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ACHIEVING COST-EFFECTIVE ENERGY EFFICIENCY FOR CALIFORNIA: SECOND ANNUAL AB 2021 PROGRESS REPORT

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Abstract

This second annual report documents the progress that California's utilities are making in fulfilling the legislative mandate to invest in increased cost-effective energy efficiency as required by Assembly Bill 2021 (Levine, Chapter 734, Statutes of 2006).

The 2008 data used in this report was compiled from annual reports filed by investor-owned utilities with the California Public Utilities Commission (CPUC) and from publicly owned utilities' data collected by the California Municipal Utilities Association (CMUA) and filed with the California Energy Commission (Energy Commission).

During the CPUC's 2006–2008 efficiency program cycle, the investor-owned utilities have exceeded their three-year energy efficiency goals as outlined in the CPUC's Decision 04-09-060 and in the Energy Commission's Assembly Bill 2021 Report. During these three years, the investor-owned utilities achieved over 200 percent of their electric energy savings goal and 150 percent of their natural gas savings goal.

Efficiency savings recorded by publicly owned utilities increased substantially from 2007 to 2008. Savings reported by publicly owned utilities reached 74 percent of AB 2021 adopted goals in 2008. Publicly owned utilities demonstrated their commitment to efficiency savings over the last year by expanding both energy efficiency staff and customer programs. As in the 2008 AB 2021 progress report, the 2009 targets are very high, and again there is a concern that the publicly owned utilities will not meet the ambitious goals for the near future years of 2009–2011. This is particularly a concern since slowing economic conditions in California negatively impact the investments required for utility customers to become more energy-efficient.

Energy efficiency program evaluation plays a prominent role for both the investor-owned utilities and the publicly owned utilities in this year's AB 2021 Progress Report. Investor-owned utility-verified savings for 2004–2005 programs fell below reported savings, thus calling into question the success of both past and current programs. Many publicly owned utilities prepared evaluation plans or performed verification studies for the first time. While the results are preliminary at this time, publicly owned utility-verified savings, in most cases, do confirm the 2008 reported program savings.

Keywords: Energy efficiency, savings, demand reduction, peak demands, electricity consumption, natural gas, electric-peak demand reduction, potential estimates, targets, program evaluation, goals, measurement and verification, Assembly Bill 2021, Senate Bill 1037, investor-owned utilities, publicly owned utilities.

Executive Summary

This second annual report presents progress by California utilities in achieving energy efficiency goals as required by Assembly Bill 2021 (Levine, Chapter 734, Statutes of 2006). This legislation set a goal of reducing total forecasted consumption by 10 percent over the next 10 years. This goal is reinforced in Assembly Bill 32 (Núñez, Chapter 488, Statutes of 2006) and the California Air Resources Board scoping plan that places energy efficiency in the central role to reduce global warming.

In the interest of promoting increased energy efficiency in all California utilities, AB 2021:

- Requires the California Energy Commission (Energy Commission) to develop statewide energy efficiency potential estimates and targets (or goals) for California's investor-owned and public utilities.
- Requires publicly owned utilities identify all potentially achievable cost-effective electricity energy savings and establish annual targets for energy efficiency savings and demand reduction for the next 10-year period.
- Requires the Energy Commission to report, as part of its biennial *Integrated Energy Policy Report (IEPR)*, progress by utilities in implementing AB 2021.

This 2009 staff report documents progress by investor-owned and publicly owned utilities in fulfilling these energy efficiency objectives. Ten-year statewide goals were adopted in December 2007. Targets submitted by the publicly owned utilities and the annual goals the California Public Utilities Commission (CPUC) set for the investor-owned utilities in Decision 04-09-060 comprise the bulk of the overall statewide energy goal set for 2007-2016.

During the CPUC's 2006-2008 efficiency program cycle, the investor-owned utilities succeeded in meeting their goals as outlined in the CPUC's D. 04-09-060 and in the Energy Commission's AB 2021 Report. Investor-owned utilities combined reported 10,000 gigawatt hours of annual energy savings, 1,800 megawatts of peak savings, and 138 million therms of natural gas savings. These reported accomplishments substantially exceeded their CPUC-mandated goals. However, measurement and verification studies completed over the last few years on 2004–2005 programs indicate the possibility of *verified* efficiency program savings being less than those *reported.*

Annual efficiency savings reported by publicly owned utilities in 2008 increased by nearly 50 percent for energy savings and nearly 60 percent for peak savings over 2007. The publicly owned utilities reached 75 percent of their AB 2021 targets for 2008. Publicly owned utilities reported on measurement and verification accomplishments for the first time. Many completed evaluation plans, and others reported on actual study results in terms of verified savings for specific programs. While the results are preliminary, the verified savings confirm the 2008 reported program savings in most cases.

Evidence that the publicly owned utility community is on the right long-term track continues. Publicly owned utilities are successfully demonstrating their commitment to energy efficiency as part of a larger responsibility to carbon emissions reduction. The Energy Commission staff is concerned, however, about the ability of the publicly owned utilities to meet adopted goals for 2009–2010 given challenges with California's weak economy that are stressing local government budgets and diminishing consumer willingness to invest. Publicly owned utilities must achieve an increase of 64 percent from their 2008 reported energy savings and an increase of 164 percent from their 2008 reported peak savings to reach their 2009 adopted targets.

AB 2021 requires the Energy Commission to provide a statewide estimate of energy efficiency potential and targets every three years. The statewide potential estimates, goals, and targets will be updated again in 2010. Both the investor-owned utilities, through the CPUC, and the publicly owned utilities will be required to identify all cost-effective electricity savings potential and establish individual savings targets based on that potential. The Energy Commission will be working intensively on this commitment over the next year and reporting the results in the *2010 Integrated Energy Policy Report Update*.

Key Recommendations for Publicly owned Utilities

The following are staff's most important recommendations for publicly owned utilities. Additional recommendations are included at the conclusion of the report.

- Energy Commission staff and publicly owned utilities should work together to understand the issues that individual utilities face that impact their efficiency expenditures and savings in 2009–2010, including the impacts of economic conditions.
- In the *Achieving Cost-effective Energy Efficiency for California: An AB 2021 Progress Report* (December 2008) a request was made to the publicly owned utilities for additional information to be supplied in the California Municipal Utilities Associations 2009 status report on the cause of yearly fluctuations in efficiency performance. Unlike the investor-owned utilities, publicly owned utilities savings can vary widely in either direction. The level of information provided in the California Municipal Utilities Associations 2009 status report was an improvement with the exception of some publicly owned utilities. Staff and the publicly owned utilities need to develop a framework for soliciting and providing information that will explain year to year differences in savings accomplishments.
- Publicly owned utilities may be expanding their collaboration with local governments and other potential service providers to achieve energy efficiency with use of the 2009 American Recovery and Reinvestment Act funds. To the extent that this collaboration is planned and underway, its achievements should be detailed in the 2010 California Municipal Utilities Associations status report.

- Publicly owned utilities with residential and small commercial CFL distribution programs that comprise a large portion of their annual efficiency savings should consider these for impact evaluation in 2009-–2010. There has been considerable information generated on this topic in the investor-owned utilities arena. To simplify the publicly owned utilities analysis, they should decide which investor-owned utilities analysis they can apply and what data may be unique to their service areas. There is sufficient uncertainty in both recent publicly owned utilities and investor-owned utilities CFL studies to warrant this evaluation priority.
- The greatest value of measurement and verification studies to publicly owned utilities, especially to smaller utilities, is the opportunity to improve program delivery and cost-effectiveness. It would be very helpful for the California Municipal Utilities Associations 2010 status report to include a discussion of the ways in which the evaluation studies *completed for 2008-2009 programs* resulted in modifications of the efficiency portfolio and specific efficiency programs in 2009-2010. This should be a continuing feature of subsequent status reports.

Introduction

This second annual report documents the progress that California's utilities are making in fulfilling the legislative mandate (AB 2021, Levine, Chapter 734, Statutes of 2006) to invest in increased cost-effective energy efficiency. Both investor-owned utilities (IOUs)[1] and publicly owned utilities (POUs) sponsor energy efficiency programs that, together with building and appliance standards and other efficiency efforts, substantially reduce California's annual electric and natural gas consumption. In 2008, IOUs provided about 67 percent of the retail electricity consumed in California, while POUs provided about 25 percent, and direct access providers supplied the rest. Of the 2008 utility efficiency programs, those of the IOUs accounted for more than 90 percent of all utility energy savings.[2]

While California has a 20-year history in cost-effective energy efficiency, the prominence of energy efficiency as a future resource was expanded in 2003 by the state energy agencies' first *Energy Action Plan*.[3] Senate Bill 1037 (Kehoe, Chapter 366, Statutes of 2005) made this policy into law by requiring electric utilities to meet their resource needs first with energy efficiency. Senate Bill 1037 (SB 1037) requires the California Public Utilities Commission (CPUC), along with the California Energy Commission (Energy Commission), to identify all potentially achievable cost-effective electric and natural gas energy efficiency savings for the IOUs and set targets[4] 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.

A strong role for energy efficiency in California's future was further underscored by climate change legislation. Assembly Bill 32 (Núñez, Chapter 488, Statutes of 2006) requires greenhouse gas emissions be reduced to 1990 levels by 2020. Customer-side energy efficiency is one of the primary approaches contributing to this goal in the electricity and natural gas sectors.

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[1] California's IOUs are Pacific Gas and Electric Co. (PG&E), Southern California Edison Co. (SCE), San Diego Gas & Electric Co. (Sempra Utilities) (SDG&E), and Southern California Gas Co. (Sempra Utilities) (SCG).

[2] California Energy Commission, *California Energy Demand 2008-2018 Staff Forecast*, CEC-200-0007-015-SF2, November 2007.

[3] The three agencies were the California Public Utilities Commission, California Energy Commission and then existing California Power Authority.

[4] The terms for energy efficiency "targets" and "goals" are used interchangeably. There is an established convention (at least since 2004) that the CPUC and IOUs use the term "goals." POUs have adopted the term "targets" since that is the term used in AB 2021.

More specific legal directions were added in 2006 by AB 2021, in which the Legislature stressed actions to increase California's energy efficiency programs. The purpose was to ensure continued prudent investments in energy efficiency produce cost-effective energy savings and reduce customer energy demand by 10 percent over the next 10 years. Other benefits include the reduction of overall system costs, increased reliability, and increased public health and environmental benefits. Expanding California's energy efficiency programs ameliorates air quality problems throughout the state and also reduces greenhouse gas emissions. It is expected that energy savings achieved through this legislation will be an essential component of the state's plan to meet Governor Schwarzenegger's greenhouse gas reduction targets established in Executive Order S-3-05.

AB 2021 directed 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:

- Every three years, starting June 2007, 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 Energy Commission.
- Annually report 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; and sources of funding for investments.
- Report methods and input assumptions used to determine cost-effectiveness.
- Report independent evaluation, measurement, and verification results of the energy efficiency savings.
- Treat investments made to achieve energy efficiency savings and demand reduction targets as procurement investments.

AB 2021 also directs the Energy Commission to:

- Provide, in consultation with the CPUC as the regulator of IOU energy efficiency programs, a statewide estimate of energy efficiency and demand reduction potential and targets for a 10-year period.
- Include the POU information noted above in the *Integrated Energy Policy Report (IEPR*), as well as a comparison of each utility's energy efficiency targets and actual results for each POU.
- Provide recommendations to POUs, Legislature, and Governor if the Energy Commission determines improvements could be made in the level of collective achievement by POUs or in the level of achievement by any POU.

The first requirement was met in December 2007 when the energy agencies, together with the utilities, developed statewide targets and utility-specific targets.[5] An overall statewide goal equivalent to all cost-effective efficiency economic potential was adopted and presented in the Energy Commission's *2007 IEPR*.

In the 2008 IEPR update process, the first AB 2021 report was provided on 2007 IOU and POU energy efficiency activities and progress.[6] In the IOU arena, energy efficiency accomplishments for the 2006–2008 program cycle and plans for the 2009–2011 program cycle were discussed. The 2009 report contains an update on these topics. In addition, the report will address the CPUC's Verification Report, which summarizes the measurement and verification (M&V) efforts of the program years 2004–2005. The POUs reported on activities to meet their 2008 energy efficiency program goals in their *Energy Efficiency in California's Public Power Sector: A Status Report*[7]). Completed evaluation plans and studies for the POUs are being reported for the first time in this report. After summarizing and assessing the POU material, this report concludes with recommendations for the POUs.

While measurement and verification activities are presented in this report for both the IOUs and the POUs, none of the utility savings accomplishments have been adjusted to reflect M&V results. As noted in the next section, for the IOUs this adjustment process is taking place in CPUC and Energy Commission proceedings.[8] For the POUs, program evaluation results on verified savings are too recent and too few to consider making savings adjustments based on evaluation realization rates.

IOU Energy Efficiency Program Accomplishments

In 2008, the IOUs were in the third and last year of their 2006–2008 efficiency program cycle. Using program planning and measurement standards mandated by the CPUC for energy efficiency programs, the IOUs have each reported strong individual performances for the overall 2006-2008 planning cycle.

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[5] California Energy Commission, *Achieving All Cost-Effective Energy Efficiency for California*, Final Staff Report, CEC-200-2007-019-SF, December 2007.

[6] California Energy Commission, *Achieving Cost-Effective Energy Efficiency for California: An AB 2021 Progress Report,* CEC-20-2008-007, December 2008

[7] This annual report from the California Municipal Utilities Association (CMUA) to the Energy Commission is frequently referred to as the "CMUA Report" or "March Report".

[8] See CPUC's R.06-04-010, the current energy efficiency rulemaking initiated in 2006; and, R.09-01-019, the new rulemaking on Risk Reward Incentive Mechanism (RRIM) initiated in 2009. The Energy Commission's 2009 IEPR proceeding includes analyses on the differences among reported (ex ante) savings, verified (ex post) savings, and savings estimates developed using the Energy Commission's demand forecast models.

Table 1 and Table 2 describe the IOUs' accomplishments relative to CPUC adopted annual savings goals for electricity savings (GWh), peak demand reduction (MW), and natural gas savings (million therms) (MMth).

Table 1: IOU First Year[9] Reported Net Program Impacts (2006 - 2008)

Year		CPUC Mandated Goal	Reported Savings	Percentage of Goal
2006	Electricity (GWh)	2,032	1,718	85%
	Peak (MW)	442	300	68%
	Natural Gas (MMth)	30	22	73%
2007	Electricity (GWh)	2,275	3,562	157%
	Peak (MW)	478	617	129%
	Natural Gas (MMth)	37	49	132%
2008	Electricity (GWh)	2,505	5,082	203%
	Peak (MW)	528	863	163%
	Natural Gas (MMth)	44	67	152%

Source: CPUC, Energy Efficiency Groupware Application Database, April 2009

Table 2: IOU Cumulative Reported Net Program Impacts (2006 - 2008)

	PGE	SCE	SDGE	SCG	Total
Electricity (GWh)	5,383	4,046	933	0	10,362
Peak (MW)	882	730	167	0	1,779
Natural Gas (MMth)	69	0	7	62	138

Source: CPUC, Energy Efficiency Groupware Application Database, April 2009

The IOUs spent $316 million, $670 million, and $932 million on their efficiency portfolios in program years 2006, 2007, and 2008, respectively.[10] The annual increase in expenditures is mirrored by a similarly rising trend in program accomplishments for those same years. The apparently diminutive 2006 accomplishments can be reasonably attributed to the timing of

[9] The term "first year" refers to saving impacts that begin in a given year. Efficiency savings usually extend beyond the year in which they actually begin. As new savings programs begin over successive years these savings become cumulative.

[10] CPUC Energy Division, Energy Efficiency Groupware Application Database, April 2009.

the 2006 - 2008 portfolio approval and implementation which occurred well into 2006. The IOUs' joint performance in 2007 and 2008, though, was strong enough that their total savings-to-goal ratios were greater than 120 percent across all savings categories.

Energy Efficiency 2006 - 2007 Verification Report

Table 1 shows the IOUs' *ex ante* savings; that is, savings that have not been verified by third-party evaluators.[11] The evaluation or M&V of savings is a critical feature of CPUC's jurisdiction over IOU efficiency programs. M&V studies inform program planners who continually strive towards more cost-effective and ultimately more successful program designs. Equally important is the role M&V plays in protecting IOU ratepayers from investing in efficiency programs that do not yield true value as a resource. The CPUC, through a mechanism known as Risk/Reward Incentive Mechanism (RRIM)[12], offers the IOUs shareholder earnings as an incentive to reach or exceed their energy efficiency goals. Within the context of the RRIM, the CPUC Energy Division must produce *ex post* savings estimates — savings that have been verified and that serve as the basis for IOU incentive payments.

The CPUC's *Energy Efficiency 2006-2007 Verification Report*, published in February 2009, updated the parameters used to estimate efficiency program costs and benefits using results from third-party M&V studies of the 2004 and 2005 programs.[13] The updated savings parameters were used to adjust the IOUs' reported *ex ante* savings accomplishments and to determine the amount of shareholder earnings each IOU would be eligible to claim. **Table 3** shows the percentage reductions to reported savings made by the CPUC's Energy Division analysis on the IOUs reported portfolio savings. These reductions, in turn, lowered earnings estimates.

[11] *Ex ante savings* are estimated or forecasted savings used for program planning. Once an evaluation has taken place and savings have been verified, the resulting savings, which may be revised, are referred to as *ex post savings*.

[12] Current CPUC decisions regulating IOU energy efficiency shareholder earnings in R. 06-04-010 are D.07-09-043 (2007) and 08-01-042 (2008).

[13] CPUC, *Energy Efficiency 2006–2007 Verification Report*, prepared by Energy Division, February 5, 2009

Table 3: 2006 – 2007 IOUs Verified Savings as a Proportion of Reported Savings

	PG&E	SCE	SDG&E	SCG
Efficiency Program Portfolio Savings Adjustments				
Total Electricity Savings (GWh)	70.87%	78.38%	80.94%	
Total Peak Savings (MW)	72.40%	81.49%	87.96%	
Total Natural Gas Savings (MMTh)	85.94%		91.79%	81.11%

Source: CPUC Energy Division, *Energy Efficiency 2006-2007 Verification Report*, February 5, 2009.

The *Verification Report* suggests that, for program years 2006 and 2007, the IOUs realized a percentage of their reported accomplishments. CPUC Energy Division staff concluded that of the four IOUs with claimed earnings (totaling $152 million collectively) only Southern California Gas Company was eligible to claim earnings. This was due to SCG's exclusively natural gas portfolio. Natural gas measures had higher verification results and earnings potential than electric measures, notably lighting, which comprises a large portion of all other IOUs' portfolios.

Although the *Verification Report* was intended to serve as the primary mechanism for awarding utility earnings, due to controversy surrounding its method as well as the timing of its release, the report did not have any direct effect on the IOUs' first interim payment. In December 2008, the CPUC awarded the IOUs a combined total of $82 million in earnings for program years 2006 and 2007— 35 percent of the IOUs' original earnings claim.[14]

The *Verification Report*, published two months after the IOUs received their first interim payment, may still be used for planning. The background analyses of the *Verification Report* led to modifications of the CPUC's Database of Energy Efficiency Resources (DEER)[15] database, which, in turn, affects the calculation of 2009–2011 portfolio savings. The Energy Commission is using data in the Verification Report's summary reports to determine efficiency savings embedded in the demand forecast.[16] In a recently proposed decision, the CPUC states "... the Verification Report of 2006 and 2007 energy efficiency activities now provides 2006–2007 data, which can be reasonably projected to 2008 and beyond by the IOUs."[17] However, there is considerable disagreement on this application of M&V results.

[14] CPUC D.08-12-059, *Decision Granting in Part and Denying in Part the Petition for Modification*, January 2, 2009.

[15] Database of Energy Efficiency Resources (DEER) contains the technical data for energy efficiency measures that is used to estimate savings impacts for planning purposes.

[16] Energy Commission, Quantifying Energy Efficiency in the Demand Forecast, 2009 IEPR Workshop, May 21, 2009.

[17] CPUC, Proceeding A.08-07-021, *Interim Decision Determining Policy and Counting Issues for 2009 to 2011 Energy Efficiency Programs*, April 21, 2009.

Efficiency Goals for 2009 and Beyond

IOU Goals for 2009–2011

In July 2008, the CPUC issued a decision on long-term energy efficiency goals, directing a new paradigm in savings objectives for the IOUs.[18] The CPUC recommended a "hybrid-goal structure" consisting of total market "gross" (TMG) goals and "net" utility-specific goals for each IOU service area for 2012 to 2020. The CPUC decision modifies the existing goals set in 2004 for use in the 2009–2011 program cycles by redefining the goals from net to gross savings.[19] The CPUC and IOUs believe this savings choice to be more realistic because it reflects the latest information on energy efficiency potential in Itron's *2008 Goals Update Study*[20]. Because the previous 2004–2013 goals (defined as net) exceed the 2008 estimate of efficiency opportunities and because the goals were based upon assumptions that are now outdated, they are no longer an appropriate benchmark of future program accomplishments.

The July 2008 decision sets interim TMG goals to be used for AB 32 and resource procurement planning, but postpones setting utility-specific goals until 2010 after program evaluations for 2006-2008 programs are completed.

As shown in **Table 4,** the CPUC left unchanged the 2009–2011 program cycle goals set by D.09-04-060 (2004). However, IOUs will be measuring their program accomplishments by the revised definition of goals outlined in D.07-08-047 (2008). The redefinition of goals from net to gross begged the question of what could be included in the gross impact definition. A comprehensive proposal has been offered by the CPUC in a recent interim decision that details how the IOUs will achieve annual and cumulative goals and determine the cost-effectiveness of their portfolios.[21]

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[18] CPUC, D.08-07-047, *Decision Adopting Interim Energy Efficiency Savings Goals for 2012 through 2020, and Defining Energy Efficiency Savings Goals for 2009 through 2011*, July 31, 2008. The development of the IOU goals for CPUC efficiency program cycle 2009-2001 is discussed at length in last year's AB 2021 progress report (California Energy Commission, *Achieving Cost-Effective Energy Efficiency for California: An AB 2021 Progress Report,* CEC-200-20078-007, December 2008).

[19] Ibid, pp. 28-32. Gross savings include naturally occurring and additional savings that may be related to a particular program but not its direct result. This broader definition will permit the IOUs to meet their goals using gross savings; that is, greater savings per efficiency measure. In theory, if the attribution is justified, the IOUs may claim savings from codes and standards activities, government partnerships, and other sources.

[20] Itron, Inc., *California Energy Efficiency Potential Study*, prepared for the CPUC, September 10, 2008

[21] CPUC, Proceeding A-08-07-021, *Interim Decision Determining Policy and Counting Issues for 2009 to 2011 Energy Efficiency Programs*, April 21, 2009. Comments on this decision will be taken by CPUC until May 21.

Table 4: IOU Gross Savings Goals for 2009-2011

	2009	2010	2011	Cumulative 2009-2011
Energy (GWh)	2,538	2,465	2,513	7,516
Peak (MW)	535	519	530	1,584
Natural Gas (MMth)	52	54	57	163

Source: California Public Utilities Commission, D.08.07.047, Table 3, Page 29.

IOU Goals for 2012–2020

In updating the TMG goals for program years 2012 through 2020, the CPUC must consider the results of M&V studies for program years 2006 through 2008 along with revised estimates of energy efficiency potential. Additionally, the results of a new CPUC proceeding established to evaluate and modify the IOU incentive mechanism will play a role in determining revised goals. The challenge facing the CPUC lies in incorporating as much relevant data as possible into the goals update while leaving time enough for the IOUs to integrate their new goals into their 2012–2014 planning cycle. While recognizing a 2011 update would be more comprehensive, the CPUC scheduled the update to be completed by October 2010—the latest date by which the IOUs could reasonably be expected to use the updated goals for planning purposes. [22]

Program Applications for 2009–2011

The IOUs originally filed their program applications for 2009–2011 in July 2008. Those applications were deemed inadequate by the CPUC for, among other reasons, not sufficiently supporting the CPUC's *California's Long-Term Energy Efficiency Strategic Plan (CEESP)*. In response, the CPUC ordered the utilities to revisit their portfolio design to better reflect state policies.[23] The IOUs worked closely with CPUC Energy Division staff to

[22] CPUC, D.08-07-047, *Decision Adopting Interim Energy Efficiency Savings Goals for 2012 through 2020, and Defining Energy Efficiency Savings Goals for 2009 through 2011*, July 31, 2008.

[23] CPUC, *Assigned Commissioner's and Administrative Law Judge's Ruling Requiring Supplemental Filings*, October 30, 2008. See also CPUC, D.08-09-040, *Decision Adopting the California Long-Term Energy Efficiency Strategic Plan*, September 19, 2008.

produce a revised set of applications that more closely addressed the four initiatives of the CEESP:

- All new residential construction will use zero net energy by 2020.
- All new commercial construction will use zero net energy by 2030.
- Heating, ventilation, and air conditioning (HVAC) industry will be transformed.
- Low income customers will be integrated into the mainstream energy efficiency portfolio.

As of April 2009, the IOUs are well into the second quarter of their 2009 efficiency program year. Their 2009–2011 efficiency portfolio applications, initially filed in July 2008, were resubmitted in February 2009 and are scheduled to be approved possibly as early as August 2009. The IOUs are currently using 2009 to continue implementing their most successful 2008 programs with "bridge" funding approved by the CPUC. During this gap between official program cycles, 2008 IOU programs are winding down, but the IOUs are not expecting a ready start-up of newly approved programs.

Until the IOUs' 2009–2011 applications are fully vetted and approved, it remains to be seen how closely the new portfolios meet the needs of the CPUC going forward. In their final applications, the IOUs have moved forward with first steps towards the CEESP initiatives. They are planning pilot programs to integrate whole building analysis with demand side options such energy efficiency, demand response, Smart Meter/AMI, Climate Smart, self generation, and low income programs. Portfolio emphases will be placed on phasing out program emphasis on certain lighting options that are no longer cost-effective and adding commercial space conditioning and consumer electronics which is expected to be the greatest contributor to residential load growth in the next two decades. Other new program offerings include innovative financing options, workforce training, and an aggressive pursuit of codes and standards enhancements. The utilities' requested budgets for 2009-2011 total $3.7 billion.[24]

POU Energy Efficiency Program Accomplishments

California's POUs are a widely varying set of 39 locally controlled entities that range in size from the state's third largest utility, Los Angeles Department of Water & Power (LADWP), down to very small entities that serve less than a thousand customers. Among these 39

[24] IOU 2009-2011 Energy Efficiency Applications propose budgets of $1.8 billion for PG&E, $1.3 billion for SCE, $322 million for SDG&E, and $273 million for SCG (Joint IOU Presentation of the 2009-2011 Energy Efficiency Applications, March 13, 2009).

utilities, LADWP and Sacramento Municipal Utility District (SMUD) serve approximately 63 percent of the retail sales, and the largest 15 POUs serve 97 percent of the total POU load.[25]

The POUs have had energy efficiency programs for their customers for many years. Since electricity deregulation legislation in 1996, Assembly Bill 1890 (Peace, Chapter 854, Statutes of 1996), these programs have been funded from California's public goods charge (PGC). As noted in the Introduction, the energy agencies, together with the utilities, developed statewide targets and utility-specific targets in December 2007[26] in response to AB 2021 (2006).

The POUs have been fulfilling their reporting obligation by providing a joint report compiled by the California Municipal Utilities Association (CMUA) with Northern California Power Agency (NCPA) and Southern California Public Power Authority (SCPPA). In March 2009, CMUA provided the Energy Commission with the second progress report since the energy efficiency targets were adopted in December 2007.[27]

POU Energy Efficiency Expenditures: Reported and Projected

AB 2021 directs the Energy Commission to provide a comparison of each POU's targets and the utility's actual annual energy savings and demand reductions.[28]

The POUs collectively spent $104 million on energy efficiency programs in 2008, a 65 percent increase from their 2007 reported expenditures. The largest 15 POUs spent $100 million, or 97 percent, of this total. LADWP spent the largest amount at $36 million, and SMUD spent the next highest at $29 million. Together they spent a combined total of 63 percent of the POU programs, which is roughly commensurate with their share of retail sales.

For 2009, the POUs project to spend $152 million on energy efficiency programs, a 46 percent increase. LADWP is responsible for the majority of the increased projected spending, increasing from $36 million to $72 million dollars a 100 percent increase from

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[25] The largest POUs, or "big 15" are: Anaheim Public Utilities, Burbank Water and Power, Glendale Water and Power, Imperial Irrigation District (IID), Los Angeles Department of Water and Power (LADWP), Lodi Electric Utility, Modesto Irrigation District (MID), City of Palo Alto, Pasadena Water and Power, Redding Electric Utility, Riverside Public Utilities, Roseville Electric, Silicon Valley Power, Sacramento Municipal Utility District (SMUD), and Turlock Irrigation District. Staff concentrates on these utilities because they comprised 96 percent of the efficiency savings in 2008.

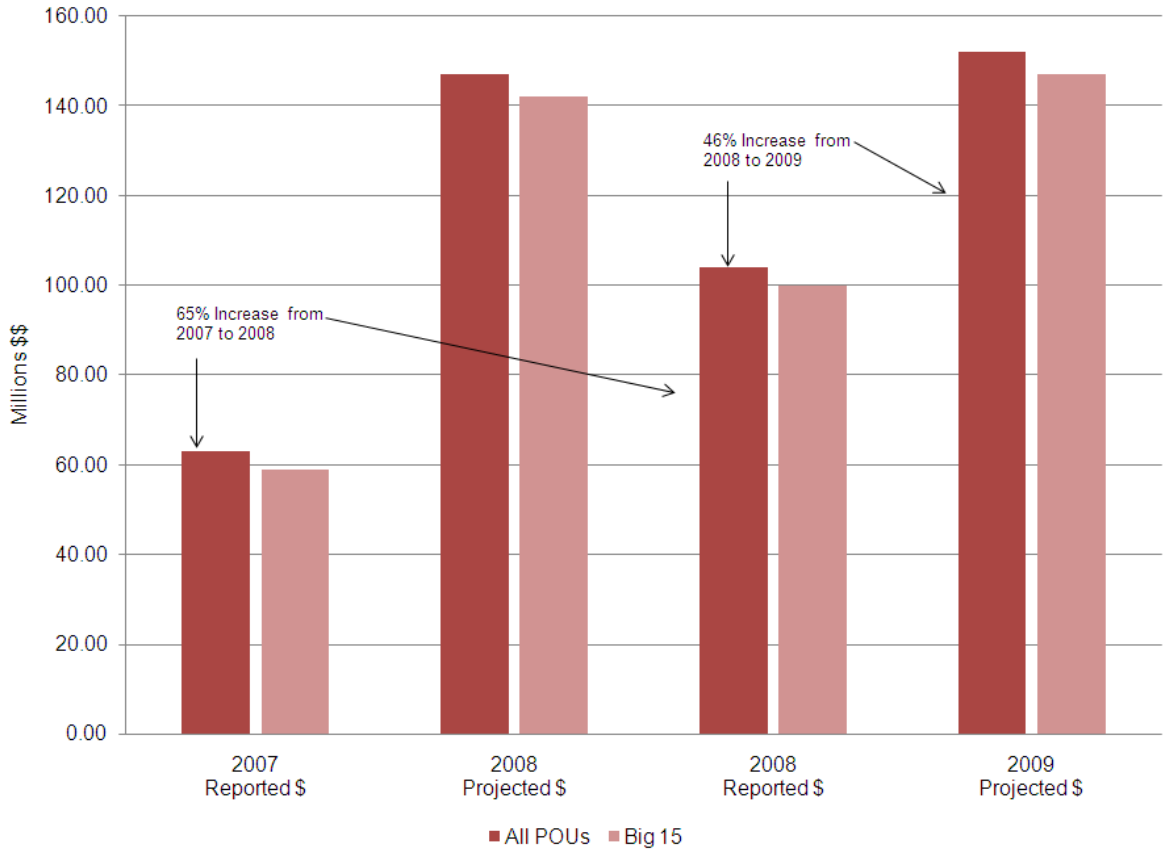
[26] California Energy Commission, *Achieving All Cost-Effective Energy Efficiency for California,* Final Staff Report, CEC-200-2007-019-SF, December 2007.

[27] CMUA, *Energy Efficiency in California's Public Power Sector: A Status Report,* March 2009

[28] AB 2021(Levine, Chapter 734, Statues of 2006), Section 3(f), amends Section 9615 of the Public Utilities Code.

2008 to 2009. **Figure 1** illustrates the reported and projected energy efficiency expenditures for 2007 through 2009, and the supporting data is contained in Appendix **Table A-1**.

Figure 1: POUs' Reported and Projected Energy Efficiency Expenditures for 2007-2009



Sources: California Municipal Utilities Association, *Energy Efficiency in California's Public Power Sector*: *A Status Report*, March 2009.

One measurement of a utility's commitment to energy efficiency is the amount of program expenditures relative to a utility's total revenue. In 1996 the Legislature mandated a variable minimum percentage of that POUs should collect through the PGC.[29] The POUs spent an

[29] AB 1890 (Peace, Chapter 854, Statutes of 1996) , Chapter 2.3, Article 8. The PGC is added to customer utility bills to cover costs related to "public interest" activities which include energy efficiency. The PGC funds allocated to energy efficiency by the POUs are intended to be equivalent to that allocated by the IOUs. See AB 1890 (Peace, Chapter 854, Statutes of 1996, Ch. 2.3, Article 8). For a discussion of PGC spending for energy efficiency by POUs, see Natural Resources Defense Council, *A Review of Public Benefits Investment Information Available From California's Consumer-Owned Electric Utilities*, February 23, 2005.

average of 1.3 percent of their total revenues on energy efficiency programs in 2008, a slight increase from 2007.[30] **Figure 2** illustrates the range of this measure for the POUs in 2008. The most significant increases in energy efficiency spending as a percentage of utility expenditures came from Azusa, LADWP, Needles, Redding, Silicon Valley Power, SMUD, and Truckee Donner. For these utilities the average increase in energy efficiency spending was 73 percent for one year.[31]

The primary source of funding for POU energy efficiency programs is the PGC which was created by the Legislature during electric industry restructuring in 1996. In some instances, local governing boards have allocated energy efficiency spending beyond the PGC using general fund and sometimes specifically targeting "procurement" funds; i.e., what would be characterized as deferring generation purchases. [32]

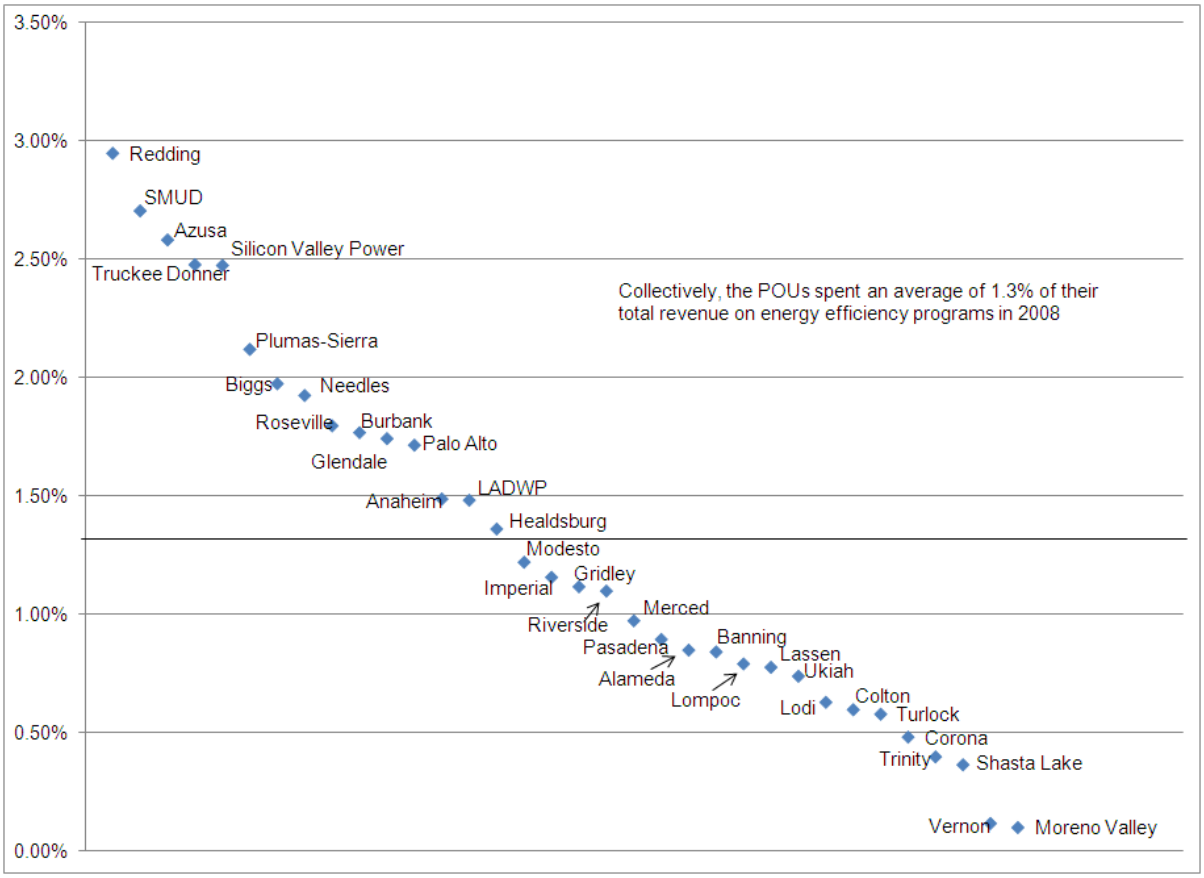
Subsequent to last year's AB 2021 progress report, the POUs were specifically requested to identify in their next report the use of funds other than PGC allocated to energy efficiency. Two utilities, Modesto Irrigation District (MID) and Alameda Municipal Power, have budgeted procurement funds for some portion of their total spending on energy efficiency programs in 2008 - 2009. In 2008 MID funded their energy efficiency programs with approximately 58% ($2,100,000) coming from PGC and 42% ($1,492,000) from their power procurement budget. Alameda Municipal Power has budgeted $552,195 for their energy efficiency programs in 2009 of which 91% ($502,195) is from PGC and 9% ($50,000) is from their power procurement budget.

[30] Revenue data from EIA-861-Annual Electric Power Industry Report File 2; augmented with data from *SCPPA 2007-2008 Annual Report, 2007-2008 NCPA Annual Report*, Sacramento Municipal Utility District, *2007 Annual Report.*

[31] The average excluded the outlier, city of Needles, which increased its efficiency spending from $2,600 to $165,000 in this time frame.

[32] CMUA, *Energy Efficiency in California's Public Power Sector: A Status Report*, March 2009, page 19.

Figure 2: POUs' Energy Efficiency Spending as Percentage of Revenue (2008)



Sources: California Municipal Utilities Association, *Energy Efficiency in California's Public Power Sector*: *A Status Report*, March 2009. EIA-861- Annual Electric Power Industry Report. File 2.

POUs' Electric Energy and Peak Savings[33]

POUs' expenditures resulted in an increase in reported energy efficiency savings.[34] In 2008, the POUs collectively provided 402 GWh of electric energy savings, which is a 58 percent increase from 2007. In 2007, the POUs projected their energy savings would be 541 GWh in 2008. The 2008 reported savings are roughly 26 percent less than the 2007 projection and 34 percent less than their AB 2021 adopted targets (See **Figure 3**).

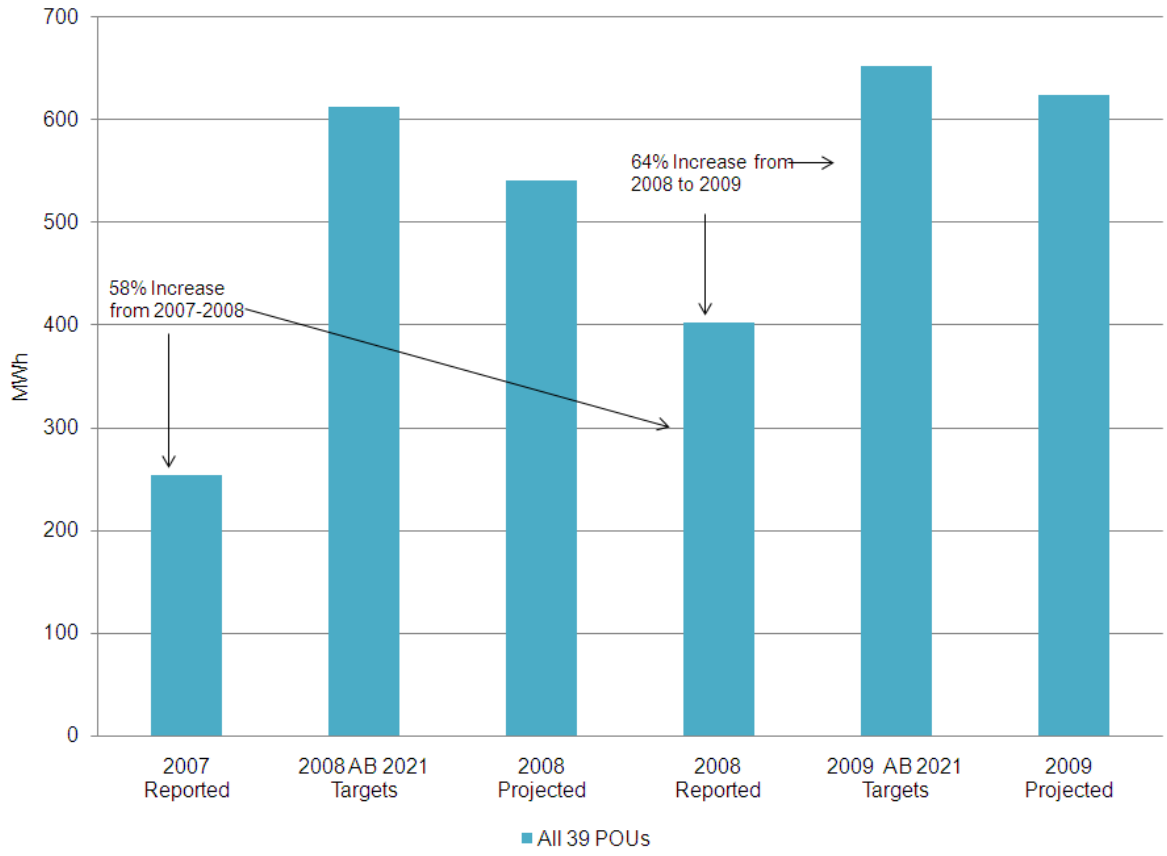
Of the 39 POUs, the largest 15 POUs collectively provided 96 percent of annual energy savings in 2008. SMUD and LADWP together provided 57 percent of all POU annual energy savings. To meet the 2009 adopted targets, POUs must achieve an increase of 64 percent

[33] As noted in the Introduction, these POU savings are self-reported; they have not been adjusted as a result of measurement and verification studies.

[34] POUs report electric savings only. City of Palo Alto is the only POU that serves natural gas; there were no reported gas savings in 2009.

from their 2008 reported savings to the 2009 adopted targets. Opportunities for the POUs to achieve these 2009 targets will be discussed in the Staff Assessment section of this report.

Figure 3: POUs' Reported and Projected Electric Energy Savings Relative to AB 2021 Adopted Targets (MWh)

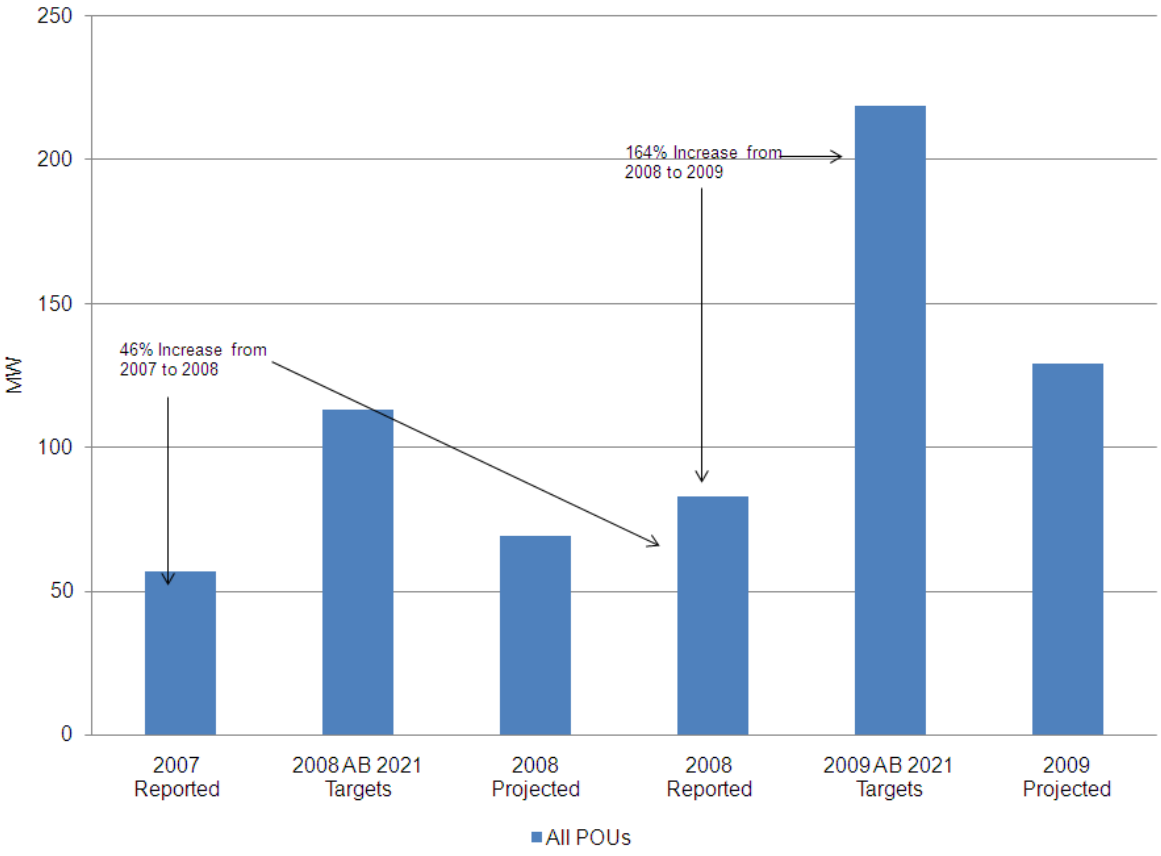


Sources: California Municipal Utilities Association, *Energy Efficiency in California's Public Power Sector*: *A Status Report*, March 2009 for the publicly owned utilities; and California Energy Commission, *Achieving All Cost-Effective Energy Efficiency for California*. CEC-200-2007-019-SF, December 2007.

In 2008, POUs collectively provided 83 MW of electric peak savings, which is a 46 percent increase from 2007. **Figure 4** illustrates a projected peak savings of 69 MW in 2008. The 2008 reported savings are roughly 20 percent higher than this 2007 projection, indicating an earlier underestimation of savings. The 2008 reported savings are 36 percent of their AB 2021 adopted targets. More than half of POUs' total *2008 adopted target* for peak energy was represented by LADWP, which continued to ramp up its peak savings programs in 2008. Over the last year, SMUD and LADWP together recorded 76 percent of all POU annual peak savings. The four utilities with the greatest peak savings are SMUD, LADWP, Anaheim, and Imperial Irrigation District; together they account for 75 percent of the 2008 peak savings. Despite this year's success, for POUs to meet the 2009 adopted peak targets,

they must achieve an increase of 164 percent from their 2008 reported peak savings. Opportunities for the POUs to achieve these 2009 targets will be discussed in the Staff Assessment section of this report.

Figure 4: POUs' Reported and Projected Annual Peak Savings Relative to AB 2021 Adopted Targets (MW)



Sources: California Municipal Utilities Association, *Energy Efficiency in California's Public Power Sector:* A Status Report, March 2009; and California Energy Commission, *Achieving All Cost-Effective Energy Efficiency for California*, CEC-200-2007-019-SF.

By customer sector, programs for commercial and industrial (non-residential) customers contributed more than half of the efficiency energy savings for POUs. The energy end use that continued to dominate POU portfolios is residential and non-residential lighting (see Appendix **Table A-3 and Table A-4**). Lighting provided 63 percent of annual energy savings and more than half of all peak savings in 2008, roughly unchanged from last year. Typical program options include compact fluorescent lighting (CFL) distribution for both residential and small commercial customers.

Residential and non-residential air conditioning is the next most significant end use savings, contributing 20 percent of the annual energy savings and 28 percent of the peak savings.

Some of the typical programs providing these savings include air conditioner rebates and refrigerator recycling or exchange programs.

Demand Response and Smart Grid Activities

AB 2021 requires that POUs first meet their unmet resource needs through all available energy efficiency and demand reduction resources that are cost-effective, reliable, and feasible. As noted in Appendix **Table A-5**, 17 POUs have or intend to implement a demand response program. The use of demand response programs is generally tied to the size of the utility. In general, large utilities have such programs while smaller utilities do not.

There is an increasing focus within the public power community on the Smart Grid and the deployment of Advanced Metering Infrastructure (AMI). While most demand response programs are targeted at commercial customers, AMI technologies (that is, smart meters) will enable residential customers to be better served by both energy efficiency and demand response programs. The smart meter may eventually communicate with appliances and thermostats within homes or business. These devices may receive price and emergency signals from the utility and will be programmed to respond in a way compatible with consumer's needs and schedules. This will greatly facilitate the ability for customers to use energy efficiently and control their energy costs. While only a handful of POUs have taken steps toward smart grid technologies, it is conceivable that more may follow as a result of the American Recovery and Reinvestment Act (ARRA) which has dedicated $4.5 billion for smart grid development in the United States.

As a case study, SMUD is planning for a full deployment of their advanced metering infrastructure by 2012. In addition, SMUD is developing a comprehensive suite of energy efficiency, renewable energy, and dispatchable and price demand response programs. This umbrella program involved marketing, research, development, and implementation strategies. Pilot programs are underway to investigate critical peak pricing, air conditioning load management using programmable communicating thermostats, zero net energy homes, along with a full suite of residential and commercial energy efficiency programs.

POU Progress in Measurement and Verification

The POU community made remarkable progress in efficiency program evaluation over the last year. As part of the POUs' annual report to the Energy Commission, they are required to submit (1) the methods and input assumptions used to determine cost-effectiveness, and (2) the results of an independent report that measures and verifies the energy efficiency savings and demand reductions of their energy efficiency programs. POUs are in the early stages of developing common measurement and verification (M&V) methods and tools for this purpose. Although the utilities have had some savings and cost-effectiveness

measurement tools since 2005, the 2009 CMUA report contains data from the first independent evaluations of POU efficiency programs.[35]

POUs developed the E3 Energy Efficiency Reporting Tool[36] to calculate efficiency savings and measure cost-effectiveness of their efficiency program portfolios. The E3 Tool standardized quantification methods to estimate energy and peak reductions from efficiency programs. The E3 Tool foundations are the 2005 Database for Energy Efficient Resources (DEER) and 2005 IOU "work papers"[37] which provide program details mandated by the CPUC. The E3 Tool is very important to efficiency program planning and evaluation because its assumptions translate program activities into savings measured in kilowatt-hours (KWh) and kilowatts (KW) that are at the core of the independent program evaluations.

Evaluation *plans* are the critical first step to outline the approach a POU will take to evaluate its entire efficiency portfolio of programs; the plan identifies what evaluation *studies* will be done and on what schedule. Evaluation *studies* execute measurement and verification for specific programs. Over the last year 11 POUs completed an efficiency evaluation plan.[38] These utilities include members of Northern California Power Agency (NCPA) that contracted with an independent party to perform these evaluations in early 2008. For the most part these plans anticipated evaluations of specific programs in 2008 (July 2007–June 2008). In April 2009, Southern California Public Power Authority (SCPPA) awarded a contract for the development of evaluation plans for its members in Southern California.

Of the Northern California POUs with 2008 M&V plans, a number of POUs followed up and completed actual evaluation studies on specific programs by April 2009. SMUD also completed several program M&V studies over the last year. SMUD evaluates their programs on a continuous basis. Ultimately, all of its major programs will be evaluated at fixed intervals two to four years apart through 2017. This work will be funded by approximately 3 percent of its total energy efficiency budget.[39] LADWP has retained a third-

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[35] Many utilities have had procedures in place to track and verify program participants for the payment of efficiency program rebates.

[36] The E3 Reporting Tool was developed by two consultants, E3 and KEMA, in 2005-2006 specifically for the POUs. It is a spreadsheet model using mainly default assumptions that estimates utility-level energy and demand savings and benefit cost tests (using total resource cost and other tests) at the efficiency end-use level.

[37] IOU "workpapers" that provide detailed savings estimations (assumptions and algorithms) were filed with their efficiency portfolio applications to CPUC for program years 2004-2005.

[38] These POUs are City of Biggs, Gridley Municipal Utility, City of Healdsburg Municipal Utility, Lassen Municipal Utility District, Lodi Electric Utility, City of Lompoc, Plumas-Sierra Rural Electric Cooperative, Roseville Electric , Silicon Valley Power, Turlock ID, and Ukiah Public Utility.

[39] M&V expenses for POUs are not broken out from a budget category that includes marketing, M&V, and administrative costs. Utility incentives and direct install costs are reported separately.

party contractor to prepare M&V studies for its 2006-2008 programs; results are expected in the summer of 2009.

Efficiency evaluation plans have two objectives:

- Identify evaluation priorities in an efficiency portfolio.
- Determine which process and impact M&V methods should be applied for each program.

Process evaluation assesses program procedures, marketing to prospective participants, and delivery mechanisms such as rebates or other incentives. A process review may evaluate the selection of program measures and recommend the inclusion of a new product or elimination of one that no longer needs program incentives to get into the market. [40] Objectives of process evaluation include:

- Improving procedures that lead to increased program participation.
- Improved data collection.
- Improving program cost-effectiveness through the reduction of free ridership.

Impact evaluations assess energy and demand savings and cost-effectiveness of a program. Impact evaluation includes:

- "Paper trail" verification that efficiency actions were, in fact, taken.
- Telephone or on-site inspection.
- Analysis of the savings which includes a review of deemed savings or verification of savings through metering or billing (energy usage) data.

Ultimate choices are always subject to available budgets and how soon results are needed.[41] Impact evaluation priorities target programs with:

- The greatest energy and demand savings relative to the overall portfolio.
- The greatest uncertainty in savings measurements.

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[40] Program participants who receive rebates for energy efficiency products that they would have purchased anyway are known as "free riders." Free ridership is high with products that already have a high market acceptance and are widely available. Paying program incentives to "free riders" is seen as a waste of program funds. The terms "net and gross" savings are frequently used in evaluation literature. Savings are considered gross until adjustments for free riders (and other effects) are calculated. Adjusted savings are "net" of all effects.

[41] For a more complete description of these methods, see *Model Energy Efficiency Program Impact Guide*, National Action Plan for Energy Efficiency, USEPA, December 2007; and, *The California Evaluation Framework*, prepared for the CPUC, Tecmarket Works, June 2004.

Ex ante savings (pre-verification saving impacts estimates) are known as "deemed"; that is, based on engineering and behavioral assumptions. Impact evaluation methods are designed to test these assumptions and update deemed savings with more accurate "real-time" measurements. The resulting *ex post* savings are the true measure of efficiency program savings and their value as a utility resource.

In 2007–2009 POU efficiency portfolios, non-residential lighting and HVAC measures typically comprise the largest portion of all savings. Ex ante savings for lighting tends to be relatively straightforward because lighting equipment has standardized wattages. The wild card in lighting savings is the hours of operation where inaccurate data can significantly distort ex ante savings estimates. Savings for HVAC equipment are based on building simulation models with input data that may be very different from actual conditions at any given customer site. Given these considerations, most of the 2008 POUs' M&V plans contained these typical recommendations:

- Process review of database tracking systems to ensure the collection and accessibility of relevant information (such as lighting hours of operation) for M&V purposes.
- Review of measures in residential portfolio to determine which measures (notably appliances) could be added and which could be eliminated due to high free ridership.
- Verification of efficiency equipment installations through review of applications (paper trail), telephone, or on-site visits.
- Verification of savings of a sample of program participants through a review of engineering assumptions to determine if deemed savings used are accurate given conditions in a POU.
- Verification of savings of a sample of program participants using metered data or billing analysis (less frequent).

POUs realize the value of these recommendations for their efficiency program success. Following up on the recommendations in their plans, POUs completed M&V studies over the past year for specific POU programs, resulting in conclusions on both process and electric (energy and demand) savings impacts.[42] A number of these studies began with a review of POUs' database tracking systems for efficiency programs. An objective was to assess if data collection and subsequent accessibility to data was conducive to evaluation. Many studies also contained a process review of the suitability of measures that comprised the residential programs. A few rebate and distribution measures were recommended for elimination because they had high free ridership; these included both dishwashers and

[42] M&V studies were completed for the following POUs: Lodi Electric Utility, City of Lompoc , City of Palo Alto, Port of Oakland, Redding Electric Utility, Roseville Electric, Silicon Valley Power, SMUD (3 studies), Turlock Irrigation District, and Truckee Donner Public Utility District.

screw-in CFL distribution measures in different utilities.[43] On the other hand, it was found that certain measures, such as Energy Star® HD-ready televisions and DVDs, TV converter boxes, programmable thermostats, and residential water heaters should be added to the rebate programs.[44]

Impact evaluations to determine if reported savings were realized were completed on a number of retrofit/rebate programs. Residential program measures included lighting, HVAC, and refrigerator recycling; non-residential programs included lighting, HVAC, and process (variable speed drives and compressed air) measures. A typical approach to evaluating these programs included:

- A review of customer applications
- On-site inspection of a sample of sites to verify the installation of energy efficient equipment and real-time operations
- Review of engineering assumptions used to calculate ex ante savings. In most instances this level of rigor was considered sufficient.

For example, non-residential lighting retrofits, unless combined with other measures at the same site, were nearly always based on a sample of completed projects for which a review of ex ante savings algorithms and verification of installed fixtures either through on-site inspection or other contact with the customer would take place.

In few instances, in both residential and non-residential programs, methods included the metering of retrofit equipment using data loggers or statistical analysis of billing data to determine if a change in energy use could be detected. For example, in 2007 SMUD performed a study of residential air conditioning units using equipment metering and related performance testing methods.[45] While Silicon Valley Power's 2008 study of their non-residential custom projects analyzed metering and billing data from sites that contained multiple measures (lighting, HVAC, and process).[46]

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[43] On the other hand, another utility's impact evaluation showed a CFL distribution program with ex post savings exceeding ex ante savings by 5 percent. These differing results suggest a more in-depth review of evaluation methods will be needed for this measure over the next year.

[44]For these recommendations see Summit Blue Consulting, *Process Evaluation of Lodi Electric Utility's Efficiency Programs and Impact Evaluation of the Non-Residential Custom Program-Lighting and Appliance Rebate Program: FY 2007/08, Final Report,* prepared for Lodi Electric Utility, (no date).

[45] RLW Analytics, Inc., *Sacramento Municipal Utility District (SMUD), Residential HVAC Program Evaluation*, prepared for SMUD, March 31, 2008.

[46] Summit Blue Consulting, *Evaluation, Verification, and Measurement Study-FY 2007/08 Program for Silicon Valley Power (SVP),* prepared for SVP, March 20, 2009

The goal in any impact evaluation study is to determine how much of the planned ex ante savings are in fact realized over some period. The *savings realization rate* expresses this ratio of ex post/ex ante savings.[47] In the impact evaluation studies performed on POU programs over the last year or so, savings realization rates for measures were very high, frequently ranging from 85 to over 100 percent. In cases where specific program sites had low verified savings, there was usually a cause that could be readily identified.

Preparations for the 2010 Statewide Estimation of Energy Efficiency Potential and Revision of Energy Efficiency Goals

As noted in the Introduction section, AB 2021 mandates the Energy Commission to provide a statewide estimate of energy efficiency potential and goals every three years. The next update of the potential estimates and goals will be in 2010. Inputs to this process come from both the POUs and the IOUs. The POUs are required to identify all cost-effective electricity savings potential and establish savings goals based on that potential. Through CPUC energy efficiency proceedings, the IOUs also identify electricity and natural gas savings potential and set savings goals that they use for both efficiency program and resource planning. Both POUs and IOUs revisit their energy efficiency potential estimates and goals every three years; however, they do not do so in the same years.

Goal setting for the IOUs by the CPUC began in 2004 with D.04-09-060, which established goals for the years 2004-2016. These goals were not updated in 2007 as scheduled; however, a major energy efficiency potential update effort was undertaken. The IOUs produced the *2008 IOU Energy Efficiency Potential Study*, which identified all potentially achievable cost-effective energy savings. This study was used to establish interim targets in July 2008 for each IOU service territory for 2012 through 2020. These interim targets will be used by the IOUs for procurement planning in 2010; however, a goals revision must be completed before 2011 in order to allow the IOUs to incorporate the new goals into their energy efficiency portfolio planning process for 2012 through 2014. Impact evaluation studies from 2006-2008 programs and DEER updates are scheduled for March 2010; it is expected that the 2012-2020 goals update will occur soon thereafter. The CPUC concluded that the update must be completed by October 2010 for adequate portfolio planning lead time.

POUs are also required to identify all potentially achievable cost-effective electricity efficiency savings and to establish annual targets for energy efficiency savings and demand reduction over the next 10 years by June 1, 2007, and every three years thereafter. In support of this effort, the Northern California Power Agency (NCPA), in conjunction with the Southern California Public Power Authority (SCPPA), has issued a request for proposals on

[47] This realization refers to gross savings only. With few exceptions, free ridership rates or other adjustments were not calculated.

behalf of 37 of the POUs to retain a qualified consultant to prepare an energy efficiency potential study. Given the size and some of the relatively unique circumstances facing the two largest POUs, LADWP and SMUD, they will produce independent potential studies. LADWP will likely revise its efficiency targets in response to the current economic conditions and other factors while SMUD does not foresee any revision of its target goals. By July 31, 2010, all 39 POUs plan to file their revised energy efficiency potential estimates and proposed targets for 2010–2020.

Staff Assessment of POU Progress in 2008

POUs over the last year have made impressive strides to implement environmental initiatives in response to threats of global climate change. Integral to these initiatives in 2008 were significant steps taken by the POUs to surpass their 2007 expenditures and energy savings accomplishments. The CMUA March 2009 report outlines successful and innovative programs from many of the POUs.[48] The Energy Commission is required to make recommendations to the POUs, Legislature, and Governor if it determines that improvements could be made in the level of aggregate achievement by POUs or in the level of achievement by a specific POU. Analysis for these recommendations would be greatly helped by the POUs' provision of justifying documents for yearly fluctuations in efficiency expenditures and savings achievements. This request for information was made in staff's *Achieving Cost-effective Energy Efficiency for California: An AB 2021 Progress Report (*2007) and is noted again in this report's section on recommendations.

Energy Commission staff analyzed the 2008 data on efficiency program savings and expenditures relative to previous year accomplishments , projections and, as required by AB 2021, to adopted targets. Progress is considered reasonable if a POU comes within plus or minus 20 percent of its annual adopted target.[49] **Table 5** shows the 2008 results of this review. All but four of the largest POUs (Burbank, LADWP, Redding, and Riverside), had annual energy savings within 20 percent band of their adopted 2008 targets. (In 2007, only one-third of the largest POUs achieved savings in the 20 percent band.)

[48] CMUA, *Energy Efficiency in California's Public Power Sector: A Status Report*, March 2009, pages 2-6.

[49] California Energy Commission, *Achieving All Cost-Effective Energy Efficiency for California*, CEC-200-2007-019-SF, December 2007.

Table 5: POU Reported 2008 Energy Savings (MWh)
Compared to Targets and Performance Range

Utility	2008 Target	Target Minus 20%	2008 Reported Savings	Target Plus 20%
Anaheim	16,117	12,894	16,808	19,340
Burbank	11,307	9,046	8,719	13,568
Glendale	11,586	9,269	13,548	13,903
Imperial	29,000	23,200	30,644	34,800
LADWP	315,000	252,000	115,519	378,000
Lodi	2,000	1,600	3,091	2,400
Modesto	13,586	10,869	16,123	16,303
Palo Alto	2,800	2,240	4,399	3,360
Pasadena	10,000	8,000	8,164	12,000
Redding	2,803	2,242	1,640	3,364
Riverside	22,640	18,112	7,260	27,168
Roseville	8,716	6,973	9,314	10,459
Silicon Valley Power	25,762	20,610	24,509	30,914
SMUD	107,000	85,600	114,662	128,400
Turlock	7,271	5,817	10,937	8,725
Total	**585,588**	**261,322**	**385,335**	**391,984**

Source: Energy Commission staff.

Reviewing the savings projections for these utilities into 2009 is also illustrative. In **Table 6** projected changes in savings accomplishments from 2008 are noted for the 15 largest POUs. Large increases are anticipated for Pasadena (111 percent) and LADWP (137 percent). Pasadena is expecting increased participation in two program areas, residential lighting and non-residential cooling.[50] In the case of LADWP, their shortfall in 2008 was stated as a result from a delay in the rollout of their CFL Distribution Program, which did get underway in 2009. A primary reason that Redding fell short of its 2008 targets (and expects to do so in 2009) is lackluster activity in their commercial lighting program. Redding intends to evaluate modifying the incentive levels in key programs to increase participation. While Burbank is not projecting a large savings increases in 2009, they are expanding their low-income refrigerator exchange program and partnering with the Southern California Gas

[50] Pasadena's "Power of 10 Challenge" challenges customers to replace at least 10 of their incandescent lights with CFLs. Their non-residential "Energy Efficiency Partnering Program" provides rebates for cooling technologies among other items. There is also a non-residential direct install program featuring HVAC cycle management.

Company in a residential home audit and retrofit program, "Home House Call," to boost participation in 2009-2011.

Four utilities project a decrease in 2009 energy savings, the *largest* changes are expected by Lodi (-75 percent), Modesto Irrigation District (MID) (-57 percent), and Roseville (-30 percent). Lodi cites the slow economy's impact on customer spending and "market saturation" due to high customer participation in programs since 1996. MID's savings in 2007 included large industrial projects that did not reoccur in 2008. Roseville expects lower savings relative to last year (2008) due to slow economic conditions. Savings were also higher in 2008 than are expected in 2009 because of a large industrial rebate last year that will not reoccur in 2009.

While the POUs are planning to increase their efficiency budgets by 48 percent in 2009, these plans could ultimately be jeopardized by two conditions: 1) shrinking city and utility budgets that may affect energy efficiency program funding; and, 2) customers reluctant to make energy efficiency investments. The prevailing economic downturn is especially challenging for the smallest POUs that may be dependent upon a small number of large commercial or industrial accounts for a major portion of their savings.

Table 6: Projected Increases and Decreases in Annual Energy Savings by Large POUs for 2008–2009

Utilities	2008 Projected Savings MWH	2008 Reported Savings MWh	2009 Projected Savings MWh	2009 Projected Savings Compared to 2008 Reported Savings
Anaheim	15,231	16,808	25,712	53%
Burbank	8,005	8,719	8,275	-5%
Glendale	12,324	13,548	12,386	-9%
Imperial	30,080	30,644	37,500	22%
LADWP	275,088	115,519	273,682	137%
Lodi	2,900	3,091	773	-75%
Modesto	6,556	16,129	6,942	-57%
Palo Alto	2,694	4,399	4,619	5%
Pasadena	5,895	8,164	17,258	111%
Redding	2,815	1,640	2,802	71%
Riverside	11,020	7,260	12,189	68%
Roseville	7,751	9,314	6,528	-30%
Silicon Valley Power	23,176	24,509	26,350	8%
SMUD	107,000	114,662	155,832	36%
Turlock	9,371	10,937	12,592	15%
Total	519,906	385,343	603,440	56%
Total excluding LADWP	244,819	286,400	329,758	
Total excluding LADWP and SMUD	137,819	171,738	173,926	

Source: California Energy Commission staff, California Energy Commission, *Achieving All Cost-Effective Energy Efficiency for California*, Final Staff Report, CEC-200-2007-019-SF, December 2007, California Municipal Utility Association (CMUA), *Energy Efficiency in California's Public Power Sector: A Status Report.* March 2009.

Of the large increases in savings that were reported in 2008 and are projected for 2009, a very high percent are the result of expanding residential and small commercial lighting. As noted last year, CFL distribution programs are popular with all utilities. While these estimated savings appear to be extremely cost-effective, the verified savings of similar lighting program designs are proving to be less than expected, as demonstrated in two

recent evaluation studies for the CPUC.[51] This issue highlights the necessity for rigorous M&V activities in this particular program area.

Staff highly commends many POUs for the enthusiastic initiation of evaluation plans and studies. There is definitive progress being made with most of the Northern California POUs having completed evaluation plans in 2008, and the Southern California POUs implementing evaluation plans in 2009–2010. Acting upon the recommendations in evaluation reports can be extremely important to the long-run success of the POU efficiency programs. Especially for POUs with new programs, efficiency program evaluation can lead to substantially greater savings in the future than would be realized without the program adjustments made based on M&V results.

The value of energy efficiency as a real POU resource is reflected in measures of program cost-effectiveness relative to other utility options.[52] In their 2009 CMUA report, the POUs included the Total Resource Cost (TRC) test for each utility's portfolio.[53] The average TRC was 3.31, implying that every program dollar resulted in more than three dollars of societal benefits. This result slightly exceeded the TRC metric for 2007. For all POUs, only the smallest (with the exception of Redding) had portfolio TRC below 2.0. The largest 15 POUs had cost effective program portfolios averaging a TRC of 3.5 with ranges from 5.9 (Lodi) to 1.84 (Redding). While the extreme outliers should be investigated, it is very likely in most utilities' interest to expand their energy efficiency program using utility funding beyond their PGC allocation. As noted earlier in this report, this issue has been of continuing concern. In the 2009 CMUA report, the POUs provided information on the percentage of their revenues spent on energy efficiency which demonstrated a slight increase. Two POUs provided some evidence of efficiency program spending beyond PGC funding. These are steps in the right direction.

The POUs have been responsive to AB 2021 during 2008 and in their planning for 2009 and beyond. Despite California's currently depressed economic climate, most POUs expect to increase their energy efficiency spending and, therefore increase energy savings. They expect to aggressively pursue "continuous improvement" through M&V activities that will add value to the energy efficiency resource.

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[51] Itron, Inc., *2004-2005 Statewide Residential Retrofit Single-Family Energy Efficiency Rebate Evaluation Report*, October 2007; CADMUS Group, *Residential Retrofit Contract Group First Draft Verification Report,* prepared for the CPUC, November 2008; Cadmus Group, *Compact Fluorescent Lamps Market Effects Interim Report,* prepared for the CPUC, January 2009.

[52]Availability of the E3 Reporting Tool "workpapers" from individual utilities would improve the evaluation of the cost-effectiveness of POU programs.

[53] Total Resource Cost (TRC) test is the most frequently used measure of the cost effectiveness of an energy efficiency program. The TRC ratio includes the identified benefits of the program such as avoided generation costs divided by the net costs, which include both the utility and participant costs. When the TRC test ratio is greater than 1.0 for a utility program (or portfolio of programs), it is deemed cost-effective for planning purposes.

Recommendations Regarding POU Energy Efficiency

Staff, POU representatives, and other parties have worked together on recommendations made in staff's 2007 AB 2021 report. The "overall" recommendations below contain an updated version of those earlier recommendations that need continued effort during 2009 – 2010.

Overall Staff Recommendations

- Energy Commission staff and publicly owned utilities should work together to understand the issues that individual utilities face that impact their efficiency expenditures and savings in 2009–2010. These include the impacts of economic conditions and the receipt of any ARRA funding earmarked for efficiency programs.
- In the *Achieving Cost-effective Energy Efficiency for California: An AB 2021 Progress Report* (December 2008) a request was made to the POUs for additional information to be supplied in the March 2009 CMUA report on the cause of yearly fluctuations in efficiency performance. Unlike the IOUs, POU savings can vary widely in either direction. The level of information in the March 2009 report was an improvement with the exception of some POUs. Staff and POUs need to develop a framework for soliciting and providing information that will explain year to year differences in savings accomplishments.
- Staff understands that the POUs will develop a table that documents historic and forecast total PGC funding amounts allocated to energy efficiency and to other programs, such as low-income, research and development, and renewables. This request was made by staff last year, and the POU response is still pending.
- As noted earlier in the report, the process for updating the efficiency potential estimates and targets required by AB 2021 is underway. New goals are due to the Energy Commission by June 1, 2010. Before that date the POUs and the Energy Commission staff should schedule regular meetings to discuss progress. A workshop should be scheduled to vet draft results.

Staff Recommendations for POU Efficiency Measurement and Verification

The work that has been initiated in POU efficiency program measurement and verification is responsive to AB 2021's directive regarding independent evaluations of efficiency programs. More importantly, 2009 M&V products have the promise of substantially improving program delivery, energy and demand savings, and future evaluation efforts. Looking to 2009-2010, Energy Commission staff makes the following recommendations.

- The source materials for the savings and cost-effectiveness model adapted for the POUs in 2006 have been updated. The Database for Energy Efficient Resources (DEER) was updated in May 2008 with revisions that should impact POU energy and demand savings estimates. The IOUs have also updated their work papers in the latest efficiency applications for the CPUC's 2009–2011 efficiency program planning cycle. These updates should be considered in a revision of the POUs' E3 efficiency planning model.
- Many POUs, especially in southern California, are just initiating their M&V plans and process reviews. In the early stages of programs, POUs are encouraged to work with evaluators to ensure the collection of data needed for evaluation is comprehensive. Impact evaluations will be impossible to perform without adequate information to measure the baseline conditions at customer sites.
- POUs with residential and small commercial CFL distribution programs which comprise a large portion of their annual efficiency savings should consider these for impact evaluation in 2009–2010. There has been considerable information generated on this topic in the IOU arena. To simplify the POU analysis, they should decide what IOU analysis they can apply and what data may be unique to their service areas. There is sufficient uncertainty in both recent POU and IOU CFL studies to warrant this evaluation priority.
- The POUs should consider the use of the California Measurement Advisory Council (CALMAC) for information on efficiency program evaluation.[54] The organization was created for use by the California IOU program evaluation community. Its value to POUs as a repository for evaluation studies and as a discussion forum should be explored by POUs and their representative association, California Municipal Utility Association (CMUA). Together they can decide on CALMAC membership.
- The greatest value of M&V to POUs, especially to smaller utilities, is the opportunity to improve program delivery and cost-effectiveness. It would be very helpful for the 2010 CMUA report to report on the ways in which the evaluation studies *completed for 2008-2009 programs* resulted in modifications of the efficiency portfolio and specific efficiency programs in 2009-2010. This should be a continuing feature of subsequent CMUA reports.

[54] California Measurement Advisory Council information is available at http://calmac.org.

Glossary

Acronym	Definition
AB 2021	Assembly Bill 2021
AMI	Advanced Metering Infrastructure
ARRA	American Recovery and Reinvestment Act
CALMAC	California Measurement Advisory Council
CEESP	California's Long-Term Energy Efficiency Strategic Plan
CFL	Compact fluorescent light
CMUA	California Municipal Utilities Association
CPUC	California Public Utilities Commission
DEER	Database of Energy Efficiency Resources
GWh	Gigawatt hour
HVAC	Heating, ventilation and air conditioning
IOU	Investor-owned utility
LADWP	Los Angeles Department of Water and Power
M&V	Measurement and verification
MID	Modesto Irrigation District
MMth	Million therms
MW	Megawatt hour
NCPA	Northern California Power Agency
PGC	Public Goods Charge
POU	Publicly owned Utility
RRIM	Risk Reward Incentive Mechanism
SCPPA	Southern California Public Power Authority
SMUD	Sacramento Municipal Utility District
TMG	Total Market Goals
TRC	Total Resource Cost
USEPA	United States Environmental Protection Agency

APPENDIX A: Data from Publicly owned Utilities

Table A-1: POU Reported and Projected Expenditures

15 Largest Utilities	2007 Reported ($000)	2008 Reported ($000)	2009 Projected Expenditures ($000)
Anaheim	2,046	3,655	5,546
Burbank	1,723	2,720	2,582
Glendale	2,886	2,947	2,694
Imperial	3,249	4,957	6,066
LADWP	12,550	35,942	71,976
Lodi	218	415	331
Modesto	2,154	3,139	1,351
Palo Alto	1,061	1,485	1,559
Pasadena	1,628	1,357	4,170
Redding	1,624	2,305	2,564
Riverside	1,945	2,739	2,830
Roseville	1,214	2,058	1,697
Silicon Valley Power	3,602	5,803	5,977
SMUD	21,938	28,965	35,609
Turlock	1,021	1,144	2,268
Total for 15 Utilities	60,000	100,000	148,000
Rest of Utilities (24)	3,623	4,277	4,901
Grand Total	**64,000**	**104,000**	**153,000**

Sources: California Energy Commission staff. California Municipal Utilities Association. *Energy Efficiency in California's Public Power Sector. A Status Report*, March 2009.

Table A-2: Smaller POUs Energy Efficiency Reported Savings Versus Targets (MWh)

Utility	2008 Target	Target Minus 20%	2008 Reported Savings	Target Plus 20%
Alameda	760	608	2135	912
Azusa	2084	1667	2352	2501
Banning	873	698	634	1048
Biggs	106	85	133	127
Corona	467	374	1583	560
Colton	2625	2100	23	3150
Gridley	92	74	24	110
Healdsburg	198	158	236	238
Hercules	136	109	79	163
Industry	0	0	0	0
Island Energy	178	142	102	214
Lassen	733	586	123	880
Lompoc	1121	897	304	1345
Merced	3619	2895	1871	4343
Moreno Valley	822	658	298	986
Needles	817	654	72	980
Plumas-Sierra	621	497	422	745
Port of Oakland	884	707	280	1061
Rancho Cucamonga	448	358	359	538
Shasta Lake	129	103	30	155
Trinity	0	0	12	0
Truckee Donner	1001	801	4456	1201
Ukiah	198	158	279	238
Vernon	0	0	935	0
Total	**17912**	**13830**	**16741**	**20744**

Sources: California Energy Commission staff: California Municipal Utilities Association. *Energy Efficiency in California's Public Power Sector*. *A Status Report*, March 2009.

Table A-3: Large POUs' Energy Efficiency Residential Programs

Utility	Air Conditioner/HVAC	HVAC Duct Testing / Maintenance	Check Me	CFL / Incentive / Distribution / Give Away	Energy Audit	Energy Star Appliance Rebates	Energy / Financial / Loans / Grants	Home Electronics	Lighting Incentive / Retrofit	Low Income Assistance	Online Services	Permit Wavier Fee	Pool / Pump	Refrigerator/Freezer Recycling Rebates	Refrigerator Exchange / Replacement	Residential Outreach / Education	Shade Tree	Solar/ Photovoltaic	Water Rebates /Survey's	Weatherization
Anaheim				xxx	xx	x	x			x	x	x					x		xx	x
Burbank	x		x	x							x			x	x		x			x
Glendale	x			xxx	x					xx				x	x		x		x	
Imperial	x	x			x	x	xx											xx		x
LADWP				x	x	x								x	x					
Lodi	x	x				x	xx													x
Modesto	x					x			x											x
Palo Alto											x				x					x
Pasadena	x			xx	x	x							x	x			x			
Redding	x	x			x	x			x											x
Riverside	x					xx				xx	x		x	x	x		x	x		x
Roseville	x				x					xx	x			x			x			
Silicon Valley Power				x	x	x								x				x		x
SMUD	x				x	x		x	x				x				x			x
Turlock (TID)	x				x	x			x	x				x			x			x

The "X" represents the number of programs for each measure.

Table A-4: Large POUs' Energy Efficiency Non-Residential Programs

Utility	Air Conditioner/HVAC	CFL / Incentive / Give Away	Chillers / Compressors/ Cooling Towers	Demand Side Management	Education / Outreach	Energy Audit / Incentives	Energy Efficiency Technologies	Energy Efficient Exit Signs	Energy Star Rebates	Energy / Financial / Loans	HVAC / New Cooling	Heat Pump Rebates	Large Business Energy	Leadership Energy and Environmental Design Cert	Lighting Savings / Rebates	Low / Senior Income	Metering	New Construction Design	New Construction Rebates / technical Assistance	Online Services	Permit Waiver	Public Facilities Lighting Retrofit	Pumps / Motors Replacement	Refrigeration Rebates	Refrigeration Retrofit or Replacement	School / Education	Retrocommissioning (RCx)	Shade Tree	Small Business Energy	Solar/ Photovoltaic	Water Rebates	Weatherization
Anaheim	x					x		x		x		x			xx	x		x	x		x	x	xx		x				x		xx x	
Burbank	x													x														x				
Glendale	x x					x x							x													x			xx x			
Imperial	x			x		x			x									x								x						
LADWP	x					x	x			x								x	x										x			
Lodi	x					x									x								x			x				x		
Modesto	x		x												x								x		x						x
Palo Alto	x														x					x			x			x						
Pasadena	x					x	x							x																		
Redding															x										x							
Riverside	x				x	x	x x				x				x			x				x x	x			x		x		x		
Roseville																		x	xx			x x x				xx xx						
Silicon Valley Power	x		x			x	x							x	x			x	x			x	x		x					x		
SMUD	x x									x					x			x	xx						x		x					
Turlock (TID)						x									x		x							x		xx	x					

Table A-5: POUs with Demand Response Programs

Utility	Demand Reduction Programs			
	Peak Load Reduction Program(s)	Municipal Load Reduction	HVAC Load Shifting Through Thermal Storage	Smart Grid/AMI Program(s)
Anaheim	X	X	X	Planned
Azusa	X			
Burbank			X	
Glendale	X			Planned
Gridley	X			
Imperial ID	X			
LADWP	X		Planned	
Lompoc	X			
Modesto ID	X			Planned
Palo Alto	x			
Pasadena	Pilot Program			
Redding			X	
Riverside	X			
Roseville	X			Planned
SMUD	X			Planned
Silicon Valley	X			
Turlock ID				X

Source: CMUA , *Energy Efficiency in California's Public Power Sector: A Status Report*, March 2009

Table A-6: POUs with Measurement and Verification Studies 2008-2009

Utility	Most Recent Evaluation, Verification, and Measurement Studies
Lodi	Evaluation and Impact Evaluation of Non-Residential Lighting and Appliance Rebate (November 2008)
Lompoc	Evaluation, Verification, and Measurement Study of Refrigerator and Freezer Replacement Programs (March 2009)
Palo Alto	Evaluation, Verification, and Measurement Study of Efficiency Programs (February 2009)
Port of Oakland	Evaluation, Verification, and Measurement Study of Non-Residential Lighting Efficiency Program (February 2009)
Redding	Evaluation, Verification, and Measurement Study of Efficiency Programs (March 2009)
Roseville	Process and Impact Evaluation of Roseville Electric's Residential New Construction, HVAC Retrofit, and Commercial Custom Rebate Programs for 2008 (February 2009) Prepared by Morrison Energy Services
Silicon Valley Power	Evaluation, Verification, and Measurement Study of Efficiency Programs (March 2009)
SMUD	• Evaluation of Residential HVAC Program (March 2008) Prepared by RLW Analytics • Measure and Verify Savings of Refrigerator Recycling Program (May 2007) Prepared by ADM Associates • Evaluation of Prescriptive Lighting Program (November 2007) Prepared by ADM Associates
Turlock ID	Evaluation, Verification, and Measurement Study of Efficiency Programs (March 2009)
Truckee Donner	Evaluation, Verification, and Measurement Study of Efficiency Programs. Prepared by Robert Morris & Assoc. (February 2009)

All reports were prepared by Summit Blue Consulting unless otherwise noted.
Source: Northern California Power Agency (NCPA) Website: http://www.ncpa.com/energy-efficiency-m-v-reports-2.html.