The Utility Reform Network (TURN) Comments to the Senate Energy Committee California Legislative Committee re. Investor-Owned Utilities (IOUs) Energy Efficiency (EE) Programs May 17, 2011

I. Organization of Comments

TURN very much appreciates this opportunity to provide the Senate Energy Committee with the following comments regarding the California Investor-Owned Utilities (IOUs) ratepayer-funded energy efficiency (EE) programs. Our comments are provided in following sections and attachments:

- Section II: Introduction and Overview
- Section III: California's Historic Record of Energy Efficiency (EE) Savings
- Section IV: Utility EE Programs: Post-Deregulation to Current
- Section V: Energy Efficiency Policy Implications Relative to AB 32 GHG Emission Reduction Requirements

- Attachment 1: Post-2004 to Current Comparison California Total and Per Capita Electricity Consumption to the Balance of the U.S.
- Attachment 2: CEC Detailed Historic Utility Reporting of EE Program Savings
- Attachment 3: "Stabilizing California's Demand: The Real Reasons Behind the State's Energy Savings", Energy Economics Inc., Public Utility Fortnightly, March 2009.
- Attachment 4: Energy Savings from EE vs. GHG Emissions and Energy Consumption Reductions

II. Introduction and Overview

In 2005, California's energy policymakers and regulators established energy efficiency (EE) as California's highest priority resource for meeting future needs in a clean, reliable, and low-cost manner. In 2006, the California legislature and governor positioned energy conservation and efficiency as the cornerstone of the state's Global Warming Solutions Act. The Act mandates a 2020 statewide limit on greenhouse gas (GHG) emissions to 1990 levels. Compliance will be nothing short of Herculean: California will have to reduce per capita energy usage in a manner that accommodates continued brisk population growth and protects the state's economy from economic dislocations and recessionary pressures.

The California Energy Commission (CEC) and California Public Utilities Commission (CPUC) have pointed to California's historical record in saving energy (see Figure 1), coupled with its current stable per capita electricity use relative to the balance of the United States (see Figure 2), as proof that it is up to this formidable challenge:" Because of its energy efficiency standards and program 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."

The CEC and CPUC took credit for saving, on a cumulative statewide basis from 1975 to 2003, about 40,000 GWh, or the equivalent of 15 percent of annual electricity use, through a combination of utility EE programs and appliance and building standards (see Figure 2). Figure 2 illustrates the trend in average per capita.

California's leadership in encouraging energy efficiency has been heralded around the country and the world, with Figure 2 appearing in numerous publications, including most notably Al Gore's 2009 "Our Choice: A Plan to Solve the Climate Crisis".

> "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."

As part of the process of sorting out committed and uncommitted EE savings in the load forecast for the *2009 Integrated Energy Policy Report (IEPR)* the CEC issued the following restatement of the historic attribution of EE savings. Per Figure 4, in addition to attributing EE savings to the Figure 1 categories of appliance and building standards and IOU EE programs, the

CEC added a fourth attribution category of "price / market effects"[1] that in effect reassigns the majority of prior classified utility EE program savings to this new attribution category. In other words, the new approach correctly recognizes that California's historical track record in EE savings has much less to do with utility EE program savings than previously credited, and much more to do with consumers using less electricity in response to high electricity prices.[2]

The IOUs recent and current EE portfolios have left much to be desired in terms of meeting or exceeding the CPUC's rather humble EE goals[3] in a cost-effective manner. As discussed in Section 4, utility performance as tracked over three EE portfolio cycles (2002-2003, 2004-2005, and 2006-2008) is actually declining, not improving. TURN believes the regulatory – utility EE portfolio process as a whole is stuck in serious, if not tragic rut. The IOUs EE portfolios for the most part are comprised of the same core program offers with generally the same market strategies for the past decade.

III. California's Historic Record of Energy Efficiency (EE) Savings

California has a long history of utility energy efficiency (EE) programs dating back to 1975. These programs have developed over time to encompass a wide range of activities and to attract very large budgets that are paid for by ratepayers. California is often touted as the national if not international leader in utility EE programs, based in large part on the two graphs below (Figs. 1 & 2) created by the California Energy Commission (CEC) around 2003.
Figure 1 shows reported utility savings from EE programs as well as the savings attributed to building codes and appliance standards for 1975 to 2003. It shows an upward trend in reported savings. Figure 2 shows that over roughly the same time period (since the 1970s), California's per capita consumption of electricity stabilized relative to the upward trend evident in the US as

[1] TURN notes that at least the "price" component of "price / market effects" most likely has more to do with reductions in energy consumption via "conservation" (i.e. just using less energy) than energy efficiency per se (that is, using energy more efficiently).

[2] That is, the price effect/price elasticity factors that are embedded (in different forms) in the residential, commercial, and industrial sector end use models at the CEC.

[3] While the CPUC's EE goals are often heralded as highly ambitious, the goals in fact only represent reductions of about one-half of incremental load growth; that is, not absolute reductions in consumption as required by AB 32.

a whole.[4] The CEC's 2003 Figures 1 and 2 below sought to establish a link between these two trends.

Fig. 1: CA Cumulative Energy GWh Savings: Utility EE Programs and Bldg. & Appliance Standards

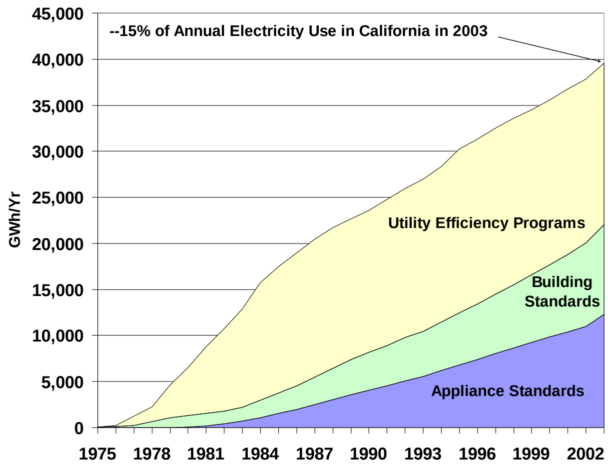
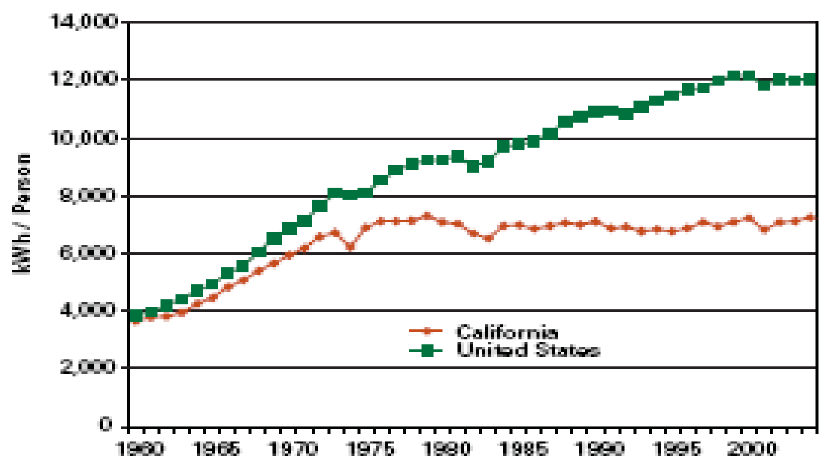


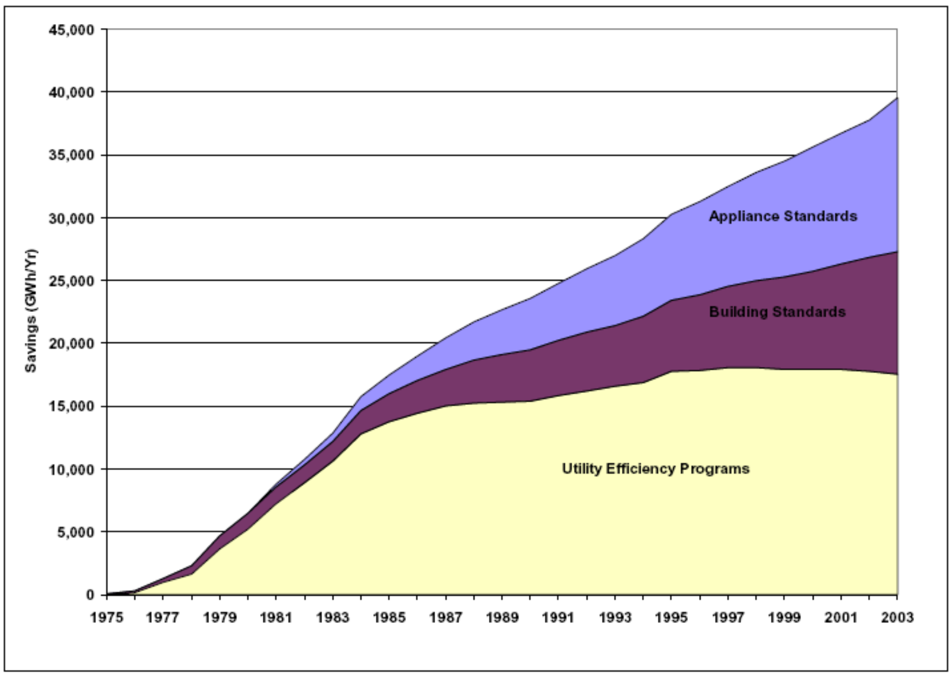
Fig. 2: Per Capita Electricity Use in the U.S. and CA: 1960-2004



[4] Interestingly, per Attachment 1: Post-2004 to Current Comparison California Total and Per Capita Electricity Consumption to the Balance of the U.S, post-2004 data shows that CA's per capita is in fact increasing, and at a greater rate than the balance of the U.S.

Interestingly, if the data in Figure 1 is reordered per Figure 3 below it becomes clear that the after an initial surge in utility reported savings (1975-1984), the driving force behind the continued increase in EE savings was savings attributed to building codes and appliance standards (1985-2003).

Fig. 3: Re-ordered CA Cumulative Energy GWh Savings: Utility EE Programs and Building and Appliance Standards



Several widely publicized CEC and CPUC 2003 – up to the current times assume there is a substantial and causal link between the upward trend in reported savings and the relatively stable pattern in per capita electricity consumption. This assumed 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 utility EE programs could have contributed to the stabilization of California's electricity consumption on a per capita basis.[5]

[5] Anant Sudarshan and James Sweeney, Deconstructing the 'Rosenfeld Curve', Precourt Institute for Energy Efficiency, Stanford University, June 1, 2008: http://piee.stanford.edu/cgi-

In addition, it became clear that the original graph based on utility reported EE program savings (Figure 1) did not fully capture the details of the story.[6] In 2009, the CEC reassessed and reanalyzed the data on reported savings from utility EE programs and created a very different picture of the actual level of savings from these programs. In essence the CEC revised its assessment of the impact of the first decade of utility programs and substantially reduced the savings that could be attributed to utility efforts. The first years of California's experience with utility EE focused on activities such as audits, information, and education, that do not generate long-term, sustained savings.[7] The CEC also recognized that it had failed to take into account price and market effects in its original formulation. Once these were factored in, the quantity of savings that could be attributed to utility EE programs dropped (Figure 4)

---

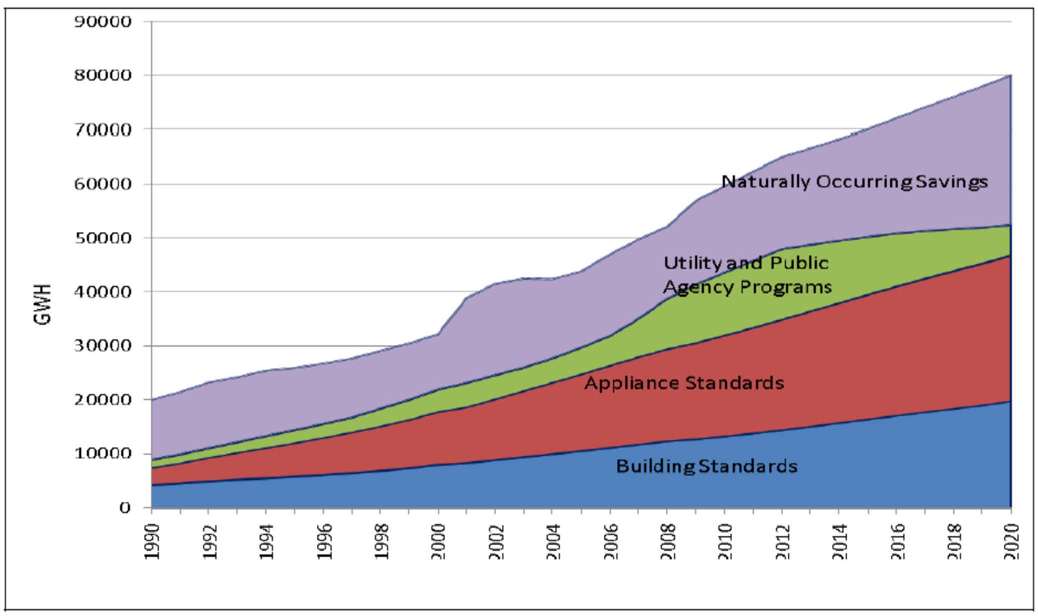
bin/docs/publications/Deconstructing_the_Rosenfeld_Curve.pdf . The study concluded that no more than one-quarter of the difference between the US and California could be attributed to utility energy efficiency programs.

[6] The CEC's 2003 series (Figure 1), with its attribution of a larger level of savings to utility EE programs, was a simple aggregation of utility reported EE savings from 1975 to 2003. It was based on savings estimates that were subject to varying levels of evaluation, measurement, and verification (EM&V). For instance, utility reported EE program savings 1975-1985, were not adjusted in any manner, but simply restated by the CEC as reported by the utilities. Indeed, it was not until 1989 that utility EE savings began to be verified and reported on a net basis (see Figure 2). 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.
The key point about the 2003 series is that its presentation in various CEC documents does not mean that the series impacted the CEC demand forecast, either in 2003 or in 2009. The series was reported in its entirety in the 2003 forecast documents, but in 2009 only the portion that impacted the forecast was reported in the forecast documents.

[7] See CPUC Energy Efficiency Evaluation Protocols: Technical, Methodological, and Reporting Requirements for Evaluation Professionals. April 2006. www.cpuc.ca.gov/PUC/energy/energy+efficiency/EM+and+V. See also Attachment 2, "CEC Detailed Historic Utility Reporting of EE Program Savings". 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) There is also evidence to suggest that information and audits remained important components of IOU EE programs into the 1990s. For example, the 1993-2013 demand forecast estimated cumulative savings from PG&E's committed conservation and efficiency programs (excluding system efficiency savings) for 1991 to be 4,373 GWh. Of this total, almost one-third (1,430 GWh) is derived from "Energy Management Services." (California Energy Demand: 1993-2013, Volume XI: Demand Side Planning Program Savings Existing/Committed, California Energy Commission P300-93-014, June 1993, page 3-130-131.) According to PG&E's Annual Summary of DSM Programs for 1992, Commercial Energy Management Services help "commercial customers manage their energy consumption through a wide range of information and evaluation services." The Industrial Energy Management Services Program was similar to the Commercial Program, while in the residential sector "Energy Management Services" included surveys and energy efficiency education services. (PG&E Annual Summary of DSM Programs – March 1992, page II-47, PG&E Annual Summary of DSM Programs – March 1992, page II-48, PG&E Annual Summary of DSM Programs – March 1992, page II-25).

Fig. 4: 2009 CEC Revised Historic Savings

Figure 159: Distribution of Efficiency/Conservation Consumption Savings by Source

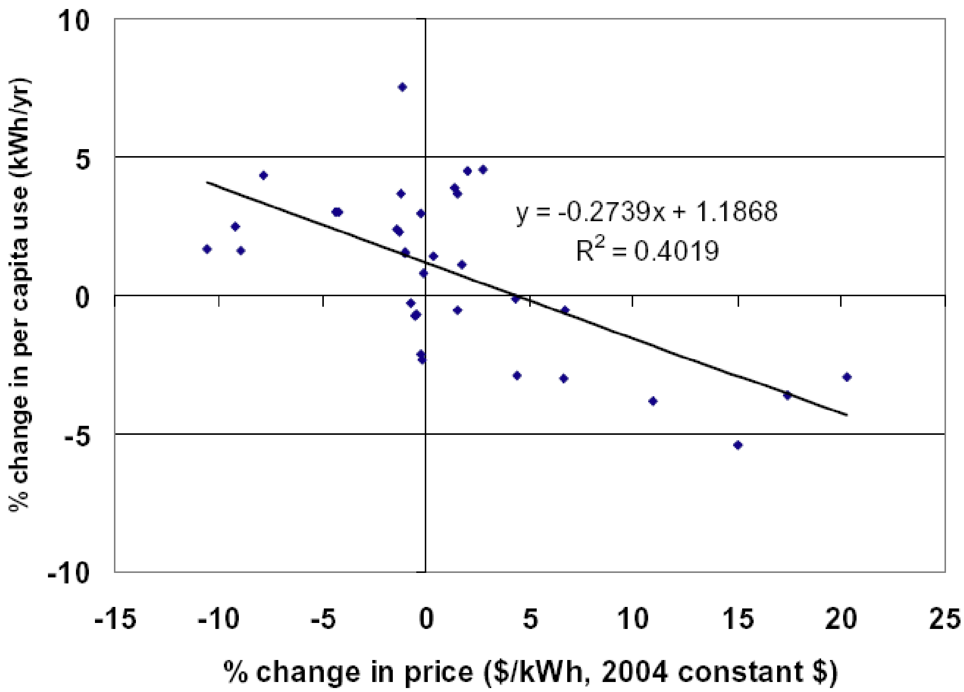


Source: California Energy Commission, 2009

At about the same time, Energy Economics, Inc.[8] 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 (Figure 5).

[8] Energy Economics Inc. is TURN's consultant on energy efficiency.

Fig. 5: Change in CA Per Capita Res Electricity Consumption vs. Change in CA Price of Res Electricity: 1970-2004



Despite these new findings, a widespread perception of the positive impact of utility EE programs on per capita electricity consumption remains. This is partly due to the attractive message that the original CEC graphs relayed. It is, however, also due to a misplaced faith in the reliability of utility reported savings from EE 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. The 2009 CEC graph sought to take these factors into account.

IV. Utility EE Programs: Post-Deregulation to Current

The importance of reliably verifying utility reported EE savings becomes clear once the data on the difference between utility reported and verified savings is examined. In California, that difference is large and has become more substantial over time. This trend can be seen from Table 1, which shows reported and evaluated savings as a percentage of goals for three utility EE program cycles: 2002-2003, 2004-2005, and 2006-2008. In the 2002-2003 program cycle utility reported kWh savings were 118% of the CPUC's EE goals for those years, a figure which fell to

104% once the savings were evaluated. This decline from reported to evaluated (14%) is small in comparison to the reduction for the 2006-2008 program cycle. For those years, the utilities reported kWh savings were 151% of the CPUC's EE goals, a figure that fell to just 62% of CPUC's EE goals once the results of the evaluations were factored in. A similar pattern was evident for kW and therm savings.

Table 1: Reported and Evaluated Net Savings as a Percentage of Goals: California Utilities[9]

Table 3. Reported and Evaluated Net Savings as a Percentage of Savings Goals since 2002*

	kWh		kW		Therms	
Program Cycle	**Reported**	**Evaluated**	**Reported**	**Evaluated**	**Reported**	**Evaluated**
2002-2003	118%	104%	104%	86%	98%	81%
2004-2005	127%	79%	133%	75%	182%	55%
2006-2008	151%	62%	122%	55%	117%	50%

*In this table the 2002-2003 and the 2004-2005 accomplishments are compared to IOU program specific goals; and in 2006-2008 the CPUC adopted goal is the point of comparison.

The differences are important for several reasons. First, in California energy efficiency is the first loading order resource.[10] This means that savings from utility EE programs are factored into the demand forecast every two years and therefore have to be reliable if the state is to ensure that it has sufficient supply to meet the demand for electricity. Second, utilities are required to deliver cost-effective programs. They plan their programs based on assumptions about the level of savings that are likely to be produced and the cost of delivering those programs. If the benefits of the programs, in terms of the value of the savings generated, are higher than the costs, then the program is deemed to be cost-effective. However, if utilities over-estimate the prospective savings due to their programs (and under-estimate the effect of price or market transformation, for example), then, once savings are evaluated and verified, their programs may turn out to be not cost-effective and ratepayers' money has been wasted. Third, while electricity consumption accounts for approximately 25% of the state's GHG emissions, current government

[9] Source: 2006-2008 Energy Efficiency Evaluation Report, July 2010, page xi: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/2006-2008+Energy+Efficiency+Evaluation+Report.htm Click on Main Report

[10] Energy Action Plan 2003. http://docs.cpuc.ca.gov/published/REPRT/28715.htm,

policies assign 40% of the AB 32's GHG reduction targets to the electricity sector in part via energy efficiency.

In California, there are a number of indications to suggest that the cost-effectiveness requirement for utility programs is at best being marginally met. In the first place, the 2006-2008 portfolios showed a startling reduction in cost-effectiveness once the cost-effectiveness tests[11] were calculated on the basis of post-utility program measured and verified savings (see Table 2). For example, statewide the reported cost-effectiveness was 2.52 but, once the evaluated savings had been factored in, the benefits declined and the evaluated cost-effectiveness fell to 1.14 (Table 2). Second, the 2010-2012 portfolios, which are very similar in terms of EE programs to those of 2006-2008, are less cost-effective than the 2006-2008 portfolios *as reported by the IOUs* and are likely to be even less so if the full findings from the 2006-2008 evaluation process were incorporated into the cost-effectiveness analysis. (Table 2)

[11] Cost effectiveness is generally measured and expressed as a ratio of benefits relative to costs or B/C. Benefits are the estimated long-run cost savings in utility capital and operating costs that are avoided over the life of the energy efficiency programs. Costs are the total costs of the EE programs, that is, ratepayer and participant costs.

Table 2: The Difference between Utility Reported and ED Evaluated Cost-Effectiveness of the 2006-2008 Energy Efficiency Portfolios[12]

Table 32. Utility Reported and Evaluated Cost Effectiveness[76]

(Values in Million $)	Reported			Evaluated		
IOU	Benefit	Cost	Ratio	Benefit	Cost	Ratio
PGE						
Program TRC[1]	$3,110	$1,068,	2.91	$1,253	$1,069	1.17
Program PAC[1,2]	$3,110	$852	3.65	$1,253	$852	1.47
SCE						
Program TRC	$2,193	$984	2.23	$1,169	$984	1.19
Program PAC	$2,193	$638	3.44	$1,169	$638	1.83
SDGE						
Program TRC	$604	$276	2.19	$281	$276	1.02
Program PAC	$604	$206	2.93	$281	$205	1.37
SCG						
Program TRC	$471	$205	2.30	$184	$205	0.90
Program PAC	$471	$117	4.01	$184	$116	1.59
Statewide						
Program TRC	$6,381	$2,534	2.52	$2,886	$2,534	1.14
Program PAC	$6,381	$1,815	3.52	$2,886	$1,810	1.59

[1] B/C Ratio is an approximation because any supply cost increases are treated as negative benefits rather than as a cost as in the Standard Practice Manual

[2] PAC benefits include environmental costs. This is to be consistent with the TRC benefits, but is not strictly consistent with the Standard Practice Manual.

These overall portfolio cost-effectiveness' disguise some very large reductions in the cost-effectiveness of specific programs, particularly those that rely heavily on lighting for savings. For example, the cost-effectiveness for PG&E's Residential Mass Market (primarily lighting CFLs) program declined from the utilities' claimed cost-effectiveness of 4.23 to an evaluated cost-effectiveness of 1.00. Likewise, SCE's Residential Incentive Program (also primarily lighting CFLs) claimed a cost-effectiveness of 4.25; a figure that fell to 1.25 once *evaluated* benefits were taken into account.[13]

[12] Source: 2006-2008 Energy Efficiency Evaluation Report, July 2010, page 126: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/2006-2008+Energy+Efficiency+Evaluation+Report.htm Click on Main Report. "TRC" is the "Total Resource Cost" test and reflects all costs, that is ratepayer and participant costs. "PAC" is the "Program Administrator Cost" test that only includes the utility – ratepayer program costs. The TRC is the primary test of cost-effectiveness.

[13] 2006-2008 Energy Efficiency Evaluation Report, July 2010, Appendix A: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/2006-2008+Energy+Efficiency+Evaluation+Report.htm Click on Appendices

Table 3: The Cost-Effectiveness of the 2010-2012 Energy Efficiency Portfolios under Different Input Assumptions

Summary of the Cost-Effectiveness of the IOUs' 2010-2012 Energy Efficiency Portfolios per the Utilities and CPUC Energy Division		
	Utility Projected Cost-Effectiveness	CPUC Energy Division Adjusted Cost-Effectiveness
PG&E	1.30	0.85
SCE	1.17	0.81
SDG&E	1.33	0.87
SoCalGas	1.50	0.92

The CPUC's Energy Division's analysis shows that if the input data for the key variables are based on findings from the 2006-2008 EM&V process, the IOUs' 2010-2012 portfolios are not cost-effective.

A worrying signal is that while the 2010-2012 programs include an additional $1 billion of funding,[14] they are remarkably similar to the 2006-2008 programs, whereas the savings goals that the IOUs are required to meet are only marginally higher. The portfolios remain heavily reliant on lighting measures and CFLs in particular. Continued reliance on CFLs may be one reason why the cost-effectiveness of the portfolios is likely to decline. In the residential sector, the IOUs' estimates of the cost-effectiveness of the 2010-2012 CFL measures is higher than would be the case if the findings from the 2006-2008 evaluations were included in the input data (Table 4). In the case of PG&E, the CFL measures would not be cost-effective at all.

[14] The IOUs' 2006-2008 EE Portfolios had a ratepayer price tag of $2.2 Billion; the 2010-2012 Portfolios have an approved budget of $3.1 Billion.

Table 4: The Cost Effectiveness of Residential Upstream Traditional CFL Measures under Different Input Assumptions: IOU Reported and ED Adjusted (to reflect the 2006-2008 evaluation results)

Utility and Energy Division Estimates of the Cost-Effectivness of Residential Upstream Traditional CFLs: 2010-2012 Energy Efficiency Portfolios					
		Utility		Energy Division (adj)	
	# of CFLs (millions)	% Net GWh Portfolio Savings	Cost Effectiveness	% Net GWh Portfolio Savings	Cost Effectiveness
PG&E	10.6	5	1.32	3	0.72
SCE	15.4	10	1.99	9	1.27
SDGE*	9.5	33	1.66 - 1.72	30	1.06 - 1.15

* SDGE provides CFL measure information by bulb wattage.

Source: Utility data are based on SDG&E 10-12 4g3.xls, PG&E 10-12 4g5.xls, and SCE 10-12 4g.xls (total portfolio compliance filing submitted E3 imported into most recent E3 calculator with all corrections/changes); Energy Division Adjusted data are based on SDG&E 10-12 4g3 ADJUSTED.xls, PG&E 10-12 4g5 ADJUSTED.xls , and SCE 10-12 4g ADJUSTED.xls (with input tab DG14 set to low which reflects the findings of the 06-08 EM&V process and DEER 2.05 values). The Excel files are available from: ftp://deeresources.com/pub/WorkpaperReview/10-12Phase1/ , file group All_IOU_TRCscenarios_v2_2010-11-29FullDetail.exe .

With an additional $1 Billion added to the 2010-2012 IOUs EE Portfolio budgets, TURN believes it will be hard for the IOUs to produce cost-effective savings, especially if the realization rates (utility claimed to CPUC ED measured and verified savings) of the programs do not improve over those evaluated for 2006-2008. One of the key issues is that a large proportion of the program expenditures are channeled into non-resource and non-incentives costs (Tables 5-7).

Table 4: Non-Resource Costs in the 2010-2012 EE Budget

Non-resource Costs as a Percentage of Total EE Budgets: 2010-2012 Portfolios			
	Total Budget ($m)	Non-Resource Budget ($m)	% Non-resource
PG&E	$ 1,338	$ 196	14.7
SCE	$ 1,228	$ 115	9.4
SDGE	$ 278	$ 77	27.8
SoCalGas	$ 285	$ 67	23.5
Total	$ 3,129	$ 456	14.6

Source: IOUs' November 2009 Compliance Filing Tables, Table 4.2: IOU Portfolio Budget by E3 Format

Table 5: Breakdown of Portfolio Budget for 2010-2012: All IOUs

TABLE 2				
	ALL IOUs			
	Resource	Non-Resource	Total	Non-Resource % Total
Adminstration	$ 264.0	$ 71.0	$ 335	21%
Marketing & Outreach	$ 248.0	$ 39.0	$ 237	16%
Incentives / Rebates	$ 1,444.0	$ -	$ 1,444	0%
Direct Implementation	$ 659.0	$ 329.0	$ 988	33%
EM&V	$ 108.0	$ 19.0	$ 125	15%
Total	$ 2,723.0	$ 458.0	$ 3,129	15%

Table 6: Incentives (Rebates) in the IOUs' EE Portfolio Budgets

Incentive Costs in the IOUs' 2010-2012 EE Program Budgets ($ millions)

	PG&E	SCE	SDG&E	SoCalGas	Total
Total Budget (inc. EMV)	1,338.0	1,228.0	278.0	285.0	3,129.0
Non-incentive costs	844.3	588.5	127.6	131.6	1,692.0
Incentive Costs	**493.7**	**639.5**	**150.4**	**153.4**	**1,437.0**
Incentives as % total budget	37%	52%	54%	54%	46%

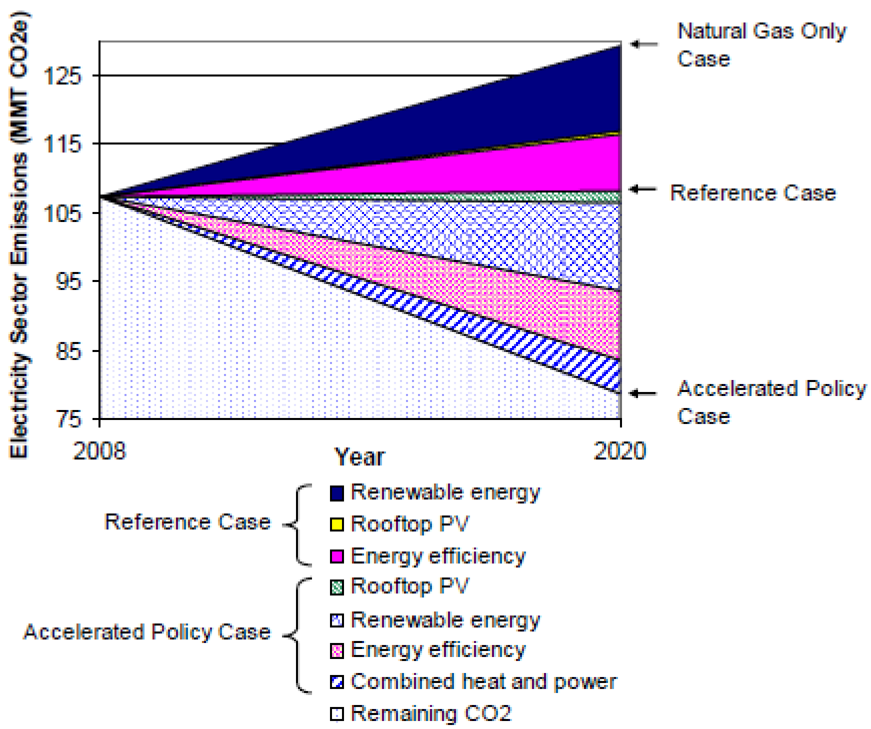
Source: IOUs' November 2009 EE Budget Placemats

V. Energy Efficiency Policy Implications Relative to AB 32 GHG Emission Reduction Requirements

Language found in state policy documents often fails to stipulate how the necessary GHG reductions are to be achieved: whether through energy efficiency (EE), consumption reduction, a shift to renewable sources of electricity (RE), or some other mechanism. The following figure, taken from p. 38 of the "Final Opinion on Greenhouse Gas Regulatory Strategies," however, assigns renewables (RE) and energy efficiency (EE) major shares of the stipulated GHG reductions. Reduction in energy (electricity) consumption is not found in this chart, because the general assumption is that we can get there by relying on these two supply side solutions—renewables and energy efficiency—to deliver the reductions.

Figure 3-1

2020 GHG Emissions in Three Key Scenarios



EE often tops the lists of strategies by which policy makers hope to achieve these goals: "Energy efficiency is extremely important for limiting the economic impacts of GHG reduction on consumers and the economy as a whole,"[15] but these statements are never accompanied by an

[15] The CPUC's October, 2008 "Final Opinion on Greenhouse Gas Regulatory Strategies", p. 41.

explanation of how the means (energy efficiency) can be expected to lead to the end (GHG reductions).

The Air Resources Board goes even further, arguing that the electricity sector can be expected to contribute a disproportionate share of the required reductions in GHG emissions: "ARB's Draft Scoping Plan would assign approximately 40% of the economy-wide responsibility for mandatory emissions reductions to the electricity sector, even though electricity represents only 25% of the statewide emissions."[16] Policy makers in CA clearly expect (electricity) energy efficiency to play a major role in achieving AB32's goals.

TURN Figure 6 below, which quantifies the required change in GHG emissions solely in terms of reductions in electricity consumption is another interpretation of how to achieve the goals of AB32. Reduced electricity consumption is a metric more tightly coupled to the goal of GHG reductions than either EE or RE, and it involves not just experts but invites the public to participate in pursuit of this goal. It also is less subject to obfuscation. When electricity consumption is reduced directly by individuals, households, institutions, the reduction registers at the meter, the utility bill, and people's consciousness.[17]

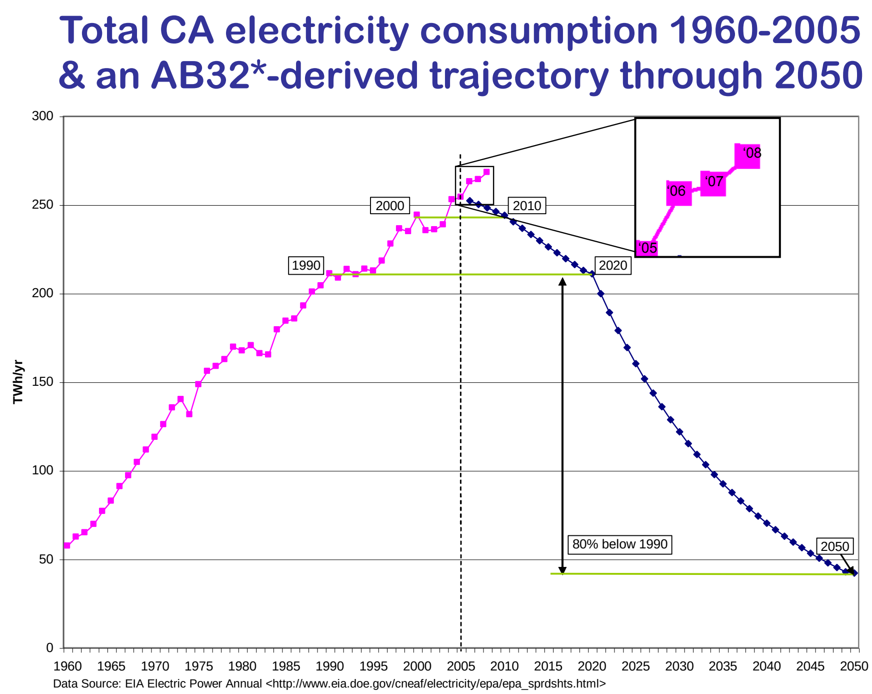
Neither renewables nor energy efficiency have to date yielded any absolute reductions in California's GHG emissions, but have instead (arguably) resulted in a change in the rate of growth in energy consumption and GHG emissions. TURN expects substantial reductions in electricity consumption will be required to meet these goals. Our decision to represent both past and future consumption was meant to put the future courses of action into context. Our chart not only extrapolates into the future, it explicitly includes the historical consumption trajectory as a point of reference. If Californians generated the equivalent GHG emissions in the 1950s that AB32 demands of the State by 2050, this casts the objective in a less speculative light than the chart reproduced above.

[16] Ibid., p. 122.

[17] See Attachment 4: Energy Savings from EE vs. GHG Emissions and Energy Consumption Reductions for a discussion of the important differences in these metrics.

What mix of energy efficiency, renewable energy, or reduction in consumption will ultimately be involved is unclear, but we believe that consumption reduction will play a much larger part than policy makers currently assume in their reports.

TURN Figure 6



* Executive Order S-03-05 stipulates the 2020 & 2050 targets
Source: Reuben Deumling, Associate Energy Economics Inc. *Separating Means and End: Reorienting Energy Efficiency Programs and Policy Toward Reducing Energy Consumption in California*