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PREFACE

In its April 2, 2008 Scoping Order, the California Energy Commission's (Energy Commission) Efficiency Committee (Committee) established the scope of Phase I of the 2008 Appliance Efficiency Rulemaking regarding possible amendments to the Appliance Efficiency Regulations (Title 20, California Code of Regulations, Section 1601 through Section 1608). Phase I was initially divided into two separate, concurrent rulemakings, Part A and Part B. Later in April, the Committee established Part C to consider televisions and any additional topics separately.

The Committee conducted a public workshop on July 16, 2008, to seek comments from interested parties regarding possible appliance efficiency standards for televisions. Pacific Gas & Electric Company (PG&E) and the Consumer Electronics Association (CEA) submitted written proposals for consideration. This report examines draft standards for televisions in both active and standby modes, preemption issues surrounding the current federal test method for televisions, and recent market and test data.

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ABSTRACT

This staff report contains draft amendments to the Appliance Efficiency Regulations (California Code of Regulations, Title 20, Sections 1601 through 1608) to be considered as part of the 2008 Appliance Efficiency Rulemaking, Phase I, Part C (Docket # 07-AAER-03-C).

This report covers standby and active mode efficiency standards for televisions (TVs), labeling requirements, and use of the International Electrotechnical Commission (IEC) test method “Methods of Measurement for the Power Consumption of Audio, Video and Related Equipment,” IEC 62087 Edition 2.0, as the test method for the measurement of energy consumption for TVs.

This report presents staff analysis of the legislative criteria, background, statewide energy use, savings and cost analysis, federal regulations and test method, technical feasibility, policy issues and next steps, stakeholder comments, and proposed regulations related to televisions.

Keywords: Appliance Efficiency Regulations, appliance standards, televisions, TVs, energy efficiency, plasma, LCD, CRT, DLP, rear projection.

Legislative Criteria

Section 25402(c) of the Public Resources Code requires the California Energy Commission to adopt standards for the energy efficiency of appliances whose use, as determined by the Energy Commission, requires a significant amount of energy on a statewide basis. New and upgraded standards must be feasible and attainable and must “not result in any added total costs to the consumer over the designed life of the appliances concerned.” The added total cost is obtained by comparing the cost and performance of a typical model that the consumer would be expected to purchase with the proposed standard in effect, to the cost and performance of a typical model that the consumer would be expected to purchase without the proposed standard in effect.

Summary

Changes in Televisions Energy Use

Televisions (TVs) have been a part of the American household since the late 1930s. The first models were exclusively cathode ray tube (CRT) based and sold in wood cabinetry. In the last 30 years TVs have become standard in every living room or family room across the country. Today it is common for households to own multiple TVs in several rooms in the house. The popularity and increase in demand of TVs has led to strong competition and rapid innovation to provide ever increasing functionality and features. The energy consumption of TVs has been growing rapidly over recent years, and this trend will continue in the near future for the following reasons:

- Continuous growth in sale of digital flat panel TVs
- Growth in average screen size
- Growth in number of TV units per household
- Drop in prices of high-definition flat screen digital TVs
- Enhanced features and functionality of TVs, including increased screen brightness, higher resolution, and more built-in auxiliary functions
- Increase in daily usage time

The majority of the TVs in California are also connected to closely associated electronics such as cable TV tuners, satellite receivers/tuners, Internet Protocol Television (IPTV) devices, Digital Video Recorders and digital signal converters, as well as to accessory devices such as Digital Versatile Disc/Blue-Ray players and video game consoles. Overall, these devices provide greater availability of television programming resulting in an increase in daily usage of TVs to an average of more than five hours a day.

At present the total energy used by television viewing, with programming recording and playback equipment connected, is estimated to represent about 10 percent of residential electricity

use.¹ The PG&E analysis shows that significant energy can be saved in the future by requiring the sale of energy efficient TVs, and proposes that standards be developed.

Television Energy Use Measurement

Setting practical energy efficiency standards for modern digital TVs requires an accurate measurement of energy consumption while in active mode. Staff concludes that the current United States Department of Energy (U.S. DOE) test method for testing and measuring active mode energy consumption of TVs is outdated, and is not suitable for modern televisions using Liquid Crystal Display (LCD) and plasma based digital technologies. The current U.S. DOE test method was written to measure energy consumption for black and white TVs displaying National Television System Committee (NTSC) analog signals. Starting February 17, 2009 all TV stations in the United States will stop broadcasting programs in NTSC format and begin broadcasting only in Advanced Television Systems Committee (ATSC) format digital signals. There is no provision in the U.S. DOE's test method for testing the energy consumption of color digital TVs designed to display high-resolution and/or ATSC format images.

Recently, the International Electrotechnical Commission (IEC) has developed an active mode test method titled "Methods of Measurement for the Power Consumption of Audio, Video and Related Equipment," also referred to as IEC 62087-Edition 2.0. This test method is a consensus-developed test method that is already widely accepted and used by the consumer electronics industry. The ENERGY STAR® specifications require manufacturers to use this test method to generate their energy use data. PG&E recommends that the Energy Commission replace its current test method with IEC 62087-Edition 2.0, and staff further recommends that the test data collected by using the updated IEC test method be used to set any future energy standards.

Proposals for Television Standards

Pacific Gas and Electric Company (PG&E) submitted to the California Energy Commission their Codes and Standards Enhancement (CASE) Initiative "Analysis of Standards Options for Televisions" document on April 1, 2008. A revised proposal was submitted by PG&E on July 3, 2008 that was jointly endorsed by the other California investor owned utilities (Southern California Edison, San Diego Gas and Electric, and Southern California Gas companies). PG&E's analysis indicates that energy consumption of digital flat screen TVs is, in addition to other factors, proportional to the screen size. The demand for larger screen size TVs is continuously growing; consequently, energy consumption is also on the rise.

The PG&E analysis shows that significant energy can be saved in the future by requiring the sale of energy efficient TVs, and proposes that standards be developed. PG&E proposed two Tiers of Standards as shown in Table 1.

¹ <http://www.nrdc.org/air/energy/energyeff/stb.pdf>

Table 1
PG&E Proposed Standards

	<u>Effective Date</u>	<u>Maximum Active Mode Power Usage (Watts)</u>
<u>Tier 1</u>	<u>January 1, 2011</u>	<u>0.20* Screen Area (in²) + 32</u>
<u>Tier 2</u>	<u>January 1, 2013</u>	<u>0.12* Screen Area (in²) + 25</u>

The Consumer Electronics Association (CEA) also proposed that the Energy Commission adopt television standards to amend Title 20 of the California Code of Regulations such that, effective February 17, 2009, any manufacturer intending to sell a digital television in the state must submit an energy use declaration for each model prior to sale. The declaration would include the model numbers of all televisions, the type of display technology employed (e.g., LCD, Plasma, CRT, Rear Projection), along with the active mode power consumption of the model(s) as calculated pursuant to IEC 62087, Edition 2.0. CEA stated that the mandatory reporting requirement would allow the Commission to better monitor and evaluate consumption and efficiency trends for televisions. It also would allow the Commission to review direct evidence that technological advancements and market-oriented programs continue to drive energy efficiency improvements in televisions.

CEA also proposed a consumer education campaign, in partnership with the Energy Commission U.S. EPA, and other key parties, designed to support and encourage consumer purchases of televisions meeting the new ENERGY STAR® 3.0 TV specifications. The new specification, a result of collaboration between government, industry and energy efficiency stakeholders, will help guide Californians to purchase TVs that are up to 30 percent more efficient than non energy star TVs according to the U.S. EPA. Finally, CEA also welcomes the Energy Commission review of and contributions to industry's recommendations and research supporting energy use disclosure requirements for televisions.

Staff Proposed Standards

Staff proposes that the Energy Commission adopt television standards that include:

- Two Tiers of efficiency standards for active mode , similar to PG&E's proposal,
- A revision of the existing standby mode standard to reflect technological advances, and
- A requirement that televisions meet a specific power factor standard.

Staff's standards proposal is summarized in Table 2. At the end of this report, Staff provides draft specific edits to the Title 20 code, including new definitions to support the proposed standard levels.

Table 2: Staff Proposed Standards

<u>Effective Date</u>	<u>Maximum TV Standby-passive Mode Power Usage (watts)</u>	<u>Maximum Active Mode Power Usage (Watts)</u>	<u>Maximum Power Factor</u>
January 1, 2006	3 W	No standard	No standard
<u>January 1, 2011</u>	<u>1 W</u>	$\frac{0.20 * \text{Screen Area (in}^2\text{)} + 32}{}$	<u>0.9</u>
<u>Alternate Staff Proposal for January 1, 2011</u>	<u>1 W</u>	$\frac{0.156 * \text{Screen Area (in}^2\text{)} + 80}{}$	<u>0.9</u>
<u>January 1, 2013</u>	<u>1 W</u>	$\frac{0.12 * \text{Screen Area (in}^2\text{)} + 25}{}$	<u>0.9</u>

While staff's active mode proposed standards are similar to those proposed by PG&E, staff is in addition proposing an alternative standard for consideration for Tier 1. The purpose of this alternative Tier 1 standard is to provide similar energy savings to the current proposal while offering a different market impact. By increasing the constant in the equation from 32 to 80 while decreasing the slope multiplier for screen area from 0.2 to 0.156 allows more time and flexibility for televisions less than 50 inches to comply with the proposed standards and captures greater savings in larger screen sizes. Staff is considering this alternative pending feedback from television stakeholders.

Staff's proposed regulations also incorporate CEA's suggestion to require manufacturers to submit energy use information and product information and require energy disclosure on television packaging.

California's current Title 20 standards regulate TVs only in the standby mode. This standard requires the maximum standby mode power to not exceed 3.0 watts for all TVs. The energy used in standby mode represents approximately 5 percent of the energy consumed by a TV; it is estimated that 95 percent of the energy consumed by TVs is consumed while in the active mode. Active mode energy efficiency standards for TVs would result in significant energy savings.

In addition energy savings could be achieved through re-evaluation of the current standard of 3 watts for standby mode. The appliance efficiency data submitted by most TV manufacturers shows that TV standby mode power consumption is commonly below 1 watt². Staff recommends that the current maximum energy consumption during standby requirement of 3 watts be lowered to 1 watt and thus be harmonized with ENERGY STAR[®] and global standby standards.

Energy Commission staff is interested in promoting energy efficiency and welcomes CEAs suggestion to work together to educate California consumers. However, CEA's proposal does not offer the necessary statewide impact, cost effectiveness, feasibility, and the energy savings necessary to mitigate rapidly growing TV electrical load that will be achieved through the draft TV efficiency standards.

Statewide Energy Use

Current Estimated Energy Consumption for TVs in California

PG&E's CASE report provides current retail sales trends for TVs, and it shows a continuous growth in sales of LCD TVs at approximately 88.2 percent market share, with flat screen plasma TVs accounting for 10.5 percent, and digital light projection (DLP) accounting for 0.5 percent of the market share respectively. Cathode Ray Tube (CRT) TVs have effectively been replaced by DLP, LCD and Plasma flat screen TVs on store shelves with current market share of only 0.8 percent. However, there is still a large existing stock of CRT TVs in use. According to PG&E's estimates, the total number of TVs in use throughout California is approximately 35.4 million, with total annual sales of approximately 4 million.

PG&E estimates that the statewide energy consumed by TVs is more than two percent of California's gross system electricity usage. The coincident peak demand for TV energy use is further estimated to be 875 MW. Of the various types of TV sets widely in use, Plasma and LCD TVs consume significant energy and their use, numbers, and size are growing. The sale of CRT, rear projection, and DLP TVs has declined rapidly and their sales have diminished to less than two percent of all TV sales.

PG&E has estimated in Table 3 how much power each type of technology requires to display a picture (per square inch of screen area) and, the average power per TV for each type of TV technology.

² As of November 25, 2008 there are 1,974 televisions certified to the Energy Commission. More than 81 percent report standby power usage of 1.0 watt or less.

Table 3: Average Power Use in Watts per TV Technology Type

TV Type	Energy use per square inch	Power Use by Average Size	Annual Power Use *
CRT	0.23 watt	101 watts	192.6 kWh/year
DLP and rear projector	0.14 watt	245 watts	467.2 kWh/year
LCD	0.27 watt	144 watts	274.6 kWh/year
Plasma	0.36 watt	361 watts	688.4 kWh/year

*Annual power use is calculated by multiplying power use with hours of TV use per year. According to PG&E's CASE study annual hours of use per TV are 1907.

PG&E estimates that the existing stock of TVs is made up of 63 percent CRT, 30 percent LCDs, 5 percent plasma flat screen, and 2 percent DLP. The July 8 revised PG&E study estimates the average television use to be 1907 hours per year. Table 4 shows the estimated total energy consumed in California per year by each type of TV technology.

Table 4: Total Energy Consumed Per Year by Each Type of TV Technology

Television Type	Existing Stock (Million Units)	Power Use (W) by Average Size TV	Energy consumption per year in Millions of kWh/year
CRT	22.3	101	4,295.1
DLP and Projection	0.7	245	327.1
LCD	10.6	144	2,910.9
Plasma	1.8	361	1,239.2
Total	35.4	129.78	8,772.3

Source: PG&E Excel file. This file is available by request

The power consumption for each type of TV technology is calculated by multiplying the existing stock with the average wattage used and multiplying the product by the average hours of use per year. Summing the energy consumption for all TV types, the estimated statewide total energy use attributable to TVs is an estimated 8,772.3 GWh/year.

Savings and Cost Analysis

Based on PG&E’s analysis, the annual energy savings is estimated at 3831 gigawatt-hours (GWh) for Tier I, and 2684 GWh for Tier II, after the existing stock is replaced.

Table 5: Energy Savings and Reduced Costs for LCD and Plasma TVs – Tier I and Tier II

Tier	Design Life (Years)	Annual Unit Energy Savings (kWh/year)	Incremental Cost of Improvement Per Unit (\$)	First-Year Unit Energy Cost Savings (\$)*	Reduced Total Cost over the Design Life (\$)**	Simple Payback Period (Hours)	Annual Sales (millions of units)	First-Year Statewide Energy Savings (GWh)
I	10	132	0	18.48	164.21	0	4.0	528
II	10	84	0	11.76	104.50	0	4.0	336

Source: PG&E’s April 2, 2008 CASE Study

Design life, incremental cost of improvement , annual energy cost savings and annual sales are provide in PG&E’s CASE study. Energy savings for Tier I are calculated by subtracting base case from Tier I energy use. Energy savings for Tier II are incremental and are calculated by subtracting Tier I from Tier II.

* First-year energy cost estimated to be \$0.14 per kilowatt hour. Source: California Energy Commission’s *Staff Forecast: Average Retail Electricity Prices 2005-2018*.

** The present value of a kWh over a 10 year design life is calculated to be \$1.244 using \$0.14 per kilowatt hour with a 3 percent discount rate.

Table 5 summarizes the energy savings and reduced costs for LCD and Plasma TVs due to the proposed Tier I and Tier II standard levels. The design life and incremental cost per unit for TVs is based on the PG&E CASE study. Based on currently available information the estimated incremental cost per unit is negative or \$0.00³ for Tier I and negative or \$0.00 for Tier II. Annual unit energy savings were calculated by multiplying the average annual reduction in energy use per unit with energy price. The first year statewide energy savings were calculated by multiplying the average annual unit energy savings by the total number of annual unit sales in California for these types of TVs. The reduced total cost over the design life is calculated by multiplying the estimated design life in years by the estimated annual reduction in electrical energy use due to implementing the proposed standard (kWh/Unit/Yr) by the \$/kWh. The simple payback period is instantaneous because of the conclusion that the standards have zero or negative costs.

³ PG&E’s CASE Study April 2, 2008 page 12, Section 5.2.

Federal Regulations and Test Method

Currently there are no federal energy efficiency standards in effect for digital and analog TVs. Under federal law the Energy Commission is not preempted from adopting active mode energy conservation standards for TVs.

Currently, California's *Appliance Efficiency Regulations* regulate TVs in standby mode. To comply with the California standards manufacturers test their TVs using the IEC 62087: 2002 (E) *Methods for Measurements for the Power Consumption of Audio Video, and Related Equipment* to determine if their units meet the standby power requirement. The U.S. DOE also has a test procedure for television sets, found in 10 CFR Pt. 430, Subpt. B, App. H, but the test method is not appropriate for measuring the energy consumption of the color digital TVs that compose nearly the entirety of California's market.

The U.S. DOE test procedure was adopted in 1977 and is titled, "Uniform test method for measuring the energy consumption of television sets." The 31 year old federal test method for television sets was designed for black and white CRT televisions and has long been obsolete. Since there were no commercially available digital TVs when the DOE first adopted this test method, it is obvious that it was intended to cover only analog CRT television sets

As new digital technologies have emerged in the last few years, other federal agencies, such as the Federal Communication Commission and U.S. DOE and EPA's ENERGY STAR®, have adopted new test methods acknowledging the substantial changes in TV technology.

The new test method proposed by the Energy Commission is IEC 62087, Ed. 2.0: *Methods of Measurement for the Power Consumption of Audio, Video and related Equipment*. This test method is widely accepted by the TV manufacturers and other stakeholders. PG&E recommends that the Energy Commission adopt this test method and harmonize with the TV industry and the ENERGY STAR® program.

Technical Feasibility

Energy Efficiency Improvements with New Technologies:

Television technology has changed rapidly over the last decade along with related TV programming services. The most obvious pressure on manufacturers has been to make TVs larger, cheaper, and include more enhanced features and functionalities. Unfortunately this drive has lead to a corresponding increase in energy consumption.

The two most widely available TV technologies are Plasma and LCD. Plasma TVs use approximately 32 percent more energy than LCD TVs. A 42-inch plasma TV set can draw more power than a large refrigerator, even if the TV is only used a few hours a day. Powering a TV

plus an extensive entertainment system – with set-top boxes, game consoles, speakers, DVDs and digital video recorders – can add nearly \$200 to a family's annual energy bill.”⁴

On the other hand manufacturers have been working to improve the energy efficiency of Plasma TVs. Panasonic has developed a more energy efficient Plasma display that was introduced at the 2008 Consumer Electronics Show in Las Vegas. Through the development of new phosphors and cell design technology, as well as optimizing the electronic driving circuits for better efficiencies, their new display boasts doubled energy efficiency. By reducing energy consumption by half, Plasma could, in the future, be on at least equal footing with LCD displays in their energy consumption.⁵

There has been great progress made by manufacturers to improve the energy efficiency of Plasma TVs in recent years. Jim Palumbo, president of the Plasma Display Coalition (PDC) representing the top plasma TV manufacturers, says the industry has reduced power consumption 30 percent in the past six years.⁶ Many new technologies are available to manufacturers that can help to decrease TV energy consumption. For example:

- 3M has developed its Vikuitiy™ display enhancement technology for LCD screens which increases the efficiency of the backlight's transformation into a picture.
- New phosphors are being used that improve the efficiency of Plasma Televisions. Phosphors are further developed to enhance the picture quality and energy efficiency of the displays.
- TV models are being manufactured with photo-sensors which automatically adjust the brightness and contrast of a screen based upon the ambient light conditions.
- Some TVs now sold are programmed with an energy-saver mode that users may select in order to reduce energy consumption.

Display Settings Data Analysis for Feasible Energy Savings Standards

TV power consumption in the future is expected to increase as the current stock is replaced by the newer technologies that use higher wattage, have larger screen sizes, and have increased functionality and enhanced features.

⁴ <http://www.sciam.com/article.cfm?id=choosing-an-energy-efficient-tv>

⁵ http://www.electronichouse.com/article/the_real_efficient_plasma and <http://ezinearticles.com/?Should-a-New-Energy-Efficient-Plasma-TV-Be-in-Your-Future?&id=979498>

⁶ <http://www.usnews.com/articles/business/2007/12/06/your-new-plasma-tv-may-be-an-energy-hog.html>

Most TVs purchased today contain within its settings menu a variety of options for adjusting the characteristics of the picture produced by the TV. Many TVs also contain a variety of factory preset picture modes, each of which comprises a particular set of stored settings labeled for use with specific types of TV content. TVs are typically shipped from the factory to a retailer with very high brightness settings and many consumers are unaware of the energy savings that can be achieved by adjusting the brightness and contrast to levels more appropriate for the home.

The brightness and contrast settings combined generally determine how much light the TV emits. Unlike a light bulb, a TV is an information display device; more light from the screen is not necessarily better for the user. Overly bright displays may incorrectly represent the original broadcast or movie content that the user was intended to see, or may harm picture quality by washing out dark areas of the screen or making text more difficult to read. Many manufacturers are considering automatic brightness control to enhance picture quality and save energy.

Significant reductions in energy consumption can be achieved in Plasma and LCD TVs by adjusting the contrast and brightness screen settings by manufacturers before shipping TVs to the retailers. The power consumption of the TV drops significantly with screen setting modifications. On average, plasma TVs will consume almost 21 percent less power when set to a low power factory preset, sometimes called "movie" or "pro" settings. The data on LCD TVs indicate power consumption could be reduced by an average of 16 percent through the low power factory preset.⁷ PG&E's analysis of test data indicates that TVs consume high power in what is referred to as "torch settings." A torch setting means very high brightness and contrast and is generally designed for store display models.

Power Factor

The proposed regulations include a requirement for power factor greater than 0.9 for televisions manufactured on or after January 1, 2011. On November 1, 2008, Energy Star[®] adopted new standards for TVs and for external power supplies. The new *Energy Star Requirements for Televisions Eligibility Criteria (Version 3.0)* require TV manufacturers to report the "True Power Factor" of their products in order to qualify for the Energy Star[®] label. Of the televisions submitted for qualification thus far approximately half of the models have reported a power factor of 0.9 or greater. In addition to these television requirements the recently effective *Energy Star[®] Program Requirements for Single Voltage Ac-Dc and Ac-Ac Power Supplies Eligibility Criteria (Version 2.0)* requires that external power supplies which draw more than 100 watts have a power factor of 0.9 or greater when operated at its full load. Televisions typically draw significantly more power than this minimum value and therefore can generate the same power quality benefits as the external power supply standard. Improving power factor will reduce energy use by household distribution systems and improve the quality of power in California's distribution system by avoiding unnecessarily high current draw.

⁷ http://www.isf-europe.com/Articles/ECOS_ISF_TV_Power_Consumption_Sensitivity_Analysis_Memo.pdf

Policy Issues and Next Steps

Currently consumers are unable to assess the energy consumption and associated operating costs of purchasing a particular television model. Even though annual household TV energy consumption is approaching that of a new refrigerator, there is no systematic label similar to those found on major appliances that provides estimated annual energy use and electricity costs for a particular model. Television energy use varies widely among TVs for any given screen size and represents a large energy savings opportunity.⁸

To aid customers in making informed choices about energy consumption, the proposed regulations require energy disclosure on product packaging. Staff also is considering using the Energy Commission's Consumer Energy Center to further educate consumers about television energy use. The proposed regulations are designed to eliminate lower efficiency televisions from California thereby removing the poorest energy choice options from the market.

⁸ http://www.efficientproducts.org/reports/tvs/NRDC_TV-efficiency_2004.pdf

Stakeholder Comments

U.S. Environmental Protection Agency (U.S. EPA), ENERGY STAR® Comments:

ENERGY STAR®, in their letter dated July 23, 2008, expressed concern that their voluntary program is distinctly different from mandatory standards and stated that careful consideration should be paid in proposing their performance levels to be used as mandatory standards. Moreover, ENERGY STAR® stated that as of November 1, 2008, when their specifications will take effect, only 27 percent of the products on the market will meet their requirements.

Given our similar goals, it would not be unusual for the energy efficiency targets of ENERGY STAR® and California's Appliance Efficiency Program to be closely aligned. The current proposed standards by PG&E were developed based upon datasets that were partially constructed using the ENERGY STAR® qualifying models. PG&E's proposed standards are based on data for 762 TVs dataset collected from various sources, which included data for 284 TVs that qualify for ENERGY STAR®. The PG&E CASE study proposal has discussed the ENERGY STAR® performance levels in detail.

The following table provides a summed count of the TV models used for the PG&E CASE 2008 study, by source as provided by PGE&E in their July 3, 2008 revised CASE Study.

Figure 2

Data sets used for the April 2008 report	
ENERGY STAR®	175
CEC PIER	70
Subtotal (April report)	245

Data acquired after the April 2008 report	
CEC PIER	50
ENERGY STAR®	114
CNET	94
EICTA (Europe)	102
MTP (Europe)	157
Subtotal (post April report)	571
Grand Total	762

Based on the data gathered from all of these sources PG&E would propose energy standards stricter than ENERGY STAR® 3.0. Many of the characteristics of the ENERGY STAR® specifications are included in PG&E's proposal because they have already been through a rigorous stakeholder review with the consumer electronics industry to establish their attainability.

Comments by Plasma Display Coalition, Inc (PDC)

1. In their October 10, 2008 comments, the Plasma Display Coalition (PDC) expressed concern with PG&E's and NRDC's proposed energy standards. PDC stated that PG&E misunderstands the complexities inherent in the consumer electronics industry. According to PDC the TV manufacturers cannot definitively state the power consumption data of their pending models. Based upon this assumption PDC has concluded that it cannot predict how many TV models would be excluded from the California market if the PG&E proposal is adopted.

The following quotation describes PDC's announcements of plasma TV energy efficiency in the years to come.

Jim Palumbo, president of the PDC, speaking at the Display Search/NPD HDTV conference in September 2008, in Los Angeles, said that the plasma industry has made "huge" strides in manufacturing and efficiency. 2008 model screens are 15% to 20% more efficient than ones made just one year ago and Palumbo told the audience that people should start calling them "entertainment efficient" for displaying great images while sipping on just 155 watts of power (for a 42-inch 720p display). 50-inch displays in 720p and 1080p resolutions use 210 and 307 watts of power respectively. Palumbo added that the coalition will reduce power consumption of its screens by another 50% by 2012.⁹

Energy Commission staff response: While the PDC may claim that it is difficult to predict energy efficiency in future models, they have certainly made specific claims regarding the efficiency of TVs up to 2012. Panasonic has made similar announcements regarding energy efficient plasma TVs as mentioned on page 6 in the technological feasibility section of this staff report.

2. According to PDC government regulation should not limit either competition or innovation for the purpose of meeting unreasonable standards proposed by those unfamiliar with TV industry dynamics. PDC states that a mandated proposal to effectively ban certain HDTVs in California will have far reaching consequences to retailers and manufacturers. According to PDC regulations take away the opportunity to sell the most desirable products (larger, higher end TVs), impact revenue and profits of retailers, and complicate their business plans.

⁹ <http://www.tgdaily.com/content/view/39346/97/>

Energy Commission staff response: The Commission is working to encourage new innovations which result in improved energy efficiency for TVs. The proposal does not ask manufacturers to sacrifice the size or quality of picture. PIER conducted a study to explore the relationship between the screen setting and power consumption in the active mode. The analysis shows that significant energy savings can be achieved by requiring energy efficient screen settings which do not materially impact the overall picture quality of the TV. The proposed standards are far less stringent than the level described by manufacturer press releases. The regulation would only serve to motivate responsible efficiency considerations while designing televisions.

3. PDC commented that PG&E's proposed energy efficiency standards for TVs will foster an emergence of a 'black market' of HDTV goods that are offered for sale in nearby states. California is a leader with "early adopter" consumers who will want manufacturers that cause TVs to use higher amounts of energy than is allowable by the California Standards and will shop out-of-state or online for those products. This will increase costs to consumers and cause negative environmental impacts to long-distance deliveries. California also will risk losing tax revenue on sale of HDTVs and add-on sales.

Energy Commission staff response: The PDC has not provided data in support of their argument. Similar claims have been presented to the Energy Commission previously regarding other products and has yet to materialize into a significant impact.

4. PDC pointed out that Kathleen Hogan, Director of the ENERGY STAR® program believes 27 percent of products on the market will meet ENERGY STAR® requirements, or conversely that 73 percent of HDTV sets will not qualify for ENERGY STAR®. If regulations requiring 100 percent of TVs to meet ENERGY STAR® requirements are adopted in California it would be a tremendous hardship on the industry for 73 percent of HDTVs would be banned because of "arbitrary, mandated program proposed by one utility and adopted by the State."

Energy Commission staff response: New ENERGY STAR® data indicates that a large range of TVs available in today's market qualify for the ENERGY STAR® label. Ms. Hogan's 27 percent estimate is based upon stakeholder data for TV's manufactured in 2006 and 2007. This data is outdated and does not accurately represent the television market going into 2009.

Proposed Regulations

The remaining text in this staff report presents draft standards language as it might appear in the associated sections in the *Appliance Efficiency Regulations*. Draft new language appears as underline (example) and draft deletions appear as strikeout (~~example~~). Existing language appears as plain text.

Section 1601. Scope.

- (v) Televisions, and Consumer audio and video equipment, which are ~~televisions,~~ compact audio products, digital versatile disc players, and digital versatile disc recorders.

Section 1602. Definitions.

- (v) Televisions, and Consumer Audio and Video Equipment.

“Automatic Brightness Control” means an integrated control system that automatically adjusts the brightness of a television based upon the ambient lighting conditions.

“Combination TV” means a system in which a television or television monitor and an additional device or devices (e.g., DVD player, HDD, VCR, etc.) are combined into a single unit and which meets all of the following criteria: the additional devices are included in the television casing; it is not possible to measure the power requirements of the components separately without removal of the television casing; and the system is powered through a single power cable.

“Component TV” means a television composed of two or more separate components (e.g., separate display device and tuner) marketed and sold as a television under one model or system designation. The system may have more than one power cord.

“Computer Monitor” means an analog or digital device designed primarily for the display of computer generated signals, is “plug and play,” and is not marketed for use as a television.

“Download Acquisition Mode (DAM)” means the product is connected to a power source, produces neither sound nor a picture, and is downloading channel listing information according to a defined schedule for use by the electronic programming guide, monitoring for emergency messaging/communications and/or otherwise communicating through a network protocol. The power use in this mode is typically greater than the power requirement in Standby and less than that in On Mode.

“Direct-View TV” means a type of television or television monitor whose display device emits light either directly from the screen surface or transmits light from a source mounted directly behind the screen. Examples include CRT, LCD, and plasma display technologies.

“Forced Menu” means a menu which requires the selection of a display mode each time a television is turned on after being disconnected from line voltage.

“Native Vertical Resolution” means the physical pixel count for the vertical axis of the television. For example a television with a screen resolution of 1920 x 1080 would have a native vertical resolution of 1080.

“On Mode/Active Power” means the product is connected to a power source and produces sound and a picture. The power requirement in this mode is typically greater than the power requirement in Standby and Download Acquisition Modes.

“Point of Deployment (POD)” means a card which enables a TV to have secure conditional access to a cable or satellite system.

“Rear-Projection TV” means a type of television or television monitor in which the display device is a projector that focuses images onto a screen located within the housing of the TV.

“Television (TV)” means an analog or digital device designed primarily for the display and reception of a commercially available electronic product consisting of a monitor, which may or may not have a tuner/receiver, encased in a single housing, which is designed to receive and display an analog or digital video signal received from a terrestrial, satellite, cable, or broadband source Internet Protocol TV (IPTV), or other broadcast or recorded transmission of analog and/or digital signals. TVs include Combination TVs, Television Monitors, Component TVs, and any unit that is marketed to the consumer as a TV. “Television” does not include multifunction TVs which have VCR, DVD, DVR, or EPG functions or which have a POD card slot. “Television (TV)” does not include computer monitors.

“Television monitor” means a TV that does not have an internal tuner/receiver or playback device.

“TV standby-passive mode” means the product is connected to a power source, produces neither sound nor vision but can be switched into another mode with the remote control unit or an internal signal.

Section 1604. Test Methods for Specific Appliances.

(v) Televisions, and Consumer Audio and Video Equipment.

The test method for televisions, and consumer audio and video equipment shall be International Electrotechnical Commission (IEC) 62087, Edition 2.0 – “Methods of Measurement for the Power Consumption of Audio, Video, and Related Equipment.”

Section 1605.3. State Standards for Non-Federally-Regulated Appliances.

(v) Televisions, and Consumer Audio and Video Equipment.

(2) **Televisions.** All televisions manufactured on or after January 1, 2006 shall meet the requirements shown in Table V-2. In addition, televisions manufactured on or after January 1, 2011 shall meet the requirements shown in Sections 1605.3(v)(2)(A), 1605.3(v)(2)(B), and 1605.3(v)(2)(C) of this Article.

A. A television shall include a forced menu

Or

A television shall have automatic brightness controls

B. A television shall automatically enter passive-standby mode after a maximum of 15 minutes without signal input.

C. A television shall enter passive-standby mode when turned off by remote or integrated button/switch. A separate button, remote, or method including pressing the power button twice may be provided to enter other standby modes such as DAM.

Table V-2

Standards for Televisions

<u>Effective Date</u>	<u>Maximum TV Standby-passive Mode Power Usage (watts)</u>	<u>Maximum Active Mode Power Usage (Watts)</u>	<u>Maximum Power Factor</u>
January 1, 2006	3 W	No standard	No standard
<u>January 1, 2011</u>	<u>1 W</u>	<u>$\frac{0.20^* \text{ Screen Area}}{\text{(in}^2\text{)} + 32}$</u>	<u>0.9</u>
<u>Alternate Staff Proposal for January 1, 2011</u>	<u>1 W</u>	<u>$\frac{0.156^* \text{ Screen Area}}{\text{(in}^2\text{)} + 80}$</u>	<u>0.9</u>
<u>January 1, 2013</u>	<u>1 W</u>	<u>$\frac{0.12^* \text{ Screen Area}}{\text{(in}^2\text{)} + 25}$</u>	<u>0.9</u>

Section 1606. Filing by Manufacturers; Listing of Appliances in Database.

Table X Continued - Data Submittal Requirements

	Appliance	Required Information	Permissible Answers
V	<u>Televisions</u>	<u>Type</u>	<u>CRT, Plasma, LCD, DLP, Rear Projection, Laser, OLED, LCOS</u>
		<u>Brightness Control</u>	<u>forced menu, automatic brightness control, both, other</u>
		<u>Screen Size (square Inches)</u>	
		<u>Standby-Passive Mode Power (watts)</u>	
		<u>Active Mode Power (watts)</u>	
		<u>Power Factor</u>	

* "Identifier" information as described in Section 1602(a).

1 = Voluntary for federally-regulated appliances

2 = Voluntary for state-regulated appliances

Section 1607. Marking of Appliances.

(d) Energy Performance Information.

(11) Televisions. Each package containing a television shall be marked, permanently and legibly on the packaging in an accessible and conspicuous place, in characters no less than 1/2" showing the active mode power as reported as specified in Section 1606 of this Article.