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September 24, 2003

To Interested Reviewers

The attached paper, **A Discussion of Proposed Energy Savings Goals for Energy Efficiency Programs in California,** has been prepared to expand upon the exploratory analysis of energy savings goals presented in the *Public Interest Energy Strategies* report published in August 2003 as part of the Commission's *Integrated Energy Efficiency Report* Process.

This analysis builds upon that exploratory analysis to recommend a specific set of electricity savings goals for California's energy efficiency programs, a process for disaggregating these goals down to utility service territories, and recommendations for reviewing and monitoring progress toward these goals.

We seek comments from interested parties on the methods used, the data analysis, and the overall recommendations in this report to help guide the State's efforts to meet the ambitious energy savings set out in the Energy Action Plan.

Comments should be sent to Mike Messenger at mmesseng@energy.state.ca.us with copies to John Wilson [JWilson@energy.state.ca.us] and Rosella Shapiro (RShapiro@energy.state.ca.us), our principal advisors. Please provide your comments by e-mail by no later than October 18, 2003. We appreciate your time and any input you may provide.

Sincerely,

Robert Pernell
Commissioner and Presiding Member,
Efficiency Committee
California Energy Commission

Arthur Rosenfeld
Commissioner,
Efficiency Committee
California Energy Commission

Discussion of Proposed Energy Savings Goals For Energy Efficiency Programs In California

Mike Messenger
Energy Efficiency and Demand Analysis Division
California Energy Commission

STAFF PAPER

DISCLAIMER

September 2003
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Discussion of Proposed Energy Savings Goals for Energy Efficiency Programs In California

Final Draft from Mike Messenger
September 18, 2003

TABLE OF CONTENTS

Discussion of Proposed Energy Savings Goals for Energy Efficiency Programs in California

Final Draft from Mike Messenger
September 22, 2003

Summary

California Energy Commission staff has analyzed the cost effectiveness and feasibility of rapidly ramping up energy efficiency program efforts over the next decade. As a result of this analysis, staff recommends the joint action agencies set short term and long term energy efficiency savings goals for energy efficiency programs funded by public goods charges (PGC) and supplemental procurement decisions.[1] We recommend setting goals to achieve 6,000 gigawatt-hour (GWh) per year of annual savings by 2006, 12,000 GWh by 2008, and 30,000 GWh by 2013. Achieving the recommended long-term goal would be equivalent to reducing per capita energy use by 0.3 percent per year over the next decade from 7,145 kilowatt-hour (kWh) per capita in 2003 to 6930 kWh per capita in 2013. This is also equivalent to meeting roughly 50 percent of the projected increase in electricity usage over the next decade.

It is worth noting that sustained reductions in per capita electricity use over a 10-year period have never before been achieved in any industrialized country in modern times. California's sterling record in maintaining roughly constant electricity use per capita of 7300 kWh over the last decade suggests achieving this magnitude of reductions may be achievable but to a significant extent actually reaching the goal will be dependent upon factors beyond the scope of this analysis such as trends in the energy intensity of California's industrial output. Our analysis suggests achieving this goal would require energy efficiency programs to achieve cumulative annual energy savings above 30,000 GWh per year by 2013. This would require an average annual savings of 2,000 GWh from new or expanded program efforts in addition to current level of annual savings reported by utility administered programs of roughly 1600 GWh per year over the last decade.

We believe that simply setting a goal and establishing a method to track progress would be a significant accomplishment in and of itself. We also believe that California's energy efficiency infrastructure will respond positively to the Commission's adoption of electricity savings goals by increasing their marketing efforts and creating more efficiency choices for Californian's .For these reasons, we urge the Commission's to set specific energy savings goals for 3, 5, and 10 year increments as soon as possible.

[1] This report did not consider the potential to achieve additional energy savings from building and appliance standards because this task would require the development of a different methodology. However, it may be a good idea to set similar energy and peak savings goals for these programs on a three to five year cycle.

Introduction

Policy makers in California have called for the establishment of aggressive savings goals for energy efficiency programs and renewable generation resources. This call was motivated in part by the success of energy efficiency programs and customer actions in reducing the probability for rolling outages in the summer of 2001 when peak demand was reduced by at least 3,000 megawatts (MW) in 2001. This paper analyzes the remaining potential to save more electricity through investments in energy efficiency programs, recent trends in program effectiveness and the underlying growth in demand to develop a short and long-term goal for electricity savings to be achieved by energy efficiency programs, appliance standards, and building standards.

In addition, the legislature has set a goal of producing at least 20 percent of the state's electricity generation using renewable resources for electricity generation over the next 15 years. This paper combines the expected contribution of renewables with the goals set here to assess whether or not the state could achieve the goal of meeting all incremental electricity use over the next decade through efficiency programs and renewables.

The public policy objectives to be achieved by setting and reaching an electricity savings goal include minimizing future electricity procurement costs, reducing environmental emissions during peak periods, and providing a hedge against future price instability in the wholesale generation market. An important question for policymakers is how to select energy savings goals that represent a challenge or stretch for program administrators on the one hand but do not divert scarce societal resources to achieving a high level of program savings that might not be cost effective or desirable in comparison to other alternatives available to meet customer's energy needs. This analysis strikes that balance.

This paper builds off of some preliminary analysis in the Energy Commission's PIES report to recommend both near term and long-term savings goals for energy efficiency programs currently operated by Investor Owned Utilities (IOU) and the state's energy agencies.[2] The preliminary analysis analyzed the energy impacts of different levels of overall program funding on the statewide forecast without consideration of how or whether current administrators could rapidly ramp up program funding levels to achieve additional electricity savings. In addition, this analysis did not set a firm goal. This analysis looks at these factors in more detail and develops proposed goals for the short and long-term.

[2] Energy Commission Staff, Chapter 3, in Public Interest Energy Strategies Report (CEC Publication Number 100-03-012D; August 8, 2003).

Roadmap of the Report

This report is organized as follows:

- Section 1 identifies criteria for setting energy efficiency program savings goals.
- Section 2 reviews estimates of the economic potential to increase energy savings through programs that encourage the installation of energy efficiency measures and compares these estimates with the levelized cost of supply alternatives.
- Section 3 examines the feasibility of achieving higher annual energy savings levels in light of past program experience and trends in program cost effectiveness.
- Section 4 develops estimates of the program savings levels over the next decade that would be necessary to achieve with three different per capita electricity savings targets, ranging from achieving constant per capita electricity use to achieving a decline in per capita use of 1 percent per year.
- Section 5 recommends short and long-term energy savings goals based on the proceeding analysis.
- Section 6 proposes a process to use in monitoring progress towards these goals and making periodic adjustments based on program results and the observed demand for electricity.
- Section 7 summarizes the key findings from this analysis.
- Section 8 provides a recommended set of next steps.

We conclude that while it may be technically feasible to meet the goal of meeting all incremental load over the next ten years[3] through investments in energy efficiency from these programs, it would not be wise to adopt this aggressive goal until more experience is gained with respect to the program's ability to rapidly ramp up both funding and achieve incremental savings in the first few years of the proposed program ramp up. Accordingly, we recommend setting a slightly less ambitious term savings goals of 12,000 GWh by 2009 and 30,000 GWh per year by 2013.

[3] The estimated incremental annual electricity usage for California is roughly 43,000 GWh per year or roughly 14 percent of projected demand of 298,000 GWh per year in 2013.

Section 1 - Criteria to Consider in Developing Efficiency Program Savings Targets

The following criteria should be used in setting electricity savings targets or goals for the next decade:

1. Targets should utilize current information on energy efficiency potential to define upper savings limits but be realistic in assessing the ability of programs to quickly ramp up spending to achieve maximum feasible or cost effective energy savings.

2. Targets should be consistent with past program administrator's experience in procuring and capturing energy savings and be consistent with future expectations regarding the timing of energy efficiency savings to meet, base load, shoulder or peaking conditions.

3. Targets should be easily understood by practitioners in the energy efficiency industry and capable of being used as a motivational tool for public and private stakeholders.

4. Targets should be long term in nature and not be changed on an annual basis in response to cycles in utility procurement practices, generation contract signings, short term market swings, or utility financial practices.

In addition to consideration of these criteria, it is important to consider the effect that the addition of conservation resources will have on the overall portfolio of generation and transmission investments that will be used to meet customer energy needs. This paper considers three economic criteria to help select the right level of conservation resources.

Expansion of energy efficiency program funding may be warranted for at least three separate economic reasons:

1. The cost of shifting or reducing the energy usage at a particular time of day is less than or equal to the cost of supplying the same energy needs via contracts with generation resources.

2. Investments in these efficiency programs as part of the overall portfolio of resources to meet systems demands can be shown to reduce the overall risk of supply shortages, volatile prices, or reliability problems by diversifying risk.

3. Investing in programs that have specific load savings profiles or geographic impacts will reduce or eliminate the environmental impacts from specific generation or transmission facilities identified as having "unacceptable" cost or other impacts on local communities.

Section 2 - Review of Economic Potential for Energy Efficiency Programs

In the past two years, the investor owned utilities have funded a series of studies investigating the potential to increase the number of energy efficiency investments made by customers and businesses in specific segments over the next decade. This section uses the estimated cost and energy savings data from these reports to estimate the magnitude of savings that could be achieved by programs at a cost equal to or less than the projected cost of supply alternatives. In this section we build on the generalized cost of supply curves constructed in these reports by disaggregating measures into different parts of the utility load curve and examining the relevant marginal supply cost for each time period.

This section discusses how the estimated levelized cost of future energy efficiency programs can be used to bound or develop estimates of realistic increases in program funding. We conclude that the costs of new efficiency programs should be compared to the costs of providing generation in specific load blocks or shapes using either supply curves or levelized cost comparisons. This analysis then used to bound the likely range of program funding increases over the next 10 years based on economic comparisons described in criteria #1 only. We do not have the time or the resources to scope out the additional value provided by consideration of factors 2 and 3 above. We note that this "omission" is likely to result in more conservative estimates of optimal future funding levels.

The most recent evaluation of the potential to obtain increased savings from energy efficiency investments or "measures" in California was completed for the Energy Foundation based on studies funded by the state's investor owned utilities. This study estimated the remaining potential to reduce energy usage by influencing customers to make energy efficiency investments over the next 10 years. The study examined estimates of market saturation for a list of over 200 measures for the residential, commercial and industrial sectors. Cost of conserved energy supply curves were generated that showed additional energy savings could be achieved equivalent to 10 percent of total electricity sales in 2011 at a levelized cost of less than 5 cents per kWh.[4]

This overall "averaged" supply curve does not discriminate between the load profile impacts of measures which primarily save energy use during peak periods and those which save energy on a daily basis year round. However, the study does present information that allows us to make this transformation using the conservation load factor (CLF) associated with each measure: CLF = Average annual savings/system peak load savings. This information can be used to discriminate between energy savings from measures that will primarily affect demand during the base load, shoulder, and peak load energy use blocks in the following bins:

[4] Mike Rufo and Fred Coito, California's Secret Energy Surplus. (Hewlett Foundation; September 2002, pages 3-4)

Type 1 - Base load - Efficiency Measures that save energy for 4380 to 8760 hours per year. Examples: (Lighting or cooling measures in facilities running 7 days per week, 24 hours per day or at least 90 percent of normal daylight operating hours.)

Type 2 - Shoulder - Measures that save energy for 1000 to 4379 hours per year Examples: Expected savings from more efficient HVAC and lighting measures in commercial buildings.

Type 3 - Peak Savings - Measures save energy during peak periods for 400-999 hours per year. Example: Efficiency measures such as more efficient central air conditioners that primarily reduce residential cooling loads. Note these are not super peak or "demand response" resources that can be called on to reduce load for the highest 50 to 100 hours per year, but once implemented should reduce the overall average peak load during summer months.

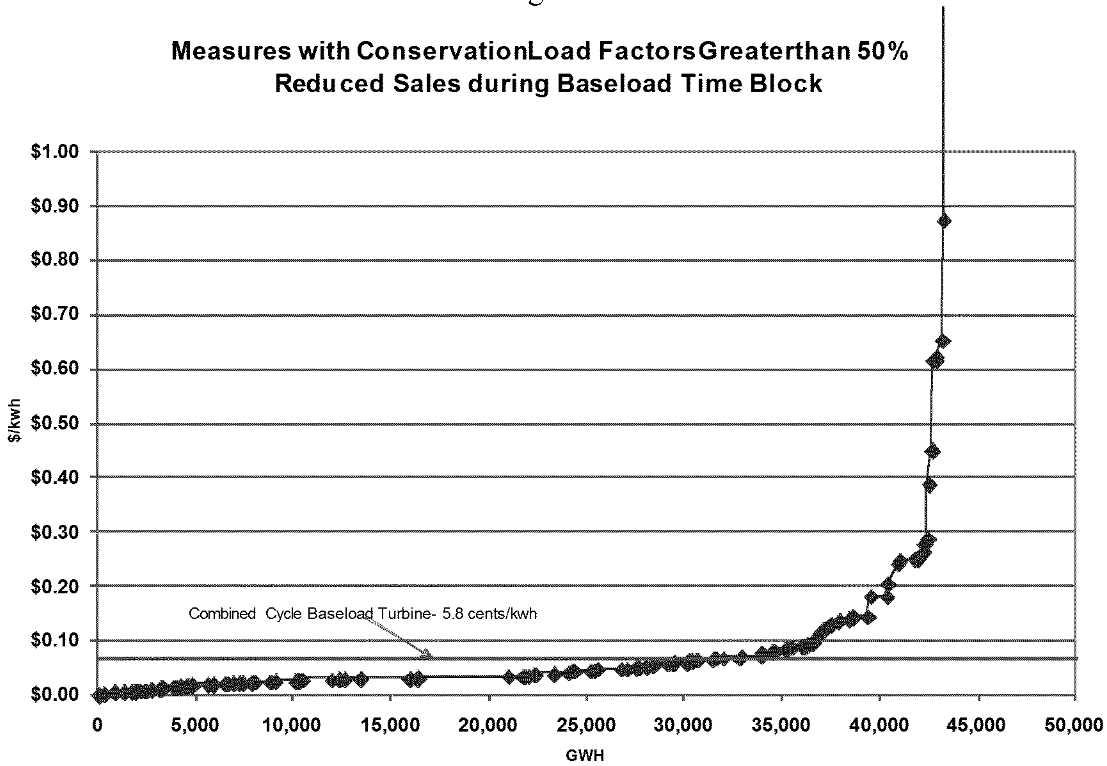
Note: We do not estimate the potential for various kinds of load management systems to reduce loads from 50 to 399 hours per year in response to emergency conditions.

Staff has constructed cost of conserved energy estimates based on the expected timing of energy savings from the energy measures included in the Hewlett Foundation study. This provides us with a better perspective of how much the energy savings from groups of efficiency measures will be available to meet specific load shape needs identified in the utilities' procurement process and their costs.

Potential to Achieve "Economic" Savings from Base Load Energy Efficiency Measures

Figure 1 provides an estimate of the annual GWh savings available from "base load" measures that operate for the majority of the year and thus generate savings during the base load period. The GWh savings numbers represent the summation of annual savings estimates from the Hewlett Foundation study but sorted by the time period of the expected impacts. These measures tend to have lower costs of conserved energy because the cost of achieving these savings is spread across a larger number of operating hours per year. However, these measures also face stiffer price competition from supply side alternatives whose levelized costs are also lower due to their higher utilization rates. The estimated levelized marginal cost of a base load generation alternative is 5.1 cents per kWh. (Source: Energy Commission Electricity and Natural Gas Assessment Report, Appendix D). This cost estimate does not include any environmental adders or the potential value for reducing green house gas emissions at the margin. Figure 1 shows how much annual energy savings could be purchased at different levels of annualized costs over the next decade.

Figure 1



Data Source: Mike Rufo et al, *California's Secret Energy Surplus*, (Hewlett Energy Foundation, October 2002)

The relevant competitive supply option for this time period is a combined cycle gas turbine with a levelized cost of 5.18 cents per kWh at the generation level. This estimate is adjusted upward to 5.8 cents per kWh to account for distribution and transmission line losses of 10 percent. This figure can be used as a benchmark for deciding what level of additional conservation investments should be pursued over the next 10 years.

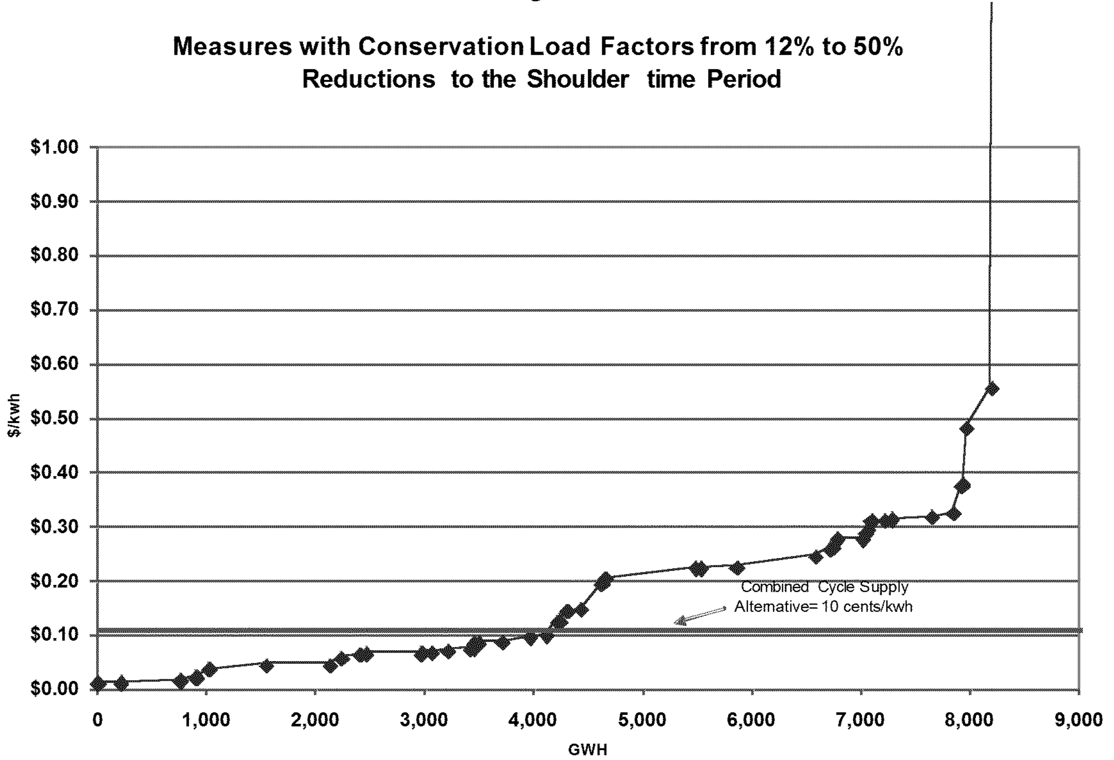
Based on this graph, an additional 31,575 GWh of conservation resources could be obtained at a levelized cost of less than the 7 cents per kWh benchmark. This potential drops to 28,521 GWh if the benchmark is 6 cents per kWh. Due to the fact that externalities are not included in the estimated supply costs, we will use the 31,575 GWh estimate.

We believe that this estimate of additional energy efficiency potential resources needs to be adjusted downward slightly to account for the conservation savings that have occurred since the data used to construct these curves was published in 2001. We reduce this amount by 2,000 GWh per year down to 29,575 GWh per year to account for program savings reported in 2000 and 2001.

Potential for Achieving Energy Savings from Measures that Reduce Load during the Shoulder Time Period

Figure 2 shows the level of annual savings that could be achieved over the next decade at various prices during the shoulder time period, from 8 a.m. in the morning to 1 or 2 p.m. in the afternoon. Measures in this time period produce electricity savings for roughly 1,500 to 4,500 hours per year, similar to the hours of operation for businesses open for 10 hours per day on weekdays and closed on weekends. These measures have load factors that range from .12 to .49.

Figure 2



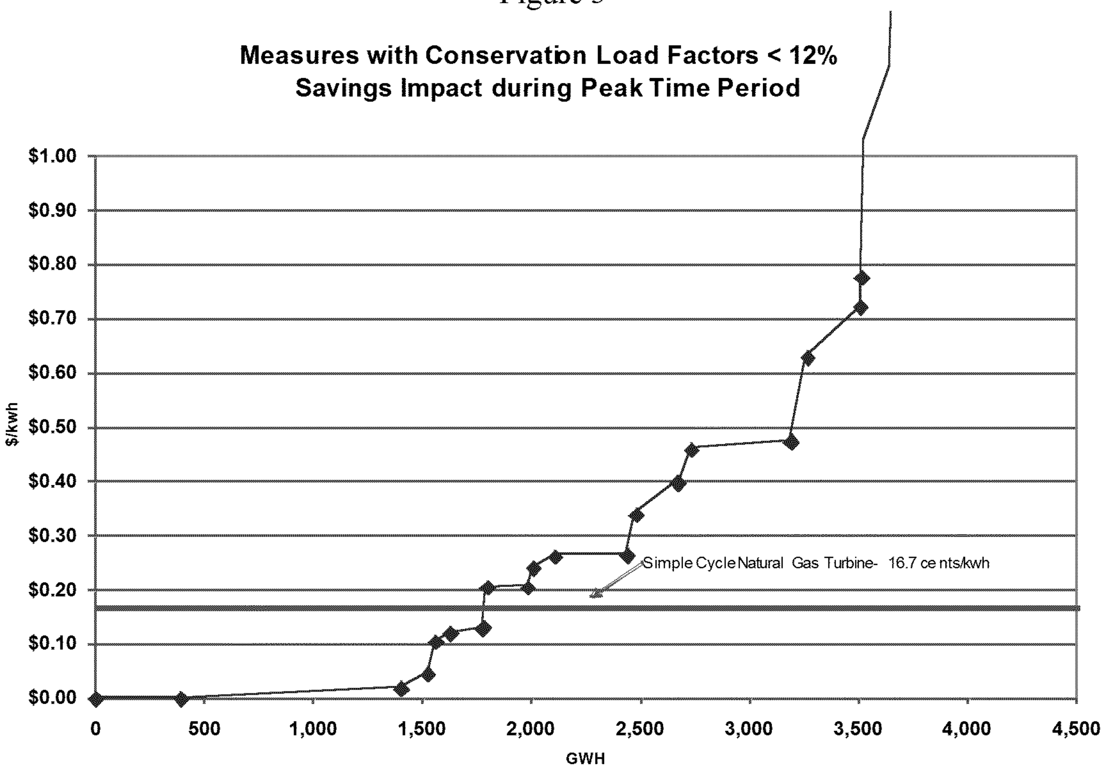
Data Source: Mike Rufo et al, *California's Secret Energy Surplus*, (Energy Foundation, October 2002).

The relevant supply cost benchmark for this group is probably a combined cycle turbine that operates from 1,000 to 4,300 hours per year. We estimate that the levelized cost of supply alternatives ranges between 7 cents per kWh for a simple combustion turbine run for 2,000 hours per year or 12 cents per kWh for a combined cycle operating for only 1,000 hours per year. Taking 9.2 cents per kWh as the median in the range and adjusting it upward to 10 cents per kWh to account for line losses, the chart shows that an additional 4,000 GWh of energy efficiency can be purchased at a cost of 10 cents per kWh or lower.

Potential for Savings from Energy Efficiency Measures that Reduce Peak Load for up to 1000 hours per year

Figure 3 presents the annual potential savings and levelized costs for measures whose impacts fall primarily in the peak period. The peak period is defined as the 700 hours that occur between 12 p.m. and 7 p.m. on weekdays between May and October (7 hrs/day *20 weekdays/month *5 months).

Figure 3



Data Source: Mike Rufo et al, *California's Secret Energy Surplus*, (Hewlett Energy Foundation, October 2002).

The relevant supply cost benchmark for these measures depends to a large extent on market conditions that exist throughout the Western States grid on any given day. We know that high prices were paid for this type of energy in 2000 and 2001 that ranged from 25 cents to 50 cents per kWh. Appendix D in the staff Electricity and Natural Gas Report estimates the levelized cost of a simple cycle gas turbine is 15.1 cents per kWh, which adjusted for line losses is 16.7 cents per kWh. A lower cost boundary of only 9.32 cents per kWh results if the turbine runs for at least 100 hours per year. Thus, the range of supply costs to serve peak demands in this time frame is between 9 cents and 50 cents per kWh.

For this analysis, we pick a conservative generation estimate near the low end of the range, 15 cents per kWh and then adjust for line losses to give a benchmark of 16.7 cents per kWh. Figure 1 shows the intersection of this supply curve and this price results in an additional potential savings of 1750 GWh per year.

Summary of Conservation Supply Curve Analysis

Table 1 shows the expected total conservation that could be purchased at a cost lower than the supply benchmarks provided in the previous sections.

Table 1
Economic Potential by Resource Time Block

Resource Period (1)	*GWh Per Year (2)*	*Average MW[5] (3)*
Base Load (8760 hrs)	29,575	3,424
Shoulder (1200 hrs)	4,000	2,600
Peak (560 hrs)	1,750	3,125
Total Savings	35,325	9,149

Base load efficiency measures contribute 84% of this total, suggesting that the state may need to look at other types of measures and in particular energy information and control systems if it wishes to specifically achieve energy savings during peak time periods. Consideration of time differentiated pricing and different types of demand response program could conceivably meet these needs.

This estimate of a potential to save 35,325 GWh per year is slightly lower than the findings from the generalized cost of conservation curve analysis presented in the Energy Foundation Study. Their analysis showed that expansion of utility conservation programs could be used to increase annual energy savings from roughly 5 percent of total electricity sales today (12,500 GWh per year) to 13-15 percent of forecasted electricity sales in 2013 (42,000-45,000 GWh per year) at an averaged marginal cost below or equal to 10 cents per kWh.

Limitations to the Use of the Economic Potential Study Results

Before proceeding to the next section, we should note that there are some shortcomings of the Energy Foundation potential study that may bias any estimate of the actual energy savings that could be achieved from this data.

[5] Average MW = # of GWh savings per number of hours in the time period of interest. The actual number of hours used is shown in the parentheses in Column 1. Example 30,000 GWh/8760 hours = 3,424MW.

Factors suggesting the energy savings estimates may be too high include:

- Economic potential in the foundation study is based on the hypothesis that a 100 percent increase in customer rebate levels will lead to a 100 percent increase in customer measure adoption and ultimately measure penetration for some programs. We find this assumption to be too optimistic.

- Administrative costs of reaching and convincing the final 10 to 20 percent of customers who have not invested in a measure found to be cost effective on average may be significantly higher than the constant administrative costs per customer assumed in this model.

Factors suggesting these estimates may be lower than possible include:

- Estimates of the potential energy and peak savings from new industrial energy efficiency measures, energy management control system effects, and effect of dynamic pricing on the potential of firms to reduce their energy use was not addressed.

- The estimates of the level of energy savings that can be achieved by energy efficiency programs assumes current administrative framework for program administration will remain in place for a decade. A new structure could produce more savings per program dollar spent. This question is currently being reviewed by the CPUC.

- This study includes no estimates of the potential savings from new or emerging technologies bound to be invented and or introduced over the next decade.

It is not reasonable at this time to predict or quantify how these factors are likely to interact and lead to either higher or lower savings estimates overall. Thus, we choose to use the best available estimate today and make revisions in the future.

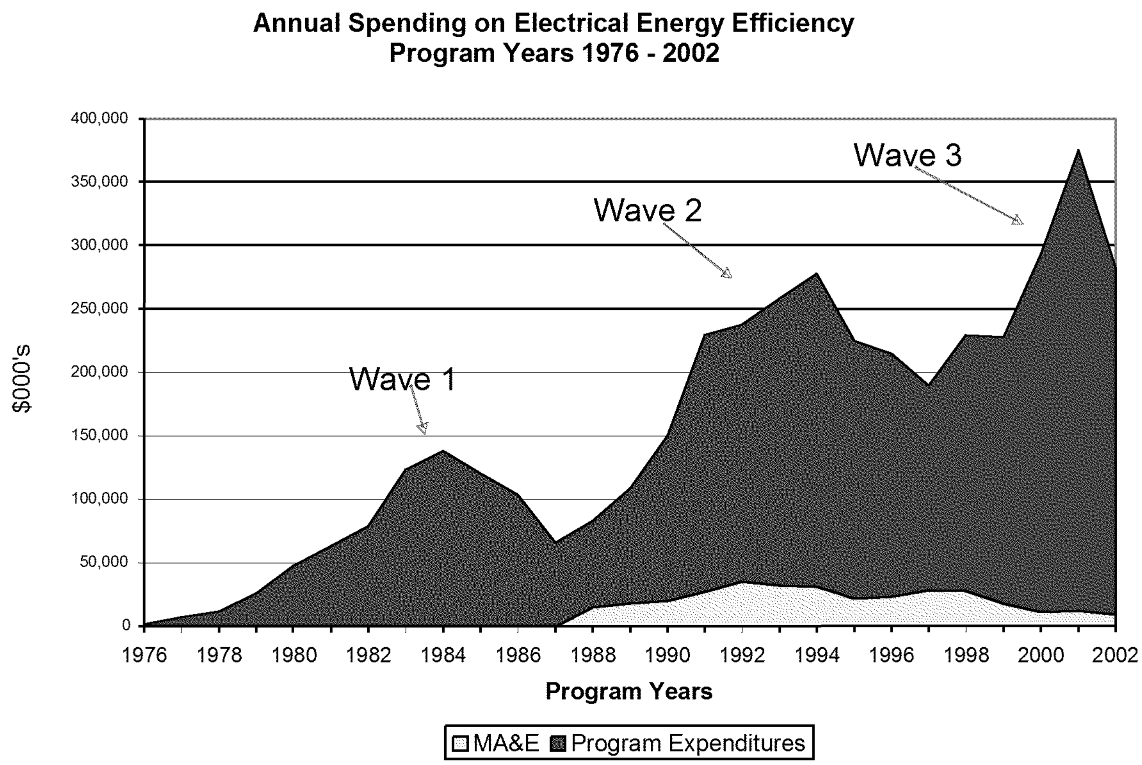
We conclude that the cost effectiveness of available efficiency measures is probably not the limiting factor in achieving a large increase in effective electricity savings for all ratepayers by 2013. Rather, there may be other limits to achieving this potential based on the costs of recruiting customers to participate, convincing them to invest via increased rebates or better information, and or the ability of program administrators to ramp up program funding to achieve the desired energy savings targets. These potential barriers are reviewed in the next section.

Section 3 - Feasibility of Achieving Additional Energy Savings Quickly Based on Previous Program Experience and Trends in Cost Effectiveness

Review of Previous Attempts to Quickly Ramp up Energy Savings from Energy Efficiency Programs

This section reviews the success of past attempts to quickly ramp up energy savings from utility administered energy efficiency programs over the last 20 years. Review of the historical record suggests there have been three waves of energy efficiency funding increases with corresponding but not proportionate increases in energy savings. It is interesting to note that in each of the cycles, funding generally increases for five to seven years and then begins to fall back for two or three years before a new wave begins again. Figure 4 shows the overall pattern of expenditure for the last 27 years.

Figure 4



Source: Utility Annual Report Filings for Investor owned utilities, Independent Evaluations for municipal utility programs; 1977-2002. Nominal $.

Table 2 presents the level of program funding and savings increases recorded in each of these three energy efficiency waves and contrast the annual rates of program funding and savings increases that proved feasible within each wave.

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Table 2
Review of Energy Conservation Funding and Savings
Cycles Over the Last 27 years

Wave Description and Timing	***Funding and Savings at Bottom of the Cycle***	***Funding and Savings Level at Top of the Cycle***	***Percent Increase in Funding or Savings-Bottom to Top (%)***	***Annual Percentage Increase in Funding and Energy Savings During the Wave Period (%/yr)***
Oil Crisis 1978-1984 Period = 7 years				
Funding $ MM	12	138	1047	50.2
Savings GWh/yr	747	1795	239	15.7
Integrated Planning 1988-1994 Period = 7 years				
Funding $ MM	68	247	261	23.9
Savings GWh/yr	645	1937	200	20.4
Electricity Crisis 1999-2002 Period = 4 years? (Or 7??)				
Funding $ MM	210	405	93	24.5
Savings GWh/yr	905	1938	114	28.9

All estimates are in nominal $ not adjusted for inflation.

Review of this data suggests several trends and limits to the capacity to achieve additional savings from energy efficiency programs funded through public goods charges or ratepayer funds:

1. The highest funding level for each of the three levels represents roughly a doubling of the highest spending from the previous wave. The program funding peak was $139 million in wave 1, $247 million in wave 2, and $445 million in wave 3. This trend in wave peaks suggests that a fourth wave peaking in 2011 could hit $900 million if there were no other technical or economic constraints.

2. Actual energy efficiency program spending peaked in 2001, dropped substantially in 2002 and is likely to continue downward in 2003 and 2004 unless regulatory policy is changed.

3. Sustaining increases in program funding over a 3 to 6 year period is possible but is usually followed by a 2 to 3 year stable or down cycle in funding and savings achievements. Whether this phenomenon is the result of market saturation effects or cycles in regulatory support for energy efficiency programs is unknown.

4. The percentage increases in recorded energy savings achieved over a three to four year ramp up period are usually lower and sometimes lag increases in program funding.

5. Annual and peak energy savings from utility administered programs have never increased above 2000 GWh per year for first year energy savings and 700 MW in peak demand savings.

6. Peak savings from all state programs did reach 3000 MW in 2001 but this is primarily due to the infusion of an additional $300 million in program spending in the same year.

7. Funding levels in the first year of a ramp up period in the last 15 years have never exceeded a 50 percent increase and usually ramp up at a level of 20 to 30 percent per year. This was not true for the initial ramp up of energy efficiency program funding that went from $2 million in 1976 to $50 million in 1980. These "spending limits" are probably due to difficulties in hiring new staff, contractors and fielding new programs but could also be due to the structure of the organizations implementing the programs.

8. Despite the ebbs and flows of funding cycles, average annual spending on energy efficiency programs has trended upward at an impressive rate of 21.6 percent per year over 26 years.

Lessons learned from this review include:

1. A doubling or tripling of energy efficiency spending levels has never been achieved in one year and normally takes three to four years.

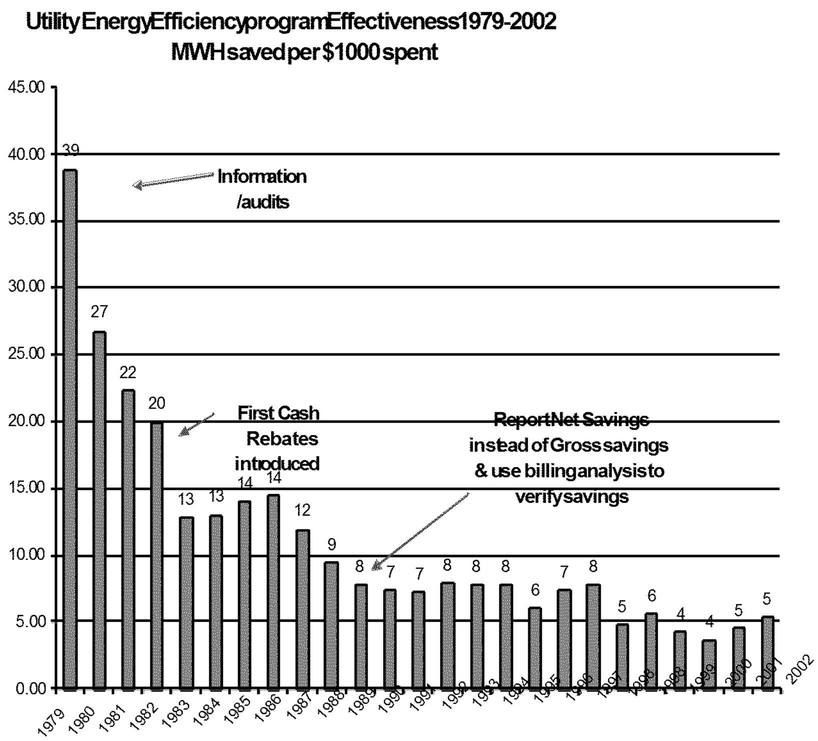
2. Gradually increasing funding levels over a three to six year period is likely to yield more energy savings and be more sustainable than a authorizing an 80 to 100 percent increase in funding during the first year of an expansion cycle. This is because the current administrative structure has historically encountered difficulties in actually spending the authorized level of funding during program ramp up periods.

3. The maximum rate of increasing program funding over a 5-year period appears to be in the range of annual program funding increases of 25 to 33 percent per year.

Review of Program Effectiveness Trends – Can the trend toward decreasing or flat energy savings returns per dollar spend be reversed

Analyzing the historical trends in efficiency program's effectiveness in achieving energy savings or kWh saved per dollar spent is probably more important than our analysis of the cyclic nature of program spending to determine what level of energy savings is achieved over the next decade. Figure 4 presents an analysis of the MWH saved per dollar of program spending reported by utility and state program administrators over the last 25 years. These numbers are not directly comparable to the cost of conserved energy curves because they include first year savings/first year program costs as opposed to annualize costs/annualized savings over the program life. If we make the conversion from kWh per dollar and from first year to levelized lifecycle savings, this chart shows the cost of conserved energy per program dollar (for all investor owned utility programs and SMUD) went from 0.1 cents per kWh in 1976 to 2.5 cents per kWh in 2002. This cost estimate does not include the full incremental costs of purchasing the efficiency investments but does include the costs of rebate which in some cases approach or even equal the incremental cost of the more efficient measure.

Figure 5
Trends in Utility Energy Efficiency Program Effectiveness



The downward trend in Figure 5 can be explained by major changes in both the composition of energy efficiency programs and measurement methods over time. At the beginning of the cycle, most of the utility programs provided recommendations via audits and information booklets but did not provide funds to reduce the cost of measures. Throughout the 1980s the program mix shifted toward offering customer rebates for specific measures which as Figure 2 decreased the yield or kWh per dollar of program spending.

Periodic strengthening of California’s building and appliance standards is another important factor that contributes to the decline in utility program effectiveness over time as measures that are promoted by programs in the early stages of their diffusion curve eventually become part of a mandatory standard. Major increases in the stringency of California's building and appliance standards requirements occurred in 1983, 1988, and 1994.

Most of these changes in program accounting rules, program mix and measurement changes contribute to the downward slide in program effectiveness. A similar change in measurement metrics led to a decline in reported savings between 1987 and 1990. In these years, utilities were ordered to report net program savings, which included a downward adjustment from 10 to 50 percent of gross savings to account for customers who report they would have made the energy efficiency investments independent of the program existence. In addition, utilities began to report savings from programs using billing analyses and control groups as opposed to simple engineering analyses during the same time frame. Both methodological improvements often led to slightly lower estimates of program savings.

In sum, the steep slope of declining program effectiveness in this chart is slightly misleading because it reflects changes in the type of programs delivered over time and changes in the measurement methods that mask any saturation effects or increased costs in either reaching customers or paying for the incremental costs of efficiency investments. The trend in this graph is consistent with the pattern of diminishing returns we would expect in most attempts to mine a commodity resource, be it energy efficiency potential or oil fields.

There are also some positive trends in this graph:

- The long downward slide in kWh saved per dollar spent appears to have stabilized in the last four or five years at an average value of 4.5 kWh per dollar or 2.3 cents per kWh on a levelized basis. (Assuming an average efficiency measure life of 10 years.)

- Reported program effectiveness actually increased to 5 kWh per dollar in 2001 and 2002 during the electricity crisis. This is due in part to the increased public receptivity to energy investments during the crisis.

- Additional general fund revenues of roughly $200 million per year were spent in 2001 and 2002 by state agencies to yield a significant increase in both GWh and MW saved. This spending also increased the overall program effectiveness ratio from 4.1 to 5.2 kWh per dollar program spending. However, these state level programs are not assumed to continue due to lack of available general funds.

The important question for the future is whether one should assume that this stabilizing trend in program effectiveness is likely to continue for the next 10 years or whether we should expect a continuation of the progressively lower energy savings per program dollar over time. We will address these factors after reviewing the energy savings targets proposed in this proceeding.

Section 4 - Review of Proposed Energy Savings Goals and their Impact on the Expected Growth in Statewide Electricity Usage

This section reviews the impact of setting per capita reduction goals on the overall forecast and then assesses the feasibility of using energy efficiency programs to reach those goals.

The baseline growth in demand for electricity in California is projected to increase by roughly 18 percent over the next 10 years or 1.6 percent per year, from roughly 256,000 GWh to 300,000 GWh per year statewide in 2013. Policy makers have searched for ways to reduce the expected increase in annual electricity use of roughly 44,000 GWh over the next decade by either by increasing spending for energy efficiency programs or increasing the rate of development of renewable generation. This section reviews how the achievement of different per capita energy savings goals would affect the overall demand for electricity in California.

Policy makers have asked staff to review the feasibility of achieving a range of per capita electricity reductions goals ranging from maintaining the historical constant per capita use levels (of roughly 7145 kWh per capita) to reducing per capita usage by 1.0 percent per year over the next decade. Table 3 illustrates the impact of achieving different levels of per capita savings goals on statewide electricity use over the next decade were achieved. Baseline projection is for per capita use to increase by .16 percent per year from 2003 to 2013. Goals 1 through 4 illustrate the impact of different per capita savings goals on overall energy use. These calculations demonstrate that significant increases in program savings will be necessary to achieve the goal of holding electricity use constant over the next decade, equivalent to reducing per capita usage by 1.5 percent per year or annual savings of 45,527 GWh by 2013.

Table 3
Translation of Electricity Use Per Capita Goals into Statewide Electricity Use over the next Decade (2003 - 2013)

Savings Goal #	Description of per Capita Electricity trend	Electricity Demand in 2003	Electricity Demand in 2008	Electricity Demand in 2013	Increase in Electricity use- 2013 vs 2003	Avg Annual Savings required to reach goal over 10 yrs =(bas-goal/10yrs)
		GWh/yr	GWh/yr	GWh/yr	GWh/yr	GWh/yr
--	Baseline=0.16%/yr increase per capita	256,476	281,773	299,586	43,110	0.0
1	Constant electric use per capita	256,476	276,717	294,954	38,478	509.5
2	Decline 0.3%/cap/year	256,476	272,591	286,224	29,748	1469.8
3	Decline 0.5%/cap/year	256,476	269,868	280,534	24,058	2190.9
4	Decline 1%/cap/year	256,476	264,989	266,751	10,275	3940.2
5	Decline 1.5%/cap/year	256,476	256,806	254,059	-2,417	5463.2

Comparison of the savings results to the savings goals would suggest that achieving all of the 35,750 GWh of potential over the next decade would allow us to meet the per capita savings goal between #3 (30,975 GWh) and #4 (45,527 GWh per year). This economic potential result of 35,750 GWh is also 83 percent of the policy goal of achieving all of the incremental growth in use during the decade of 43,110 MWH. However, the earlier constraints to rapid program ramp up and the fact that the incremental savings produced by 2002 program was only 1,475 GWh/yr suggest it will be important to examine the expected pattern of funding increase and overall savings over the next 10 years before setting a final goal.

Program Funding Trajectories Needed to Reach Each of these Savings Goals

Below we examine what levels of program funding and savings would be needed to reach each of these goals; consistent with the earlier discussion of the need to ensure the spending is cost effective and not rely on an unsustainable rapid ramp up of savings to achieve a long term savings goal.

Table 4 presents the annual program spending and estimated incremental and cumulative program savings that would be necessary to achieve three different efficiency program goals: constant per capita electricity use, declining per capita use by .5 percent per year and declining per capita use by 1.0 percent per year. The first row provides the baseline level of program funding whose impacts are already included in the baseline forecast. This table suggests that relatively significant increases ranging from doubling program funding to quintupling program funding would be needed to meet the per capita goals without any contributions from renewable energy sources.

Table 4
Match Between Per Capita Savings Goals, Program Funding Requirements and Energy Savings Achieved

Energy Efficiency Goal #	Description- Per capita trends 2003 to 2013	Annual Program Spending by 2008 (a)	Annual Program Spending by 2013 (a)	Cumulative Annual Savings Required over Decade to reach goal	Annual Energy Savings in 2013(cumulative over 10 yrs)- optimistic case	Annual Energy Savings in 2013- cum over 10 years realistic case (.8*col 6)
		$ millions	$ millions	GWh/yr	GWh/yr	GWh/yr
Col # 1	2	3	4	5	6	7
Baseline Forecast	Increase by 0.16%/yr)	225.0	225.0	71,012.0	12,017.0	NA
1	Constant electric use per capita	235.0	240.0	41,802.5	9,243.0	7,394.4
2	Decline by 0.3%/cap/yr	430.0	700.0	88,275.0	20,126.0	16,100.8
3	Decline 0.5%/year	430.0	1,600.0	111,386.0	32,428.0	25,942.4
4	Decline 1.0 %/year	768.0	4,252.0	182,545.0	42,502.0	34,001.6
Notes	Recall that economic potential for savings was estimated to be .				35,535.0	
	(a) funding levels in first row is in the baseline forecast for the four IOU's and SMUD					
	(b) all other funding levels are in addition to this base level of $225 MM in 2003.					
	(c) program ramp up rates constrained to 33% per year for goal 1&2 and 50% per year for goal 3&4					

The electricity savings levels presented in this table are incremental to the electricity savings projected from baseline funding of $225 million for energy efficiency programs and already included in the CEC forecast over the next decade. Thus, all of the estimated energy savings for Goals 1, 2, 3, and 4 are in addition to the 71,012 GWh of cumulative energy savings from PGC programs already expected over the next decade. Comparing the total cumulative savings required to reach the savings goals gives a good idea of the relative level of effort that will be needed to achieve each savings goal. Achieving the constant per capita savings goal will require roughly a doubling of funding from current levels while achieving the 1%/ per year reduction in per capita use would require a 10-fold increase in funding from $225 million per year to $4,252 million in 2013 given the ramp up constraints and the assumed constant program effectiveness over the decade.

The annual energy savings projections in column 6 are based on a trajectory analysis of the feasible annual increases in program effort and savings over a decade, assuming constant savings per dollar. In each row, funding increases were limited to 40 percent jump in the first year and 33 percent per year for the remainder of the decade. Note that even at these sustained increases in funding that increase funding to over a billion dollars a year for Goal 3, it is not possible to meet the aggressive per capita savings target of a decline of 1.0 percent per year.

These calculations do not take into account any changes in program effectiveness, either positive or negative that could occur if there were new program administrators or a different method of allocating funding. Column 7 reflects the impact of an assumed 2 percent per year drop in program cost effectiveness over the next decade. This drop in program effectiveness is similar to the pattern observed between 1997 to 2000. The last decade of program effectiveness data (Recall Figure 4) suggest it may be reasonable to plan for falling program effectiveness or kWh saved per dollar spent. However, if this drop occurs, it would be harder to meet each of the savings goals and funding would probably need to increase proportionately.

Required Program Effort and Funding to Meet the Energy Savings Levels to Achieve the Per Capita Savings Goals

Our review of the required increases in program funding and savings to meet each of the goals in this table is presented below.

Achieving Goal, 1 maintaining constant per capita electricity use for a decade appears to be feasible with roughly a doubling of program funds to achieve an incremental level of savings of 10,000 GWh per year (or a total savings of 22,013 GWh) by 2013. The funding increase is necessary to keep up with the expected population growth in California of 5 million people in the next decade.

Achieving Goal 2, a .3%/year reduction in per capita electricity use over the decade could be feasible if program effectiveness remains relatively stable. Achieving this goal would require increasing program funding levels to $655 million per year by 2009 and$925 million by 2013 to achieve incremental electricity savings of 20,000

GWh/year by 2013. Theoretically this goal could also be achieved at a 20to 40 % lower funding level by no longer funding programs with low cost effectiveness in the residential sector and shifting funds to more lucrative savings areas in commercial and industrial sectors. However, we assume that such a fundamental shift in policy is not likely to occur in the short term.

Achieving Goal 3, a decline in per capita energy use of .5 percent per year, would require roughly quadrupling the current expenditure level of $225 million per year by 2008 to 1.1 billion per year by expanding program funding by 40 percent per year until 2013. Annual incremental savings of 28,512 GWh are added to the baseline projection of roughly 16,000 GWh from current funding levels to yield 42,000 GWh by 2013. This sustained expansion of program effort to a level 4 times that in 2001 does not seem feasible to us given our review of previous funding cycles that suggest the maximum funding increase is limited to a tripling of the maximum funding level from the previous cycle.

Achieving Goal 4, a 1 percent per capita decline or annual program savings of 45,000 GWh from energy efficiency programs alone in 2013 requires even more unlikely funding increases of up to $4 billion per year in 2013. It is very unlikely that this level of funding could be supported or sustaining by the current regulatory system or that limits to the cost effectiveness of these programs would not be reached long before this funding level was authorized.

Section 5 - Recommended Short and Long Run Energy Efficiency Goals

Long Run Electricity Savings Goals

The previous analysis suggests it may be possible to achieve program energy savings levels over the decade somewhere between the per capita savings goals of maintaining constant usage or reducing per capita usage by .5 percent per year. Staff recommends setting both a short-term, 5 year, and long-term, 10 year, energy efficiency goals at saving levels slightly below the per capita savings goal of reducing per capita electricity use by .5 percent per year. This goal would be equivalent to reducing per capita energy use by 0.3 percent per year over the next decade from 7145 kWh per capita in 2003 to 6930 kWh per capita in 2013.

It is worth noting that sustained reductions in per capita electricity use over a decade have never before been achieved in an industrialized country but California's record in maintaining roughly constant energy use per capita of 7300 kWh per capita over the last decade suggest this may be achievable. Achieving this goal would require programs to achieve annual energy savings from all energy efficiency programs that accumulate to 30,000 GWh per year by 2013. This would require an average annual savings of 3,000 GWh from new program efforts in addition to current level of annual savings reported by PGC funded programs of roughly 1600 GWh per year.

Figure 6 illustrates the electricity savings from the baseline PGC funded programs (already included in the staff baseline forecast) and the additional savings from an expansion of energy efficiency program efforts needed to meet this long-term goal of saving 30,000 GWh per year by 2013.

Figure 6

Long Term Electricity Savings Goal for Energy Efficiency Programs

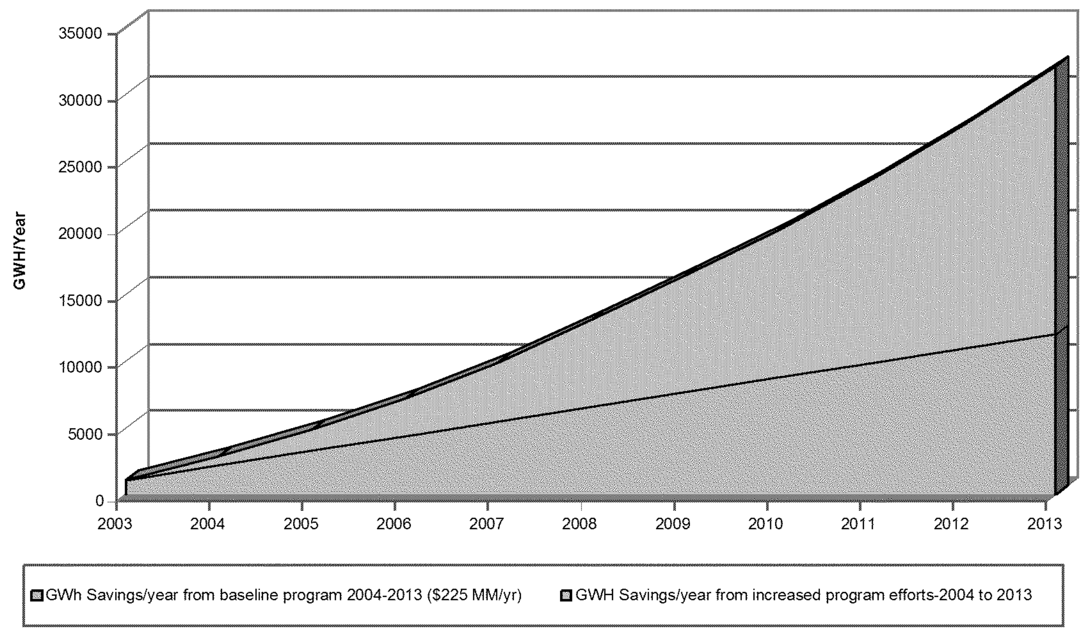


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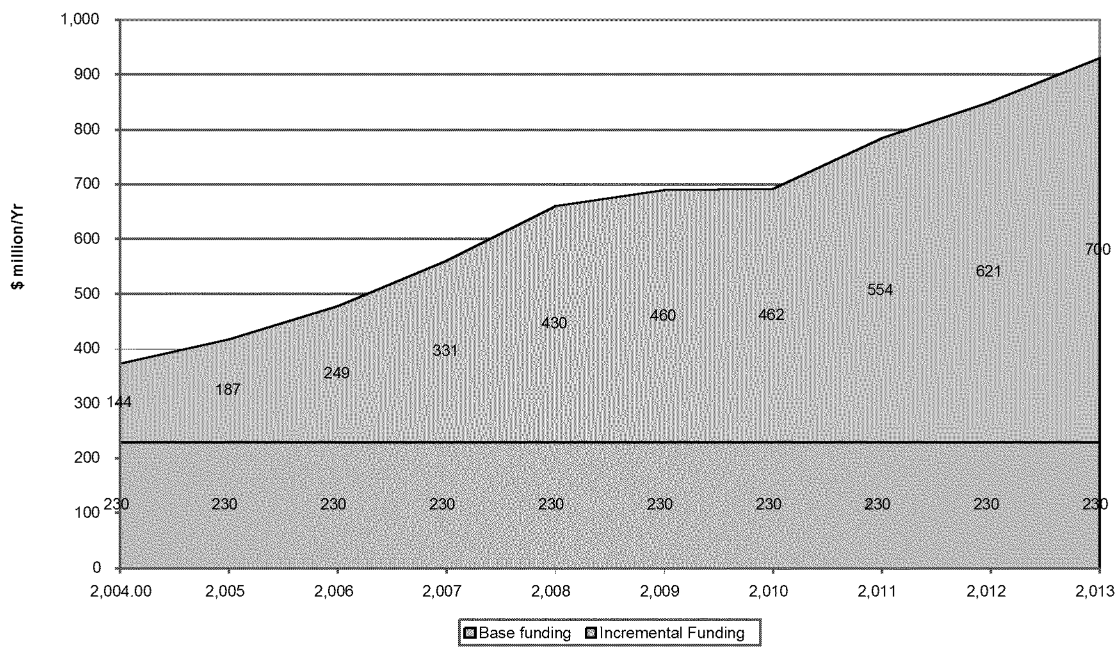
Figure 7 illustrates the funding levels that would be required if program effectiveness levels remain constant at 5 kWh per dollar over the decade (or 2 cents per kWh). Meeting this goal would provide roughly 50 percent of the expected increase in electricity requirements of 43,000 GWh over the decade. Appendix A presents the annual spending and funding targets necessary to meet the long-term savings goals.

Figure 7

Funding Levels Needed to Reach Long Term Electricity Savings Goal of 30.000 GWh per Year by 2013 ($ million per year)



Near Term Electricity Savings Goals

To set the near term goal, it is important to examine the latest trends in electricity savings over the last two years. Table 5 shows reported energy and peak savings from the investor owned utilities, municipal utilities, and California's energy agencies.

Table 5
Recent Funding and Electricity Savings Trends
For Energy Efficiency Program in California

Program Administrator	*2001 GWh/yr*	*Funding $ Millions*	*2002 GWh/Yr*	*Funding $ Millions*
Investor Owned Utilities	1,423	306.4	1,104	194.3
SMUD**	62	16.8	69	18.8
CEC	167	40.2	290	59.2
Other State Programs (20/20 and Flex Your Power) ##	3,053	415.2	_	_
Total	4,705	778.6	1,363	372.3

**No program funding or electricity savings data is yet available for 2002 from LADWP and the other municipal utilities

Estimates from Global Energy Partners, California Summary Study of 2001 Energy Efficiency Programs (CALMAC Study: March 13, 2003).

The 2002 funding and savings estimates represent a 50 to 100 percent drop relative to program achievements in 2001. In part, this is due to the fact that the 2002 totals reported for the investor owned utilities do not include $50 million in PGC funding that was redirected to Non IOU administered programs in 2001. This is because the savings from these programs have not yet been reported or verified. However, the major difference is the huge surge in program funding for state programs precipitated by the electricity crisis. This funding is not expected to reappear in the near future.

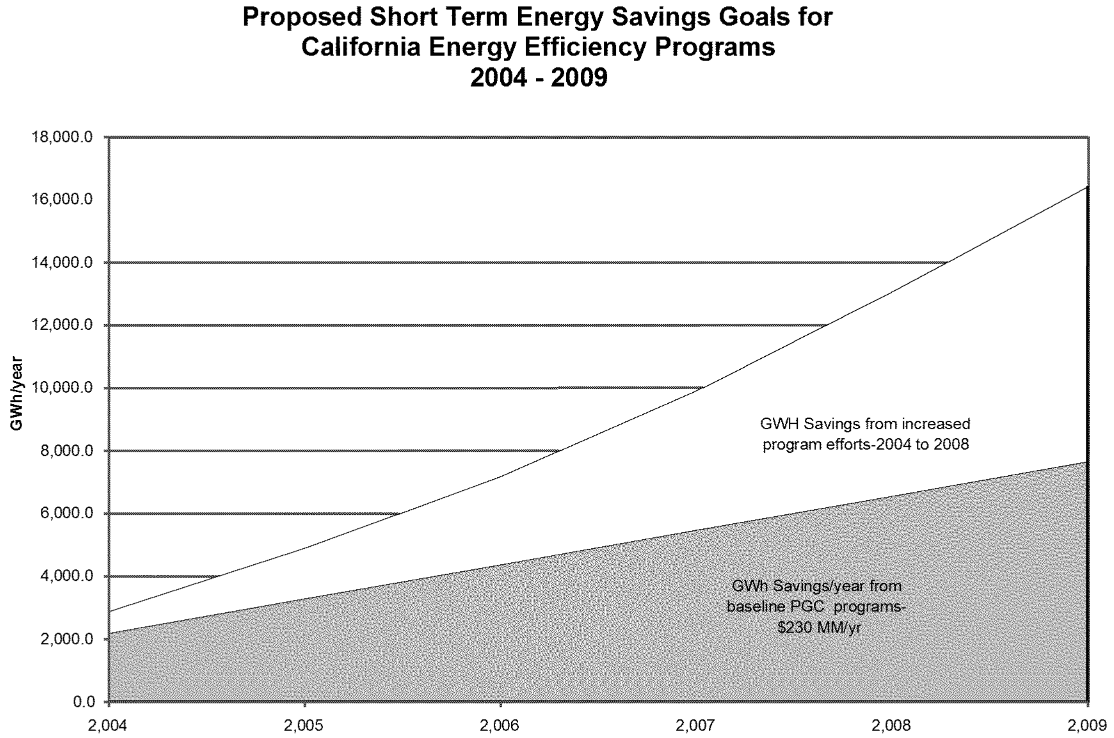
The other significant factor to consider in the near term is the investor owned utilities proposal to spend an additional $140 million per year (on top of the authorized $230 million for 2003) as part of the CPUC proceeding on utility procurement. A decision on these proposals is not expected until late 2003 so funding could not start until 2004.

Both of the proceeding factors, a slow down in spending and regulatory uncertainty on what level of funding will be improved, will make it harder to reverse the downward trend in funding from 2001 to 2002 and begin another program ramp up cycle. We recommend setting bold targets to motivate the market to make this change.

We recommend setting electricity savings goals that are consistent with the previous energy savings ramp up constraints of 60 percent per year in the first year and then 33 percent per year in the second or third year of a major program ramp up. This is consistent with the first year funding increase of 55 percent proposed by the investor owned utilities in the procurement process. We also recommend holding the estimated program effectiveness ratio constant at 4.8 kWh per dollars over the next five years even though the there is a slight chance that these ratios may increase. The increase could be driven by either significant increase in administrator productivity as a result of the current CPUC rulemaking on program administration or if the 30 to 50 percent increase in electricity prices in the last two years spurs the introduction of new or improved energy efficiency technologies or improvements in metering systems and energy management controls.

Figure 8 summarizes the recommended short-term electricity savings goals. The upper area represents incremental savings goals above and beyond the savings from baseline programs shown in lower blue area. Electricity savings from the lower area are already included in the baseline forecast of electricity use. The actual incremental values for each year are shown in the upper red area as well. We recommend setting near term energy savings goals of 6,000 GWh per year from all IOU and municipal energy efficiency programs by 2006 and 12,000 GWh per year by 2008. The investor owned utility program should be asked to achieve roughly 80 percent of this goal while the municipal owned utilities should be asked to strive to achieve the remaining electricity savings.

Figure 8



	2,004	2,005	2,006	2,007	2,008	2,009
GWh Savings/year from baseline PGC programs- $230 MM/yr	2,185.0	3,277.5	4,370.0	5,462.5	6,555.0	7,647.5
GWH Savings from increased program efforts-2004 to 2009	698.4	1,606.3	2,813.9	4,419.9	6,507.7	8,738.7
Total GWh	2,883.4	4,883.8	7,183.9	9,882.4	13,062.7	16,386.2

Note that even with a relatively steep ramp up rate the incremental savings from increased program efforts does not exceed the cumulative savings from the baseline program efforts funded at $225 million per year until 2009, the last year of the short term period. This illustrates how important it is to start the program ramp up as soon as possible.

These goals represents a balancing of the available savings potential and the review of history that suggests it will be difficult for three investor owned utility administrators to rapidly increase spending to levels 100 to 200 percent above current funding levels, particularly given the fact that the CPUC is currently re-evaluating the system of program administration where utilities perform the majority of functions in the system. Achieving the savings in this table would require a funding increase from

$230 million in 2004 to $660 million in 2009, nearly tripling over six years. This trajectory is achieved through program funding increases of 60 percent in Year 1, 30 percent in Year 2, and 33 percent per year out to 2009. This is a reasonably conservative trajectory on the way to the long-term goal of quadrupling program savings efforts by 2013.

Our intent is to set near term goals that would be necessary to achieve in the short run to make the long-term goal achievable but not necessarily make planning decisions based on the long-term goal until all parties can review the feasibility of gradually ramping up funding and savings from these program over the next three years.

Achieving these short-term goals may also require a thoughtful evaluation of alternative methods of increasing the effectiveness of current program administrators to reverse the long-term trend toward lower conservation yields per dollar spent. We are encouraged the CPUC is investigating new mechanisms for selecting and administering energy efficiency programs that could achieve this result.

Section 6 - Proposed Process to Monitor Progress towards Goals and Make Periodic Adjustments

The effects of this significant funding increase over the first three years should be monitored yearly to see if the programs could continue to capture additional savings at the current program effectiveness rate of roughly 2 cents per kWh. After the first three years, in 2006, the agencies should reassess whether continued program expansion would be cost effective given the additional savings achieved. The energy savings achieved and the efficacy of the new administrative structure should be independently reviewed in 2009. Additional energy savings could also be achieved from the development and adoption of new building and appliance standards beginning in 2008 or by setting savings goals for California's Municipal Utilities. We recommend that the Commissions consult with the building standards staff and the codes and standards support staff at each utility and the municipal utilities to develop energy savings performance goals for 2008 and 2013 that can contribute to the statewide total.

Following each triennial review, program delivery agents should be asked to adjust their program designs based on the load impact results for different program types and propose ways to increase electricity and natural gas savings during the next planning cycle.

Section 7 - Summary of Findings

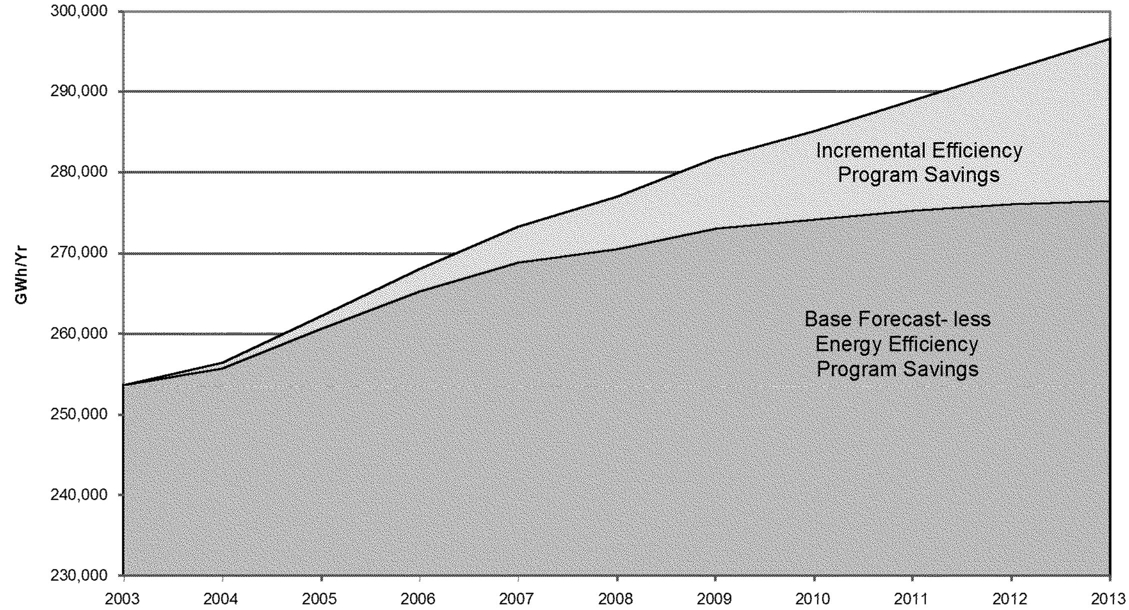
Achieving the additional savings suggested in this table would be unprecedented in the "history of energy policy," but California has already surprised the world by reducing its peak demand for energy by 8 percent in less than one year. Certainly increasing overall funding levels for energy efficiency programs by a factor of 3 over the next decade will stretch the capacity of the current planning and delivery structure. For example, over the last 25 years, savings from utility energy efficiency programs have never exceeded annual savings of more than 2000 GWh per year but achieving the long term goal would require an increase to 4460 GWh per year of first year savings by 2013.

It is important not to underestimate the huge challenges program administrators will face in trying to achieve these long-term savings goals over the next decade, particularly given the roller coaster of program funding support observed over the last 25 years. Achieving this level of spending will necessarily entail a dramatic increase in both the number of program administrators and the level of participation of energy efficiency service professionals and vendors and perhaps a change in the administrative structure itself.

Figure 9 shows the projected impact of achieving this savings goal on the baseline Energy Commission forecast of electricity demand. The chart suggests that roughly 50 percent of the incremental growth in demand can be met by efficiency programs if additional funding is made available either through the public goods charge or through procurement decisions. We suggest that the remaining incremental GWh system needs (the difference between the base usage of 253,000 GWh in 2003 and the expected usage of 276,508 GWh in 2013 if the efficiency goals are achieved) could be met through aggressive pursuit of the RPS standard for renewables. However, reviewing the costs, benefits and potential ramp up rates from renewable generation resources is beyond the scope of this paper.

Figure 9

Impact of Achieving Additional Energy Savings on the Statewide Electricity Forecast



The cost of achieving additional savings from these programs could drop over time, depending on the pace of technical innovation and trends in overall energy costs but our analysis of the long-term trend in program effectiveness suggests that expecting a 20 year trend toward higher costs per kWh of savings to reverse itself over the next 10 years is not prudent. In addition, it will be increasingly difficult and perhaps expensive to procure additional renewable resources over the next decade. However, we believe the benefits of achieving such a goal and reducing the state's reliance on generation sources fueled by natural gas are worth the risk. California's ability to reduce energy usage and continue it economic growth would quickly set an example for the rest of the world.

Achieving this goal will require a multi-year commitment by state policy makers and program administrators to gradually ramp up program spending levels by a factor of 3 over the next 6 years and a similar ramp up of renewable procurement efforts. It is important to recognize there are other types of benefits to achieving these savings goals in addition to the fact that these efficiency resources are cheaper than the supply benchmark. A short list of the benefits expected if the ramp up in program funding achieves the estimated energy savings of roughly 200,000 GWh per year over the next decade.

- The additional efficiency achieved through these programs will avoid the need to purchase roughly 150,000 GWh over 10 years; equivalent to the annual output of 2600 MW of power plant at a .65 capacity factor.

- Reduce need purchasing strips of high priced energy at peak by roughly 1000 MW by 2013.

- Reduce 8.2 million tons of green house gas emissions[6]

- Keep an additional $20 billion in energy savings achieved by customers during the next decade within the state's boundaries.

Section 8 - Next Steps

The joint agencies should explicitly direct their staff to work with the existing program administrators and building standards staff to translate these statewide goals to program or utility area GWh and MW savings goals for each of the relevant program service territories. An example of the proposed goal format is presented in Appendix B. This is necessary because per capita electricity savings goals have no meaning for program administrators or implementers until they are translated into annual GWh and MW targets. Per capita energy use trends also cannot be easily tracked because of unrelated changes in population trends (migration, birth rates, etc) and economic growth.

Simultaneously, the governing agencies should hire independent evaluation firms to track program administrator progress toward meeting goals and make sure that program administrators are part of the evaluation process but not managing the contractors. These firms should be given the job reviewing all program evaluations to be conducted over next three years, identify any obvious methodological errors, summarize the total program savings contribution toward the statewide goal and reconcile them with actual energy usage over next three years to ensure there is consistency between the sum of bottoms up energy savings estimates and the top down view of actual energy usage trends. The results of the first three years of the ramp up experiment should then be presented to policy makers and legislators.

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[6] Emission factor of 1100 lbs of CO2 per MWH of generation from Pat McAuliffe based on simulation runs of PG&E system and mid point of the 8760 hour analysis.

Appendix A

Projected Level of Energy Savings and Funding Required to Meet Long-Term Savings Goal of Reducing Per Capita Usage by 0.3 Percent per Year for Next Decade.

GWh	2,004	2,005	2,006	2,007	2,008	2,009	2,010	2,011	2,012	2,013
Savings/year from baseline PGC programs- $230 MM/yr	2,185.0	3,277.5	4,370.0	5,462.5	6,555.0	7,647.5	8,740.0	9,832.5	10,925.0	12,017.5
GWH Savings from increased program efforts- 2004 to 2013	698.4	1,606.3	2,813.9	4,419.9	6,507.7	8,738.7	10,993.9	13,700.2	16,731.3	20,126.3
Total GWh	2,883.4	4,883.8	7,183.9	9,882.4	13,062.7	16,386.2	19,733.9	23,532.7	27,656.3	32,143.8
Incremental MW from increased programs	180.7	415.7	728.2	1,143.8	1,684.1	2,261.4	2,845.0	3,545.3	4,329.7	5,208.3
Total funding- $ MM per year	374.0	417.2	479.0	561.1	660.5	690.0	695.0	788.0	855.0	930.0

Note: Shaded rows (2 & 4) show incremental energy and peak savings from program funding beyond the $225 million in the baseline public goods charge.

Appendix B

	Example Format for Annual Program Savings Goals-				
	Service Territory and or Statewide Program Description	2006	2006	2008	2008
		GWh/yr	MW	GWh/yr	MW
	PG&E				
	SCE				
	SDGE				
	SMUD				
	LADWP				
	Savings Goal suggested in report for sum of utility areas above (1)	2300	575	3180	795
	Statewide Savings from Appliance or building Standards	??	??	??	??
	Notes				
	Baseline savings for IOU's in 2002	*1477*	*369.25*		
	(1) GWh Goal was derived expected annual savings from baseline funding in goal + required energy				
	savings to meet per capita reduction goal of .3%/year over the decade.				