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A Review of the 2011 and 2013 Digital Television Energy Efficiency Regulations Developed and Adopted by the California Energy Commission

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A Review of the 2011 and 2013 Digital Television Energy Efficiency Regulations
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Abstract
In December 2009, the California Energy Commission (“CEC”) adopted on-mode standards for power consumption of televisions, (e.g., watts used) which will go into effect in 2011. Proposed standards are subject to Section 25402(c) of the California Public Resources Code (“CPRC”) which requires that proposed regulations must “not result in any added total costs to the consumer over the designed life of the appliances concerned.” In order to comply with the CPRC, in September 2009, the CEC issued a report alleging consumers would save $8.1 billion from reduced energy consumption. We find that the CEC study is critically flawed and that contrary to their conclusions, California consumers are likely to be economically harmed by the proposed regulations. Inasmuch as the CEC proposed regulations go into effect in 2011 and have been cited as a model for the rest of the country, our results have important legal, economic, policy and regulatory implications for California and the United States as a whole.

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I. INTRODUCTION

The relationship between pro-environmental policies and market performance gained momentum as an important topic of economic research in the early 1990’s. There were those studies that demonstrated regulation can induce innovation, create competitive advantage for some regulated firms, and create domestic efficiencies and comparative advantage for US firms.¹ That optimism must be considered against opposing arguments that regulation actually reduces innovation and firm competitiveness.² Moreover, research on similar types of ecologically-motivated regulation has shown that alternative approaches are often superior to outright regulation. For example, one study finds that a gasoline tax would produce greater fuel savings than increases in the corporate average fuel-economy (“CAFE”) standards, by encouraging people to drive less, and eventually to choose more-fuel-efficient vehicles.³ This is the fundamental paradox that should be addressed in any attempt to regulate digital televisions in California.

In California, the consumption of energy by certain appliances and equipment is regulated, in part, by the Appliance Efficiency Regulations (“AER”).⁴ These

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³Austin, David and Terry Dinan, Clearing the air: The costs and consequences of higher CAFE standards and increased gasoline taxes, Journal of Environmental Economics and Management 50 (2005) 562–582.
⁴California’s AER were established in 1976 and are updated periodically to reflect new energy efficiency technologies. The current Appliance Efficiency Regulations, (California Code of Regulations, Title 20, Sections 1601 through 1608), dated August 2009, contain amendments that were adopted by the California Energy Commission on December 3, 2008, and replaced all previous versions. The official version of these regulations is published by the Office of Administrative Law.
regulations are designed by the California Energy Commission ("CEC") and impose standards of power consumption (e.g., watts used) for consumer appliances (e.g., refrigerators), subject to Section 25402(c) of the California Public Resources Code ("CPRC") which states that 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." In other words, the total cost to consumers of the regulations, over the life of the regulated appliance, must be non-positive (i.e., the present value of consumer expenditures savings must be greater than the cost of compliance), or put another way, must be consumer net-neutral.

In April 2008, the CEC indicated its plans to establish regulations for the power consumption of digital televisions, and in its Scoping Order, the CEC’s Efficiency 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). The CEC subsequently issued a preliminary draft report in December 2008 proposing draft efficiency standards and, following a period of public and stakeholder comment, issued its final recommendation in September 2009. Finally, on December 3, 2009 the CEC issued its final order adopting the proposed regulations which will take effect beginning in 2011.

The Appliance Efficiency Regulations include standards for both federally-regulated appliances and non-federally-regulated appliances. Twenty-three categories of appliances are included in the scope of these regulations. The standards within these regulations apply to appliances that are sold or offered for sale in California, except those sold wholesale in California for final retail sale outside the state and those designed and sold exclusively for use in recreational vehicles or other mobile equipment. Source: 2009 Appliance Efficiency Regulations, California Energy Commission, August 29, CEC-400-2009-013.  

5 California Public Resources Code Section 25402.  
6 2008-04-02_COMMITTEE_SCOPING_ORDER.pdf.  
7 2009 Appliance Efficiency Rulemaking Phase 1 Part C - Docket #09-AAER-C.  
The CEC stated that the proposed regulations would result in overall energy cost savings to California consumers of approximately $8.1 billion (net present value) plus the savings gained by avoiding construction of an approximately $615 million natural gas plant.

The proposed CEC regulations were cited by CEC Commissioners\(^9\), California Legislators\(^{10}\), and stakeholder utilities (e.g., Pacific Gas & Electric [“PG&E”])\(^{11}\) as making California “a leader in clean investment and green jobs” and a model for the rest of the country. As such our paper has important policy and regulatory implications not only for California but for the rest of the United States.

We find that the proposed regulations are economically misguided and that the CEC-commissioned study conducted by PG&E, upon which the CEC bases its conclusions, is compromised by simple mathematical errors and a reliance on unfounded assumptions. We ultimately conclude that the proposed regulations violate the restriction that proposed regulations must at least be consumer net-neutral if not net-positive.

\(^9\) “…Energy efficiency standards are one of the most important responsibilities of the Energy Commission and, in part, in large part, through our standards, the energy use of per capita energy use of Californians has remained constant for the past 30 years, where it has gone up 40 percent on average in the rest of the country.” CEC Chairman Karen Douglas. Proposed Amendments To Appliance Efficiency Regulations California Code of Regulations Title 20 Sections 1601 through 1607 Public Hearing Transcript October 13, 2009. Page 9.

\(^{10}\) “I would like to quote our Governor, Arnold Schwarzenegger, who just last month said, and I quote, ‘Being a leader in clean energy standards has made California a leader in clean energy investment and green jobs. In the last three years, more than $6 Billion…,’ and that is Billion with a ‘B’, ‘…$6 Billion in venture capital has been pumped into California's economy, making us the national leader in a number of clean businesses.’ So this is not the original purpose of our energy efficiency standards, but we think it is a very large additional benefit…” Julian Levin. Proposed Amendments To Appliance Efficiency Regulations California Code of Regulations Title 20 Sections 1601 through 1607 Public Hearing Transcript October 13, 2009. Page 9.

\(^{11}\) “California will lead not only the nation but the entire world by adopting these standards.” Alex Chase (Energy Solutions, PG&E). Proposed Amendments To Appliance Efficiency Regulations California Code of Regulations Title 20 Sections 1601 through 1607 Public Hearing Transcript October 13, 2009. Page 55.
In addition to the likely negative fiscal impact on consumers, there are indications that innovation in display technologies may be negatively impacted as manufacturers are prevented or discouraged from developing or bringing new features to market. For example, suppose a manufacturer developed a paper thin digital television technology which cost pennies to produce yet was energy inefficient. Although consumers would have high demand for such a television, the regulations would preclude the R&D investment necessary being made in the first place. This example is grounded in reality; it is our understanding that had the proposed regulations been in place earlier, plasma DTVs would not have been invested in by industry as a plausible concept. It is beyond the scope of this paper (and we would suggest this is true of the CEC as well) to predict what future innovations may be precluded due to the proposed regulations.

II. THE EVIDENCE AND REASONS PROFFERED FOR THE PROPOSED REGULATIONS ARE MISLEADING

The CEC attempts to motivate the need for television energy efficiency regulatory standards by indicating that television viewing (including programming recording and playback) currently represents eight percent of residential electricity usage and that power consumption is growing rapidly and consequently needs to be regulated. One of the primary motivating factors behind the CEC’s regulatory efforts is the stylized fact (asserted in the PG&E report) that the total number of TVs in use is

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12 “We do know that this would even pose risks for the existing technologies if CEC regulations had been in place in 2001, there would be no plasma TV introduction” Douglas Johnson, Consumer Electronics Association. Proposed Amendments To Appliance Efficiency Regulations California Code of Regulations Title 20 Sections 1601 through 1607 Public Hearing Transcript October 13, 2009, Page 89.

13 “There is really no dispute about the fact that televisions do consume a large amount of electricity in California. They are up to 8 percent of residential electricity consumption.” Julian Levin. Proposed Amendments To Appliance Efficiency Regulations California Code of Regulations Title 20 Sections 1601 through 1607 Public Hearing Transcript October 13, 2009. Page 7.
increasing and therefore power consumption is increasing.\(^{14}\) We do not dispute the increased number of televisions in use. However, in evaluating the resulting increase on power consumption, one should consider the benefits of the *replacement effect* (i.e., gains caused by the replacement of inefficient CRT televisions with predominantly LCD technology).\(^{15}\)

As one can see from Figure 1, a simple modeling exercise with conservative assumptions illustrates that while energy costs and consumption are increasing due to consumers watching more television on larger screens, the offset due to efficient technology actually keeps energy costs to consumers constant over time. See Appendix A for a complete breakdown of costs and inputs by year.

*Figure 1: Total Estimated Energy Cost of Televisions by Type*

\(^{14}\) “PG&E’s analysis indicates that energy consumption of digital flat screen TVs is, in addition to other factors, proportional to screen size. The demand for larger screen size TVs is continuously growing; consequently, energy consumption is also on the rise.” See CEC Staff Draft Report, page 2.

\(^{15}\) LCD televisions compose approximately 90% of the market of new television purchases and LCD televisions are 70% more energy efficient than CRT televisions. See Business and Climate, “Put yourself in the picture over energy efficient TV screens”, March 30, 2007, page 8. LCD televisions have become more efficient since 2007, the current stocks of CRT TVs in use is relatively even more inefficient. This point is conceded but not quantified by PG&E: “The market is rapidly shifting; the formerly ubiquitous cathode ray tube TV with an analog signal will soon be surpassed by new types of digital televisions.” See PG&E in the Codes and Standards Enhancement (“CASE”) Initiative “Analysis of Standards Options for Televisions”. April 1, 2008.
These results demonstrate that the CEC’s claims that larger screen sizes necessitate energy control and regulation are tenuous at best.

**A. THE CEC DISTORTS ENERGY CONSUMPTION FORECASTS**

The CEC relied upon PG&E’s analysis of the Energy Information Administration ("EIA") Annual Energy Outlook 2008 to support the claim that the television market is, and will be, experiencing relatively large growth over the next 20 years. PG&E provided graphical evidence of energy consumption growth rates with the magnitudes of energy use as a function of bubble size. While the PG&E report notes that the 2005-2008 Color Television and Set-Top Box growth rate was 7.6%, but that growth rates will level off as manifested by a 2005-2030 estimated growth rate of
1.8% per year.\textsuperscript{16} This data contrasts markedly with the misrepresentations made by the CEC at the Public Hearing of October 13, 2009:

The residential consumption due to new television, digital televisions, rapidly increased from 3 to 4 percent in the 1990s to 8-10 percent in 2008. And it is continuously growing. Without regulations, the residential energy consumption may grow up to 16-18 percent by 2023.\textsuperscript{17}

The CEC cites the International Energy Association’s Annual Energy Outlook for the 8-10\% figure but we are unable to confirm this source. Nevertheless, assuming \textit{in arguendo} that 10\% is correct, an annualized growth rate of 1.8\% per year would result in energy consumption due to televisions of 12.6\%, not the suggested 16-18\%. Supporters of the CEC’s position, such as the Environmental Defense Fund, similarly asserted false or misleading energy consumption growth rates:

TVs account for 10 percent of household electricity and their energy consumption rate is increasing 8 percent annually.\textsuperscript{18}

It should be noted that these inaccurate comments made by the CEC and EDF have gone uncorrected in the record.

\textbf{III. THE CEC’S ATTEMPT TO REGULATE ENERGY CONSUMPTION IN TELEVISIONS IS CONTRARY TO FUNDAMENTAL ECONOMIC PRINCIPLES}

\textsuperscript{16} PG&E CASE study, page 9, section 4.1.
\textsuperscript{17} Harinder Singh, Project Manager for Television Rulemaking. Proposed Amendments To Appliance Efficiency Regulations California Code of Regulations Title 20 Sections 1601 through 1607 Public Hearing Transcript October 13, 2009. Page 16.
The unsubstantiated conclusion reached by the CEC that the incremental manufacturing cost of compliant TVs is zero (or negative) is inconsistent with economic theory and concepts. The CEC has failed to grasp these fundamental economic concepts when they state: “In most cases, adding efficient technologies in televisions do not result in increased cost of the television because other components can be reduced, offsetting any increased cost.” The CEC ultimately concluded “[n]o increase in cost for energy efficient televisions” from the regulations. These statements are economically nonsensical - if manufacturers were able to produce energy saving components (features consumers would pay for) for less, they would already be motivated to do so.

A basic lesson of economic theory is that in a market for differentiated products, such as the DTV market, fewer choices for consumers necessarily leads to higher prices and/or reduced innovation. The introduction of new brands and models puts pressure on existing companies to lower prices and improve features and quality. Conversely, market concentration leads to less competition among sellers both in price effects and technological improvement effects.

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19 CEC FAQs, Energy Efficiency Standards for Televisions: “How much will this add to my cost for buying a new television?”  
20 Supplemental Response to Consumer Electronics Associations (CEA)’s comments. DOCKET 09-AAER-1C. DATE NOV 02 2009, RECEIVED NOV 02 2009.  
21 “At some point in time, however, a dominant design or a narrow class of designs emerges and finally becomes established. Only firms that can adopt the dominant design stay in the industry. In addition, competition shifts from design to price, process innovation increasingly dominates product innovation, and economies of scale and learning become important. This induces further exit and also puts potential entrants at a disadvantage.” This theory suggests that price is directly correlated to the number of competitors in a market where product innovation is an important characteristic. Syrneoidis, George, Innovation, Firm Size and Market Structure: Schumpeterian Hypothesis and Some New Themes, OECD Economic Studies No. 27 1996, page 58. In the television market, we can predict that if there are a small number of firms, prices will rise to cover the cost of research and development until an efficient innovation can be produced. In an unregulated market, competition for a “dominant design” is already in place, as firms must continually adapt to the stay in the industry and maintain market share.  
22 Syrneoidis (1996) summarized widely accepted economic literature on market innovation and found, “R&D [Research & Development] projects typically involve large fixed costs, i.e. costs which are independent of the size of the market for the innovation. The disadvantage of small firms stems
A. IF MANUFACTURERS WERE ABLE TO MAKE MORE ENERGY EFFICIENT TVS AT NO COST THEY WOULD ALREADY BE COMPELLED TO DO SO

First, one can safely characterize the TV market (whether it consists of a single market or of multiple distinct markets, e.g., flat panels as distinct from rear projection) for TVs as competitive in an economic sense. There are multiple manufacturers (e.g., Sony, Samsung, Panasonic), prices are relatively similar by type, size and feature set. The distribution channels (e.g., Best Buy, internet) are similar if not identical. Margins are relatively low. In other words, the market(s) is(are) competitive and pricing is therefore effectively constrained to be where marginal revenue equals marginal cost. Consequently, were manufacturers able to make more energy-efficient sets at no cost, they would already be compelled to do so. In short, if a feature is desirable to consumers and costs the manufacturer nothing (or more precisely costs less than the manufacturer can charge) a rational profit-seeking manufacturer would introduce such a feature and attempt to capture some of the gained economic benefit.

Second, the market already corrects for energy usage through pricing. It has been demonstrated that energy efficiency is a feature that consumers want. In economic terms, consumers will pay extra for televisions that use less energy. For example, from the fact that, given the gross rate of return, their expected sales are not sufficiently large to allow them to cover these costs.” This implies that if firms are forced into innovation many of the smaller, less prosperous manufacturers will leave the market due to the costs of competition and in turn market concentration will increase. Syrneonidis (1996), page 58. Marginal cost is the manufacturer’s cost of producing one additional unit. In a competitive market with intense price competition, any company setting a price above marginal cost will be undercut, and thereby lose their market share. Thus prices will be bid down to meet marginal cost, which is beneficial to consumers. See Varian, Hal, Microeconomic Analysis, 1992, Third Edition, New York: W.W. Norton, Chapter 13. Moreover, if manufacturers are able to make more energy-efficient sets a no cost, at some point in the future, they would again be compelled to do so.
consumers are willing to pay a premium for Energy Star televisions, since low energy usage televisions save them money. Manufacturers are cognizant of this fact and consequently participate in voluntary standard setting processes such as Energy Star. Free market competition allows manufacturers the flexibility to manage energy efficiency improvements while balancing the economic demands of research and development.

In theory, given full information as to energy consumption costs, high energy usage televisions need to sell at a discount relative to comparable low energy usage televisions, since otherwise consumers would not buy them. The point is that the price mechanism already gives television manufacturers the incentive to develop energy efficient models. This is consistent with indications that energy usage innovations are ongoing for practically every company in the television market.

The following example is illustrative. Suppose a component could be added to a television which reduces the lifetime energy consumption of a television by $50. If the cost of manufacturing the component is less than $50, the component will be added to the television (and if it is greater than $50 it will not be). Assuming that the component costs $30 to make, new models will include it. In this case, an extra $20 of surplus is generated by the energy saving innovation. The cost of the component will be added to the sale price, and the amount will be between $30 and $50, so that manufacturers and consumers will split the $20 surplus (e.g., if $40 is added to the

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26 Percy’s and Energy Star: “Working together for you and the environment”, http://www.percys.com/t-estar-products.aspx. Note: It is our understanding that the FTC is in the process of requiring energy use disclosures for televisions and other electronics. This requirement would effectively convey full information to the market regarding energy consumption costs.
27 See e.g., Appendix F of the April 2, 2008 PG&E Title 20 Standards report; and According to Panasonic’s AVC Networks Group President, Toshihiro Sakamoto, “Power reduction will come in two ways. One, Panasonic will reduce the number of components in plasmas, which need more components than LCD TV. Two, Panasonic will try to detect more of the light coming from the light source to the screen itself.” Greentech Media, “Venture Power in Japan: Green Electronics”, December 29, 2008.
sale price, consumers and manufacturers will each benefit by $10). Consequently there is a direct link between energy conservation and financial incentives to innovate, since both manufacturers and consumers benefit from technological advancements.\textsuperscript{28}

From this example we can understand the effects of the CEC regulation. As the market stands now, televisions efficiently (in a financial sense) incorporate energy usage components. The CEC regulations (either 2011 or 2013) would require that economically inefficient components be added to existing televisions.\textsuperscript{29} In the example above, this would mean that the additional component would cost more than $50 to save consumers $50; \textit{i.e.}, the net effect is not a positive surplus generated, but rather a “deadweight loss” (negative surplus) as economists call it. Figure 4 graphically illustrates this loss.

\textsuperscript{28} Note that programs such as Energy Star and the FTC’s EnergyGuide program reinforce and promote such innovation.

\textsuperscript{29} Consider a television which would be banned under the SDR proposed Title 20 Standards. If a company wants to bring it to market, additional energy savings components will need to be added (assuming such components exist). If adding the component were efficient (in a financial sense), the television would already include it, so we infer that adding it is not efficient.
Figure 4: Impact of Market Standards on Innovation and Efficiency

The horizontal X-axis represents the benefits of a television component, such as reduced energy usage or improved picture quality. The vertical Y-axis is the cost of such a component. Units are in dollars. The blue 45 degree line represents the locus of all points where it would be a break-even proposition for a manufacturer to include a component. Note that below the 45 degree line we have efficient components, where the benefits outweigh the costs. Manufacturers will naturally include these components, pass the cost (and benefits) on to the consumer, and share in some of the surplus with the consumer. Conversely, the points above the blue 45 degree line represent inefficient components, that is, those which cost more than the benefits they provide. In the example mentioned with the $30 component which provides $50 of benefit, the green line shows the additional $20 of surplus generated. As we have shown, additional components added as a result of imposed standards will necessarily be in the upper region, since their costs outweigh their benefits.
(otherwise they would have been added without the impetus of regulations). The red line shows components which cost more than they generate in added value; thus these are inefficient.

IV. THE CEC ESTIMATED SAVINGS OF $8.1 BILLION IS
PREDICATED ON MATH/LOGIC ERRORS AND FLAWED
ASSUMPTIONS – EXPECTED “SAVINGS” ARE LIKELY
NEGATIVE

The CEC based its estimated present value of overall energy savings on the GWh/yr in large part on the analysis contained in the PG&E Revised CASE Study; see Exhibit 1.\(^{30}\) The Revised CASE Study was misinterpreted and then incorrectly utilized by CEC in their present value computation.

A. CEC INCORRECTLY USES 6.5 TWH AS ITS ANNUAL ENERGY
SAVINGS ESTIMATE

The CASE study reports annual incremental energy savings, which cumulate to 6.5 TWh/yr after complete stock turnover in 2022.\(^ {31}\) In other words, annual savings are 6.5 TWh/yr only in the final year of the study – 2022. The CEC misinterprets this finding and concludes that annual cost savings for each year between 2011 and 2022 are 6.5 TWh/yr. The correct application of the CASE study (assuming one agrees with that study’s findings in the first place) is to compute the cumulative year on year energy savings in a step-wise fashion. Failing to do so causes the CEC to grossly overstate the amount of energy savings from the proposed regulation. Simply correcting this error reduces the estimated $8.1 billion in savings to $3.5 billion; see Exhibit 2.

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That the CEC misinterpreted and misapplied the CASE report is an incontrovertible fact. It is very troubling that at no point of the regulatory proceedings did the CEC see fit to acknowledge this error or amend their analysis. To the contrary, in its final response to industry, the CEC reiterated: “The Energy Commission estimated from information in the record that the statewide benefit from the proposed efficiency standards for televisions will result in an energy savings of 6,515 GWh/yr which will result in a direct energy cost savings to consumers of 8.1 billion dollars” and concluded by saying “[t]here is no mathematical error in the analysis. CEA and its allies have not identified any error.”

B. CEC USES AN UNREASONABLE DISCOUNT RATE TO FIND THE NET PRESENT VALUE OF ENERGY COST SAVINGS

The discount rate used should reflect the consumer’s cost of capital, effectively approximated in this case by the consumer’s opportunity cost. The United States Department of Energy and other regulatory agencies recognize the importance of selecting the right measure: “The Department calculated the NPV as the difference between the present value of operating cost savings and the present value of increased total installed costs.”

The estimation of the California average consumer cost of capital is beyond the scope of this paper. However, in order to comply with the CPRC, and provide legislators with an accurate estimate of perceived consumer savings, the CEC should

32 Supplemental Response to Consumer Electronics Associations (CEA)’s comments. DOCKET 09-AAER-1C. DATE NOV 02 2009, REC'D. NOV 02 2009.
conduct such a study (after all it is the burden of the CEC to satisfy the requirement that all proposed regulation be consumer neutral). In the absence of such an analysis, one can nevertheless posit a reasonable discount rate based on certain known facts.

First, consumer borrowing rates for the purposes of purchasing a television can be assumed to be between the long-term debt on depreciable assets (e.g., car loans) and short term debts (e.g., credit card debt). In California, the average interest rate paid on credit card debt by consumers is approximately 13.05%. On October 14, 2009, Bank of America showed automobile interest rates ranging between 4.5% and 9.75% (this is likely too low for consumer electronics products but no better comparator is readily available).  

Second, the equity premium (the amount above the risk free rate) is approximately 6%. Given that 30-year constant maturity US treasuries currently yield approximately 4%, the opportunity cost of investing in the market can be taken as approximately 10%. Given these data points, there is little doubt that the appropriate discount rate to apply is at least 10%. This is likely conservative, but the CEC should determine a precise rate by computing the actual average consumer cost of capital for California.

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The application of this more appropriate (and still conservative) 10% discount rate to the corrected projected savings reduces the expected savings to $2.4 billion; see Exhibit 3.

C. THE CEC IGNORES THAT COMPETITION, NOT REGULATION, IS DRIVING THE PRODUCTION AND ADOPTION OF MORE EFFICIENT DTV MODELS

The third major flaw in the CEC analysis is the lack of accounting for technological improvements that would occur as a result of competition even – or perhaps especially - in the absence of government regulation. The Revised CASE study is based on the power consumption of models on the market as of 2008 (going back to 2006), and assumes that no improvements in DTV energy efficiency are made between that baseline and 2022.37 PG&E itself recognizes this limitation and states repeatedly that their analysis “does not account for natural market adoption of higher efficiency models.”38 The CEC analysis similarly fails to account for this limitation.

It is a known fact that the energy efficiency of DTVs has improved remarkably over time, including from 2006 to 2008, and from 2008 to the present, and continues to improve. Improved efficiencies have been generated as a result of the competitive nature of the consumer electronics industry, not as a result of regulation. It is inconceivable that future efficiencies would not be obtained in the absence of government regulation.

Consequently, one must measure the cost savings of the proposed regulations against the expected energy efficiency of televisions in 2010, 2011, 2012… 2022, not simply against the efficiency of 2006-2008 DTVs (as the CEC has done).

The television industry itself believes that the average energy efficiency (across all DTVs, not just Energy Star compliant models) will continue to improve. For example, one manufacturer believes that energy efficiency of DTVs will improve by 17% annually between 2007 and 2010.\textsuperscript{39} They further believe that they will obtain a 10% annual improvement between 2010 and 2022. Similarly, another manufacturer indicates that from December 2007 to October 2009 the energy efficiency of DTVs improved by 22% annually.\textsuperscript{40}

Conservatively assuming an annual efficiency gain of 17% between 2008 and 2010 and 1% annually thereafter would reduce the previously estimated $2.4 billion figure to $548 million; see Exhibit 4.

D. THE CEC INCORRECTLY ASSUMES ZERO COST OF COMPLIANCE WITH THE PROPOSED REGULATIONS

The fourth major flaw in the CEC analysis is the assertion that the cost of compliance – that is the cost to consumers of the proposed regulation, setting aside energy efficiencies – is zero. The CEC’s support for this claim is simply that compliant models currently exist and that certain manufacturers and technology providers support the proposed regulation. Moreover, the CEC ignores economic principles and factual evidence indicating the contrary.

First, \textit{ceteris paribus}, if manufacturers could satisfy demand (in terms of customer-demanded price/feature combinations) with models that are both more energy efficient and cheaper to the consumer they would already be doing so. The

\textsuperscript{39} Per confidential discussions with the manufacturer.  
\textsuperscript{40} Per confidential discussions with the manufacturer.
economic gains would be divided between the supplier and the consumer resulting in economic improvement for both parties.

Second, current model prices reflect a number of factors including, among other things, supply and demand conditions, manufacturing and distribution costs, marginal cost, marginal revenue, and product quality and feature mixes. The mere existence of models which satisfy the proposed regulations does not address any of these issues. Simplistically, assume that the cost to the consumer can be divided into two components: 1) the increased cost from required components resulting in a higher marginal cost of production; and 2) increased prices resulting from reduced competition (or reduced supply). Were manufacturers able to produce these higher efficiency models at no cost they would already have done so. Consequently, there is no question that the regulations will remove some models from the market – thereby reducing competition. Even if the eliminated models are replaced by other models, the feature/quality/price mix will have been changed. Consequently there is no question that there will be some reduction in supply competition and prices will effectively move higher. Put more simply, the existence of less expensive energy inefficient models constrains the price of the efficient models.

Finally, setting aside actual economic principles, the CEC ignores actual evidence contradicting their zero cost assumption (e.g., projections of increased costs provided by Vizio, Best Buy and others).

E. A COST OF COMPLIANCE GREATER THAN $17 ELIMINATES ANY POTENTIAL SAVINGS

41 At the October 13, 2009 hearing, Vizio, Inc., a manufacturer of LCD digital TVs, claimed in its comments to the CEC that the proposed regulation would raise the price of TVs by “tens to hundreds of dollars.” The January 2009 submission from Best Buy indicates that Energy Star compliant DTV’s sell for a significant premium ($167) above non-energy star DTVs.
Ultimately, a cost of compliance of approximately $17 per television would eliminate the estimated $548 million in savings. Any costs above $17 would immediately cause the proposed regulations to be consumer net-negative; see Exhibit 5.

We recognize that the specific energy efficiency improvement percentages resulting from competition and the increased consumer cost figures may be disputed by the CEC. There can be little doubt, however, that some combination of these two factors needs to be addressed by the CEC.

In our opinion, a cost increase of $17 is highly likely to be exceeded should the regulations be put into effect. Consequently, the proposed regulations are likely to be consumer net-negative.

V. CONCLUSION

In summary, the CEC fails to prove that the proposed regulations are consumer neutral. Rather, the evidence seems to indicate, to the contrary, that consumers will suffer from increased overall costs and potentially reduced access to future innovations and technologies. As such, we believe that the CEC regulation will violate Section 25402(c) of the California Public Resources Code.

To the extent that other States consider adopting similar regulations, their respective legislative bodies and regulatory agencies should be aware of the flaws and shortcomings of the CEC analyses proffered in support of the California regulation.42

42 The CEC indicates that “Massachusetts has held hearings, and Washington is gathering information on new standards that match California’s proposed standards.” Supplemental Slides to Legislative Hearing Presentation, Legislative Hearing, October 21, 2009, Chairman Karen Douglas California Energy Commission.
We conclude by noting that regulatory-free competition in DTVs has resulted, and should continue to result, in significant energy efficiency improvements over time. For example, under Energy Star Version 5.0, the maximum power consumption allowance for a 50” television or larger would be slightly more than a single 100 watt light bulb.  

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43 See Energy Star 5.0 Requirements: [http://www.energystar.gov/index.cfm?c=tv_vcr.pr_crit_tv_vcr](http://www.energystar.gov/index.cfm?c=tv_vcr.pr_crit_tv_vcr). Televisions with screen areas greater than 1068 square inches (equivalent to a screen size of 50 inches) have a maximum on mode power consumption of 108 watts.