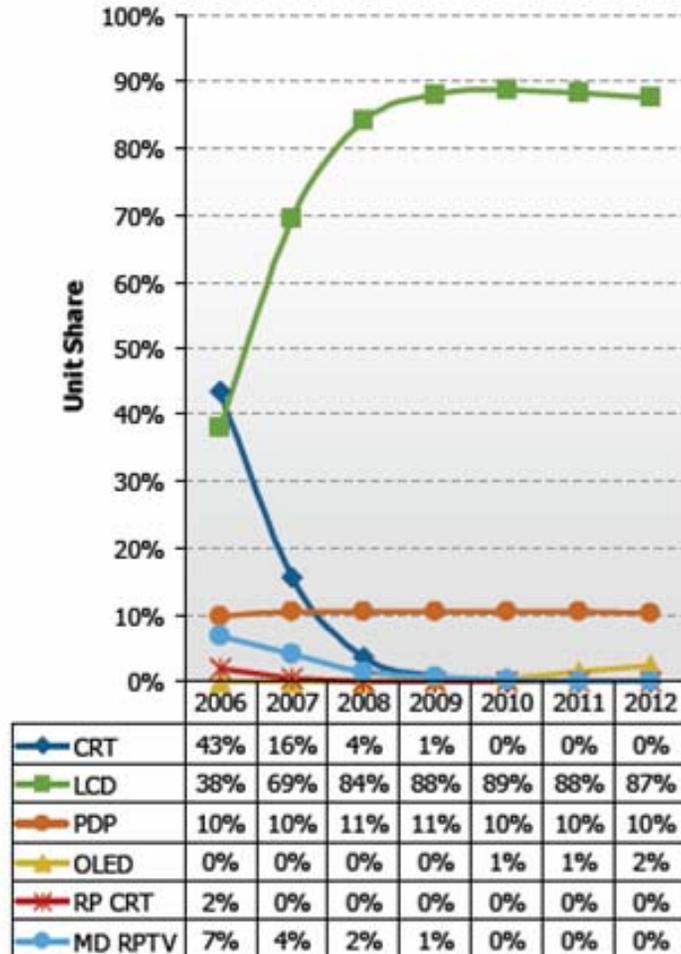
TV Proposal: On Mode Levels



Section 2

Market and Energy Trends

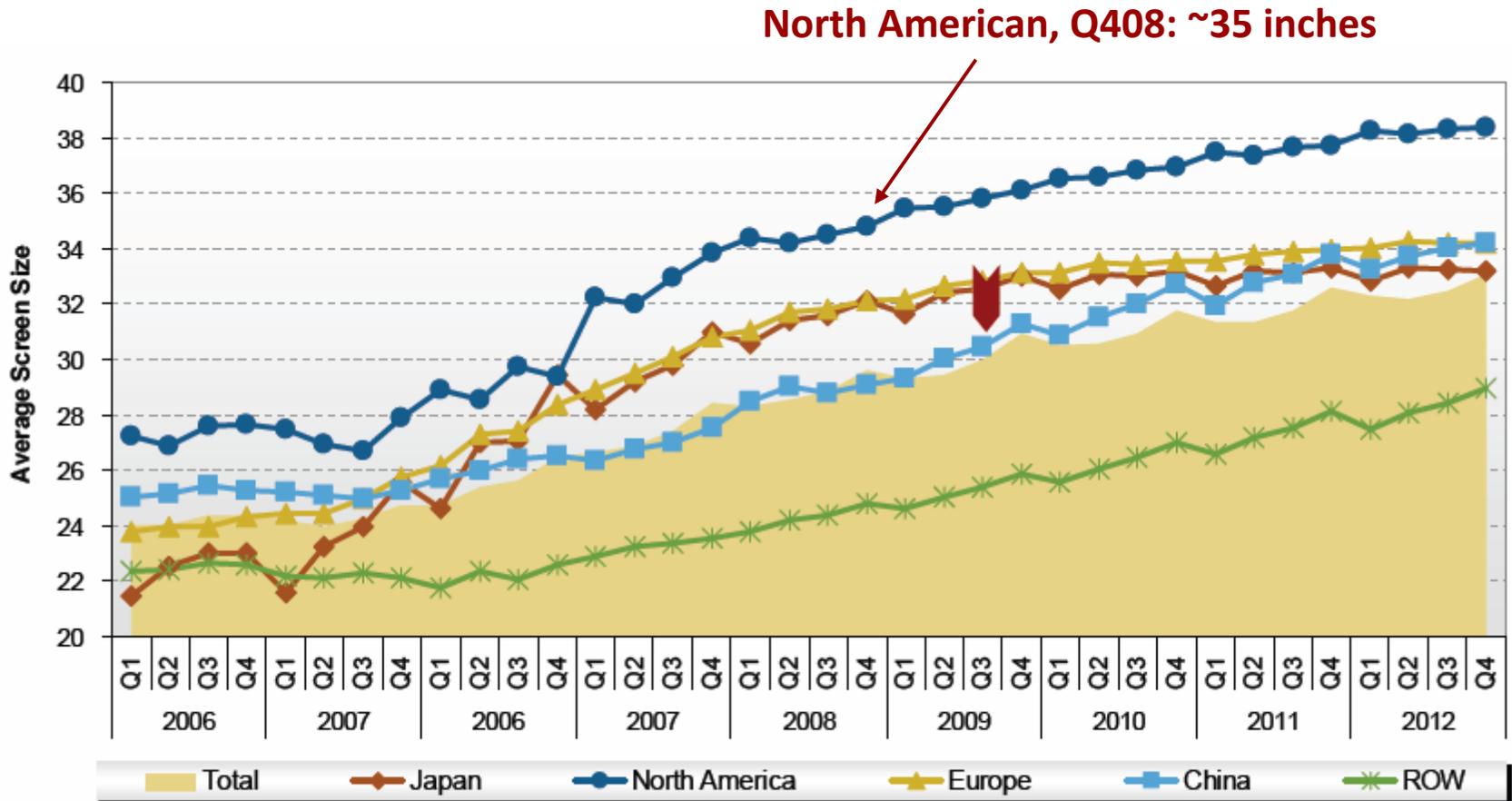
TV Market Share by Technology



Source: DisplaySearch Global TV Shipment and Forecast Report

- A leading TV market research firm (DisplaySearch) estimates that LCD market share is rapidly growing and will flatten at roughly below 90%.
 - Plasma (PDP) displays are showing a relatively flat market share at roughly 10%.
 - CRTs and RPTVs market share has been declining. OLED TVs are entering the market but at a small percentage.
- ❖ *Therefore, in order to gain worthwhile energy savings that contribute towards AB 32 goals, a Title 20 standard and incentive programs must adequately address the majority of the market.*

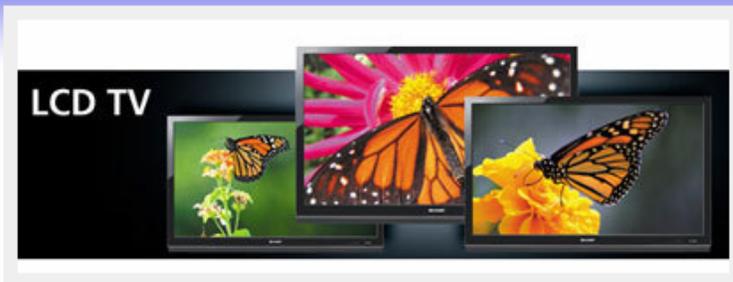
Screen Size Projections



Source: DisplaySearch Global TV Shipment and Forecast Report

Screen Sizes: Competing Views

Average TV size up to 60-inch by 2015 says Sharp



Think your 42-inch screen is impressive? Well, it's going to be old hat by 2015, with average screen sizes set to rise to 60-inch says Sharp.

In the last 12 months, sales of 46 inches and above LCDs have risen 272%, suggesting big screen TVs are becoming the norm rather the exception. Sales of 40-42 inch TVs have also increased by 128% and sales of 37-inch screens by 308%. Although with house sizes getting no bigger, you wonder where all these monster screens might go.

According to Mike Gabriel, head of marketing and communications for Sharp Electronics (UK): "Big screens are no longer for just shop windows or shiny office receptions. The demand for HD-ready 1080p picture quality in the home has led to an increase in both the affordability and availability of larger TVs. People can now expect a home cinema experience from their TV and technology that was once associated with the rich and famous is now accessible to homes across the country."

Sharp

LG Display sees strong demand for small LCD TVs

Fri Apr 11, 2008 5:30am IST

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[\[-\] Text](#) [\[+\]](#)

SEOUL, April 11 (Reuters) - The LCD TV market is seeing stronger-than-expected demand for small-size sets as consumers switch to sleeker TVs from bulky tubes at ever-faster rates, the chief executive of LG Display Co Ltd (034220.KS: [Quote](#), [Profile](#), [Research](#)) said.

"Demand is strong for 26-inch or smaller TVs. The market is shifting to LCD rapidly," said Kwon Young-soo, CEO of LG Display, the world's No.2 maker of large-sized liquid crystal display (LCD) panels.

Kwon's comments, made at a media event after quarterly results on Thursday, were embargoed until Friday.

"Demand for small-sized TVs and cheaper notebook computers is something we hadn't had expected and counted in," Kwon said, adding an oversupply in 2009 will be milder than expected.

South Korea-based LG Display is set to start mass production from its new "eighth-generation" production line early in 2009, when analysts expect the market will tilt toward an oversupply.

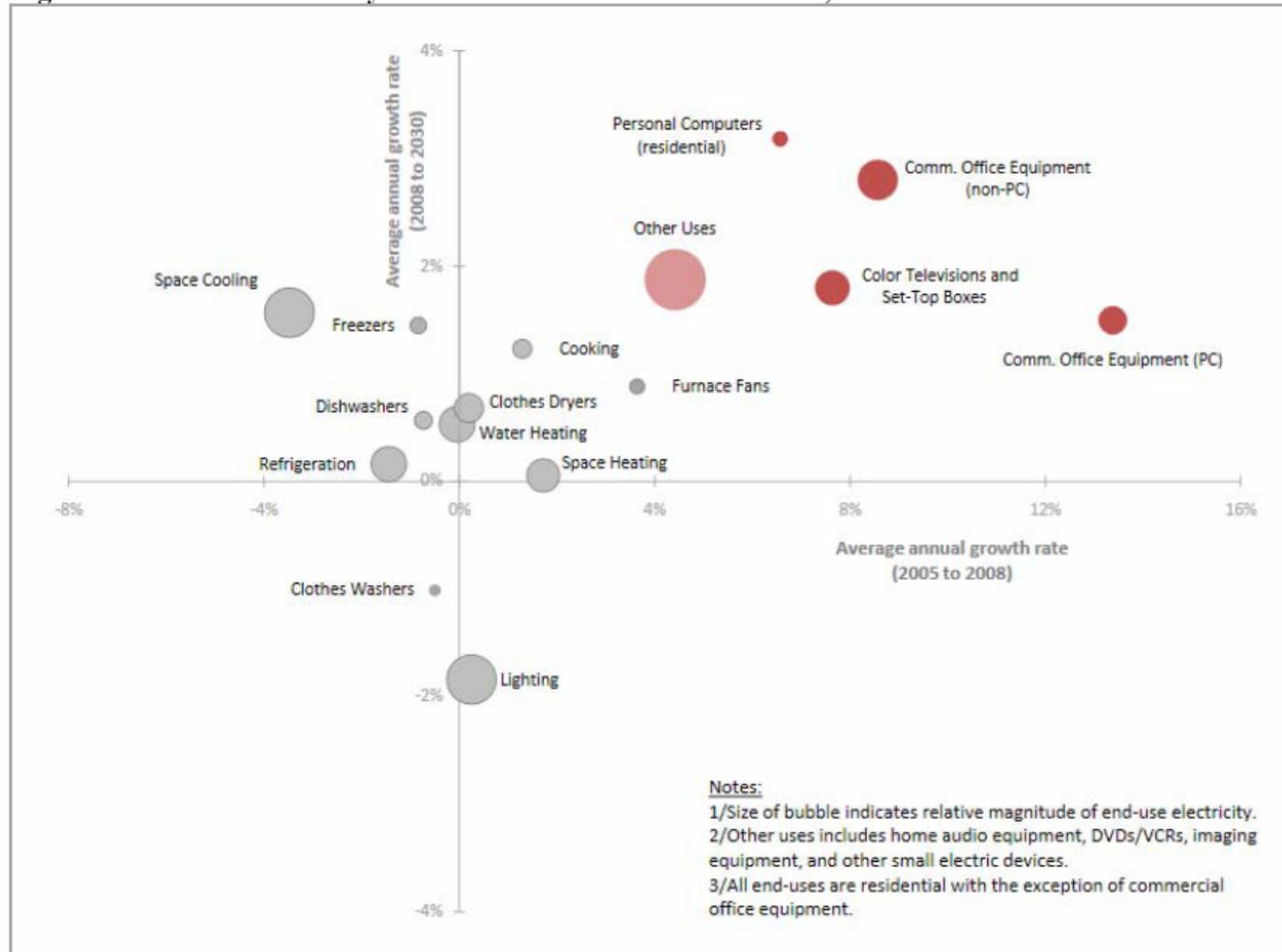
Kwon said the mass production could start one or two months earlier than the original schedule of March or April. (Reporting by Rhee So-eui; Editing by Keiron Henderson)

Sources: http://www.techdigest.tv/2008/01/average_tv_size.html

<http://in.reuters.com/article/governmentFilingsNews/idINSEO20183020080411>

TV Trends: End-Use Growth Rate

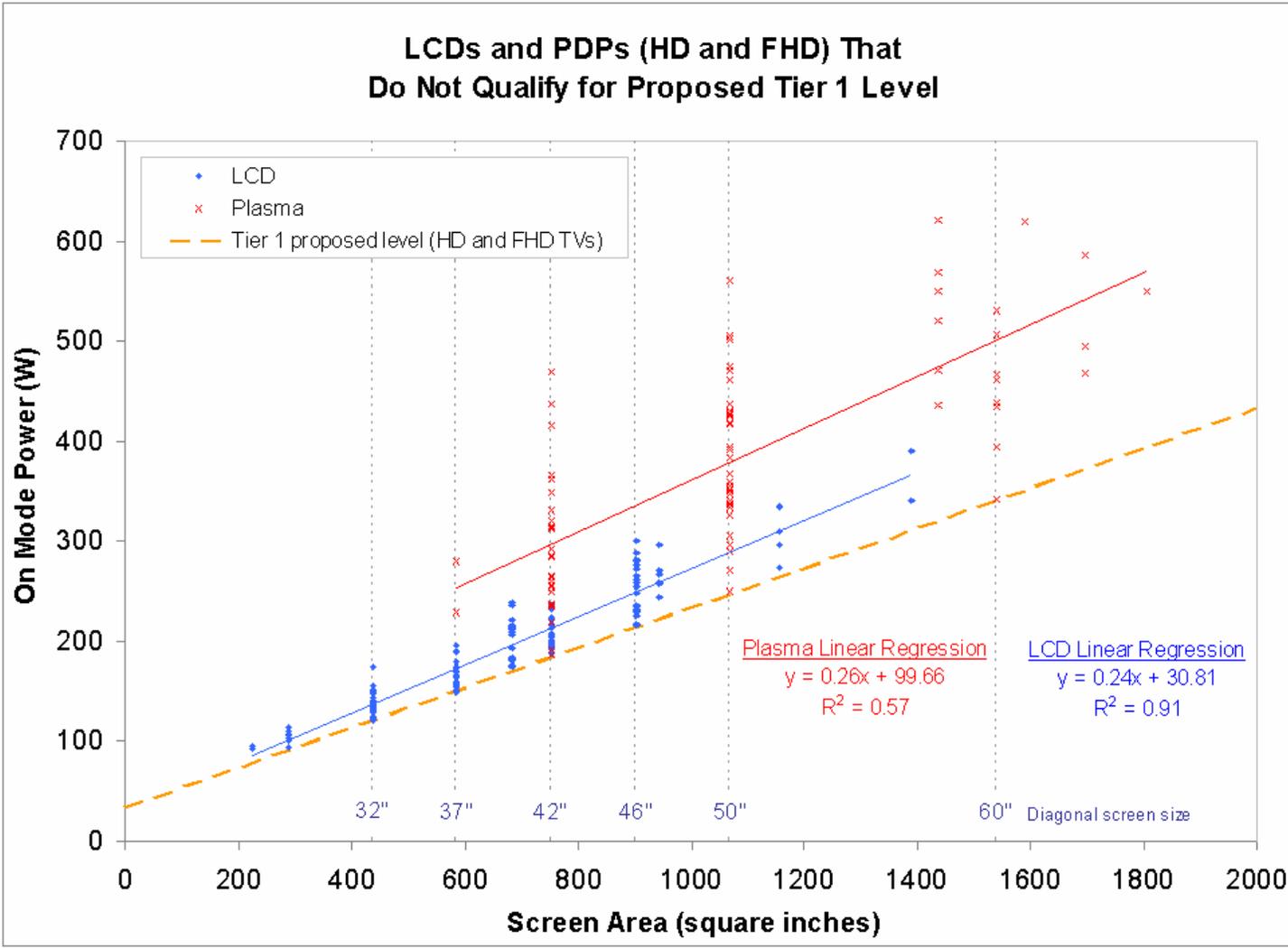
Figure 5. End-Use Electricity Growth Rates in the United States, 2005 - 2030



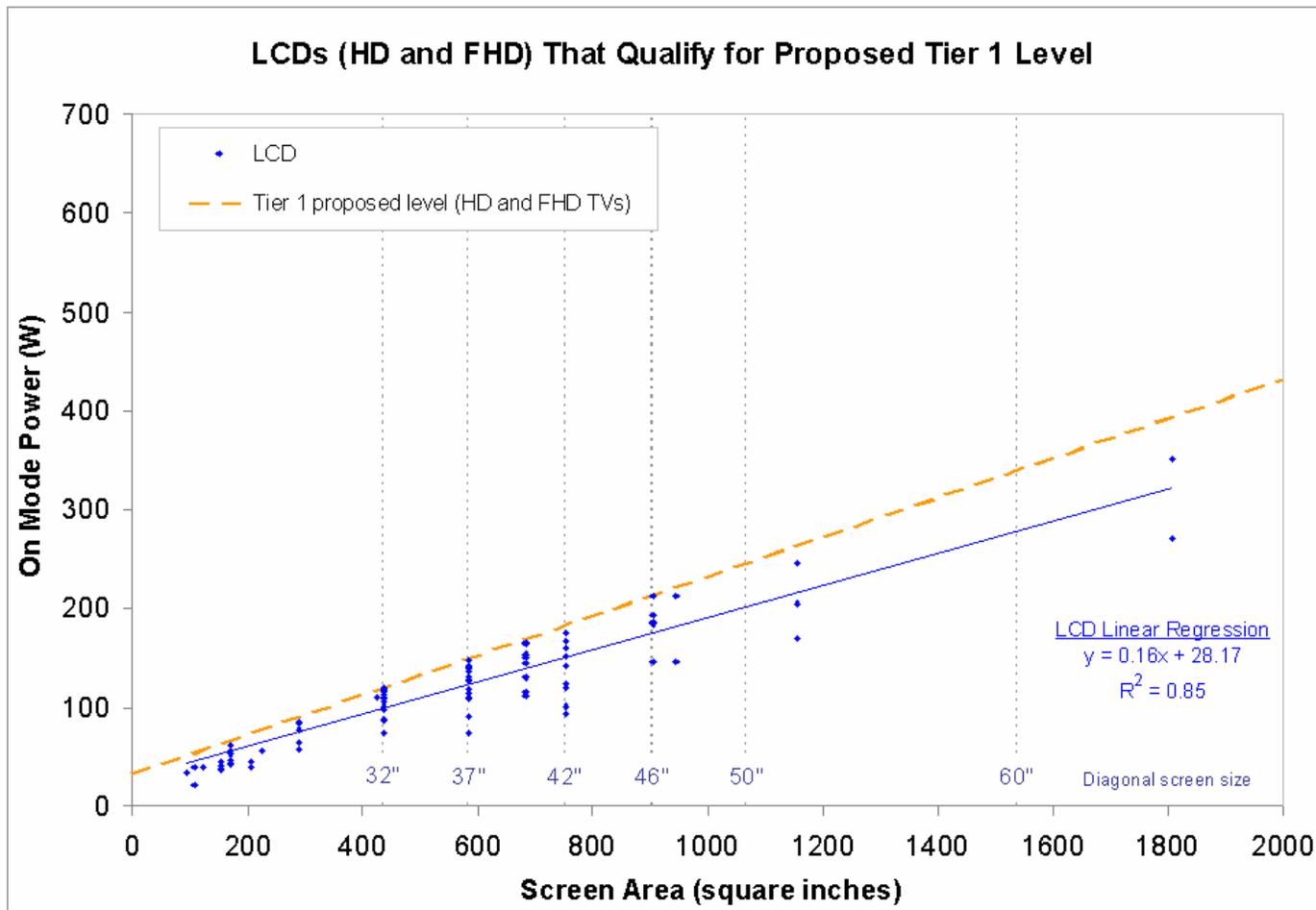
Source: Analysis of “Year-by-Year Reference Case Tables” in EIA 2008. Includes the estimated impact of H.R.6, “Energy Independence and Security Act of 2007” that was enacted in late December, 2007.

Source: PG&E April 1, 2008 CASE report, “Analysis of Standards Options for Televisions”

TV Trends: On Mode Power



TV Trends: On Mode Power



Note: Figure does not fully reflect the energy efficient TVs (specifically for both LCD and plasma technologies) which are currently entering the market and/or being publicly promoted and showcased by several major manufacturers (see next slides).

Section 3A

**LCDs on the market today:
Selected efficient models**

Philips Eco TV

CNET.com > CES 2008 > CES award winners

CES award winners

BEST IN SHOW



Philips' Eco TV sips power, saves rainforest

At CNET, we take HDTV power consumption seriously, which helps explain our excitement when Philips announced its Eco TV. The 42-inch, 1080p resolution, flat-panel LCD, model 42PFL5603D (due in March, \$1,399 MSRP), is packed with power-saving features. Chief among them is the ability to dim the backlight--by up to five times peak brightness--in response to program material, much like the "local dimming" found on Samsung's LED-based LN-T4681F. Dimming the backlight in darker scenes has the dual benefit of

saving power and improving black-level performance, according to the company. ([Read more](#))

Posted By: David Katzmaier Jan 7 2008

Philips' Eco TV (42" 1080p, flat panel LCD) won best in show at CES 2008.

~90W On Mode power

56% better than Energy Star

50% better than original proposed Title 20 level

Eco TVs are now available in 42" (three models), 47", and 52"

Sony BRAVIA 32" TV

Press Releases

The following information is true and accurate at the time of publication.

June 17, 2008

Sony's New "BRAVIA" JE1 Series Digital LCD TVs Achieve Industry's-Highest Energy Efficiency
Realizes Energy Efficiency Rating of 232%, 89W Power Consumption

New Product

English summary of product press release for the Japanese market



BRAVIA

~89W Power Consumption

~25% beyond Tier 1 level

Section 3B

Plasmas on the market today: Screen setting impacts

Plasma Screen Settings

- This section focuses solely on *plasma TVs currently available on the market*.
- Typically, the default screen setting for TVs (the “out-of-the-box” setting) is set to have high light output which results in correspondingly high power consumption.
 - This mode is informally referred to as “torch mode” and manufacturers may refer to this setting as “Vivid” or “Dynamic”
 - This default screen setting may be ideal for retail shop settings (in order to compete for attention from other TVs) but is not typically calibrated for optimal home viewing.
 - Screen settings significantly effect on mode power: *the difference between “torch” settings and better calibrated settings ranged from 27 to 65% for the nine plasma TVs highlighted in this presentation*

Plasma Screen Settings

- The leading plasma manufacturers have plasma TVs on the market *today* that can meet the proposed Tier 1 levels.
 - Achieved simply by adjusting the “out-of-the-box” screen settings—a \$0 hardware cost pathway.
- Plasma TVs currently available from the leading manufacturers are highlighted in this presentation
 - Panasonic, Samsung, LGE, Hitachi, Pioneer, Vizio, and Insignia

PDP TV

	Units	Revenues
↑	Panasonic 33.4%	Panasonic 34.5% ↑
↑	Samsung 19.2%	Samsung 20.1% ↑
↑	LGE 17.7%	LGE 16.1% ↑
↑	Hitachi 8.0%	Hitachi 7.5% ↓
↓	Philips 5.9%	Pioneer 7.3% ↓

Source: DisplaySearch Global TV Shipment and Forecast Report

CNET Test Results

- Results in this section are based on CNET test results and are being confirmed by independent PG&E testing.
 - TVs were tested at various screen settings: “Default”, “Calibrated”, and “Power Save” (if applicable) and reported in the “Juice Box” at the bottom of each CNET review (see example)
 - CNET test results are valuable because we know the TV brand and model number. Allows us to assess market availability, which we can’t do for the masked Energy Star dataset.

Juice box

	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	336.1	216.65	118.51
Picture on (watts/sq. inch)	0.31	0.2	0.11
Standby (watts)	25.1	1.1	1.1
Cost per year	\$117.31	\$66.46	\$36.66
Score (considering size)	Good		
Score (overall)	Poor		

CNET Test Results: the Stats

- 104 HDTVs have been tested by CNET between January 2006 and June 2008.
- TVs tested after June 22, 2007 include power consumption data for various picture modes
- 15 of these TVs are Plasma
 - 9 of 15 (60%) should be able to meet the Energy Star level in a lower-power picture mode
 - 7 of 15 (47%) should be able to meet the proposed Tier 1 Title 20 level in a lower-power picture mode

Currently Available Plasma TVs

- The next several slides highlight plasma TVs that should be able to meet the proposed Title 20 Tier 1 level in a better calibrated picture mode (add'l examples in appendix)

Model	TV release date	Screen size (in.)	CNET Test Results On Mode Power (W)			Max On Mode Power (W)		Meets the following level?		Difference b/w min and max on mode power
			"Default"	"CNET Calibrated"	"Power Save"	Energy Star Level	Proposed Title 20 Level	Energy Star Tier 1	Proposed Title 20 Tier 1	
Panasonic TH-42PX80U	Mar-08	42	260	191	na	208	183	Yes	No	27%
Insignia NS-PDP42	Nov-07	42	217	204	138	208	183	Yes	Yes	37%
Panasonic TH-50PH10UK	Sep-07	50	379	262	342	318	246	Yes	No	31%
Hitachi P50H401	Jan-08	50	336	217	119	318	246	Yes	Yes	65%
Pioneer PDP-5080HD	Jul-07	50	331	229	254	318	246	Yes	Yes	31%
Samsung HP-T5064	Apr-07	50	322	233	288	318	246	Yes	Yes	27%
LG 50PC5D	Feb-07	50	320	289	248	318	246	Yes	Borderline*	23%
Vizio VP50HDTV	May-07	50	317	197	na	318	246	Yes	Yes	38%
Panasonic TH-50PZ800U	May-08	50	191	286	na	318	246	Yes	Yes	33%

Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure Plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power.

*CNET results are slightly over the max level (by 2W), which is within the potential error range if these were tested using the IEC test procedure.

Hitachi P50H401

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Inexpensive; relatively effective antiglare screen; three independent picture memories per input; versatile selection of aspect-ratio modes and power-saving options; three HDMI inputs.

The bad: Produces a light shade of black; relatively soft picture; inaccurate primary color of green; bluish color temperature that cannot be adjusted; introduces false contouring.

The bottom line: Although it's inexpensive, Hitachi's P50H401 50-inch plasma produces one of the least impressive pictures we've seen lately.

Specs: Product type: Plasma TV; Diagonal size: 50 in; Resolution: 1280 x 1080
See full specs >>

Price range: ~~\$1,289.00~~ - ~~\$1,999.99~~

See all products in the Hitachi PH401 series

CNET EDITORS' RATING

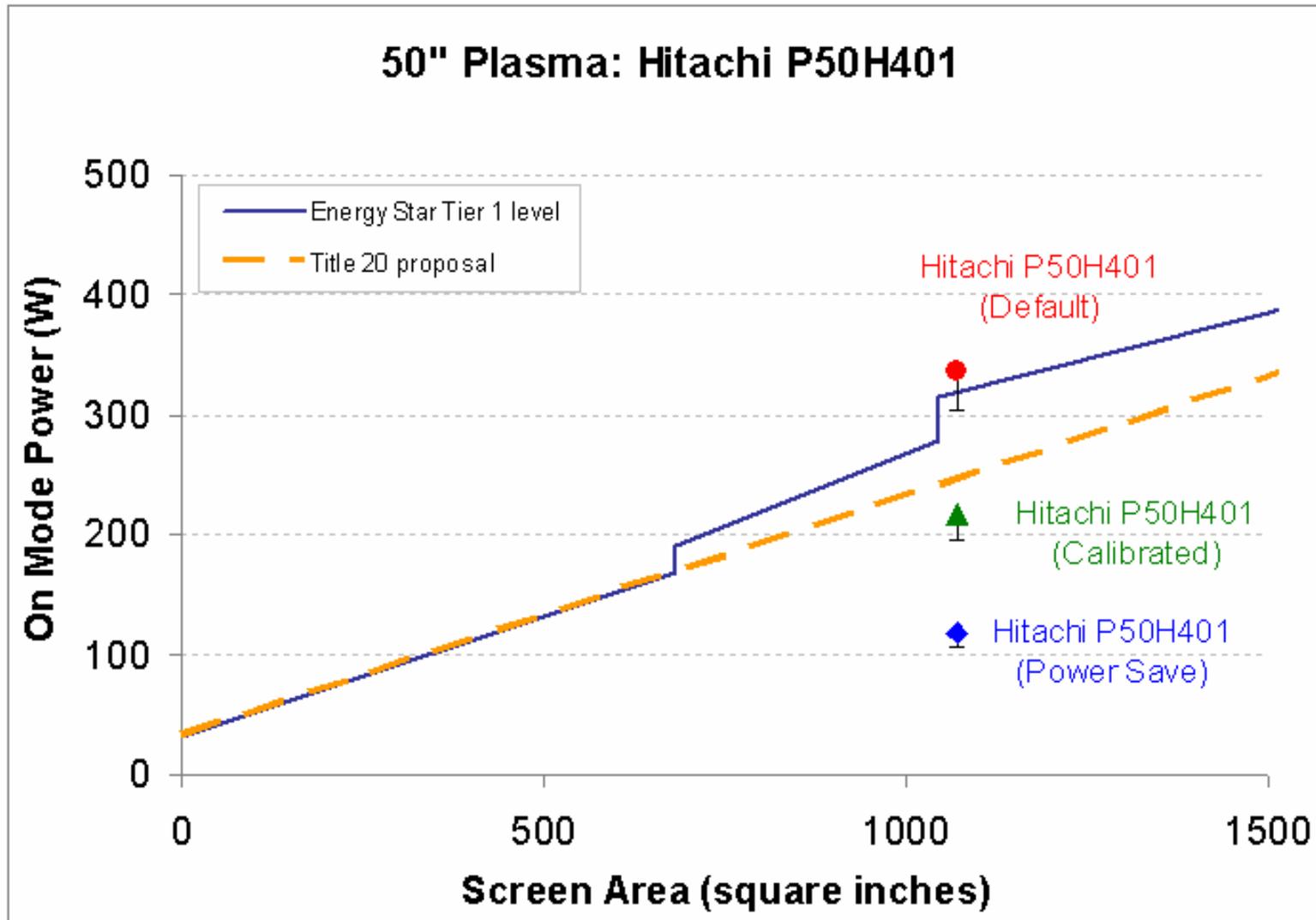


AVERAGE USER RATING from 29 users



Juice box

	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	336.1	216.65	118.51
Picture on (watts/sq. inch)	0.31	0.2	0.11
Standby (watts)	25.1	1.1	1.1
Cost per year	\$117.31	\$66.46	\$36.66
Score (considering size)	Good		
Score (overall)	Poor		



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure Plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Vizio VP50HDTV

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Relatively inexpensive; solid standard-def and PC monitor performance; custom color-temperature controls.

The bad: Subpar black level performance; inaccurate primary color of green; no color temperature presets; some false contouring; sometimes unresponsive to remote commands.

The bottom line: For many less critical viewers, the Vizio VP50HDTV's bargain pricing will be worth the trade-off in picture quality.

Specs: Product type: Plasma TV; Diagonal size: 50 in; Brightness (cd/m2): 1500 cd/m2 [See full specs >>](#)

Price range: ~~\$1,299.99~~

CNET EDITORS' RATING

 **6.0/10**
Good
[Editorial policies >>](#)

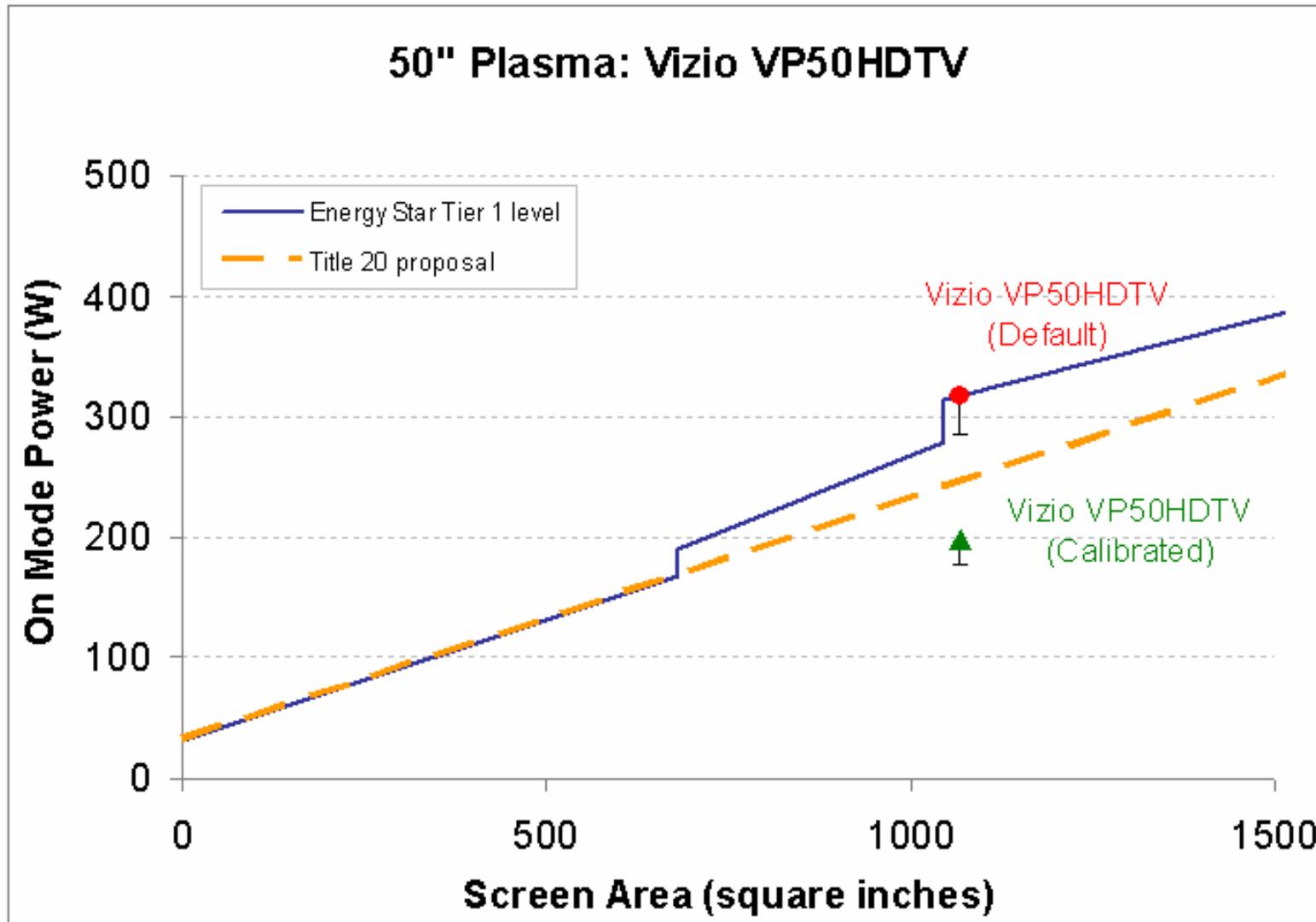
AVERAGE USER RATING

from 32 users

 **6.5/10**
Good
[Read user opinions >>](#)

Juice box

Vizio VP50HDTV	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	317.23	197.48	N/A
Picture on (watts/sq. inch)	0.3	0.18	N/A
Standby (watts)	1.33	1.33	N/A
Cost per year	\$97.14	\$60.78	N/A
Score (considering size)	Good		
Score (overall)	Poor		



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure Plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Panasonic Viera TH-50PZ800U

REVIEW | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good:

Reproduces deep black levels and highly accurate color; excellent uniformity with little false contouring; THX mode obviates in-depth calibration; relatively effective antireflective screen; solid connectivity with four HDMI and one PC input; handsome styling with single-pane design.

The bad: Expensive; blacks not quite as deep as the best plasmas; optional 24p mode introduces flicker; fewer picture controls than most HDTVs.

The bottom line: With the accuracy of its THX mode and great black-level performance, the Panasonic TH-50PZ800U is one of the best-performing HDTVs available.

Specs: Product type: Plasma TV; Diagonal size: 50 in; Resolution: 1920 x 1080
[See full specs >>](#)

Price range: ~~\$2,169.99~~ - ~~\$3,199.99~~

CNET EDITORS' RATING

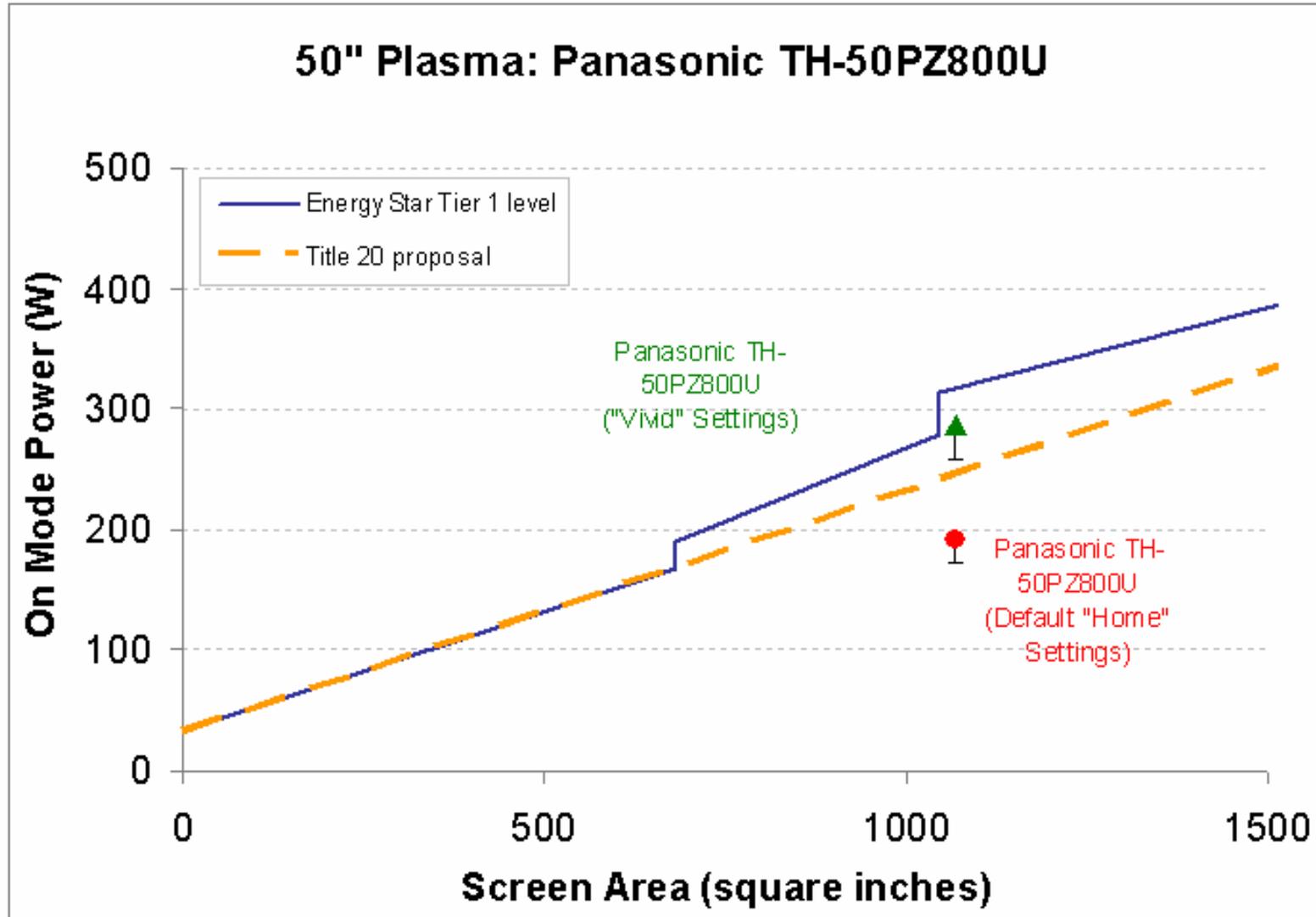


From CNET review:

“We would have liked to see an energy saver mode on this TV, but it does include one nice extra that really helps ameliorate power consumption. When you first plug in and set up the TV, it asks you whether you're in a store or home environment. Choosing "home" engages the Standard picture preset by default across all of the inputs, which saves quite a bit of power over the Vivid preset.”



This is a strategy we want to encourage with a Title 20 standard



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Plasma Screen Settings

Note: additional slides highlighting plasma TVs on the market today that can meet Tier 1 levels with better calibrated screen settings are provided in the Appendix.

Section 4A

LCD Efficiency Developments: **Showcased products from major brands**

Efficient LCD TVs:

New Technologies Coming to a Screen Near You

- The following slides highlight the efficiency developments for several LCDs prominently showcased at the Display Week 2008 show in Los Angeles from May 18 – 23, 2008.
- Manufacturers proudly displayed working models of their latest TV's. Energy efficiency is now clearly a hot button issue for the market leaders as demonstrated by their show booths.
- What the photos on the next slides show is the relative power requirements of their current models compared to their next generation models.
- In most pictures you can see the active mode watts displayed.

**Display
Week 2008**
The SID International Symposium,
Seminar & Exhibition

May 18-23, 2008

Los Angeles Convention Center

Los Angeles, California, USA

www.sid2008.org

SID Society for Information Display

2008 International Symposium, Seminar, and Exhibition

May 18-23, 2008

Los Angeles Convention Center, Los Angeles, California, USA

The **SID International Symposium, Seminar and Exhibition**, now in its 46th year, is the premier international gathering of scientists, engineers, manufacturers and users in the electronic-display industry.

The event provides access to a wide range of technology and applications from high-definition flat-panel displays using both emissive and liquid-crystal technology to the latest in OLED displays and large-area projection-display systems. One can find state-of-the-art information on the latest in image processing, systems software and display processor hardware, human factors and applied vision, and exciting new applications such as multimedia and the electronic cinema.

With more than 550 booths and 7,600 attendees, SID is the leading North American show for the electronic-display industry.

Samsung 52" LCD Green TV



AUO 46" ECO-Friendly LCD TV



Samsung 46" LCD with 3-Way dimming

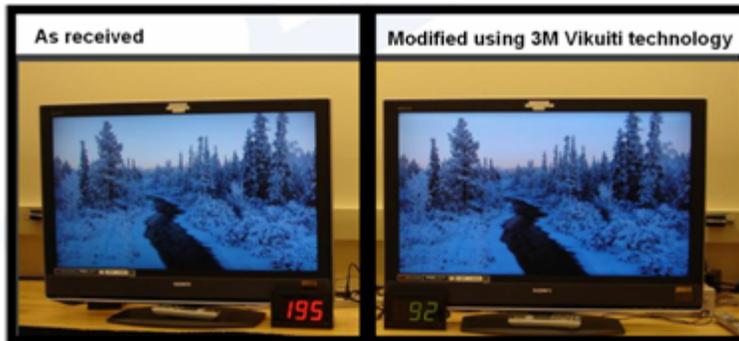


Samsung 46" LCD with 3-Way dimming



On Mode Power (W) comparisons

40" LCD with 3M Vikuiti Display Enhancement



40" Common LCD-TV
 Brightness: 350 nits
 Power: 195 Watts

40" Ultra Low Power LCD-TV
 Brightness: 350 nits
 Power: 92 Watts

Ultra Low Power 32" LCD-TV with 3M Vikuiti Display Enhancement



CMO Power Saving Technology Non-HD 31.5" LCD



3M Vikuiti™ Dual Brightness Enhancement Film

Energy Efficient Displays

More Energy Efficient LCD TVs, Monitors, Notebooks and Handheld Displays



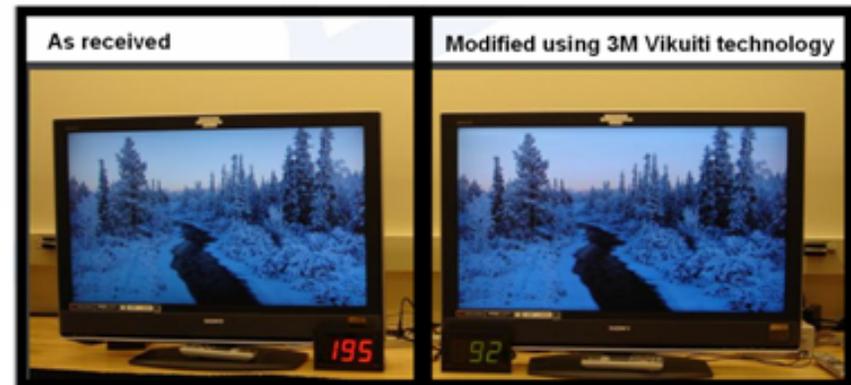
LCD TVs

Vikuiti™ Dual Brightness Enhancement Film (DBEF) – the industry’s first reflective polarizer – recycles light that normally would be absorbed by the LCD. It improves backlight efficiency by 32 percent to 52 percent, and provides total LCD TV energy savings of 23 percent to 37 percent.

For example, a 46 inch LCD TV with Vikuiti DBEF and two diffusers ran on 83 fewer watts than the same TV with three diffusers and no Vikuiti DBEF.

Vikuiti DBEF increases brightness so much that engineers can design equally bright LCD TVs with fewer bulbs and inverters. A lower-watt power supply can also be used, further reducing costs.

40” LCD with 3M Vikuiti Display Enhancement



40” Common LCD-TV

Brightness: 350 nits

Power: 195 Watts

40” Ultra Low Power LCD-TV

Brightness: 350 nits

Power: 92 Watts

AUO “ECO-Friendly” LCD TV Panels

AUO to Exhibit Wide Range of Green Innovations for Large-sized TFT-LCDs at SID 2008

Hsinchu, Taiwan, - (May 14, 2008)

AU Optronics Corp. (“AUO” or the “Company”) (TAIEX: 2409; NYSE: AUO) will exhibit its latest cutting-edge green innovations for large-sized TFT-LCDs at SID (Society for Information Display) 2008, from May 20 through 22 in Los Angeles, California. The AUO Green Innovations exhibit, AUO’s first large-scale exhibition after its “Green Solutions” announcement, will include a wide range of energy-saving technologies and LED technologies together with a less than 10 mm thick ultra slim 42” LCD TV panel.

According to Dr. B.D. Liu, Vice President of the AUO Technology Center, “Our four major domains of green innovations are **Energy Saving, Material Saving, Environment Friendly and Lean Design**. These four principles will not only drive future innovation and development trends, but will also become competitive advantages for AUO in providing customers high value-added green products.”

The four domains of AUO’s green innovations are as follows:

1. Energy Saving

AUO continues in the development of its new generation AMVA III technologies to provide static contrast ratio>5000:1 with higher transmittance to increase the energy utilization rate. AUO’s RGBW -Technology can increase 30% luminance with up to almost 20% power saving in NB applications. In addition, AUO latest 46” eco-friendly LCD TV panels can also save up to 50% in terms of power consumption.



LCD Panel Suppliers and Customers

Table 2: Shipments (millions) and Shares of the Top Three Suppliers

Rank	LCD TV Module Makers	Top Customers	Top Customers' Unit Share
1	AUO	Sony, Samsung, Philips, LGE, Proview	61%
2	LPL	Philips, LGE, Toshiba, AmTRAN, Toshiba, Skyworth	73%
3	CMO	Samsung, Philips, Funai, LGE, Sony	48%
4	Samsung	Sony, Samsung, TCL	85%
5	Sharp	Sharp, Philips	100%
6	CPT	Samsung, LGE, Funai, Tatung, XOCECO	68%
7	IPS-Alpha	Panasonic, Toshiba, Hitachi	100%

* Sales by Quanta Display have been added to AU Optronics revenues for 2006.

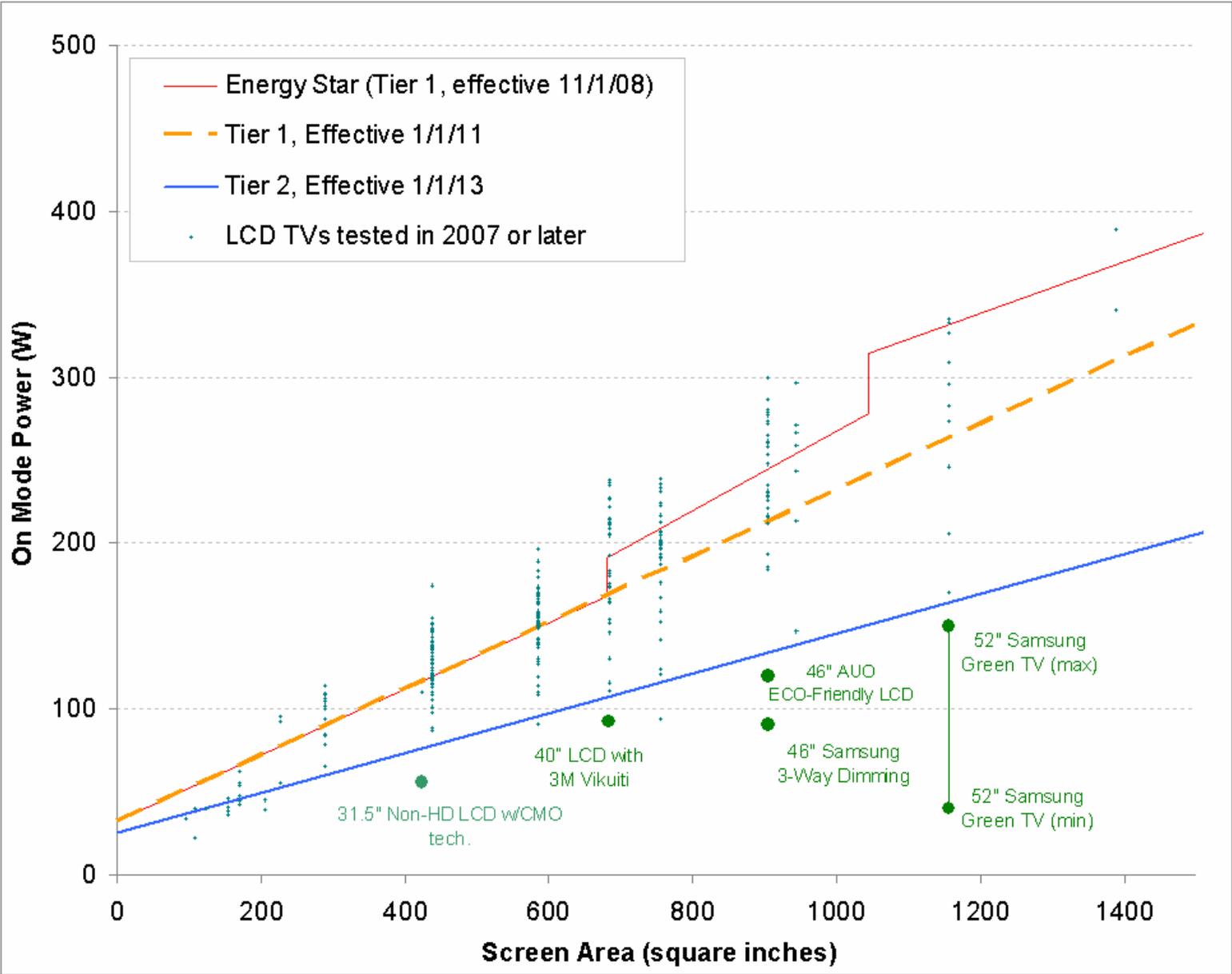
Leading panel makers and brands were represented at SID Display Week 2008 showcasing LCD TVs that surpassed proposed Tier 1 and Tier 2 levels

Efficient LCD TVs:

How do they measure up?

- The next two slides show how the next generation LCD TVs compare to the proposed Title 20 Tier 1 and Tier 2 levels.
 - *Next generation LCDs exceed proposed Tier 1 levels by 28-58% (i.e., more efficient)*
 - *Exceed proposed Tier 2 by 8-33%*

Next generation LCDs exceed proposed Tier 1 by 28-58% and Tier 2 by 8-33%.



Section 4B

**Plasma Efficiency Developments:
Showcased products and efficiency
developments from major brands**

Efficient Plasma TVs: New Technologies Coming to a Screen Near You

- The following slides highlight the following:
 - The Double Efficiency Technology (aka “Neo PDP”) being promoted by Panasonic, the leading Plasma brand
 - Comparison to Energy Star and the proposed Title 20 levels
 - Additional plasma efficiency developments

Panasonic Press Release: January 7, 2008

PANASONIC INTRODUCES NEXT-GENERATION PLASMA DISPLAYS AT 2008 INTERNATIONAL CES

*Revolutionary Plasma Technologies Boast Dramatic Energy Efficiency,
Less Than One-inch Super-thin Profile and 150-inch Ultra-large Screen*

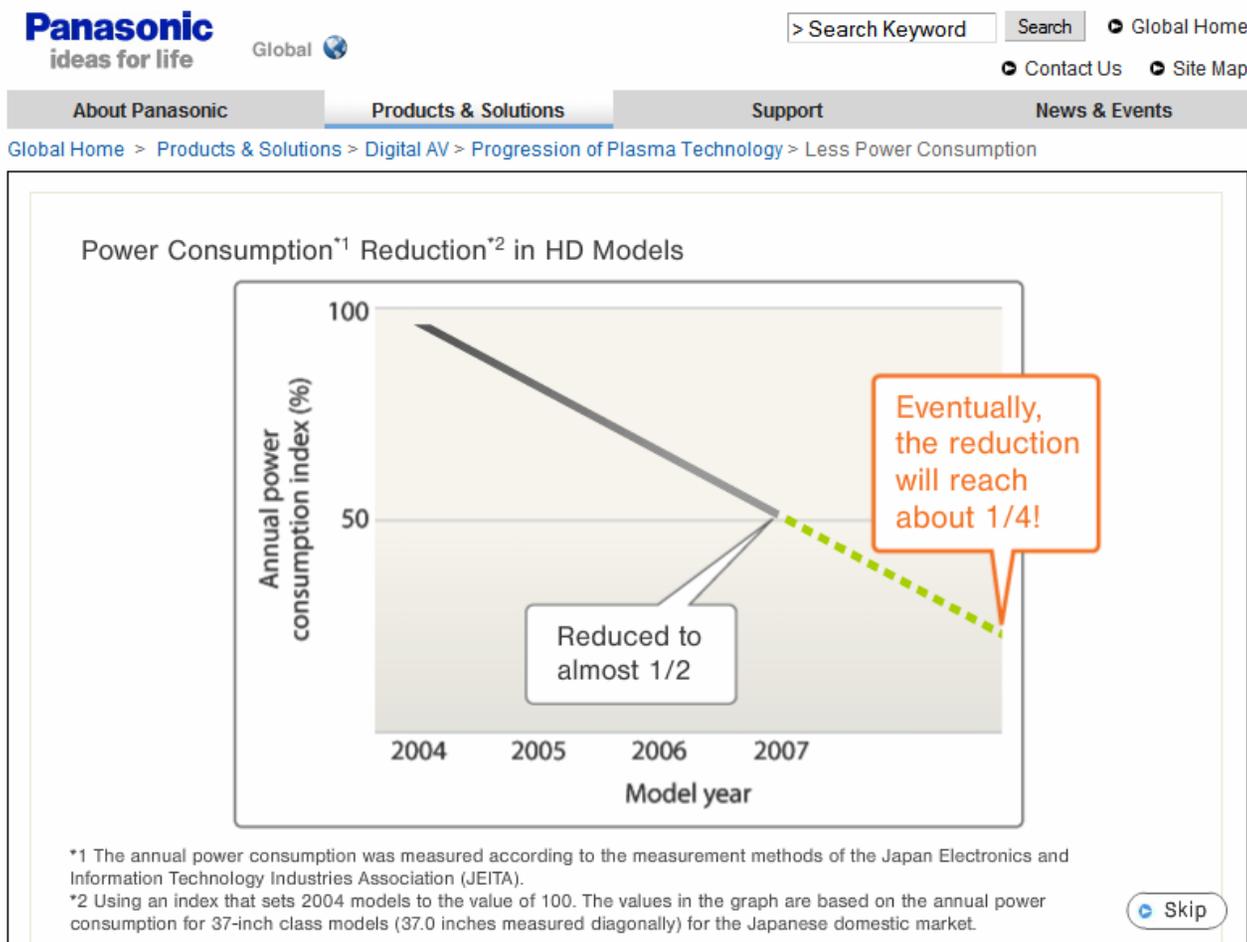
Las Vegas, NV (January 7, 2008) – Panasonic, the leading brand by which Matsushita Electric Industrial Co., Ltd. is known, today announced that the company has developed three prototype plasma display panels (PDPs) using ground-breaking technologies. The prototypes include a 42-inch panel with double efficiency technology that halves energy consumption while maintaining the same brightness*, a less than one-inch super-thin 50-inch PDP and the world's largest 150-inch advanced high definition (HD) PDP. The three prototypes are on display at the 2008 International Consumer Electronics Show (CES) that starts on January 7 in Las Vegas.

At the core of these cutting edge PDP's lies the double efficiency technology used in the 42-inch prototype. After thoroughly reviewing its existing IC technology and panel structures, Panasonic developed new phosphors and cell design technology for improved discharge and new circuit and drive technology to significantly reduce power loss. As a result, the 42-inch prototype has twice the luminance efficiency and provides the same brightness as the existing 42-inch 1080p full HD PDP, while cutting the power consumption by half.

The double-efficiency technology forms the base for next-generation PDPs, enabling even thinner profiles, larger screens, brighter images, higher definition and lower power consumption. The revolutionary technology promises to open up new possibilities for PDPs. Higher density HD PDP's that can be used as master monitors for movie studios will become possible through this innovative technology.

“...the 42-inch prototype has twice the luminance efficiency and provides the same brightness as the existing 42-inch 1080p full HD PDP, while cutting the power consumption by half.”

Panasonic Double Efficiency PDP Technology



Source: Panasonic website (as of June 6, 2008)

http://panasonic.net/plasma_progression/less_power_consumption.html

Panasonic Double Efficiency PDP Technology

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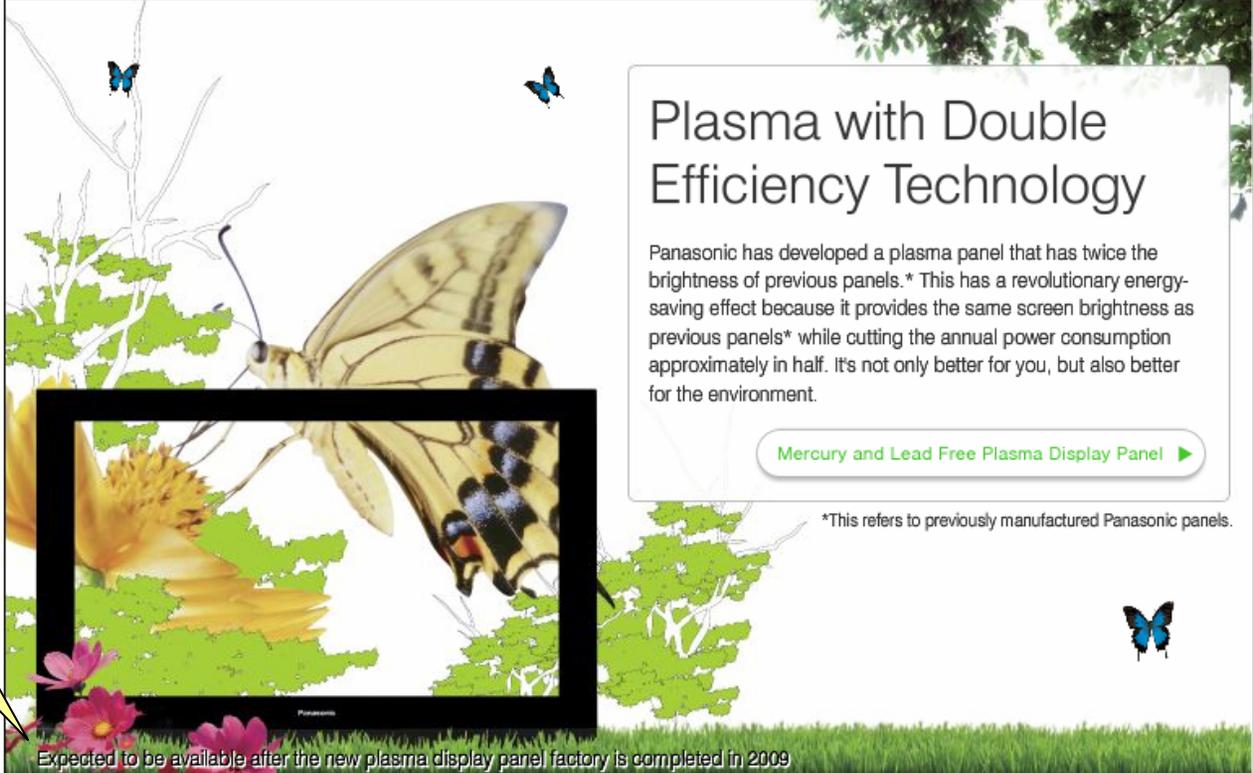
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[Global Home](#) > [Products & Solutions](#) > [Digital AV](#) > [Progression of Plasma Technology](#) > [Less Power Consumption](#)



Plasma with Double Efficiency Technology

Panasonic has developed a plasma panel that has twice the brightness of previous panels.* This has a revolutionary energy-saving effect because it provides the same screen brightness as previous panels* while cutting the annual power consumption approximately in half. It's not only better for you, but also better for the environment.

[Mercury and Lead Free Plasma Display Panel](#) ▶

*This refers to previously manufactured Panasonic panels.

Expected to be available after the new plasma display panel factory is completed in 2009

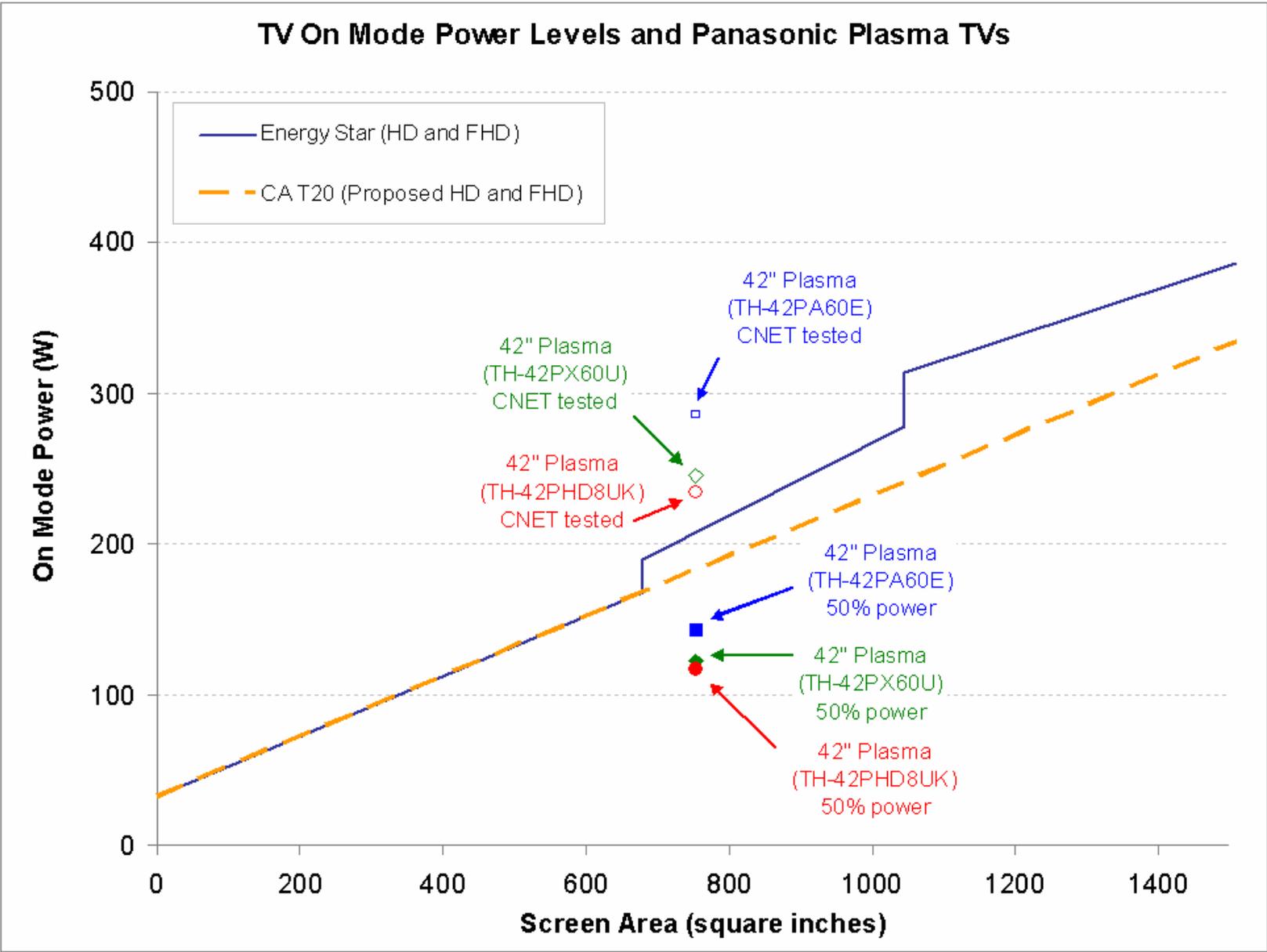
“Expected to be available after the new plasma display panel factory is completed in 2009”

Source: Panasonic website (as of June 6, 2008)

http://panasonic.net/plasma_progression/less_power_consumption.html

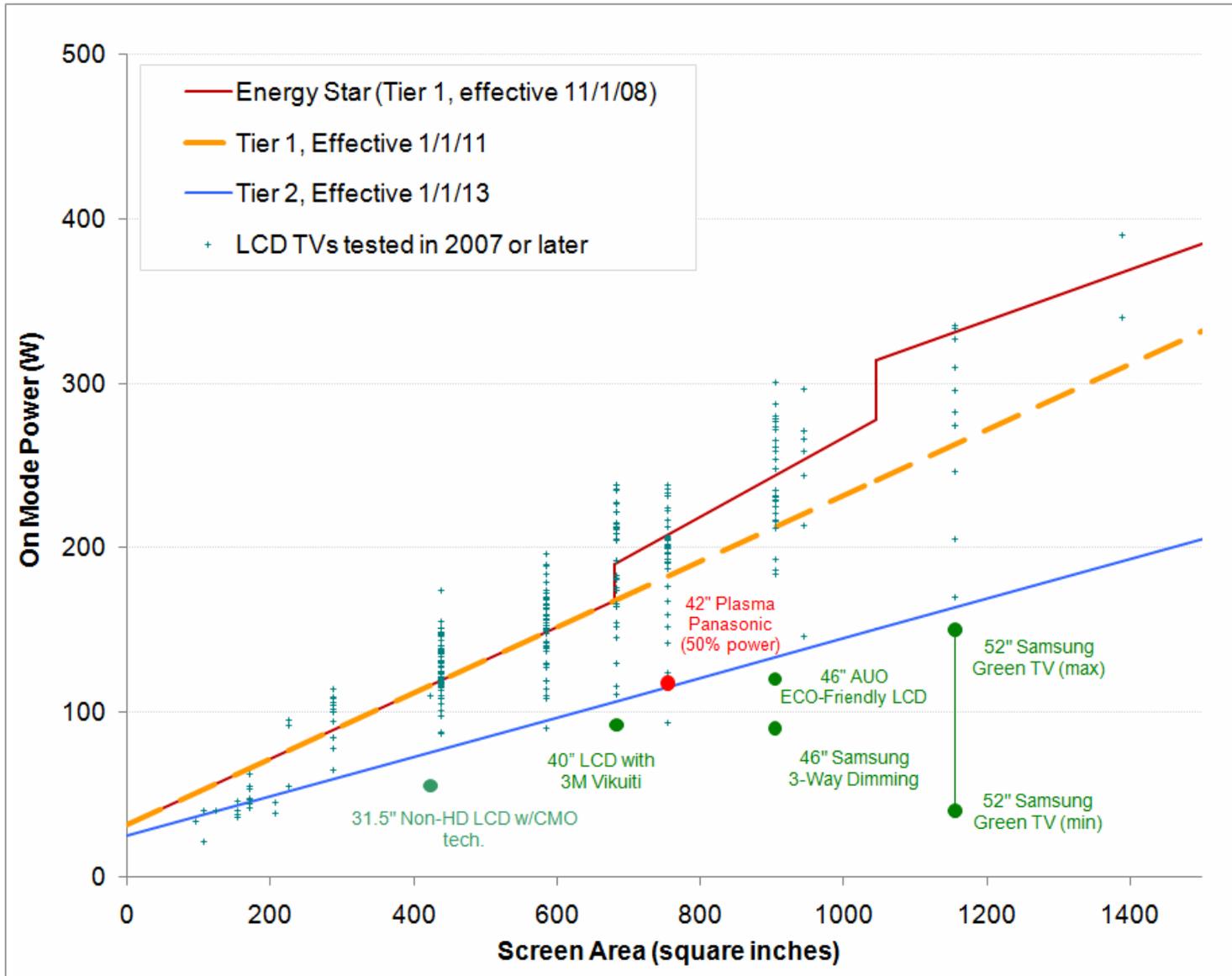
Panasonic Double Efficiency Technology (aka Neo PDP): How does it measure up?

- The next two slides show where the Panasonic next generation units might fall based on their factory claims.
 - Shows 50% power consumption relative to three Panasonic PDP TVs available today (based on CNET test results).



Next generation Panasonic Plasma TVs will significantly exceed the proposed Tier 1 level based on performance claims.

Next generation PDPs approach Tier 2 levels: 4.5 years before proposed effective date (1/1/13)



Panasonic's Neo PDP Shown at CHITEC 2008 (The 11th China Beijing International High-tech Expo) May 21-25, 2008



Panasonic details Neo PDP launch update



Philip Wong | May 20, 2008



You may have read about Panasonic's Neo PDP plasma technology. You may even have caught a glimpse of the prototypes at January's Consumer Electronics Show in Las Vegas. Well, we now have news that they could be coming to an electronics store near you as early as June 2009, according to a spokesperson at a recent Panasonic Tokyo/Osaka tour that CNET Asia was invited to. The global release follows an initial May production from the Panasonic P5 plant, its latest plasma panel manufacturing facility currently undergoing construction in Amagasaki, Japan.

The lineup includes a petite 24.7mm-thick 50-incher and its life-size 150-inch sibling. The latter also offers four times better image details over standard full-HD TVs with a native 4,096 x 2,160-pixel resolution. Size and picture quality aside, there is the FX or Double Efficiency technology. This eco-friendly feature delivers the same level of screen brightness at only half the power required by current flat panels.

Watch this space as we bring you more exciting coverage on [Panasonic Center Tokyo](#) and its Amagasaki plant tour.

“You may have read about Panasonic’s Neo PDP plasma technology. You may even have caught a glimpse of the prototypes at January’s Consumer Electronics Show in Las Vegas. Well, we now have news that **they could be coming to an electronics store near you as early as June 2009, according to a spokesperson at a recent Panasonic Tokyo/Osaka tour that CNET Asia was invited to.”**

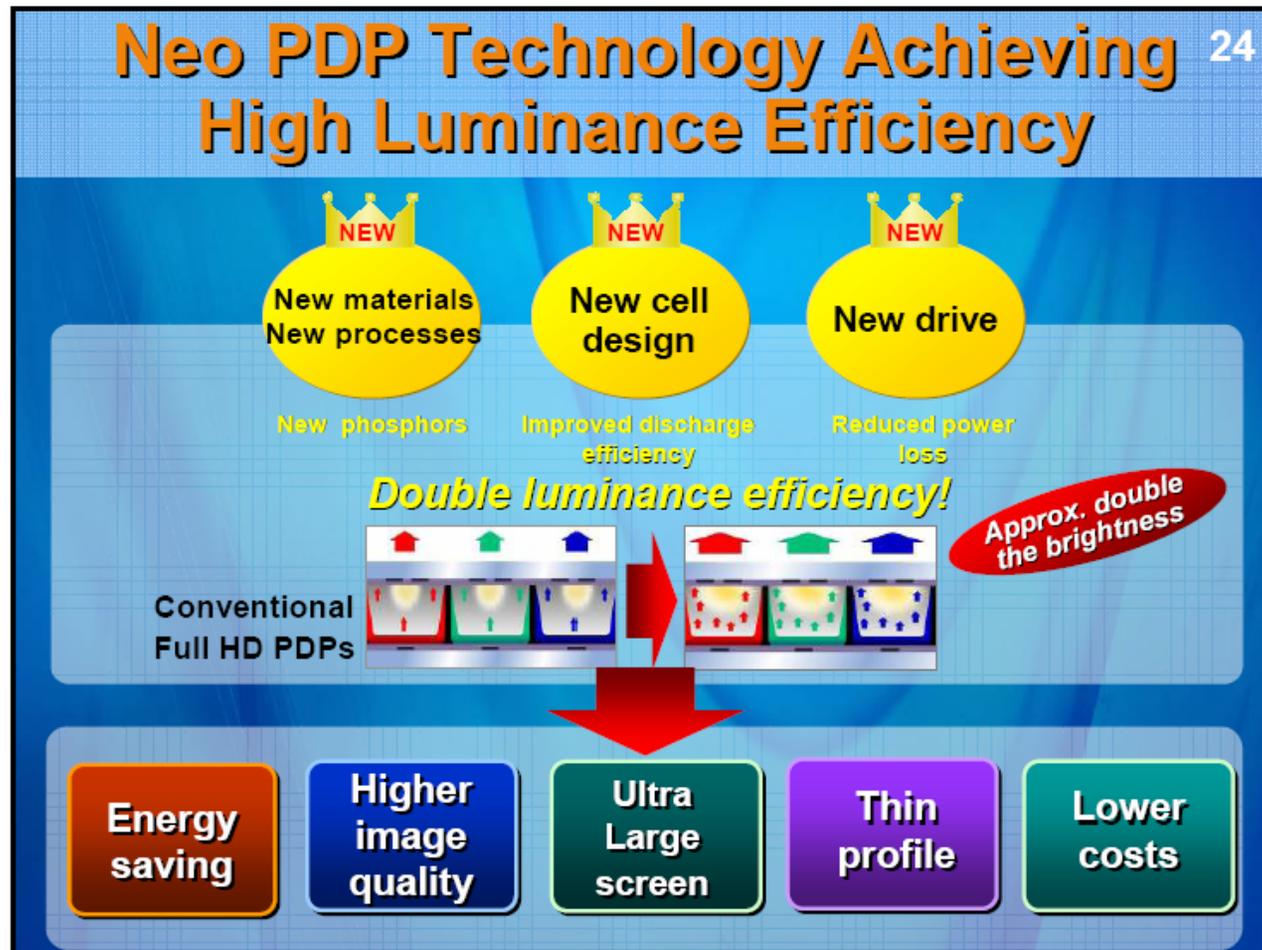
Source: <http://asia.cnet.com/crave/?t=neo+pdp>

Slide From:

“Growth Strategy for Digital AV Business Growth”

Toshihiro Sakamoto, President Panasonic AVC Networks Matsushita Electric Industrial Co., Ltd.

February 6, 2008



Pioneer and Panasonic (Matsushita) to Merge and Use Neo PDP Technology



[EETimes](#):

Pioneer and Matsushita to merge PDP business

Yoichiro Hata
(04/24/2008 10:29 PM EDT)
URL: <http://www.eetimes.com/showArticle.jhtml?articleID=207402018>

TOKYO—Pioneer Corporation and Matsushita Electric Industrial Co., Ltd. have agreed on a comprehensive business alliance on PDP technology development and panel production. Matsushita will absorb Pioneer's PDP development team, while it becomes responsible for volume production of PDP panels and modules used in the two companies' independently branded large screen TV products.

Low power consumption

By combining the two companies' accumulated PDP technologies, Pioneer and Matsushita plan to tackle on the Achilles' heel of PDP: its whopping power consumption —especially in comparison to [LCD](#) panels.

The partners hope to create by 2010 a large-screen PDP TV whose power consumption will be slashed by two thirds, compared to PDP TVs of 2007, while infinitely increasing contrast and reducing panel thickness to less than an inch.

“The partners hope to create by 2010 a large-screen PDP TV whose power consumption will be slashed by two thirds, compared to PDP TVs of 2007, while infinitely increasing contrast and reducing thickness to less than an inch.”

Full article:

<http://www.eetimes.com/rss/showArticle.jhtml;jsessionid=FCI3H5FDTVFLWQSNDLQSKH0CJUNN2JVN?articleID=207402018&cid=RSSfeed&printable=true&printable=true>

Plasma Efficiency Developments

Note: additional slides highlighting plasma efficiency developments are provided in the Appendix.

Section 5

Retailers and Incentive Programs

How Do Retailers Fit In?

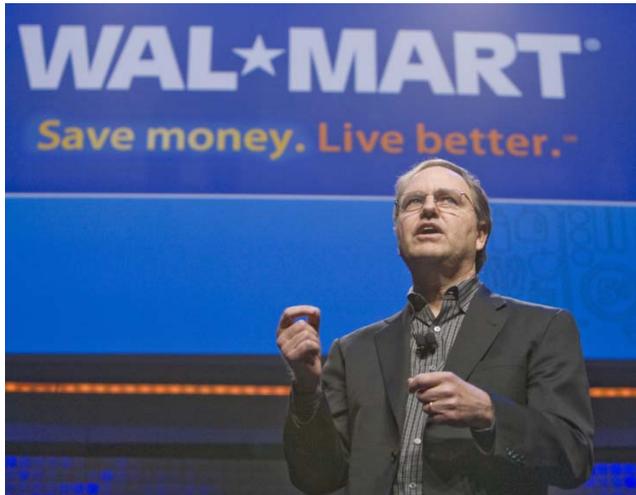
- Some will use their purchasing power to move the market towards higher efficiency
 - e.g., Wal-Mart
- Some will be incentivized to sell energy efficient TVs by participating in the CA Statewide Electronics Rebate program
 - To be discussed in separate presentation by Tim Michel, PG&E Program Manager

Remarks from Lee Scott

CEO and President of Wal-Mart

"The Company of the Future"
Wal-Mart's U.S. Year Beginning Meeting

January 23, 2008



"Today we are announcing initial steps that we hope to achieve by 2010: ...all our flat-panel televisions will be 30% more energy efficient"

Excerpt from speech:

"Our first commitment has to do with products that we sell. A household is made up of hundreds of items that contribute to energy use -- sometimes wastefully. Microwaves, televisions, computers and portable phones, for example, draw standby power even when they are not in use. Energy is also wasted when heat leaks out of our homes and cold leaks in.

Our goal is to work with suppliers to make the most energy intensive products in our stores, anywhere in the world, 25% more energy efficient within three years. We do not know exactly how we will get there. We do not even know if our suppliers can make items like hair dryers use 25% less energy. But we do know that our approach works – to partner with suppliers, to help customers make better decisions, and to use our business model to drive out waste.

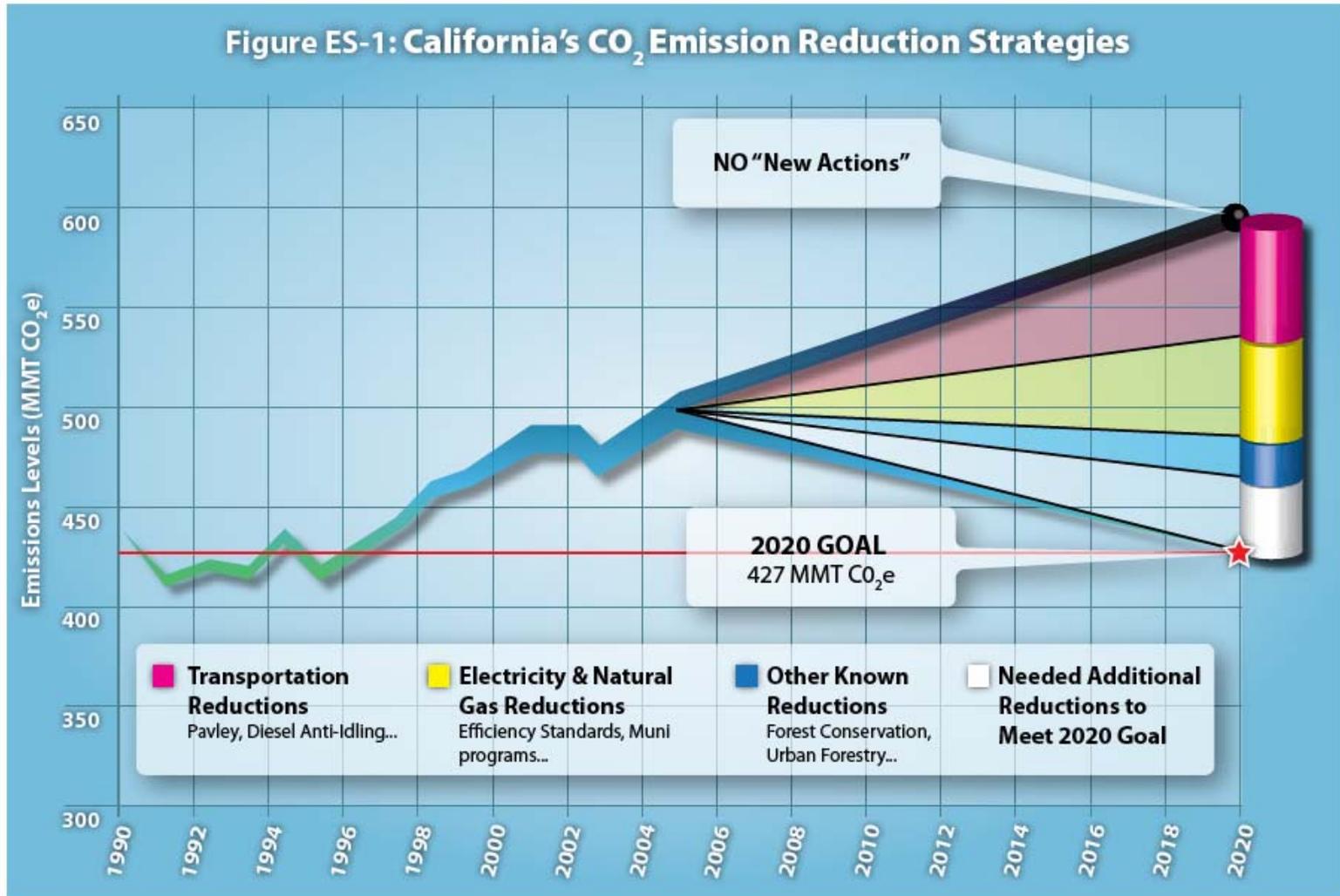
If we achieved our 25% goal just in the U.S., we would save enough electricity to power 3 million homes per year or the equivalent of 10 million barrels of oil.

Today we are announcing initial steps that we hope to achieve by 2010: every air conditioner that we sell in the U.S. will be Energy Star rated; and all our flat-panel televisions will be 30% more energy efficient. The energy savings on televisions alone would be enough to power over 53,000 single family homes for an entire year."

Section 6

Motivation: CA energy efficiency and greenhouse reduction goals in context

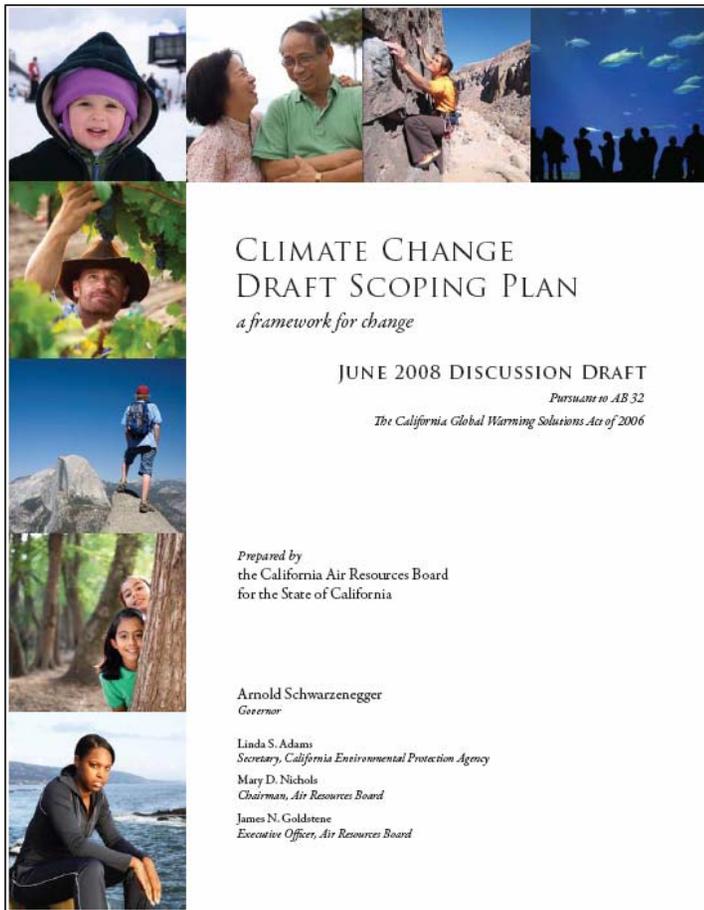
AB 32 Reduction Target



Source: California Energy Commission, Climate Action Team data.

On a per-capita basis, this means reducing our annual emissions of 14 tons of carbon dioxide for every man, woman and child in California down to about 10 tons per person by 2020.

Climate Change Draft Scoping Plan (June 2008 Discussion Draft) Pursuant to AB 32



EXECUTIVE SUMMARY

California strengthened its commitment to develop a comprehensive approach to address climate change when Governor Schwarzenegger signed Assembly Bill 32, the Global Warming Solutions Act of 2006 (Núñez, Chapter 488, Statutes of 2006). By requiring in law a reduction in greenhouse gas emissions to 1990 levels by 2020, California set the stage for its transition to a clean energy future. This historic step helped put climate change on the national agenda, and has spurred action by many other states.

Key elements of ARB's preliminary recommendation for reducing California's greenhouse gas emissions to 1990 levels by 2020 include:

- Expansion and strengthening of existing energy efficiency programs and building and appliance standards;
- Expansion of the Renewables Portfolio Standard to 33 percent;
- Development of a California cap-and-trade program that links with other WCI Partner programs to create a regional market system;
- Implementation of existing State laws and policies, including California's clean car standards, goods movement measures, and the Low Carbon Fuel Standard;
- Targeted fees to fund the State's long-term commitment to AB 32 administration.

Expansion and strengthening appliance standards is key element to achieve AB 32 goals

Climate Change Draft Scoping Plan (June 2008 Discussion Draft) Pursuant to AB 32

Table 2: Recommended Greenhouse Gas Reduction Measures

Recommended Reduction Strategies	Sector	2020 Reductions (MMT _{CO₂E}
The Role of State Government <ul style="list-style-type: none"> Reduce carbon footprint Set an example 	Various	1-2 ¹⁷
California Cap-and-Trade Program Linked to WCI: Emissions cap of 365 MMT _{CO₂E}		
California Light-Duty Vehicle GHG Standards <ul style="list-style-type: none"> Implement Pavley standards Develop Pavley II light-duty vehicle standards 	Transportation	31.7
Energy Efficiency <ul style="list-style-type: none"> Building and appliance energy efficiency and conservation <ul style="list-style-type: none"> 32,000 GWh reduced electricity demand 800 million therms reduced gas use Increase Combined Heat and Power (CHP) electricity production by 30,000 GWh Solar Water Heating (AB 1470 goal) 	Electricity & Commercial and Residential	26.4
Renewables Portfolio Standard (33% by 2020)	Electricity	21.2
Low Carbon Fuel Standard	Transportation	16.5
High Global Warming Potential Gas Measures	High GWP	16.2
Sustainable Forests	Forests	5
Water Sector Measures	Water	4.8 ¹⁸
Vehicle Efficiency Measures	Transportation	4.8
Goods Movement <ul style="list-style-type: none"> Ship Electrification at Ports System-Wide Efficiency Improvements 	Transportation	3.7
Heavy/Medium Duty Vehicles <ul style="list-style-type: none"> Heavy-Duty Vehicle GHG Emission Reduction (Aerodynamic Efficiency) Medium- and Heavy-Duty Vehicle Hybridization Heavy-Duty Engine Efficiency 	Transportation	2.5
Million Solar Roofs (Existing Program Target)	Electricity	2.1
Local Government Actions and Regional GHG Targets	Land Use and Local Government	2
High Speed Rail	Transportation	1
Landfill Methane Control	Recycling & Waste	1
Methane Capture at Large Dairies	Agriculture	1 ¹⁹
Energy Efficiency and Co-Benefits Audits for Large Industrial Sources	Industrial	TBD
Additional Emissions Reduction from Capped Sectors		35.2
	Total Reductions	169

GHG Reductions for AB 32:

169 MMT_{CO₂e} total by 2020

26.4 MMT_{CO₂e} (15.6%) from Energy Efficiency (including appliance standards)

Potential Statewide Energy Savings

Potential California Statewide Energy Savings

Scenario	For First-Year Sales (Tier 1: 2011) (Tier 2: 2013)			After Entire Stock Turnover		
	Coincident Peak Demand Reduction (MW)	Annual Energy Savings (GWh/yr)	GHGs (MMT _{CO₂e})	Coincident Peak Demand Reduction (MW)	Annual Energy Savings (GWh/yr)	GHGs (MMT _{CO₂e})
Tier 1 (incremental)	33	349	0.2	362	3,831	2.0
Tier 2 (incremental)	23	243	0.1	253	2,684	1.4
Tier 1 and 2 (combined)	56	593	0.3	615	6,516	3.5

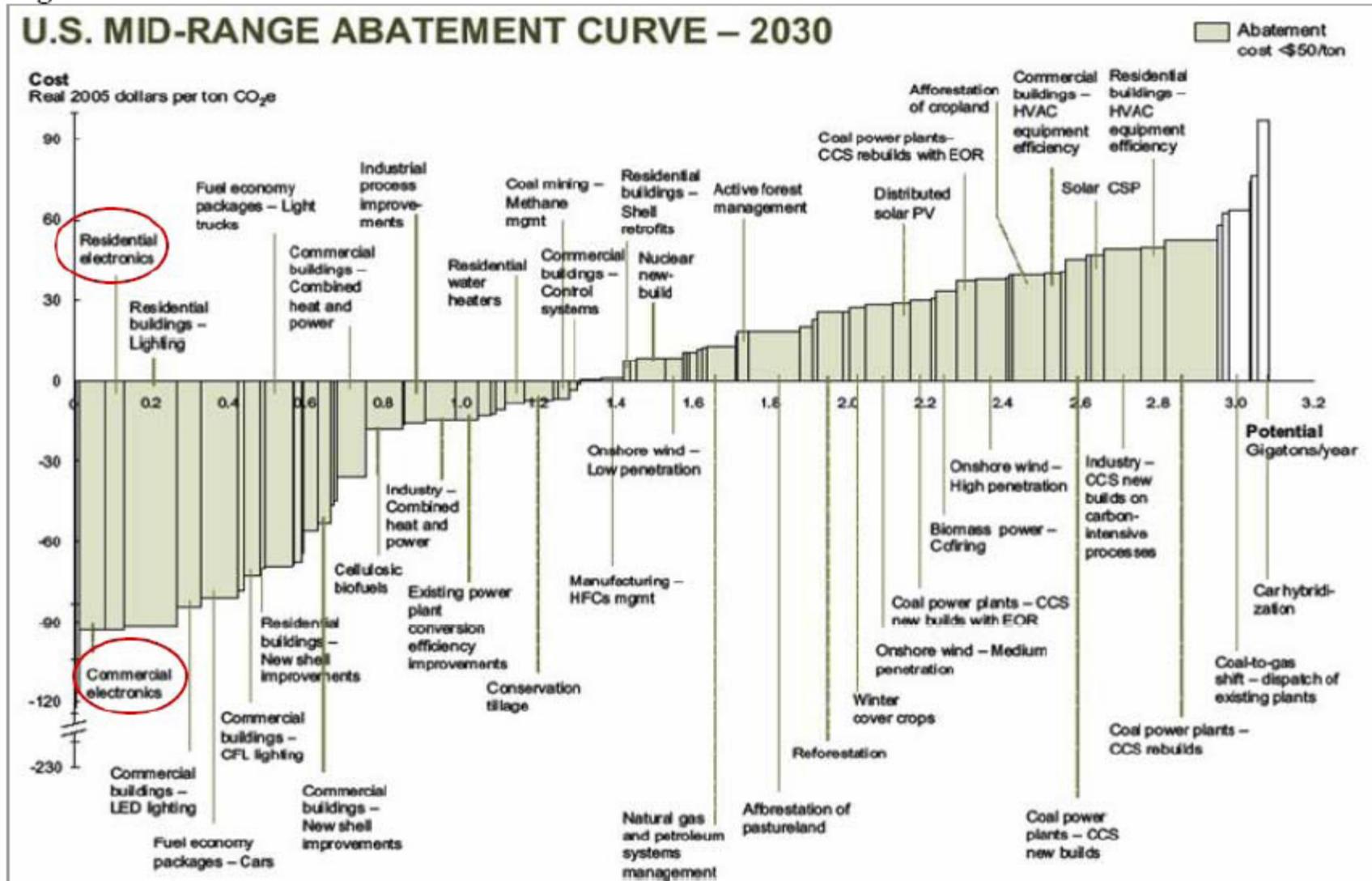
Note: values reflect savings to TVs in PG&E's dataset (2008) and does not fully account for natural market adoption of higher efficiency models. Savings based on an estimated useful life of 10 years (see CASE reports for full assumptions). GHG values are based on an avoided emissions factor of 0.000531 million metric tons of carbon dioxide equivalent (CO₂e) per gigawatt-hour delivered (derived from CA EPA 2006).

3.5 MMT_{CO₂e} represents:

2% of *total* AB 32 goal (169 MMT_{CO₂e})

13% of *energy efficiency* component goal for AB 32 (26.4 MMT_{CO₂e})

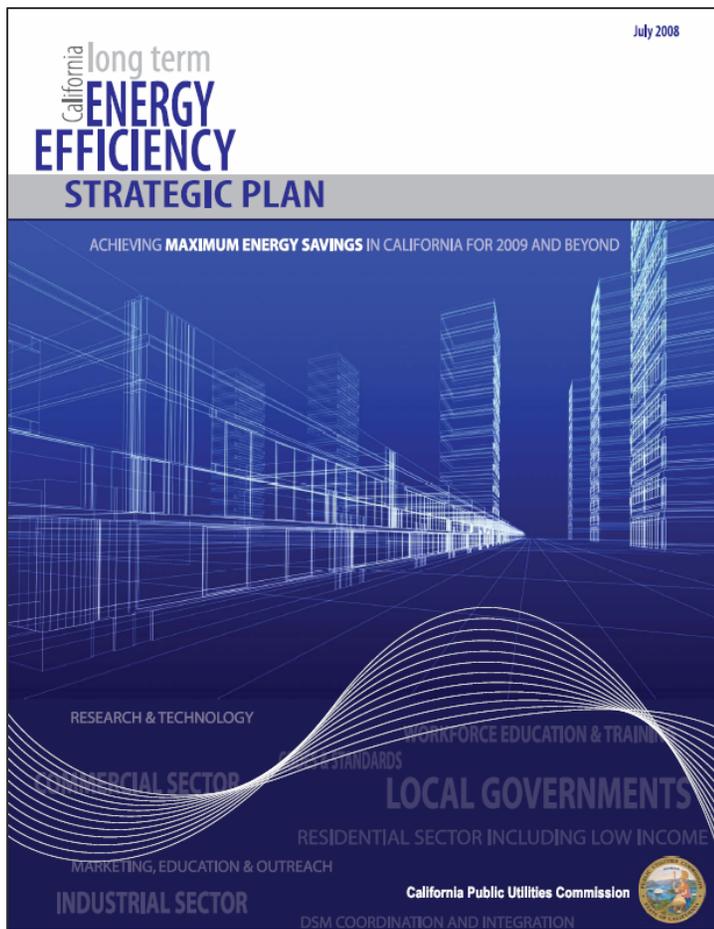
Figure 9. Greenhouse Gas Abatement Curve



Source: McKinsey & Company (2007). Note: circles added by author to emphasize the residential and commercial electronics categories.

Source: PG&E April 1, 2008 CASE report, "Analysis of Standards Options for Televisions"

California Long Term Energy Efficiency Strategic Plan (Final July 2008)



7. CODES AND STANDARDS

7.1 VISION

A broad range of aggressive and continually improving energy codes and standards will be adopted to greatly accelerate the widespread deployment of zero-net energy and highly efficient buildings and equipment. The effectiveness of codes and standards will be enhanced by improved code compliance as well as coordinated voluntary efficiency activities.



The ambitious goals of this *Strategic Plan* as well as greenhouse gas imperatives place an unprecedented reliance on mandatory codes and standards—both on energy codes for new and renovated buildings and on efficiency standards for appliances and equipment—and pressure for them to perform.

California Long Term Energy Efficiency Strategic Plan (Final July 2008)

Goal 1: Code Enhancement and Expansion

Implementation Plan and Timeline				
Strategies	Near-Term (2009-2011)	Mid-Term (2012-2015)	Long-Term (2016-2020)	2021 – Beyond
1.1: Develop more stringent codes and standards.	<ul style="list-style-type: none"> • Adopt a progressive set of building codes; including one or two voluntary “reach code” tiers for residential and commercial sectors. • Lower the renovation threshold at which the code applies to an entire existing structure 	<ul style="list-style-type: none"> • Develop road map for codes and standards to enhance Title 20 and Title 24 codes in a “top-down” approach • Increase building commissioning requirements for new buildings and retrofits. 	<ul style="list-style-type: none"> • Development of reach codes for buildings as “net producers” energy. • Codes and Standards require net zero residential buildings by 2020 	<ul style="list-style-type: none"> • Codes and Standards require net zero commercial buildings by 2030
1.2: Expand Titles 24 and 20 to address all significant energy end uses	<ul style="list-style-type: none"> • Expand Title 20 to cover additional plug loads such as copy machines, printers, battery chargers, televisions. 	<ul style="list-style-type: none"> • Expand Title 20 and Title 24 to cover additional uses such as server farms, process loads and water use. 	<ul style="list-style-type: none"> • Investigate expansion of Titles 24 and 20 to address all significant energy end uses (manufacturing, agricultural, healthcare, etc.). 	<ul style="list-style-type: none"> • Ongoing

↑
Televisions are specifically mentioned

California Long Term Energy Efficiency Strategic Plan (Final July 2008)

1.4 STRATEGIC VISION AND GOALS

With a foundation of innovation, integration and collaboration, this *Plan* establishes a three-part vision:

**TV standard
addresses
strategic
visions**

1. All cost-effective, reliable, and feasible energy efficiency measures and actions are implemented in an integrated systems or whole-building approach.
2. Strategies, programs, measures and institutional structures must provide long-term energy savings.
3. Energy efficiency will generate significant reductions in greenhouse gas emissions.



This vision embraces four specific goals, known as the “Big Bold Energy Efficiency Strategies,” or Programmatic Initiatives, established by the CPUC in D.07-10-032 and D.07-12-051:

**TV standard
important for
first two goals**

1. All new residential construction in California will be zero net energy by 2020⁷;
2. All new commercial construction in California will be zero net energy by 2030;
3. Heating, Ventilation and Air Conditioning (HVAC) will be transformed to ensure that its energy performance is optimal for California's climate; and
4. All eligible low-income customers will have a meaningful opportunity to participate in the LIEE program and will be provided all cost effective energy efficiency measures in their residences by 2020.

Section 7

Conclusions

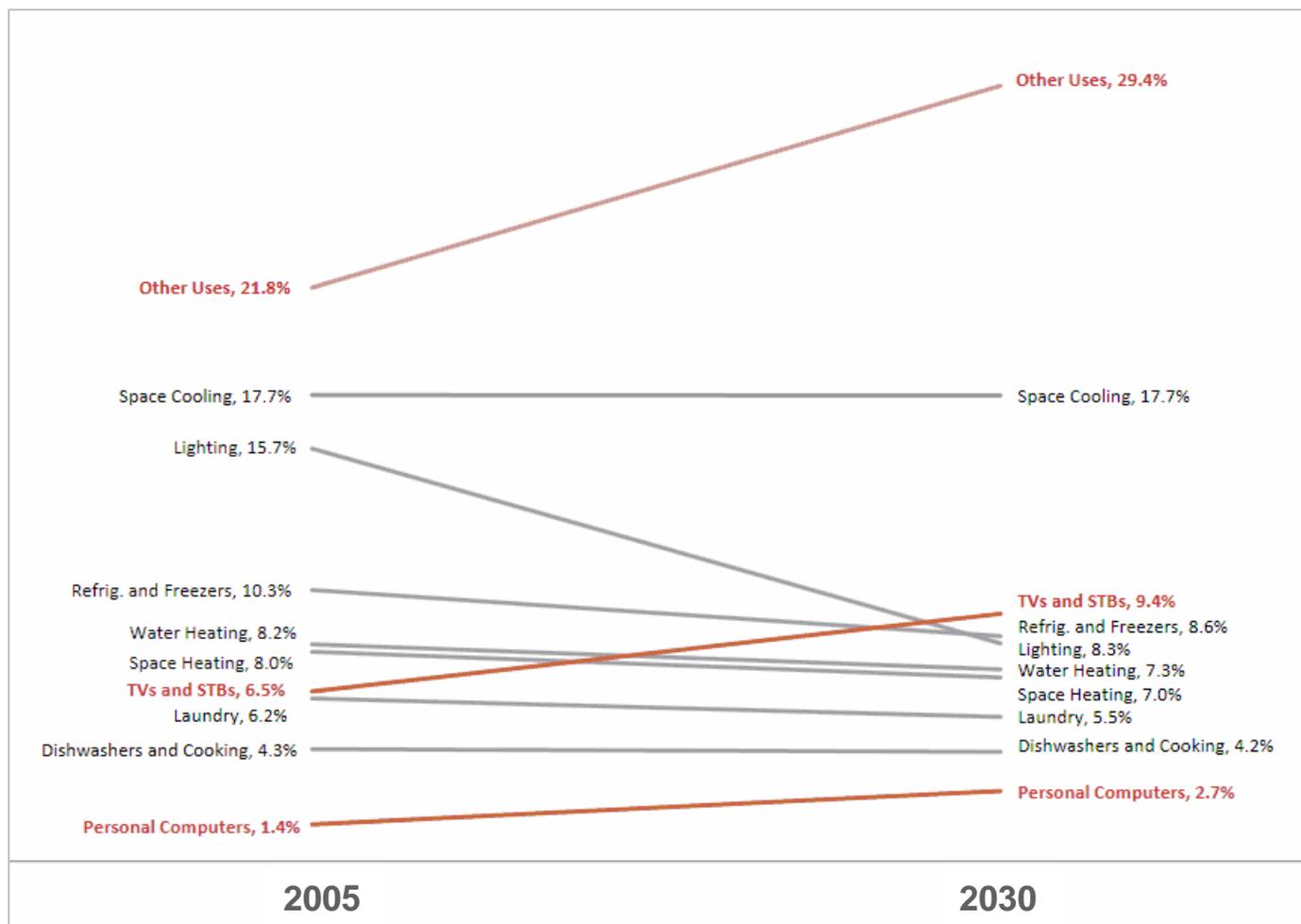
Conclusions

1. Televisions represent a prominent and growing source of end-use energy consumption. Current growth rates indicate that televisions are on a trajectory to become a dominant—and in some cases the leading—residential end-use.
2. Addressing this load growth with energy performance standards is a necessary approach for California to achieve its ambitious energy efficiency and greenhouse reduction goals.
3. TVs on the market today can meet and exceed the proposed Tier 1 level. This includes TVs at various sizes, functionality, and technology types (e.g., LCD, plasma).
4. Adopting a two tier standard enables California to take advantage of the advanced technologies entering the market and are currently being publicly promoted and showcased by several major TV manufacturers (specifically for both LCD and plasma technologies). These technologies can meet or exceed Tier 2 levels today. Industry will have 4.5 additional years to prepare for the Tier 2 effective date (1/1/13).
5. By implementing this two-tiered standard, California will lead the nation and world in advancing the market transformation towards the most energy efficient televisions.

Section 8

Appendix: Additional Reference Slides

U.S. Residential Electricity Percentage by End-Use, 2005 to 2030



The Electronics segment is projected to be the major (perhaps only) residential load growth

Proportion is greater in California due to:

- strong history of appliance standards and building codes
- utility incentive programs
- regional weather variations

Source: Analysis of “Year-by-Year Reference Case Tables” in EIA 2008. The “Other Uses” category includes home audio equipment, DVDs/VCRs, imaging equipment, and other small electric devices. Total delivered electricity is 4.64 quad BTU in 2005 and 5.88 quad BTU projected in 2030.

Key TV Activity

California

- Title 20 efficiency standard: ongoing, results TBD
- Utility incentive program: retailer incentive starting in November 2008

U.S.

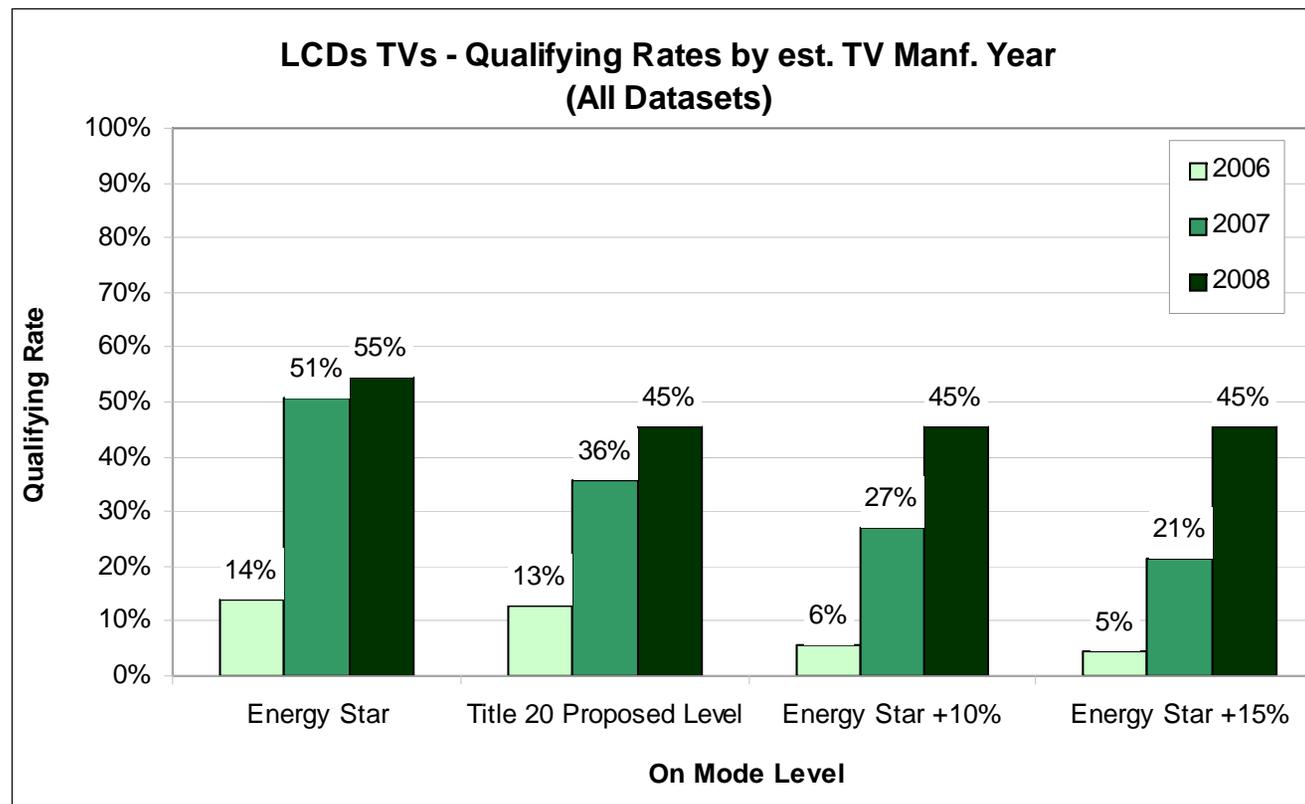
- Energy Star
 - Tier 1 effective November 2008;
 - Tier 2 (TBD) effective Sept. 2010
- Energy Guide Labels (dates TBD)
- Consortium for Energy Efficiency (CEE) is developing advanced specification (tentative effective date November 2008)

International

- Standard and labeling activity in at least Europe, Australia, New Zealand, Japan, and China

Trends by Year: 2006, 2007, and 2008

Current efficiency trends suggest that qualifying rates will likely increase over the next several months to years; therefore, an anticipatory standard is necessary.



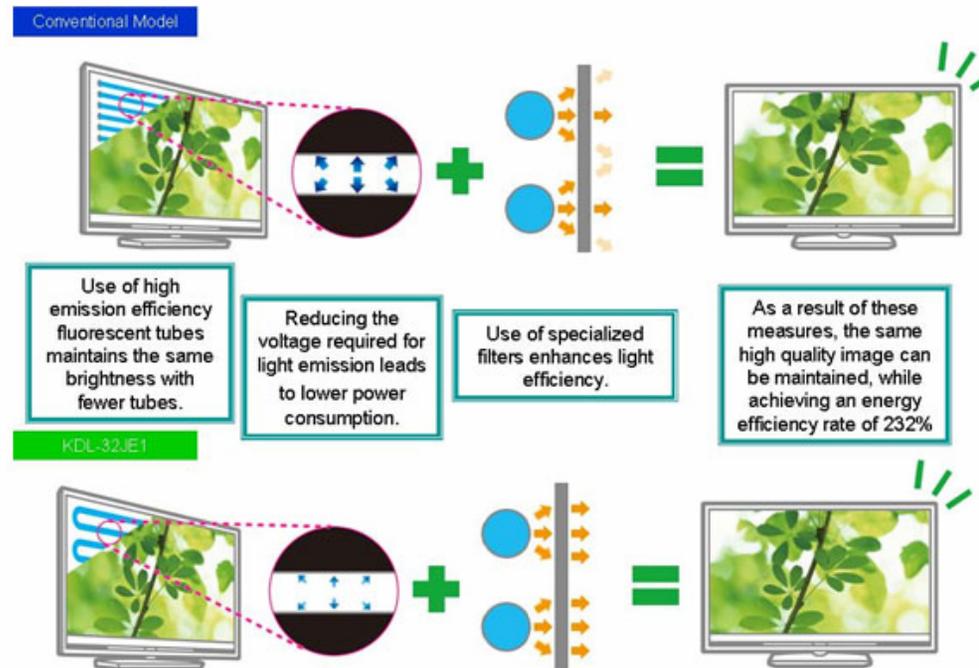
Note: sample size for figure is 86 test results for 2006; 256 for 2007; and 11 for 2008. Sample size for 2008 is too low for results to be statistically significant so careful interpretation is necessary.

Sony BRAVIA 32" TV

1. Industry's Highest*¹ Energy Efficiency

KDL-32JE1 incorporates fluorescent tubes capable of delivering higher luminance efficiency at lower electric voltage, and uses optical film that possesses a higher light transmission rate. This technology enables KDL-32JE1 to maintain the same brightness as conventional models, while significantly improving energy efficiency. As a result these developments, the KDL-32JE1 realizes the industry's highest energy efficiency*¹ in terms of energy efficiency rating, momentary power consumption and cumulative power consumption per year.

Its energy efficiency rating of 232% easily surpasses the 164% required to receive a five star "Energy Saving Label" in Japan.



*1 As of June 17, 2008. For 32 inch digital LCD TVs sold in Japan

CNET Test Settings

Default

This column lists results we measure when the TV's settings are in the default position, right out of the box. Typically the default picture settings represent "torch mode," with high light output and correspondingly high power consumption (examples include "Dynamic" or "Vivid" picture modes), but some new models, such as the Panasonic TH-50PZ800U, default to a more efficient picture mode when the user indicates a "home" rather than a "store" environment during initial setup. In these cases we'll use the "home" setting for the default measurement. The Default settings are also the only ones used to arrive at the TV's power consumption scores (see below).

Calibrated

This column lists results we measure after the picture has been adjusted for optimal home theater picture quality in a dark room. This adjustment is part of every TV review, and the individual picture settings are always listed in the "Tips & Tricks" section of the review.

Power Save

Many televisions have a mode designed to cut down on power consumption. In the final column, we list results measured when this mode is engaged while the other picture settings remain in Default. If the set has multiple power-saving modes, like "Low" and "High," we use the one that saves the most power. If the TV lacks a power saving mode, we list "N/A" in this column.

CNET Test Procedure

How we test TV power consumption

The whole idea behind this project is to get a good idea of how much electricity a TV uses by recording the actual current flow into the set. We talked to consultants and engineers, both from the Environmental Protection Agency and from major TV makers, to come up with a reliable test procedure.



The Extech 380803 power analyzer

While manufacturers usually report TV power consumption data, they often report only peak usage or standby time. Our goal was to come up with a more real-world estimate of how much power TVs use under normal usage patterns. To collect our data, we used an [Extech 380803](#) power analyzer connected to a laptop PC for data logging. We set it to record in 1-second intervals the power consumption, in watts, of all of the TVs we tested.

We performed two separate tests for each display. The first consists of one hour with the power on, where the screen displays an average TV show—in our case, we use two back-to-back episodes of *That '70s Show* (trust us, that \$#@ show should have been canceled much sooner than it was), including commercials, recorded to a DVD. To maintain as level a playing field as possible, we connect each TV via HDMI to a DVD player playing the disc, we reduce the volume control all the way to "0" (but not muted), and we leave the picture settings in their default positions. The second test consists of one hour of standby, where the TV is left powered off but still plugged in. *Updated 07-02-2007:* For our Juice Box tests, as defined below, we use the same DVD but perform up to four separate measurements: Standby, Default, Calibrated, and Power Save. We've also shortened the measurement recording time to a half-hour for each test, because it turns out there's little statistical difference between the average power consumption over 30 versus 60 minutes.

- CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for Plasma TVs. If the CNET test result is different, it's estimated that it would be higher than the IEC test result. Therefore, the results are likely conservative estimates of On Mode power. Error bars shown in this presentation represent this estimated range.
- PG&E is sponsoring testing of these TVs using the IEC 62087 test method to verify findings.

Panasonic Viera TH-42PX80U

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Relatively inexpensive; produces a deep shade of black; accurate initial color temperature; solid connectivity with three HDMI inputs; handsome, understated exterior.

The bad: Color decoding accentuates red; inaccurate primary color of green; ineffective noise reduction.

The bottom line: Panasonic's TH-42PX80U 42-inch plasma sets the picture quality-to-value standard for entry-level flat-panel HDTVs.

Specs: Product type: Plasma TV; Diagonal size: 42 in; Dynamic Contrast Ratio: 1000000:1 [See full specs >>](#)

Price range: ~~\$899.97~~ - ~~\$1,199.99~~

[See all products in the Panasonic Viera TH-PX80U series](#)

CNET EDITORS' RATING



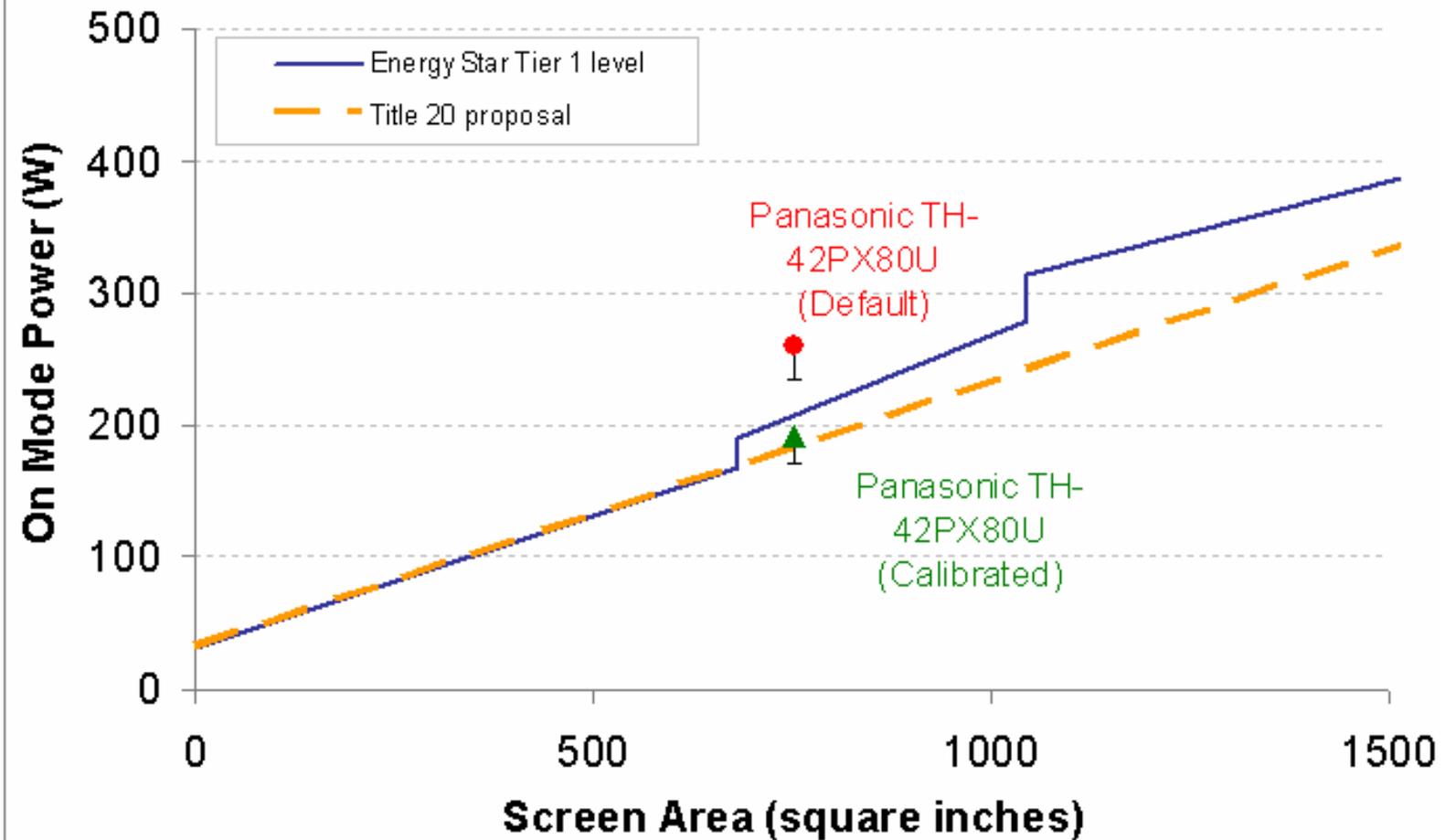
AVERAGE USER RATING from 8 users



Juice box

Panasonic TH-42PX80U	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	260.18	190.53	N/A
Picture on (watts/sq. inch)	0.35	0.25	N/A
Standby (watts)	0.99	0.99	N/A
Cost per year	\$81.14	\$59.59	N/A
Score (considering size)	Poor		
Score (overall)	Average		

42" Plasma: Panasonic TH-42PX80U



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Insignia NS-PDP42

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Inexpensive; accurate initial color temperature; solid selection of picture adjustments; clean design.

The bad: Unacceptable incidence of image retention (burn-in); produces a relatively light shade of black; some video noise; softer image with 1080i sources.

The bottom line: Serious issues with image burn-in spoil the Insignia NS-PDP42's appeal as an inexpensive plasma HDTV.

Specs: Product type: Plasma TV; Diagonal size: 42 in; Brightness (cd/m2): 1500 cd/m2 [See full specs >>](#)

CNET EDITORS' RATING

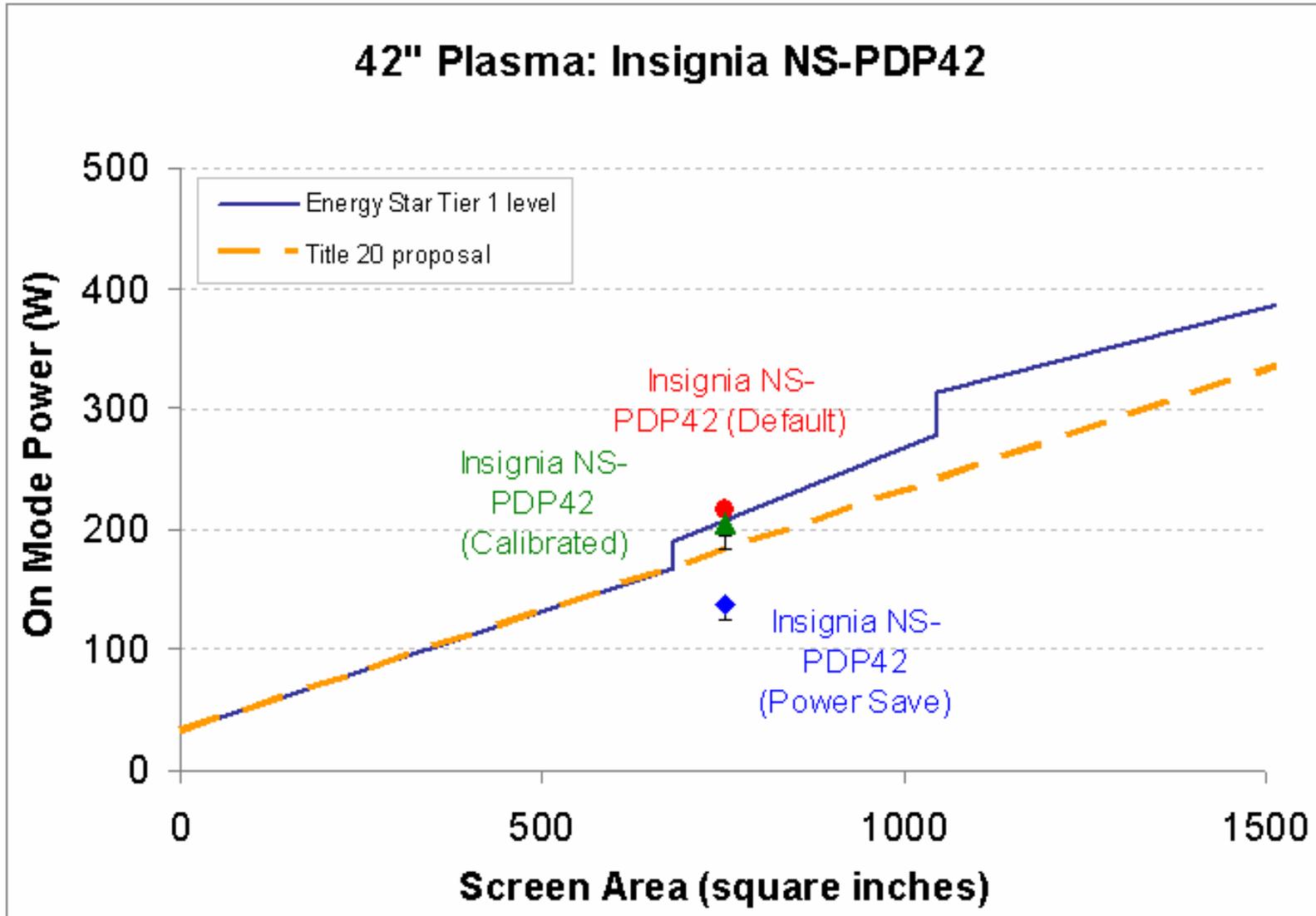


AVERAGE USER RATING from 10 users



Juice box

Insignia NS-PDP42	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	216.76	203.87	137.64
Picture on (watts/sq. inch)	0.29	0.27	0.18
Standby (watts)	1.39	1.39	1.39
Cost per year	\$66.67	\$62.76	\$42.64
Score (considering size)	Good		
Score (overall)	Average		



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

LG 50PC5D

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Relatively inexpensive; produces a deep level of black; solid standard-definition performance; sleek design.

The bad: Some video noise; inaccurate primary color of green; inadequate color temperature controls; subpar PC performance via VGA.

The bottom line: The LG 50PC5D suffers a few picture quality faults compared to the best 50-inch plasmas, but its aggressive price and solid black levels really increase its appeal.

Specs: Product type: Plasma TV; Diagonal size: 50 in; Brightness (cd/m2): 1500 cd/m2 [See full specs >>](#)

Price range: ~~\$1,169.88~~ - ~~\$1,599.99~~

CNET EDITORS' RATING



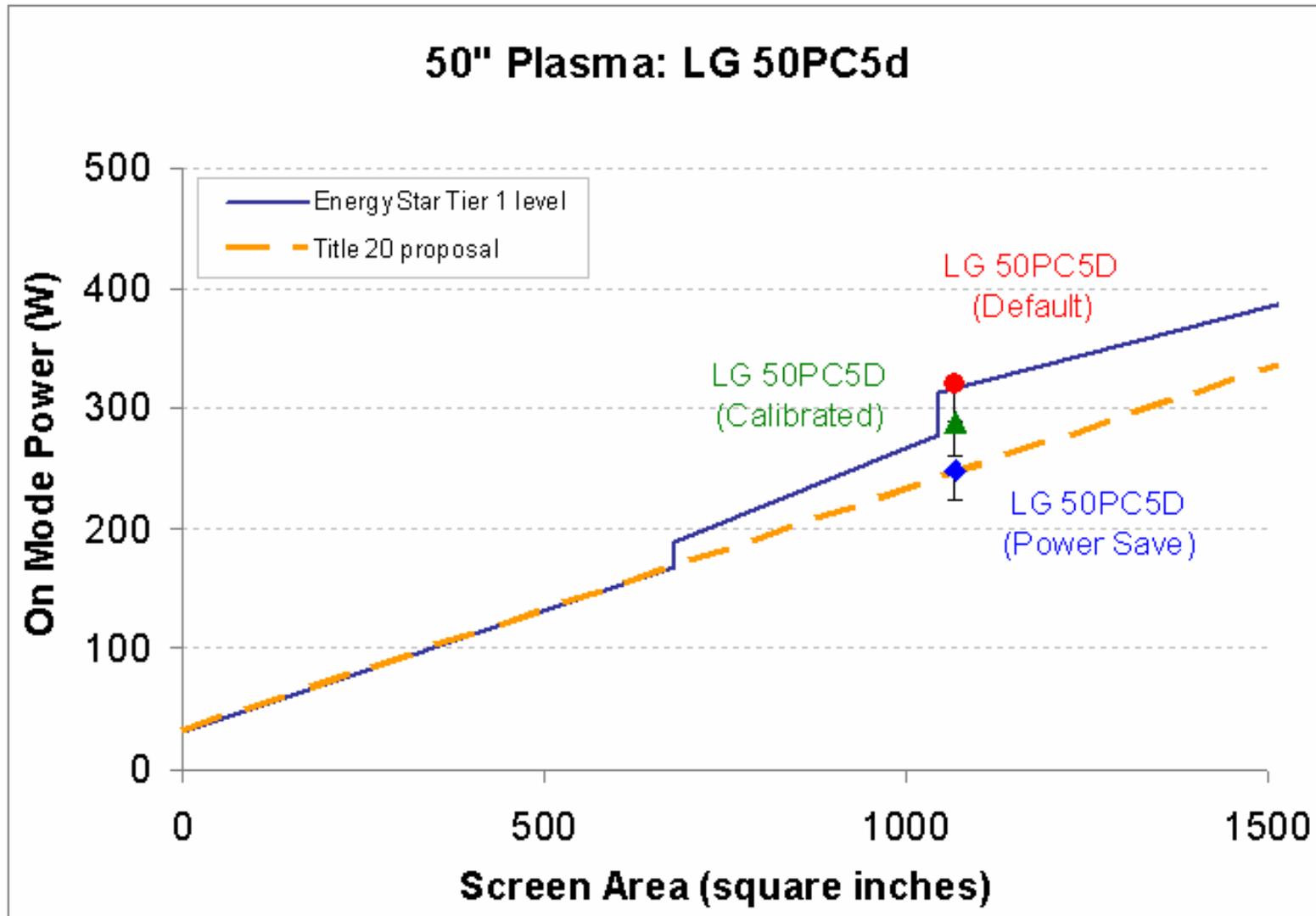
AVERAGE USER RATING

from 17 users



Juice box

LG 50PC5D	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	320.03	289.15	247.63
Picture on (watts/sq. inch)	0.3	0.27	0.23
Standby (watts)	0.78	0.78	0.78
Cost per year	\$97.66	\$88.28	\$75.67
Score (considering size)	Good		
Score (overall)	Poor		



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure Plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Panasonic TH-50PH10UK

REVIEW | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Very good black-level performance and shadow detail; accurate color decoding; independent memory per input; versatile PIP function; extensive picture adjustments with full grayscale controls; removable, customizable inputs; spartan styling.

The bad: Inaccurate primary color of green; some false contouring; does not include a stand, a tuner, or speakers; limited to only four total inputs and doesn't include a digital input out of the box; cannot change aspect ratios with HDTV sources.

The bottom line: While still offering excellent all-around picture quality, the "professional" Panasonic TH-50PH10UK plasma TV isn't quite as good a bargain as its "consumer" cousins.

Specs: Product type: Plasma panel; Diagonal size: 50 in; Image contrast ratio: 10000:1 [See full specs >>](#)

Price range: ~~\$1,300.00~~ - ~~\$2,399.00~~

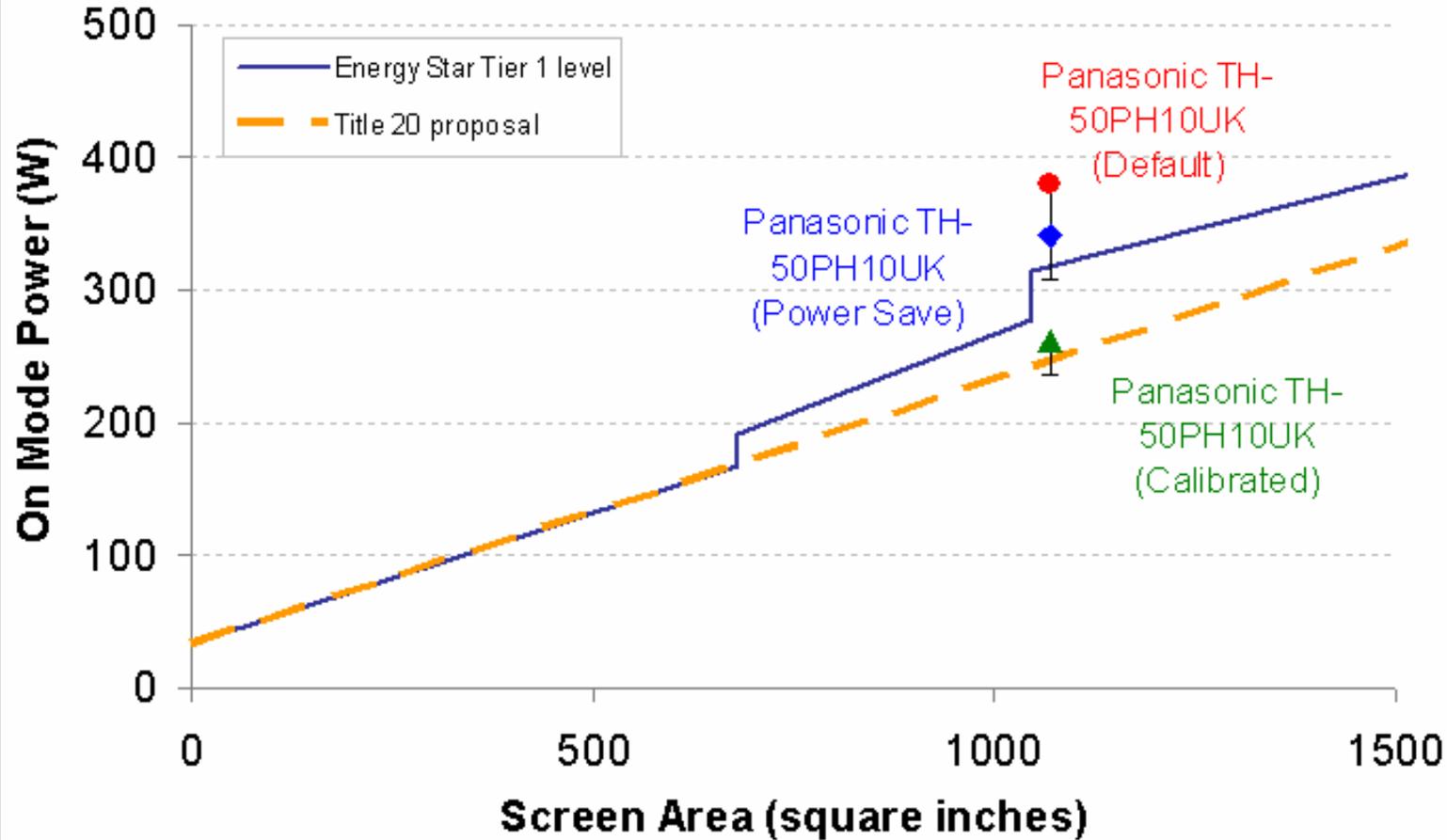
CNET EDITORS' RATING



Juice box

Panasonic TH-50PH10UK	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	379.32	261.88	341.65
Picture on (watts/sq. inch)	0.36	0.25	0.32
Standby (watts)	0.94	0.79	0.79
Cost per year	\$115.76	\$80.01	\$104.23
Score (considering size)	Poor		
Score (overall)	Poor		

50" Plasma: Panasonic TH-50PH10UK



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Samsung HP-T5064

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: Produces deep blacks with excellent shadow detail; accurate primary colors; numerous picture controls; great range of burn-in protection modes; extensive connectivity featuring three HDMI and one PC input

The bad: Glare-reducing screen could be more effective; color decoding desaturates green; some false contouring.

The bottom line: The picture quality of the Samsung HP-T5064 places it among the top tier of 50-inch plasma HDTVs.

Specs: Product type: Plasma TV; Diagonal size: 50 in; Dynamic Contrast Ratio: 15000:1 [See full specs >>](#)

Price range: ~~\$949.99~~ - ~~\$1,899.99~~

CNET EDITORS' RATING

7.6/10
Very good
[Editorial policies >>](#)

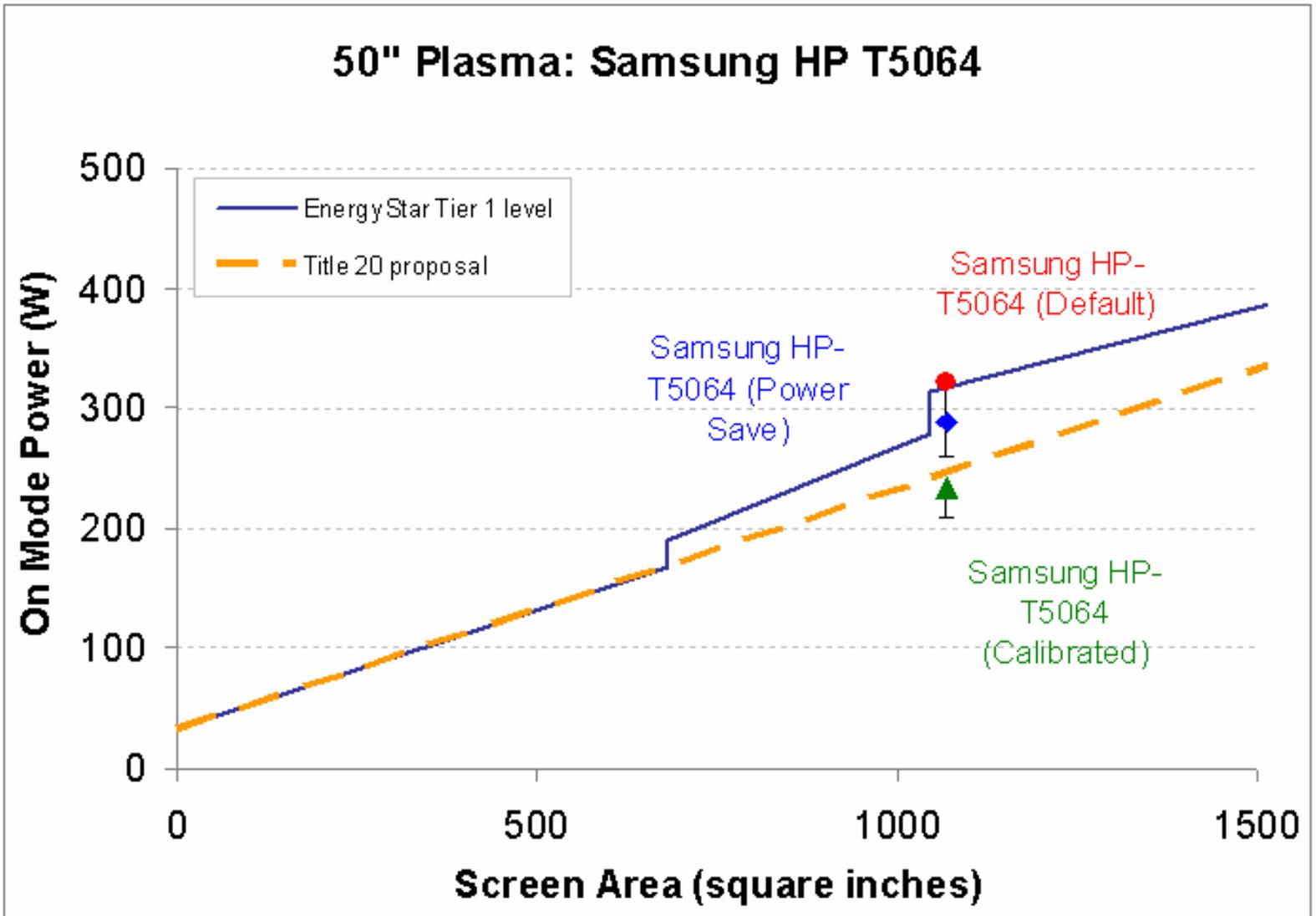
AVERAGE USER RATING

from 33 users

7.8/10
Very good
[Read user opinions >>](#)

Juice box

Samsung HP-T5064	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	321.62	233.3	288.46
Picture on (watts/sq. inch)	0.3	0.22	0.27
Standby (watts)	1.28	1.28	1.28
Cost per year	\$98.45	\$71.63	\$88.38
Score (considering size)	Good		
Score (overall)	Poor		



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Pioneer Kuro PDP-5080 HD

REVIEW | USER OPINIONS | SPECIFICATIONS | COMPARE | SHOP



PRODUCT SUMMARY

The good: This 50-inch plasma TV displays an exceedingly deep shade of black with excellent shadow detail; clean image with little noise; "smooth" video-processing mode removes most judder; excellent antireflective screen; sleek, minimalist styling; removable speaker; superb connectivity with four HDMI inputs and one PC input; CableCard compatible with TV Guide EPG.

The bad: Expensive; inaccurate primary color of green; no user-menu fine color temperature controls.

The bottom line: The Pioneer PDP-5080HD produces the deepest shade of black—and thus one of the best pictures—we've ever tested.

Specs: Product type: Plasma TV; Diagonal size: 50 in; Resolution: 1365 x 768
[See full specs >>](#)

Price range: **\$2,698.00**

CNET EDITORS' RATING

8.7/10
Excellent
[Editorial policies >>](#)

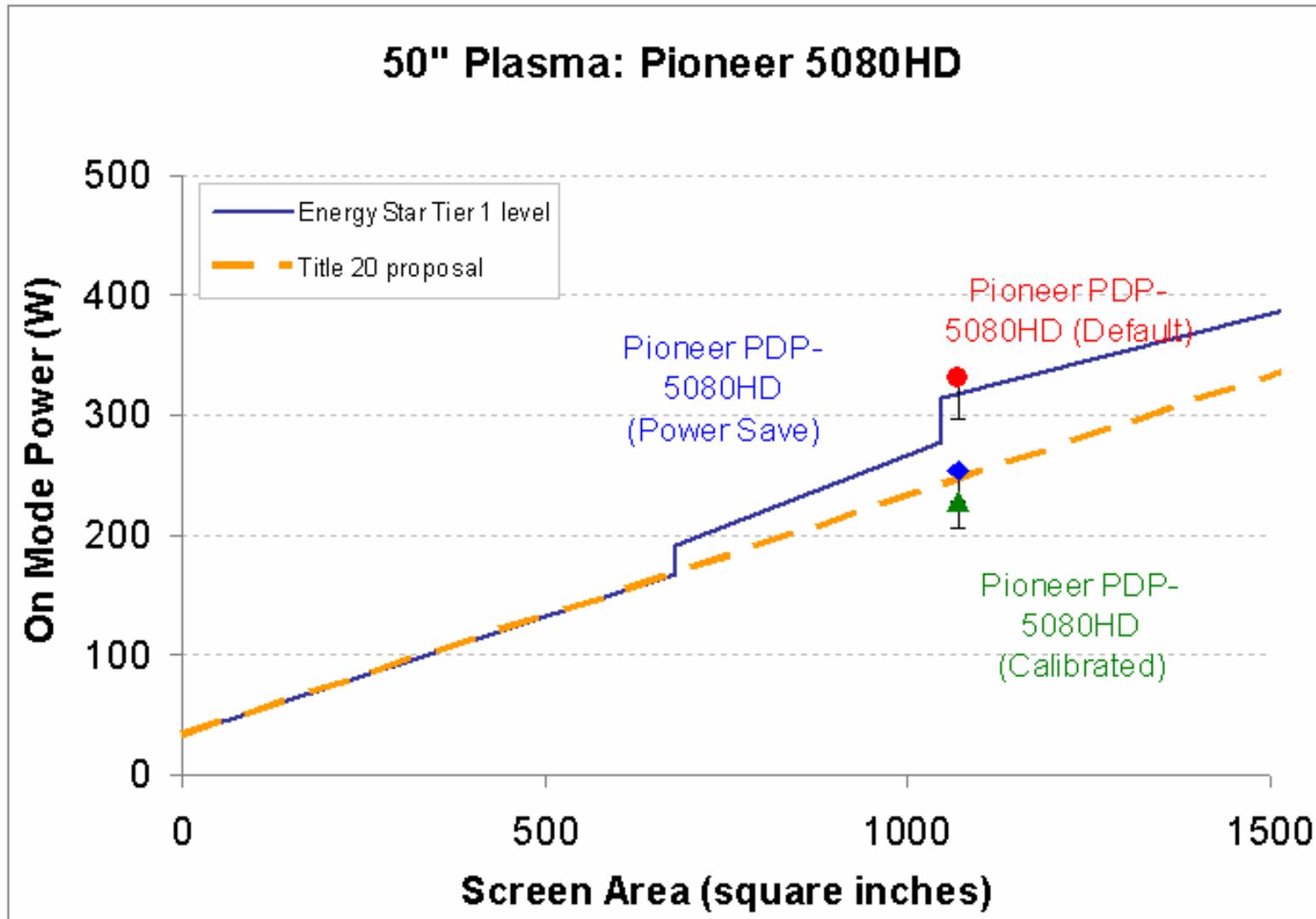
AVERAGE USER RATING

from 60 users

8.1/10
Excellent
[Read user opinions >>](#)

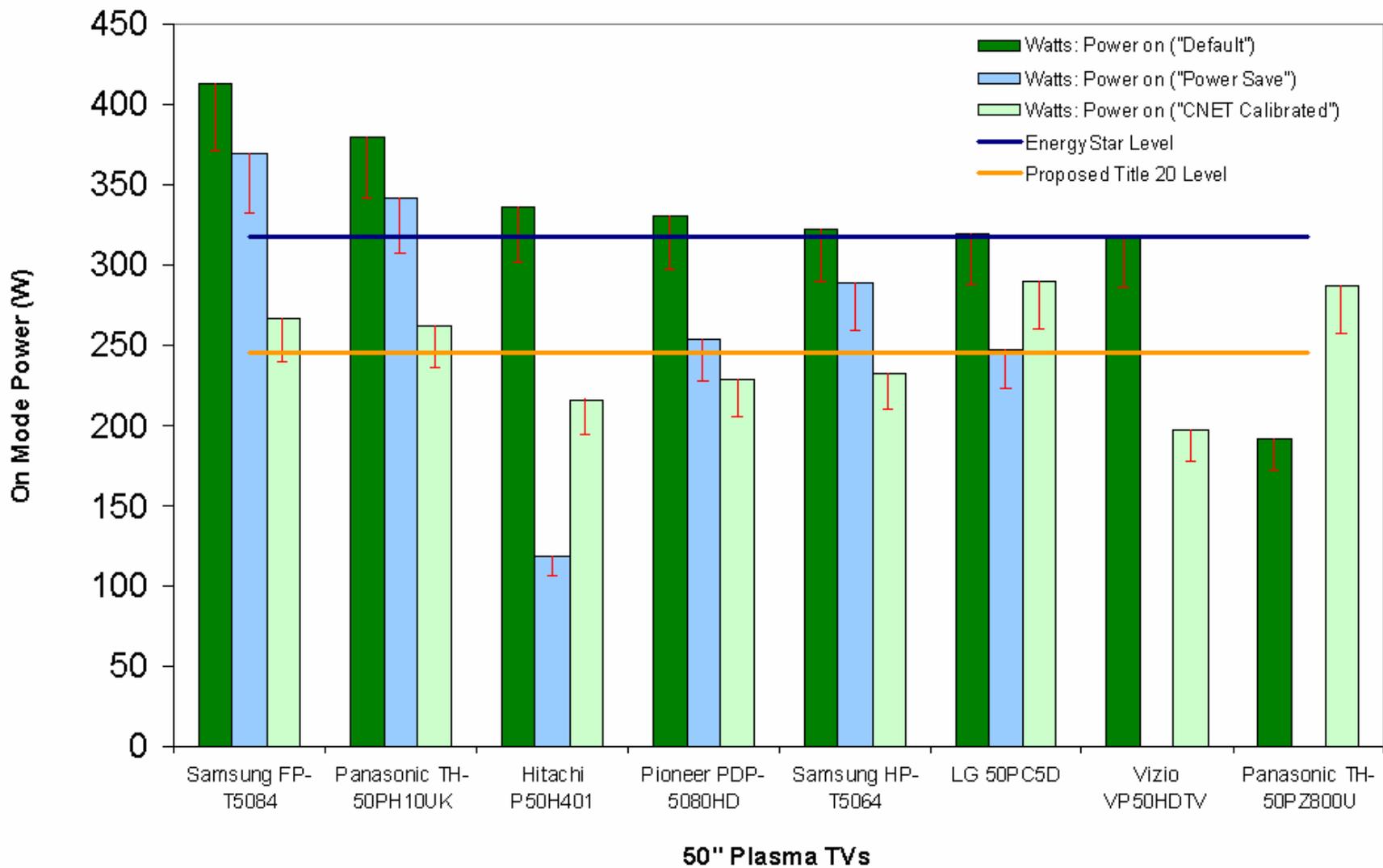
Juice box

Pioneer PDP-5080HD	Picture settings		
	Default	Calibrated	Power Save
Picture on (watts)	330.6	228.56	253.72
Picture on (watts/sq. inch)	0.31	0.21	0.24
Standby (watts)	22.95	22.95	22.95
Cost per year	\$114.34	\$83.35	\$90.99
Score (considering size)	Good		
Score (overall)	Poor		



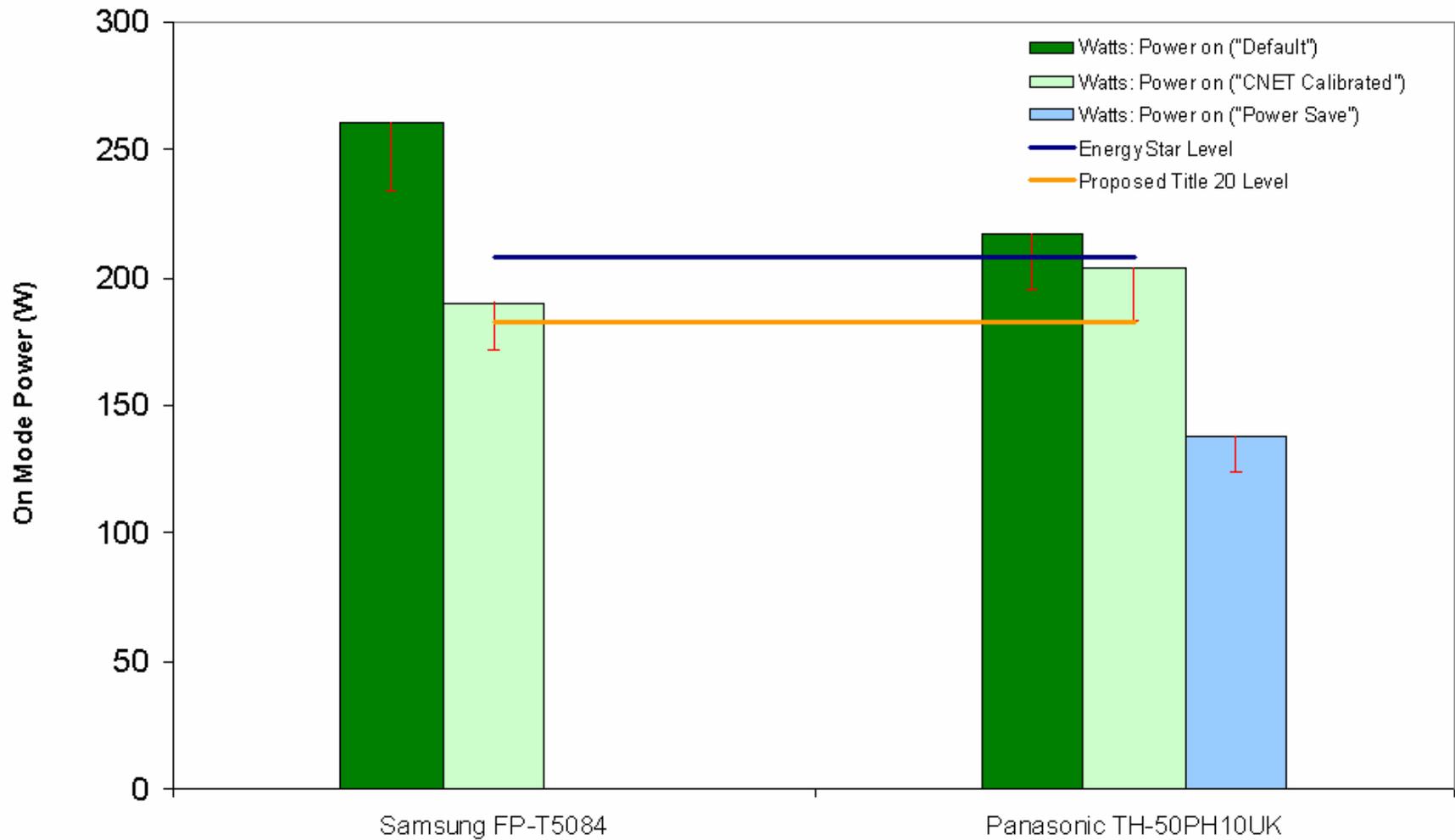
Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure Plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

50" Plasma TVs: On Mode Power Consumption at Various Screen Settings



Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

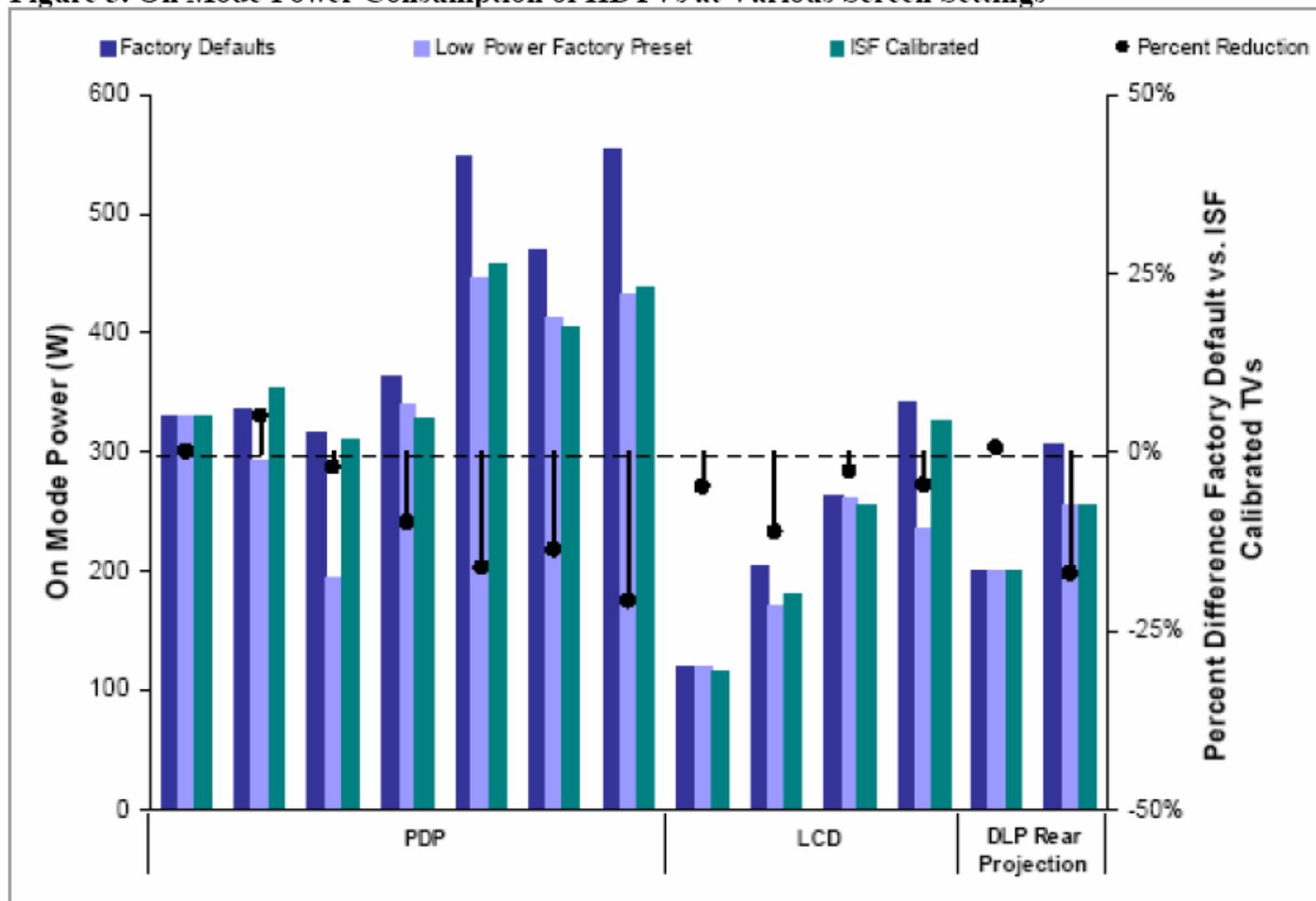
42" Plasma TVs: On Mode Power Consumption at Various Screen Settings



42" Plasma TVs

Note: CNET test results can be found at: http://reviews.cnet.com/4520-6475_7-6400401-3.html?tag=nav. CNET did not use the IEC 62087 test procedure; however an industry contact very familiar with the IEC test method estimates the CNET test procedure would be within 10% of the IEC test procedure for plasma TVs. If the CNET test result was different it would be higher. Therefore, the results above are likely conservative estimates of On Mode power. Error bars shown represent this estimated range.

Figure 3. On Mode Power Consumption of HDTVs at Various Screen Settings



Note: results are based on testing conducted by Ecos Consulting. ISF = Imaging Science Foundation.

Source: PG&E April 1, 2008 CASE report, "Analysis of Standards Options for Televisions"

Highlights from SID Display Week 2008

Display conference highlights green technologies

[Nicolas Mokhoff](#)

(05/23/2008 1:37 PM EDT)

URL: <http://www.eetimes.com/showArticle.jhtml?articleID=208200274>

LOS ANGELES — Along with a number of display industry firsts at this week's Society for Information Display conference here, manufacturers acknowledged the need to incorporate "green" technologies and production processes.

But speakers stressed environmental issues. "We need to apply a long-term environmental commitment within the TFT-LCD industry, and have companies develop best practices that improve both the bottom line and the environmental footprint," said Paul Peng, senior vice president and general manager at AU Optronics Corp.

AU Optronics has launched a "Green Solutions" initiative that has so far yielded eco-friendly LCD TV technology with energy savings by optimizing a backlight design. The company's latest 46-inch LCD TV panel reduces power consumption by up to 50 percent while retaining 500 nits of brightness with a 5,000:1 contrast ratio.

The LCD TV Association also rolled out a GreenTV logo program. Chairman Bruce Berkoff said the association wants to "help focus LCD TV manufacturers and brands on reducing the power consumption of LCD TVs and raising consumer awareness about this issue."

The group is working with TV vendors to promote the use of ambient light sensors that can automatically lower set brightness in a dark room by decreasing power to the backlight. "This may reduce power consumption by at least 30 percent," Berkoff said.

Sony's Yoshito Shiraishi said its new [organic light-emitting diode TV](#) is eco-friendly. Sony's XEL-1 OLED "consumes 60 percent less power than comparable technologies like LCD and PDP in flat panel TVs," Shiraishi claimed.

Other display makers stressed green technologies at SID. For example, 3M showed optical film that lowers LCD energy consumption by 30 percent. It also showcased a 60-watt, 32-inch LCD TV, and a Lenovo 19-inch wide 20 watt monitor that uses only two CCFL bulbs, each optimized with Vikuiti brightness enhancement films.

LCDs Featured at Display Week 2008

	Energy Star Level	On Mode Power (W)			Manufacture claim	% better than Energy Star	% better than proposed Tier 1	% better than proposed Tier 2
		Proposed Title 20 Tier 1 Level	Proposed Title 20 Tier 2 Level					
CMO Power Saving Technology								
31.5" Common LCD (non-HD)	76	76	76	105				
31.5" Non-HD LCD w/CMO tech.	76	76	76	55	28%	28%	28%	
3M Vikuiti								
40" Common LCD TV	191	169	107	195				
40" LCD with 3M Vikuiti	191	169	107	92	52%	45%	14%	
AUO 46" ECO-Friendly LCD TV								
46" Common LCD TV	244	213	134	240				
46" AUO ECO-Friendly LCD	244	213	134	120	51%	44%	10%	
Samsung 46" 3-Way Dimming								
46" Samsung 3-Way Dimming	244	213	134	90	63%	58%	33%	
Samsung 52" Green TV								
52" Samsung Green TV (min)	331	263	164	40				
52" Samsung Green TV (max)	331	263	164	150	55%	43%	8%	

On Mode Power is estimated based on product display information at Display Week 2008 (available upon request). Note: 31.5" CMO is a Non-High Definition TV so Energy Star and Proposed Title 20 level is more stringent compared to HD and FHD TVs

Next generation LCDs exceed proposed Tier 1 by 28-58% and Tier 2 by 8-33%.

Thinking big? Think plasma!

VIERA



Sports

Movies

Friends and family

Long life

Environment



Plasma is designed for low environmental impact
Does a PDP really use more power than an LCD?

No, it does not.

Independent tests show that Panasonic PDPs use roughly the same power as equivalent LCDs on the market.



Power Consumption per 253 min.	Type	Costs per 253 min.	Costs per year
Panasonic 579.5 Wh	PDP	11.59 Cent	42.30 Euro
LG 521.1 Wh	LCD	10.42 Cent	38.03 Euro
Philips 569.0 Wh	LCD	11.38 Cent	41.54 Euro
Sony 542.2 Wh	LCD	10.84 Cent	39.57 Euro
Samsung 622.5 Wh	LCD	12.45 Cent	45.44 Euro

Slide From:

“Growth Strategy for Digital AV Business Growth”

Toshihiro Sakamoto, President Panasonic AVC Networks Matsushita Electric Industrial Co., Ltd.

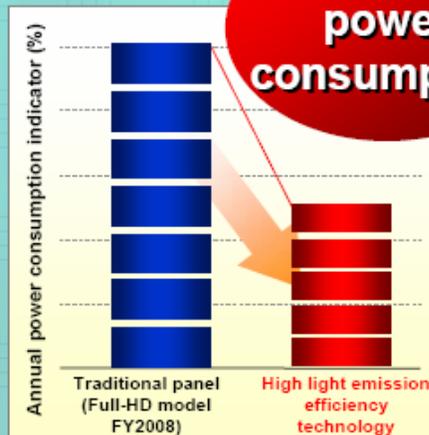
February 6, 2008

Neo PDP
Less Power Consumption

Realizing Lower Power Consumption & Higher Efficiency

 25

Retaining brightness and saving energy through high light emission efficiency!



Halving power consumption

Further expanding high-quality with increased peak brightness



More vivid images!

Plasma Presentation from Pioneer



The Case for Plasma

November 14th, 2007
Hirokazu “Kazu” Takayoshi.
Manager Product Planning
Home Business Division
PIONEER Europe.



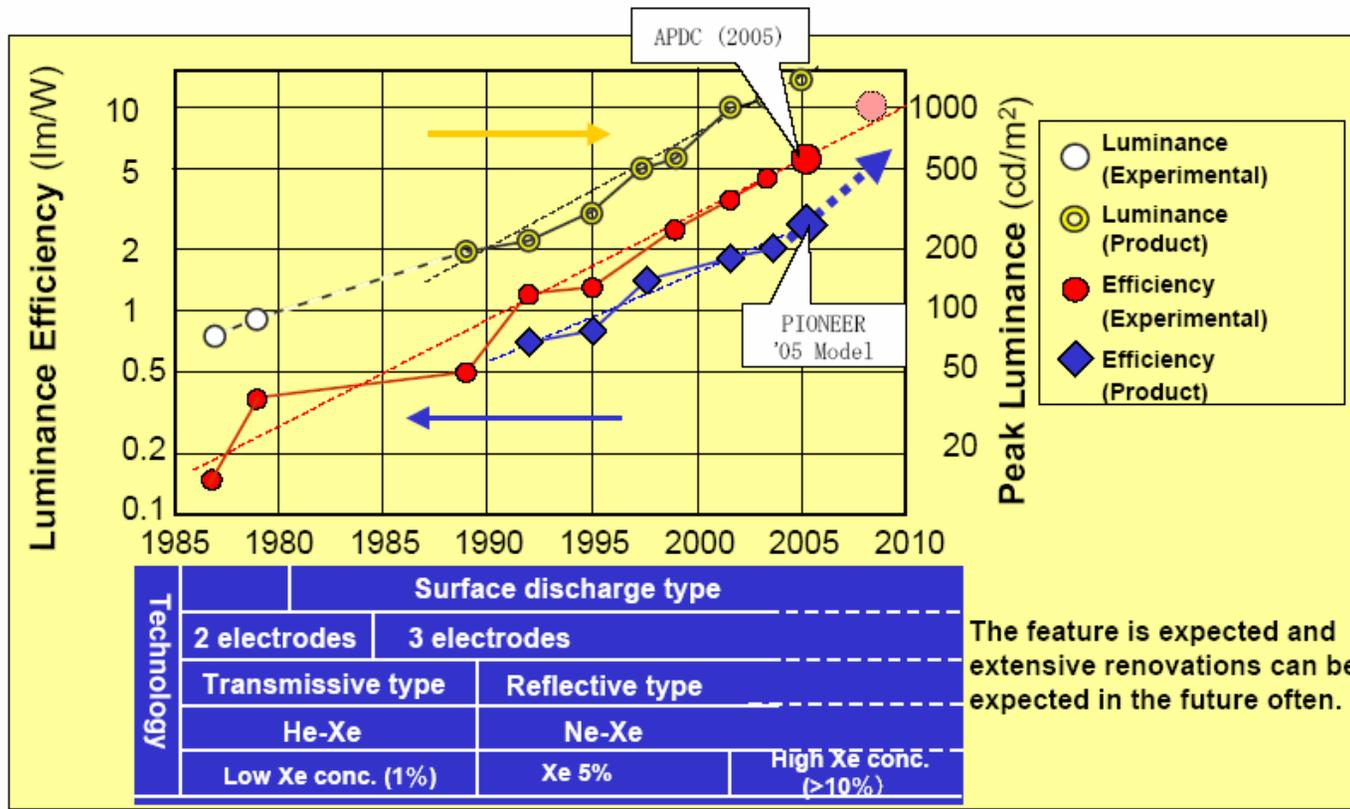
- The next two slides are from a presentation given by Hirokazu Takayoshi from Pioneer on November 14, 2007
- They showcase the efficiency trends for PDPs and the associated benefits.

PDP Luminance Efficiency Continues to Improve

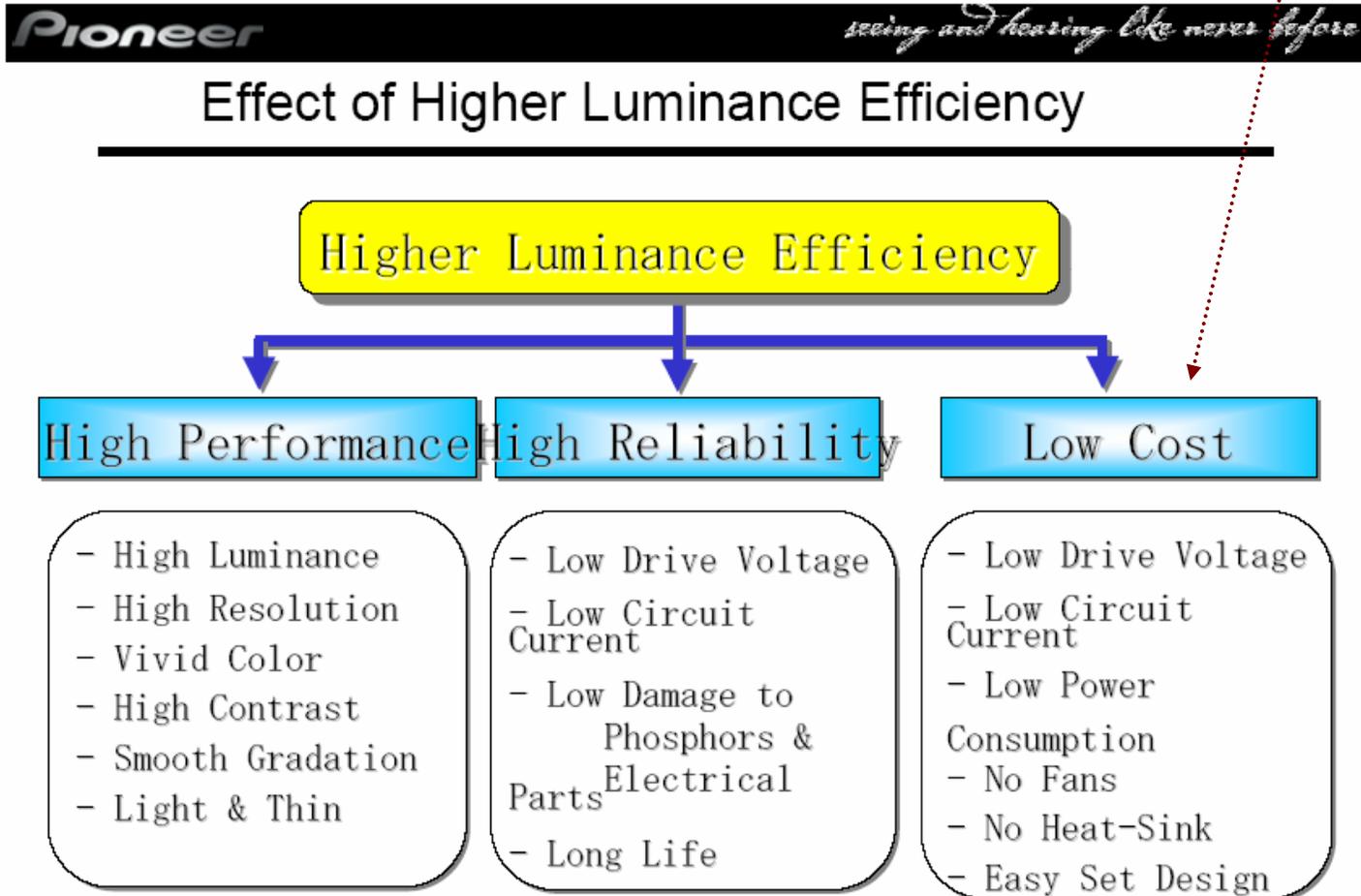
Pioneer

seeing and hearing like never before

Trend of PDP Luminance Efficiency



Benefits of Higher PDP Luminance Efficiency: “High Performance, High Reliability, Low Cost”



Korea Advanced Institute of Science and Technology Press Release: More Advances in PDP Efficiency

http://www.eetasia.com/ART_8800460668_765245_NT_f951330b.HTM

Korean engineers tout power-saving tech for PDPs 4/13/07

A team of engineers from the Korea Advanced Institute of Science and Technology (KAIST) led by professor Choi Kyung-cheol has developed a highly efficient, power-saving technology for light-emitting plasma display panels (PDPs) that are used in digital TVs, according to a report from the *Korea Herald*.

The technology boasts of a new cell structure and driving method for light-emitting PDPs that **can boost power efficiency by four times compared to existing methods.** According to the report, the technology features a four-electrode cell structure, which is the core technology for saving power in light-emitting solutions.

"The existing PDPs have used up about 1.5 times more electric power compared to LCDs. However, with this technology, PDP power consumption can be less than LCD consumption supposing the two are emitting the same degree of light," Choi said in the report.

At present, local PDP developers use Fujitsu's three-electrode cell structure. Choi noted that if local developers will use their power-saving technology, "they won't have to pay fees for using Japan or American PDP technologies."

"can boost power efficiency by four times compared to existing methods."

"PDP power consumption can be less than LCD consumption supposing the two are emitting the same degree of light."

Efficiency Statements from Leading Plasma Manufactures

http://www.eetasia.com/ART_8800455864_480700_NP_24a70954.HTM 3/9/07

PDP driver cuts power consumption by 35%

Samsung Electronics Co. Ltd announced that its new, broad 256-channel display driver IC (DDI) for PDP offers a lower power-consumption rate over conventional PDP driver ICs, and creates greater cost efficiencies by reducing the number of DDIs per panel. According to the company, it has again implemented its energy-recovery circuit technology in its new driver IC to recycle energy loss within the circuit. **The feature lowers the DDI power consumption of a conventional PDP TV by over 35 percent,** eliminating the need for a separate power-saving component feature and enabling a slimmer and lighter TV module.

Samsung:
“...lowers the DDI power consumption of a conventional PDP TV by over 35%...”

<http://news.thomasnet.com/companystory/500654> 11/27/06

"Panasonic is also making progress on reducing the amount of energy each Plasma TV consumes," said Mr. Thompson. **"There is an inaccurate but persistent myth that Plasma TVs consume much more energy than other types of digital television.** The truth is that large screen TVs consume more energy than the smaller screened CRT-based TVs they replace. Our research indicates that energy consumption by large-screen Plasma, LCD and DLP TV sets is on average comparable. **But as a relatively new technology, compared with LCD, Plasma is capable of becoming considerably more energy-efficient, and Panasonic plans to lead the way to this goal."** - David Thompson, Panasonic Corporation of North America's director of environmental affairs.

Panasonic:
“...Plasma is capable of becoming considerably more energy-efficient, and Panasonic plans to lead the way to this goal...”

Efficiency Statements from Leading Plasma Manufactures

http://www.nzherald.co.nz/section/story.cfm?c_id=5&objectid=10461566&ref=rss

9/4/07

Hiro Wada, who is in charge of planning for visual products and display devices at Panasonic, said he believed plasma could maintain a share of at least 30 per cent of the market for flat-screen TVs bigger than 37 inches in the medium term.

"We have a chance because demand for bigger screens is increasing," Wada told Reuters in an interview at IFA. He said Matsushita, which is investing \$1.5 billion (\$NZ2.1bn) in a plasma panel factory in Japan, aimed to stay number one in the plasma market. He added that plasma technology, which has only been commercial for about 10 years, still had plenty of room to improve. LCD television technology has been commercial for more than 30 years.

He also said Panasonic aimed to reduce the power consumption of its sets by about 20 per cent per year.

Panasonic:

"...Panasonic aimed to reduce the power consumption of its sets by about 20 per cent per year."