CALIFORNIA
ENERGY
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STATEWIDE ENERGY EFFICIENCY POTENTIAL ESTIMATES AND TARGETS FOR CALIFORNIA UTILITIES

DRAFT STAFF REPORT

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ABSTRACT

The Governor and Legislature of California have emphasized that energy efficiency is at the top of California's "loading order" for new energy resources. Assembly Bill 2021 (AB 2021, Levine, Chapter 734, Statutes of 2006) requires the Energy Commission, along with the California Public Utilities Commission (CPUC), to develop statewide estimates of energy efficiency and demand reduction potential and savings targets for publicly owned utilities and investor-owned utilities for a ten-year period. The utility potential estimates and targets are to be developed within a public process sponsored by the Energy Commission and reported in the Commission's biennial *Integrated Energy Policy Report*.

The current targets for the investor-owned utilities are based upon those set by the CPUC for the period 2004-2013. For this report, the investor-owned utilities' potential estimates are derived from the most recent analysis completed in May 2006. Three levels of potential were evaluated: technical potential, which is the maximum possible; economic or cost-effective potential; and feasible or achievable potential. Data and methods used to develop technical and economic potential estimates for the publicly owned utilities came from this same source in addition to studies done for individual utilities. Each publicly owned utility also used internal sources to develop proposed savings targets from their potential estimates.

Energy Commission staff evaluated the reasonableness of the technical and economic potential estimates and the targets of the investor-owned and publicly owned utilities. Staff compared the proposed targets relative to economic potential, and the proposed targets relative to the consumption and growth rates of forecasted natural gas consumption, electricity consumption and peak electricity demand. The investor-owned and publicly owned utilities combined are expecting to achieve 67 percent of the economic potential for electric consumption savings, 85 percent of the economic potential for peak demand savings, and 65 percent of the economic potential for natural gas consumption savings.

Energy Commission staff recommends the option that achieves at least 80 percent of the combined economic potential.

Key Words

Energy efficiency, energy savings, demand reduction, electricity consumption, natural gas consumption, electric peak demand reduction, energy efficiency potential estimates, energy efficiency targets, energy efficiency goals, Assembly Bill 2021 (2006), Senate Bill 1037 (2005), investor-owned utilities, and publicly owned utilities.

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TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

EXECUTIVE SUMMARY

Introduction

Assembly Bill 2021 (AB 2021, Levine, Chapter 734, Statutes of 2006) requires the California Energy Commission to develop statewide energy efficiency potential estimates and targets for California's private and public utilities. Data for these efficiency estimates and targets originate with the California Public Utilities Commission (CPUC) for the investor-owned utilities and from the publicly owned utilities. The legislation requires, among other mandates, that the publicly owned utilities identify all potentially achievable cost-effective electricity energy savings, establish annual targets for energy efficiency savings and demand reduction for the next 10-year period, and report these targets to the California Energy Commission. Then, in consultation with the CPUC, the California Energy Commission defines a statewide estimate of energy efficiency and demand reduction potential and targets for a 10-year period.

AB 2021 also mandates the Energy Commission to report progress of the legislation's implementation as part of its biennial Integrated Energy Policy Report process. This report describes the purpose and background of the legislation, the responsibilities of the involved parties, and implementation efforts to date.

Objective and Analytical Approach

Staff's objectives were to evaluate the data on technical, economic and feasible potential and savings targets submitted by the CPUC for the investor-owned utilities and from the publicly owned utilities. The primary concerns were the accuracy of the potential estimates, and the reasonableness and sufficiency of the utilities' proposed targets to achieve the mandates of AB 2021 to achieve feasible cost-effective efficiency and reduce energy consumption. The main results of the staff's evaluation and analyses are an acceptable estimate of statewide efficiency potential and a recommendation for a level of combined investor-owned utilities and publicly owned utilities efficiency targets. To achieve these objectives, staff analyzed individual utility and aggregated potential data, analyzed proposed individual and aggregated targets, developed options for selecting a statewide target, derived criteria for evaluating these statewide target options, and recommends a preferred option.

Data Collection from Utilities

The Energy Commission created a comprehensive statewide data set that aggregated the forecasts of energy consumption, estimates of energy efficiency potential and proposed savings targets for the investor-owned utilities and publicly owned utilities. The current targets for the investor-owned utilities are based upon those set by the CPUC for the period 2004-2013. For this report, the investor-owned utilities' technical and economic potential estimates are derived from the most recent potential study by Itron, Inc. titled *California Energy Efficiency Potential Study* (May 2006). For the publicly owned utilities, the potential analyses were completed at

different times and by different contractors. Five of the publicly owned utilities (Sacramento Municipal Utilities District, Los Angeles Department of Water and Power, City of Redding, City of Palo Alto, and Silicon Valley Power) began their studies prior to the passage of AB 2021. In June 2007, the Rocky Mountain Institute completed the potential estimations for the remaining 34 publicly owned utilities. For most publicly owned utilities, the estimate of feasible potential became their "proposed targets" because their governing boards had not yet adopted them.

Data and methods used to develop estimates of technical and economic potential estimates for the publicly owned utilities service areas came from three sources: (1) the investor-owned utilities' *2006 Itron* potential study, (2) *2007 Rocky Mountain Institute* potential study, and (3) each independent publicly owned utility. Each publicly owned utility then developed independent estimates of feasible and achievable potential which translated into proposed targets. The publicly owned utilities' selection of their proposed targets was based on the results from the Rocky Mountain Institute analysis, and in some cases, adjustments were made based additional factors and criteria not fully described in their submission to Energy Commission staff. In all of the studies, however, the approaches were similar and based on the current investor-owned methodology and data sources.

Staff relied on the energy demand forecasts for electricity, peak demand and natural gas contained in the California Energy Commission's *California Energy Demand 2008-2018, Staff Draft Forecast* (July 2007) to provide the basis for the aggregated comparisons in this report. Technical, economic, and feasible potential energy savings estimates were subtracted from these baseline forecasts. Subtracting the savings yielded projections of what the 2007-2016 energy consumption patterns would be if these levels of savings were achieved.

Key Results based on Data from Investor-Owned and Publicly Owned Utilities

The combined economic potential in 2016 for the IOUs and the POUs is estimated to be 39,472 gigawatt hours, 6,569 megawatts and 749 million therms, excluding the potential that might be available from emerging technologies. California Energy Commission staff evaluated the reasonableness of the technical and economic potential estimates, and of the targets of the investor-owned utilities and publicly owned utilities. Staff compared the proposed targets relative to economic potential, and the proposed targets relative to the consumption and growth rates of forecasted natural gas consumption, electricity consumption and peak electricity demand.

The investor-owned utilities' targets will achieve 71 percent of their economic potential by the end of the decade if they meet all of their annual savings targets. This ratio assumes that the CPUC will direct the investor-owned utilities to achieve savings at a rate equal to the annual savings in 2013, the last year covered by D.04-09-060, the governing decision.

The publicly owned utilities' will achieve 56 percent of their economic potential with their proposed savings targets for the same period. On a statewide basis, the investor-owned utilities

and the publicly owned utilities combined are expecting to achieve 67 percent of their economic efficiency potential if they can meet their ten year electric energy savings targets.

For peak electrical demand, the investor-owned utilities are expecting to achieve 95 percent of the economic potential, while the publicly owned utilities are projecting to achieve 62 percent. Combined, the investor-owned utilities and the publicly owned utilities are expecting to achieve 85 percent of the economic potential for peak electricity demand savings by 2016.

Natural gas efficiency targets are proposed to capture a smaller percentage of the economic potential than the electric efficiency. The investor-owned utilities are aiming to achieve 66 percent of the economic potential and the publicly owned utilities 21 percent. Since the overwhelming portion of the natural gas consumption is represented by the investor-owned utilities, the combined percentage is also 65 percent of the economic potential.

The proposed savings targets partially offset the forecasted increase in electricity and natural gas consumption between 2007 and 2016.

- The publicly owned utilities' program savings targets meet 63 percent of the electricity consumption and 50 percent of the peak demand growth for this time period.
- The investor-owned utilities' savings are projected to offset more than their forecasted electricity consumption growth (101 percent) and 79 percent of their peak demand.
- Combined, the savings targets will meet 89 percent of electricity consumption growth and 70 percent of the peak demand growth.
- For natural gas, proposed savings targets (predominantly investor-owned utilities) will meet four percent of the forecasted consumption in 2016 and 68 percent of the growth between 2007 and 2016.

Staff's Analyses and Recommendation

To develop a recommendation for a statewide target, staff developed a set of criteria to evaluate each option. There are four criteria: 1) *Policy Context* – Do the targets meet AB 2021 mandates? 2) *Plausibility* – Are the proposed annual target trajectories or ramp up rates provided by each publicly owned utility or investor-owned utility feasible? 3) *Motivational* -– Will the targets motivate all publicly owned and investor-owned utilities to achieve a significant increase in the level of electricity and natural gas savings currently achieved? 4) *Margin for Error* – Since the level of verified energy savings tend to be less than reported savings, will these targets provide a sufficient cushion for unrealized savings?

Staff used these criteria to evaluate four options:

> *Option 1 – CPUC Targets for IOUs/Feasible Targets for POUs:* For the IOUs, continue progress on the targets set by the CPUC through 2013. After 2013, continue programs with the incremental savings equal to the 2013 target set by the CPUC in 2004 (this level

is roughly 68 percent of the 2006 economic potential).[1] For the POUs, set targets at their proposed levels (this is roughly 56 percent of economic potential).

Option 2 – Eighty Percent Economic Potential: Set the target at 80 percent of the combined economic potential for both the IOUs and the POUs.

Option 3 – Full Economic Potential: Set the target at meeting full economic potential for both IOUs and POUs. This is in line with policy established in SB 1037 which states that California's utilities should capture all cost-effective potential. This would constitute a "stretch goal".

Option 4 – Ten Percent Consumption Reduction: For both the IOUs and POUs combined, set the target at a 10 percent reduction in electricity consumption in year 2016 (as expressed in AB 2021). Even though not required by AB 2021, consider this same option for peak demand and for natural gas consumption.

AB 2021 describes a visionary mandate to reduce electricity and natural gas consumption in California through the achievement of all cost-effective efficiency measures. Guided by AB 2021 and using IOU and POU data, Energy Commission staff recommends Option 2.

Option 2 – Eighty Percent Economic Potential: Set the target at 80 percent of the combined economic potential for both the IOUs and the POUs.

This target applies to saving at least 80 percent of the economic potential identified for electricity consumption, peak demand and natural gas consumption.

Since the purpose of AB 2021 is to reduce energy consumption and peak demand, staff recommends that the Energy Commission also establish consumption and peak demand targets that can be more easily tracked than savings. Based on the current Energy Commission forecast, the staff's recommendation for Option 2 translates into the forecast reductions for 2016 shown in Table 1.

Table 1: Statewide 2016 Consumption and Peak Forecasts and Impact of Option 2

	2016 Forecast	**2016 Forecast if Option 2 Achieved**
Electricity Consumption	282,887 GWh	251,309 GWh
Peak Demand	68,037 MW	62,782 MW
Natural Gas Consumption	11,629 MMth	11,030 MMth

GWh is gigawatt hours, MW is megawatts and MMth is million therms

[1] The savings beyond 2013 were selected as a reasonable level for analytical purposes, since the CPUC has not selected goals for 2014 to 2016 or beyond. Staff is not attempting to establish a policy regarding these goals.

Recommending Option 2 balances the evaluation criteria. Although Option 3 yields greater reduction in consumption and demand, Option 2 is likely to be more realistic. Finding the right balance between goals that are too high and goals that are relatively easy to achieve is difficult given policy factors such as AB 32. Setting the goal at 80 percent of economic potential will give the IOUs an incentive to continue to ramp up their program savings. In addition, it will give the POUs an incentive to continue expanding their efforts to achieve a higher fraction of the economic potential over time.

Staff's analyses of individual utility submittals suggest that some utilities will have great difficulty in achieving the 80 percent economic potential goal while it will be relatively easy to achieve for those utilities with a long history of running efficiency programs. In addition to a diversity of long term goals and rationales presented for them, staff found that most of the POUs had not spent much time thinking about how to develop an appropriate ramp up rate to achieve their long term goal. Indeed, the appropriate long term savings goal for 2016 and a feasible ramp up rate are two separate issues that require different types of data and analysis to resolve.

Rather than setting a target that applies to all utilities, staff is convinced that it would be better to develop both a long term goal and a trajectory to get there that was customized to the situation of each utility. Accordingly staff plans to propose both a long term savings goal for 2016 and plausible ramp up rates for each utility at the workshop on September 17th.

The future challenge is to narrow the gap between the achievable potential (represented by the proposed savings goals) and the economic potential. In part, this may be accomplished by an improvement in the accuracy of both the forecasts of economic potential and program savings results to take into account the unique features of each POU service area. In addition, escalating energy prices and the cost of greenhouse gas emissions reduction may increase the amount of economic savings over the next decade. Given the AB 32 requirements and the fact that verified savings are less than reported savings, the statewide savings targets will likely need to be increased in future updates by developing approaches to close the gap between the achievable potential and the economic potential, as well as accelerating the deployment of emerging technologies.

Staff has also developed several process recommendations. These are intended to help the Energy Commission better understand individual utility perspectives, help the POUs improve the effectiveness of their programs, institute an effective evaluation, measurement and verification system for the POUs, develop a system to track progress toward goals and make the next AB 2021 cycle more effective.

CHAPTER 1: Introduction and Background

Purpose and Objectives of this Report

Assembly Bill 2021 (AB 2021, Levine, Chapter 734, Statutes of 2006) requires the California Energy Commission (Energy Commission) to develop statewide energy efficiency potential estimates and targets for California's investor-owned and publicly owned utilities. AB 2021 also mandates the Energy Commission to report progress of the legislation's implementation as part of its biennial Integrated Energy Policy Report (IEPR) proceeding. This report describes the purpose and background of the legislation, the responsibilities of the involved parties, and implementation efforts to date.

The intent of AB 2021 is for California's utilities to expand their efficiency programs to reduce customer energy consumption and bills, increase system reliability, and improve public health through better air and environmental quality by reducing greenhouse gas emissions (GHG). The state's need for low carbon-emitting resources to meet its energy demands is growing in importance. For this reason, the Legislature states in AB 2021 "… that all load serving entities procure all cost-effective energy efficiency measures so that the state can meet the goal of reducing total forecasted electrical consumption by ten percent in ten years." AB 2021 directs the pursuit of "all cost-effective, reliable, and feasible energy savings [both electricity and natural gas] and [peak] demand reductions". The California investor-owned utilities (IOUs) have energy consumption and peak demand savings goals for 2004-2013. AB 2021 extends this practice to publicly owned utilities (POUs). This report will focus on the issues involved with the achievement of these legislative thresholds.

The energy savings achieved through AB 2021 implementation are an essential component of the state's plan to meet Governor Schwarzenegger's greenhouse gas reduction targets established in Executive Order S-03-05 and the California Global Warming Solutions Act of 2006 (Assembly Bill 32 – AB 32, Nuñez-Pavley, Chapter 488, Statutes of 2006). Electricity production is a chief source of carbon emissions, which makes these environmental mandates foundational to future state energy policy. Energy efficiency is attracting significant attention because it is both emissions-free and the lowest cost energy resource option.

The remainder of Chapter 1 will present the background and requirements of the AB 2021 legislation.

Background

In response to the energy crisis of 2000-2001, the Energy Commission, the California Public Utilities Commission (CPUC), and the California Power Authority developed "the loading order" as a joint policy vision articulated in the *2003 Energy Action Plan* (*EAP*) and in the *2003 Integrated Energy Policy Report (2003 IEPR).* The loading order defines a set of preferences for meeting California's future energy resource needs, starting with energy efficiency and conservation, including demand response, then adding new generation first through renewable

energy resources and distributed generation, and finally by improving infrastructure including repowering or adding new natural gas fired generators.[2]

The CPUC and Energy Commission[3] worked together to develop electricity and natural gas savings goals for each of the IOUs over the period 2004-2013. These goals were adopted by the CPUC in 2004.[4] This decision also instructed the IOUs to include these goals as the basis of their 2006-2008 efficiency program portfolios and their 2006 (and subsequent) resource procurement plans. In September 2004, the CPUC announced that the *2005 Integrated Energy Policy Report (2005 IEPR)* would be the "initiation of a new, integrated, statewide resource planning process," which among other things, would "recommend broad, statewide resource preference policies."[5]

A new CPUC rulemaking is focused on the post-2005 efficiency policies, incentive mechanisms, programs, and evaluation, including planning the 2009-2011 program cycle.[6] IOU efficiency potentials and targets are being reviewed and updated in this venue. The CPUC is considering innovative 'big, bold, ideas' to guide IOU program development to meet future efficiency targets.

California's POUs are not regulated by the CPUC and have not been subject to the same energy efficiency mandates as the IOUs. AB 2021 is not the first time that POUs have been required to report on their energy efficiency activities. The federal Energy Policy Act of 1992, required them to report on energy efficiency to the federal Western Area Power Administration (Western), which is a primary source of publicly owned power for most of California's POUs. Since the early 1990s, Western has required California POUs to file Integrated Resource Plans (IRP) every five years with annual progress reports.[7] In the IRP, each POU must evaluate energy efficiency as an energy supply alternative. It is too early to tell how these two regulatory obligations will be integrated.

The Energy Commission's Title 20 data regulations obligate the POUs to submit historic and forecast electric and natural gas consumption and peak demand data in IEPR proceedings if

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[2] CPUC and Energy Commission, *The Energy Action Plan*, adopted in 2003, available at http://www.cpuc.ca.gov/static/energy/electric/energy+action+plan/index.htm.

[3] California Energy Commission *Proposed Energy Savings Goals for Energy Efficiency Programs in California,* Staff Report, Pub. No. 100-03-021, October 27, 2003; and California Energy Commission, *2003 Integrated Energy Policy Report,* Pub. No. 100-03-019, December 2003.

[4] California Public Utilities Commission (CPUC), Decision 04-09-060, September 24, 2004, *Interim Opinion: Energy Savings Goals for 2004 and Beyond.*

[5] CPUC, Rulemaking 04-04-003, Assigned Commissioner's Ruling, September 16, 2004, p. 2 and Attachment A.

[6] CPUC, Rulemaking 06-04-010, Order Instituting Rulemaking to Examine the Commission's post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification and Related Issues, filed April 2006.

[7] Western Area Power Administration, US Department of Energy, Energy Planning and Management Program, Programmatic EIS, Appendix C: Extract of Public Law 102-486.

their loads exceed 200 megawatts (MW). Roughly one-third of California's POUs are subject to this regulation.[8] As part of these submittals, the POUs report efficiency program portfolio expenditures by market sector and estimate savings impacts. The data in these submittals typically is uneven in quality.

New Energy Efficiency Legislation for Utilities

Two recent legislative bills, Senate Bill 1037 and Assembly Bill 2021, recognize the magnitude of electricity in California provided by POUs and take steps to obligate the POUs to contribute toward meeting critical state goals of electric reliability and environmental mitigation.

Senate Bill 1037 (SB 1037, Kehoe, Chapter 366, Statutes of 2005) provided the first step. This bill codified the pursuit of energy efficiency as the first priority in the loading order of energy resources as expressed in the *EAP* and already being implemented by the CPUC. The bill requires the CPUC, in consultation with the Energy Commission, to identify all potentially achievable cost-effective electric and natural gas energy efficiency measures for the IOUs, set targets for achieving this potential, review the energy procurement plans of IOUs, and consider cost-effective supply alternatives such as energy efficiency. In addition to these IOU requirements, SB 1037 requires that all POUs, regardless of size, report investments in energy efficiency programs annually to their customers and to the Energy Commission.

In response to SB 1037, the POUs produced their first legislative report in December 2006 titled *Energy Efficiency in California's Public Power Sector: A Status Report*. The report includes previous and current year's expenditures as well as savings for the energy efficiency programs for all 39 POUs offering energy efficiency programs. The report also includes an overview of the public benefit programs administered by the POUs, information about the local customer base, and any demand reduction programs currently in place or being considered for the future.

Requirements for SB 1037 reference only the POU's *historical* energy efficiency accomplishments. With the passage of AB 2021 in 2006, the POUs joined the IOUs in being required to provide a *forecast* of energy efficiency savings to the Energy Commission.

AB 2021 became law in September 2006. As SB 1037 codified for the IOUs, AB 2021 directed the POUs to first acquire all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible. Additionally, the legislation requires each POU to:

1. Account for energy efficiency and demand reduction resource expenditures as procurement investments in resource planning.
2. Identify all potentially achievable cost-effective electricity energy saving every three years, establish annual targets for energy efficiency savings and demand reduction for the next 10-year period, and report these targets to the Energy Commission.

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[8]California Code of Regulations, Title 20, Public Utilities and Energy Division, Chapter 3, Article 2, Section 1345: Demand Forecasts.

3. Report annually to its customers and the Energy Commission its investment in energy efficiency programs, description of programs, expenditures, cost-effectiveness, and expected and actual energy savings results; sources of funding for investments;
4. Report methodologies and input assumptions used to determine cost-effectiveness; and
5. Report the results of independent evaluation, measurement, and verification of the energy efficiency savings.

AB 2021 also directs the Energy Commission to:

1. Provide a statewide estimate of energy efficiency and demand reduction potential and targets for a 10-year period. The Energy Commission is directed to produce this estimate in consultation with the CPUC as the regulator of IOU energy efficiency programs.
2. Include the POU information noted above, as well as a comparison of each utility's energy efficiency targets and actual results for each POU, in the IEPR.
3. Provide recommendations to the POUs, Legislature, and Governor if the Energy Commission determines that improvements could be made in the level of aggregate achievement by POUs or in the level of achievement by any individual POU. (This will take place when the POUs begin to report program results in early 2008 and this progress is evaluated.)

In the *2007 IEPR*, which is due to the Legislature by November, Energy Commission staff will make the first statewide potential estimate and set combined IOU-POU efficiency targets. This necessitated collecting data, evaluating the potential estimates from all utilities, developing methods to aggregate IOU-POU data, developing options for setting targets, and creating criteria for evaluating those options. By July 2, 2007, the Energy Commission had received all data on efficiency potential and proposed targets from the POUs[9] and the CPUC (for the IOUs).[10] Most of the POUs have submitted *draft* targets; by late September, they are expected to have their draft targets approved by their governing boards or city councils.

Energy Commission staff is optimistic that, through the implementation of AB 2021, California utilities will gain the knowledge, methods, and motivation to achieve a significantly higher magnitude of energy efficiency. This should provide an effective means of addressing the state's long term need for reliable energy supplies and a healthy environment.

The remainder of this report is organized in the following manner. Chapter 2 will present the data collection activities and methods used by the IOUs, POUs and state agencies to implement

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[9] Rocky Mountain Institute (RMI), *Establishing Energy Efficiency Targets: A Public Power Response to AB 2021,* for the California Municipal Utilities Assoc., June 2007.

[10] CPUC, D. 04-09-060, *op.cit.*, and Itron, Inc., *California Energy Efficiency Potential Study*, Volumes 1-2, submitted to Pacific Gas and Electric Co., May 24, 2006.

AB 2021. Chapter 3 will present the data as submitted to the Energy Commission by the CPUC for the IOUs and by the POUs. Chapter 4 contains staff's analysis of the data in aggregate and individually for the 13 largest POUs. It also proposes criteria by which to evaluate efficiency targets, reports current IOU and POU program achievements, examines their capacity for meeting future targets. Chapter 5 presents and evaluates four options for statewide efficiency targets. Chapter 6 presents staff's recommendations on the statewide target and on ways to optimize the next AB 2021 cycle.

There are three appendices. Appendix A contains energy efficiency and demand reduction potentials and savings targets for each utility. Electric and natural gas utilities are grouped separately. Appendix B contains additional supporting figures and tables. Appendix C contains graphs of aggregated data for the IOUs and all of the POUs. The graphs compare electric energy consumption, peak electricity demand and natural gas consumption.

CHAPTER 2: Data Sources and Analytical Approach

Introduction

This section provides information on the methods used by the IOUs and POUs to develop their efficiency potential estimates and targets, and on the analytical approach used by the Energy Commission to combine utility results to develop statewide efficiency potential estimates and targets.

Technical potential is a measure of savings that would be captured if all applicable energy efficiency measures were installed without regard for practicality or cost. Economic potential is a measure of savings that would be achieved if all customers could be convinced to invest in all available efficiency measures shown to be cost effective. Cost effectiveness of the measures is determined using the Total Resource Cost (TRC) test, which takes into account the present value of the electricity savings evaluated at avoided costs, incremental measure costs, and program administrative costs. Typically, a third level of potential is defined that represents the smaller portion of economic potential that will actually be installed in homes and businesses through efficiency programs. Achievable potential takes into account such factors as market conditions, public policy, incentives, and general customer behavior that affect rates of measure adoption.

The Energy Commission retained Navigant Consulting (Navigant) to assist with data management and analyses. Navigant developed a comprehensive statewide data set that aggregated the baseline forecasts of energy consumption, estimates of energy efficiency potential and proposed savings data for the IOUs and POUs[11]. Sources of this data are described in the next section of this chapter.

Potential studies for the IOUs and POUs were completed at different time periods and by different contractors. Itron completed the most recent potential estimates for the IOUs in May 2006.[12] Five of the POUs began their studies prior to the passage of AB 2021 (Sacramento Municipal Utility District, Los Angeles Department of Water and Power, City of Redding, City of Palo Alto, and Silicon Valley Power) using various contractors. The California Municipal Utilities Association (CMUA), Northern California Power Agency (NCPA), and Southern California Public Power Authority (SCPPA) jointly retained the Rocky Mountain Institute (RMI) in early 2007 to perform potential estimations for the remaining 34 POUs.[13] In all of the studies,

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[11] Under a separate effort, Navigant is assisting the Energy Commission with a scenario analysis project. Staff has made an effort to use consistent data sets for both projects. In particular, the technical and economic potential estimates both come from the same source, the *2006 Itron* report.

[12] Itron, Inc., *California Energy Efficiency Potential Study, Volumes 1-2*, submitted to Pacific Gas and Electric Co., May 24, 2006 (2006 Itron).

[13] Rocky Mountain Institute (RMI), *Establishing Energy Efficiency Targets: A Public Power Response to AB 2021*, submitted to California Municipal Utilities Association (CMUA), June 2007. Although Silicon Valley Power completed its own potential analyses, RMI included them in the combined POU report.

however, the approaches were based on the methods and data sources, including the Energy Commission's demand forecast, used in recent California IOU studies.

Data for the Investor-Owned Utilities

The current goals for the IOUs, shown in Table 2, were adopted by the CPUC in D.04-09-060 for the period 2004-2013. The CPUC is currently considering whether to update these goals for 2009-2013 and how to extend them to 2020. The staff analysis looks at the impact of having no IOU efficiency programs after 2013 and the impact of holding the incremental savings after 2013 equal to the annual savings goals set by the CPUC for 2013. Holding the incremental savings for the IOU programs constant after 2013 results in savings that are slightly higher than the uncommitted energy efficiency in the IOUs long-term procurement plans for electricity.[14] These same savings are slightly less than the savings contained in the Energy Commission's 2005 Transmittal Report.[15] Source data and estimated savings are roughly consistent with the high energy efficiency development scenario (Case 3A) in the preliminary Energy Commission scenarios analysis work.[16]

Table 2: Approved 2004-2013 CPUC Targets for IOUs

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total Annual Electricity Savings (GWh/yr)	1,838	1,838	2,032	2,275	2,505	2,538	2,465	2,513	2,547	2,631
Total Cumulative Savings (GWh/yr)	1,838	3,677	5,709	7,984	10,489	13,027	15,492	18,005	20,552	23,183
Total Peak Savings (MW)	379	757	1,199	1,677	2,205	2,740	3,259	3,789	4,328	4,885
Total Annual Natural Gas Savings (MMTh/yr)	21	21	30	37	44	52	54	57	61	67
Total Cumulative Natural Gas Savings (MMTh/yr)	21	42	72	110	154	206	260	316	377	444

Source: CPUC Decision 04-09-060, September 23, 2004 - INTERIM OPINION: ENERGY SAVINGS GOALS FOR PROGRAM YEAR 2006 AND BEYOND

The goals identified in Table 2 were based on a potential study from 2002. In this report, Energy Commission staff used the *2006 Itron* potential study as the basis for the IOUs' estimates of technical and economic potential through 2016. The *2006 Itron* study included separate estimates of savings from mainstream and emerging technologies.

Since the *2006 Itron* potential study used 2004 as its base year, the potential estimates need to be adjusted for the program savings that have already been realized. Table 3 summarizes the potential estimates in the *2006 Itron* study, utility energy efficiency program accomplishments

[14] IOU filings of uncommitted energy in CPUC, R.06-02-013, Order Instituting Rulemaking to Integrate Procurement Policies and Consider Long-Term Procurement Plans, December 2006.

[15] California Energy Commission, *Transmittal of 2005 Energy Report Range of Need and Policy Recommendations to the California Public Utilities Commission*, Commission Report, CEC-100-2005-008-CMF, November 2005. The difference between the two is 485 GWh or six percent for electricity and 91 MW or 5 percent for peak. The Transmittal Report did not provide numbers for natural gas consumption.

[16] California Energy Commission, *Scenario Analyses of California's Electricity System: Preliminary Results for the 2007 Integrated Energy Policy Report*, Staff Draft Report, CEC-200-2007-010-SD, June 2007.

from 2004 to 2008[17], and identifies the remaining potential, both with and without emerging technologies.[18] All estimates are presented as gross total savings from cumulative adoptions over the period 2004-2016, which means they have not been reduced by either a naturally-occurring estimate or a net-to-gross ratio.

Table 3: Remaining Efficiency Potential for IOUs

	2004-2016 Itron Potentials		2004-2008 Reported Savings	Post 2008 Remaining Potentials	
	Technical	Economic		Technical	Economic
Energy (GWh)					
PG&E	22,326	17,833	4,534	17,792	13,299
SCE	23,315	18,199	5,277	18,038	12,922
SDG&E	5,061	4,005	1,308	3,754	2,698
Sub-Total	**50,702**	**40,037**	**11,119**	**39,584**	**28,919**
Emerging Technology	12,481	12,481		12,481	12,481
Total	**63,183**	**52,518**		**52,065**	**41,400**
Demand (MW)					
PG&E	5,086	3,076	936	4,150	2,140
SCE	4,989	3,082	1,006	3,983	2,076
SDG&E	1,068	652	264	805	389
Sub-Total	**11,143**	**6,810**	**2,206**	**8,938**	**4,605**
Emerging Technology	4,288	4,288		4,288	4,288
Total	**15,431**	**11,098**		**13,226**	**8,893**
Gas (10^6 Th)					
PG&E	750	439	84	666	355
SoCalGas	932	416	80	852	336
SDG&E	125	68	15	110	53
Sub-Total	**1,807**	**923**	**179**	**1,628**	**744**
Emerging Technology	547	547		547	547
Total	**2,354**	**1,470**		**2,175**	**1,291**

Sources: Itron, Inc., *California Energy Efficiency Potential Study, Volumes 1-2*, submitted to Pacific Gas and Electric Co., May 24, 2006 (2006 Itron) for the technical and economic potential. Itron memo titled *Where Are We Now?* April 30, 2007 for reported savings 2004-2006. CPUC Decision 04-09-060, September 23, 2004 - *Interim Opinion: Energy Savings Goals For Program Year 2006 And Beyond* for reported savings 2007-2008.

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[17] The Estimated 2004-2008 Savings column in Table 3 is comprised of two groups of numbers. The Itron memo titled *Where Are We Now?* April 30, 2007, is the source for the savings from 2004-2006. Data in this memo originated in each IOUs' *2005 Energy Efficiency Annual Reports*, and the 2004-2006 IOU Energy Efficiency Groupware Application (EEGA-data filed monthly with CPUC). For the savings in 2007 and 2008, the savings are taken from the CPUC decision, D.04-09-060.

[18] Staff has separated out standard technical and economic potential from the potential savings due to emerging technologies that are "near-term opportunities" that are currently "lacking market acceptance." (*Itron 2006,Chapter 11*) The *2006 Itron* study only examined the potential from emerging technology for the IOUs. Emerging technologies were not addressed in the potential studies done for the POUs, so the numbers shown in Table 3 are likely to be understated.

Table 3 only presents technical and economic potential for the IOUs. The potential for the IOUs and the POUs combined is shown in Table 6. The relationship between the available economic and technical potential and the CPUC selected goals is shown for each utility in Appendix A.

Data for the Publicly Owned Utilities

Rocky Mountain Institute Potential Study

CMUA, NCPA, and SCPPA contracted with the Rocky Mountain Institute (RMI) to produce a report, *Establishing Energy Efficiency Targets: A Public Power Response to AB 2021*, which provides efficiency potential and "preliminary targets" for 35 of the POUs.[19] An earlier study from the POUs, *Energy Efficiency in California's Public Power Sector: A Status Report,* provides data on 2005-2006 efficiency investments and savings.[20]

Data and methods used to develop estimates of technical, economic and feasible program savings estimates for the POU service areas came from three sources: (1) the IOUs' *2006 Itron* study, (2) *2007 RMI* study, and (3) each independent IOU. RMI used the Itron analysis at the customer sector and end-use levels for the geographically closest IOU to produce new estimates of technical and economic potential for each of the POUs. Each POU then developed independent estimates of achievable potential or proposed targets on an annual basis over the next decade.

To help POUs set feasible[21] efficiency targets, RMI developed a method (Option 1) which identified three possible levels of savings (percentages of consumption reduced) relative to their economic potential. Utilities could choose this simplified option by selecting their savings targets at their current level, 50 or 80 percent of economic potential, or one of two other options: Option 2: adjust the per measure savings if market penetration of measures is known; or Option 3: use both options 1 and 2 plus existing state energy goals, and local market conditions. Those using options 2 or 3 included the following factors into their target calculation:

- Market is perceived to be saturated for some measures in some POUs (e.g. compact fluorescent light bulbs (CFLs)
- Some measures are not possible for certain POUs, e.g., air conditioning for winter peaking utilities (e.g. Alameda, Lompoc, Truckee-Donner)
- Lack of customer diversity limits the markets for some measures
- Economic and demographic factors such as recession, growth, etc.

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[19] Rocky Mountain Institute (RMI), *Establishing Energy Efficiency Targets: A Public Power Response to AB 2021*, submitted to California Municipal Utilities Association (CMUA), June 2007.

[20] California Municipal Utilities Association, *Energy Efficiency in California's Public Power Sector: A Status Report*, December 2006.

[21] In this report, the terms "achievable potential" and "feasible potential" are used interchangeably.

Unfortunately, RMI did not identify which POU selected which option, making it difficult for staff to evaluate their feasible targets.

The relationship between the available economic and technical potential and the proposed target levels developed by RMI is shown for each utility in Appendix A.

Potential Studies for the Other Publicly Owned Utilities

Four utilities conducted their own potential studies which were not included in the RMI report. Energy Commission staff developed tables and graphs showing economic and technical potential for these POUs using the same format as used by RMI. These tables and graphs are also located in Appendix A.

Los Angeles Department of Water and Power (LADWP)

The technical and economic potential numbers for 2017 were extracted from *Los Angeles Department of Water and Power Energy Efficiency Study*.[22] The baseline forecasts and proposed savings numbers were provided by LADWP on July 2, 2007 in conjunction with its submittal, *Energy Efficiency Targets – Los Angeles Department of Water and Power: Submittal in Response to AB 2021*.[23]

City of Palo Alto

The City of Palo Alto Utilities (CPAU) provided the Energy Commission with its "Ten Year Energy Efficiency Plan 2007," approved by the City Council on April 23, 2007. The CPAU potential study was part of a 2005 report, *Portfolio Planning for the City of Palo Alto Utilities*.[24] CPAU provided the data used in this analysis to the Energy Commission on July 12, 2007 in a "Ten Year Efficiency Plan Summary" for the period 2008-2017. The Energy Commission, therefore, included no reductions for 2007 in its analysis. Energy Commission staff anticipates, however, that CPAU will in fact achieve measurable savings in 2007 through its existing programs. CPAU's baseline forecasts of electrical consumption, electrical demand, and natural gas consumption were extrapolated back from 2008 to 2007.

City of Redding

Redding Electric Utility provided the Energy Commission with a report, *Achievable Potential for Energy Efficiency Report*, by Nexant Consultants[25]. The report did not provide technical and economic potential numbers, but did provide proposed savings targets and a baseline 10-year electricity consumption forecast.

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[22] Quantum Consulting, *Los Angeles Department of Water and Power Energy Efficiency Potential Study, Final Report*, submitted to LADWP, February 8, 2006.

[23] Communication to Commissioner J. Pfannenstiel, Energy Commission, from R. Deaton, General Mgr., LADWP, dated June 29, 2007.

[24] Rocky Mountain Institute (RMI), *Implementation of Energy Resource Portfolio Planning for the City of Palo Alto, Final Report, Volume I*, submitted to City of Palo Alto, December 2005.

[25] Nexant Consultants, *Achievable Potential for Energy Efficiency Report,* submitted to Redding Electric Utility, City of Redding, June 11, 2007.

Sacramento Municipal Utility District (SMUD)

The SMUD Board of Directors adopted 10-year targets on May 17, 2007 and provided SMUD's potential and proposed savings numbers for the period 2008-2017 on July 5, 2007. The base year for their calculations was 2007, so staff decided to use data for 2007 to 2016 in this analysis. SMUD's baseline forecasts of energy and demand are taken from the utility's October 2006 report, *SMUD Forecast of System Loads, Customer Accounts and Energy Sales 2007-2016*. SMUD's estimates of potential are derived from a report completed for SMUD in 2006 by Itron.[26]

Data Evaluation Challenges

The current efficiency goals for the IOUs are based on the potential studies completed during 2002-2003.[27] These potential estimates were revised in the *2006 Itron* study, which is based on 2005 data. A newer Itron study (2007) is in progress, but it is too soon to know whether this revision will increase or decrease the IOU potential estimates. The IOUs have stated that if the future potential is reduced, then their goals should be reduced. In part, this argument is based on the differences between the 2002 and the 2006 potential studies, which showed that less potential was identified 2006 than in 2002, the studies on which the CPUC based the 2004-2013 goals.[28]

Many factors influence potential estimates, including program accomplishments; new energy efficient building codes and standards; new saturation studies; new customer end-use survey data; behavioral data; updated list of measures and their savings; revised rate forecasts; new demographic data; and emerging technologies. Numerous differences between the studies also complicated the comparison. Staff believes that until these influences and differences are fully evaluated and potential estimates are further updated for the IOUs, use of the 2006 potential estimates and current goals (set in 2004) is a reasonable approach because it applies the most current and officially accepted information to date.

While use of the IOUs' *2006 Itron* study for determining efficiency potential for the POUs may be a reasonable approach, several uncertainties are introduced because: 1) POU sector and end-use level data needed to make reliable estimates of economic potential is lacking; and, 2)

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[26] Itron, Inc., *Energy Efficiency Potential Study*, submitted to SMUD, June 2, 2006.

[27] Kema-Xenergy, Inc., *California Statewide Commercial Sector Energy Efficiency Potential Study. Final Report, Volumes 1-2,* July 2002.

Kema-Xenergy, Inc., *California Statewide Residential Energy Efficiency Potential Study. Final Report, Volumes 1-2*, April 2003.

Kema-Xenergy, Inc., *California Statewide Commercial Sector Natural Gas Energy Efficiency Potential, Final Report, Volumes 1-2*, May 2003 (revised July 2003).

Kema-Xenergy, *California's Secret Surplus: The Potential for Energy Efficiency, Final Report*, submitted to Energy Foundation and Hewlett Foundation, September 23, 2002.

[28] CPUC, Rulemaking 06-04-010, OIR to Examine the Commission's post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification, and Related Issues, Workshop held June 20, 2007.

IOU data used as a proxy for unavailable POU data may be too variable. Staff has several concerns about the use of the available potential studies for IOUs or POUs.

First, while the potential studies are detailed, comprehensive, and reflect extensive data on the utilities' customers and program experience, there are a number of limitations. The IOUs' 2006 potential study[29], which also served as the primary source for most of the POUs' studies, is based on 2005 data. Numerous limitations and caveats are noted in the study including exclusion of behavioral measures, limited scope of emerging technologies and need for improved data on saturations, and market adoption. A related issue is the Total Resource Cost (TRC) calculation which determines cost-effectiveness. The inclusion of costs, choice of discount rates, etc., needs to be revisited before future potential studies are initiated.

Second, there are differences between the six available potential studies that serve as the basis for estimating technical and economic potential, and there are differences in the methods used to establish the feasible potential (and proposed savings goals). Almost all of the potential studies used the same data (that is, derived from the *2006 Itron* study and the Database for Energy Efficient Resources database). All of the IOUs used the same Itron study. The others employed similar methodologies as used by the IOUs, and most of the studies relied upon the data from the *2006 Itron* study. While all of the studies employed rigorous analysis and best available data, there are some significant differences. The major differences (aside from the utility service area specific characteristics) between these studies are:

- Avoided energy costs – the avoided energy costs used by each utility are not readily documented. This obviously affects the economic potential. Some POUs appear to have very low avoided costs relative to rest of the state. In addition, it appears that some POUs did not include an avoided capacity cost in their cost-effectiveness calculations.[30].
- Derivation of feasible targets – various methods were used to go from the economic potential to the feasible potential/proposed savings goals for each POU area. Many of the POUs appear to have used a subjective process of setting the feasible savings at 50 percent of the economic potential.[31] Other utilities discounted the potential from some measures because: (a) they thought other programs and efforts in their communities would be attaining those improvements; (b) the measures are not really applicable in their service area; (c) the measures already have market penetration in their service area; and (d) they did not think a utility program would attain high market penetration.

Third, there were wide variations in the expected program savings among utilities relative to:

- forecasted electricity consumption,
- peak electrical demand and natural gas consumption in 2016,

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[29] Itron, (May 2006), *op. cit.*

[30] CMUA, June 2007. *op. cit.*

[31] For example, see Palo Alto, April 2007, *Ten Year Energy Efficiency Portfolio Plan*, memo to Utilities Advisory Commission, Palo Alto, CA, April 4, 2007, or see CMUA, June 2007, *op. cit.*

- economic and technical potential, and,
- a reduction in consumption or peak demand by 10 percent by 2016.

These variations can be attributed to many factors, including differences in customer base, size of the existing energy efficiency program budget, available staff and experience in developing energy efficiency programs, and views about the cost effectiveness of specific energy measures across utilities.

Fourth, the methods used by RMI and the individual POUs to determine achievable potential still remain unclear to staff. The RMI study indicates that "… each POU established … targets based on the results of the RMI study and knowledge of their respective service areas."[32] Although a list of possible adjustment options are provided in the study, the specific methods of adjustment for each POU and their implications are unknown. To fully assess the method and results used to develop achievable potential, Energy Commission staff needs to know the following:

1. The general method used to set annual program savings targets. Which of the three options given by RMI did they select?
2. The extent to which the method used estimates of economic or technical savings potential to bound or inform the level of savings found to be reasonable.
3. Which of the following factors were used in the development of annual efficiency program targets?
    a. Historical program savings results over time.
    b. Estimates of available program funding.
    c. Consideration of ramp up constraints: available program staff, product vendors, and trade allies in area, stock turnover rates, new home starts, etc.
    d. Consideration of other external factors, emerging technologies, such as advanced metering deployment and new communication devices.

AB 2021 legislation realized that importance of understanding the derivation of POU targets by directly requiring the POUs to "…..report those targets to the California Energy Commission and the basis for establishing those targets."[33]

Data Aggregation

The data aggregation and analysis for the POUs are based on data sheets provided with the RMI study**.** The study contained separate tables for 33 of the 35 POU participants in the report:

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[32] RMI (2007), *op. cit*., p. 23.

[33] AB 2021 (Levine), Chapter 734, Statutes of 2006, p. 4.

the City of Industry and the City of Vernon did not submit data. Each of the POU tables contained annual values for the years 2007-2016 in the following categories:

- Technical Potential: Energy as noted in megawatt hours(MWh) and Demand as noted in megawatts (MW)
- Economic Potential: Energy (MWh) and Demand (MW)
- Feasible Targets (i.e. Feasible Potential): Energy (MWh) and Demand (MW)
- Baseline Energy Forecast (MWh) and Baseline Demand Forecast (MW)

In most cases these numbers were not adopted by each individual POU board prior to submission to the Energy Commission and staff considers them preliminary.

Technical, economic, and feasible potential energy savings estimates were subtracted from the baseline forecasts. Subtracting the savings yielded projections of what the 2007-2016 energy consumption patterns would be if these levels of savings were achieved.

The data obtained from the other POUs and IOUs were entered into similar data sheets to allow comparison among all utilities. Data for the natural gas utilities were compiled in the same way. The aggregated data served as the foundation for the analyses provided in Chapter 3 of this report.

Energy Consumption and Peak Demand Forecasts

For purposes of making statewide estimates and comparisons, staff has relied on the energy demand forecasts contained in the Energy Commission's *California Energy Demand 2008-2018, Staff Draft Forecast*, which covers each of the transmission planning areas in the state.[34] To develop energy use forecasts for each individual utility, staff applied the planning area growth rate to the most recent recorded year of electricity and natural gas consumption. For electricity, the last historic year is 2005, but natural gas was updated with 2006 actual consumption. Final electric consumption from 2006 is not yet available, but will be incorporated into the revised demand forecast.

For the IOUs and larger POUs, Energy Commission staff developed a peak demand forecast by applying the planning area forecast growth rate to the staff's estimate of weather-adjusted 2006 peak demand, documented in *Staff Forecast of 2008 Peak Demand*.[35] For smaller POUs, the peak demand forecast submitted by the POU was used.

Energy efficiency impacts from the IOUs' approved 2006-2008 program portfolios are treated as committed energy savings and have been embedded in the Energy Commission's demand forecast. In contrast, the pre-2008 efficiency impacts for the POUs have not been accounted for

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[34] California Energy Commission, *California Energy Demand 2008-2018 Staff Draft Forecast*, CEC-200-2007-015SD, July 2007.

[35] California Energy Commission, *Staff Forecast of 2008 Peak Demand*, Staff Final Report, CEC-200-2007-006-SF, June 18, 2007. See Table 1-8 for a description of forecast planning areas.

in the Energy Commission's forecast because data was too inconsistent. Energy savings estimates beyond 2009 are treated as uncommitted savings for both the IOUs and the POUs. When comparing energy savings estimates to the forecasts for electricity, peak demand and natural gas presented in Chapter 3 and analyzed in Chapter 4, the impact of this treatment for the IOUs was that the remaining technical and economic potential covers the years 2009 to 2016. For the POUs it covered the years 2007-2016. Chapter 4 contains graphs showing the comparison of the potential estimates to the electricity, peak demand and natural gas forecasts.

Other Utilities

A number of utilities[36] have not participated in the AB 2021 process this year either because they did not specifically qualify as publicly owned (municipal) utilities or they are self generators (electricity) or private marketers (natural gas). The self generators represent four percent of electricity consumption and the private marketers represent 17 percent of natural gas end-use consumption. The other electric utilities, presented in Table 4, account for approximately six percent of California's electric energy consumption (of which Department of Water Resources is one-half). The other gas utilities represent two percent of the natural gas consumption. This report does not include efficiency potential estimates and targets for these utilities, self generators or private marketers.

Table 4: Other Utilities and Corresponding Planning Areas

Electricity		
#	Utility	Planning Area
1	Anza	SCE
2	Calaveras	PG&E
3	DWR	DWR
4	MWD	SCE
5	Pacificorp	Other
6	San Francisco	PG&E
7	Sierra Pacific	Other
8	Southern California Water	SCE
9	Surprise Valley	Other
10	Tuolumne	PG&E
11	USBR-CVP	PG&E
12	USBR-Parker Davis	SCE
13	Valley Electric	SCE

Natural Gas		
#	Utility	Planning Area
1	Avista Energy	Other
2	Coalinga	PG&E
3	Long Beach	SCG
4	Southwest Gas Corporation	Other

[36] The Power & Water Resources Pooling Authority, a joint powers authority formed in 2004, submitted data for inclusion in the AB 2021 process on August 15, 2007. It was not possible to include their data in this version of the report.

CHAPTER 3: Presentation of Energy Efficiency Data

Introduction

This chapter contains a composite of individual publicly owned and investor-owned utilities and statewide efficiency data summaries as taken from the sources identified in Chapter 2. Appendix A contains the data from individual utilities. A table and graphs on electricity consumption (MWh) and peak demand (MW) are presented for each utility. Each natural gas utility has a table and a graph on natural gas (in million therms (MMth or 10^6 th)).

Differences between Publicly Owned and Investor-Owned Utilities

The electricity and natural gas needs of most Californians are met through a combination of IOUs and POUs. There are three major IOUs (Pacific Gas and Electric Co. (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric Co. (SDG&E)) and more than 40 POUs located throughout the state. Figure 1 shows that the IOUs provided about 68 percent of the 281,000 GWh of electricity consumed in California in 2006; the POUs collectively provided about 22 percent.[37] The remaining 10 percent is provided by the other utilities referred to in Table 4 and several self generators.

Excluding entities outside of the AB 2021 process this year, the IOUs provide 75 percent and the POUs 25 percent of California's electricity. Natural gas is provided by three major IOUs (PG&E, SDG&E and Southern California Gas Co. (SCG)) for a collective total of 98 percent. Palo Alto is the only natural gas POU reporting targets this year. As with electricity, some of the natural gas is provided by entities not participating in the AB 2021 process this year. The other entities, discussed in Chapter 2, provided the rest of the totals for electricity and natural gas.

There are significant differences in scale between the average publicly owned and investor-owned utility which impact their energy efficiency histories. Even among POUs, the range of sizes is dramatic: one-third of the POUs account for over 90 percent of POU electricity sales. The IOUs dwarf most of the POUs in the size of their territory and the number of customer accounts. The POUs vary greatly in the number of customers served. LADWP provides service to the largest number of customers at 1.5 million accounts, while Pittsburg Power Company provides service to less than 300 accounts. Most of the POUs serve between 10,000 and 90,000 customers. As a result, the POUs tend to have a less heterogeneous customer mix than the IOUs. This can limit the breadth and diversity of efficiency program options.

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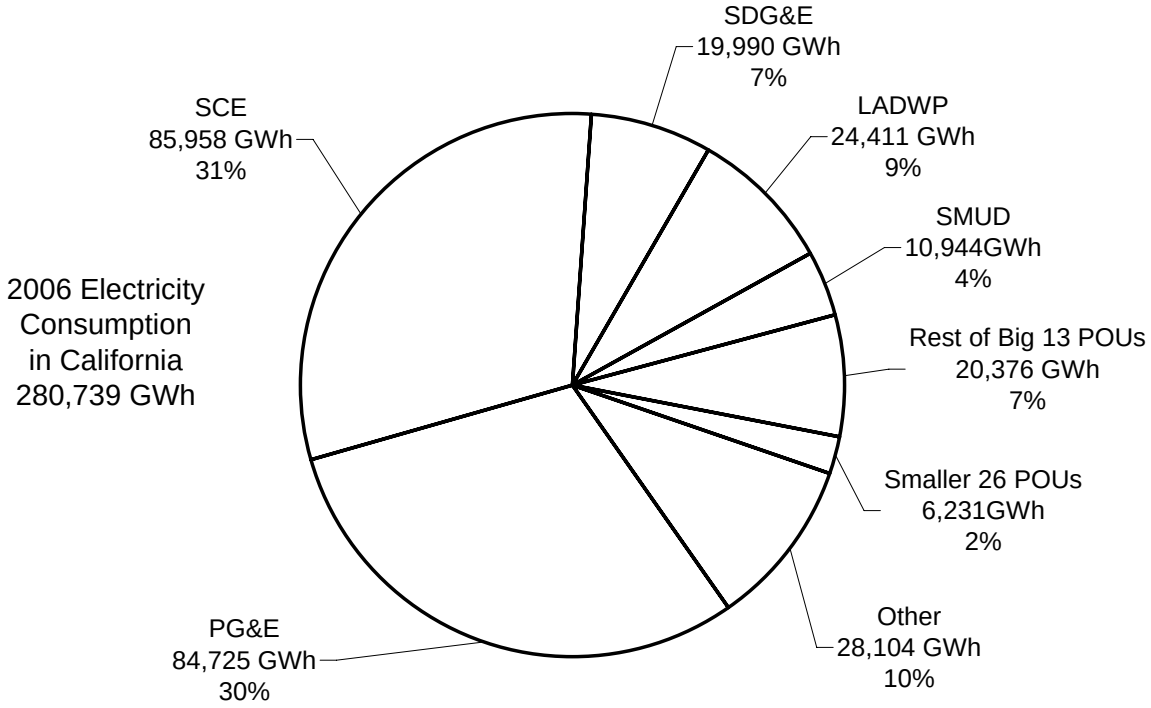
[37] Based on California Energy Commission, *California Energy Demand 2008-2018 Staff Draft Forecast*, CEC-200-2007-015SD, July 2007.

Figure 1: IOU and POU Shares of California's Electricity Consumption in 2006



Source: California Energy Commission, *California Energy Demand 2008-2018 Staff Draft Forecast*, CEC-200-2007-015SD, July 2007.

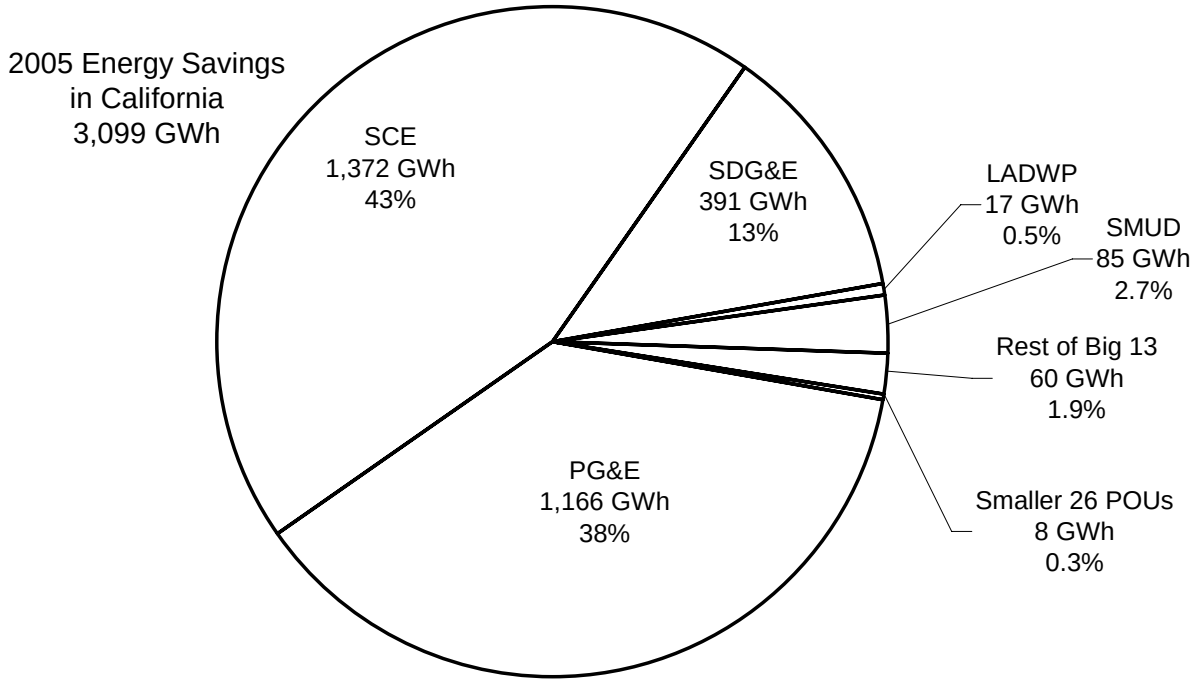
From 2000 through 2003, the IOUs reported 4,838 GWh, 1,248 MW, and 93 million therms of energy efficiency savings. In the CPUC's 2004-2005 program cycle, the IOUs reported energy efficiency savings of 4,773 GWh, 948 MW, and 77 million therms with a total expenditure of $965 million. For the CPUC's 2006-2008 efficiency program cycle, the IOUs budgeted a total of $2 billion for three years of efficiency programs for projected savings of 6,812 GWh, 1,006 MW and 111 million therms.[38]

Like the IOUs, the POUs administer a variety of energy efficiency programs for their customers. During 2005/2006, all POUs collectively spent over $54 million dollars on energy efficiency and saved over 170 million kWh and 53 MW of peak electricity. Figure 2 shows the electric energy savings reported for 2005 for both IOUs and POUs. Combined, the IOUs' programs resulted in 95 percent of the savings. The two largest POUs in the state, SMUD and LADWP, both of which have had programs as long as the IOUs, account for 3.2 percent of the statewide savings, but 60 percent of the savings that came from the POUs. SMUD had the highest energy efficiency

[38] CPUC, D.05-09-043, Interim Opinion: Energy Efficiency Plans and Program Funding Levels for 2006-2008-Phase I Issues, September 22, 2005, and Proposed Corrections to this decision, November 29, 2005.

expenditures at $22 million, close to half of the entire amount spent for all 39 POUs. LADWP spent the next highest amount at $11 million for their energy efficiency programs.[39]

Figure 2: IOU and POU Share of Electric Energy Savings in 2005



Sources: *2006 Energy Efficiency Annual Reports* for the investor-owned utilities. California Municipal Utilities Association (CMUA), *Energy Efficiency in California's Public Power Sector: A Status Report*, December 2006 for the publicly owned utilities.

The purpose of this brief historical overview was to set the stage for understanding the proposed utility goals and their compilation into a statewide evaluation. These comparisons form the remainder of this chapter.

Statewide Perspective

This section of the chapter examines the aggregated savings of the IOUs and the POUs, as groups of utilities and combined. The aggregated energy savings targets are compared to the forecasted consumption in 2016, to the forecasted growth by 2016 and to the remaining technical and economic potential.

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[39] California Municipal Utilities Association (CMUA), *Energy Efficiency in California's Public Power Sector: A Status Report*, December 2006.

Proposed Savings Targets as a Percentage of Forecasted Consumption and Forecasted Growth

The proposed savings goals relative to forecasted consumption over the next ten years are summarized in Table 5. The consumption forecasts used for this table are from the California Energy Commission 2007 Staff Draft forecast.[40] The proposed savings were aggregated from the individual utility data presented in Appendix A.

Table 5: Savings Goals Relative to Energy Consumption and Growth Forecasts

Electric Energy Consumption					
Utility Type	**Forecasted Electric Consumption in 2007 (GWh)**	**Forecasted Electric Consumption in 2016 (GWh)**	**Proposed Savings (GWh)**	**Proposed Savings as % of Forecasted Consumption in 2016**	**Proposed Savings as % of Forecasted Growth from 2007 to 2016**
IOU	193,072	213,459	20,585	9.6%	101%
POU	61,444	70,801	5,907	8.3%	63%
IOU and POU	**254,516**	**284,260**	**26,491**	**9.3%**	**89%**

Electric Peak Demand					
Utility Type	**Forecasted Electrical Demand in 2007 (MW)**	**Forecasted Electrical Demand in 2016 (MW)**	**Proposed Savings (MW)**	**Proposed Savings as % of Forecasted Peak Demand in 2016**	**Proposed Savings as % of Forecasted Growth from 2007 to 2016**
IOU	45,347	50,850	4,357	8.6%	79%
POU	14,873	17,304	1,212	7.0%	50%
IOU and POU	**60,220**	**68,154**	**5,568**	**8.2%**	**70%**

Natural Gas Consumption					
Utility Type	**Forecasted Natural Gas Consumption in 2007 (MMth)**	**Forecasted Natural Gas Consumption in 2016 (MMth)**	**Proposed Savings (MMth)**	**Proposed Savings as % of Forecasted Consumption in 2016**	**Proposed Savings as % of Forecasted Growth from 2007 to 2016**
IOU	10,876	11,598	489	4.2%	68%
POU	31.0	31.3	0.9	3.0%	297%
IOU and POU	**10,907**	**11,629**	**490**	**4.2%**	**68%**

Source: Energy Commission staff work based on data contained in Appendix A.

The proposed savings targets partially offset the forecasted growth in electricity and retail gas consumption between 2007 and 2016. The POUs' program savings targets meet 63 percent of the electricity consumption and 50 percent of the peak electrical demand growth for this period. The IOUs' programs savings are projected to more than offset (101 percent) the growth in electrical consumption and 79 percent of the peak demand growth. Combined, the savings targets will meet 89 percent of the growth in electricity consumption and 70 percent of the growth in peak demand. Since only one POU serves natural gas end-use customers, the consumption of natural gas considered in this report is mainly by IOU customers. The proposed

[40] California Energy Commission, *California Energy Demand 2008-2018 Staff Draft Forecast*, CEC-200-2007-015SD, July 2007.

savings targets will reduce forecasted consumption by four percent in 2016 and offset 68 percent of the growth between 2007 and 2016.

Proposed Savings Targets as a Percentage of Potential

This section compares the sum of the technical and economic potential estimates to the sum of the energy savings targets proposed by the POUs or set as goals by the CPUC for the IOUs.

The technical and economic potential estimates are contrasted with the proposed savings goals for the IOUs and the POUs in Table 6. As discussed in Chapter 2, the proposed savings and the technical and economic potential shown in this table cover the period 2009-2016, while for the POUs they cover the period 2007-2016. The IOUs expect to achieve 71 percent of the economic potential by 2016 if they meet all of their annual savings goals, whereas the POUs proposed savings targets for the same period are equivalent to 56 percent of the economic potential. On a statewide basis, the combined IOUs and POUs expect to achieve 67 percent of the economically achievable savings if they can meet their 10-year electric energy savings targets.

Table 6: Summary of Utility Proposed Savings Goals and Potentials by the Year 2016

Electric Energy Consumption						
Utility Type	**Technical Potential (GWh)**	**Economic Potential (GWh)**	**Proposed Savings (GWh)**	**Economic as % of Technical**	**Proposed Savings as % of Technical**	**Proposed Savings as % of Economic**
IOU	39,584	28,919	20,585	73%	52%	71%
POU	13,687	10,553	5,907	77%	43%	56%
IOU and POU	**53,271**	**39,472**	**26,491**	**74%**	**50%**	**67%**
Including Emerging Technology	65,752	51,953	26,491	79%	40%	51%

Electric Peak Demand						
Utility Type	**Technical Potential (MW)**	**Economic Potential (MW)**	**Proposed Savings (MW)**	**Economic as % of Technical**	**Proposed Savings as % of Technical**	**Proposed Savings as % of Economic**
IOU	8,938	4,605	4,357	52%	49%	95%
POU	3,236	1,964	1,212	61%	37%	62%
IOU and POU	**12,174**	**6,569**	**5,568**	**54%**	**46%**	**85%**
Including Emerging Technology	16,462	10,857	5,568	66%	34%	51%

Natural Gas Consumption						
Utility Type	**Technical Potential (MMth)**	**Economic Potential (MMth)**	**Proposed Savings (MMth)**	**Economic as % of Technical**	**Proposed Savings as % of Technical**	**Proposed Savings as % of Economic**
IOU	1,628	744	489	46%	30%	66%
POU	5.6	4.5	0.9	80%	17%	21%
IOU and POU	**1,634**	**749**	**490**	**46%**	**30%**	**65%**
Including Emerging Technology	2,181	1,296	490	59%	22%	38%

Source: Energy Commission staff work based on data contained in Appendix A. Itron, Inc., *California Energy Efficiency Potential Study, Volumes 1-2*, submitted to Pacific Gas and Electric Co., May 24, 2006 (2006 Itron) for the technical and economic potential of emerging technologies.

The lower percentage for the POUs relative to the IOU projections is attributable to multiple factors including, the limitations in the method used to converting technical and economic

potential estimates from the IOU efficiency potential study to the POU service areas (see Chapter 2), the less diverse customer base for most POUs, less experience with energy efficiency programs, the fact that a regulatory agency set the energy savings goals for the IOUs, and the differences in what each POU considered appropriate or cost-effective measures given their program cost structure and avoided costs estimates.

For peak demand, the IOUs are expecting to achieve 95 percent of the economic potential, while the POUs are projecting to achieve 62 percent. In part this is because IOUs placed more emphasis on achieving peak demand savings relative to base load energy savings in response to CPUC policy rules after the 2000-2001 energy crisis. Most of the difference may be linked to the way the POUs and IOUs estimated economic potential and selected 10-year savings targets. Combined, the IOUs and the POUs are expecting to achieve 85 percent of the economic potential for peak demand savings by 2016.

Natural gas efficiency programs capture a smaller percentage of the economic potential than the electric programs. The IOUs aim to achieve 66 percent of the economic potential and the POUs 21 percent. Since most natural gas consumption is by IOU customers, the combined percentage is also 65 percent of the economic potential.[41]

Individual Utility Perspective

This section of the chapter examines the savings goals for electricity consumption, peak demand and natural gas consumption. Each of these sections is organized into four methods of comparison: (1) percentage of forecasted consumption in 2016, (2) percentage of consumption growth by 2016, (3) 10 percent reduction in consumption by 2016, and (4) percentage of remaining potential.

Electricity Consumption Savings Goals by Utility

This section compares the utilities' proposed electricity savings goals to the forecasted 2016 electricity consumption, to the forecasted increase in electricity consumption for the period 2007 through 2016, and to the 10 percent savings intent from AB 2021 relative to the baseline forecast in 2016. Supporting data for the figures in this section, taken from Appendix A, has been combined into a summary table contained in Appendix B and in Table 7.

Percentage of Forecasted Consumption in 2016 (See Figure 3)

The IOUs' savings represent nine percent of the forecasted 2016 electric energy consumption and the POUs' savings represent 8.8 percent. There is significant variation among the individual utilities, ranging from a low of zero to a high of 12.8 percent. The 13 largest POUs account for more than 90 percent of the POU sales. The savings goals for the 13 large POUs, as a percent of their combined 2016 consumption, are twice as high as for the 26 small POUs (8.7 percent compared to 4.3 percent).

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[41] The natural gas consumption numbers in this report refer to retail end-use natural gas consumption – that is, natural gas used in electricity generation plants is excluded.

Percentage of Consumption Growth by 2016 (See Figure 4)

Even greater variation is seen when the savings are compared to growth in electric energy consumption. For the IOUs, the savings as a percent of growth are 101 percent, for the POUs 63 percent, and combined 89 percent. The percentage ranges from a low of zero to a high of 2970 percent for Glendale, which is expecting to grow only a few percent by 2016 and has proposed to reduce consumption compared to 2007 by a significant amount.

10 Percent Reduction in Consumption by 2016 (See Figure 5)

AB 2021 establishes a target reduction of 10 percent compared to 2016 electricity consumption. Compared to this target, the IOUs will fall short of that goal by four percent and POUs by 17 percent. Combined, the IOUs and the POUs will reach 93 percent of the reduction target. Only three utilities, SMUD, Pasadena and Needles, are planning to exceed a 10 percent reduction in electricity consumption by 2016.

Figure 3: Electricity Savings Goals as a Percent of 2016 Consumption Forecast

Larger utilities are proposing larger reductions to their 2016 forecasted consumption than smaller utilities.

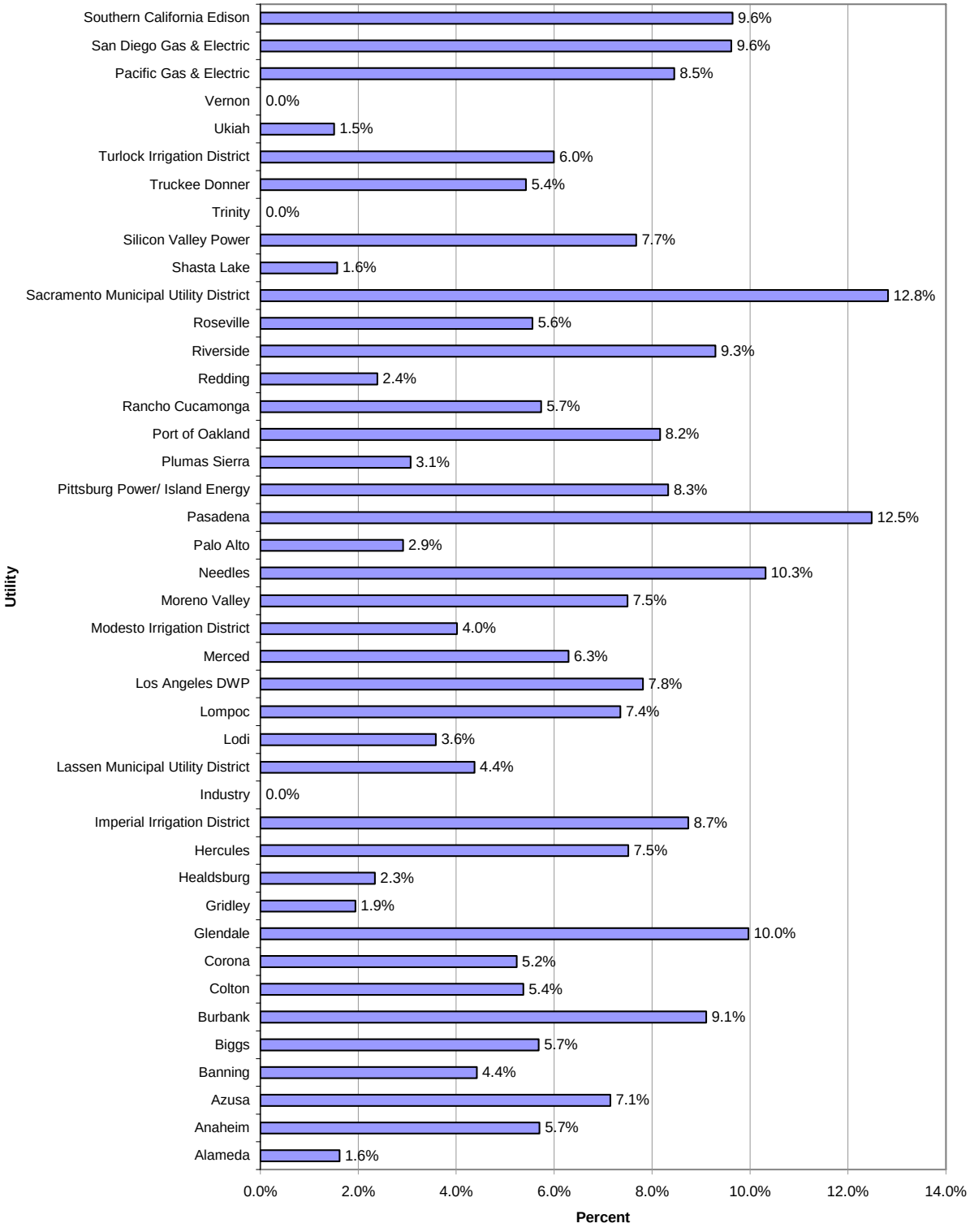


Figure 4: Electric Savings Goals Relative to Consumption Growth by 2016

The IOU goals keep consumption growth flat. One-third of the POUs propose targets to reduce their 10-year consumption by more than half of expected growth. Most of the POUs expect to reduce consumption growth by at least 20 percent over ten years.

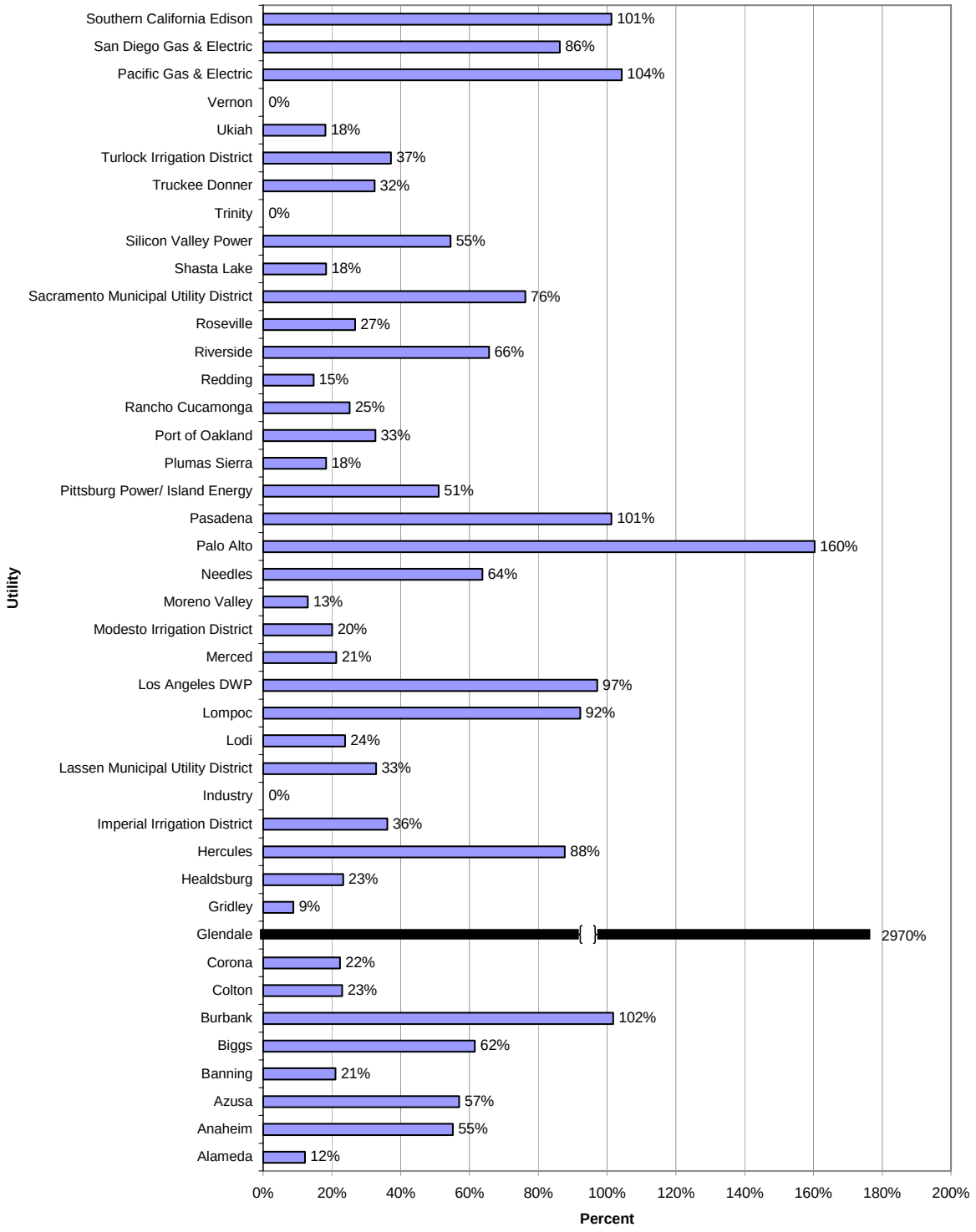
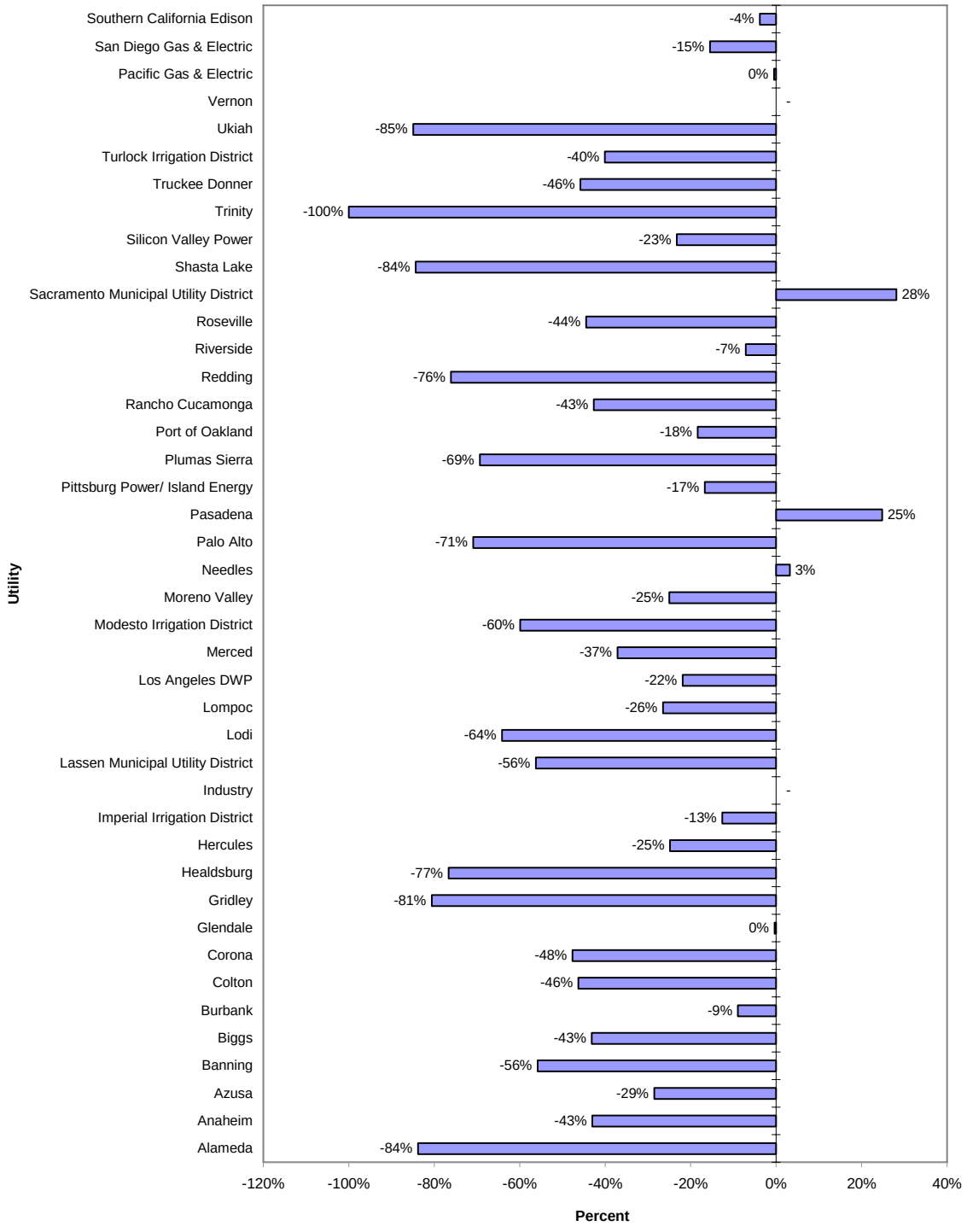


Figure 5: Electricity Savings Goals Compared to 10% Reduction in Consumption by 2016

Three of the POUs propose goals that achieve a 10 percent reduction in 2016 forecasted consumption as called for in AB 2021. On average, the utilities are 17 percent short of meeting this guideline.



Percentage of Remaining Potential

Table 7 compares the individual electricity savings goals to technical and economic potential. On average, the IOU goals capture 71 percent of the remaining economic potential, while the POUs capture 56 percent of theirs. Individual POUs capture between zero and 100 percent of their future economic consumption potential.

Table 7: Electricity Savings Goals Compared to Potential

	Total Technical Potential (MWh)	Total Economic Potential (MWh)	Proposed Savings Goals (MWh)	Economic as % of Technical	Proposed Savings as % of Technical	Proposed Savings as % of Economic
Publicly Owned Utilities						
Alameda	89,404	68,379	7,605	76%	9%	11%
Anaheim*	430,783	317,446	167,682	74%	39%	53%
Azusa	50,561	41,198	20,840	81%	41%	51%
Banning	44,810	35,129	8,734	78%	19%	25%
Biggs	3,355	2,936	1,063	88%	32%	36%
Burbank*	217,783	181,393	113,073	83%	52%	62%
Colton	86,298	70,410	26,254	82%	30%	37%
Corona	12,182	8,835	4,669	73%	38%	53%
Glendale*	215,548	179,028	113,620	83%	53%	63%
Gridley	8,966	6,410	917	71%	10%	14%
Healdsburg	14,953	11,827	1,984	79%	13%	17%
Hercules	3,086	2,513	1,364	81%	44%	54%
Imperial Irrigation District*	1,006,526	839,496	405,600	83%	40%	48%
Industry	n/a	n/a	n/a	n/a	n/a	n/a
Lassen Municipal Utility District	32,263	25,338	7,333	79%	23%	29%
Lodi	104,120	67,565	20,001	65%	19%	30%
Lompoc	24,494	21,489	11,210	88%	46%	52%
Los Angeles DWP*	5,057,000	4,049,000	2,026,000	80%	40%	50%
Merced	88,019	72,009	36,195	82%	41%	50%
Modesto Irrigation District*	589,690	276,984	138,557	47%	23%	50%
Moreno Valley	21,447	15,941	8,221	74%	38%	52%
Needles	20,500	16,694	8,173	81%	40%	49%
Palo Alto	70,000	70,000	29,300	100%	42%	42%
Pasadena*	250,161	181,260	181,260	72%	72%	100%
Pittsburg Power/ Island Energy	2,721	2,254	1,777	83%	65%	79%
Plumas Sierra	34,104	26,434	6,209	78%	18%	23%
Port of Oakland	16,714	12,325	8,837	74%	53%	72%
Rancho Cucamonga	13,464	8,641	4,478	64%	33%	52%
Redding*	-	-	23,249	n/a	n/a	n/a
Riverside*	478,402	393,171	240,380	82%	50%	61%
Roseville*	286,337	169,699	87,162	59%	30%	51%
Sacramento Municipal Utility District*	3,228,328	2,518,873	1,784,000	78%	55%	71%
Shasta Lake	17,557	13,213	1,292	75%	7%	10%
Silicon Valley Power*	686,469	514,914	257,620	75%	38%	50%
Trinity	17,838	-	-	0%	0%	0%
Truckee Donner	32,303	20,321	10,014	63%	31%	49%
Turlock Irrigation District*	409,151	294,747	139,990	72%	34%	47%
Ukiah	22,088	17,599	1,979	80%	9%	11%
Vernon	n/a	n/a	n/a	n/a	n/a	n/a
Subtotals	**13,687,423**	**10,553,471**	**5,906,641**	**77%**	**43%**	**56%**
Investor Owned Utilities						
Pacific Gas & Electric	17,792,000	13,299,000	9,449,000	75%	53%	71%
San Diego Gas & Electric	3,753,500	2,697,500	1,899,700	72%	51%	70%
Southern California Edison	18,038,000	12,922,000	9,236,000	72%	51%	71%
Subtotals	**39,583,500**	**28,918,500**	**20,584,700**	**73%**	**52%**	**71%**
IOU and POU	**53,270,923**	**39,471,971**	**26,491,341**	**74%**	**50%**	**67%**

* Identifies the Big 13 POUs.

Peak Demand Savings Goals

The following sections compare the utilities' proposed peak demand savings goals to the forecasted 2016 peak demand, to the forecasted growth in peak electrical demand for the period 2007 through 2016, and to the 10 percent savings target relative to the baseline forecast in 2016. Even though this last metric was not required pursuant to AB 2021, staff decided it was a useful comparison. Supporting data, taken from Appendix A, has been combined into a summary table contained in Appendix B and in Table 8.

Percentage of Forecasted Peak Demand in 2016 (See Figure 6)

The IOUs' savings represent nine percent of the forecasted 2016 peak electrical demand and the POUs' savings represent seven percent. There is significant variation among the individual utilities, ranging from a low of zero to a high of 14 percent. The 13 largest POUs account for 98 percent of the POU peak demand. The savings goals for the 13 large POUs as a percent of their combined 2016 peak electrical demand are more than three times as high as for the 26 small POUs (seven percent compared to two percent).

Percentage of Peak Demand Growth by 2016 (See Figure 7)

Comparing the savings to growth in peak demand reveals even greater variation. For the IOUs, the savings as a percent of growth are 79 percent, for the POUs 50 percent, and combined 70 percent. The percentage ranges from a low of zero to a high of 135 percent for Burbank, which is expecting its peak demand to grow only a few percent by 2016 and has proposed to reduce the peak compared to 2007 by a significant amount.

10 Percent Reduction in Peak Demand by 2016 (See Figure 8)

AB 2021 establishes a target reduction of 10 percent compared to 2016 electricity consumption. Staff applied the same metric for peak demand. When compared to the target, the IOUs will fall short by 14 percent and the POUs by 30 percent. Combined, the IOUs and the POUs will reach 82 percent of the reduction target. Only SMUD is planning to exceed a 10 percent reduction in peak demand.

Figure 6: Peak Demand Savings Goals as a Percent of 2016 Peak Demand Forecast

Larger utilities are proposing larger reductions in their 2016 forecasted peak demand than smaller utilities.

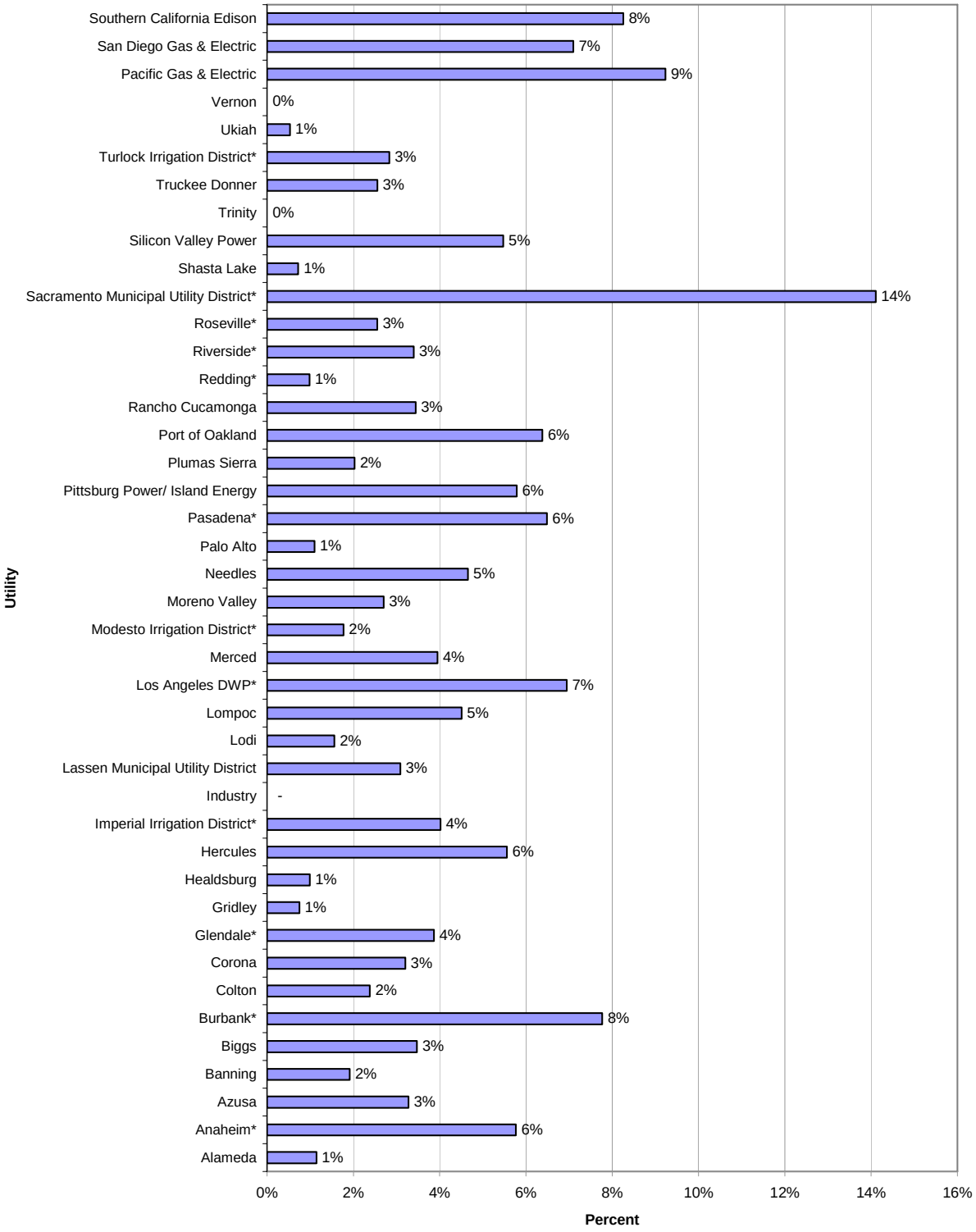


Figure 7: Peak Demand Savings Goals as a Percent of Growth by 2016

Peak demand growth is more difficult to reduce. IOU goals would reduce their projected peak growth by two-thirds over the decade, while POUs propose to reduce peak growth by half of the expected forecast for 2016.

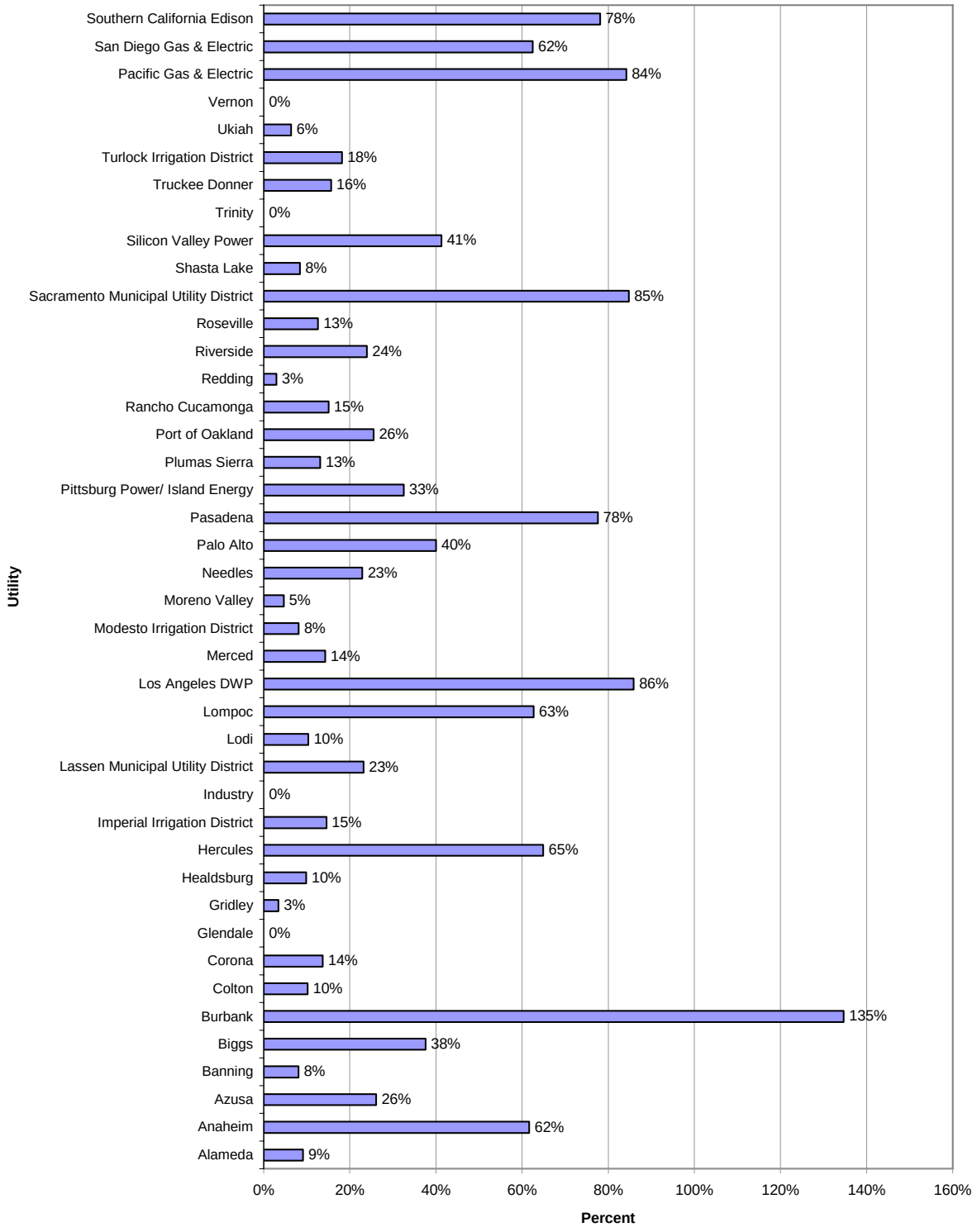
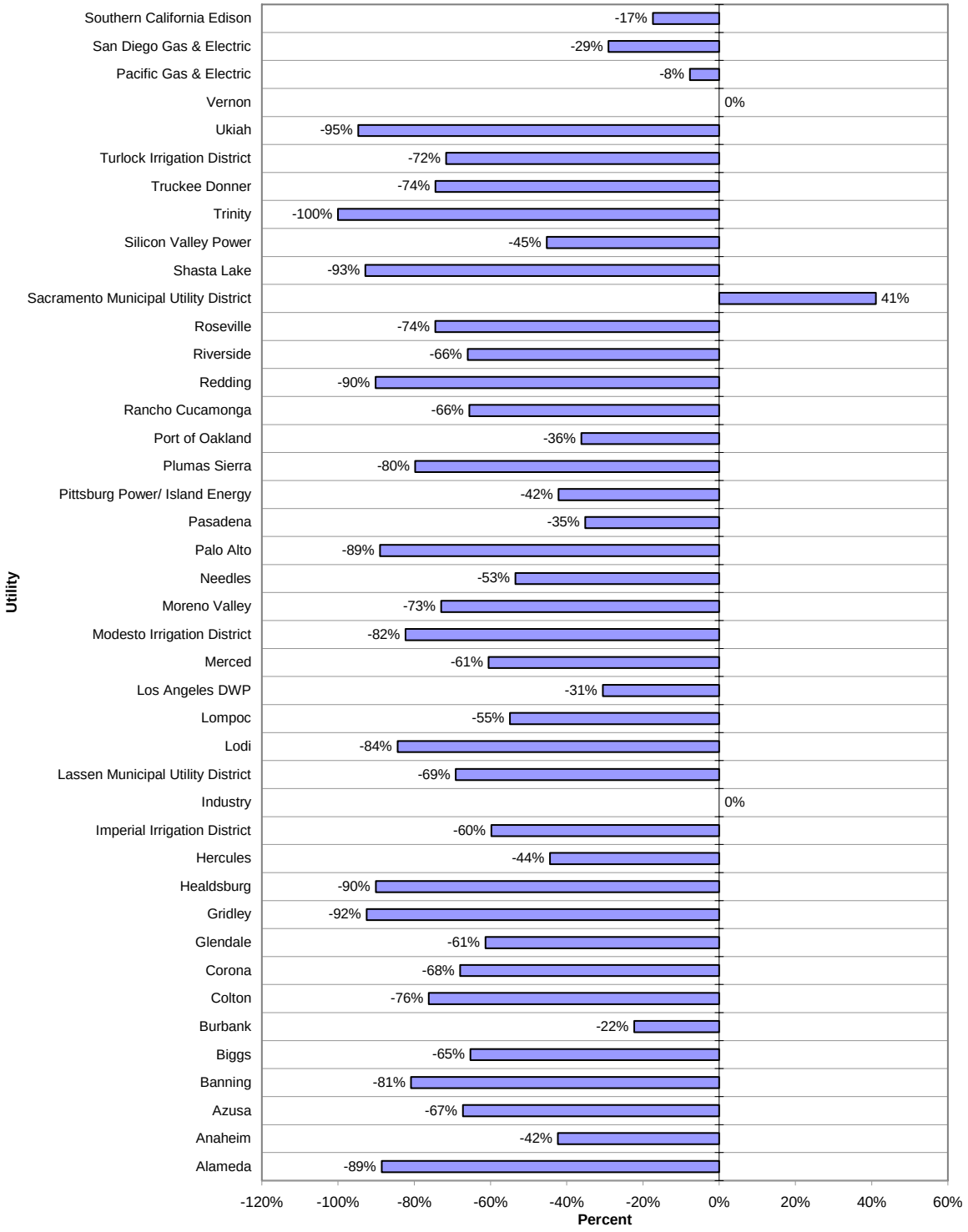


Figure 8: Peak Demand Savings Goals Compared to 10% Reduction in Peak Demand by 2016

Only one utility proposed to reach a 10 percent reduction in 2016 peak demand. On average, the utilities are 18 percent short of reaching this level of peak reduction.



Percentage of Remaining Potential

The peak demand savings goals are compared to the technical and economic potential in Table 7. On average, the IOU goals capture 95 percent of their remaining economic potential, while the POUs capture 62 percent of theirs. The proposed achievement of available economic peak demand potential among the POUs ranges from zero to 118 percent.

Table 8: Peak Demand Reduction Goals Compared to Potential

	Total Technical Potential (MW)	Total Economic Potential (MW)	Proposed Savings (MW)	Economic as % of Technical	Proposed Savings as % of Technical	Proposed Savings as % of Economic
Publicly Owned Utilities						
Alameda	11	8	1	73%	9%	12%
Anaheim*	56	38	35	68%	63%	93%
Azusa	7	5	2	72%	37%	51%
Banning	6	5	1	75%	20%	27%
Biggs	0	0	0	84%	40%	48%
Burbank*	27	21	24	76%	89%	118%
Colton	11	8	3	76%	26%	34%
Corona	2	1	1	69%	37%	54%
Glendale*	27	20	13	75%	48%	65%
Gridley	1	1	0	63%	10%	16%
Healdsburg	2	1	0	72%	12%	17%
Hercules	0	0	0	74%	43%	58%
Imperial Irrigation District*	140	114	55	81%	39%	48%
Industry	n/a	n/a	n/a	n/a	n/a	n/a
Lassen Municipal Utility District	4	3	1	73%	24%	32%
Lodi	17	10	2	55%	14%	26%
Lompoc	3	2	1	87%	47%	54%
Los Angeles DWP*	1,377	927	420	67%	31%	45%
Merced	11	9	4	78%	40%	51%
Modesto Irrigation District*	75	32	16	42%	21%	50%
Moreno Valley	3	2	1	71%	37%	53%
Needles	3	2	1	79%	39%	49%
Palo Alto	5	5	2	n/a	n/a	n/a
Pasadena*	34	22	22	63%	63%	100%
Pittsburg Power/ Island Energy	0	0	0	76%	74%	97%
Plumas Sierra	4	3	1	76%	19%	25%
Port of Oakland	2	2	1	71%	51%	72%
Rancho Cucamonga	2	1	1	61%	32%	53%
Redding*	-	-	4	n/a	n/a	n/a
Riverside*	58	45	22	77%	38%	50%
Roseville*	43	21	11	48%	24%	50%
Sacramento Municipal Utility District*	1,155	557	518	48%	45%	93%
Shasta Lake	2	1	0	67%	7%	10%
Silicon Valley Power*	81	60	30	74%	37%	50%
Trinity	2	-	-	0%	0%	0%
Truckee Donner	4	2	1	59%	27%	46%
Turlock Irrigation District*	58	35	16	60%	28%	46%
Ukiah	3	2	0	73%	8%	11%
Vernon	n/a	n/a	n/a	n/a	n/a	n/a
Subtotals	**3,236**	**1,964**	**1,212**	**61%**	**37%**	**62%**
Investor Owned Utilities						
Pacific Gas & Electric	4,177	2,167	2,054	52%	49%	95%
San Diego Gas & Electric	804	388	361	48%	45%	93%
Southern California Edison	3,958	2,051	1,942	52%	49%	95%
Subtotals	**8,938**	**4,605**	**4,357**	**52%**	**49%**	**95%**
IOU and POU	**12,174**	**6,569**	**5,568**	**54%**	**46%**	**85%**

* Identifies the Big 13 POUs.

Proposed Natural Gas Energy Savings Goals

Table 9 compares the natural gas savings goals for each utility to forecasted demand for natural gas, to the forecasted growth in natural gas demand for the period 2007 through 2016, and to a 10 percent savings relative to the 2016 baseline forecast. Even though not required by AB 2021, staff decided it was a useful comparison.

Table 9: Summary of Proposed Gas Savings Goals

	Cumulative Natural Gas Proposed Savings Goals (MMth)		Forecasted Natural Gas Consumption (MMth)		10-yr Total Natural Gas Proposed Savings Goals (MMth)	% Reduction in 2016 Forecast	Savings as % of Growth	Reduction Needed to Meet 10% Target (MMth)	Difference between Planned Savings and 10% Target	
	2007	2016	2007	2016					(MMth)	(%)
Publicly Owned Utilities										
Palo Alto	-	0.9	31.0	31.3	0.9	3.0%	297%	3	(2)	-70%
Subtotals	**-**	**0.9**	**31.0**	**31.3**	**0.9**	**3.0%**	**297%**	**3**	**(2)**	-70%
Investor Owned Utilities										
Pacific Gas & Electric	-	187	4,614	4,936	187	3.8%	58%	494	(307)	-62%
San Diego Gas & Electric	-	42	572	643	42	6.5%	59%	64	(23)	-35%
Southern California Gas Company	-	261	5,690	6,019	261	4.3%	79%	602	(341)	-57%
Subtotals	**-**	**489**	**10,876**	**11,598**	**489**	**4.2%**	**68%**	**1,160**	**(671)**	**-58%**
IOU and POU	**-**	**490**	**10,907**	**11,629**	**490**	**4.2%**	**68%**	**1,162.9**	**(673)**	**-58%**

MMth is million therms.

Percentage of Forecasted Consumption in 2016 (Table 9)

The IOUs' savings represent 3.2 percent of the forecasted 2016 natural gas demand, while Palo Alto's savings, the only natural gas POU reporting, represents 3 percent. There is a modest variation among the individual utilities, ranging from a low of 2.9 to a high of 4.9 percent.

Percentage of Consumption Growth by 2016 (Table 9)

When the savings are compared to growth in natural gas consumption, there is substantial variation. The savings as a percent of growth represent 51 percent for the IOUs, 297 percent for Palo Alto, and 52 percent for the combined utilities. Palo Alto is expecting natural gas consumption to grow only a few percent by 2016 and has proposed to reduce the consumption compared to 2007 by a significant amount.

10 Percent Reduction in Consumption by 2016 (Table 9)

AB 2021 establishes a target reduction of 10 percent compared to 2016 electricity consumption. Staff applied the same metric for natural gas. When compared to the target, both the IOUs and Palo Alto will fall short of that goal by close to 70 percent. Combined, the IOUs and the POUs will reach 32 percent of the reduction target.

Percentage of Remaining Potential (Tables 9 and 10)

Comparing the amount needed for the IOUs to reach a 10 percent reduction target of 1,160 million therms (see Table 9), to the economic potential of 744 million therms shown in Table 10, indicates that there is insufficient economic potential for the IOUs to reach a 10 percent

reduction in natural gas consumption over 10 years. This observation needs to be tempered with the fact that the economic potential used for analysis in this report does not include the savings available from emerging technologies. According to the *2006 Itron* study, emerging technologies could provide another 547 million therms of savings, more than enough to reduce consumption in 2016 by 10 percent. Table 10 also shows that the savings as a percent of economic potential ranges from 21 to 47 percent.

Table 10: Natural Gas savings Goals Compared to Potential

	Total Technical Potential (MMth)	Total Economic Potential (MMth)	Proposed Savings (MMth)	Economic as % of Technical	Proposed Savings as % of Technical	Proposed Savings as % of Economic
Publicly Owned Utilities						
Palo Alto	5.60	4.50	0.9	80%	17%	21%
Subtotals	**5.6**	**4.5**	**0.9**	**80%**	**17%**	**21%**
Investor Owned Utilities						
Pacific Gas & Electric	666	355	187	53%	28%	53%
San Diego Gas & Electric	110	53	42	48%	38%	78%
Southern California Gas Comp	852	336	261	39%	31%	78%
Subtotals	**1,628**	**744**	**489**	**46%**	**30%**	**66%**
IOU and POU	**1,634**	**749**	**490**	**46%**	**30%**	**65%**

MMth is million therms.

Summary

The wide range in estimates suggests that there may have been some methodological problems for RMI in converting the Itron estimates of potential savings to the POU service areas. Other problems may relate to the scope of programs considered. The studies of technical and economic potential only consider demand savings resulting from energy efficiency measures. Impacts from demand response and load management measures and programs are not included. The IOUs and large POUs have separate demand response programs which provide additional coincident peak demand reductions.

CHAPTER 4: STAFF ANALYSIS

Introduction

This chapter proposes criteria by which to evaluate efficiency targets, reports current IOU and POU program achievements, examines their capacity for meeting future targets.

Defining the Efficiency Targets

AB 2021 legislation requires the Energy Commission to develop a statewide estimate of all potentially achievable cost-effective electricity and natural gas savings and establish statewide annual targets for energy savings over 10 years. The Energy Commission is using proposed individual POU and IOU targets as input for deriving this first statewide target. Additionally, the Commission is also using IOU and POU technical and economic potential estimates that exceed the sum of these proposed targets. Although the Commission is not imposing POU targets, it does expect to recommend individual POU targets once we have more information to draw from. These targets can be used by utilities as benchmarks. Staff sees the need for both statewide and individual utility targets. The statewide number establishes the overall goal, while the individual utility targets help ensure accountability. Once a statewide target is set, the Energy Commission, the CPUC, the IOUs, and the POUs all have to work together to establish the criteria that will be used to evaluate both statewide and individual targets and to achieve the umbrella statewide goal.

Criteria to Evaluate Efficiency Targets

This section provides a brief discussion of criteria to consider in setting an overall energy savings target for utility programs. Staff recommends the Energy Commission consider the following criteria in developing the statewide and individual utility service area targets:

- *Policy Context* – It is the intent of the Legislature in AB 2021 and SB 1037 that the Energy Commission's activities will ensure the IOUs and POUs procure all cost-effective energy efficiency savings. The legislation provides a guideline of reducing projected energy consumption by 10 percent in 10 years. In addition, there are other considerations mentioned in the AB 2021 legislation, most notably the impacts of energy efficiency on air quality and reduction of harmful greenhouse gas emissions.[42] This policy context will guide program funding allocations and program philosophy, for example, an emphasis on immediate peak demand reduction vs. avoiding lost opportunities over the long run.
- *Plausibility* – The proposed annual target trajectories or ramp-up rates provided by each POU or IOU must be plausible at both the statewide and individual utility levels. Plausible in this context means it is conceivable that each utility can attract or commit

[42] Executive Order S-3-05 by the Governor of the State of California, June 1, 2005.

the necessary staff and funding resources to achieve the proposed goals and that the numbers themselves look reasonable given recent historical efficiency program experience.

- *Motivation - A* statewide efficiency target must have an impact on the level of savings achieved by individual utilities. For the POUs, the targets must be perceived as productive guidance at the individual POU level and not as unwarranted meddling by the Energy Commission. The Energy Commission should aim to set an energy savings goal that will motivate all utilities (POUs and IOUs) to achieve a significant increase in the level of electricity and natural gas savings beyond those currently achieved by their programs. In turn, the Energy Commission will appropriately recognize those utilities who actually achieve their goals at the service territory level.
- *Margin for Error* - The proposed statewide or utility level goal needs to contain enough cushion or margin for error that the anticipated impact on overall electricity use will be sufficient to meet the policy goals after adjusting for the likely 20 to 30 percent shortfall in program savings. This shortfall reflects the impact of evaluation studies that often reduce reported or forecasted savings to the level of verified savings. The level of verified energy savings tend to be less than reported savings – the IOUs report saving some 4,800 GWh and 77 million therms as a result of their 2004 and 2005 efforts[43]. Preliminary evaluation results of a subset of these programs indicate that actual savings are about 70 percent of reported savings for electric and 45 percent or reported savings for gas programs.[44]

AB 2021 requires that utilities pursue all achievable cost-effective energy savings. As discussed in Chapter 2, cost-effectiveness is one of the key elements in the determination of economic potential. Therefore, by definition, all of the options are supposed to be cost effective. However, it is important to recognize that not all utilities view the components of cost-effectiveness exactly the same way, nor do they have exactly the same numeric values for all inputs. These differing perspectives need to be addressed in future cycles of the AB 2021 process.

Investor-Owned Utilities' Likely Success with Proposed Savings Targets

Energy Commission staff based its review of the original IOUs' savings goals for 2004-2013 set by the CPUC on historical experience of the IOUs' programs, trends in savings per dollar, and a comparison of proposed savings level to the level of economic potential estimated for each

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[43] Itron, April 2007, *Where Are We Now? 2004-2007 Reported Energy Efficiency Program Accomplishments and Costs,* San Diego, California.

[44] TecMarket Works, *Preliminary Findings from Completed Impact Evaluation Reports*, Memorandum from Carmen Best and Nick Hall to Michael Wheeler at the CPUC dated April 30, 2007.

utility.[45] The IOUs' annual program reports document their success in meeting their 2004 and 2005 electricity savings goals. However, the reported level of savings is often reduced by 10 to 30 percent on the basis of third party evaluation.[46]

Meeting their 2006 annual electricity savings goals seems to be proving more difficult, although this may be due to the late start up of the 2006 -2008 program cycle. The IOUs project that they will meet their 2007 savings goals, and express confidence that they will meet the cumulative three-year energy and peak demand goals for the 2006-2008 timeframe. Achieving natural gas goals is proving more difficult for the IOUs; about half of the 2006-07 goals have been reached by mid-2007.

The CPUC and utilities recognize that the gap between the achievable potential represented by the current savings goals and the economic potential may not be feasible through normal program channels. The Big Bold Energy Efficiency Strategies Workshop[47] series was designed to identify new strategies and initiatives to close this gap.

The IOUs believe the current goals should be revised downward based on the results of recent evaluations and smaller estimates of remaining economically achievable savings in the *2006 Itron* report than the KEMA-Xenergy study completed in 2003. The issue of potentially revising the energy efficiency savings potential and targets adopted in 2005 is a major controversy in current CPUC proceedings. Southern California Edison filed forecasted energy efficiency targets that are considerably lower than the CPUC targets in its 2006 Long-Term Procurement Plan (CPUC Proceeding R.06-02-013). Pacific Gas and Electric's plan states that the goals can only be met through significant changes to the current efficiency policy rules. Utilities are requesting the CPUC to give credit for program "spillover" (customers who take action without receiving a rebate), to expand the savings attributable to utilities from codes and standards advocacy programs, and to change the estimation of net-to-gross savings from programs.

As reported by the IOUs in the CPUC's Energy Efficiency Groupware Application (EEGA) database, the data suggest that the IOUs are likely to meet their 2006-2008 goals.[48] However, given the likelihood that their savings estimates will be reduced when evaluated by independent parties, it is our expectation is that at least some of the IOUs are likely to fall short of these goals unless the rules for counting savings are changed. If the utilities are successful in

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[45] California Energy Commission, *Proposed Energy Savings Goals for Energy Efficiency Programs in California*, 100-03-021, October 27, 2003.

CPUC, D.04-09-060, *Interim Opinion on Energy Savings Goals for 2004 and Beyond*, September 24, 2004.

[46] TecMarket Works, *Preliminary Findings from Completed Impact Evaluation Reports*, Memorandum from Carmen Best and Nick Hall to Michael Wheeler at the CPUC dated April 30, 2007.

[47] CPUC, R.06-04-010, OIR to Examine the Commission's Post-2005 Energy Efficiency Policies, Programs Evaluation, Measurement and Verification, and Related Issues.

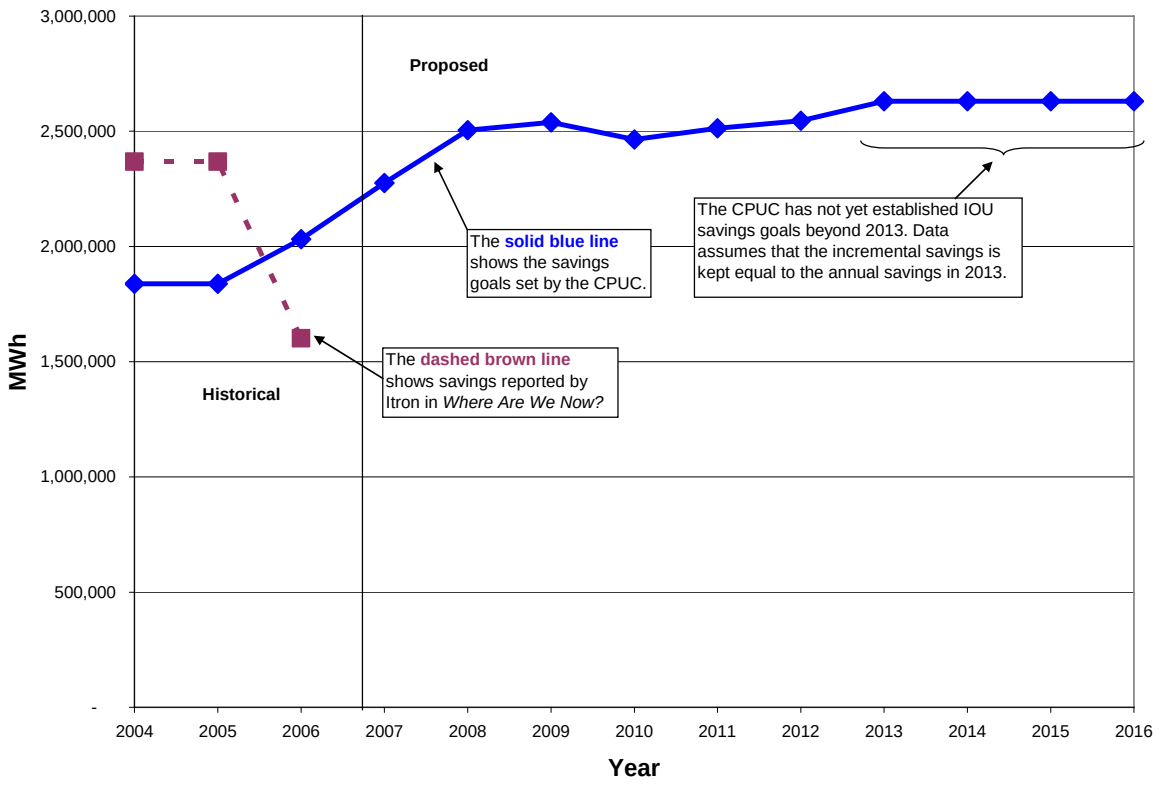
[48] CPUC, Energy Efficiency Groupware Application (EEGA), contains monthly IOU savings reporting for 2006-2008 programs, located at http://eega2006.cpuc.ca.gov

convincing the CPUC to make these policy rule changes, it should be much easier to achieve verified savings that exceed the current goals.

Figure 9 shows the IOUs' annual savings accomplishments as reported by Itron for the years 2004 - 2007. Between 2005 and 2006, the IOUs' annual savings dropped 32 percent. With the new program cycle that began in 2006, the IOUs increased their program savings goals by 56 percent through 2008. After that, the savings rate dips down for two years and ramps up slowly from 2010 to 2013, the end of the period for which the CPUC has established savings goals. From 2014 to 2016, the savings are shown as being equal to the incremental savings rate for 2013.

The steep drop in savings from 2005 to 2006 and the nearly-as-steep increase from 2006-2007 is indicative of stopping and starting program cycles.[49] Closer inspection of the combined trend shows that the goals set by the CPUC for PG&E and SCE are the primary drivers of the increase in ramp-up rate through 2009 and of the sustained levels through the end of the projection period. SDG&E's goals show a decline after 2011. Appendix B contains individual graphs for each IOU.

Figure 9: Investor-Owned Utilities - Combined Historical Compared to Proposed Annual Energy Savings, 2004-2016

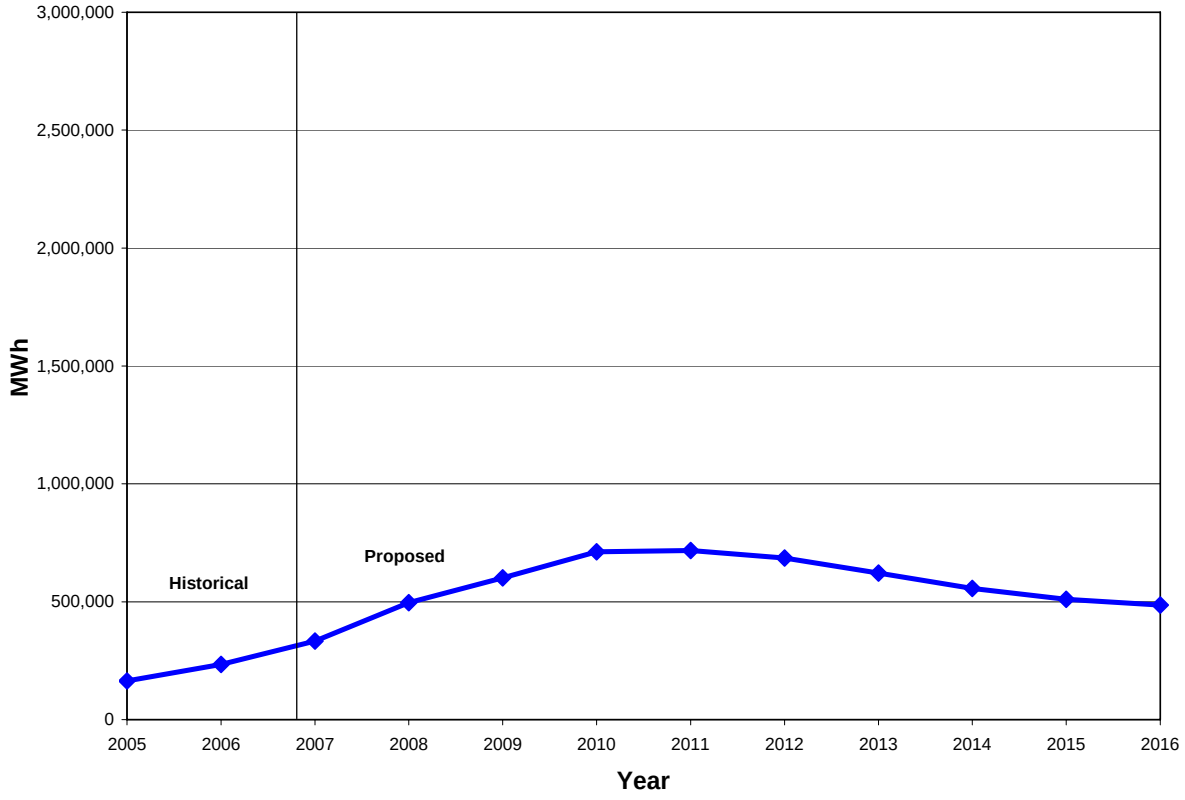


[49] In 2004 and 2005 the CPUC allowed the utilities to include committed savings in their totals. This rule changed in 2006 and now they are only able to account for the actual savings in the year they occur. Subtracting out the committed savings for 2004 and 2005 makes the change to 2006 much smaller.

POUs' Likely Success with Draft Savings Targets

Figure 10 shows the sum of the 13 largest POUs reported annual savings accomplishments for the years 2005 and the savings projected for 2006 compared with the sum of their forecasted annual savings goals for the period 2007 to 2016.[50] Projected savings from these utilities represent over 90 percent of the aggregate savings from all POUs in California. From 2005 to 2006, it appears that the largest 13 POUs increased their program savings by 93 percent and by an additional 13 percent from 2006 to 2007. From 2007 to 2010 they plan to increase their program savings over by 127 percent. These POUs do not appear to sustain these rather steep ramp-up rates as evidenced by the decline back to 2008 levels by 2016. This combined graph for the 13 largest POUs hides some of the variation staff found in the individual utilities. Closer inspection shows that the ramp-up portion of the combined curve is due primarily to SMUD and LADWP, and the decline in the last five years of the projection is caused primarily by LADWP.

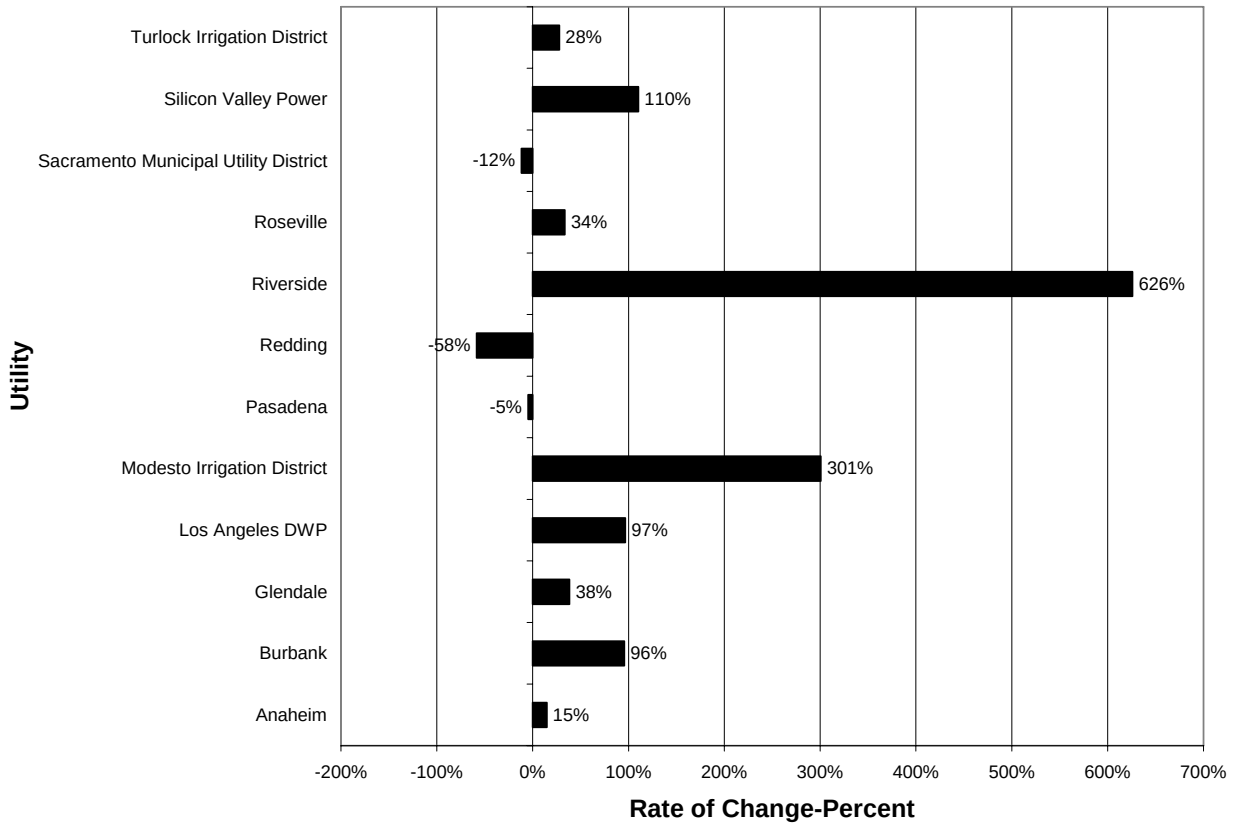
Figure 10: Publicly Owned Utilities - 13 Largest Combined Historical Compared to Proposed Annual Energy Savings, 2004-2016



[50] The POUs report energy savings in the 2006 SB 1037 report. Their estimate of savings was reported for 2005, but only the projected savings for 2006 since the results for 2006 had not been compiled at the time the reports were submitted. Some utilities report calendar year savings while others report fiscal year savings.

Examining the individual POU annual rates of change reveals a wide level of variation in both the reported increases in savings from 2005 to 2006 and the projected increase from 2006 to 2007. The rate of change from 2006 to 2007 is illustrated in Figure 11 which presents percentages for 12 of the 13 largest POUs. Imperial Irrigation District was not included in this chart because they did not submit data in the AB 2021 process for 2007.

Figure 11: Rate of Change in Projected Program Savings from 2006 to 2007



Redding shows a reduction of 83 percent in projected savings while at the other extreme, Riverside shows a projected increase of more than 600 percent. On the face of it, these wide variations are difficult to explain. They may be due to differences in how each utility estimates and reports savings and to differences in the level of experience of their energy efficiency staff.

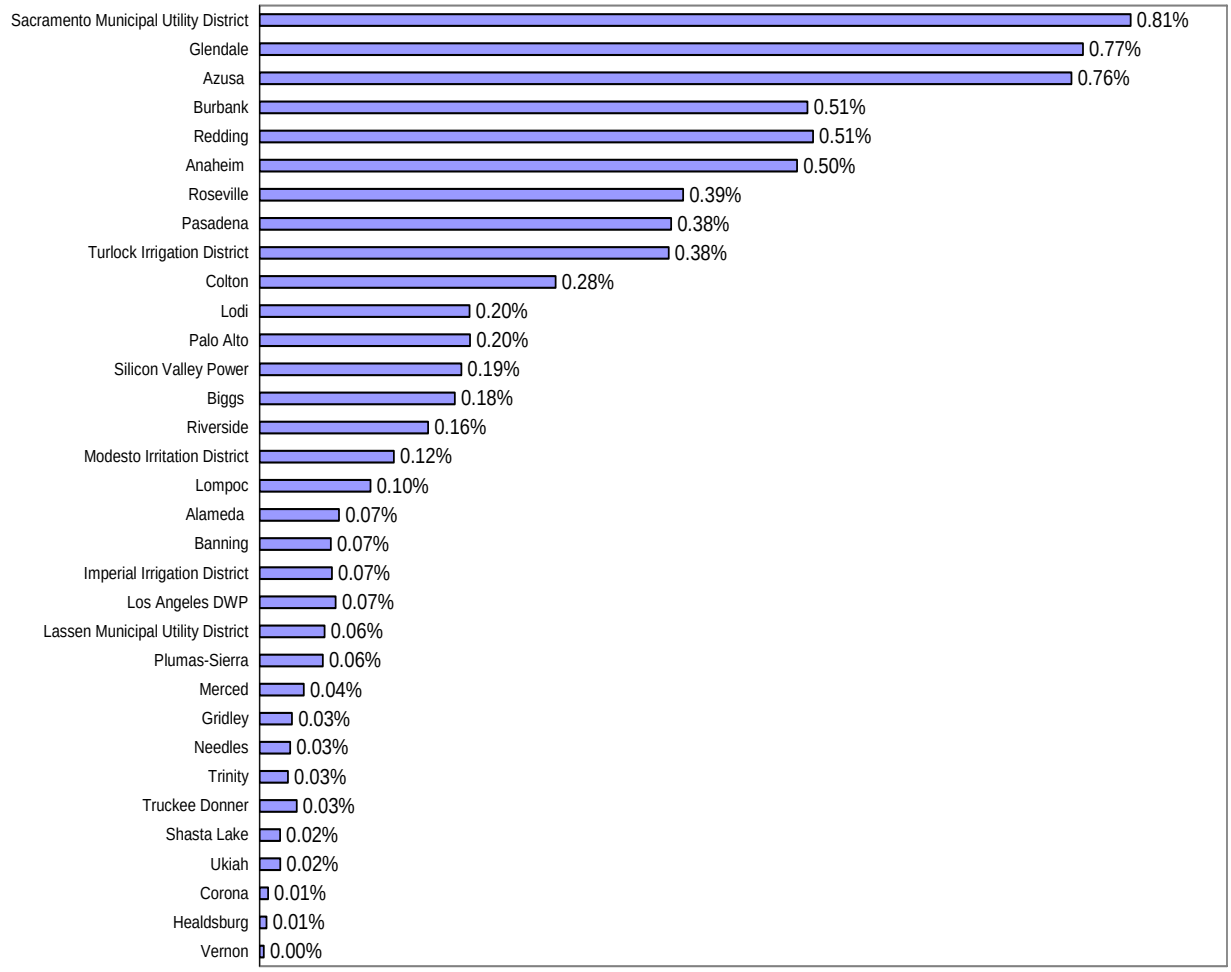
POUs may have more difficulty achieving a higher fraction of the economic potential than the IOUs for a number of reasons:

- Historically, low avoided costs of generation have contributed to a reduced emphasis on energy efficiency for some POUs.
- For many of the POUs, there is a paucity of the data required to estimate technical, economic, or achievable conservation potential. For many POUs with limited staff or expertise, the databases and models used by the IOUs are overly complex and difficult to utilize effectively. Default values for key parameters based on IOU data had to suffice in many cases.

- Many smaller POUs have climate conditions and customer compositions that may reduce the size or level of efficiency opportunities available from their customer base. Utility service areas which lack economic diversity may not be conducive to comprehensive efficiency program portfolios.
- The 2005-06 state legislation on energy efficiency is limited to demand-side or customer end-use energy use. Supply-side operational energy savings, however, have traditionally been considered by many POUs as a significant part of their efficiency portfolios.

The proposed savings varies among the utilities in both magnitude and compared to annual electricity consumption. One of the common metrics used to compare utility programs is the ratio of annual savings to annual consumption. Figure 12 depicts the variation of this ratio in 2005, before the AB 2021 legislation took effect. Based on their SB 1037 reports, for those utilities reporting energy efficiency programs, the ratio ranges from 0.01 to 0.81 percent. Appendix B contains the supporting table.

Figure 12: Ratio of Savings to Electricity Consumption in 2005



Source: California Municipal Utilities Association (CMUA), *Energy Efficiency in California's Public Power Sector: A Status Report*, December 2006 for the publicly owned utilities.

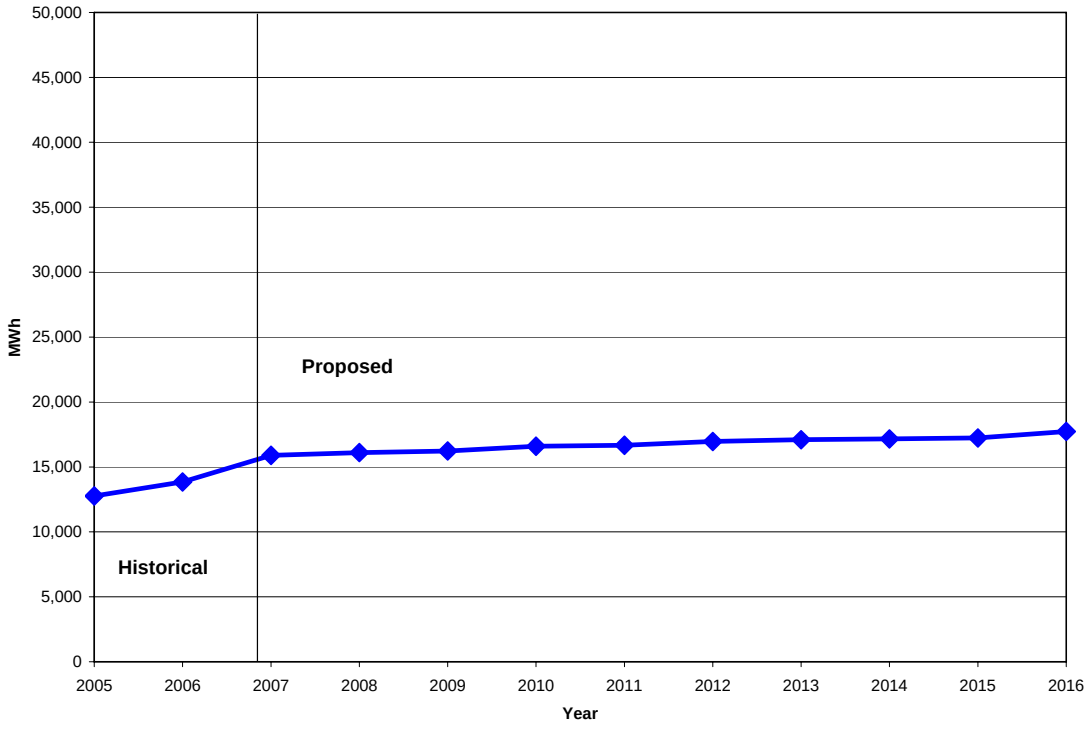
The 13 Largest POUs

This section contains staff's analysis of the historical and proposed first year electricity savings for each of the 13 largest POUs.

Anaheim Public Utilities

Description – Figure 13 shows Anaheim's plans to acquire savings from its electricity efficiency programs over the next ten years. Projected first-year savings from efficiency programs are expected to increase by 16 percent from 2005 to 2007 and by 28 percent by 2016. Efficiency program spending was projected to increase by 11 percent by 2006 and an additional 20 percent by 2007. Based on discussions with Anaheim staff, program savings for 2005 were equivalent to 0.48 percent of electricity sales, in the middle of the range of 0.01 percent to 0.81 percent of electricity sales reported by POUs for 2005. This program savings-to-sales ratio is forecast to hold relatively constant from 2007 to 2016.

Figure 13: Anaheim Public Utilities
Historical Compared to Proposed Annual Energy Savings, 2005-2016



Assessment – The program savings trajectory above appears to be a plausible forecast of the level of electricity and peak savings Anaheim could capture over the next ten years for the following reasons. First, Anaheim publishes an annual savings report and uses standardized energy savings values for efficiency measures from a peer-reviewed data base. Second, Anaheim has an experienced staff that have shown they have the capability to achieve a 10- 30 percent increase in program savings on an annual basis. The projected 16 percent increase in

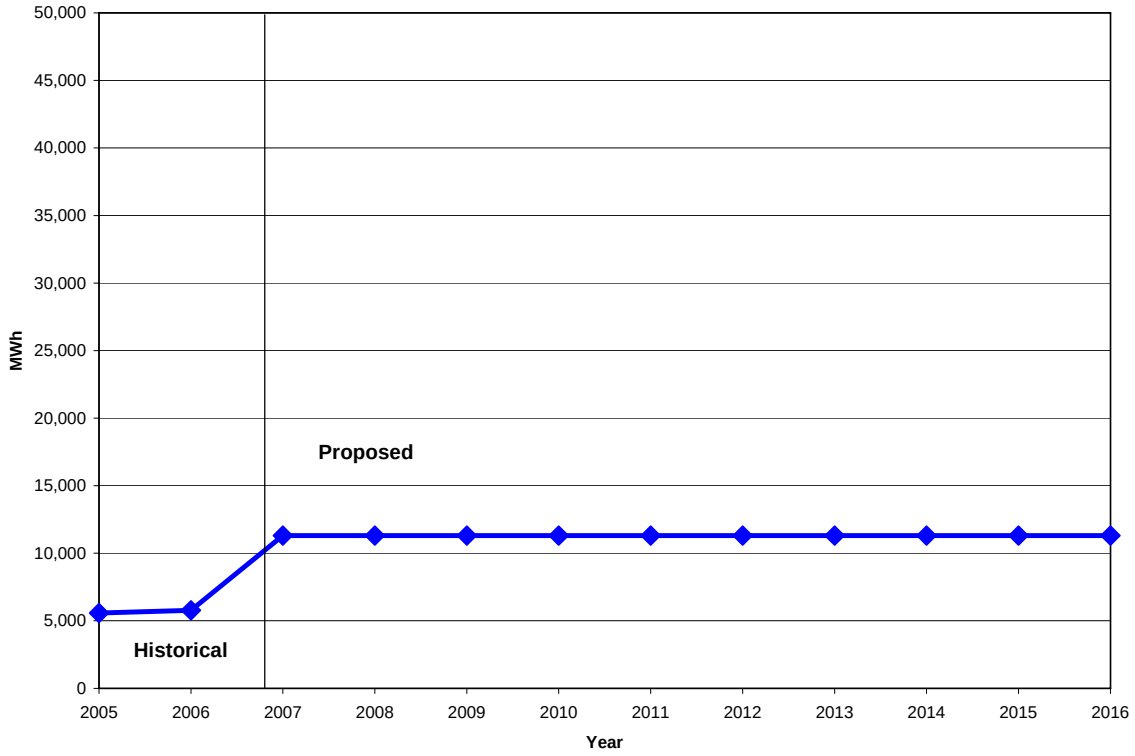
annual savings from 2005 to 2007 is technically feasible and it appears within Anaheim's capability to increase the program funding sufficiently to achieve the savings.

Third, the rate of increase over the next ten years is plausible and consistent with the likely policy context. Increasing the annual program savings rate between 2006 and 2016 by 28 percent over ten years appears reasonable and would lead to the capture of 53 percent of the savings found to be economically achievable by 2016. The annual program savings in this tenth year of the forecast is equivalent to 0.6 percent of forecasted electricity sales. This increase translates roughly to a 50 percent increase in this ratio relative to their historical performance (program savings as a fraction of sales).

Burbank Water & Power

Description – Figure 14 shows Burbank's plans to acquire savings from its electric energy efficiency programs over the next ten years. Historical savings were flat in 2005 and 2006, with a projected increase of 95 percent in 2007. After 2007, annual first-year program savings are projected to stay flat until 2016. Efficiency program spending is projected to increase by 17.7 percent from 2005 to 2006 (base year=FY 2005/06) and would need to increase by an additional 70 to 90 percent to achieve the rapid ramp-up in savings projected for 2007. Program savings for 2006 were equivalent to 0.5 percent of annual electricity sales, in the middle of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. The annual savings projected for 2016 is equivalent to 0.9 percent of forecasted electricity sales, a reasonable number.

Figure 14: Burbank Water & Power
Historical Compared to Proposed Annual Energy Savings 2005-2016



Assessment – The savings trajectory shown above has a very steep ramp up between 2006 and 2007. Program savings are projected to jump from 0.5 percent of annual sales to 1.0 percent of annual electricity sales. In our view it is likely that Burbank may encounter short-term funding and staffing constraints that will make it very difficult to achieve verified energy savings of over 11,000 MWh in 2007. Interviews with Burbank staff suggest that they do not perceive the amount of program funding will be a constraint to achieving the goals, but acknowledge it may be difficult to add additional staff beyond their current levels.

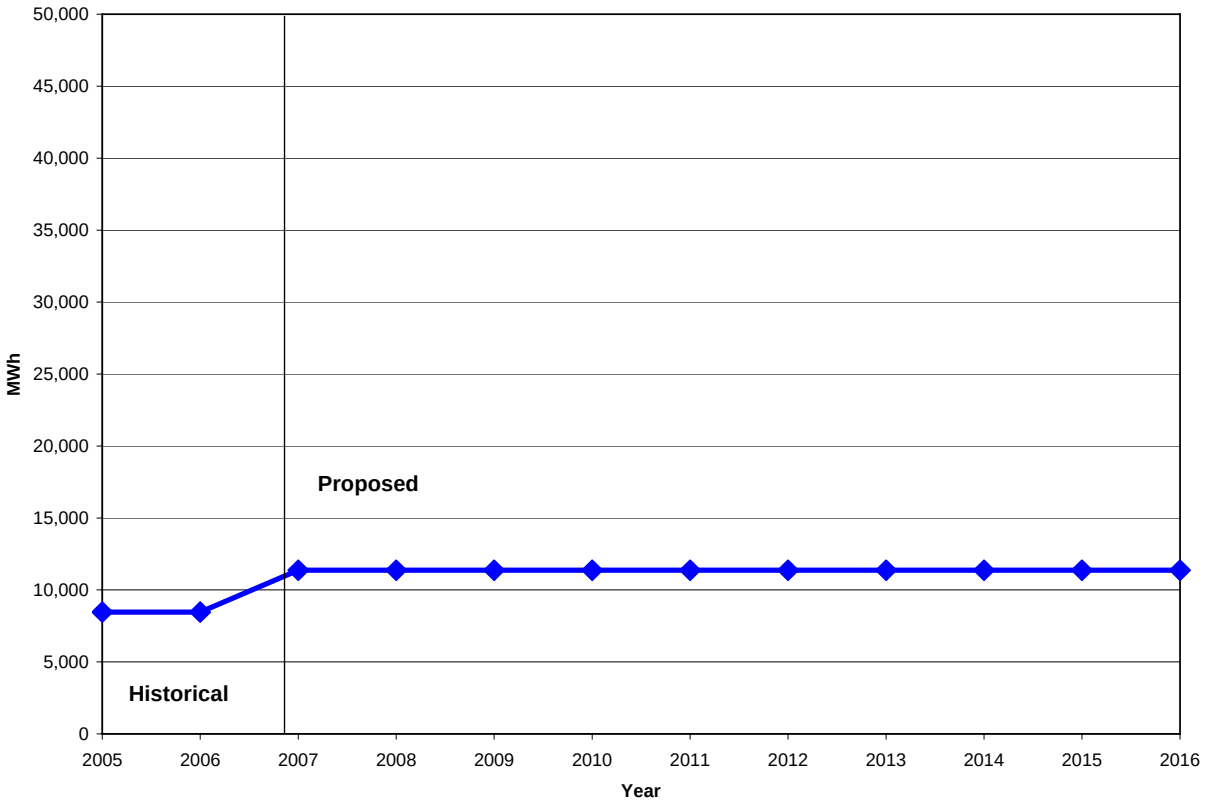
Staff plans to work with Burbank staff to construct a plausible ramp up rate to realize their long term goal of achieving a program saving sales ratio of 1.0 percent. This is equivalent to achieving at least 50 percent of the electricity savings found to be economic by the RMI model over the next three years.

Glendale Water & Power

Description – Figure 15 shows Glendale's plans to gradually increase the energy savings from its energy efficiency programs over the next ten years. Glendale's projected savings from efficiency programs are expected to increase by 34 percent from 2005 to 2007 and then stay flat for the next 10 years. Efficiency program spending was projected to remain constant between fiscal years 2005 and 2006 and would need to increase by an additional 10 percent to 20 percent annually from 2008 thru 2010 to achieve the ramp-up in savings projected for 2008 and beyond. Program savings for 2006 were equivalent to 0.8 percent of annual electricity sales, at the high end of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. This fraction is projected to increase to 1.0 percent of forecasted electricity sales in 2016, a significant increase.

Assessment –The overall savings trajectory looks plausible, particularly given the fact that Glendale has been running an aggressive program over the last five years. During interviews, staff learned that this flat trajectory for savings beyond 2007 was not a conscious decision by Glendale staff but a simplification introduced by RMI in its analysis process. Rather than estimate a first year annual savings trajectory over time, RMI simply estimated a fraction of the total economic potential in year 2016 (ranging from 50 to 100 percent), divided this sum by 10, and spread this level of saving of the years 2007 to 2016. Conversations with Glendale staff revealed they had made some adjustments to some of the RMI assumptions related to the potential savings that could be achieved through CFLs and refrigerator rebate programs. The net effect was to reduce the long-term savings target down slightly. Glendale staff also stated they did not devote any effort to developing a plausible ramp-up path to reach this level of annual energy savings, but rather simply accepted the revised RMI annual savings numbers for the entire decade.

Figure 15: Glendale Water & Power
Historical Compared to Proposed Annual Energy Savings 2005-2016



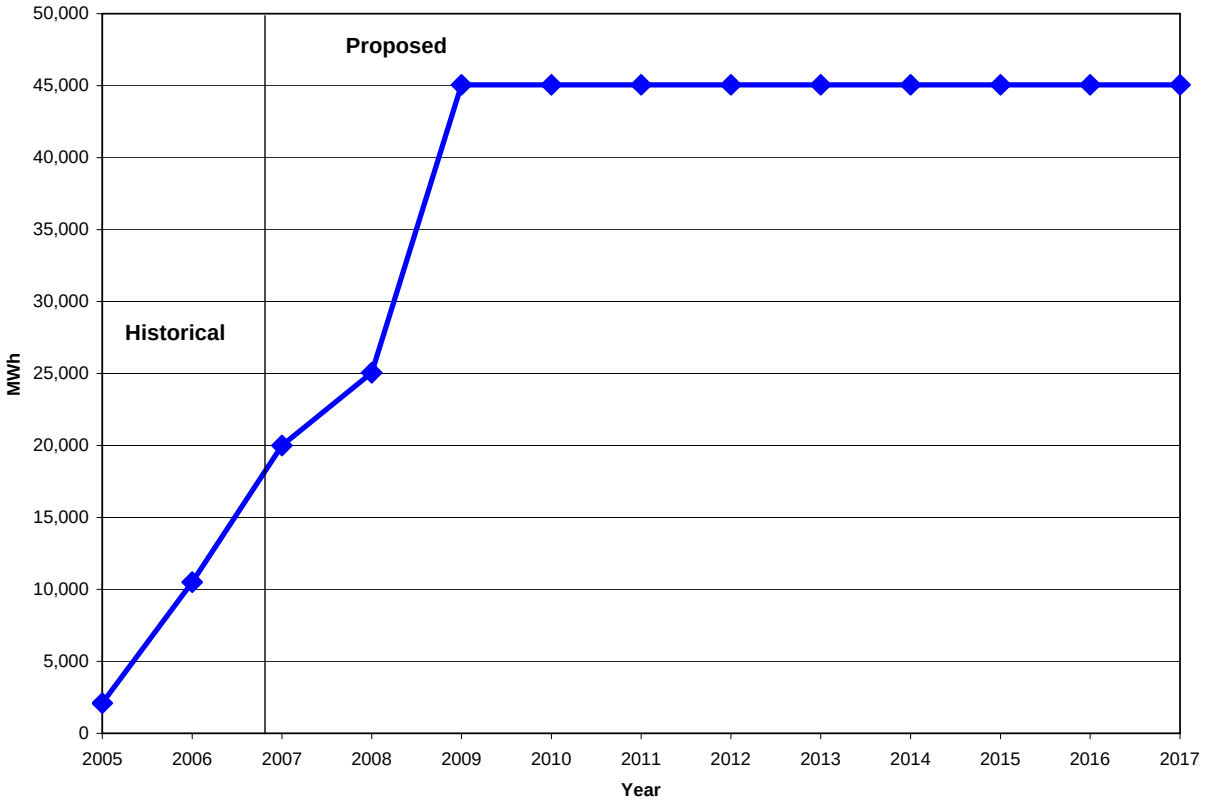
Glendale staff expects very little growth in population or electricity sales over the next ten years, making a flat program savings trajectory plausible. Energy Commission staff believe it is more likely that that annual program savings after 2009 will continue to increase at 10 to 30 percent per year despite flat sales forecasts for the region because neighboring utilities like Pasadena have stated they will pursue aggressive savings. Statewide and local green house gas emission reduction strategies will continue to call for more of a contribution from energy efficiency programs over the remainder of the decade. Staff seeks IEPR Committee direction on whether it should work with Glendale staff to increase the annual program savings trajectory after 2008 or simply accept Glendale's goals for now and potentially increase the annual program savings goals three years from now during the next update.

Imperial Irrigation District

Description – Figure 16 shows Imperial Irrigation District's (IID) plan to dramatically increase the annual energy savings from its energy efficiency programs over the next ten years. IID expects to increase annual savings by a factor of 20 (2,086 percent) between 2005 and 2007. IID staff reported verified program savings of 2 GWh in 2005 and 11 GWh in 2006. The 2006 savings level was equivalent to 0.3 percent of annual electricity sales, at the bottom end of the range of 0.01 percent to 0.81 percent of savings to sales ratios reported by POUs for 2005. Going from a

0.3 percent (ratio of savings to sales) in 2006 to a ratio of 1.2 in 2009 seems to be a very difficult ramp- up path. Staff contacted IID to better understand the driving factors behind this forecast.

Figure 16: Imperial Irrigation District
Historical Compared to Proposed Annual Energy Savings 2005-2017



IID staff explained that the rapid increase in program savings from 2005 to 2007 was rational from their perspective because they are trying to "catch up" from previous years where program efforts were minimal. IID staff explained they are ramping up the expected annual savings from their energy efficiency programs, in part, because a significant amount of public goods charge (PGC) funding had been carried forward from previous years given lower levels of efficiency program activity. As a result, IID program staff does not expect the availability of program funding to become an issue until mid-2009 based on current rates of spending and the available balance. They also expect to receive IID board support for a proposed increase in program staff and plan to outsource programs to third parties, if internal program staff can not be hired.

Assessment – The rapid increase in annual program savings shown in this forecast is not likely to be sustainable given Energy Commission staff's understanding of the historical experience over the last twenty years for both POUs and IOUs who have attempted to achieve a doubling or tripling of expected savings over a two to three-year period. All of the IOUs in California experienced reductions in program savings in 2006 after a rapid ramp up in reported savings from 2004 and 2005. This experience shows that utilities that rely on deemed savings for a

majority of their portfolio total savings (in this case from CFLs) often find out during the verification phase of the cycle that actual energy savings were far less than projected.

Nevertheless, staff is willing to work with IID to attempt to achieve its long-term savings goals of 45,000 MWh per year and perhaps in the process work out a more gradual ramp-up rate for achieving energy saving in the short term. Staff is willing to provide support to IID to help track and validate program savings as well as develop new program ideas, and keep them abreast of emerging technologies and trends in the new construction market. A particular focus on new construction programs is warranted given IID's current rapid customer growth rate that is averaging seven percent per year and may "slow down" to five percent per year in the long run. Energy Commission staff recommend further meetings with IID staff to develop a more gradual ramp-up rate for the next three years and a process to monitor progress toward achieving these goals.

Los Angeles Department of Water & Power

Description – Figure 17 shows LADWP's plans to dramatically increase the energy savings from its energy efficiency programs over the next ten years. Projected savings from efficiency programs are expected to increase by five fold (over 400 percent) from 2006 to 2010 and then decline steeply for the remaining five years. LADWP staff stated this savings trajectory is consistent with the maximum achievable savings levels recommended by its contractor, Quantum Consultants, in a February 2006 study entitled, *Los Angeles Department Of Water And Power Energy Efficiency Potential Study.*

Reported program savings of 58 GWh for 2006 were equivalent to 0.3 percent of annual electricity sales, in the middle of the range of 0.01 percent to 0.81 percent of sales reported by POU's for 2005. LADWP expects to increase annual program savings to over 300 GWh per year in 2010, or 1.3 percent of projected 2010 sales.

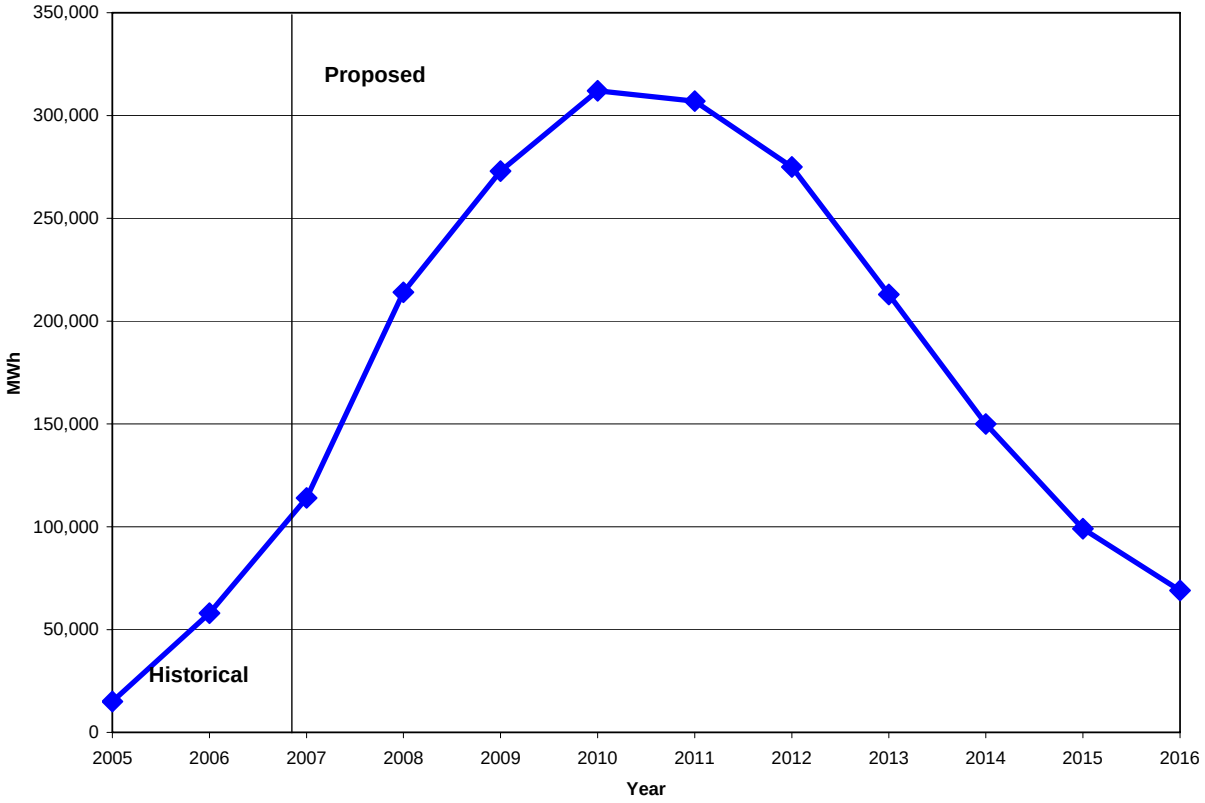
Assessment – The savings trajectory portrayed in the figure above implies a rapid ramp-up in both program funding and the level of staff required to implement and evaluate the programs. Energy Commission staff interviewed LADWP program staff to understand the driving factors supporting this forecast of rapid program savings.

Staff also interviewed Itron, which did the potential study for LADWP and learned that the decline in savings after 2010 is due to the way the model calculates the rate of acquiring savings from a fixed amount of available potential. In their analysis, Itron selected a ramp up rate, which once half of the savings have bee achieved, means that the annual savings rate will decline until the available potential bucket has been emptied. A different ramp up rate could have been chosen which would yield a different curve.

LADWP has received approval to increase their program funding from $10 million per year to $75 million per year. LADWP staff feels that something close to $85 million per year may be necessary to reach the stretch goals. LADWP's staff is relying on a significant expansion of their CFL programs, both distribution and manufacturer buy-down programs and a new direct install program to help support the dramatic increase in post-2007savings. LADWP's board has approved some form of energy cost adjustment factor account to make up for lost revenues

from successful energy efficiency programs. LADWP plans to launch a number of new programs to try and capture additional energy savings. The new programs include pursuit of emerging technologies and standard performance contracts. LADWP staff expressed optimism that LADWP would be able to reach their program savings goal of over 300 GWH/ year within a year or two but acknowledge that to date their efforts had only yielded savings five to six times below this level.

Figure 17: Los Angeles Department of Water & Power Historical Compared to Proposed Energy Savings Annual First Year Savings, 2005-2016



Staff has concerns after reviewing LADWP's proposed portfolio of efficiency programs. Based on a power point presentation made to LADWP's board, program staff is relying on CFL "distribution" programs to achieve over 50 percent of the total energy savings for the residential sector and up to 25 percent of the total program savings. Implicit in this projection is the assumption that a program can be used to provide up to 2 million CFLs free to households and that all of these bulbs will be installed (100% installation rate) and used for 5 to 6 hours per day.

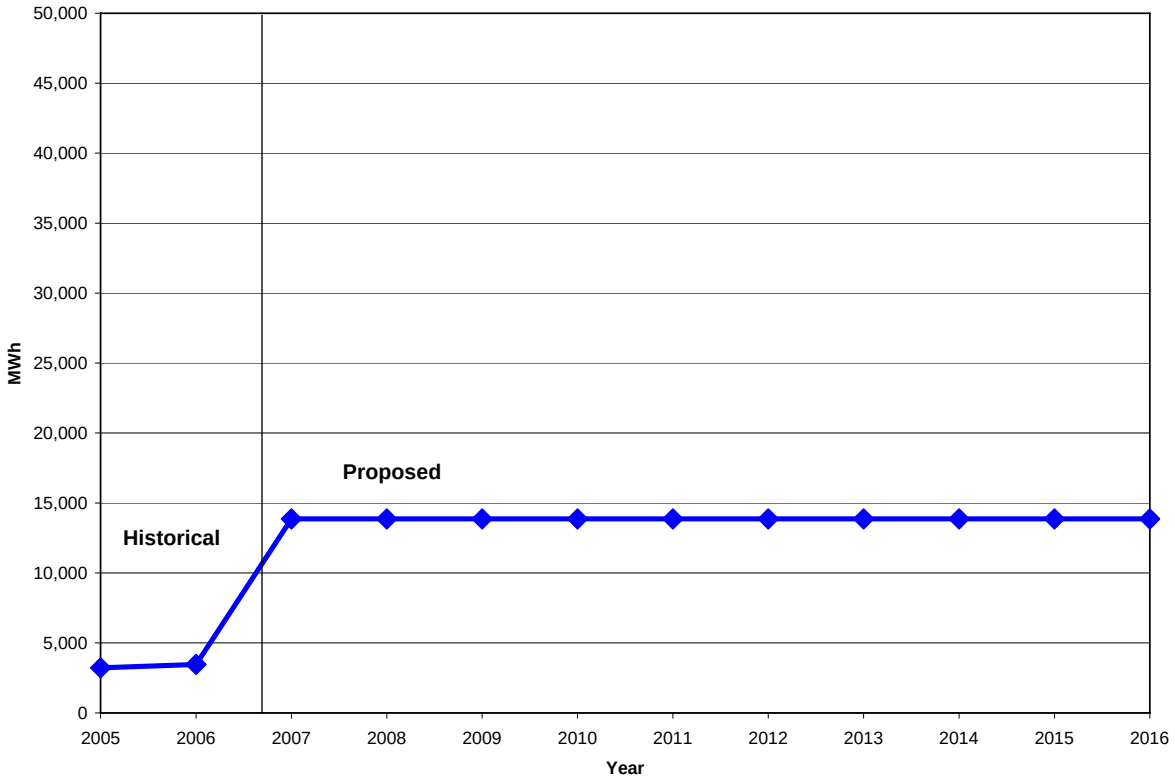
Recent IOU evaluations suggest such CFL distribution programs are unlikely to achieve these high installation rates because home owners often choose to only install 2 to 4 bulbs and then keep the rest in storage. In addition, the assumed hours of operation for these bulbs in the program savings estimate appears to be a factor of two higher than the levels found in recent

IOU evaluation studies.[51] Staff has a concern that LADWP may find that the actual energy savings from these programs is much lower after the evaluations of these programs are complete and urges them to consider diversifying their program offerings to ensure too many eggs are not put in the CFL basket.

Modesto Irrigation District

Description – Figure 18 shows Modesto's plans to dramatically increase the energy savings from its energy efficiency programs over the next ten years. Modesto's reported program savings for 2006 were equivalent to 0.1 percent of annual electricity sales, at the low end of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. Electricity savings from efficiency programs are then projected to increase three fold or 304 percent from 2006 to 2007 and then stay flat for the next 10 years. Annual savings are projected to increase from 0.13 percent of 2006 annual sales to 0.5 percent of annual sales in 2007 and slowly decline to 0.4 percent of sales in 2016

Figure 18: Modesto Irrigation District
Historical Compared to Proposed Annual Energy Savings, 2005-2016



[51] For example , see the study performed by Itron, *SDG&E Hard-to-Reach Lighting Turn-In Program*, (CALMAC Study ID: SDG0213.01 in March , 2006) or the study performed for the Energy Commission in 1999, *California Baseline Lighting Efficiency Technology Report*, which reported a value of 2.31 hours per day (843 hours per year) of operation for CFL fixtures.

Assessment – The steep ramp up in the annual savings rate from 2006 to 2007 will require a significant increase in both funding and staff to ensure the savings actually occur. Staff is also concerned about the lack of any consideration of a reasonable ramp up rate either from 2006 to 2007 or after 2008. Modesto staff explained that this flat trajectory had come from the RMI model. Modesto had not yet received approval from its board for any funding increases, although they plan to request a small increase in September 2007. Modesto staff also agreed that actual program savings reported on a year-to-year basis are likely to be much more volatile based on their experience and worry that some measures may reach high saturation levels and diminishing returns over the decade. In Energy Commission staff's view, a more plausible savings path would show a slower ramp-up rate from 2006 to 2010 and incremental savings increasing at 10 to 30 percent per year after 2012.

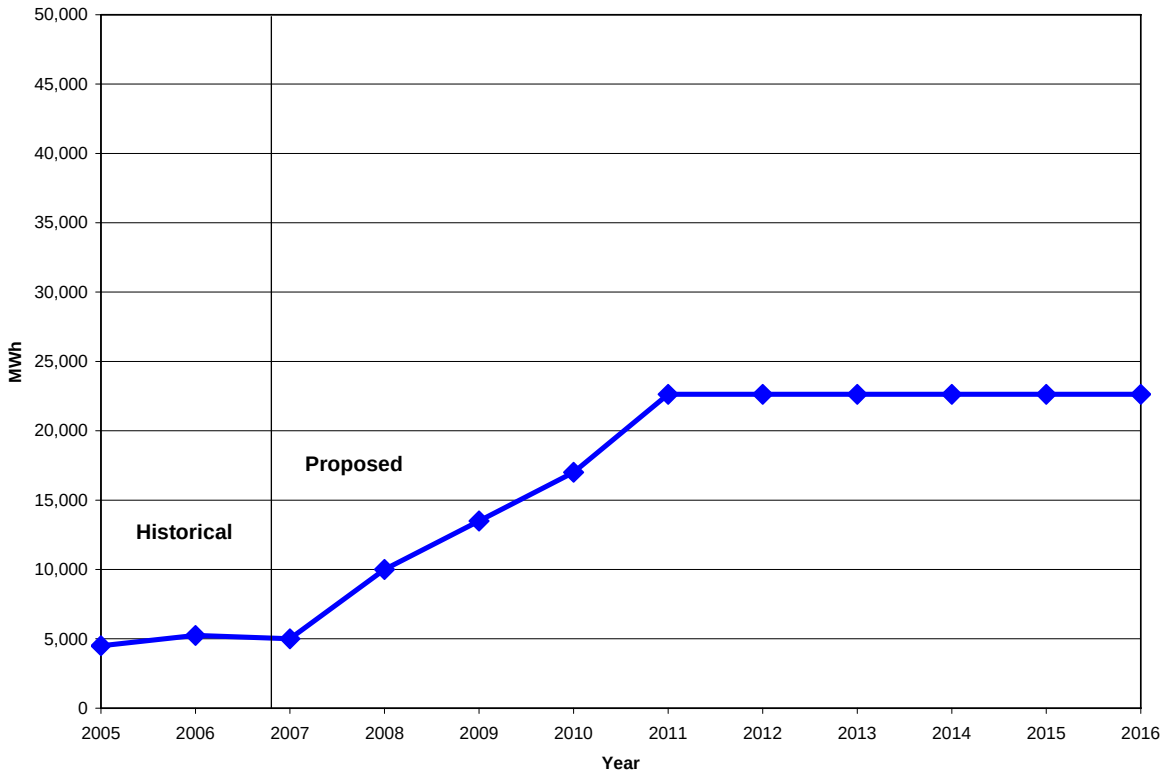
Pasadena Water & Power

Description – Figure 19 shows Pasadena's plans to significantly increase the energy savings from its energy efficiency programs over the next ten years. Annual savings are projected to increase from 5,000 MWh to over 22,000 MWh over the next five years, a four fold increase. Projected savings from efficiency programs are expected to stay flat from 2005 to 2007, then dramatically increase by over 300 percent from 2007 to 2011, and finally stay flat for the next five years. Pasadena's annual program savings for 2006 were equivalent to 0.4 percent of annual electricity sales, in the middle of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. Projected savings in 2016 are equivalent to 1.56 percent of forecasted electricity sales for Pasadena. After SMUD, this ratio of program savings-to-sales is the second highest of all POU projections.

Assessment – Pasadena's steep ramp-up rate in annual energy savings is the most aggressive increase of all the POU filings reviewed. Pasadena staff provided the following explanation for the steep ramp-up rates. Their board had directed them to achieve a 10 percent reduction in their forecast of total consumption by 2012 and to achieve 100 percent of the economic potential estimates from RMI by 2016. Pasadena's participation in a number of UN-sponsored climate change initiatives that call for achieving dramatic increases in energy savings at the municipal level is partially responsible. To their credit, the Pasadena team recognized this would require a significant increase in funding and also revealed they are worried about relying on high levels of CFL saturations to achieve a significant fraction of the initial year savings (over 40 percent).

Energy Commission staff believe that the funding increases needed to support this level of annual program savings would be equivalent to at least a three fold increase in program funding from the current base of $1.2 million per year. Staff recommends working with Pasadena to develop a slower, and perhaps more sustainable, path in the near term to achieve the 24,000 MWh per year savings goal contained in their filing for the years 2011 to 2016.

Figure 19: Pasadena Water & Power
Historical Compared to Proposed Annual Energy Savings, 2005-2016

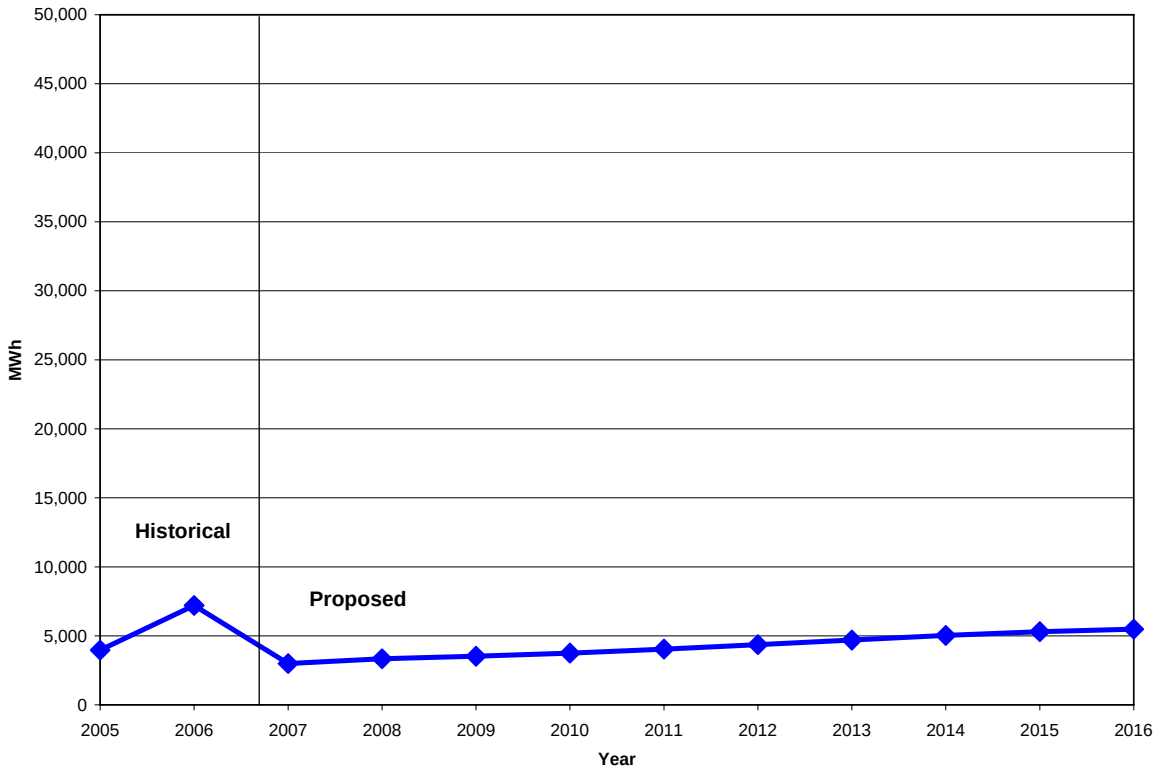


Redding Electric Utility

Description – Figure 20 shows Redding's plans to at first decrease the annual energy savings from its energy efficiency programs and then gradually increase savings at a rate of roughly 5 percent per year. Annual savings are projected to decrease from over 7,000 MWh in 2006 to less than 2,000 MWh by 2007, followed by a ramp-up to annual savings rates roughly equivalent to 2005 levels in 2016. Projected savings from efficiency programs are expected to decrease by 60 percent in 2007 and then steadily increase to the historical annual savings rates at 7 to 8 percent per year by 2016.[52] Redding's annual program savings for 2006 were equivalent to 0.9 percent of its annual electricity sales, at the top of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005, although this percentage may be adjusted when staff receives additional information.

[52] Staff contacted Redding to understand what is driving this highly variable forecast but was unable to contact the right staff to provide an explanation. Staff suspects that the program energy savings numbers for 2006 may be overstated due to differences in methodology and approach in SB 1037 relative to the RMI projections. This apparent discrepancy will need to be addressed when Redding submits its next SB 1037 report.

Figure 20: Redding Electric Utility
Historical Compared to Proposed Annual Energy Savings, 2005-2016

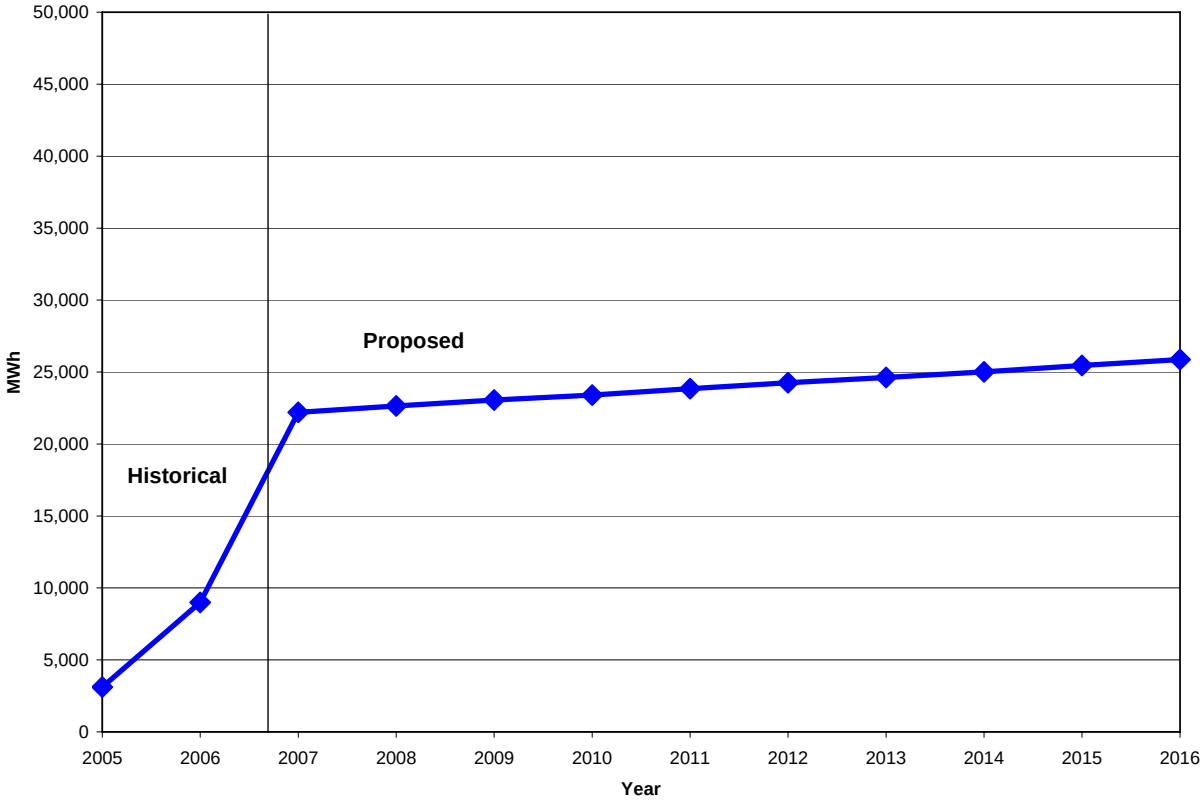


Assessment – Redding has not provided a reasonable explanation for the steep decline in likely annual program savings from 2006 to 2007 and beyond. In addition, Redding did not provide any information on its estimates of economic potential to reduce electricity use over the decade. Staff plans to continue to gather information on current and future staffing and funding levels at Redding before making recommendation.

Riverside Public Utilities

Description – Figure 21 shows Riverside's plans to significantly increase the energy savings from its energy efficiency programs over the next ten years. Annual savings are projected to increase from 3,100 MWh in 2005 to over 22,000 MWh in 2007, a seven-fold increase. Projected savings from efficiency programs are expected to steadily increase by roughly 30 percent from 2007 to 2016. The rapid increase in Riverside's efforts to grow annual program savings may be a result of its commitment to achieve roughly 66 percent of the cumulative economic energy savings identified by RMI over the decade. Riverside's program savings for 2006 were equivalent to 0.6 percent of annual electricity sales, in the middle of the range of 0.01 percent to 0.81 percent of sales reported by POU's for 2005. Projected savings in 2016, are equivalent to 1.0 percent of forecast electricity sales for Riverside.

Figure 21: Riverside Public Utilities
Historical Compared to Proposed Annual Energy Savings, 2005-2016



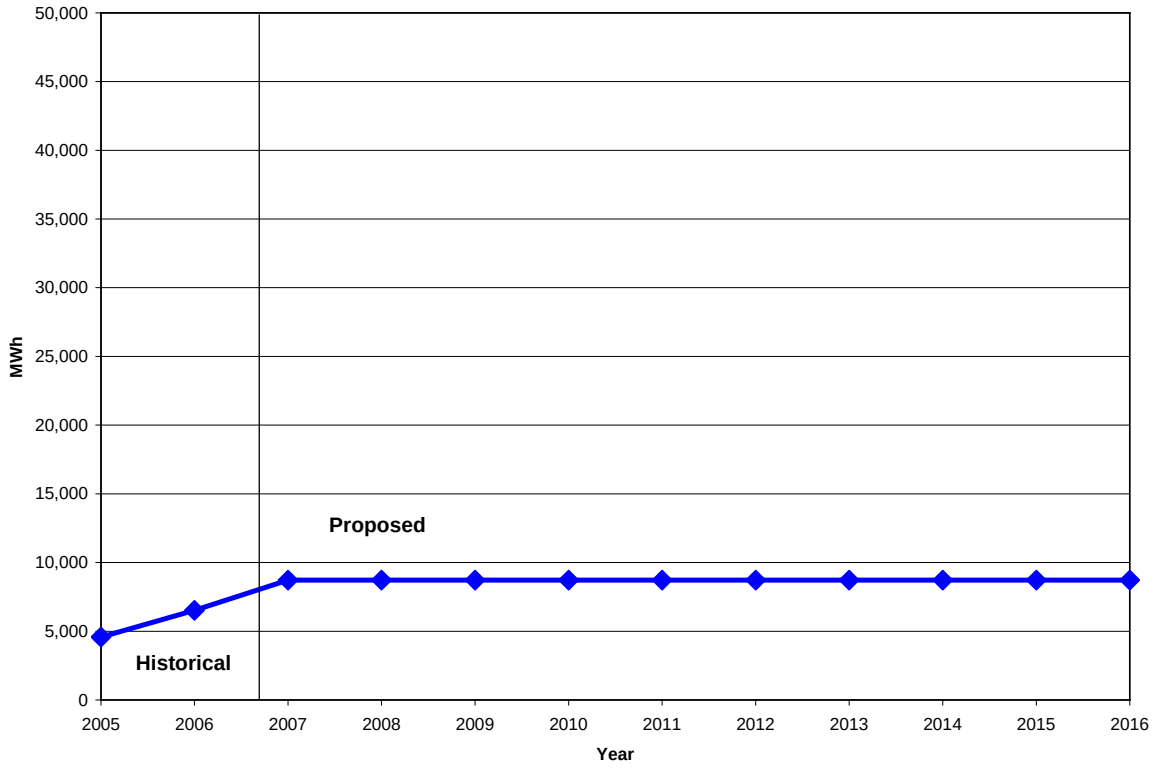
Assessment – In their SB 1037 report, Riverside submitted an estimate that they would save 3,000 MWh in 2006. In discussions with Energy Commission staff, Riverside staff felt that the energy savings estimate for 2006 was too low and should be adjusted to 9,000 MWh based on their latest information. This change is documented in the graph. The original seven-fold increase in annual savings in one year did not seem plausible and has never happened to staff's knowledge for any utility in California over the last twenty years. When adjusted for the new information, the ramp-up rate between 2006 and 2007 is now a more manageable doubling in annual savings. Riverside staff concluded there is no reason to adjust the goals for 2016 and are confident their board would provide the necessary support to achieve these goals. Riverside staff indicated they will be going to their board in September to approve the target numbers, but are not expecting any budget increase for the near term.

Energy Commission staff believe the funding increases needed to support this dramatic increase in program savings would be equivalent to at least a three-fold increase in program funding from the current base of $1 million per year. Staff is also concerned that Riverside is relying on savings from bulk distribution CFL programs to achieve a large portion of their projected increase in annual savings over the short term. Thus, it would be prudent to monitor whether any funding increases are improved by the Riverside board and then work closely with Riverside to set up a tracking system to monitor the level of reported and verified savings achieved in the near term.

Roseville Electric

Description – Figure 22 shows Roseville's plans to significantly increase the energy savings from its energy efficiency programs over the next ten years. Annual savings are projected to increase from 6,524 MWh in 2006 to over 8,700 MWh in 2007, a 33 percent increase. Projected savings from efficiency programs are expected to increase by 30 percent in 2007 and then stay flat for the next eight years. Roseville's program savings for 2006 were equivalent to 0.5 percent of annual electricity sales, in the middle of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. Projected savings in 2016 are equivalent to 0.6 percent of forecast electricity sales for Roseville. This fraction represents Roseville's commitment to achieve roughly 50 percent of the savings identified as economic by RMI over the decade.

Figure 22: Roseville Electric
Historical Compared to Proposed Annual Energy Savings, 2005-2016

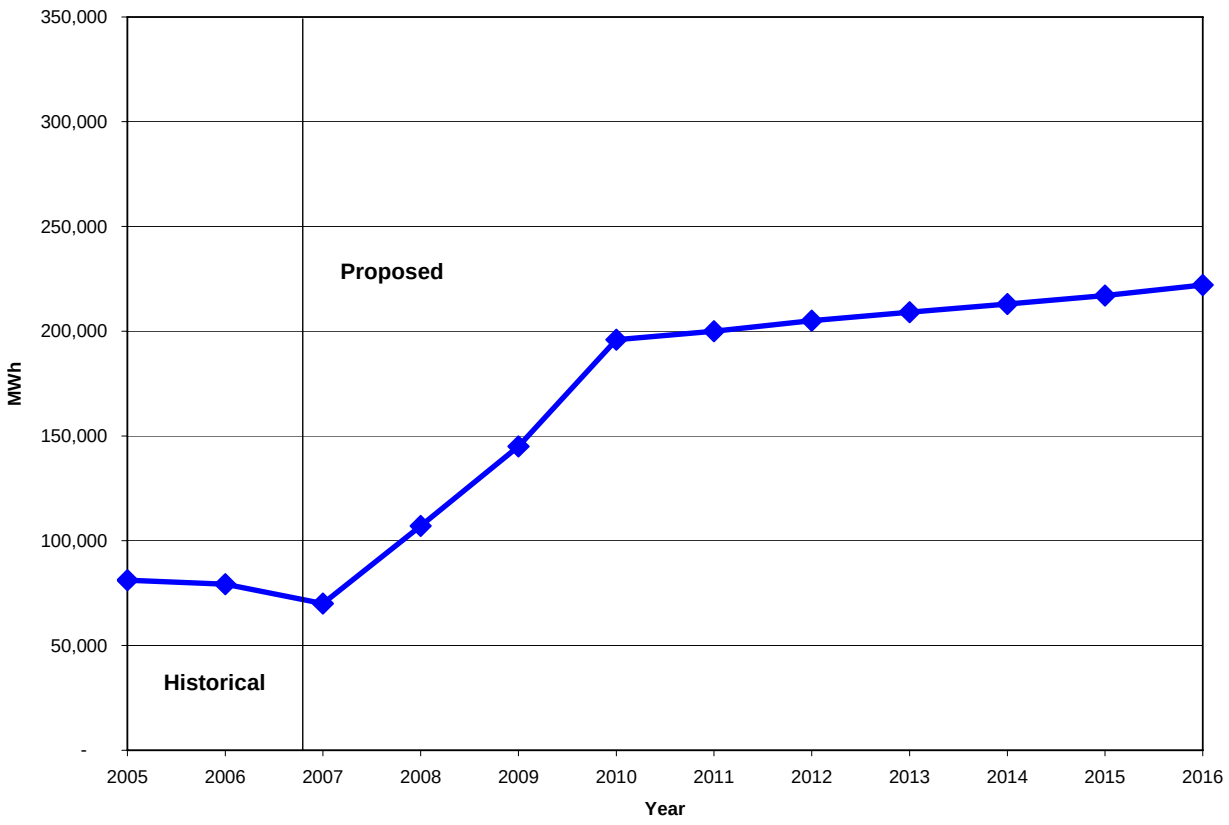


Assessment – The forecasted trajectory of feasible program savings from 2007 to 2010 seems plausible, but staff thinks it is unlikely that annual savings will stay flat from 2011 to 2016. We are optimistic that Roseville will be able to achieve their near term savings goals because the board indicated strong support by recently approving significant increases in their staffing levels. Roseville has a strong tradition of successful new construction program which bodes well for their future ability to capture savings from the estimated 20,000 new homes that will be built in their area over the next decade. Staff believes Roseville will be able to meet the more aggressive savings goals, but remains convinced it may take longer than one year to achieve the increase in annual savings outlined in Roseville's filing.

Sacramento Municipal Utility District

Description – Figure 23 shows SMUD's plans to significantly increase the energy savings from its energy efficiency programs over the next ten years. Annual savings are projected to increase from 85,000 MWh to over 200,000 MWh over the next five years, a 250 percent increase. SMUD's program savings for 2006 were equivalent to 0.8 percent of annual electricity sales, at the high end of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. Projected savings from efficiency programs are expected to decline slightly from 2005 to 2007 and then steadily increase from 2008 to 2016. Projected program savings in 2016, the last year of the forecast, are equivalent to 1.59 percent of forecast electricity sales. This fraction is the highest of all POU projections and represents SMUD's commitment to achieve 70 percent of the savings identified as economic by RMI over the decade.

Figure 23: Sacramento Municipal Utility District
Historical Compared to Proposed Annual Energy Savings, 2005-2016

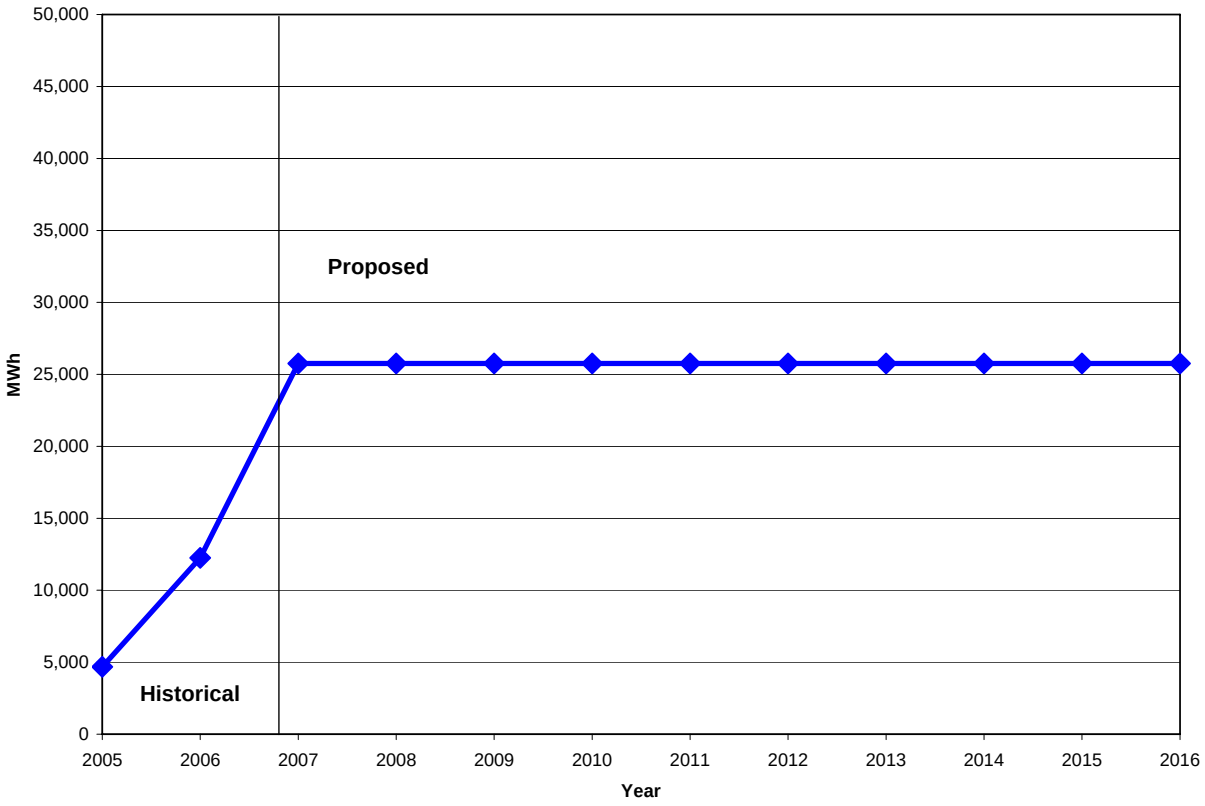


Assessment – The steep ramp-up in feasible program savings from 2007 to 2009 will require sustained commitment from SMUD's board both in terms of increased funding and potentially additional staff. This is particularly true given the recent decline in annual program savings recorded between 2005 and 2006. Staff recommends working closely with SMUD to develop an early warning tracking system to identify if there are significant deviations between projected and actual savings over the next three years.

Silicon Valley Power

Description – Figure 24 shows Silicon Valley Power's (SVP) plans to significantly increase the energy savings from its energy efficiency programs over the next ten years. Annual savings are projected to increase from 5,000 MWh in 2005 to over 25,000 GWh in 2007, a five-fold increase in one year, and then remain flat for the next nine years. The cumulative energy savings from these programs are projected to achieve 50 percent of the savings identified as economic by RMI over the decade. SVP's program energy savings in 2006 were equivalent to 0.2 percent of annual electricity sales, at the low end of the range of 0.01 percent to 0.81 percent t of sales reported by POUs for 2005. Projected savings in 2016 are equivalent to 0.8 percent of forecast electricity sales for SVP.

Figure 24: Silicon Valley Power
Historical Compared to Proposed Annual Energy Savings, 2005-2016



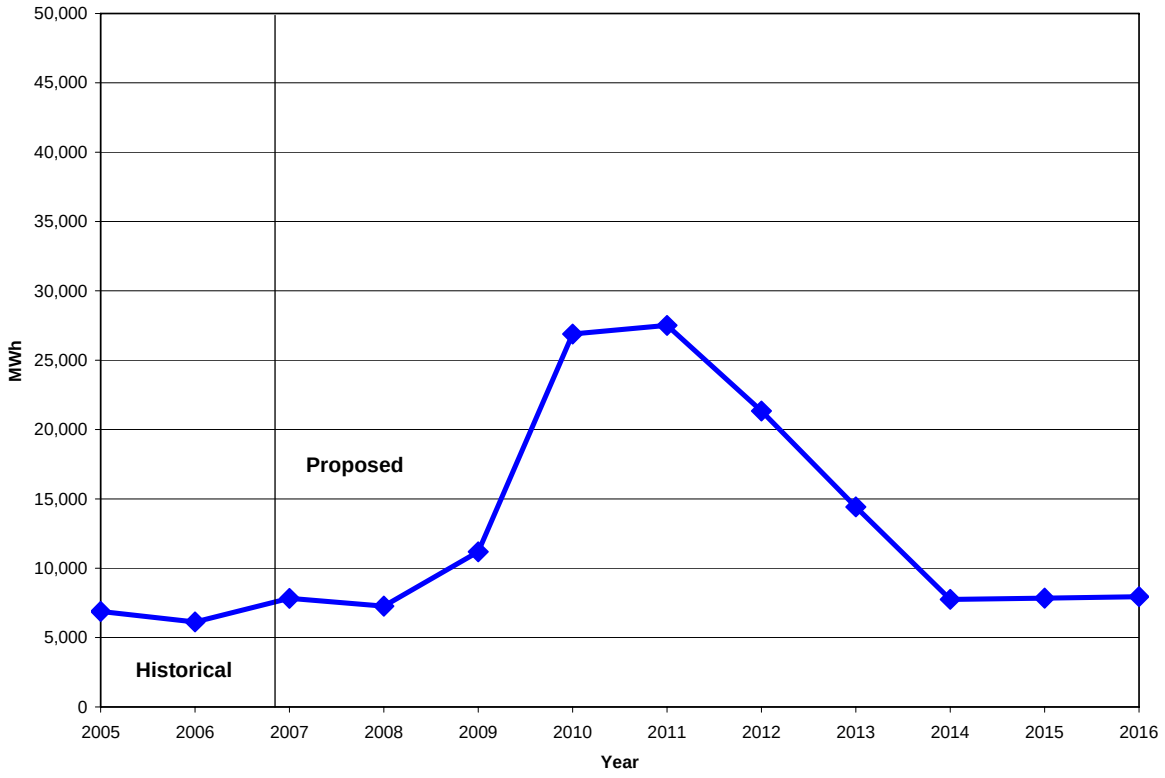
Assessment – The steep ramp-up in feasible program savings from 2005 to 2007 will require a significant increase in internal staff and funding resources, particularly given the characteristics of SVP's service territory. SVP has very little residential air conditioning load and few industrial facilities with significant capacity. SVP staff indicated that the city council had approved the goals, but not any significant funding increases, reducing the probability that the savings goals will be met from staff's perspective. The funding increases needed to support this level of savings would be equivalent to at least a five- fold increase in program funding from the current base of $3.8 million per year. In discussion with Energy Commission staff, SVP staff agreed that it might be worthwhile to construct a more gradual ramp-up rate to get the higher

savings levels called for in the RMI report. A more plausible path might have incremental annual energy savings increasing at 20 to 30 percent per year for the first five years and then at 10 to 15 percent over the remainder of the 10 years. SVP staff plans to consult with its management regarding possible collaboration on the development of a more gradual ramp-up rate in conjunction with developing program tracking systems.

Turlock Irrigation District

Description – Figure 25 shows Turlock's plans to significantly increase the energy savings from its energy efficiency programs over the next five years and then shrink the program savings five fold over the remaining five years. Annual savings are projected to increase from 6,000 MWh to more than 25,000 MWh over the next five years, a four fold increase. Projected savings from efficiency programs are expected to stay flat from 2005 to 2008, dramatically increase by over 300 percent from 2008 to 2011, and finally fall dramatically for the next three years. Turlock's program savings for 2006 were equivalent to 0.3 percent of annual electricity sales, toward the lower end of the range of 0.01 percent to 0.81 percent of sales reported by POUs for 2005. Projected program savings in 2011 are expected to increase to 1.3 percent of electricity sales in 2011 and then decline to 0.3 percent of forecast electricity sales in 2016.

Figure 25: Turlock Irrigation District
Historical Compared to Proposed Annual Energy Savings, 2005-2016



Assessment – Staff had a meeting with Turlock staff to help understand the drivers of the forecast of the savings shown above. Turlock staff felt this forecast was plausible for the following reasons:

It will take six to eighteen months to make its customers aware of the new programs they plan to offer. This is the reason that savings are not projected to increase until 2009.

Turlock does not have the staffing levels to rapidly develop new programs and felt that the lower levels of disposable income in the Central Valley would make it more difficult to achieve the level of savings achieved by some of the larger utilities, such as PG&E, who could tap into higher levels of disposable income

Turlock is worried that some of the potential savings from the RMI model might not be realized because they are based on unrealistic projections of the number of CFLs that could be installed in their customers' homes.

Finally, Turlock is unconcerned about the sharp downturn in projected savings projected for the period 2012 to 2016 because of the opportunity to revise the savings goals every three years. They point out that if the programs are successful in achieving their 2009 goals by the next goal setting process, it would be easy to adjust or raise the program savings goals in 2010 for these outer years.

Energy Commission staff remain unconvinced by many of the arguments above and still maintain it is unlikely that annual savings levels will dramatically increase between 2009 and 2010 and then dramatically fall back to 2005 levels by 2012. Staff plans to prepare a recommended savings path in the near future for consideration by the Energy Commission and the Turlock staff team.

CHAPTER 5: STATEWIDE EFFICIENCY OPTIONS

Staff considered savings targets that are relative to the utilities' economic potential (SB 1037) and to levels of future energy consumption (AB 2021). The following will present the staff's view of the options for a recommendation on statewide targets:

> *Option 1 – CPUC Targets for IOUs/Feasible Targets for POUs:* For the IOUs, continue progress on the targets set by the CPUC through 2013. After 2013, continue programs with the incremental savings equal to the 2013 target set by the CPUC in 2004 (this level is roughly 68 percent of the 2006 economic potential).[53] For the POUs, set targets at their proposed levels (this is roughly 56 percent of economic potential).
>
> *Option 2 – Eighty Percent Economic Potential*: Set the target at 80 percent of the combined economic potential for both the IOUs and the POUs.
>
> *Option 3 – Full Economic Potential*: Set the target at meeting full economic potential for both IOUs and POUs. This is in line with policy established in SB 1037 and in AB 2021which states that California's utilities should capture all cost-effective potential. This would constitute a "stretch goal".
>
> *Option 4 – Ten Percent Consumption Reduction*: For both the IOUs and POUs combined, set the target at a 10 percent reduction in electricity consumption in year 2016 (as expressed in AB 2021). Even though not required by AB 2021, consider this same option for peak demand and for natural gas consumption.

The following sections present the impact of the Options 1-4 for the combined IOU and POU electric energy consumption (GWh), electric peak demand (MW), and natural gas consumption (million therms (10^6 th)).

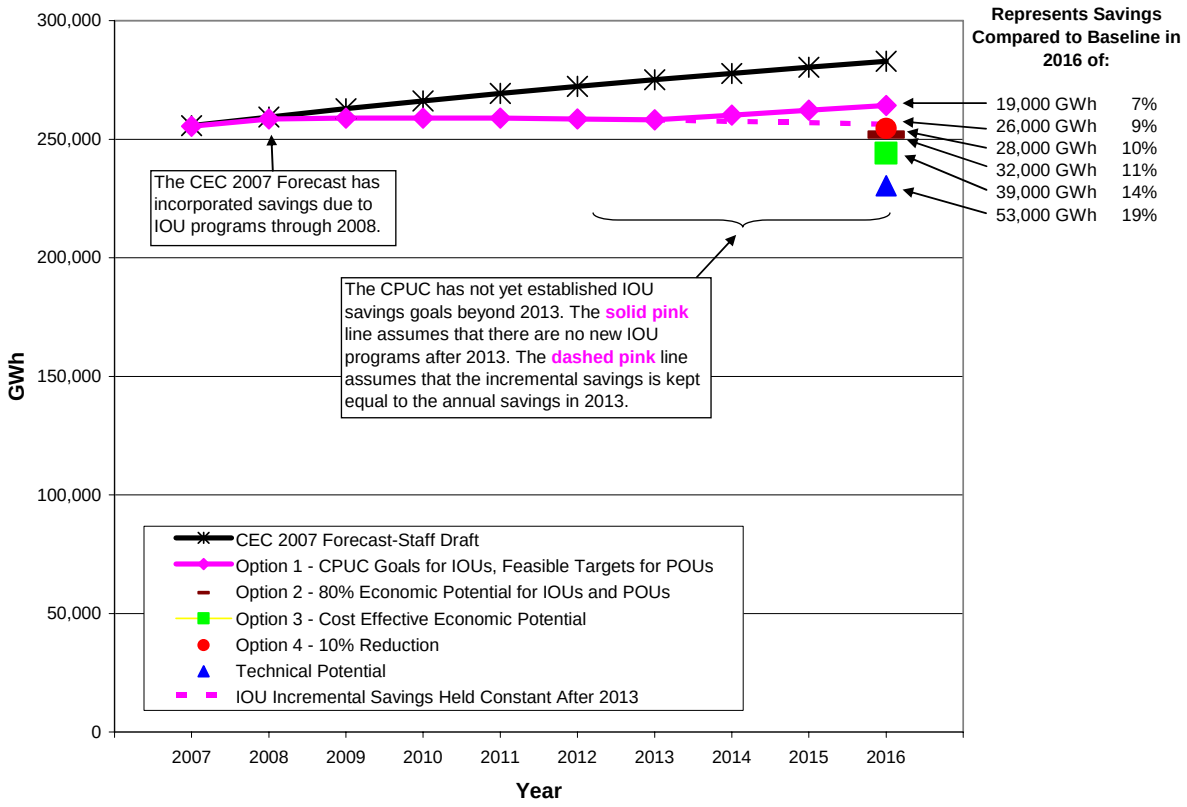
Electric Energy Consumption and Peak Demand

Figure 12 illustrates the impact of the four different savings targets on reducing statewide electricity consumption. The top line shows the projected demand for electricity absent the effects of IOU or POU programs for the period 2007-2016 (2009-2016 for the IOUs). The dashed line (Option 1) shows the resulting statewide consumption if both the POUs and IOUs are successful in meeting the energy savings goals proposed to the Energy Commission and adopted by the CPUC (and extended at the incremental 2013 rate through 2016). The other lines and symbols on this graph show the potential impact of achieving the higher savings goal represented by the IOUs and POUs obtaining 80 percent of their economic potential (Option 2), IOUs and POUs achieving all cost-effective economic potential (Option 3), a 10 percent

[53] The savings beyond 2013 were selected as a reasonable level for analytical purposes, since the CPUC has not selected goals for 2014 to 2016 or beyond. Staff is not attempting to establish a policy regarding these goals.

reduction in consumption in 2016 (Option 4) and, total technical potential (not presented as an option).

Figure 12: IOU and POU Electric Energy Consumption 2007-2016



Option 1 would achieve 67 percent of the identified cost-effective economic potential in the *2006 Itron* study, or 94 percent of the Option 4 target of reducing electricity consumption by 10 percent in 2016.

Setting the target so that the combined utilities achieve all of the cost-effective economic potential would increase the overall savings level from 26,000 GWH to 39,000 GWH, a 50 percent increase in overall savings from the programs. (Option 3)

The economic and technical potential numbers shown in the graph do not include the savings from emerging technologies. If these savings were included, economic and technical potential would each increase by more than 12,000 GWh (See Table 3 in Chapter 1). This means that there is more savings "in the bucket"[54] than has been considered thus far in the analysis. By their nature, the savings from emerging technologies are less certain that the savings from existing technologies. They do, however, provide an additional reserve of potential savings.

[54] Description of economic and technical potential provided by Karl Knapp with the City of Palo Alto Utilities in a phone conversation with Commission staff member Gary Klein on July 12, 2007.

Figure 13: IOU and POU Peak Electric Demand 2007-2016

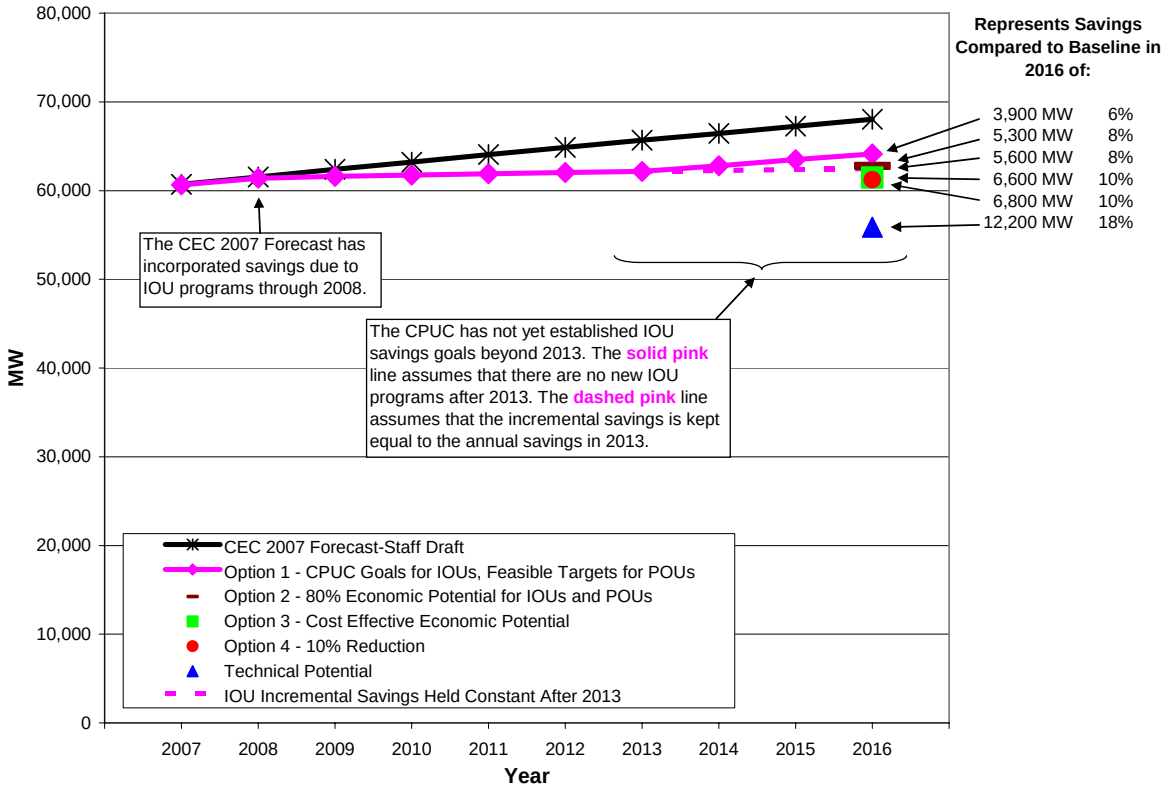


Figure 13 illustrates the potential impact on statewide peak demand of meeting different savings targets. The top line shows the projected peak demand for electricity absent the effects of IOU or POU programs for the period 2007-2016 (2009-2016 for the IOUs). The dashed line (Option 1) shows the resulting statewide peak demand if both the IOUs and POUs are successful in meeting the energy savings goals proposed to the Energy Commission and adopted by the CPUC (and extended at the incremental 2013 rate through 2016). The other symbols on this graph show the potential impact of achieving the higher savings goal represented by the IOUs and the POUs obtaining 80 percent of their economic potential (Option 2), IOUs and POUs capturing all cost-effective economic potential (Option 3), a 10 percent reduction compared to 2016 (Option 4) and total technical potential (not presented as an option).

The potential represented by Option 1 is 85 percent of the cost- effective economic potential in the *2006 Itron* study, or 82 percent of the Option 4 target of reducing peak demand by 10 percent in 2016.

Setting the target so that the combined utilities achieve all of the cost-effective economic potential would increase the savings level from 5,600 MW to 6,600 MW, an 18 percent increase in overall program savings.

As discussed above, the economic and technical potential numbers shown in the graph do not include the savings from emerging technologies. If these savings were included, economic and technical potential would each increase by more than 4,000 MW (See Table 3 in Chapter 1).

Assessing the Options

Using the criteria to evaluate both energy and peak demand targets yields similar results.

Option 1, which assumes current IOU goals and POU feasible targets, reduces consumption and demand by the least amount in both cases. It is the most conservative of the options, thus it is the least likely option to provide "margin for error" savings, or be motivational as a "stretch goal". In neither case does Option 1 fulfill the legislative mandate of all cost-effective efficiency. It approaches the AB 2021 policy threshold of a 10 percent reduction in electricity consumption, but it will fall short for peak demand. Option 1, however, is likely to be "plausible" because the targets do not aim as high as the alternative options.

Option 2, which assumes 80 percent of economic potential, is somewhat more aggressive than Option 1. Option 2 would be more motivational and would provide a greater "margin-for-error" than Option 1. Option 2 will fall short of meeting the legislative mandate of all cost-effective efficiency by 20 percent. It is close to the AB 2021 legislative mandate for electricity consumption, but it will fall short for peak demand. Option 2 is likely to be "plausible", but not as easy to achieve as Option 1.

Option 3, which assumes full economic potential for IOUs and POUs for electricity consumption and peak demand, is the most aggressive option. Option 3 fulfills the legislative mandate of achieving all cost-effective efficiency for both electricity consumption and peak demand. Option 3 provides the largest "margin for error" if some magnitude of planned savings do not materialize. Option 3 may be the most motivational option because it is a "stretch goal" which is likely to require additional resources and creative program planning. For these reasons, the obvious downside to Option 3 is "plausibility" as it may be perceived as too big a "stretch." It passes the policy threshold of reducing forecasted electricity consumption by 10 percent in 10 years (2016), but it would not reduce peak demand by 10 percent.

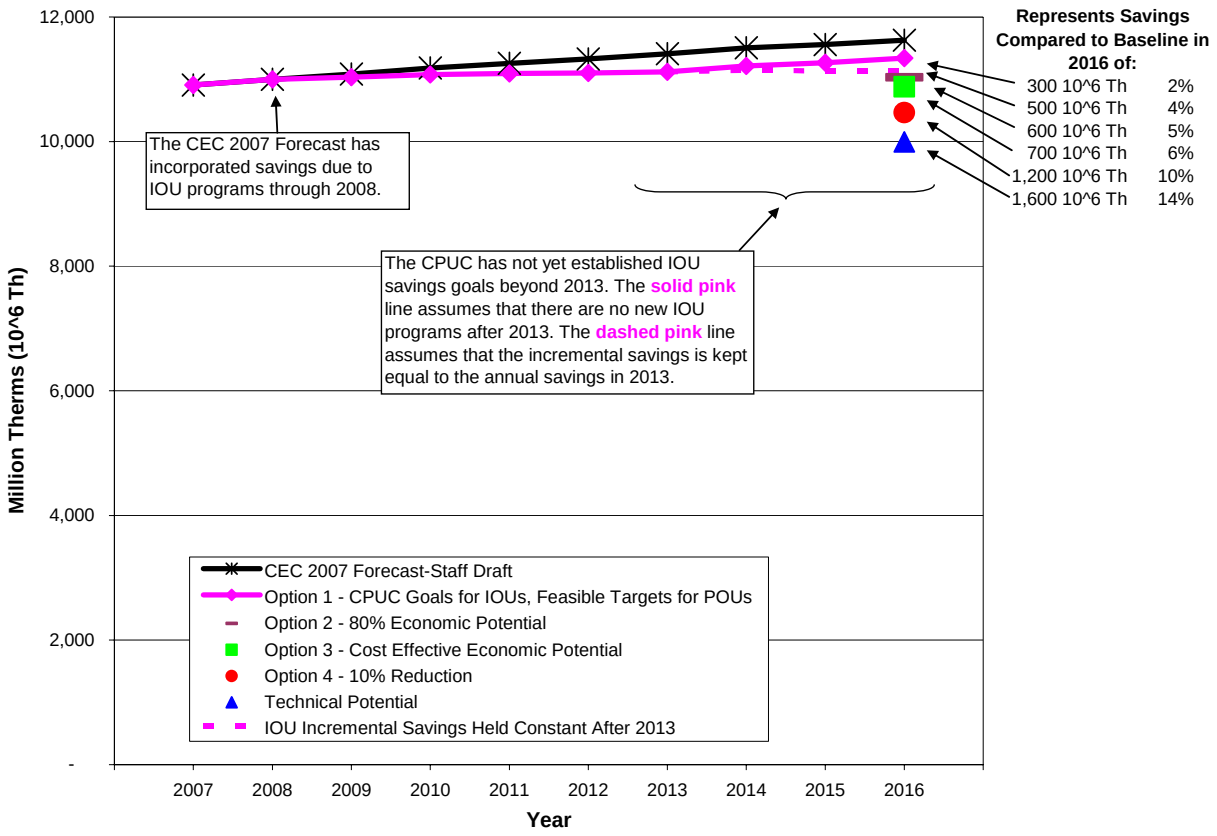
Option 4, which assumes a 10 percent reduction by 2016, has been evaluated for both electricity consumption as required by AB 2021 and for peak demand, which is not required. There is more cost-effective economic potential available than a 10 percent reduction for electricity consumption, which suggests that a savings target larger than 10 percent should be established. For peak demand, the opposite is true; the cost-effective economic potential, not including what might be available from emerging technologies, is somewhat smaller than would be achieved from a 10 percent reduction in peak demand.

Using the four evaluation criteria – policy context, plausibility, motivation, and margin for error – Option 3, achieving full economic potential, is likely to rank highest in three of them by producing the greatest savings. However, plausibility is an important qualification. The issues surrounding plausibility have already been discussed. More information is needed before we can assess this criterion adequately: namely definitions of "cost-effective", and whether the potential studies have defined technical potential broadly enough, including the magnitude from emerging technologies.

Natural Gas Consumption

Figure 14 illustrates the potential impact on statewide natural gas consumption of meeting different savings targets. The top line shows the projected demand for natural gas absent the effects of IOU or POU programs for the period 2007-2016 (2009-2016 for the IOUs). The dashed pink line (Option 1) shows the resulting statewide consumption if both the IOUs and POUs are successful in meeting the energy savings goals proposed to the Energy Commission and adopted by the CPUC (and extended at the incremental 2013 rate through 2016) respectively. The other symbols on this graph show the potential impact of achieving the higher savings goal represented as the POUs obtaining 80 percent of their economic potential (Option 2), IOUs and POUs capturing all cost effective economic potential (Option 3), a 10 percent reduction compared to 2016 (Option 4), and total technical potential (not presented as an option).

Figure 14: IOU and POU Natural Gas Consumption 2007-2016



The potential represented by Option 1 is 65 percent of the cost-effective economic potential identified in the *2006 Itron* study, or 42 percent of the Option 4 target of reducing demand by 10 percent in 2016.

Setting the target so that the combined utilities achieve all of the cost-effective economic potential would increase the savings level from 500 to 700 million therms, a 40 percent increase in overall savings from the programs.

The economic and technical potential numbers shown in the graph do not include the savings from emerging technologies. If these savings were included both economic and technical potential would increase by more than 500 million therms (See Table 3 in Chapter 1).

Assessing the Options

Option 1, which assumes current IOU targets and POU proposed targets for natural gas, is the most conservative option. It is the least likely option to provide "margin for error" savings, or to be motivational as a "stretch goal." It does not fulfill the legislative mandate of achieving all cost-effective efficiency, and it falls short of the AB 2021 policy threshold of a 10 percent reduction in natural gas consumption. Option 1, however, is likely to be "plausible" because the targets do not aim as high as the alternative options.

Option 2, which assumes 80 percent of economic potential, provides almost double the savings of Option 1. It provides more "margin for error" and it may be motivational as a "stretch goal." This option does not fulfill the legislative mandate of achieving all cost-effective efficiency. It also falls short of the AB 2021 policy threshold of a 10 percent reduction in natural gas consumption and is likely to be perceived as less plausible.

Option 3, which assumes full economic potential, would result in 2.5 times the savings of the most conservative option. Option 3 provides the greatest "margin for error" and certainly qualifies as a "stretch goal." By definition, this option fulfills the legislative mandate of achieving all cost-effective efficiency, but it falls short of the AB 2021 policy threshold of a 10 percent reduction in natural gas consumption. Since achieving it will take significantly more savings than the first two options, it is likely to be perceived as less plausible than Option 2.

Option 4, which assumes a 10 percent reduction by 2016, does not appear to be economically justified based on the technical and economic potential considered for this report. As has been pointed out earlier in this document, the economic potential from emerging technologies could provide an additional 500 million therms, thereby allowing economic potential to increase and making it possible to cost-effectively reduce consumption beyond the 10 percent threshold.

CHAPTER 6: RECOMMENDATIONS AND NEXT STEPS

Staff Recommended Statewide Efficiency Targets

AB 2021 describes a visionary mandate to reduce electricity and natural gas consumption in California through the achievement of all cost-effective efficiency measures. Guided by AB 2021 and using IOU and POU data, Energy Commission staff recommends Option 2.

Option 2 – Eighty Percent Economic Potential: Set the target at 80 percent of the combined economic potential for both the IOUs and the POUs.

This target applies to saving at least 80 percent of the economic potential identified for electricity consumption, peak demand and natural gas consumption.

Since the purpose of AB 2021 is to reduce energy consumption and peak demand, staff recommends that the Energy Commission also establish consumption and peak demand targets that can be more easily tracked than savings. Based on the current Energy Commission forecast, the staff's recommendation for Option 2 translates into the forecast reductions for 2016 shown in Table 11.

Table 11: Statewide 2016 Consumption and Peak Forecasts and Impact of Option 2

	2016 Forecast	2016 Forecast if Option 2 Achieved
Electricity Consumption	282,887 GWh	251,309 GWh
Peak Demand	68,037 MW	62,782 MW
Natural Gas Consumption	11,629 MMth	11,030 MMth

GWh is gigawatt hours, MW is megawatts and MMth is million therms

Recommending Option 2 balances the evaluation criteria. Although Option 3 yields greater reductions in consumption and demand, Option 2 is likely to be more realistic. Finding the right balance between goals that are too high and goals that are relatively easy to achieve is difficult given policy factors such as AB 32. Setting the goal at 80 percent of economic potential will give the IOUs an incentive to continue to ramp up their program savings. In addition, it will give the POUs an incentive to continue to expand their efforts to achieve a higher fraction of the economic potential over time.

Individual Utility Targets

Staff's analyses of individual utility submittals suggest that some utilities will have great difficulty in achieving the 80 percent economic potential goal while it will be relatively easy to achieve for those utilities with a long history of running efficiency programs. In addition to a

diversity of long term goals and rationales presented for them, staff found that most of the POUs had not spent much time thinking about how to develop an appropriate ramp up rate to achieve their long term goal. Indeed, the appropriate long term savings goal for 2016 and a feasible ramp up rate are two separate issues that require different types of data and analysis to resolve.

Rather than setting a target that applies to all utilities, staff is convinced that it would be better to develop both a long term goal and a trajectory to get there that was customized to the situation of each utility. Accordingly staff plans to propose both a long term savings goal for 2016 and plausible ramp up rates for each utility at the workshop on September 17th.

The future challenge is to narrow the gap between the achievable potential (represented by the proposed savings goals) and the economic potential. In part, this may be accomplished by an improvement in the accuracy of both the forecasts of economic potential and program savings results to take into account the unique features of each POU service area. In addition, escalating energy prices and the cost of greenhouse gas emissions reduction may increase the amount of economic savings over the next decade. Given the AB 32 requirements and the fact that verified savings are less than reported savings, the statewide savings targets will likely need to be increased in future updates by developing approaches to close the gap between the achievable potential and the economic potential, as well as accelerating the deployment of emerging technologies.

Improving the Next Target Setting Cycle

The POUs have made considerable progress in developing estimates of economic potential and using this information to develop estimates of feasible efficiency program savings targets. The results of this process exceed initial expectations. Three years ago, it would have been hard to believe that all of the POUs would not only be reporting the results of their programs, but also developing proposed savings goals over the next ten years. This is a huge step forward for the POUs and their customers.

The Energy Commission's challenge is to build on this progress by adopting a statewide savings target that encourages each utility to strive toward both the statewide target and their individual service area targets, and by making constructive suggestions to improve the analysis next time.

How the Energy Commission ultimately determines statewide energy efficiency targets, and how the staff will monitor them, depends on their purpose in California's future. Will the state use the targets as "stretch goals," an ideal to guide efficiency progress? Or should the targets be precise and utilized to measure progress, and reward or penalize performance?

Both perspectives may be needed. The ultimate goal is to reduce electric and natural gas consumption, providing reliable energy supplies in a carbon constrained world. Energy efficiency is the cheapest, fastest way to accomplish this, but the savings must be reliable. The targets must ultimately be translated into real resources, or "negawatts," that can be counted on

in utilities' resource plans. Evaluation, measurement and verification must be effective, lessening the gap between the ideal and real efficiency resources.

Utility targets are based on potential estimates that are moving targets, never accurate at any given point. Potential estimates are, however, very useful for estimating efficiency measure penetrations and can help to focus effective program portfolios. The data used to produce potential estimates is essential to both program design and evaluation.

AB 32 is likely to require that significantly more energy efficiency be captured by both IOUs and POUs. The Energy Commission has the responsibility for estimating statewide potential, assessing statewide targets, and evaluating POU results under AB 2021. The Energy Commission's role should be to make it more likely that each POU can meet their adopted goal and increase their goals by the next cycle in 2010. To accomplish this, staff recommends seeks IEPR Committee approval to do the following:

1. Work with POUs to understand the process and data they used to develop annual program savings goals:
    a. To give the Energy Commission a better idea of their rationale which may lay the groundwork for potentially expanding their goals next time.
    b. To help understand the constraints each POU encountered that made it difficult to provide either short-term or long-term forecasts of program savings and to work with them to mitigate or eliminate these constraints.
    c. To understand the underlying components of each utility's determination of cost effectiveness.
2. Engage the POUs to help them develop realistic and sustainable annual savings targets.
    a. Support utility requests to their boards for additional resources to increase efficiency goals.
    b. Elicit other ideas for assistance to increase efficiency savings.
3. Work with POUs staff at some of the larger utilities to establish better program tracking systems so that POU customers and the Energy Commission can ascertain if POUs are on track to meet their savings goals.
    a. Consider setting up some form of peer review process to increase the quality and availability of utility program savings reports on an annual basis.
    b. Establish a monitoring and feedback system that allows POUs to share program successes and lessons learned through evaluation with other utilities and with regulators in an ongoing basis.
    c. Give customers the ability to track program savings results for each POU on line
4. Conduct a statewide potential study that includes both IOUs and POUs. A particularly important component of this study would be the definition of cost-effectiveness to be used in assessing economic potential.
5. Consider funding research to identify the factors that lead to successful expansion of POU programs and make this information available to the smaller POUs.
6. Determine how to better integrate the requirements of the 1992 Energy Policy Act

with AB 2021 and SB 1037. Also determine how to better integrate the POU and IOU processes.