TURN Comments on the Final 2011 IEPR

Docket 11-IEP-1A

February 1, 2012

Overview

TURN offers the following comments on the Final 2011 IEPR in docket 11-IEP-1A.

1. Further revise claims regarding the impact of energy efficiency

TURN Comments filed on the Draft 2011 IEPR in December 2011[1] recommended that the misleading statement regarding the effect of California's energy efficiency programs and standards on per capita electricity use be appropriately modified or removed. Instead, new language the Final 2011 IEPR continues to present a misleading picture of the relationship between trends in per capita electricity use and energy efficiency. TURN recommends that the Final IEPR explicitly recognize that not only is energy efficiency just one of several reasons for the pattern of electricity use in California but it is not even the most significant factor driving the trends of the past thirty years. Taken together, the state's demography, economy, and climate, coupled with trends in the price of electricity, are more important than savings from energy efficiency in explaining why Californians use less electricity on a per capita basis than the rest of the United States.

2. Qualify the discussion of "three decades" of energy efficiency savings

TURN recommends that the discussion on the impact of three decades of energy efficiency savings be modified to reflect the fact that the CEC's own analyses show that the bulk of these savings derive from codes and standards and price effects, not utility efficiency programs. Utility efficiency programs have not been a significant source of savings for three decades; their contribution has only really been marked in the last decade or so.

[1] The Utility Reform Network (TURN) Comments on the Draft 2011 IEPR, Docket No. 11-IEP-1A, December 22, 2011.

3. Include attribution analysis

TURN also recommends that the Commission include additional information on the findings from recent CEC analyses regarding the relative importance of utility programs and price effects in total savings from energy efficiency. The current language recognizes that there are significant debates about the attribution process but does not present sufficient arguments for eliminating the CEC's attribution data from the document.

TURN discusses these issues in two sections below. The first examines the issue of per capita consumption and assesses the role of energy efficiency savings in explaining recent trends. The second is concerned with the issue of the attribution of savings to specific categories: codes and standards, price effects, and utility programs.

I. California's Electricity Consumption and the Impact of Energy Efficiency Savings

TURN recognizes that the Final IEPR contains a revised version of the achievements attributable to California's energy efficiency programs and policies. The Draft 2011 IEPR included the following statement:

"California's commitment to energy efficiency through programs and standards has resulted in the lowest per capita electricity use of any state in the nation,…"[2]

A similar argument was presented in the 2009 IEPR:

"Because of the state's energy efficiency standards and efficiency and conservation programs, California's energy use per person has remained stable for more than 30 years while the national average has steadily increased."[3]

TURN notes that these statements have been qualified in the Final 2011 IEPR, which now states:

"Past and current government energy policies and programs have made California a national leader in energy efficiency; in the last three decades, California's efficiency standards for buildings and appliances have contributed to keeping California's per capita electricity

[2] California Energy Commission, 2011. ***2011 Integrated Energy Policy Report.*** Publication Number: CEC-100-2011-001-LCD, page 3

[3] California Energy Commission, *2009 Integrated Energy Policy Report*, Final Commission Report, December 2009, CEC -100-2009-003-CMF, page 4.

consumption relatively constant while use in the rest of the United States has increased 40 percent."[4]

The new language points to, but does not delineate or sufficiently emphasize, the multiplicity of factors that have resulted in the state's relatively stable pattern of per capita electricity consumption compared to the rest of the United States.[5]

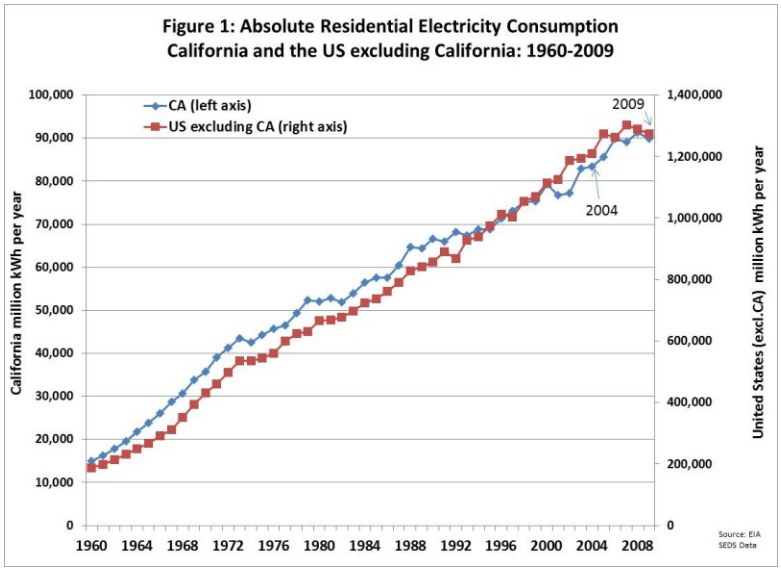
Trends in Electricity Use

The Final 2011 IEPR recognizes that electricity use in California is forecast to continue increasing to 2022.[6] This is within a context of steadily rising consumption since the 1970s despite decades of energy efficiency programs and policies (Figure 1: the y-axis for California is on the left and that for the rest of the US is on the right). That is, with the exception of 2008-2009 (during the height of the recession), the state has yet to see evidence of a decline in electricity consumption or a shift in the rate of increase in electricity use that may herald the possibility of declining usage. While *per capita* electricity use has risen relatively slowly, on an absolute basis a steady upward trend is evident. Figure 1 shows that in both California and the rest of the United States, residential electricity consumption has increased since the 1960s and 1970s. Total electricity use (not shown) has followed a similar pattern to that for the residential sector.

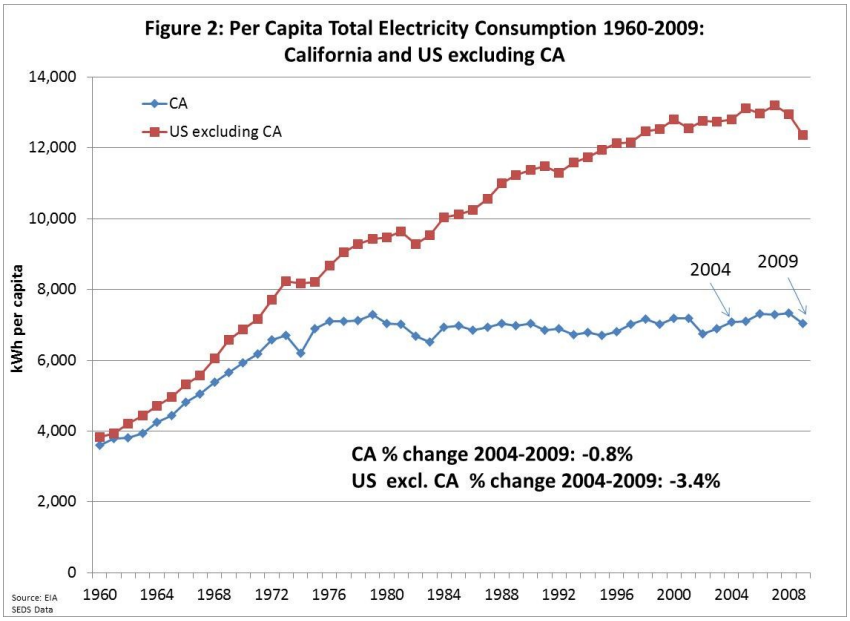
[4] California Energy Commission, 2011. ***2011 Integrated Energy Policy Report.*** Publication Number: CEC-100-2011-001-LCF, page 7-8.

[5] In this respect, the Final 2011 IEPR is similar to the 2007 IEPR which also suggested that EE had contributed to maintaining a relatively stable pattern of per capital electricity use in California rather than ascribing the pattern solely to energy efficiency The 2007 IEPR states: "Energy efficiency, which helped to flatten the state's per capita electricity use, will continue to be the keystone of California's energy strategy." California Energy Commission 2007, *2007 Integrated Energy Policy Report*, CEC-100-2007-008-CMF, page 3

[6] California Energy Commission, 2011. ***2011 Integrated Energy Policy Report.*** Publication Number: CEC-100-2011-001-LCF, page 2 and Chapter 8.

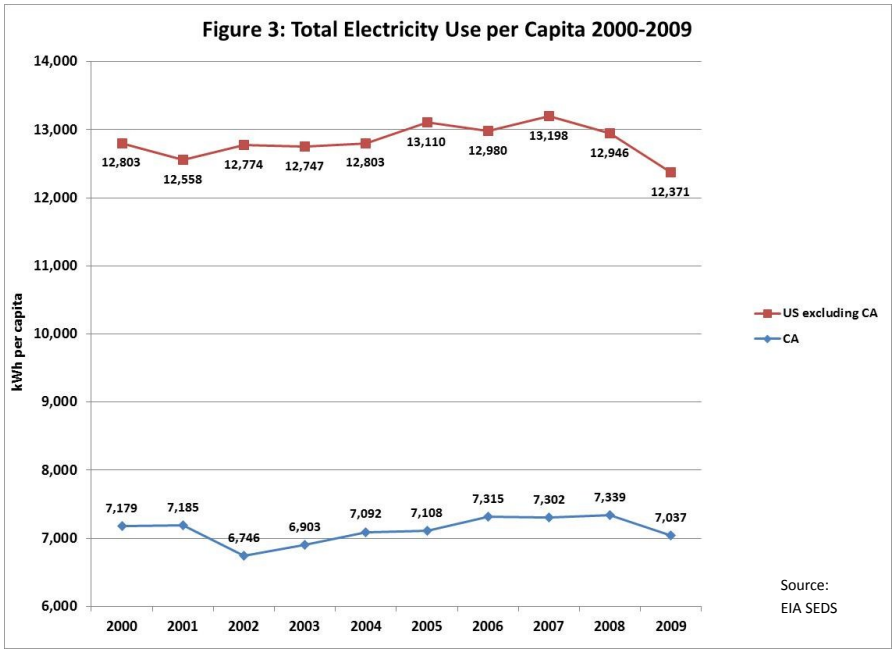


It is also instructive to look at the pattern of energy use *per capita* over time, especially since 2003. Figure 2 shows that since the 1970s the California per capita trend has been relatively stable compared to that for the rest of the U.S.



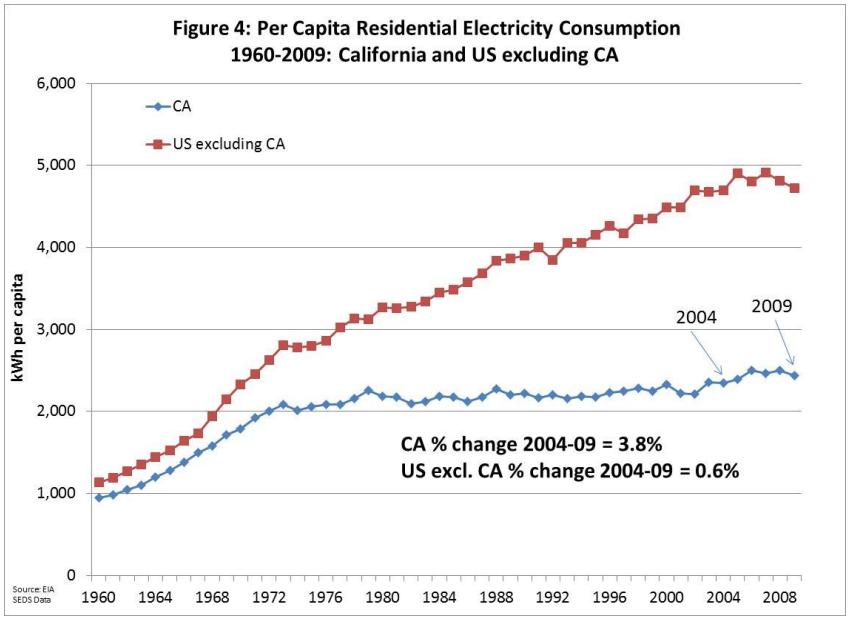
However, in the first years of the 21st century, the U.S. and California trends in total electricity use per capita are similar (Figure 3). Beginning in 2004, California's IOUs developed and administered energy efficiency programs aimed at curbing the rise in energy use in the state. As noted above, these efforts have yet to yield a reduction in absolute energy use either in the

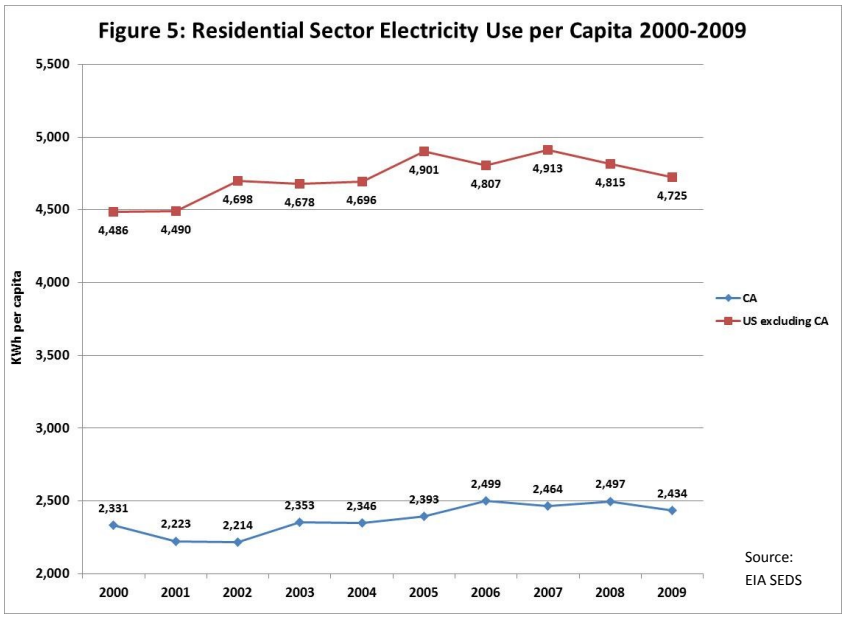
residential sector or across all sectors.[7] On a per capita basis, total electricity use also continued to rise to 2007-2008 before falling in 2009. Indeed, there was a *higher* increase in per capita consumption in California between 2004 and 2008 than in the balance of the United States (3.5% compared to 1.1%).



In the residential sector, per capita electricity consumption also rose between 2004 and 2008, *more so in California than in the rest of the US* (Figures 4 and 5). This is despite a huge investment in energy efficiency policies and programs. Use declined in 2009 and it remains to be seen whether per capita electricity use will resume its upward trend once the effects of the recession recede.

[7] After 2007 in the rest of the US and after 2008 in California, there was a drop in residential energy use (Figure 4) but it remains to be seen whether these declines will continue as the economic recession ends.





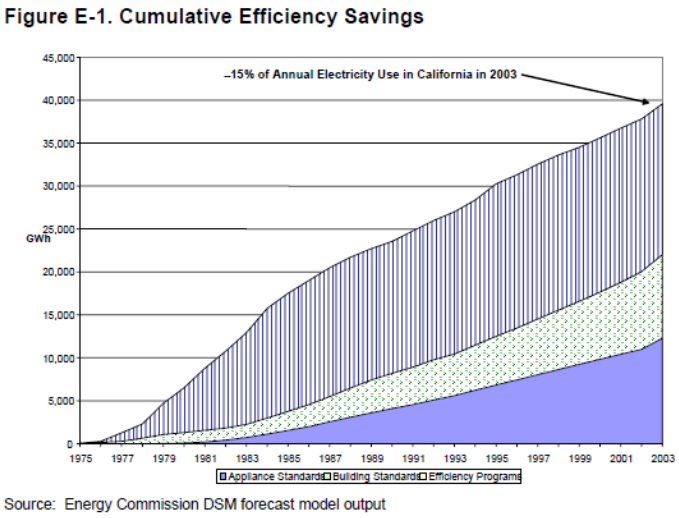
California's Energy Efficiency Savings: The Impact of Utility Programs

California's Energy Action Plan of 2003 introduced an era of increased interest in the savings from energy efficiency programs. For almost three decades prior to 2003, California had been promoting various kinds of energy efficiency initiatives, but the energy crisis of 2001 rapidly elevated the state's interest in the efficacy of those programs. The 2003 Energy Action

Plan codified this increased significance by making energy efficiency the resource of first choice for meeting California's forecast energy needs.[8]

The increased attention being paid to energy efficiency also raised the issue of accounting for the savings from EE programs and estimating their impact on consumption (and load requirements). In response to a Commissioner's request for data, CEC staff created asimple summation of the total quantity of savings from the states' utility energy efficiency programs and initiatives dating back to 1975. While the CEC had substantial experience in estimating the impact of building codes and appliance standards (the main focus of its efficiency work in the last quarter of the twentieth century[9]), its role in efficiency program activities had been mainly advisory. As a result, verified and measured data on the savings from utility programs going back to 1975 were not available. CEC staff therefore relied on *utility unverified reported* savings data to estimate savings from EE programs, and added these estimates to existing estimates of the savings from codes and standards. The results were displayed in the following figure.

Figure 6: Cumulative Efficiency Savings – 1975-2003[10]



[8] See Kavalec, Chris and Don Schultz. 2011. *Efficiency Programs: Historical Activities and Incorporation in Energy Commission Demand Forecasts*. Staff Paper. California Energy Commission, Electricity Supply Analysis Division. CEC-200-2011-005-SD, May 2011: http://www.energy.ca.gov/2011publications/CEC-200-2011-005/CEC-200-2011-005-SD.pdf for an excellent overview of the history of the CEC's involvement in measuring the efficacy of California's energy efficiency programs and initiatives.

[9] Kavalec, Chris and Don Schultz. 2011. *Efficiency Programs: Historical Activities and Incorporation in Energy Commission Demand Forecasts*. Staff Paper. California Energy Commission, Electricity Supply Analysis Division. CEC-200-2011-005-SD, May 2011, page 6: http://www.energy.ca.gov/2011publications/CEC-200-2011-005/CEC-200-2011-005-SD.pdf .

[10] Source: Implementing California's Loading Order for Electricity Resources, CEC-400-2005-043, July 2005, Figure E-1, page E-5.

The large wedge of savings attributed to utility efficiency programs (the top wedge) was simply a tally of utility unverified reported savings for the years 1975-2003.[11] The utility data were not subject to independent measurement and verification and included substantial savings from information and education programs which are not resource programs.[12] These utility estimates, especially those from the early years of the programs, could not therefore be viewed as the equivalent of supply-side resources for planning purposes.[13]

A version of Figure 6 above (see Figure 7) was then paired with data on the trend in per capita electricity consumption in California relative to the US as a whole (Figure 8) to create the impression that California's relatively stable pattern of electricity use since 1975 was due to the savings accomplishments of energy efficiency programs, codes, and standards. Commissioner Rosenfeld suggested a causal relationship between the two sets of data, an interpretation that found its way into the 2007 IEPR and other documents:[14] *"While the United States increased per capita electricity consumption by nearly 50 percent over the past 30 years, California's per capita electricity use remained almost flat, demonstrating the success of a variety of cutting-edge energy efficiency programs and cost-effective building and appliance efficiency standards."*[15]

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[11] The savings were adjusted for EUL but were not based on verified estimates; utility reported ex-ante estimates were used.

[12] CEC documentation suggests that the bulk of savings in the period of most rapid increase in utility reported savings from efficiency programs (from the latter half of the 1970s to about 1985) were ascribed to programs focused on information and audits. These activities have little long-term, measured and verified savings associated with them. Cash rebates were not introduced until 1982, and even then programs continued to comprise a mix of information and audits on the one hand and rebates on the other (Mike Messenger, Discussion of Proposed Energy Savings Goals for Energy Efficiency Programs in California, September 2003, CEC 400-03-022D, p.15).

[13] The bulk of IOU efficiency program savings occurred in the first ten years, with three quarters of the cumulative savings from 1975-2003 (16,528 GWh) taking place between 1975 and 1985. As a result, the curve for utility programs rises rapidly and then levels off over the next 20 years.

[14] California's leadership in encouraging energy efficiency has been heralded around the country and the world, with Figure 8 appearing in numerous publications, including most notably Al Gore's 2009 "Our Choice: A Plan to Solve the Climate Crisis" (pp.247-248).

> "One state that did not lose its focus on efficiency was California. Art Rosenfeld, the state energy commissioner who designed California's efficiency initiative, points out that energy use in his state had increased rapidly from the end of World War II until the first oil embargo in 1973, just as it had in the rest of the country. However, in the past three decades, California's total per capita electricity consumption has not increased at all, even though its per capita economic output almost doubled. Meanwhile, in the rest of the nation, per capita electricity use increased by more than 60 percent over the same period, with virtually the same economic-output gains."

[15] Integrated Energy Policy Report: 2007 Summary, CEC, page 3: http://www.energy.ca.gov/2007publications/CEC-100-2007-008/CEC-100-2007-008-CMF-ES.PDF ; see also Energy Efficiency: California's Highest-Priority Resource, CPUC and CEC, August 2006, page 2: "Because of its energy efficiency standards and program

Figure 7: Iconic Graph of California Annual Energy Efficiency Savings 1975-2003[16]

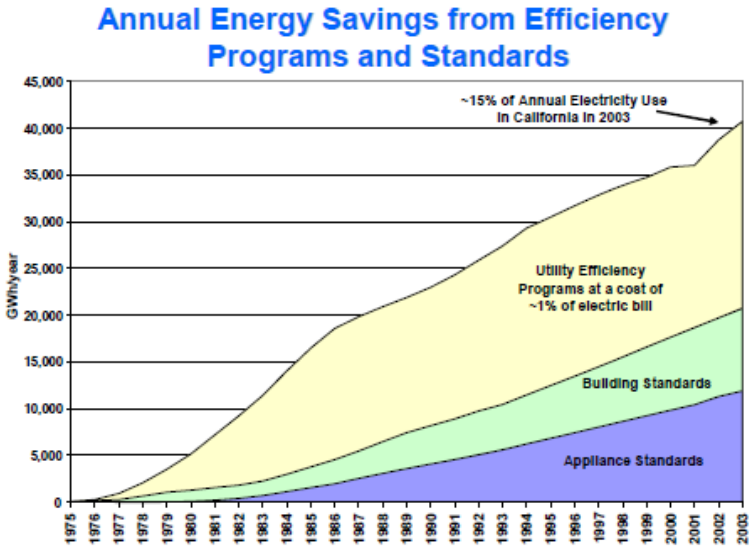
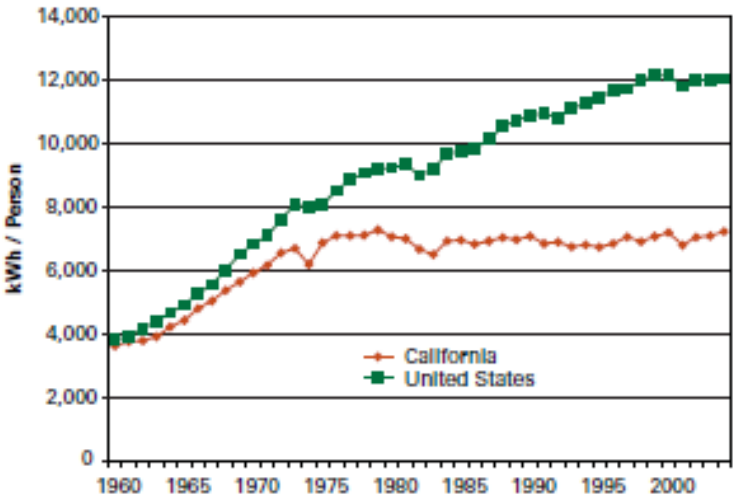


Figure 8: Per Capita Electricity Use in the United States and California (1960-2004)[17]



The story of California's much heralded success in leveling per capita consumption via energy efficiency programs and policies was built on an inadequate foundation.[18] The assumed

investments, electricity use per person in California has remained relatively stable over the past 30 years, while nationwide electricity use has increased by almost 50 percent."

[16] Source: California Energy Action Plan II: Implementation Roadmap for Energy Policies, October 2005, page 5: http://docs.cpuc.ca.gov/word_pdf/REPORT/51604.pdf

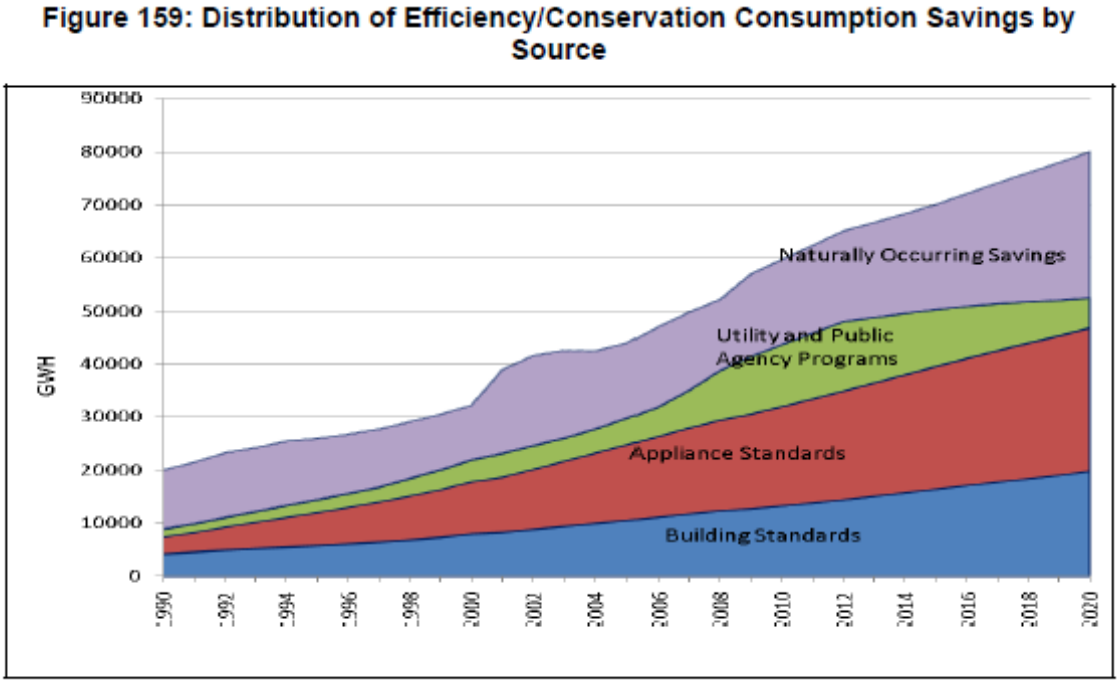
[17] Energy Efficiency California's Highest Priority Resource, CPUC and CEC, August 2006, page 3

connection between the two trends has never been empirically verified, although a study conducted in 2005 did seek to establish the extent to which factors other than energy efficiency programs could have contributed to the stabilization of California's electricity consumption on a per capita basis. It concluded that only around a quarter of the difference between the US and California could be attributed to energy efficiency programs [19] A few years later, Energy Economics, Inc. published a paper in Public Utilities Fortnightly (March 2009) that investigated the relationship between per capita electricity consumption and the price of electricity, among other factors. A simple regression in the study showed that about 40% of the change in California's residential electricity consumption could be correlated with changes in the price of residential electricity.[20] Demographic factors and changes in the structure of the California economy were also identified as important contributors to keeping the state's per capita consumption of electricity relatively low and stable.

Despite these new findings, a widespread perception of the singular impact of utility energy efficiency programs on per capita electricity consumption remained. This was partly due to the attractive message that the original CEC graphs relayed. It was, however, also due to a misplaced faith in the reliability of utility reported savings from energy efficiency programs. California's utilities reported savings without regard to their sustainability or the extent to which they would have occurred in the absence of the programs. It has become clear that the original graph based on utility reported savings (Figure 6) did not fully capture the details of the story. In 2009, the CEC reassessed and reanalyzed the data on reported savings from utility energy efficiency programs and created a very different picture of the actual level of savings from these programs (Figure 9).

[18] The context within which California's electricity consumption stabilized after 1975 and some of the factors that, in addition to EE, can account for this trend are discussed in Cynthia Mitchell et al, "Stabilizing California's Demand: The real reasons behind the state's energy savings," Public Utilities Fortnightly, March 2009, pp. 50-62.
[19] Anant Sudarshan and James Sweeney, Deconstructing the 'Rosenfeld Curve', Precourt Institute for Energy Efficiency, Stanford University, June 1, 2008: http://piee.stanford.edu/cgi-bin/docs/publications/Deconstructing_the_Rosenfeld_Curve.pdf .
[20] Cynthia Mitchell et al, "Stabilizing California's Demand: The real reasons behind the state's energy savings," Public Utilities Fortnightly, March 2009, pp. 50-62.

Figure 9: Revised Assessment of Energy Efficiency Savings by Source[21]



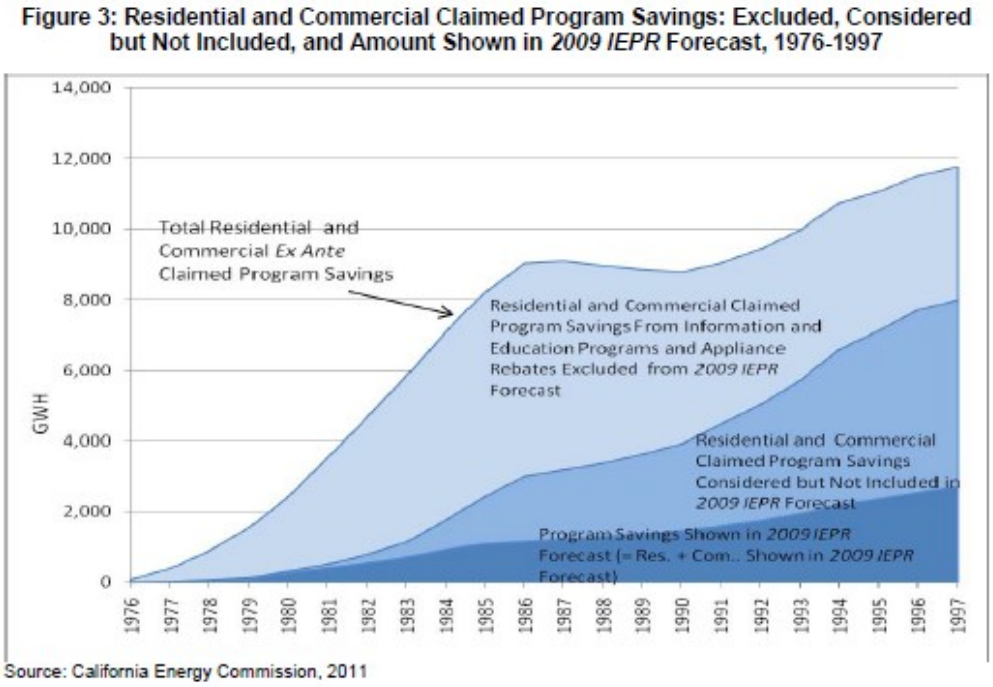
In essence the CEC revised its assessment of the impact of the first decades of utility programs and substantially reduced the savings that could be attributed to utility efforts. The first years of California's experience with energy efficiency focused on activities such as audits, information, and education that do not generate long-term, sustained savings. Once the reliability of utility reported savings was assessed and factored in to the analysis, the quantity of savings that could be attributed to utility programs dropped substantially. Figure 9 shows that utility program savings barely registered in 1990, being dwarfed by savings from codes and standards and price effects. The decline in savings attributable to IOU programs was mainly due to the exclusion of residential and commercial information and education program savings estimates from total utility reported savings.[22] A recent report that discusses the process that the CEC took to revise the estimates of savings from past utility programs notes that, "…most of the

[21] Source: Kavalec, Chris and Tom Gorin, 2009. *California Energy Demand 2010-2020, Adopted Forecast*. California Energy Commission. CEC-200-2009-012-CMF, Figure 159, page 242: http://www.energy.ca.gov/2009publications/CEC-200-2009-012/CEC-200-2009-012-CMF.PDF

[22] Kavalec, Chris and Don Schultz. 2011. *Efficiency Programs: Historical Activities and Incorporation in Energy Commission Demand Forecasts*. Staff Paper. California Energy Commission, Electricity Supply Analysis Division. CEC-200-2011-005-SD, May 2011, page 7: http://www.energy.ca.gov/2011publications/CEC-200-2011-005/CEC-200-2011-005-SD.pdf .

early run-up in utility-reported savings came from information and education programs (around 90 percent of the "excluded" area through 1985)."[23] The CEC presented the results of the new analysis (and a detailed explanation of how they were arrived at) in the forecast of energy demand for 2010-2020 for the 2009 IEPR.[24]

Figure 10: Program Savings Excluded from the Revised Savings Data Series [25]



Two key points emerge from this discussion of energy consumption and the savings attributable to efficiency programs. In the first place, it is clear that energy efficiency savings are not the only factor that has contributed to the pattern of per capita electricity consumption in California. The state's climate, economic structure, and demographic characteristics along with

[23] Kavalec, Chris and Don Schultz. 2011. *Efficiency Programs: Historical Activities and Incorporation in Energy Commission Demand Forecasts*. Staff Paper. California Energy Commission, Electricity Supply Analysis Division. CEC-200-2011-005-SD, May 2011, page 8: http://www.energy.ca.gov/2011publications/CEC-200-2011-005/CEC-200-2011-005-SD.pdf .

[24] Kavalec, Chris and Tom Gorin, 2009. *California Energy Demand 2010-2020, Adopted Forecast*. California Energy Commission. CEC-200-2009-012-CMF, Chapter 8: http://www.energy.ca.gov/2009publications/CEC-200-2009-012/CEC-200-2009-012-CMF.PDF

[25] Source: Kavalec, Chris and Don Schultz. 2011. *Efficiency Programs: Historical Activities and Incorporation in Energy Commission Demand Forecasts*. Staff Paper. California Energy Commission, Electricity Supply Analysis Division. CEC-200-2011-005-SD, Figure 3, page 10:

it relatively high electricity prices have together had a greater influence on per capita consumption than efficiency savings. Second, California's codes and standards programs may have impacted electricity use for the past three decades but it is clear that utility programs did not contribute appreciable savings until after the mid-1980s (Figure 10). Even in 1990, utility program savings were an exceedingly small proportion of the total savings attributable to energy efficiency (Figure 9). For this reason, the language in the Final 2011 IEPR should be modified to state that while appreciable savings from codes and standards and price effects have been recorded over the past three decades, utility program savings were small into the 1990s and have only increased in the past decade.

II Attribution of Savings in the 2011 IEPR

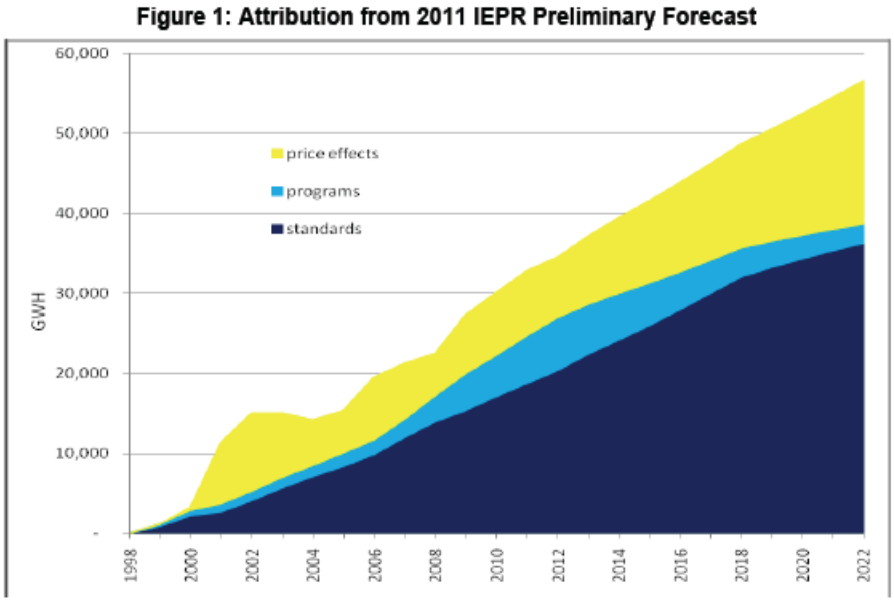
TURN recognizes that the findings from the CED recent analyses may have been unwelcome to some interested parties. Given that the new CEC data series does not ascribe as prominent a role to utility programs as the utility unverified reported data series did, one of the main issues that has arisen in recent months is the extent to which total EE savings should be attributed to specific actions and effects (appliance standards, building codes, utility programs, and market effects). That is, the debate has shifted from one revolving around the relative merits of the old and new EE savings data series to one which raises the question of whether attribution should be attempted at all.

CEC staff has, however, devoted a considerable amount of effort to estimating the relative impacts of codes and standards, utility programs, and other effects. **There seems to be little point in suppressing this insightful analysis.** Staff has taken into account concerns about the quality of the data and the analysis possible with it and has developed an assessment that places an upper bound on the contributions from various sources. That is, rather than presenting a simple series of data that represents estimates of the contribution of standards, utility programs, and price effects/naturally occurring savings (as in the 2009 IEPR forecast –Figure 9 above), CEC staff have conducted a statistical analysis which provides a range of possible values for each type of savings (standards, IOU programs, and price effects).[26]

[26] Chris Kavalec, Developing a Range for Attribution of Savings, November 9, 2011.

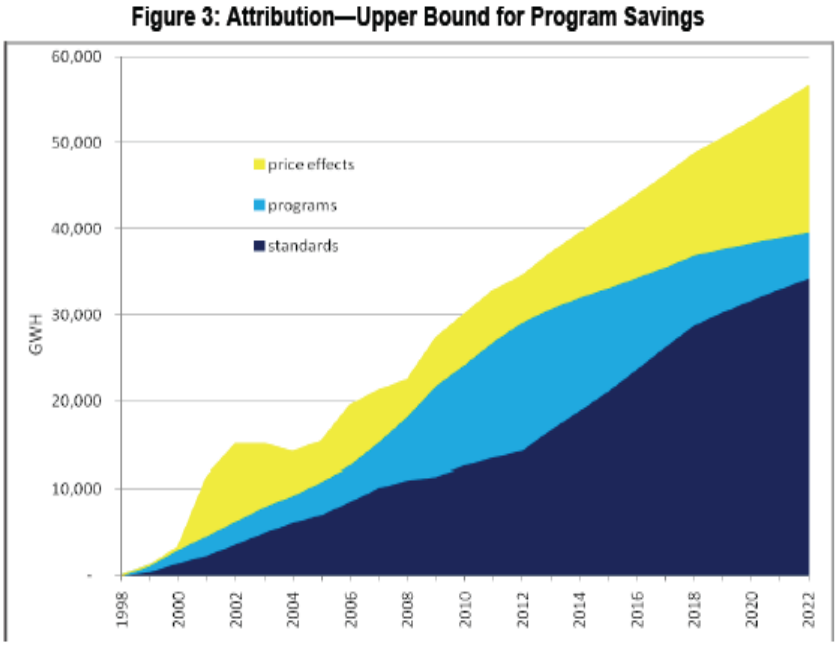
In the two figures below (Figures 11 and 12), the 2011 IEPR forecast estimate of savings and the upper bound for program savings from the statistical analysis are presented for 1998 to 2022.[27] The figures show that while the upper bound estimates for IOU program savings are larger than in the 2011 IEPR forecast, by no means do utility EE program savings, even at this upper bound, swamp savings from other sources (as they did in the original series based on utility reported savings – see Figures 6 and 7). This is especially true for the historic period savings (1998-2005). The upper bound information provides useful insights into the range of savings estimates for programs, codes and standards, and other effects. It would, however, also be useful to have the same information presented for the lower bound estimates.

Figure 11: Efficiency Savings in the IEPR Preliminary Forecast by Savings Source



[27] Chris Kavalec, Developing a Range for Attribution of Savings, November 9, 2011, Figure 1 and Figure 2.

Figure 12: The Upper Bound for Program Savings from CEC Analysis



TURN is therefore concerned that the Final 2011 IEPR mentions the discussions surrounding attribution in the Demand Analysis Working Group (DAWG) but does not present either the past or the more recent analyses mentioned above of the extent to which utility programs have contributed to total savings. This information is vital to understanding the most effective ways in which California's electricity sector can bend down the electricity demand curve and thereby contribute to the state's GHG emissions reduction targets. TURN therefore recommends that the Final 2011 IEPR be revised to include the CEC's attribution analyses.

Original signed by:

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Marybelle C. Ang, Staff Attorney
The Utility Reform Network (TURN)
115 Sansome Street, Suite 900
San Francisco, CA 94104
Tel: (415) 929-8876 x321
E-Mail: mang@turn.org