Proposed Efficiency Standards for Televisions

Presented to:

California Energy Commission

Prepared for:
Pacific Gas and Electric Company

Prepared by:
Alex Chase, Energy Solutions

Endorsed by:

December 15, 2008

Efficiency Committee Public Workshop on Draft Appliance Efficiency Standards for Televisions

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Section 1

Consumer Trends for Efficient TVs

CEA Survey Shows High Customer Demand for Energy Efficient TVs

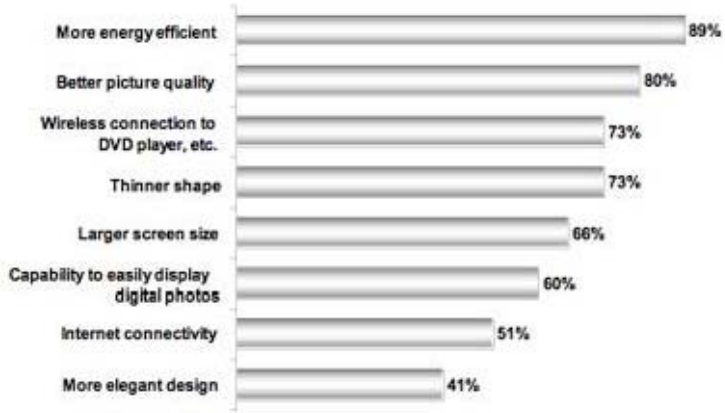
Press Release Detail
FOR RELEASE

CONSUMER DESIRE FOR "GREEN" ELECTRONICS ON THE RISE, SAYS CEA
One-Third of Consumers Expect to Make Eco-Friendly CE Purchase Within Two Years

Arlington, Virginia 12/10/2008

More consumers expect their consumer electronics (CE) devices to be environmentally friendly, according to new data released today by the Consumer Electronics Association (CEA)®. *Going Green: An Examination of the Green Trend and What it Means to Consumers and the CE Industry,* finds that 89 percent of households want their next television to be more energy efficient, for example. Although awareness of "green" CE offerings lags behind sectors like household products and automobiles, 33 percent of consumers say they expect to make some type of green CE purchase within the next two years.

Consumers' Wish List for NEXT TV Purchase



Base: random national sample of 1,000 U.S adults | Source: CEA

http://www.ce.org/Press/CurrentNews/press_release_detail.asp?id=11649

December 10, 2008
CEA press release:

"according to new data released today by the Consumer Electronics Association (CEA)®. *Going Green: An Examination of the Green Trend and What it Means to Consumers and the CE Industry,* finds that **89 percent of households want their next television to be more energy efficient** "

Section 2

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

Prepared for:
Pat Eilert
Gary Fernstrom
Ed Elliot

Pacific Gas and Electric Company

Prepared by:
Alex Chase, Energy Solutions

Endorsed by:

Southern California Gas Company, A Sempra Energy utility
SDGE, A Sempra Energy utility
Southern California Edison, An Edison International Company

Version: Revised Proposal Version 1.0
Last Modified: July 3, 2008

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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 the California Investor-Owned Utilities (IOUs)
  - Recommends two-tiered standard for on mode power
- CEC Staff Draft Report released in December 2008 includes the two-tiered standard levels

Proposed TV Efficiency Standard

- Considered market trends, such as:
  - Market transition to high definition flat panel TVs
  - Increasing average screen size and usage
  - Advancements in energy efficient technologies
- Relied on over 760 active mode power test results and efficiency advancements to inform proposed Tier 1 and Tier 2 levels.
- Developed to help California meet its ambitious energy efficiency and greenhouse reduction goals.
- Since the July 16, 2008 CEC TV workshop, new data (over 400 new test results) further confirms that the proposed standard levels in the CEC Staff Draft Report are cost effective and feasible.
  - This will be the focus of today's presentation.
  - Will highlight many positive developments within the industry to provide innovative technologies that meet the rising consumer demand for energy efficient TVs

For additional background, see PG&E's presentations at the July 16, 2008 workshop:
http://www.energy.ca.gov/appliances/2008rulemaking/documents/2008-07-16_workshop/presentations/

Section 3

New Energy Star Data

New Energy Star Data

- New Energy Star spec became effective Nov. 1, 2008.

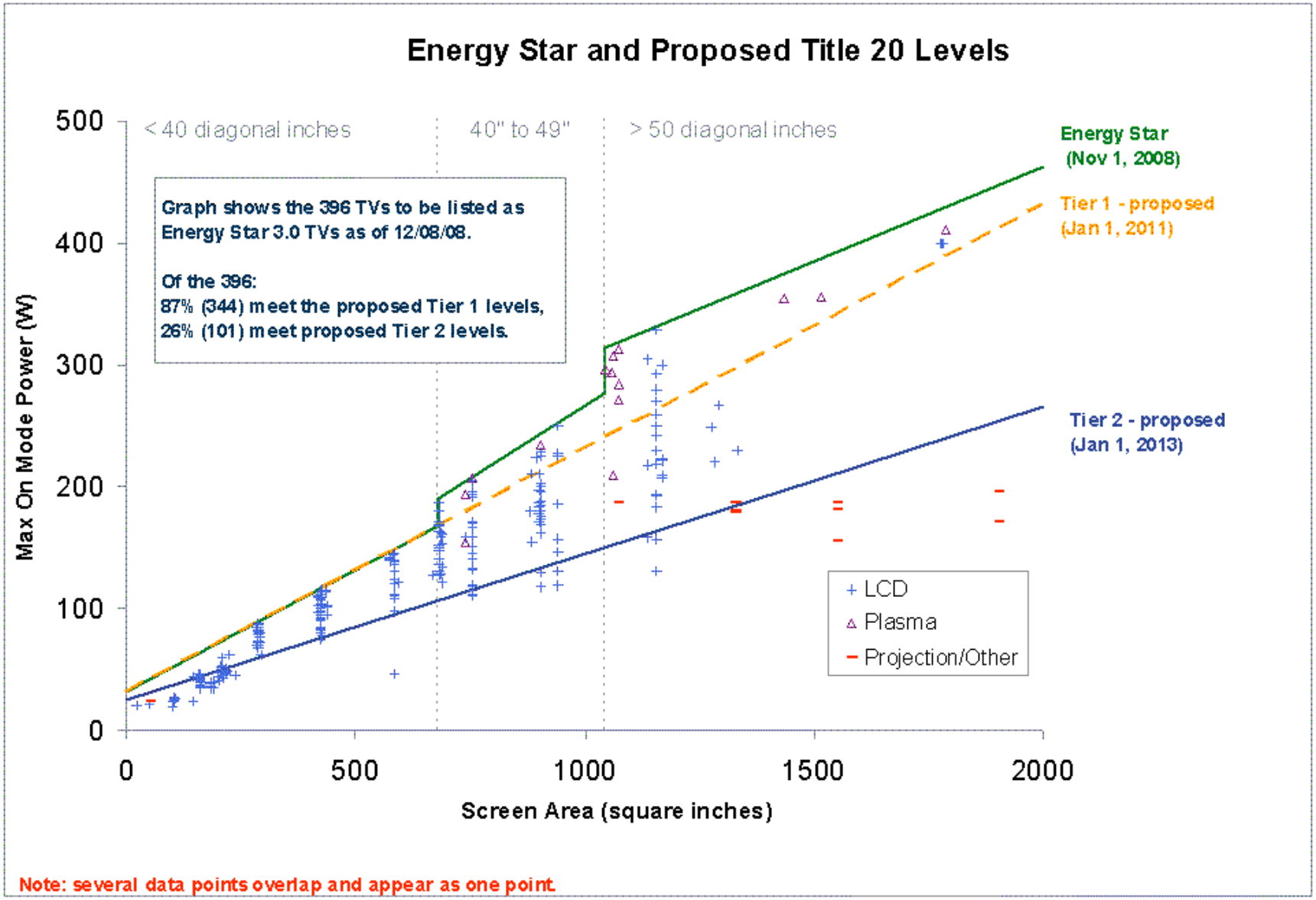
- As of Dec. 8, 2008, 396 TVs are listed as Energy Star TVs.
  - 87% (344) meet the proposed Tier 1 levels
  - 26% (101) meet proposed Tier 2 levels

- Tier 2 TVs are available today from many brands and more models will likely be added in the near future.

Tier 2 TV Brands

AOC	**JVC**	**Samsung**	**ViewSonic**
Clarity	**Magnavox**	**Sansui**	**VIZIO**
Dynex	**Philips**	**Sony**	
Emerson	**Polaroid**	**Sylvania**	
Insignia	**RCA**	**Toshiba**	

New Energy Star Data



Section 4

TVs on the market today that meet Tier 2

JVC December 11, 2008 Press Release:
"JVC LCD TVs BEAT NEW ENERGY STAR STANDARNDS"

JVC | USA

Press Releases

JVC LCD TVs BEAT NEW ENERGY STAR STANDARDS

WAYNE, NJ, December 11, 2008 – Underscoring its commitment to provide consumers with energy efficient, high-quality HDTV displays, JVC today announced that its line of LCD televisions outperforms the latest ENERGY STAR 3.0 standards for energy use, making them among the most cost-efficient sets to operate.

Based on the new ENERGY STAR 3.0 requirements, JVC LCD models are the most efficient in their class. In the 32" class, JVC is tied for the most efficient TV, and has three of the next most efficient sets. In the 40-42 inch class and the 46-47 inch class, JVC swept the first four places, in every case significantly more efficient than the ENERGY STAR requirement. And in the 50-52 inch class, JVC had the top three most efficient models. Overall, JVC LCD TVs outperformed the ENERGY STAR requirement by anywhere from 29 to 60 percent.

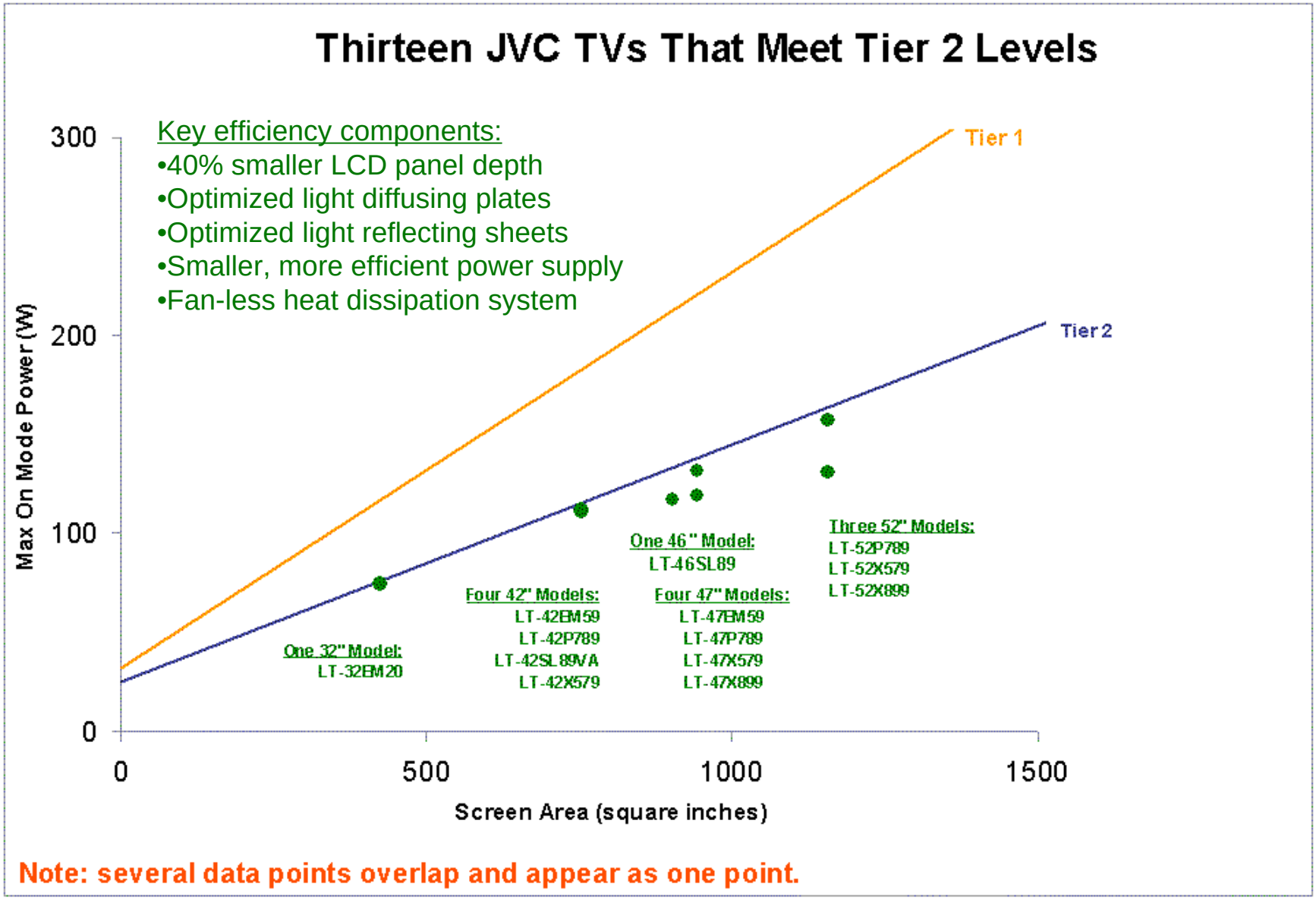
Earning the ENERGY STAR qualification means a product meets strict energy efficiency guidelines set by the U.S. Environmental Protection Agency and the Department of Energy. According to ENERGY STAR, there are 275 million TVs currently in use in the U.S., consuming over 50 billion kWh of energy each year — or four percent of all households' electricity use. This is enough electricity to power all the homes in the state of New York for an entire year.

As of November 1, the U.S. Environmental Protection Agency and the Department of Energy issued more stringent ENERGY STAR specifications for televisions. Models that earn the ENERGY STAR label under these requirements will be up to 30 percent more efficient than non-qualified models.

For more information and an updated list of brands meet the ENERGY STAR 3.0 specification, visit www.energystar.gov/products.

"Overall, JVC LCD TVs outperformed the ENERGY STAR requirement by anywhere from 29 to 60 percent"

JVC: Many Tier 2 TVs from 32” to 52”



http://tv.jvc.com/product.jsp?modelId=MODL028399&pathId=91&page=10

VIZIO Tier 2 TVs: 19” to 46” Models

VIZIO

Vizio Adds 32-inch EcoHD to Energy Friendly LCDs

Vizio has announced that all of its LCD HDTVs are Energy Star 3.0 compliant, and added a new $499 32-inch EcoHD LCD that uses 44 percent less energy.

Product News

Nov. 10, 2008 — by Arlen Schweiger

Vizio’s made a name for itself by producing quality TVs that are generally pretty light on your wallet (though the company has recently added its more premium XVT lineup too). Turns out they’re lighter on your wallet when it comes to your electric bill as well.

Vizio’s piano white 32-inch EcoHD LCD HDTV

“announced that all of its LCD models now shipping to the U.S. and Canada meet or exceed Energy Star 3.0 requirements”

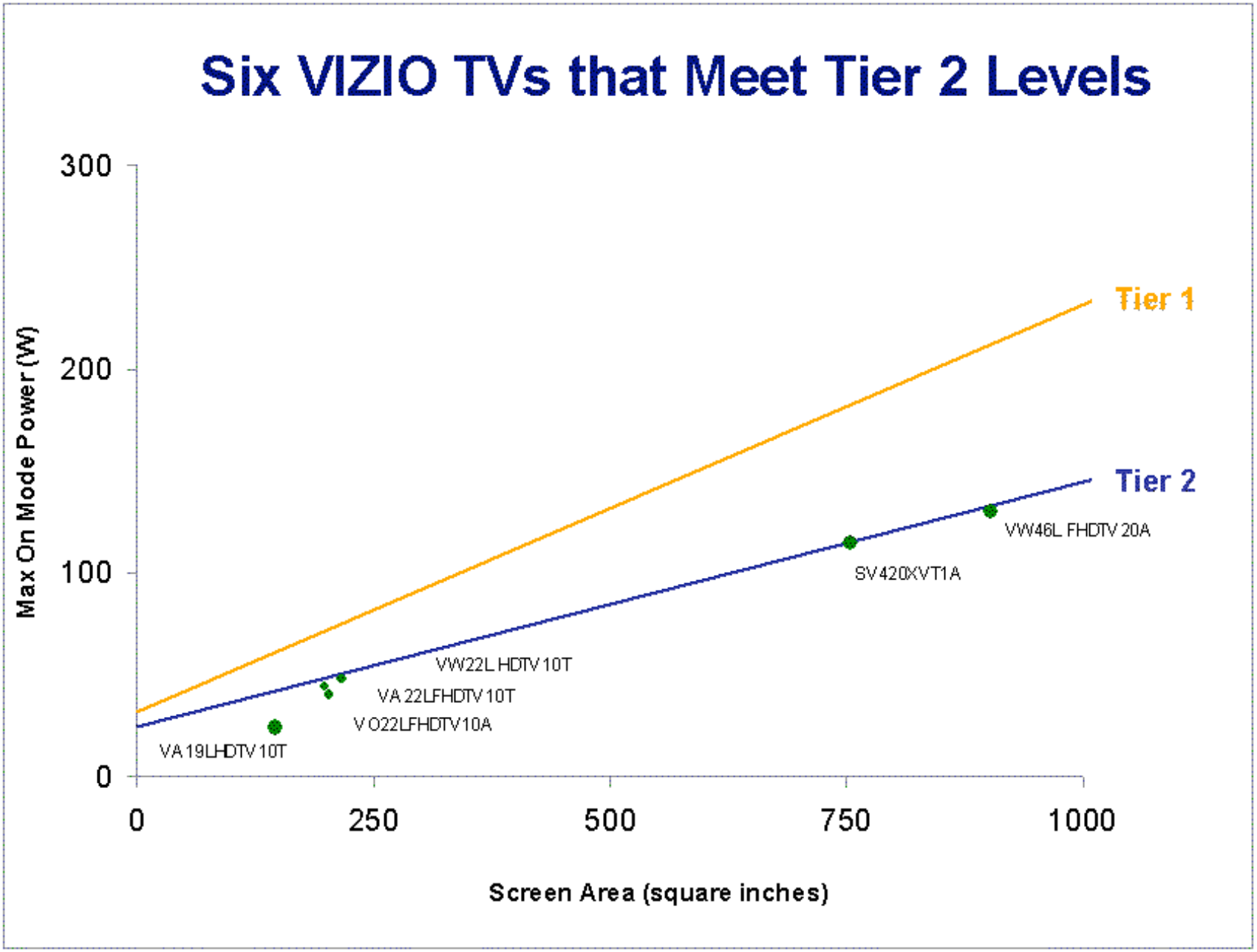
The comapny has announced that all of its LCD models now shipping to the U.S. and Canada meet or exceed Energy Star 3.0 requirements. Nine of Vizio’s models exceed the Energy Star rating by 25 percent, the company says, and all of them are RoHS (Restriction of Hazardous Substances) compliant too.

The 22-inch and 19-inch LCD models even consume less energy than a standard 60w light bulb, Vizio says.

Along these lines, Vizio has also announced a new TV, and it’s invoking the green movement. The company’s new 32-inch “EcoHD” LCD TV uses 44 percent less energy than an average 32-inch LCD HDTV, Vizio says. Don’t worry about that compromising the quality, though—you still get 12,500:1 dynamic contrast, SRS TruSurround XT Audio, and multiple HDMI inputs for all your high-def sources.

The color’s not actually green, but it’s also not the traditional black bezel, either. Instead, it’s a slick-looking white piano color that’s sure to have your guests oohing and aahing. It’s also a tidy $499, and will be online later this month at Vizio.com and other retailers’ websites such as Sam’s Club, Walmart, Costco, Dell and Target.

http://www.electronichouse.com/article/print/vizio_adds_32_inch_ecohd_to_energy_friendly_lcd


Six VIZIO TVs that Meet Tier 2 Levels
Max On Mode Power (W)
300
200
100
0
0
250
500
750
1000
Screen Area (square inches)
Tier 1
Tier 2
VW46L FHDTV 20A
SV420XVT1A
VW22L HDTV 10T
VA 22LFHDTV 10T
VO22LFHDTV10A
VA 19LHDTV 10T

Tier 2 TV Examples: Methodology

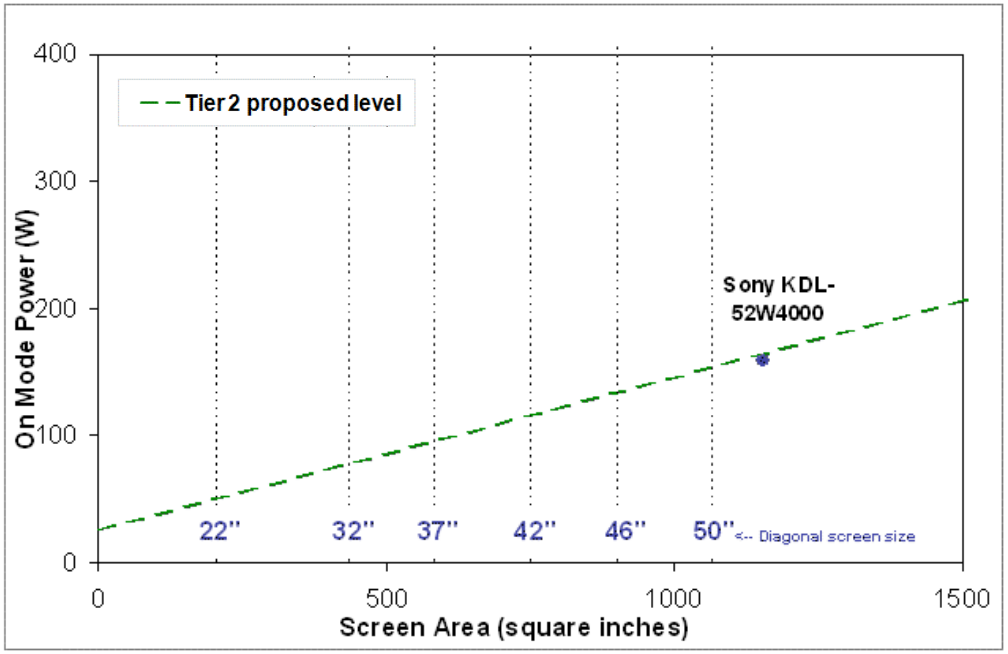
- The following slides show Tier 2 TVs on the market now. Examples include multiple brands, small to large screen sizes, and diverse features.
- On mode wattage values taken from 12/8/08 Energy Star list
- Lifetime energy savings assumes 10-yr useful life, $0.14/kWh rate, and a 3% discount rate (per CEC methodology).
- Retail Cost
  - Tier 2 Televisions:
    - Individual retail costs were taken from NPD Group Inc. market research data for sales from August-October 2008. If average price was not available from NPD, then average retail costs were taken from Best Buy, Wal-Mart, and/or Fry's.
  - Non-Tier 2 Televisions:
    - Average price for non-Tier 2 televisions were collected in November 2008 from Best Buy, Wal-Mart, and Fry's and averaged for each screen size. Sample size (n) for the average prices in the following figures is shown in the table below.

Screen Size (in)	Sample Size (n)
19"	17
22"	7
32"	39
37"	21
42"	26
46"	32

Tier 2 TV Example

Sony 52” 1080p Full HD LCD

W-Series features: Full HD 1080p, Motionflow™ 120Hz, BRAVIA Engine 2™ digital video processing, Advanced Contrast Enhancer circuit (ACE), 24p True Cinema capable, enhanced XMB™ user interface, BRAVIA Sync capable, piano black gloss color
(Screen size measured diagonally.)



Sony KDL-52W4000

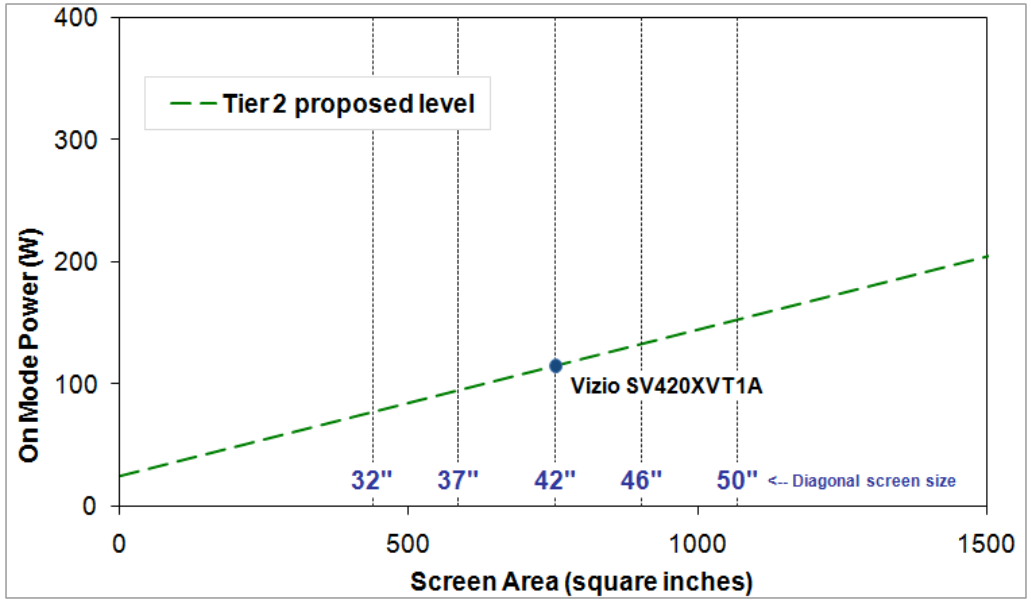
	Non-Tier 2 Average	Tier 2 TV Example
Retail Cost	$2,381.92	$2,225.00
On Mode Wattage	261.0	158.7
Lifetime energy (kWh)	4978	3026
Lifetime energy costs	$594.45	$361.33

Savings

Retail Cost	$156.92
On Mode Wattage	102.4
Lifetime energy (kWh)	1952.0
Lifetime energy (%)	39%
Lifetime energy costs	**$233.11**

Tier 2 TV Example

Vizio 42” LCD 1080P Full HD

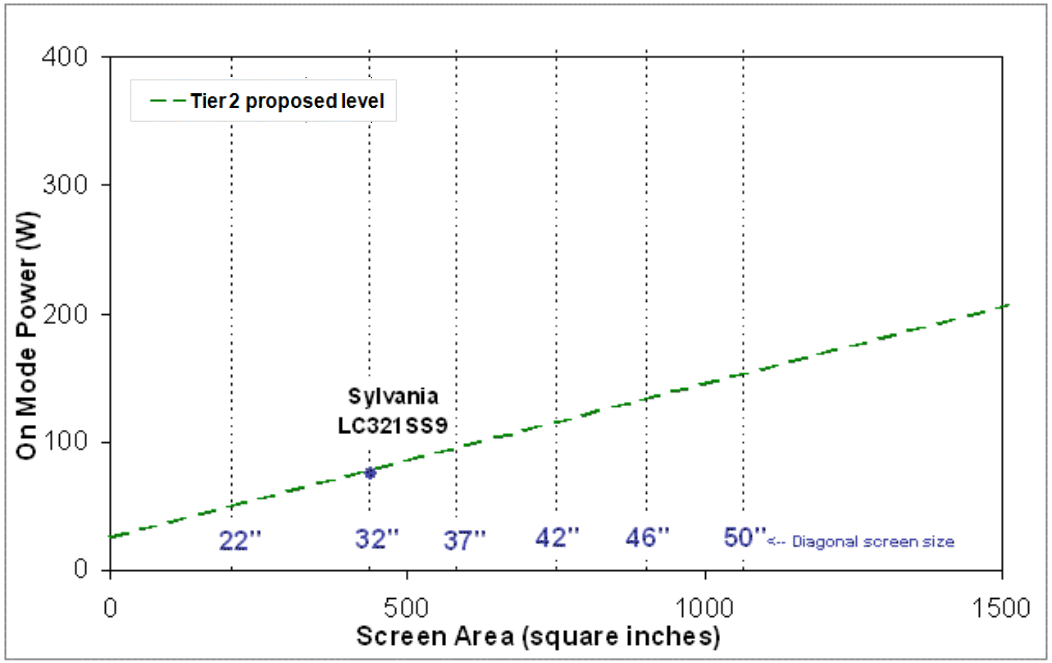


Vizio SV420XVT1A

	Non-Tier 2 Average	Tier 2 TV Example
Retail Cost	$1,121.02	$1,087.00
On Mode Wattage	180.9	115.0
Lifetime energy (kWh)	3450	2193
Lifetime energy costs	$411.98	$261.90

Savings	
Retail Cost	$34.02
On Mode Wattage	65.9
Lifetime energy (kWh)	1256.7
Lifetime energy (%)	36%
Lifetime energy costs	**$150.08**

Tier 2 TV Example
Sylvania 32” LCD



Sylvania LC321SS9

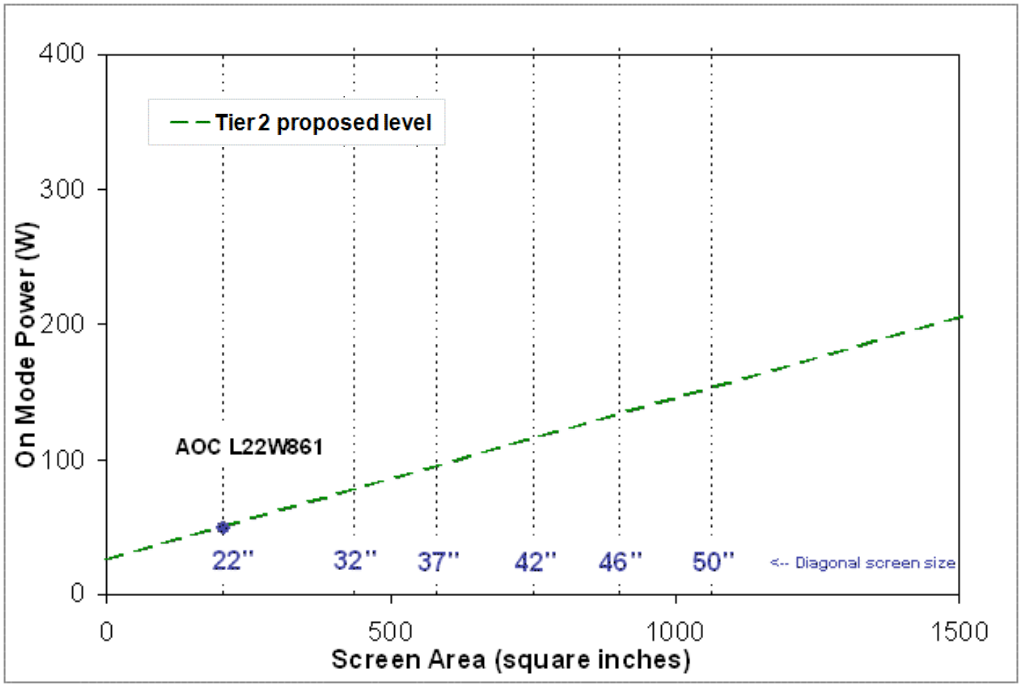
	Non-Tier 2 Average	Tier 2 TV Example
Retail Cost	$783.92	$590.00
On Mode Wattage	117.6	74.8
Lifetime energy (kWh)	2243	1426
Lifetime energy costs	$267.87	$170.35
Savings		
Retail Cost		$193.92
On Mode Wattage		42.8
Lifetime energy (kWh)		816.6
Lifetime energy (%)		36%
Lifetime energy costs		**$97.52**

Tier 2 TV Example
Envision AOC 22” LCD

OVERVIEW

The AOC 861 television series is our newest for 2008. The 861 series provides the best picture and sound quality ever offered by AOC. In addition, the 861 series is also the best looking with a slim bezel design and piano black finish. The 22" is great for a bedroom, RV, or dorm room. With inputs such as HDMI for the best connectivity and NTSC/ATSC tuners with Clear QAM for high definition signal reception you'll be ready for the 2009 digital TV revolution.

HDMI HDTV ENVISION by AOC

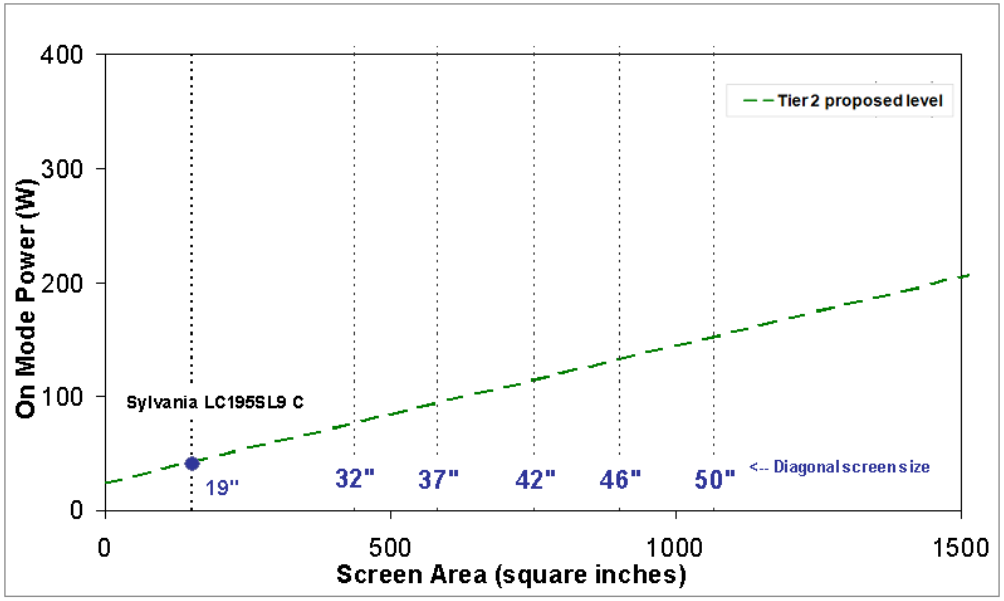


Envision AOC L22W861

	Non-Tier 2 Average	Tier 2 TV Example
Retail Cost	$394.56	$307.91
On Mode Wattage	71.4	49.0
Lifetime energy (kWh)	1362	934
Lifetime energy costs	$162.65	$111.59

Savings	
Retail Cost	$86.65
On Mode Wattage	22.4
Lifetime energy (kWh)	427.5
Lifetime energy (%)	31%
Lifetime energy costs	**$51.06**

Tier 2 TV Example
Sylvania 19” LCD HD TV



Sylvania LC195SL9 C

	Non-Tier 2 Average	Tier 2 TV Example
Retail Cost	$346.03	$299.99
On Mode Wattage	60.8	40.5
Lifetime energy (kWh)	1160	772
Lifetime energy costs	$138.51	$92.23
Savings		
Retail Cost		$46.04
On Mode Wattage		20.3
Lifetime energy (kWh)		387.5
Lifetime energy (%)		33%
Lifetime energy costs		**$46.28**

Section 5

LCD Efficiency Trends Update

Super Efficient TVs

- The following slides highlight the efficiency developments that many manufacturers have proudly displayed at industry trade shows around the world during 2008. (Key aspects: more efficient and less backlights, improved light diffusion, brightness enhancement films, more efficient power supplies, and automatic brightness controls)

- Most of the photos on the next slides show the on mode power of previous models compared to their next generation TV, for example:

AUO 46" ECO-Friendly LCD TV

Same picture content, 50% power reduction

"ECO Friendly Technology": 122 Watts

Conventional TV: 252 Watts

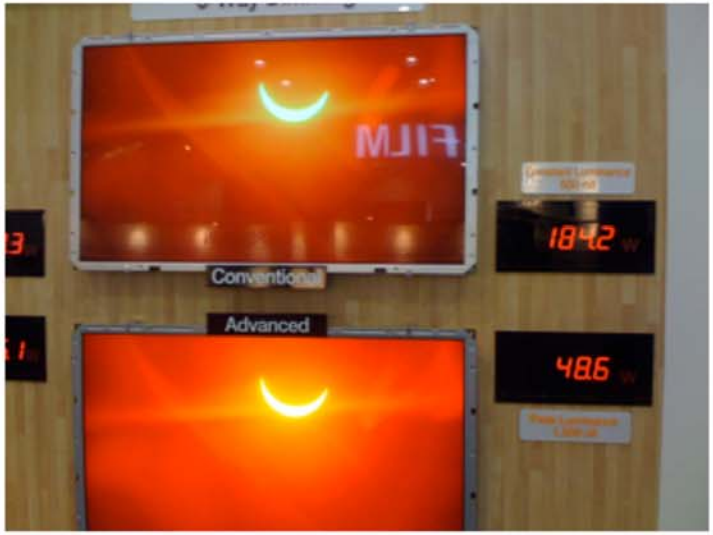
TV shown at Display Week 2008

Display Week 2008 Pictures
Los Angeles, May 18-23,2008

Samsung 52” LCD Green TV

42% reduction shown between the two TVs

Samsung 46” LCD with 3-Way dimming



74% reduction shown between the two TVs

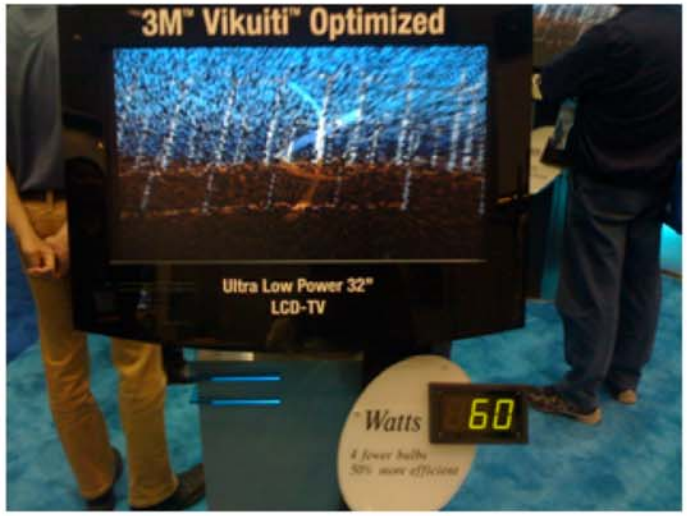
Display Week 2008 Pictures
Los Angeles, May 18-32, 2008

40” LCD with 3M Vikuiti Display Enhancement

40" Common LCD-TV	40" Ultra Low Power LCD-TV
Brightness: 350 nits	Brightness: 350 nits
Power: 195 Watts	Power: 92 Watts

53% reduction shown between the two TVs

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



60W is 23% lower than the Tier 2 level for 32” TVs (77.5W)

IFA Consumer Electronics Show Berlin, September 2008

Vestel EcoDesign 32” LCD TV
Average power reduced from 109W to 55W
50% power reduction

CEATEC Japan: Sept 30-Oct 4,2008

Hitachi Dynamic Power Control: >50% Power Reduction

Sony 32” TV: 63% reduction shown between the two TVs

Section 6

Plasma Efficiency Trends Update

Plasma Efficiency Trends

- Current plasma TVs can exceed Tier 1 levels today
  - The two top selling plasma TVs during Aug-Oct 2008 (42” and 50” TVs) exceeded Tier 1 levels
- Most plasma TVs today have a luminous efficiency of around 2 to 2.5 lumens per watt (LPW)
- In 2005, the Advanced PDP Development Center Corporation (APDC) developed technology making it possible to achieve luminous efficiency in excess of 5 LPW.
  - Advanced PDP Development Center Corporation (APDC) was established in July 2003 to co-develop basic technology for advanced PDPs with five PDP companies. Top funders include Hitachi, Panasonic, and Pioneer.
  - Panasonic showcased a ~5 LPW TV at the January 2008 CES, expected to be in production 2nd Quarter 2009
  - >5 LPW plasma TVs should meet Tier 2 levels
- Next goal for APDC is 10 LPW
  - Performance increases and costs lower
  - This level will easily exceed Tier 2 levels

Advanced PDP Development Center Corporation

Advanced PDP Development Center Corporation

"APDC was established in July 2003 to co-develop basic technology for advanced PDPs in league with five PDP companies. In just two years, we have demonstrated our potential by achieving revolutionary advances in performance (efficiency in excess of 5 LPW)"

-Ken Morita
Executive President

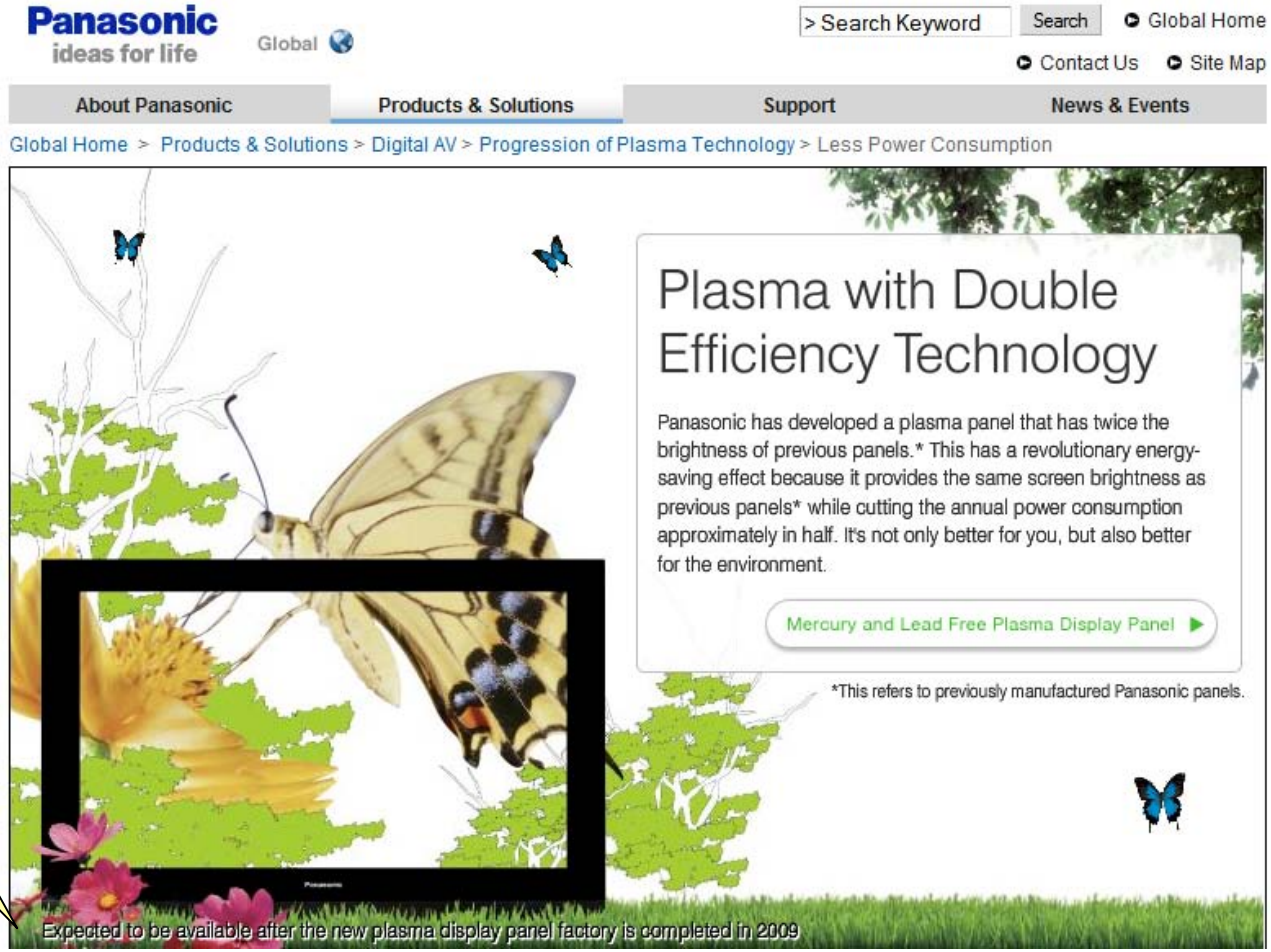
"ADPC and the major PDP companies joined in 2003-2006 national project, and accomplished technological breakthrough, realizing luminous efficiency in excess of 5 LPW, which is 2.5 times that of existing products. This achievement indicates that the day will soon come when plasma TV becomes a synonym for low-power TV."

-Tsutae Shinoda
General Manager, Central Research Laboratory

http://www.advanced-pdp.jp/english/apdc/greet/index.html

Panasonic Double Efficiency PDP Technology:
5 LPW Plasma – Showcased at CES in January 2008, Expected to be on the market by Mid-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 PDP Technology As Shown at IFA 2008 in Berlin

The TV left is the plasma display developed with the "high luminance efficiency technology" and the TV on the right is the 2007 model. Same brightness using half the power.

http://ex-blog.panasonic.co.jp/exhibition/en/ifa2008/

Advanced PDP Development Center Corporation: working towards 10 LPW technology

- Improving luminous efficiency improves performance, reduces size and number of components, and thus, can lowers costs
- Industry expert (Ross Young, Founder and Chief Research Officer of DisplaySearch) estimated the following in March 2008 for plasma TVs:
  - At 5 LPW: “Costs fall by 9% to 11% depending on size/resolution”
  - At 10 LPW: “Manufacturing costs cut by 37% - 38%”

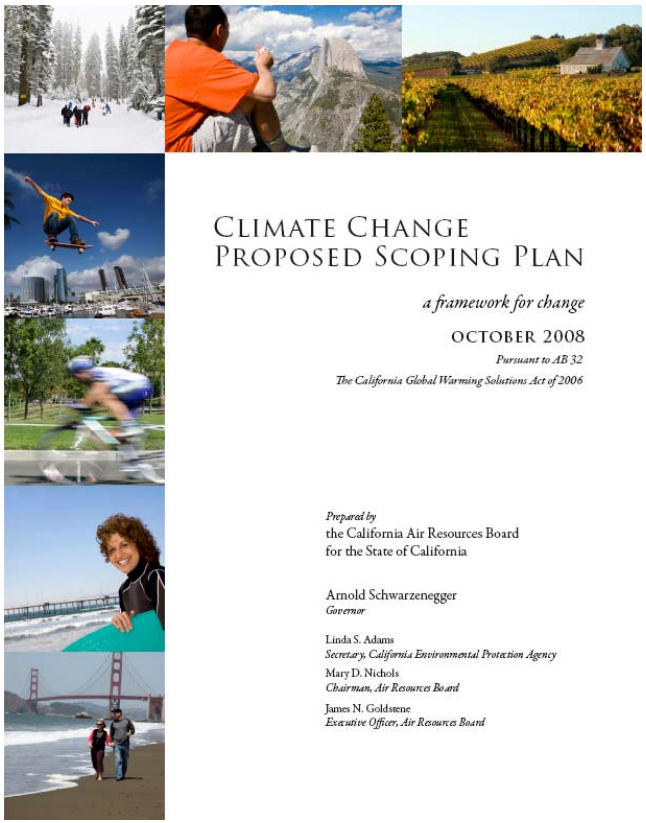
Source: APDC and Ross Young’s presentation at *2008 DisplaySearch USFPD*, March 2008, San Diego, CA

Section 6

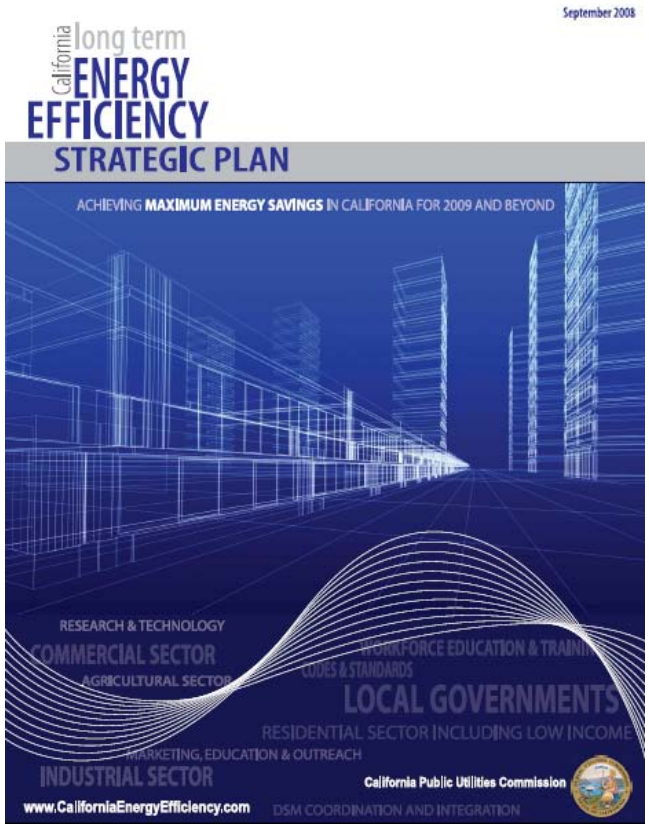
Motivation: CA energy efficiency and greenhouse reduction goals in context

Two Groundbreaking Plans for CA

December 11, 2008: Air Resources Board approved California's plan to reduce the state's greenhouse gas emissions to 1990 levels by 2020



September 18, 2008: California Public Utilities Commission (CPUC) adopted California's first Long Term Energy Efficiency Strategic Plan



Two Groundbreaking Plans for CA

Climate Change Scoping Plan

- Expansion and strengthening appliance standards is key element to achieve GHG reduction goals
- “Future appliance standards should address the energy consumption of electronic devices that offer significant potential for efficiency improvements, such as flat screen TVs”
- Gov. Arnold Schwarzenegger, who has been a vigorous advocate of the plan, vowed that it would "unleash the full force of California's innovation and technology for a healthier planet.” "When you look at today's depressed economy, green tech is one of the few bright spots out there."

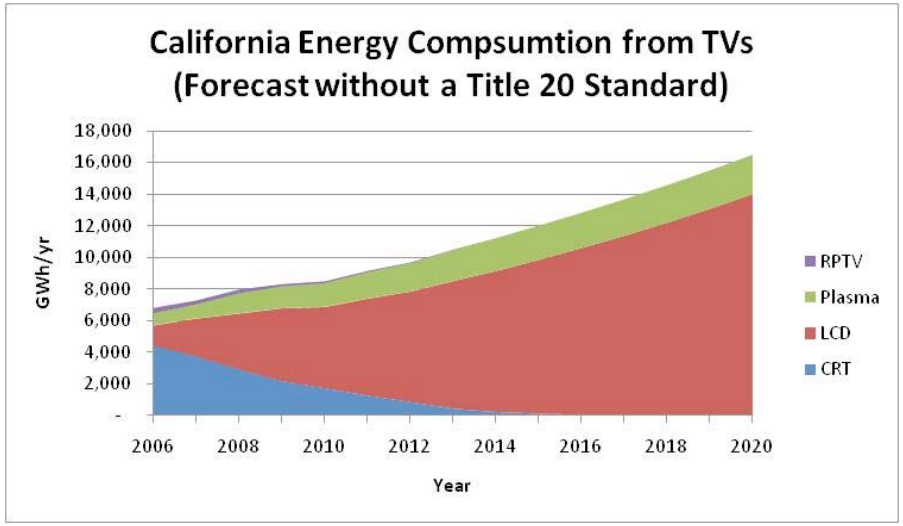
  - LA Times, 12/12/08

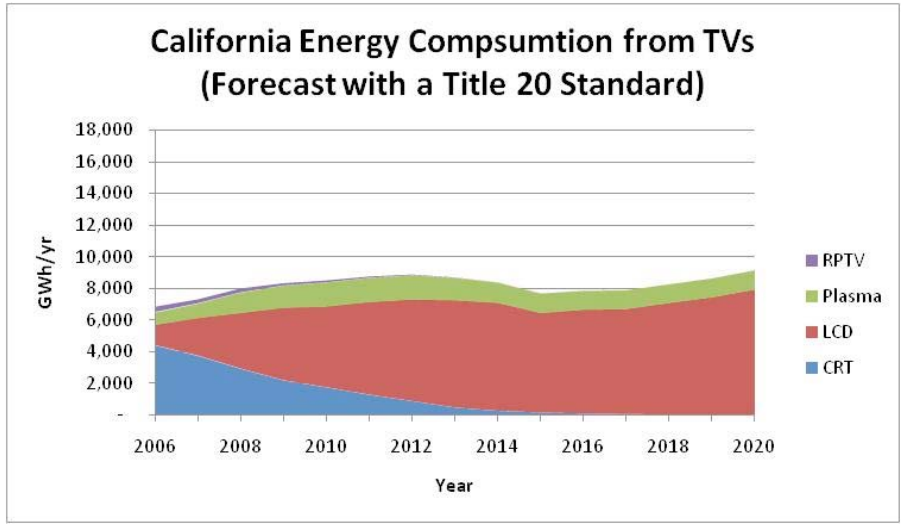
Energy Efficiency Strategic Plan

- It sets energy efficiency as the highest priority resource in meeting California’s energy needs.
- “All new residential construction in California will be zero net energy by 2020”
- The Plan seeks to move utilities, the CPUC, and other stakeholders beyond a focus on short-term energy efficiency activities into a more sustained long-term, market transformation strategic focus, using a combination of the following:
  - Codes and Standards
  - Customer Incentives
  - Education

Proposed TV Efficiency Standards Support These Ambitious Goals

CA Energy Forecast for TV Stock: With and Without Tier 2





Energy Consumption (and GHG emissions) stays roughly flat if Tier 2 level is adopted

Section 7

Conclusions and Recommendations

Conclusions and Recommendations

- Consumer demand for efficient TVs is high.
- New Energy Star data confirms that most TVs being sold today meet proposed Tier 1 level.
- Cost-effective Tier 2 TVs are available today without sacrificing functionality.
- Industry is highlighting innovative efficient technologies that further support the Tier 2 level.
- Tier 2 level will be necessary for California to achieve the goals included in the recently adopted Energy Efficiency Strategic Plan and the Climate Change Scoping Plan.

RECOMMENDATIONS

- Adopt standard levels as proposed in the CEC Staff Report.
- Finalize and publish standards in early 2009.