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Consumer Groups Comments on Efficiency Standards for Computers

Additional submitted attachment is included below.

Comments of the Consumer Federation of America, Consumers Union, Consumer Action and Consumer Federation of California on Proposed Efficiency Standards for Computers, Computer Monitors and Signage Displays

Submitted to the California Energy Commission

Docket Number: 14-AAER-02

May 23, 2016

I. RECOMMENDATION: THE STANDARDS SHOULD BE ADOPTED AS QUICKLY AS POSSIBLE

The Consumer Federation of America, Consumers Union, Consumer Action and Consumer Federation of California appreciate the opportunity to comment on the California Energy Commission's March 30, 2016 Staff Report on Revised Analysis of Computers, Computer Monitors and Signage Displays. We urge the Commission to issue a final rule as expeditiously as possible.

In extensive comments[1] filed less than a year ago in this docket, the consumer commentors[2] reviewed the analysis presented by the staff of the California Energy Commission (CEC) to set minimum efficiency standards for important household digital devices – computers, monitors and laptops. We evaluated the proposed standards and found them to deliver significant benefits to consumers, the economy and the environment.[3] A year later the staff analysis has been improved and the urgency for action has grown. In reaching that conclusion, we underscored that our approach is to take a uniquely consumer pocketbook view of standards and to apply a rigorous set of tests to the standard. We have developed this set of tests through our long experience and involvement in rulemakings across a wide range of products and issues.

[1] Comments of Consumer Federation of America, Consumers Union, Consumer Action and Consumer Federation of California, Docket Number: 14-AAER-02, Project Title: Computer, Computer Monitors, and Electronic Displays, TN #: 20385333, Date: 5/29/2015. (hereafter Consumer Group Comments)

[2] Consumer Federation of America is an association of more than 250 nonprofit consumer groups that was founded in 1968 to advance the consumer interest through research, advocacy and education. In our comments we were joined by three consumer groups. We are again joined by these groups in this filing. Consumers Union is the policy arm of Consumer Reports and works for telecommunications reform, health reform, food and product safety, financial reform, clean energy, and other consumer issues. Consumer Reports is the world's largest independent product-testing organization. Using its more than 50 labs, auto test center, and survey research center, the nonprofit rates thousands of products and services annually. Founded in 1936, Consumer Reports has over 8 million subscribers to its magazine, website, and other publications. Consumer Action, established in 1971, is a non-profit organization based in San Francisco that focuses on consumer education that empowers low- and moderate-income and limited-English-speaking consumers to financially prosper. The Consumer Federation of California is a non-profit advocacy organization. Since 1960, it has been a powerful voice for consumer rights. CFC campaigns for state and federal laws that place consumer protection ahead of corporate profit and also appears before state agencies in support of consumer regulations.

[3] We provided empirical analysis in an attachment entitled "Electricity Consumption and Energy Savings Potential of Consumer Digital Devices: The Role of California Appliance Standards Leadership."

The current proposal of the staff is an extension and improvement of the analysis and standard offered last year. They have taken a good standard, listened to the comments of stakeholders and made it better. The CEC should adopt and implement this standard as quickly as possible. Far from ignoring the comments of the industry, the CEC staff has taken those comments into account where they are based on reasonable claims and meaningful evidence. It has correctly refused to be diverted from the important task it has been given by the people of California by arguments that are unfounded and purely out of self-interest.

The CEC must seize the current opportunity we fought to preserve and deliver the benefits with an effective rule – the first in the nation – in an increasingly important area of energy consumption and environmental impact. We have noted that California frequently provides leadership in developing beneficial rules and we believe this is an important area for it to do so. While the proposal is justified on the basis of costs and benefits by saving Californians over $400 million annually, it will deliver benefits nation-wide, directly as a spillover effect of causing more efficient products to be put into the marketplace and sold, and indirectly by showing the way for others to follow.

We are disappointed that the industry continues with its opposition to the proposed standard with threadbare arguments against regulation. In these comments we will not repeat all of the previously provided detailed analysis that led us to reject the industry arguments. Instead, we focus on the positive aspects and developments in the standard setting process.

II. JUSTIFICATION

A. Analytic Framework

We build our analysis of standards on principles for the design and implementation of effective minimum energy efficiency standards. The core of that approach is the economic

analysis of technologies. We review existing studies of technologies to determine whether there are significant potential consumer savings. Our analysis combines a review of the technical economic studies, prepared by others, and evidence on the market performance of appliances and devices.

Focusing on the consumer pocketbook, we have participated in dozens of rulemakings, and we always start from a basic set of questions:

- What is the problem that the proposed standard addresses?
- How can the standard be best designed to achieve the goal?
- Will a standard save consumers money?

A detailed explanation of this framework was presented in a lecture given by the Consumer Federation of America at the CEC's Energy Academy, entitled "Energy Efficiency Performance Standards: Driving Consumer and Energy Savings in California" [4] and an excerpt from that analysis was presented to the CEC in our formal comments in this docket.[5]

B. Market Failure

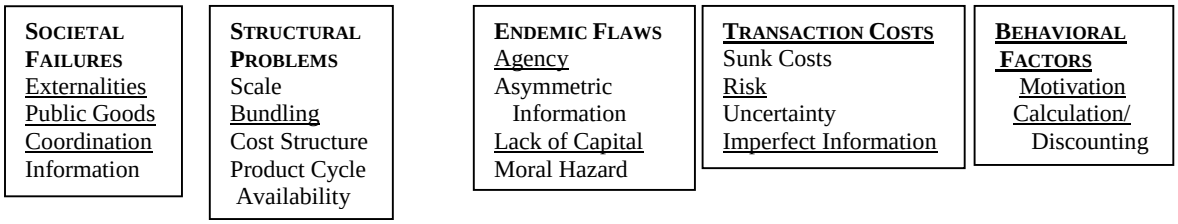
At the outset, it is important to recognize the consumer interest in the energy efficiency of household digital devices. Our analysis shows that the energy consumption of these devices has increased by 500% in the past decade, driven by both increasing penetration and use.[6]

And, our analysis leaves little doubt that the high electricity consumption of digital devices is the result of market imperfections, as shown in Exhibit 1.[7]

[4] February 20, 2014.
[5] Consumer Group Comments, Attachment B
[6] See CFA analysis, Attachment A, Figure 1 and accompanying text.
[7] See CFA analysis, Attachment A, Section IV for specific analysis of household digital devices. See Attachment B, section F for a general discussion of why performance standards are a particularly useful tool for closing the efficiency gap.

EXHIBIT 1: MARKET IMPERFECTIONS, DIGITAL DEVICES AND PERFORMANCE STANDARDS

Imperfections Addressed by Standards: Highlighting Factors Affecting Digital Devices



The Electricity Consumption of Household Digital Devices is a Particularly Difficult Problem for the Marketplace to Solve.

Externalities: Ultimately, the benefit of reducing energy consumption has value beyond the benefit that each individual directly enjoys from reduced energy consumption (a public goods problem).

Bundling/Agency: The manufacturers of the products make the key decisions about energy consumption and the bundle of attributes that will be made available in the market, thereby constraining the range of energy consumption levels the consumer has to choose from (principal agent problems).

Agency/Access to Capital: The manufacturers tend to focus on the primary product attributes and the first cost of the device, ignoring the life cycle cost (i.e. the total of acquisition and operating costs) since they do not pay the electricity bills. The manufacturers' interests are separate and different from the consumers' interests (split incentives problem).

Risk: Moving efficiency into mass market products runs the risk of being underpriced by inefficient products.

Imperfect Information/Motivation: The electricity consumption of these devices is not visible to consumers. The devices are purchased for their functionalities, which, given the dramatic increase in penetration and use, are highly desirable. The level of electricity consumption is not an attribute of the product to which consumers will pay much attention (a shrouded attribute problem).

Calculation: Even if consumers are paying attention to energy use, it would be difficult for them to determine how much energy the devices use and the impact of reducing consumption. The information is either not readily available or the transaction cost of obtaining it is high (information and transaction cost problems).

Source: Consumer Group Comments, Attachment A, pp. 24-26

The upper section in Exhibit 1 identifies the broad categories and specific types of market failures that performance standards are adept at addressing. We also highlight (underline) the specific market imperfections that affect the energy consumption of digital devices. The lower section in Exhibit 1 identifies the specific market imperfections that impact the energy consumption of household digital devices.

The paramount, but not the only, cause of the market failure with respect to the energy consumption of digital devices stems from the fact that, in this case, energy is what economists call a 'shrouded attribute.' It is part of a bundle of attributes. Computers and monitors provide valuable specific functionalities to consumers and the energy consumption of those devices is not

directly relevant or visible to the consumer (a motivation/calculation problem). The energy consuming attributes are bundled into the device by the manufacturer (an agency problem). Since electricity bills are aggregates of a month of consumption across a large number of electricity consuming durables (an information problem), consumers do not see how much electricity any specific device uses (a calculation problem). Because the devices are plugged in, there is little, if any, market pressure to improve the energy efficiency of these devices (a market failure).

III. EVALUATING THE STAFF ANALYSIS AND PROPOSED STANDARD

A. Design of the Standards

With clear market imperfections giving rise to inefficiencies, the next question becomes: why is a performance standard a good policy? Exhibit 2 identifies the characteristics we have found to be associated with effective standards. We generally prefer performance standards because they command, but they do not control by setting a goal and allowing manufacturers flexibility to decide how to meet the goal. [8]

EXHIBIT 2: KEY DESIGN FEATURES OF EFFECTIVE PERFORMANCE STANDARDS

Technology-neutral: Taking a technology neutral approach to the long term standard unleashes competition around the standard that ensures that consumers get a wide range of choices at that lowest cost possible, given the level of the standard.

Product-Neutral: Attribute-based standards accommodate consumer preferences and allow producers flexibility in meeting the overall standard.

Procompetitive: All of the above characteristics make the standards pro-competitive. Producers have strong incentives to compete around the standard to achieve them in the least cost manner, while targeting the market segments they prefer to serve.

Long-Term: Setting an increasingly rigorous standard over a number of years that covers several redesign periods fosters and supports a long-term perspective. The long term view lowers the risk and allows producers to retool their plants and provides time to re-educate the consumer.

Responsive to industry needs: Recognizing the need to keep the target levels in touch with reality, the goals should be progressive and moderately aggressive, set at a level that is clearly beneficial and achievable.

Responsive to consumer needs: The approach to standards should be consumer-friendly and facilitate compliance. The attribute-based approach ensures that the standards do not require radical changes in the available products or the product features that will be available to consumers.

Source: Consumer Group Comments, Attachment B, pp. 44-49

[8] See Attachment A, Section F.

Our analysis shows that performance standards work best when they address a clear market imperfection and are technology-neutral, product neutral and pro-competitive. The CEC proposal includes these elements. The standards establish a minimum level of efficiency but they do not dictate the technology. Standards work best when the manufacturers can design to meet the standard as they see fit. They will do so by choosing the least cost approach available to them. Different manufacturers will have different skill sets or different product lines and choose different technologies.

Performance standards like these give market certainty to stimulate adoption of cost effective energy saving technologies. Each manufacturer will set out to meet the standard in the most cost effective way that it can without the fear that it will be undercut by cheap, inefficient products that do not meet the standard. Once standards are in place, the products will succeed or fail on the merits.

Standards must also be reasonable in relationship to what can be technologically accomplished. If they go too far, impose costs that are too large or require technologies that cannot be developed or delivered in the necessary time frame, they can do harm, rather than good. The CEC proposal clearly fulfills this criterion in a number of ways on both the supply and demand sides. It identifies products on the market that currently meet the standard, indicating that they are feasible. It recognizes important functionalities of the product that are either not affected by the standard or are accommodated by providing for adders that allow more energy consumption to deliver higher levels of functionality.

The proposed standards for computers focus on reducing energy consumption when the computer/display is not operating – i.e. in the off, sleep and idle modes. They also demonstrate "no regrets" approaches – such as setting defaults at the lowest level possible and automatic

transitioning to lower levels of energy consumption when the computer is idle. This is a cautious approach which means the standards should not impair the ability of the computer to deliver the functionality that consumers want. This analysis provides strong evidence that the standard is technically feasible and not detrimental to consumers.

The targets set by these standards are moderate; if anything, they are cautiously forward looking but not very far, as the industry suggests that it needs more time to comply. It is clearly responsive to the design and build cycles of the products. This gives the industry an opportunity to plan more significant changes or a sequence of changes that eases the glide path to higher levels of efficiency. This is exactly the right way to kick off a standard for an important and dynamic product. It builds a framework that not only achieves near term gains but can provide a platform for future reductions in energy consumption

B. The Pocketbook Test

Regulatory cost benefit analysis considers all the direct and indirect costs and benefits. In many cases, the majority of the benefits are true externalities, impacts that are not or cannot easily be reflected in the market price of a product. For example, consumers do enjoy the benefits of improved public health, since they spend less time being ill or infirm, but it is difficult to pinpoint exactly which consumers benefit and to estimate the value of those benefits. This is a legitimate exercise that has been refined over the years.

When it comes to energy consumption, there is a different benefit that takes center stage. One can calculate the direct benefit of reduced energy consumption compared to the cost including the energy savings technology in the energy-consuming durable good. Energy efficiency rules can pay for themselves in direct consumer pocketbook savings because there is a market failure that is not a true externality. The public health and environmental benefits of

reduced energy consumption are certainly important, but because energy consumption has a direct impact on consumer pocketbooks, energy efficiency performance standards have a large direct economic impact on consumers. The first analysis we conduct seeks to answer the question: do the direct economic benefits of energy saving in terms of reduced bills exceed the cost of buying the technologies to achieve those cost savings? At this stage of development in energy markets, we find that there are a host of technologies that pay (handsomely) for themselves.

Exhibit 3 shows the proposed standards are strongly cost beneficial. All of the traditional (lifecycle) benefit cost ratios are greater than one. For the standards proposed, they are greater than two. In our focus on consumer pocketbook issues, we examine not only the lifecycle benefit cost ratio but also the flow of benefits and costs over time. A benefit cost ratio greater than two suggests that the break-even point comes less than halfway through the assumed product life.

EXHIBIT 3: BENEFIT COST RATIO

Device	Cost	Savings Lifecycle	Benefit Cost	Savings Annual	Payback Years	Product Life
Desktop	$18	$62	3.4	$12	1.45	5.0
Monitor	$5	$29	5.8	$4	1.13	6.6
Bundle,wtd.	$9	$38	4.2	$7	1.21	6.2
Notebook	$1	$2	2.0	$1	1.74	4.0

Source: CEC Staff Report, 2016, pp. 35, 82.

As can be seen in the exhibit, the payback periods are short, less than two years. This means that some time in the second year the cash flow is positive. Moreover, given the product lives assumed, consumers will enjoy the positive cash flow for more than half of the product life. These standards are extremely consumer-friendly.

Having reached this conclusion based on the pocketbook analysis, we hasten to add that the indirect benefits will also be substantial. By quickly increasing the disposable income that consumers have, these standards will have a positive macroeconomic impact. It is widely recognized that consumer spending is an important driver of the economy. Macroeconomic models show that every dollar of increased disposable income that is triggered by reduced energy bills stimulates over two dollars of economic activity. Of course, there will be environmental benefits as well. Although the rule could be easily justified on the basis of the environmental benefits,[9] the consumer pocketbook benefits standing alone, are much larger and as the trigger for the macroeconomic benefits, the economic benefits swamp the environmental benefits.

IV. REJECTION OF INDUSTRY OPPOSITION

A. Labelling is Not Enough and Market Evidence Suggests that the Standard is Feasible

The industry continues to argue that the standard is unnecessary and impractical. The staff has been rightly unpersuaded by these arguments.

The constant references to the ENERGY STAR standard should not dissuade the Commission from pursuing a standards approach. As a general proposition, information programs have different purposes than standards and require different market conditions. As we argued last year, ENERGY STAR, in particular, is a weak, voluntary standard that has failed to drive the computer and component market in the direction that California policy, consumer interests and environmental concerns need it to go. At the federal level, ENERGY STAR and minimum efficiency standards have a healthy push-pull relationship, but this is fueled by the presence of a minimum efficiency standard.

[9] For example, the CEC data suggests that each desktop/monitor combination lowers electricity consumption by approximately 575 kWh, or .575MWh (p. 35 for the desktop and p. 82 for the monitor. CO2 emissions per MWh are just over one-third of a ton (from p. 37). The value of those savings is dependent on the timing of the savings, the cost of carbon used and the discount rate.

B. Market Evidence Suggests that the Standard is Feasible

The fact that a substantial percentage of computers in the market (put at 10% to 25% by various industry commentors[10]) already meet the standard indicates that the standard is certainly feasible. The suggestion that the standard should be lowered to allow the vast majority of computers to pass, would rob consumers of substantial benefits.[11] The existence of a substantial number of models already in the market is one indication of the reasonableness of the standard.

The level and trends of energy efficiency improvement across digital products gives another clear indication. Exhibit 4, taken largely from evidence in this proceeding shows two factors that suggest much more could be accomplished for desktop computers.

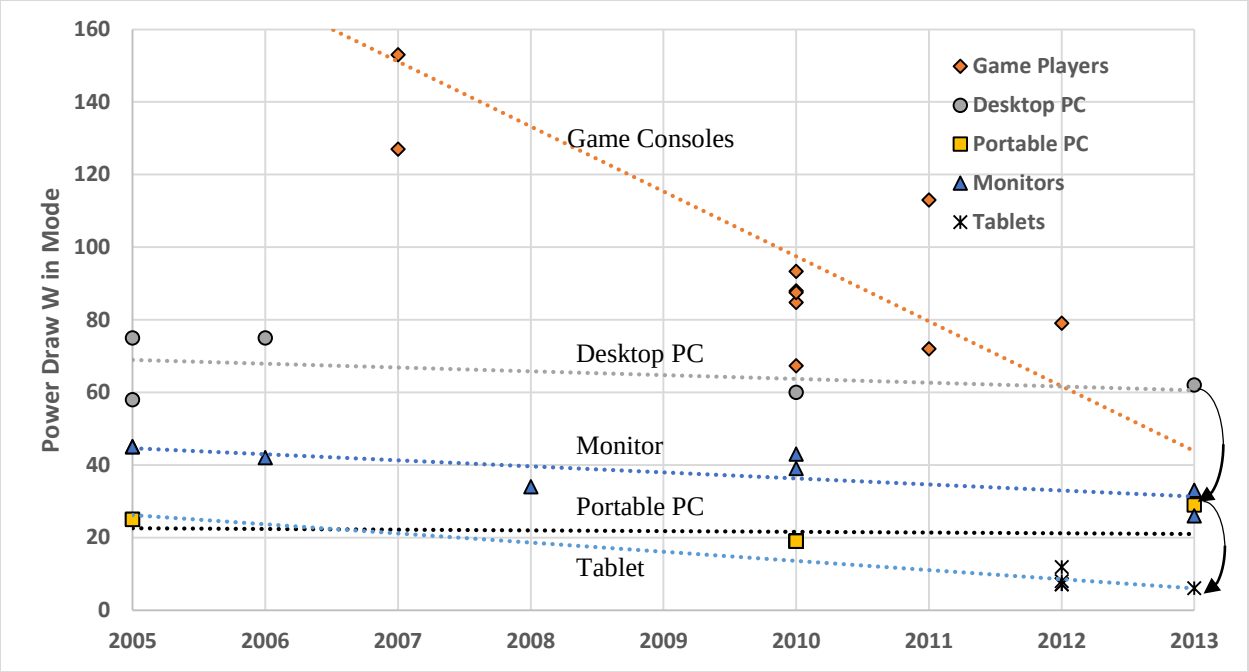
Compared to portable devices, desktops consume much more energy, in large measure because they have not improved. "Battery-powered devices of similar capabilities and price have radically lower power use." The improvement required of the desktop PC is one-third of the current PC-Table gap and one-half of the current PC-portable gap for active and sleep modes.[12] For total consumption it requires the improvement of the desktop to be close to two-thirds of the PC-notebook gap[13] and total annual consumption.[14]

As discussed above, we see this as the result of the shrouded nature of energy consumption in the desktop market and the resulting lack of market pressure to improve energy performance.

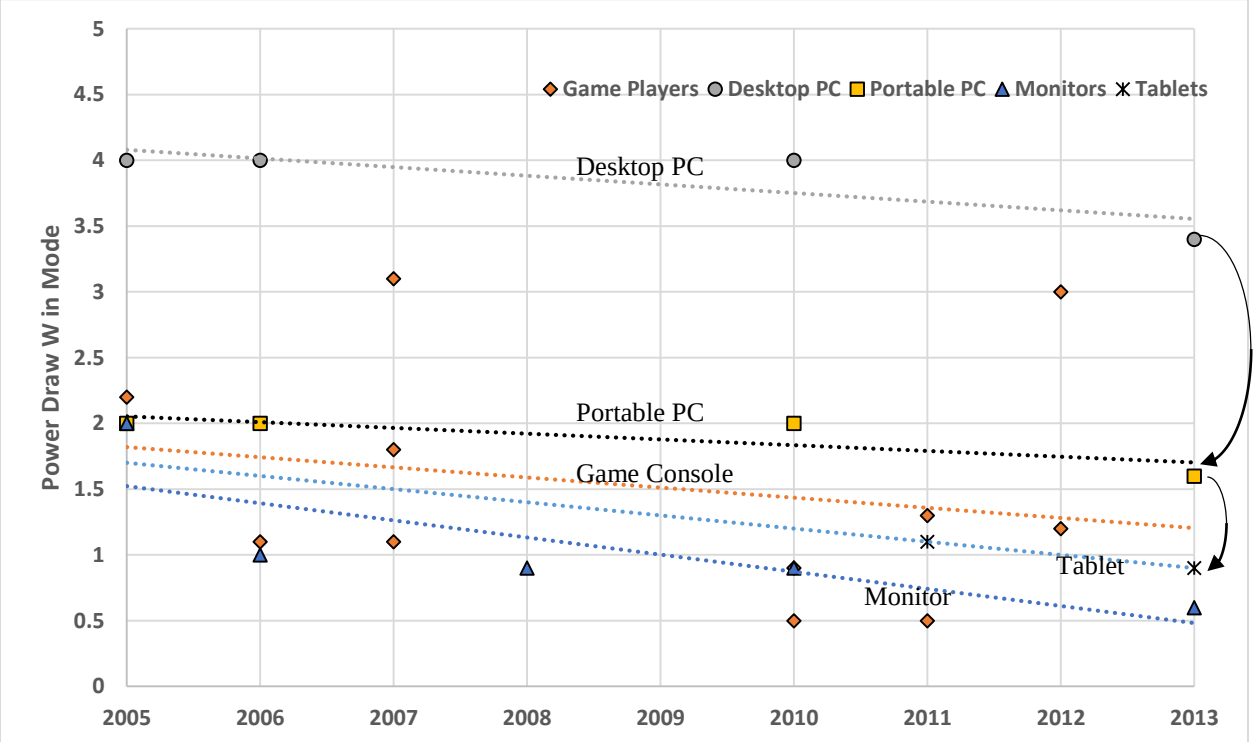
[10] The Local OEMs put the figure at 25%; ITI presenter used lower figures.
[11] LOEM at 8.
[12] Based on Exhibit 4.
[13] Based on the Staff analysis at p. 35.
[14] The estimates assume a 30% reduction in energy consumption , with the first two estimates based on the data underlying the Exhibit, the third is based on the NRDC (p. 4) data.

EXHIBIT 4: ENERGY USE BY VARIOUS DEVICES ACROSS TIME AND MODE

Active Mode



Sleep Mode



Sources: All data is from Bryan Urban, et al., *Energy Consumption of Consumer Electronics in U.S. Homes in 2013*, Fraunhoffer, USA, June 2014, pp. 32, 43, 56, 73, except game consoles, which is from A. Webb, et al., "Estimating the Energy Use of High Definition Games Consoles," *Energy Policy*, 61.

C. History Shows That Costs Will Fall, Rather Than Rise.

As noted in the CEC staff report, the cost projections are two to four times as high as the projections offered by the electric utility participants in the proceeding. Nevertheless, the industry offers cost projections that are orders of magnitude higher. These projections assume no learning, innovation or economies of scale. They are inconsistent with the history of the industry and the experience with regulation.

Historically, when it comes to standards, we have seen manufacturers line up in opposition, arguing that they impose unbearable or unconscionable costs on consumers – unbearable in the sense that they impose such high prices on consumers they will stop buying the devices or unconscionable in the sense that consumers will be forced to pay much more for a similar level of functionality or be forced to settle for devices that do not deliver the functionalities consumers want. However, history shows that the claims that standards will impose huge and unacceptable costs on consumers invariably proves false.[15] Once the companies go to work to meet the standards in the least cost manner possible, their costs are one-third of the original estimates, and the benefits vastly exceed the costs. In this case, we believe the CEC has proposed standards that avoid the problem of high negative cost impact on consumers.

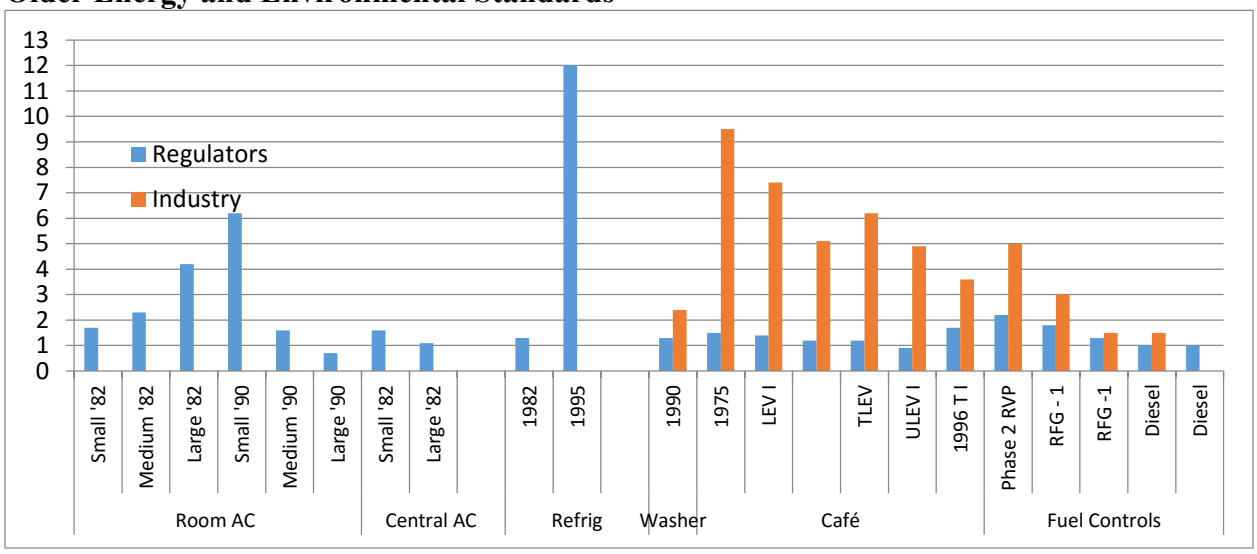
THE TRACK RECORD OF MARKET FAILURE AND POLICY RESPONSES

In our comments last year we provided references to the long-standing evidence that regulations cost less than agencies estimate and much less than industry projects. The point is so central to the decision of whether to move ahead with the standard we again provide that summary graph in Exhibit 5.

[15] Consumer Group Comments, Attachment B, pp. 43-48..

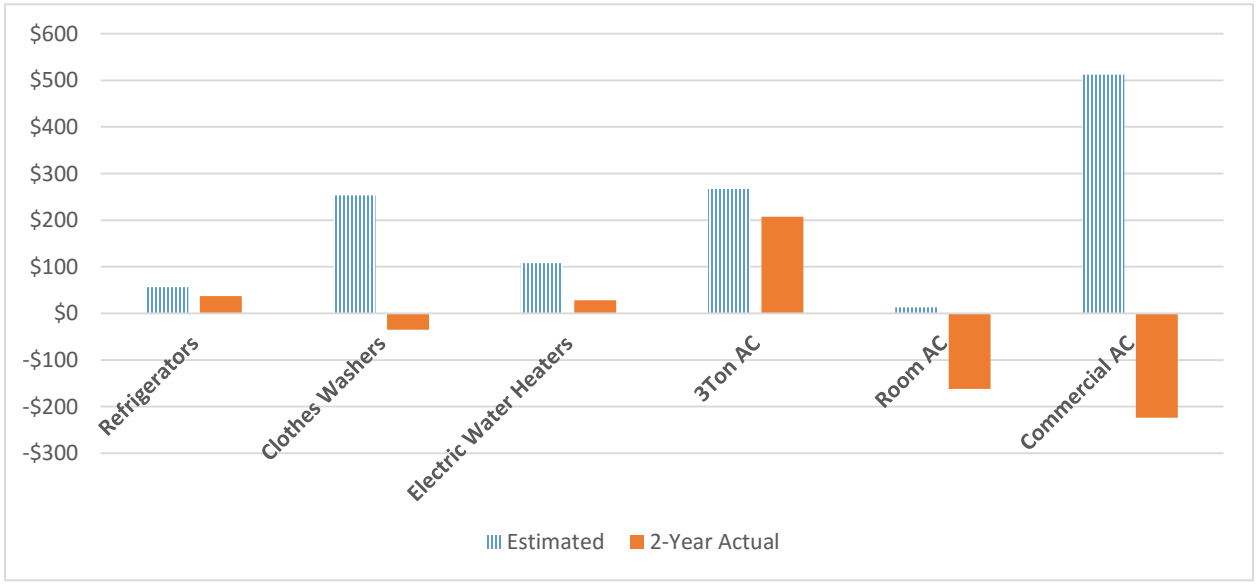
EXHIBIT 5: RATIO OF ESTIMATED COST TO ACTUAL COST BY SOURCE

Older Energy and Environmental Standards



Sources: Winston Harrington, Richard Morgenstern, and Peter Nelson, "On the Accuracy of Regulatory Cost Estimates," *Journal of Policy Analysis and Management* 19(2) 2000, *How Accurate Are Regulatory Costs Estimates?*, Resources for the Future, March 5, 2010; Winston Harrington, *Grading Estimates of the Benefits and Costs of Federal Regulation: A Review of Reviews,* Resources for the Future, 2006; Roland Hwang and Matt Peak, *Innovation and Regulation in the Automobile Sector: Lessons Learned and Implications for California's CO_2 Standard,* Natural Resources Defense Council, April 2006; Larry Dale, et al., "Retrospective Evaluation of Appliance Price Trends," *Energy Policy* 37, 2009.

Recent Standards for Major Appliances



Source: Nadel, Steven and Andrew Delaski, *Appliance Standards: Comparing Predicted and Observed Prices,* American Council for an Energy Efficient Economy and Appliance Standards Awareness Project, July 2013.

The empirical evidence that supports this conceptualization of market barriers and imperfections underlying the efficiency gap comes in two forms. The most frequent studies present real world evidence of how the barriers operate to reduce investment in energy savings technologies. The upper graph in Exhibit 5 summarizes four dozen studies published in the past decade that document virtually all of the market imperfections. A second type of study seeks to evaluate the impact of policies to reduce the efficiency gap.

Exhibit 5 shows the systematic overestimation by regulators of the cost of efficiency-improving regulations in consumer durables. The cost for household appliance regulations was overestimated by more than 100 percent and the costs for automobiles were overestimated by roughly 50 percent. The cost estimates from industry players were even further off the mark, running three times higher for auto technologies.[16] Broader studies of the cost of environmental regulation find a similar phenomenon, with overestimates of cost outnumbering underestimates by almost five to one. Industry figures are considered a "serious overestimate."[17] While the very high estimates of compliance costs offered by industry can be readily dismissed as self-interested political efforts to avoid regulation, they can also be seen as a worst-case scenario in which the manufacturers take the most irrational approach to compliance under an assumption that there is no possibility of technological progress or strategic response. Consistent with the empirical record on cost, a simulation of the cost of the 2008 increase in fuel economy standards found that a technologically static response was three times more costly than a technologically astute response. [18]

[16] Hwang, and Peak, 2006.
[17] Harrington, 2006, p. 3; Harrington, 2010.
[18] Whitefoot, et al., 2012, pp. 1…5. We perform counterfactual simulation of firms' pricing and medium-run design responses to the reformed CAFE regulation. Results indicate that compliant firms rely primarily on changes to vehicle design to meet the CAFE standards, with a smaller contribution coming from pricing strategies designed to shift demand toward more fuel-efficient vehicles... Importantly, estimated costs to producers of complying

A recent analysis of major appliance standards adopted since 2000, summarized in the lower graph of Exhibit 5 shows a similar, even stronger pattern. Estimated cost increases are far too high. There may be a number of factors, beyond an upward bias in the original estimate and learning in the implementation, that produce this result, including pricing and marketing strategies.[19] Thus, the empirical evidence suggests that efficiency is the least costly low-carbon resource and is likely to remain so at least through the mid-term. Given the 30-year track record of increasing efficiency and declining cost driven by technological innovation, there is no reason to believe this will change, even in the long term.

Examining the trends for individual consumer durables in Exhibit 6 suggests two important observations.

First, the implementation of standards improved the efficiency of the consumer durables.

Second, after the initial implementation of a standard, the improvement levels off, suggesting that if engineering-economic analysis indicates that improvements in efficiency would benefit consumers, the standards should be strengthened on an ongoing basis.

The engineering-economic analysis indicates that although the standards may increase the cost of the consumer durable, the reduction in energy expenditures is larger, resulting in a net benefit to consumers. We have also pointed to evidence that the costs of energy saving technologies tends to be smaller than the *ex ante* analysis suggests because competition and other factors lower the cost. The experience of the implementation of standards for the household consumer durables is consistent with this interpretation.

with the regulation are three times larger when we fail to account for tradeoffs between fuel economy and other vehicle attributes.

[19] Nadel and Delaski, 2013; Institute for European Environmental Policy 2013, p. 9.

There are five standards introduced for the four appliances in Exhibit 6. In three of the cases – refrigerators, clothes washers (second standard) and room air conditioners – there was a slight increase with the implementation of the standard, then a return to pre-standard downward trend. In one case – clothes washers (first standard) – there was no apparent change in the pricing pattern. In one case (central air conditioners) there was an upward trend, which may be explained by a surge in metal prices during that period.

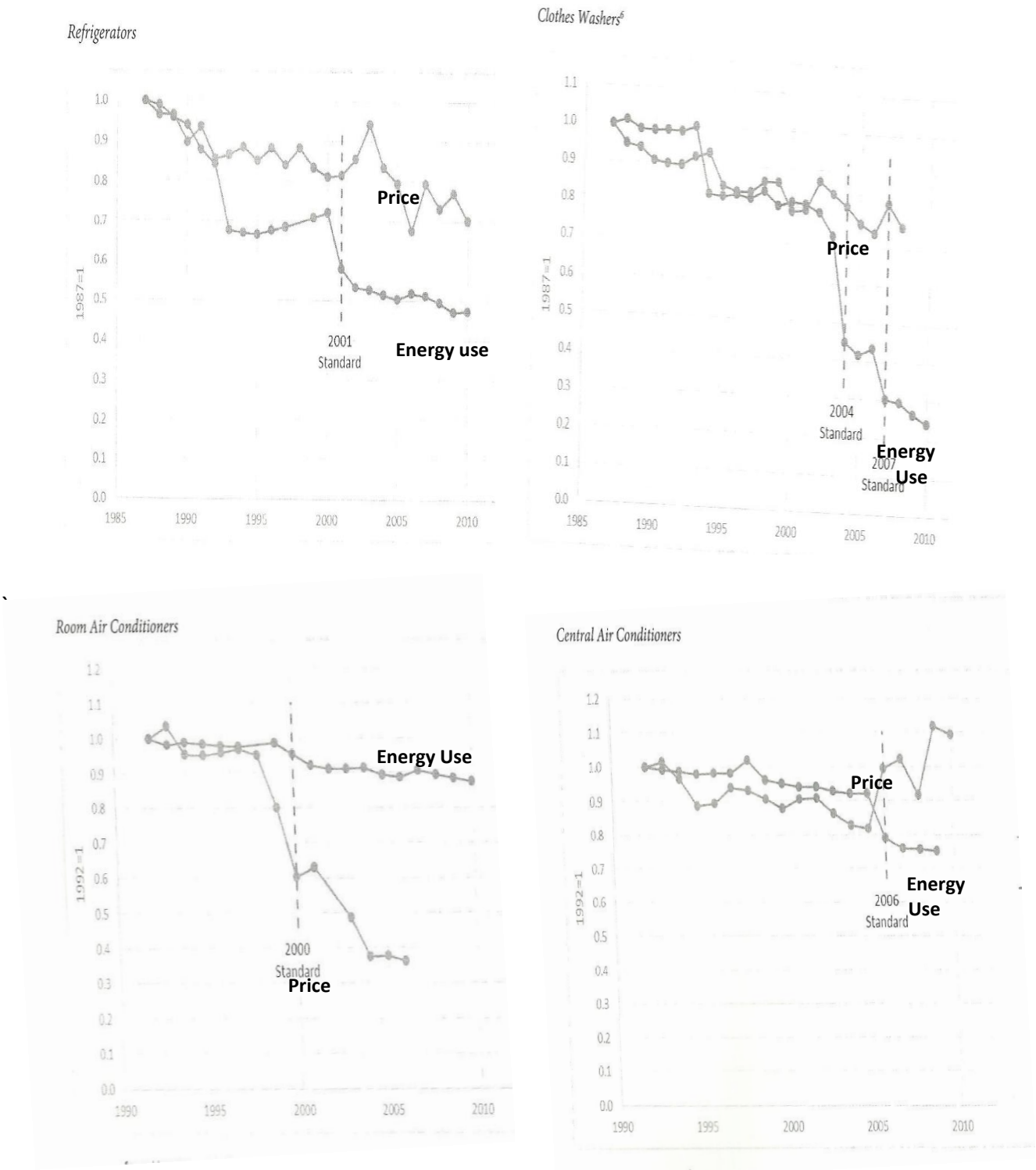
We do not mean to suggest that the price increase was too big, compared to the engineering-economic analysis or that the standards lowered costs, although there are theories that would support such a theory (i.e. suppliers take the opportunity of having to upgrade energy efficiency through redesign to make other changes that they might not have made). However, this does indicate that the standards can be implemented without having a major, negative impact on the market. The analysis of consumer durables also shows that there was no reduction in the quality or traits of the products. The functionalities were preserved while efficiency was enhanced at modest cost.[20]

Exhibit 7 shows similar data for household consumer durables that are the object of this proceeding. Here we use annual energy consumption to have a consistent point of comparison with cell/smartphones. While the cost of all devices declined sharply, there is a distinct difference between those that are plugged in and those that are portable.

Given the historical track record, we believe that the costs will ultimately be considerably lower than projected and the benefits considerably higher. However for the purposes of this rulemaking, we accept the CEC staff estimates.

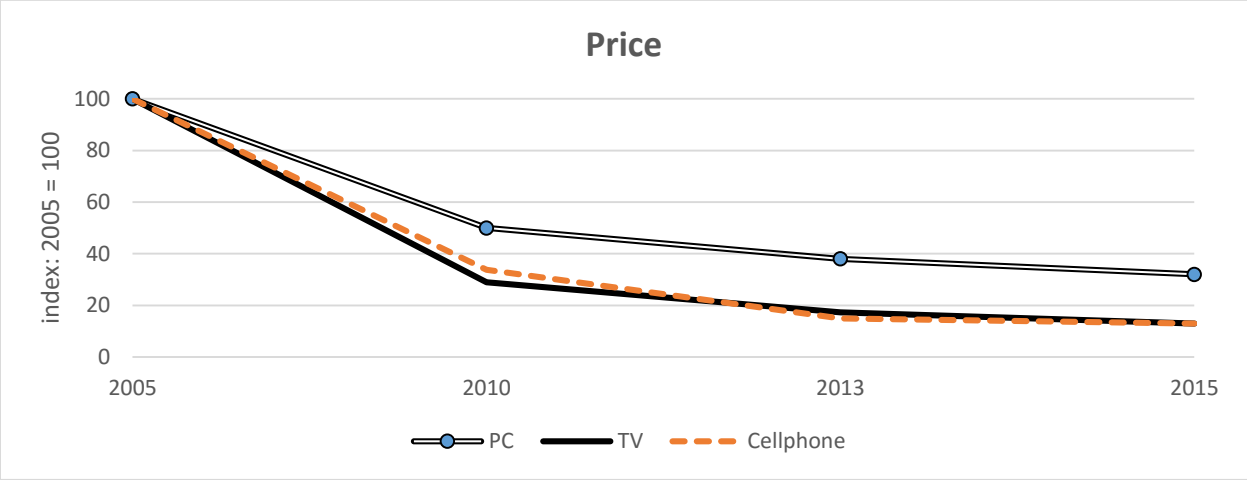
[20] Nadel, Steven and Andrew deLaski, *Appliance Standards: Comparing Predicted and Observed Prices,* American Council for An Energy Efficient Economy, July 2013; Consumer Federation of America, Performance Standards.

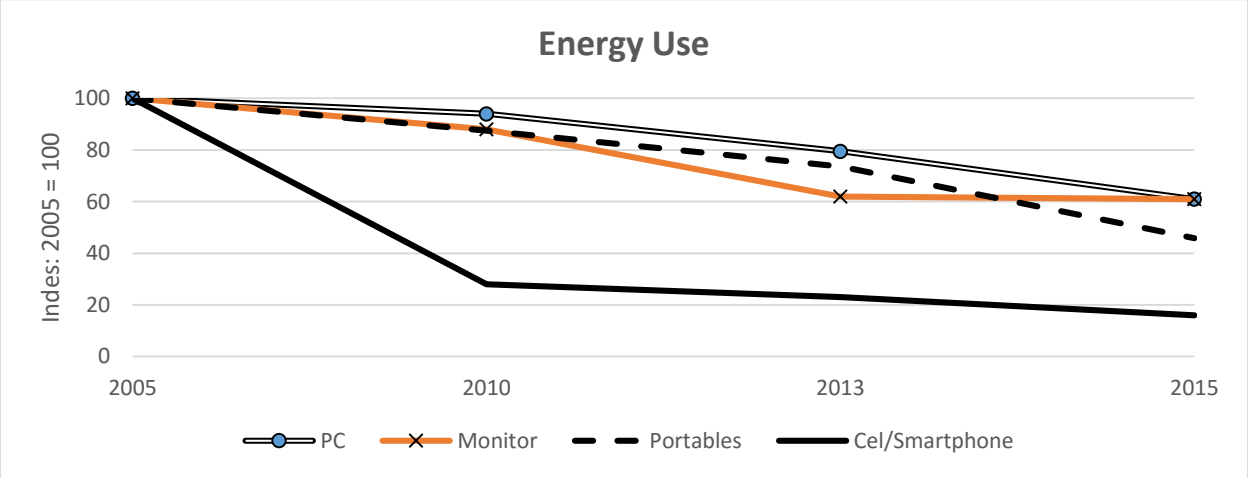
EXHIBIT 6: PRICE TRENDS AND ENERGY CONSUMPTION DRIVEN BY STANDARDS FOR HOUSEHOLD APPLIANCES



Source: Steven Nadel and Andrew deLaski, *Appliance Standards: Comparing Predicted and Observed Prices,* American Council for An Energy Efficient Economy, July 2013;

EXHIBIT 7: PRICE AND ENERGY TRENDS FOR HOUSEHOLD DIGITAL DEVICES





Source: Price from the Bureau of Labor Statistics, *Consumer Price Index;* Energy Trends from Urban, et al., *Energy Consumption of Consumer Electronics In U.S. Homes*, Frauhofer, USA, June 2013. Longer term trends for the Cellphone/Smartphone from Annarita Paiano, Giovani Lagiots and Andrea Cataldo, "A Critical Aanlysis of the Sustainability of Mobile Phone Use, *Resource Conservation and Recycling,* 73 (2013) 161-171. Noah Horowitz, et al., *Celllular Phone: Advancments in Energy Efficiency and Opportunities for Energy Savings,* NRDC, October 2004.

CONCLUSION

We applaud the California Energy Commission's efforts to move ahead with cost-effective standards for computers and monitors and urge that final action to put a standard in place be taken as expeditiously as possible. Californians will benefit through lower energy costs saving over $400 million annually as well as through improved air quality, and California's

leadership in this area will pave the way for the rest of the nation to follow and benefit once again.

Attachment A

http://www.consumerfed.org/pdfs/CFA-Household-Digital-Device-Electricity-Consumption.pdf

Consumer Federation of America Research Brief—'Electricity Consumption and Energy Savings Potential of Consumer Digital Devices: The Role of California Appliance Standards Leadership', February 2014.

Attachment B

http://www.consumerfed.org/pdfs/CFA%20et%20al%20CEC%20Computer%20Comments%20-5-29-15.pdf

Comments of Consumer Federation of America, Consumers Union, Consumer Action and Consumer Federation of California -- Submitted to the California Energy Commission: Docket Number: 14-AAER-02, Project Title: Computer, Computer Monitors, and Electronic Displays TN #: 20385333; May 29, 2015.