ENERGY EFFICIENCY

in California's Public Power Sector

A 2014 Status Report

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TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

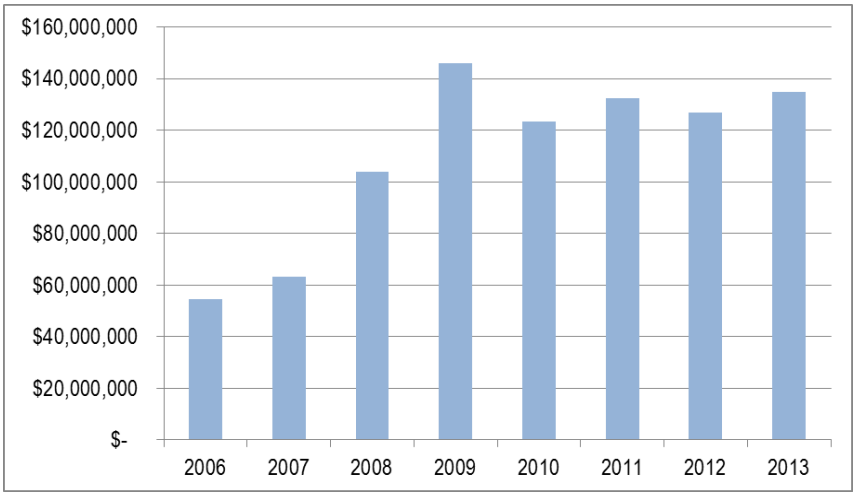
The California Municipal Utilities Association (CMUA), in collaboration with the Northern California Power Agency (NCPA) and the Southern California Public Power Authority (SCPPA), are pleased to submit this report, *Energy Efficiency in California's Public Power Sector: A 2014 Status Update.*

California Senate Bill 1037 (Kehoe, 2005) established several important policies regarding energy efficiency, including a statewide commitment to cost-effective, reliable, and feasible energy efficiency, with the expectation that all utilities consider energy efficiency before investing in other resources to meet growing demand. Assembly Bill 2021 (Levine, 2006) added to these policies by requiring the establishment of 10-year energy savings targets on a triennial basis; Assembly Bill 2227 (Bradford, 2012) amended the requirement to a quadrennial basis. Publicly owned utilities (POUs) support these policies and partner with state agencies and community stakeholders to pursue all cost-effective and feasible energy efficiency.

CMUA, NCPA, and SCPPA have been working collaboratively since October 2005 to measure energy efficiency program effectiveness and report program savings in a consistent and comprehensive manner. In December 2006, the first joint report on energy efficiency was submitted to the California Energy Commission (CEC). This eighth report takes into consideration the latest available results from public power's wide range of energy efficiency programs.

POU's long-standing commitment to energy efficiency is an extension of fundamental principles dedicated to social and environmental responsibility, ensuring reliability, and keeping rates low for the communities they serve. Even with this commitment, energy efficiency program expenditures for each utility can vary dramatically from year-to-year, depending upon the customer base of the individual utility, the climate zone in which the utility is located, physical size of the service territory, customer desires to invest in energy efficiency, and economic conditions. Despite these challenges, public power energy efficiency investments have remained very strong surpassing $120 million annually since 2009.

Total Program Expenditures, 2006-2013



Energy Efficiency Program Results

The principal findings and conclusions of this analysis for FY12/13 are as follows:

- **Significant Investment:** POUs spent $134.5 million on energy efficiency programs. This is the sixth consecutive year the $100 million threshold has been exceeded.
- **Peak Demand Reduction:** Public power programs reduced peak demand by more than 89.3 megawatts.
- **Energy Savings:** Net annual savings totaled more than 521,478 (MWh).
- **Years of Success:** Since 2006, POUs have invested nearly $885 million in energy efficiency programs, reduced peak demand by more than 656 megawatts, and achieved more than 3.4 million MWh in savings.

Summary of Programs, 2006-2013

Year	Net Peak kW Savings	Net Annual MWh Savings	Net Lifecycle MWh Savings	Total Utility Expenditures ($)
FY05/06	52,552	169,303	2,249,214	$ 54,412,728
FY06/07	56,772	254,332	3,062,361	$ 63,151,647
FY07/08	82,730	401,919	4,473,801	$ 103,907,266
FY08/09	117,435	644,260	6,749,912	$ 146,093,107
FY09/10	93,712	522,929	5,586,299	$ 123,433,250
FY10/11	81,121	459,459	4,604,364	$ 132,372,795
FY11/12	82,561	439,710	4,638,521	$ 126,936,631
FY12/13	89,305	521,478	5,722,100	$ 134,475,230
TOTAL	**656,187**	**3,413,390**	**37,086,572**	**$ 884,782,654**

- **Cost-Effectiveness:** Applying the Total Resource Cost (TRC) societal test, the principal measure used in the industry to determine whether programs are cost-effective, the aggregated TRCs for public power is 1.72 in FY12/13.
- **Most Savings:** Lighting continues to dominate public power energy efficiency programs, accounting for almost half of the total energy savings achieved (46%).
- **Efficacy of Programs:** The average cost per kWh saved from all POU programs is $0.258/kwh. The cost per kWh saved over the lifetime of the various energy efficiency measures is $0.024/kWh.

II. INTRODUCTION

Legislative & Statutory Requirements

Three pieces of legislation govern the compilation of this report. Senate Bill 1037 (Kehoe, 2005), requires POUs to annually report to its customers and the CEC on its investments in energy efficiency and demand reduction programs. Assembly Bill 2021 (Levine, 2006) directs POUs to identify all potentially achievable cost-effective, reliable, and feasible electricity efficiency savings and establish 10-year statewide energy efficiency savings targets. Assembly Bill 2227 (Bradford, 2012) changed the frequency of the energy efficiency 10-year target setting requirements from once every three years to once every four years.

In particular, this report is provided to the CEC in compliance with §9505 of the Public Utilities Code:

> *9505. (a) By March 15, 2013, and by March 15 of each year thereafter, each local publicly owned electric utility shall report to the Energy Commission and to its customers all of the following:*
>
> *(1) Its investments in energy efficiency and demand reduction programs.*
>
> *(2) A description of each energy efficiency and demand reduction program, program expenditures, cost-effectiveness of each program, and expected and actual energy efficiency savings and demand reduction results that reflect the intent of the Legislature to encourage energy savings and reductions in emissions of greenhouse gases resulting from providing service to existing residential and nonresidential buildings, while taking into consideration the effect of the program on rates, reliability, and financial resources.*
>
> *(3) The sources for funding of its energy efficiency and demand reduction programs.*
>
> *(4) The methodologies and input assumptions used to determine the cost-effectiveness of its energy efficiency and demand reduction programs.*
>
> *(b) By March 15, 2013, and by March 15 of every fourth year thereafter, each local publicly owned electric utility shall identify all potentially achievable cost-effective electricity efficiency savings and shall establish annual targets for energy efficiency savings and demand reduction for the next 10-year period. A local publicly owned electric utility's determination of potentially achievable cost-effective electricity efficiency savings shall be made without regard to previous minimum investments undertaken pursuant to Section 385. A local publicly owned electric utility shall treat investments made to achieve energy efficiency savings and demand reduction targets as procurement investments.*
>
> *(c) Within 60 days of establishing annual targets pursuant to subdivision (b), each local publicly owned electric utility shall report those targets to the Energy Commission, and the basis for establishing those targets.*
>
> *(d) Each local publicly owned electric utility shall make available to its customers and to the Energy Commission the results of any independent evaluation that measures and verifies the energy efficiency savings and the reduction in energy demand achieved by its energy efficiency and demand reduction programs.*

Outline of the Report

Nearly forty utilities detail their energy efficiency activities in this document, providing programs which cover more than 25 percent of the customer electric load served in California. Beyond the informational requirements described in the abovementioned statute, this document is designed in a manner that provides a comprehensive assessment that can be utilized by state policymakers and interested stakeholders to gauge the effectiveness of energy efficiency programs within the public power community.

Chapter III: Overview of Energy Efficiency and Public Power describes public power's unique perspective regarding energy efficiency and the role customer programs play in our communities. The chapter explores economic factors that directly influence customer decisions to participate in utility programs and invest in energy efficiency improvements. In addition, this chapter also identifies key differences among POUs and the respective customers they serve.

Chapter IV: Methodologies & Assumptions provides a description of the methodologies used by the public power community to report energy savings from different measures and programs.

Chapter V: Investments in Energy Efficiency Programs offers a summary of utility expenditures and energy savings stemming from customer programs. This chapter highlights the range of POU programs currently available to customers. Descriptions of individual utility programs can be found in **Appendix A**.

Chapter VI: Evaluation, Measurement, and Verification discusses POU commitment to independent, third-party, evaluation, measurement and verification (EM&V), as well as current POU EM&V activities. Additional information regarding EM&V activities is included in the utility descriptions in **Appendix A**.

Chapter VII: Conclusions & Policy Considerations synthesizes the collective expertise of public power into recommendations on how to achieve additional energy savings. With aggressive codes & standards updates planned, ambitious goals for existing buildings, and utility program maturation, it is imperative that the CEC, POUs, local planning departments, energy service companies, contractors, building owners, and other stakeholders work in a more coordinated manner to foster customer investments in energy efficiency improvements. This chapter identifies opportunities and likely barriers to future energy efficiency efforts.

Appendix A is a compendium of POU program data, including a description of each utility and their energy efficiency programs, as well as categorized summaries of energy savings and utility investments by program. In addition, this appendix describes EM&V funding and activities.

Appendix B summarizes the 10-year energy savings targets adopted by POUs, based on the Energy Efficiency Resource Assessment Model tool developed by Navigant to support target-setting efforts, for FY2014-2023

Appendix C is a list of references utilized in the compilation of this report.

III. Overview of Energy Efficiency and Public Power

A Public Power Perspective

The long-standing commitment of California's POUs to energy efficiency and demand reduction programs is an extension of fundamental principles dedicated to social and environmental responsibility, ensuring reliability, and keeping rates low for our communities. POUs are not-for-profit public agencies similar in structure to other municipal utility services such as water, sewer, and waste management. POUs are governed by locally- elected boards and are answerable to the very customers they serve. Energy efficiency is a critical element of the resource planning process, generation, transmission, distribution, and demand. Public power commitments to energy efficiency are guided by four important concepts:

- **Social and Environmental Responsibility**: POUs place a high priority on energy efficiency, as well as renewable power supplies, low-income programs, and economic development. Local elected officials govern public power to ensure accountability on these issues to customers.
- **Operational Efficiency**: Public power offers important programs to reduce and/or shift peak demand to optimize generation and transmission, and ensure more efficient operation of the grid.
- **Demand-side Energy Efficiency**: This is a major focus of POUs. It includes, but is not limited to: appliances, air-conditioners, building codes and standards, education, electricity management, and weatherization, all coordinated with customer-specific programs.
- **Cost-effective Energy Efficiency**: Cost-effective energy efficiency lowers the cost of providing electricity to our communities. POU customers are "shareholders" and benefits related to energy efficiency are realized by all customer-owners.

Public power commitments to energy efficiency programs are extensive and comprehensive. Residential programs focus on energy audits, Energy Star® appliance rebates and replacements, lighting improvements, attic insulation, as well as incentives to install highly-efficient heating, ventilation and air conditioning (HVAC). Commercial and industrial programs target lighting, HVAC, and manufacturing/food processing equipment. POUs also partner with schools and public institutions to educate residents and implement a variety of beneficial programs. POUs across the state are currently evaluating and developing more advanced programs in the areas of commercial/industrial demand response, thermal energy storage, on-bill financing, customer behavior change, and "whole building" retrofits.

POUs maintain a rich tradition of customer service that is distinctly local. POUs maximize the success of energy efficiency programs and services because of their unique relationships with customers and their ability to tailor programs to meet the specific needs of their communities. While harnessing the advantages of global innovations, and in many cases helping advance emerging energy technologies through progressive programs and procurement, POUs are responsive to local concerns, allowing them to maximize the value of all energy efficiency programs.

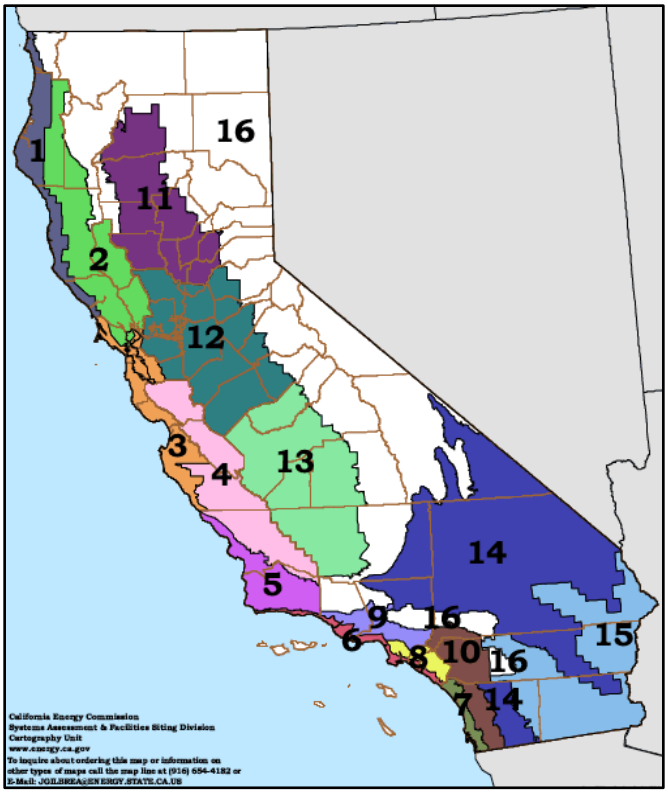
Diversity with a Common Objective

POUs are diverse, which is reflected in differing programs tailored to the needs of local constituents, taking into consideration key factors, including climate zone, customer classes, and local economic conditions. Common to all is the desire to spend energy efficiency dollars wisely and utilize the benefits of local decision-making to create programs that are effective, innovative and relevant to local conditions.

Differing Climate Zones

Location, location, location. This famous axiom regarding the "three things that matter most in property" is equally relevant when discussing what makes the Golden State's POUs unique.

Figure 1. California's 16 Climate Zones



Source: California Energy Commission

For energy policy purposes, California is divided into 16 separate and distinct climate zones, which allows state policymakers to recognize the diversity of the state's population and use of energy. This diversity extends into the evaluation of utility approaches to energy efficiency program deployment. California's POUs can be found in 13 of the 16 climate zones, ranging from Truckee-Donner over the Sierra Crest to Merced in the heart of the Central Valley to downtown Los Angeles, the nation's second largest city.

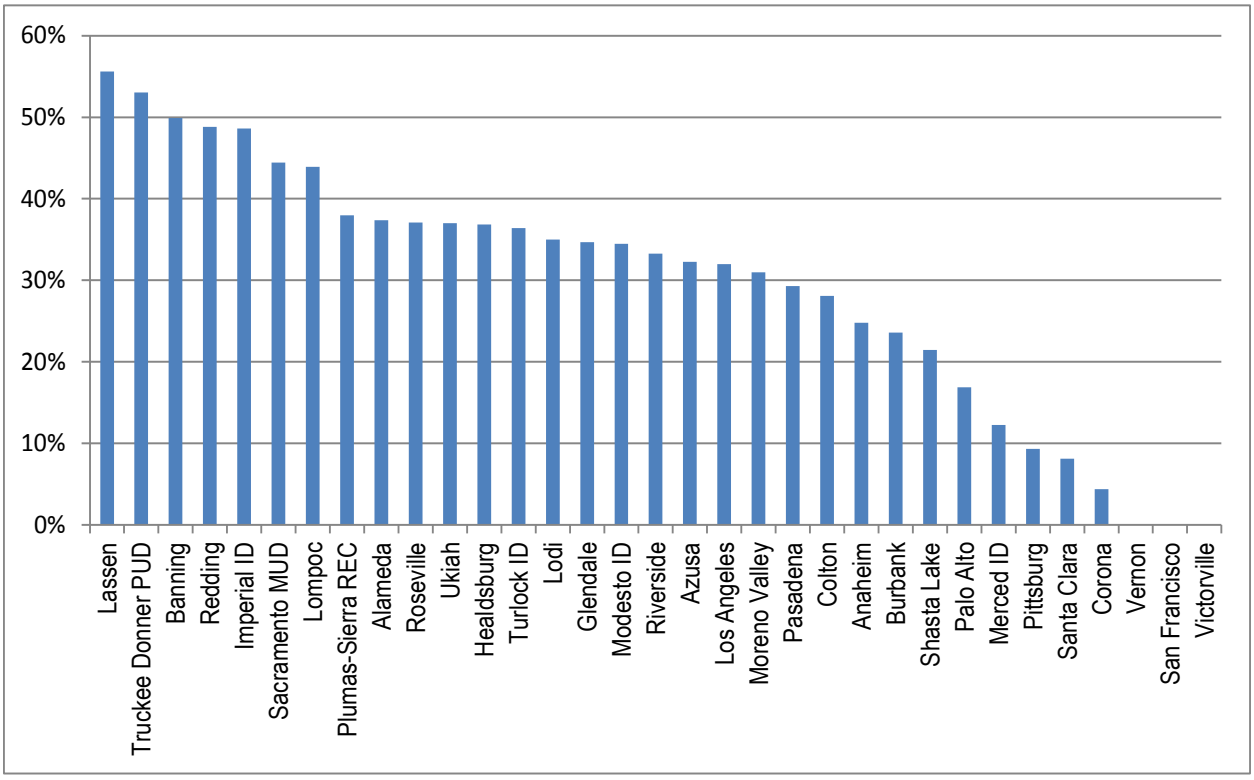
The climate zone in which the building is located is one of the primary assumptions driving differences in estimated energy savings related to specific types of energy efficiency measures across different utilities.

HVAC savings provides an excellent example of diversity across climate zones. An HVAC installed in the City of Redding (Climate Zone 11), with very hot summers that require a high utilization of air conditioner usage, yields considerably greater savings than that same unit would produce in a coastal community like Lompoc (Climate Zone 5) which lacks a significant air conditioning load. In essence, what makes for an excellent energy efficiency investment in one utility service territory may not necessarily add up to one in another. With such a wide geographic footprint, public power utilities recognize the importance of unique programs and tailor their programs to best serve the needs of their local communities.

Different Types of Customers

Customer class profiles vary significantly from utility to utility, which impacts the POU planning and program design efforts. In POU communities such as Vernon, Corona, and Silicon Valley Power, retail sales are dominated by the commercial and industrial customers. In contrast, residential customers in other POUs, such as Trinity, Lassen, and Truckee Donner represent well over 50 percent of their respective utility's total retail sales. Collectively, residential customers constitute about one third of POU retail sales (32.7%). Figure 2 below illustrates that the share of retail sales attributable to residential customers across the POUs varies considerably, highlighting the importance of customizing programs at the local level.

Figure 2. Residential Retail Sales as Percent of Total Retail Sales, 2013.



Source: US Energy Information Administration

Even among utilities with similar customer class configurations, differences can be seen. For example, Moreno Valley is a relatively new POU having started serving customers in 2004, and all of the customer facilities it serves are less than ten years old and constructed to meet current Title 24 Standards. By comparison, Lodi, Alameda, Modesto, and others have been providing service for more than 100 years, with a residential housing stock that is significantly older with different energy efficiency needs.

The success of POU energy efficiency programs is closely related to understanding the specific needs of individual customers within their respective service territories. For example, Truckee Donner has one of

the more unique customer profiles and load shapes in California since the majority of residential customers use their residences as a second home. This results in an atypical peak load for Truckee Donner between Christmas and New Year's Eve and on weekends. Glendale, which operates both a water and electric utility, closely aligns its energy efficiency programs with water conservation, administering Smart Home Energy and Water Saving Surveys which reduce customer energy consumption through comprehensive in-home energy and water saving surveys, education, and direct measures installations. Public power offers a variety of innovative programs to serve a variety of different customers (see **Appendix A** for further information**)**.

Overall Size of the Utility

POUs vary a great deal in size, which impacts the range of energy efficiency programs that are offered. At the larger end of the spectrum are the Los Angeles Department of Water and Power (LADWP), Sacramento Municipal Utility District (SMUD), and Imperial Irrigation District (IID). On the other end are POUs serving much smaller communities, such as the cities of Needles, Gridley and Biggs.

LADWP and SMUD together represent over half of the total retail electricity sales from public power (55.8%). The ten largest POUs account for the lion's share of sales (84.9%). Conversely, the ten smallest POUs are less than two percent of total retail sales from public power (1.7%).

Program support activities, including EM&V by independent third parties, can be easier for the larger utilities to manage than smaller utilities with limited resources. Even with these limitations, the collaborative nature of the public power community allows for the development and sharing of best practices among utilities, which could apply to EM&V analyses. A successful program in one utility can be replicated in other utilities with similar customer needs. Likewise, EM&V work completed for one utility can inform the decision-making of other utilities regarding whether to move forward with a program or vendor. For more on POUs EM&V activities, see **Chapter VI: Evaluation, Measurement, and Verification**.

Local Economic Factors

The state of the local economy also impacts the ability of utilities to deploy energy efficiency programs, and despite experiencing one of the worst economic recessions in decades, public power utility programs are continuing to offer a comprehensive range of programs. As previous reports have shown, energy efficiency expenditures have been strong in recent years. As we review 2013, California's economy continued to show some signs of improvement. Still, California's statewide unemployment rate in December 2013 remained above eight percent (8.3%), nearly one and a half percentage points higher than the national unemployment rate at the end of 2013 (6.7%).

In general, the communities that public power utilities serve have seen a modest improvement in their unemployment rates, consistent with the statewide trend. However, the majority of POU communities are located in areas with higher unemployment rates compared to the state as a whole, with many exhibiting unemployment rates above 10% on average in 2013 (see **Figure 3**).

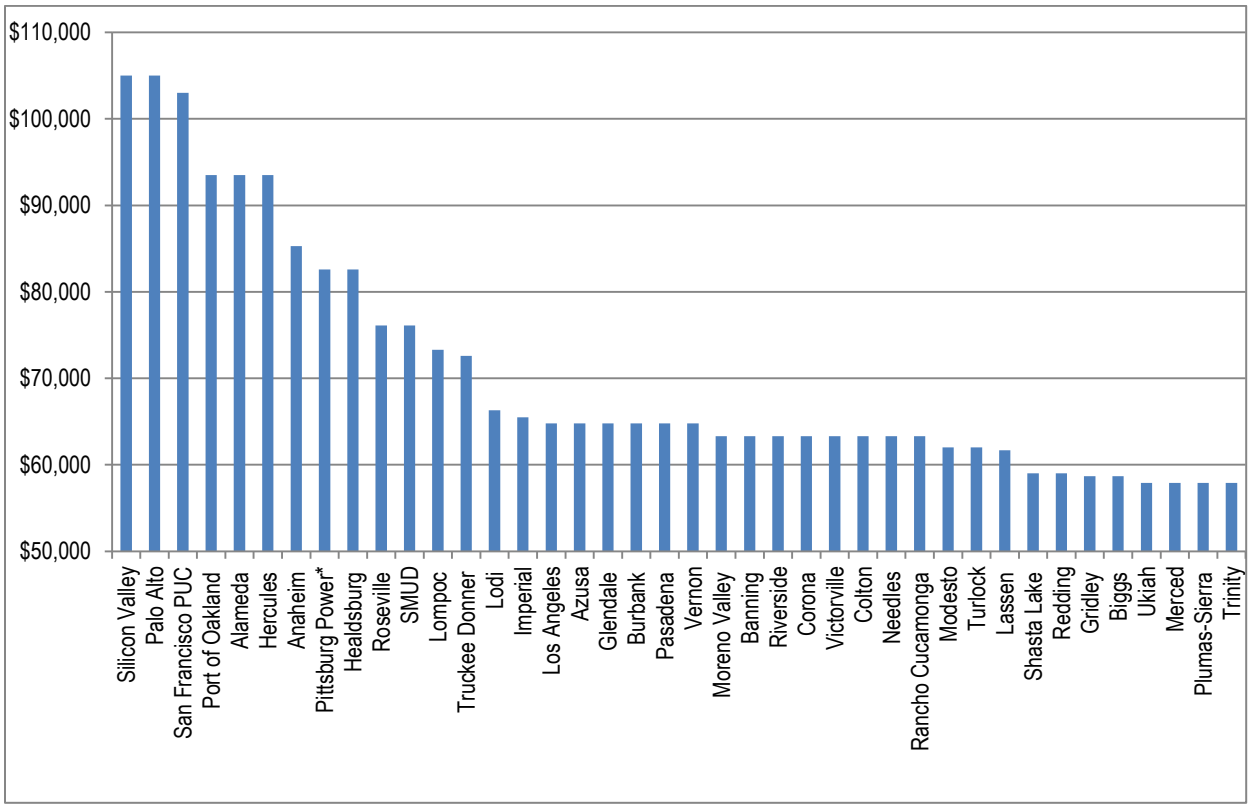
Figure 3. POU Community Unemployment Rates, 2013 Average

Utility	Unemployment Rate	Utility	Unemployment Rate
Imperial	24.5%	Lodi	9.7%
Gridley	23.2%	Redding	9.5%
Shasta Lake	14.9%	CALIFORNIA	8.9%
Merced	14.5%	SMUD	8.8%
Biggs	13.5%	Glendale	8.6%
Trinity	12.8%	Burbank	8.0%
Plumas-Sierra	12.6%	Anaheim	8.0%
Victorville	12.2%	Ukiah	7.8%
Lompoc	12.1%	Healdsburg	7.7%
Moreno Valley	11.9%	Roseville	7.6%
Banning	11.8%	Needles	7.6%
Port of Oakland	11.3%	Pasadena	7.5%
Modesto	11.2%	Corona	7.5%
Los Angeles	10.9%	Truckee Donner	6.5%
Colton	10.9%	Rancho Cucamonga	6.5%
Lassen	10.8%	Silicon Valley	6.3%
Azusa	10.7%	San Francisco	5.7%
Pittsburg Power*	10.4%	Alameda	5.0%
Riverside	10.3%	Palo Alto	3.6%
Turlock	9.8%	Vernon	0.0%

Source: California Employment Development Department
****Unemployment rate for Pittsburg is the City of Vallejo, where their customers are located***

Another useful measure of local economies and the desire of residential customers to invest in energy efficiency is the area median income, developed by the California Department Housing and Community Development. Similar to unemployment rates, the median income in POU communities varies significantly. Utilities operating in the Bay Area have the highest median income, reflecting both the very high cost of living in the region as well as the resurging technology sector of the economy. On the other end of the scale are the more rural counties of the Central Valley and the High Sierras, as well as urban pockets in the Greater Los Angeles Area, with some areas reporting median incomes that are half the levels reported in the Bay Area.

Figure 4. Median Income for POU Service Territories, 2013.



Source: California Department of Housing and Community Development

The Bay Area and Silicon Valley economies in particular are performing better than other areas. The economic vitality helps empower customers to invest in energy efficiency, which in turn drives local utilities to offer more clean energy programs and adopt more aggressive energy savings targets and clean energy goals.

Other regions have not fared as well. The Central Valley, the High Sierra, and the southeastern desert continue to struggle from the impacts of the recession. Struggling local economies adversely impact the ability of customers to participate in utility energy efficiency programs. For many it is simply a lack of disposable income. Customers with a lack of disposable income are often precluded from making energy efficiency investments even if they only require very little upfront capital, even if the investment would produce energy savings that would pay for itself in a short timeframe. POU customers who have experienced dramatic decreases in equity may be less inclined to purchase new appliances or be able to secure another loan or mortgage to finance an energy efficiency retrofit, regardless of the payback period.

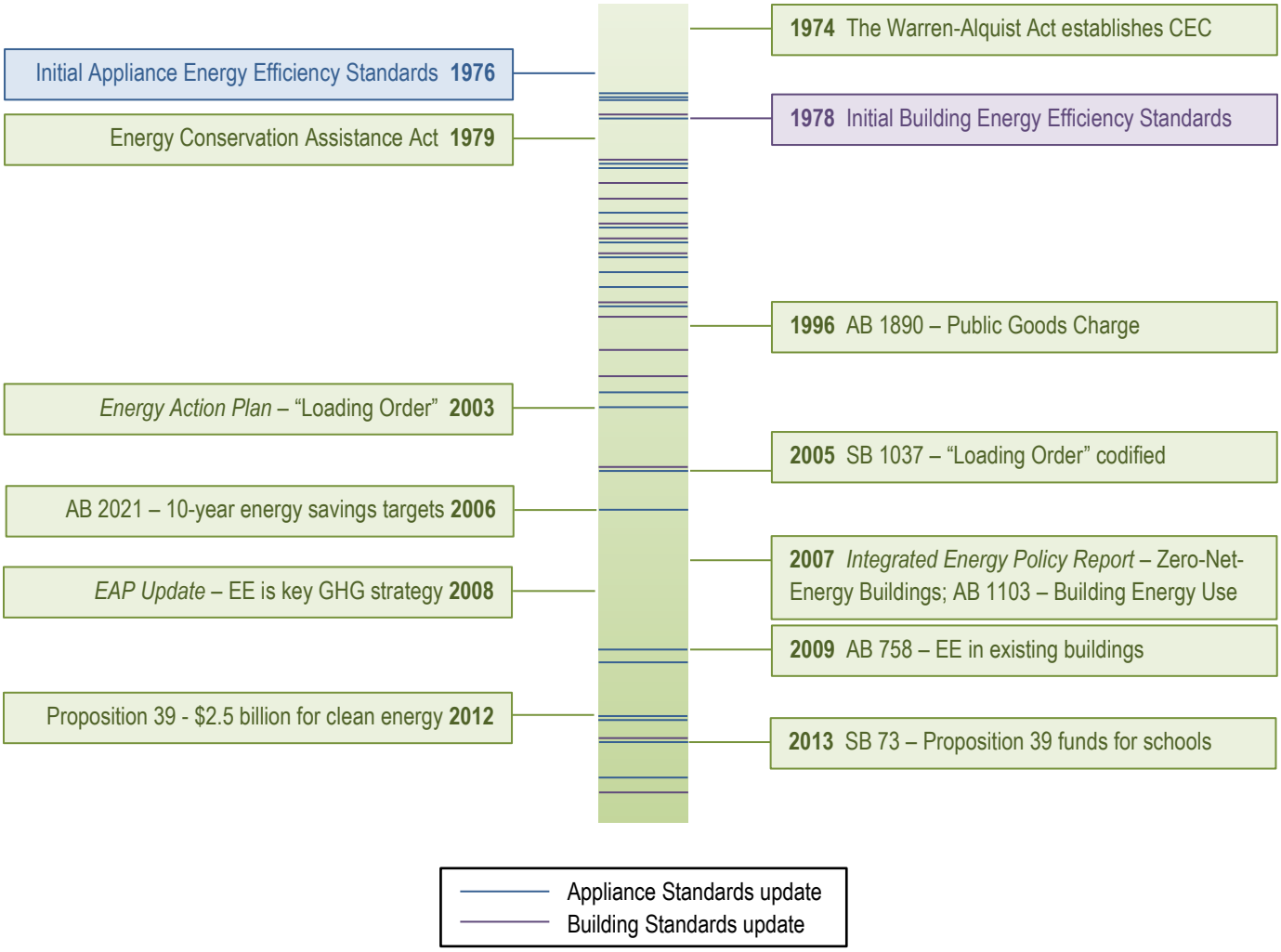
Customer participation in utility energy efficiency programs in communities with high unemployment and low median income can be especially challenging. To help customers who may not be able to afford energy efficiency improvements, even if they would save more than their investment over the long term, many POU communities are authorizing Property Assessed Clean Energy (PACE) financing. PACE

financing allows property owners to finance energy efficiency, water conservation and solar energy improvements with no money down and to repay the borrowed funds as assessments on their property tax bills. Credit ratings are not involved and the financing remains with the property so, if the property is sold, the borrower isn't required to repay the loan which is simply transferred to the new property owner. PACE financing allows more customers to make energy efficiency investments but the option is so new that many customers are not yet aware of the benefits.

Complementing Statewide Efforts

Public power programs are one of the many facets of the state's efforts to reduce energy consumption. The appliance and building energy efficiency standards – the foundation of California's energy efficiency efforts, and arguably the state's most successful and cost-effective policy for reducing greenhouse gas emissions – were initiated under Governor Brown's previous administration. For nearly 40 years, California has adopted policies aimed at promoting customer energy efficiency.

Figure 5. Timeline of Major Energy Efficiency Initiatives in California



Many of the above initiatives are active programs that continue to be implemented and improved by the CEC, utilities, and a wide range of industry and community stakeholders. The following sections review five major statewide energy efficiency program areas – Codes & Standards, the Public Goods Charge, Energy Efficiency in Existing Buildings, Zero-Net-Energy Buildings, and Proposition 39 – and examine their relationships to one another.

Codes & Standards

Since its creation nearly 40 years ago, the California Energy Commission (CEC) has been tasked with prescribing standards for minimum levels of operating efficiency and promoting the use of energy and water efficient appliances through the Appliance Energy Efficiency Standards (Title 20). In addition, the CEC prescribes building standards that increase the efficiency in the use of energy and water for new building construction through the Building Energy Efficiency Standards (Title 24).

As depicted in Figure 5, the initial Title 20 appliance standards were adopted in 1976. In general, between 1977 and 2010, the CEC adopted 21 updates to the Title 20 standards. Similarly, the initial Title 24 building standards were issued in 1978. Between 1980 and 2013, the CEC adopted 12 updates to the Title 24 standards. The CEC estimates that since their inception, Title 20 appliance standards and Title 24 building standards have saved California consumers over $37 billion and $30 billion respectively.

The CEC recognizes the effectiveness of codes and standards (C&S) updates in achieving energy savings. As noted in the *2013 Integrated Policy Report (2013 IEPR)*, "building standards ensure that cost-effective efficiency features are incorporated into each building during construction, the point at which these features are least expensive and most cost-effective. Similarly, appliance standards benefit consumers by ensuring that the most cost-effective efficiency is incorporated into their purchases." Cost-effective and feasible standards that are demonstrated to achieve energy savings have been and will continue to be one of the state's most successful energy and environmental policies, and POUs support ongoing efforts to systematically adopt cost-effective and feasible building and appliance standards updates.

There is a direct relationship between energy savings from C&S updates and the claimed energy savings from POU customer incentive programs. In general, utilities only report energy savings that are above code. As the CEC mandates higher energy efficiency standards, utility energy savings decline, compared to the savings that could claimed under the previous standards for the same measure. For example, the CEC estimates that the 2013 Building Energy Efficiency Standards are 25 percent more energy efficient than previous standards for residential construction and 30 percent better for nonresidential construction. As a result, the savings a utility reports for a measure in one year may diminish greatly or no longer be claimed the next year, which has a dramatic impact on utility program planning as well as annual progress towards 10-year energy savings targets.

To date, the state's three largest investor owned utilities (IOUs) – PG&E, Southern California Edison, and San Diego Gas & Electric – have participated in helping develop new codes and standards by funding and developing the vast majority of the research on which updates to the appliance and buildings energy efficiency standards are based. In doing so, the IOUs claim estimated savings from C&S updates towards their energy efficiency goals, for which they are provided rewards or penalties based on evaluated energy savings. POUs are only now beginning to play a more active role in the development, evaluation, and adoption of updates to Title 20 and Title 24 standards, but previously did not report any savings associate with the C&S updates. As a general practice, POUs will claim savings from C&S only if they provide

resources to support the development and/or enforcement of C&S updates, which will be noted in their narratives in **Appendix A: Description of Utility Programs**.

Public Goods Charge

POU efforts to encourage customers to invest in energy efficiency predate the passage of SB 1037 in 2006. AB 1890 (Brulte, 1996) also established the POU public goods charge (PGC), a non-bypassable charge collected from all customers to fund investments by the utility in any of the following program areas:

- Cost-effective energy efficiency and energy conservation
- Renewable energy resources and technologies
- Research, development, and demonstration to advance science and technology
- Low-income customer services

Per §385 of the Public Utilities Code, each POU is required to collect a public goods charge equal to 2.85% of the utility's annual revenue. Whereas the requirement for IOUs to collect the PGC expired at the end of 2011, AB 1890 continued the POU PGC in perpetuity. The statute allows POUs to focus their PGC funds on programs that best meet the needs to their particular customers. A POU local governing board serving a customer base with higher unemployment rates may elect to dedicate more of their PGC funds on low-income programs compared to another POU that tailors programs to support small businesses to lower their monthly electricity bill through energy saving retrofits.

As noted in the section on ***Codes & Standards***, PGC-funded energy efficiency programs typically provide incentives for measures that perform above current Title 20 and Title 24 standards. However, the CEC notes in the *2013 IEPR* that "as energy efficiency codes and standards continue to improve, energy efficiency savings from incentives programs may diminish unless those programs continue to expand beyond traditional efficiency measures. To accomplish this, the state may need to modify its incentive mechanisms to provide value for both compliance with the standards and the total energy savings from upgrading inefficient equipment and building measures."

Energy Efficiency in Existing Buildings

For decades, public power has focused on providing financial incentives and other assistance to customers to reduce energy usage in their homes and businesses. Assembly Bill 758 (Skinner, 2009) requires the CEC, in collaboration with the California Public Utilities Commission (CPUC) and stakeholders, to develop a comprehensive program to achieve greater energy efficiency in the state's existing buildings. Specifically, the CEC is directed to develop a portfolio of strategies that will achieve greater energy efficiency in existing residential and nonresidential structures that fall significantly below the current standards in Title 24.[1] In response, CEC staff issued the *Draft Action Plan for the Comprehensive Energy*

[1] §25943(a)(1) of the Public Resources Code

Efficiency Program for Existing Buildings (AB 758 Draft Action Plan) in July 2013. The AB 758 Draft Action Plan consists of three categories of strategies:

- **No Regrets Strategies** are intended to provide critical foundational resources, such as broader access to relevant information, code compliance support, widespread education and outreach, and high-quality targeted workforce development.
- **Voluntary Pathways** are broadly defined as market support activities that build on past efforts, which include ramping up current programs for market segments that have low participation rates, such as multi-family dwellings and leased commercial buildings.
- **Mandatory Approaches** may be necessary depending on the success of no regrets strategies and voluntary pathways. If determined to be necessary, mandatory approaches would be intended to make the market more transparent and move mature measures into wider use.

The AB 758 Draft Action Plan looks beyond utilities, and recognizes that a large range of stakeholders and groups are involved in facilitating customer involvement in energy efficiency retrofits. Public power strongly supports this approach and CEC efforts to improve coordination, collaboration, and communication amongst the stakeholders in implementing strategies to reach the goals of AB 758, which in itself advances the foundational principle of the "Loading Order" of energy efficiency as the preferred energy resource, as well as the state's ambitious commitment to reducing greenhouse gas emissions.

Public power has and continues to offer customer energy efficiency programs focused on improvements to existing buildings. One of the barriers to customer participation has been stakeholder and policymaker pressure to limit utility incentives and other financial assistance for measures that exceed current energy efficiency codes and standards. Achieving energy savings in buildings significantly below Title 24 code may be greatly supported by reconsidering the measures and activities that utilities are encouraged to fund and report savings from.

Zero-Net-Energy (ZNE) Buildings

A ZNE building is one where the net amount of energy produced by on-site renewable energy resources is equal to the amount of the energy consumed annually by the building, at the level of a single "project" seeking development entitlements and building code permits, measured using the CEC's Time Dependent Valuation metric.

The CEC first introduced the concept of ZNE buildings in the *2007 Integrated Energy Policy Report*. This proposal was incorporated into the CPUC's *Long Term Energy Efficiency Strategic Plan* in 2008 as one of the four "Big Bold" energy efficiency strategies. Specific legislation was not passed directing either the CEC or the CPUC to pursue a ZNE policy or program. However, both agencies cite AB 32 (Núñez, 2006), the Global Warming Solutions Act of 2006, SB 1037 (Kehoe, 2005), and AB 2021 (2006, Levine), as well as multiple Governor's Executive Orders, as establishing the policy imperative for pursuing the statewide policy that all new residential construction by 2020, and all new commercial construction by 2030, will be ZNE.

To accomplish the ZNE goal, the Title 24 updates for 2016 and 2019 are planned to reduce energy consumption by 40-60 percent compared to the 2013 update, which as previously noted was itself a 25 percent improvement over the 2008 residential building code. This represents an unprecedented effort to reduce energy usage in new buildings.

With regard to the portion of the ZNE definition that requires each building to produce a net amount of energy on-site equal to the value of energy consumed annually by the building, the CEC states in the *2013 IEPR*, "To ensure that all buildings have a pathway to compliance, the Energy Commission anticipates establishing reasonable exceptions to account for building and building site limitations, including the need for "development entitlements" for off-site renewable energy resources, such as community based renewable energy generation." The CEC correctly recognizes that not all future buildings will be suitable for on-site renewable energy resource installations and that alternative arrangements will need to be developed. Whether the renewable resource is located on-site or off-site, this requirement will have a significant impact on utility operations and resource planning. In addition, the potential for significant new development of off-site renewable energy resources designed to service a new housing development will likely impact local zoning and planning ordinances.

Proposition 39

In November 2012, the voters of California passed Proposition 39, which amended the state's corporation tax code in a manner that was estimated by the Legislative Analyst's Office to generate approximately $1 billion in additional tax revenue for the state. For the first five years, beginning in fiscal year 2013, half of new tax revenue ($2.5 billion total) is required to be spent funding energy efficiency and clean energy project. The Legislature and Governor agreed to focus Prop 39 funds on projects at K-14 public schools. SB 73 (Committee on Budget and Fiscal Review, 2013) appropriated the funds for energy efficiency and clean energy projects for fiscal year 2014, as follows:

- $381 million to local educational agencies (LEA) (e.g., school districts, county offices of education)
- $47 million to California community college districts
- $28 million to the CEC for low-interest/no-interest revolving loans and technical assistance
- $3 million to the California Workforce Investment Board for workforce training grants
- $5 million to the California Conservation Corps to perform energy surveys and other activities

Each LEA is allocated Prop 39 funding based on a legislatively established formula. In order to receive their allocation from the California Department of Education, a LEA must submit an expenditure plan to the CEC for review.[2] Since many schools lack qualified energy management staff, utilities will play a vital role in supporting schools in their applications for and administration of Prop 39 grant funds. Most POUs have been working closely with their schools on energy efficiency and rooftop solar projects for years. In many

[2] §26235(f) of the Public Resources Code

cases, POUs have designated key accounts staff to their school districts. Given the generally smaller geographic footprint of many POU service territories and a strong interest in their local communities, public power is uniquely positioned to assist schools successfully implement Prop 39-funded projects. As a practical matter, to the extent a POU dedicates resources to support a LEA in applying for Prop 39 funding, prioritizing projects, selecting third-party administrators, and/or managing energy efficiency or clean energy projects, the POU will report the energy savings from Prop 39-funded projects in forthcoming annual reports.

Utilities will play a critical role in the implementation of Prop 39, even if LEAs do not request assistance. SB 73 requires a LEA, as a condition of receiving their funding, to authorize its local electric and gas utilities to provide 12 months of past and ongoing usage and billing records at the school facility site level to the CEC.[3] The CEC, as noted in the *Proposition 39: California Clean Energy Jobs Act – 2013 Program Implementation Guidelines,* has interpreted the statute to require a LEA to provide access to their utility billing records through 2023. The CEC also requires LEAs to provide the utility billing data for all of its meters, not just the site(s) where Prop 39 funds will be spent. The access to utility billing records must be granted at the time of application for funds by completing the CEC standardized Utility Data Release Authorization form. However, since the CEC has yet to establish a process for the utility to provide usage and billing records. It is unclear what specific data a utility will be required to provide and in what form that data should be sent to the CEC. POUs will continue to work closely with the CEC to resolve these critical implementation issues.

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Public power actively participates in these many energy efficiency forums, workshops, and program proceedings to provide perspective and feedback from our diverse communities. Many of the program areas overlap with one another, facing similar challenges and sharing similar opportunities. Achieving the state's visionary energy efficiency goals, and realizing the attendant greenhouse gas emissions reductions and other non-energy benefits, requires a great deal of collaboration among stakeholders and coordination among programs. POUs look forward to working with the CEC and the growing universe of stakeholders on ensuring that the development implementation of programs in pursuit of energy savings are 'efficient' in their own right.

[3] §26240(a) of the Public Resources Code

IV. METHODOLOGIES & ASSUMPTIONS

Modeling & Compiling Program Data

This section provides a brief overview of the analytical tools developed by the public power community to report its energy efficiency savings and develop energy efficiency targets, as well as activities being undertaken to further refine the processes used to verify reported savings. In evaluating public power energy efficiency programs it is absolutely critical to understand how energy savings estimates attributed to programs are interpreted and measured.

As a practical matter, energy savings attributable to utility energy efficiency programs is defined as the difference between the expected energy use of a proposed efficiency measure and expected energy use under baseline conditions and assumptions. In most cases, baseline energy usage is governed by the Title 20 and Title 24 energy efficiency standards, as well as Federal Appliance Standards. For some custom projects, these standards do not apply, so industry standard practice is used for the baseline.

Database for Energy Efficient Resources

The Database for Energy Efficient Resources (DEER) is a CEC and California Public Utilities Commission (CPUC) sponsored database designed to provide well-documented, verifiable and consistent estimates of energy and peak demand savings values, measure costs, and effective useful life (EUL) from one data source. DEER accounts for the new baselines established through the Title 24 building standards, as well as new federal energy standards. For consistency, POUs used the DEER.

As noted in the draft *2014 DEER Update Study,* a number of stakeholders have expressed concerns with the DEER database. For example, several parties voiced concern, in the comments related to CPUC Decision 12 05 015, when a large number of measures that were originally included in DEER2005 were removed as part of the 2011 DEER update. The parties argued that some of those measures are still prominent in program accomplishments and requested that updates to restore the measures be included in DEER as soon as possible. IOUs also expressed concern that DEER measure definitions sometime lag current industry standards. In response to both the removal of measures in 2011 and the definitions lagging utility standard, IOUs have relied upon their own workpapers to provide energy savings estimates that are more representative than the DEER database. In some cases, measures covered by an IOU workpaper may comprise a large portion of the portfolio of savings. In short, DEER, the estimated energy savings resource funded by IOUs to be used by IOUs is not being used by the IOUs due to its serious shortcomings.

POUs share many of the concerns voiced by IOUs and other stakeholders regarding the DEER database. For many measures, the DEER database continues to provide energy savings estimates that align with results from POU EM&V reports of their programs. However, for other programs the estimated DEER savings are not consistent with the actual measure and program results, so POUs must rely on other sources or studies. The process in which DEER is updated and the basis on which changes to the DEER

database are made are not transparent – at least not to public power. Of course, the DEER database is primarily designed for IOUs at the direction of the CPUC, and not by public power.

Technical Reference Manual

Recognizing that the DEER database is not a tenable resource for public power to continue to use, POUs have contracted for the development of a technical reference manual (TRM). Silicon Valley Power first initiated a project to develop an energy savings estimate database specific to their respective programs as an alternative to DEER. Energy & Resource Solutions (ERS) was retained to develop the TRM for Silicon Valley Power, which was later expanded by Palo Alto Utilities to include additional measures specific to their programs as well. The 12 remaining members of NCPA, all 11 SCPPA members, and 7 CMUA members, including SMUD, then contracted with ERS for a larger TRM tool that could be used by utilities in different climate zones across the state. The TRM is expected to be finished by April 1st and will be the basis on which many POU plan their programs in the coming years.

The TRM provides the methods, formulas, and default assumptions used for estimating energy savings and peak demand impacts from energy efficiency measures and projects. The energy savings estimates are used to report program accomplishments and measure progress towards program goals.

Energy efficiency measures are documented and classified as either unit energy savings (UES) measures, semi-custom measures, or custom measures. The manual presents both nonresidential and residential measures. Each measure type is presented in separate sections and grouped by technology type. Measure information is presented in a consistent tabular format.

The reference manual also includes spreadsheets that provide detailed and transparent measure calculations and, for semi-custom measures, energy savings calculators for estimating energy savings for project-specific measures. The measure spreadsheet includes summary tables for transferring measure savings data into the program's regulatory compliance reporting tool.

The TRM includes the main manual as well as supporting spreadsheets. The manual presents both nonresidential and residential measures. Each measure type is presented in separate sections and grouped by technology type. All references and data resources are identified in the table footnotes.

As needed, each section also contains supplementary tables and charts to provide additional measure details. Measures with multiple savings values (savings by size, building use, varying levels of efficiency, etc.) will have both savings and cost data listed in a supplementary table. The last section of the manual provides the custom measure protocol, which outlines a process for estimating and documenting custom measure savings.

Energy savings calculators are also provided as part of the reference manual. The calculators are Excel spreadsheet-based engineering models for estimating semi-custom measures per the described methodology. They provide a consistent, transparent, and user-friendly approach for estimating project-specific energy savings.

The TRM will be fully accessible to the public via public power websites. The basis for energy savings estimates will be completely documented and transparent. The TRM provides a much higher degree of transparency to POUs, policymakers, and interested stakeholders regarding the energy savings estimates underpinning public power's energy efficiency programs. Next year's report will include program results based on TRM energy savings estimates.

E3 Reporting Tool

Since SB1037 was passed in 2005, public power has significantly invested in the development of tools and resources for POUs to use when reporting and verifying the results of their energy efficiency programs. The company Energy and Environmental Economics (E3) has provided public power with their considerable expertise in this effort.

The E3 Reporting Tool is a sophisticated Excel spreadsheet model used to report the results of utility energy efficiency programs. It was originally developed for the CPUC's review of IOU energy efficiency programs and has been enhanced and updated to perform this same function for POU's energy efficiency programs. The model contains a database of over 5,000 energy savings measures. The measure database included in the Reporting Tool was updated based on the final 2009 KEMA Measure Quantification Report, which itself drew from DEER. Utility incentives paid to free-riders are added as a cost in the TRC test, consistent with the CPUC methodology adopted for investor owned utilities.

During the 2011 reporting cycle, the avoided costs were updated to reflect CPUC avoided costs adopted in the fall of 2011. Updated DEER load shapes for Air Conditioning measures were also added. Finally, updated DEER Net-to-Gross (NTG) values were included and applied to each measure included in the database. These updates have reduced the TRC ratios reported by municipal utilities in years past – in some cases significantly. Those reductions are primarily a reflection of changes in the avoided costs and DEER measures rather than fundamental differences in utility programs.

The current model of the E3 Reporting Tool includes a calculation of GHG savings associated with each POU energy efficiency measure. The calculation of GHG savings will be updated for next year's report to reflect changes in POU supply portfolios per compliance with the Renewables Portfolio Standard, the California Air Resources Board's adoption of a default greenhouse gas emission factor for unspecified electricity imports, and improved methodologies for estimating GHG savings.

V. INVESTMENTS IN ENERGY EFFICIENCY PROGRAMS

Program Results

This section provides an aggregate overview and discussion about current and future energy efficiency programs and savings that apply to California's public power utilities. A detailed overview of specific utility program descriptions, expenditures, and energy savings can be found in **Appendix A**.

Figure 6 provides a comprehensive summary of energy efficiency savings and an aggregated measure of cost effectiveness of all POUs. The table reveals a range of savings, which is largely a reflection of utility size and economic considerations. LADWP and SMUD alone had net peak savings during the reporting period of over 50 megawatts (MW). Another 10 utilities (Anaheim, Burbank, Glendale, IID, Modesto, Pasadena, Riverside, Roseville, SVP, and TID) had peak savings that fell in the range of 1-8 MW.

For the first time in the annual report, public power is reporting gross savings in addition to net savings.[4] LADWP alone report over 198,836 MWh of gross savings, which is approximately the total gross savings of all other POUs, excluding SMUD, (198,501 MWh). Beginning in the next report, greater attention and analysis will be given to gross demand savings (kW), gross annual savings (kWh), and gross lifecycle savings (kWh) to facilitate a more robust discussion and evaluation of public power energy efficiency programs and the role they play in informing long-term demand forecasts, as well as state policy goals.

Figure 7 reviews the aggregated results by program sector. From the tables, it is clear that lighting and cooling programs once again account for the largest share of the savings. Regarding specific program results, lighting (particularly non-residential direct installations) continues to dominate public power energy efficiency programs, accounting for almost half of the total energy savings achieved (46%). Utility rebates accounted for the majority of program expenditures, although about one-third of the total was dedicated to utility marketing, administrative costs, and evaluation, measurement, and verification (EM&V) efforts.

Figure 8 and **Figure 9** summarize POU energy efficiency program savings and cost information for fiscal years 2006 through 2013.[5] During FY12/13, POUs spent nearly $134.5 million on energy efficiency programs, the sixth consecutive year utility energy efficiency investments have exceeded $100 million. When added to investments since the signing of SB1037, public power has spent nearly $900 million on energy efficiency. Supporting those investments were reductions in peak demand last year of 89.3 MW as well as more than 521,478 MWh of energy saved over the course of the reporting year.

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[4] Gross savings data was not available for SMUD in this reporting year, so net savings was used instead, which by definition is lower than their actual gross savings. As a result, actual cumulative POU gross savings data is higher than what is reported here.

[5] Imperial Irrigation District, Merced Irrigation District, Modesto Irrigation District, Plumas-Sierra Rural Electric Cooperative, Sacramento Municipal Utility District, Turlock Irrigation District, and Truckee Donner Public Utility District all operate on a fiscal year that extends on a calendar year basis. As such, each utility's data for FY12/13 is actually calendar year 2013.

Figure 6. Summary of Utility Results, FY12-13

All POU Summary	Resource Savings Summary						Cost Summary		
	Gross Annual kWh Savings	Gross Lifecyle kWh Savings	Net Peak kW Savings	Net Annual kWh Savings	Net Lifecycle kWh savings	Net Lifecycle GHG Reductions (Tons)	Utility Incentives Cost ($)	Utility Mktg, EM&V, and Admin Cost ($)	Total Utility Cost ($)
Alameda	3,426,185	49,687,096	399	3,076,309	43,936,427	24,376	533,493	548,199	1,081,692
Anaheim	28,672,818	143,414,384	6,879	28,672,818	143,414,377	84,987	2,103,402	973,158	3,076,560
Azusa	3,899,636	39,475,856	858	3,806,793	39,061,212	22,648	873,388	156,486	1,029,874
Banning	208,955	2,998,769	88	198,507	2,848,831	1,807	62,745	72,920	135,666
Biggs	2,664	28,150	1	1,669	17,700	10	1,179	9,221	10,399
Burbank	11,292,372	103,374,352	3,249	10,069,940	90,420,739	55,731	2,243,100	1,076,054	3,319,154
Colton	1,576,404	7,377,063	193	1,544,339	7,142,385	4,003	85,505	42,000	127,505
Corona	27,106	288,648	49	23,040	241,291	144	55,150	10,148	65,298
Glendale	12,636,721	50,308,060	1,256	12,601,727	49,873,042	29,730	1,039,246	143,098	1,182,344
Gridley	338,626	1,712,659	172	277,042	1,382,575	751	102,045	46,946	148,991
Healdsburg	947,017	12,829,056	137	804,475	10,898,575	6,021	154,001	170,566	324,567
Imperial ID	20,710,661	268,739,264	7,789	17,799,981	232,972,855	142,595	8,312,563	2,259,762	10,572,325
LADWP	198,835,556	2,897,203,712	23,448	171,477,109	2,580,946,588	1,492,728	26,158,250	24,094,350	50,252,600
Lassen	152,218	6,608,944	96	98,092	1,271,673	354	76,458	32,322	91,923
Lodi	2,253,195	34,215,436	1,069	1,801,552	27,347,813	16,043	294,109	51,363	345,472
Lompoc	243,980	2,830,940	41	196,462	2,287,370	1,265	35,514	18,500	54,014
Merced	2,295,325	25,521,600	12	1,790,962	19,918,168	10,785	233,393	-	233,393
Modesto	11,061,683	130,524,136	1,410	9,226,846	108,546,837	58,982	1,431,804	1,452,364	2,884,168
Moreno Valley	-	-	-	-	-	-	-	-	-
Needles	24,960	449,280	27	24,960	449,280	284	144,000	6,000	150,000
Oakland	-	-	-	-	-	-	-	-	-
Palo Alto	9,743,062	91,766,176	775	8,074,481	58,362,777	-	1,122,777	1,309,890	2,432,668
Pasadena	16,896,694	167,139,120	2,089	16,896,694	159,692,686	96,952	2,434,082	543,948	2,978,030
Pittsburg	128,667	1,539,939	21	128,667	1,539,939	853	8,678	5,250	13,928
Plumas-Sierra	85,118	948,182	27	56,289	594,740	351	65,004	47,527	112,531
Rancho Cucamonga	146,565	2,345,040	51	146,565	2,345,040	1,537	57,027	32,000	89,027
Redding	685,367	10,779,544	693	531,858	8,415,135	8,351	1,390,156	230,000	1,620,156
Riverside	23,773,072	279,814,560	2,065	19,300,874	219,672,154	133,171	3,517,953	940,428	4,458,381
Roseville	6,722,839	79,282,960	3,174	6,133,165	72,959,559	43,407	1,846,208	1,084,928	2,931,136
Sacramento	173,680,585	1,435,045,477	27,433	173,680,585	1,435,045,477	564,175	20,066,398	15,398,230	35,464,628
San Francisco PUC	3,159,333	40,581,680	282	3,159,333	40,581,680	21,797	2,270,850	248,842	2,519,692
Shasta Lake	230,875	2,696,154	115	188,209	2,175,177	1,225	120,264	82,689	202,953
Silicon Valley	15,475,424	2,696,154	2,034	13,057,521	166,765,730	89,795	1,717,493	1,997,923	3,715,416
Trinity PUD	21,476	534,859	2	15,033	374,401	227	28,979	-	28,979
Truckee Donner	3,400,369	30,597,688	888	2,491,682	22,413,293	12,042	601,478	393,137	994,615
Turlock ID	13,052,240	146,774,720	1,546	10,415,557	117,227,380	65,261	957,261	304,208	1,261,469
Ukiah	534,607	4,837,391	213	436,904	3,881,184	2,181	169,834	45,759	215,594
Vernon	4,674,583	67,251,624	724	3,272,208	47,076,138	27,478	293,823	56,261	350,084
Victorville	-	-	-	-	-	-	-	-	-
Summary	571,016,957	6,142,218,671	89,305	521,478,250	5,722,100,229	3,022,049	$80,607,610	$53,884,476	$134,475,230

Note: All data is fiscal year, except for the following calendar year utilities: IID, Merced, Modesto, Plumas Sierra, SMUD, Truckee Donner, and TID.

*LADWP believes "Net" savings as a results reporting outcome are abstract and irrelevant for planning power procurement needs, but have been included here to fit the current SB 1037 reporting template. Relating EE achievements in terms relevant to power procurement planning is absolutely essential to credibly establishing EE as a supply-side resource. LADWP supports a paradigm shift in EE goals and results reporting away from the traditional (and obsolete) "gross vs net" considerations and towards a concept of "grid-realized savings", with expected vs actual grid realized savings to be reconciled through EM&V. In this paradigm free-ridership should absolutely still be reviewed and used to inform continuous program evolution and improvement to avoid subsidizing transformed markets. But the savings that matter to power procurement planning are the grid-realized savings, and thus should form the basis of EE portfolios' goals and reported results. LADWP looks forward to engaging the CEC and the other CMUA members in this discussion in the coming year.

Figure 7. Summary of Energy Savings by Program Sector, FY 12/13

All POU Summary		Resource Savings Summary							Cost Summary		
Program Sector (Used in CEC Report)	Category	Units Installed	Gross Annual kWh Savings	Net Demand Savings (kW)	Net Peak kW Savings	Net Annual kWh Savings	Net Lifecycle kWh savings	Net Lifecycle GHG Reductions (Tons)	Utility Incentives Cost ($)	Utility Mktg, EM&V, and Admin Cost ($)	Total Utility Cost ($)
Appliances	Res Clothes Washers	4,930	338,147	663	663	479,071	6,318,041	2,843	$ 292,963	$ 213,268	$ 506,231
HVAC	Res Cooling	67,690	12,870,680	9,087	11,603	14,852,357	252,816,310	145,215	$ 7,781,975	$ 4,143,882	$ 11,925,858
Appliances	Res Dishwashers	1,768	54,565	144	144	79,613	1,023,713	486	$ 101,396	$ 122,494	$ 223,890
Consumer Electronics	Res Electronics	48,767	87,745	782	782	6,388,471	63,603,774	25,091	$ 654,596	$ 693,190	$ 1,347,786
HVAC	Res Heating	651	9,160	318	315	1,110,952	19,999,945	7,871	$ 330,187	$ 126,230	$ 444,060
Lighting	Res Lighting	1,681,071	14,927,980	19,663	11,381	63,597,080	496,862,619	207,641	$ 5,845,570	$ 3,546,492	$ 9,392,062
Pool Pump	Res Pool Pump	2,197	682,763	584	584	1,917,462	26,244,623	11,136	$ 553,638	$ 772,288	$ 1,325,927
Refrigeration	Res Refrigeration	41,436	18,613,550	2,958	2,957	20,305,175	174,698,472	94,549	$ 6,604,070	$ 1,641,654	$ 8,245,723
HVAC	Res Shell	40,988	7,139,914	1,464	1,482	6,787,640	95,188,799	57,986	$ 3,211,169	$ 6,209,303	$ 9,420,472
Water Heating	Res Water Heating	8,311	85,559	18	17	150,550	2,527,897	1,085	$ 103,808	$ 69,682	$ 173,490
Comprehensive	Res Comprehensive	233,491	17,154,122	925	913	16,951,679	41,205,924	23,481	$ 1,920,316	$ 404,553	$ 2,324,869
Process	Non-Res Cooking	2	2,100	41	41	464,200	1,871,500	740	$ 25,586	$ 26,567	$ 52,154
HVAC	Non-Res Cooling	31,433,987	55,983,695	7,032	7,138	47,779,143	621,184,808	369,767	$ 11,083,177	$ 9,165,678	$ 20,248,855
HVAC	Non-Res Heating	3	42,277	7	7	35,352	357,077		$ 8,664	$ 13,390	$ 22,054
Lighting	Non-Res Lighting	22,384,317	130,238,829	27,966	26,422	150,214,405	1,470,386,978	810,801	$ 27,022,755	$ 14,897,836	$ 41,916,091
Process	Non-Res Motors	139,541	6,017,949	16	663	5,694,927	67,490,819	36,920	$ 2,465,115	$ 332,974	$ 2,798,089
Process	Non-Res Pumps	750	1,616,665	97	97	1,530,036	13,584,814	7,960	$ 484,018	$ 47,338	$ 531,356
Refrigeration	Non-Res Refrigeration	483,366	8,293,477	819	803	7,116,875	67,750,796	36,011	$ 1,080,981	$ 703,301	$ 1,784,282
HVAC	Non-Res Shell	1,833	9,600,939	1,635	1,394	9,370,944	36,641,464	19,393	$ 657,285	$ 274,785	$ 932,070
Process	Non Res Process	5,479	77,828,062	10,041	10,006	76,305,437	1,458,161,109	809,698	$ 835,230	$ 1,394,612	$ 2,229,842
Comprehensive	Non Res Comprehensive	13,545,999	26,969,670	755	755	21,137,066	190,980,099	110,756	$ 2,494,097	$ 2,466,939	$ 4,961,035
Other	Other	175,260	8,411,114	1,265		8,411,012	11,432,032	6,530	$ 107,419	$ 56,079	$ 163,498
SubTotal		70,301,838	396,968,961	86,282	78,166	460,679,450	5,120,331,615	2,785,960	$ 73,664,017	$ 47,322,535	$ 120,969,695
T&D	T&D	2	1,112,597	28	28	1,112,597	24,734,078	4,150	$ 0	$ 38,450	$ 38,450
Total		70,301,840	398,081,557	86,310	78,195	461,792,047	5,145,065,693	2,790,110	73,664,017	47,360,984	121,008,145

		Ratio
EE Program Portfolio	TRC Test	**1.72**
	PAC Test	2.75

TRC excludes T&D

Figure 8. Summary of Energy Savings from All Programs, 2006-2013

Year	Net Peak kW Savings	Net Annual MWh Savings	Net Lifecycle MWh Savings	Total Utility Expenditures ($)
FY05/06	52,552	169,303	2,249,214	$ 54,412,728
FY06/07	56,772	254,332	3,062,361	$ 63,151,647
FY07/08	82,730	401,919	4,473,801	$ 103,907,266
FY08/09	117,435	644,260	6,749,912	$ 146,093,107
FY09/10	93,712	522,929	5,586,299	$ 123,433,250
FY10/11	81,121	459,459	4,604,364	$ 132,372,795
FY11/12	82,561	439,710	4,638,521	$ 126,936,631
FY12/13	89,305	521,478	5,722,100	$ 134,475,230
TOTAL	**656,187**	**3,413,390**	**37,086,572**	**$ 884,782,654**

Figure 9. Total Program Expenditures, 2006-2013

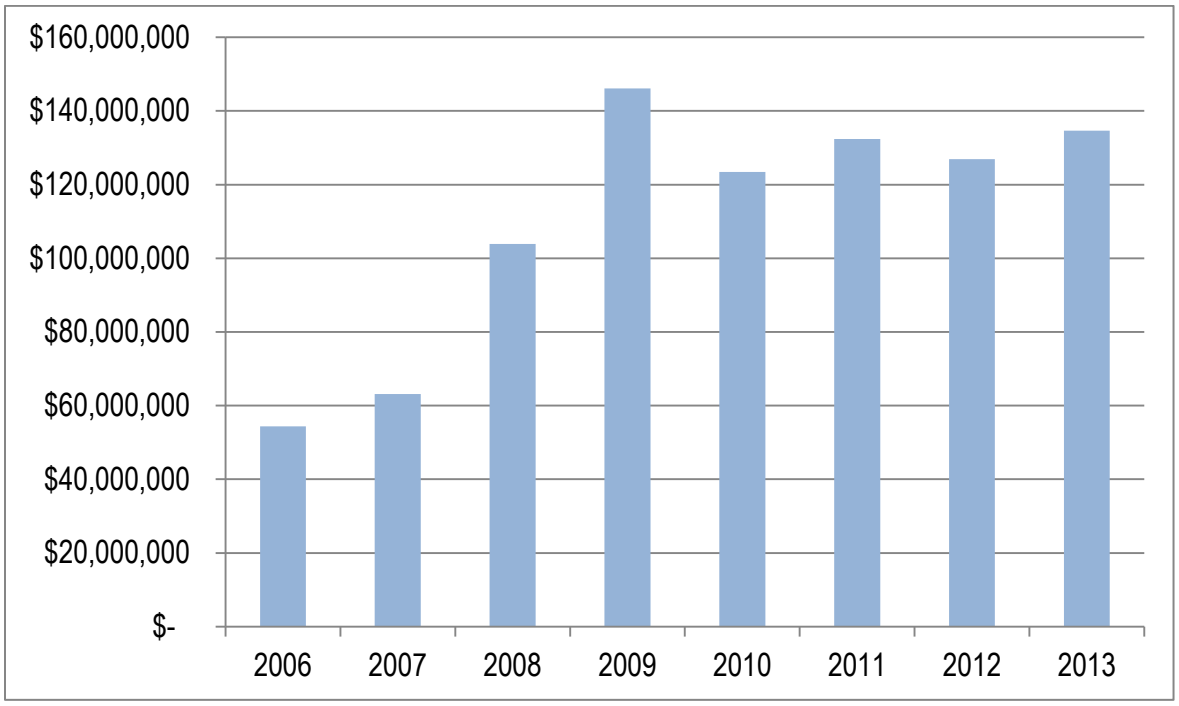

Figure 10. Utilities Most Heavily Influencing Energy Efficiency Savings

Utility	Net Annual KWh Savings	Utility Percent of Total Savings	Cumulative Percentage of Total Savings
Sacramento	173,680,585	33.3%	33.3%
Los Angeles	171,477,109	32.8%	66.1%
Anaheim	28,672,818	5.5%	71.6%
Riverside	19,300,874	3.7%	75.3%
Imperial	17,799,981	3.4%	78.7%
Pasadena	16,896,694	3.2%	81.9%
Silicon Valley	13,057,521	2.5%	84.4%
Glendale	12,601,727	2.4%	86.8%
Turlock	10,415,557	2.0%	88.8%
Burbank	10,069,940	1.9%	90.8%
Modesto	9,226,846	1.8%	92.5%
Palo Alto	8,074,481	1.5%	94.1%
Roseville	6,133,165	1.2%	95.3%
Azusa	3,806,793	0.7%	96.0%
Vernon	3,272,208	0.6%	96.6%

Figure 10 provides the FY12/13 data for the 15 utilities with the highest annual net savings. These 15 utilities provided 96.6% of the total amount reported by the entire POU community.

Continuing a long-standing trend, the majority of energy efficiency program impacts reflect public power's two largest utilities: LADWP and SMUD. From a state policy perspective focused on understanding the diversity within public power, it is important to recognize the energy efficiency program trends of the other POUs across the state. **Figure 11** highlights public power's commitment to energy efficiency programs, excluding LADWP and SMUD. During F12/13, the remaining utilities spent nearly $49 million on energy efficiency programs. While the demand (kW), annual savings (kWh), and total utility expenditures all decreased slightly from last year, the results are consistent with the general trends over the past four reporting years.

Figure 11. Summary of All POU Programs (excluding LADWP & SMUD), 2006-2013

Year	Net Peak kW Savings	Net Annual MWh Savings	Net Lifecycle MWH savings	Total Utility Cost ($)
FY05/06	19,292	67,766	953,628	$ 21,921,485
FY06/07	21,174	96,741	1,402,162	$ 28,663,125
FY07/08	37,822	171,738	2,079,276	$ 39,000,521
FY08/09	40,791	208,658	2,670,085	$ 45,476,667
FY09/10	37,781	219,315	2,529,693	$ 51,301,075
FY10/11	38,285	161,572	1,909,185	$ 52,061,405
FY11/12	45,705	187,843	2,258,294	$ 52,140,211
FY12/13	38,424	176,321	1,706,108	$ 48,758,002
TOTAL	**279,274**	**1,289,954**	**15,508,431**	**339,322,491**

Understanding Public Power Energy Efficiency Funding Sources

Section 9505(a)(3) of the Public Utilities Code requires POUs to include "the sources of funding for its investment in energy efficiency and demand reduction program investments." To that end, unless otherwise noted, program funding for energy efficiency programs within the public power community comes from the public goods charge that is collected from each utility customer pursuant to Section 385 of the Public Utilities Code.

The public goods charge is designated not only for energy efficiency, but also for renewable investment, electricity-related research and development, and low income assistance. When the Legislature authorized the imposition of the public goods charge beginning in 1998, local governing boards were afforded full discretion regarding how these funds would be allocated. Over the years, certain restrictions have been imposed on this discretion, limiting how future dollars can be allocated. As an example, under the California Solar Initiative, public utilities are precluded from reducing their expenditures on energy efficiency or low income assistance to fund its solar programs. That said, local governing boards allocate the majority of their public benefits expenditures to energy efficiency programs.

In some instances, local governing boards allocate dollars above and beyond public benefits expenditures, or even increase the public benefits surcharge to a level above the minimum 2.85% of sales requirement. Additional dollars as a practical matter come from the general fund of each jurisdiction, but could, from an energy policy context, be considered a means to defer procurement investment, to put it in context that is consistent with Section 9505(a)(3).

Critical to the ultimate success of public power energy efficiency programs is the ability to optimize the use of public dollars that are dedicated to energy efficiency activities. Putting aside the growing costs of measurement and verification, the majority of expenditures represent direct incentives to the customer and direct installation costs. By keeping overhead costs low, POUs are able to maximize the flow of money into their respective communities, which fosters economic development and customer investment into existing building infrastructures. In turn, these investments help to retain local jobs as well as promote local job growth.

The average cost per kWh saved for all POUs is 26 cents per kWh. However, this total does not capture the full electricity savings over the lifetime of different measures. The cost per kWh saved over the lifetime of the energy efficiency measures is an estimated at less than 2.5 cents per kwh. It is clear that California's POUs have established a high benchmark for efficient and effective delivery of energy efficiency programs.

VI. Evaluation, Measurement, and Verification

Section 9505(d) of the Public Utilities Code requires that each local publicly owned electric utility shall make available to its customers and to the CEC the results of any independent evaluation that measures and verifies the energy efficiency savings and the reduction in energy demand achieved by its energy efficiency. Public power has strategically responded to this directive in a manner that confirms the accuracy of reported savings while optimizing the exchange of program information across the entire range of public power utilities, large and small.

The EM&V process used to provide utility program managers with feedback relies generally on the approaches articulated in the National Action Plan for Energy Efficiency, adopted CPUC protocols, and the innovation and expertise of firms experienced in program evaluation. To further enhance the value of the information obtained from these reports, the public power community has been working closely with CEC staff to develop a consistent set of evaluation guidelines for third-party consultants that are retained to evaluate utility programs. During the past two years, the CEC has conducted several workshops regarding the EM&V process and has created a working version of evaluation guidelines, and these insights are already adding value to the analyses being undertaken across the public power community. CMUA, SCPPA and NCPA continue their active collaboration in this regard, sharing best practices and coordinating the distribution of program evaluation information throughout the public power community.

EM&V reports are intended to help utilities to understand the effectiveness of specific program areas with the purpose of enhancing program offerings in the future. Many of the EM&V studies completed to date focused on measures with high savings and measures that exhibit the greatest levels of uncertainty. Key findings from the reports submitted by POUs continue to confirm high realization rates for utility-reported energy savings, corroborating that public power's energy efficiency reporting provides a reliable source of data to help state policymakers gauge the success of the state's overall energy efficiency efforts.

The economic slowdown has had an impact on program evaluation and savings realization rates. In some cases, businesses participating in energy efficiency programs do not survive the economic downturn, even though the efficiency measures they paid for were installed, but ultimately are not being utilized as intended. In essence, unanticipated vacancies can negatively impact realization rates. In addition to the economic impacts, the continuing debate surrounding the use of net-versus-gross savings, especially when empirical data is not readily available, has made it difficult for evaluators to conduct a reliable net-to-gross analysis. Such debate is not exclusively focused on public power. The IOUs have effectively abandoned the use of net savings, something the public power community will consider going forward.

At the time this report was published, the public power community had made available more than 75 separate EM&V studies. Unless otherwise noted, each document is available at http://www.ncpa.com/current-issues/energy-efficiency-reports.html. A number of utilities are currently in the process of completing EM&V studies for 2013 programs. These and other subsequent reports will be posted to the above URL as they become available. POU-specific information regarding EM&V activities can be found in the utility narratives contained in **Appendix A**.

VII. CONCLUSIONS & POLICY CONSIDERATIONS

Conclusions

CMUA, NCPA, and SCPPA appreciate the opportunity to provide this report on the results of the energy efficiency programs administered by public power in California over fiscal year 2013. This section highlights the continued commitment of the POUs to making significant investments in energy efficiency on behalf of the customers and communities they serve. In the following section, public power offers policy considerations regarding future energy efficiency programs in furtherance of the state's energy, environmental, and economic goals.

FY12/13 Energy Efficiency Program Results

Regarding POU programs provided in FY12/13, the principal findings of this analysis are as follows:

- **Significant Investment:** POUs spent $134.5 million on energy efficiency programs. This is the sixth consecutive year the $100 million threshold has been exceeded.
- **Peak Demand Reduction:** Public power programs reduced peak demand by more than 89.3 megawatts.
- **Energy Savings:** Net annual savings totaled more than 521,478 (MWh).
- **Years of Success:** Since 2006, POUs have invested nearly $885 million in energy efficiency programs, reduced peak demand by more than 656 megawatts, and achieved more than 3.4 million MWh in savings.
- **Cost-Effectiveness:** Applying the Total Resource Cost (TRC) societal test, the principal measure used in the industry to determine whether programs are cost-effective, the aggregated TRCs for public power is 1.72 in FY12/13.
- **Most Savings:** Lighting continues to dominate public power energy efficiency programs, accounting for almost half of the total energy savings achieved (46%).
- **Efficacy of Programs:** The average cost per kWh saved from all POU programs is $0.258/kwh. The cost per kWh saved over the lifetime of the various energy efficiency measures is $0.024/kWh.

Policy Considerations

California's 40 years of energy efficiency policy represents a significant environmental and ratepayer accomplishment, and public power is proud of our role in the state's clean energy legacy. Looking ahead, the relationships that POUs nurture with their customers will become increasingly important in order to ensure continued success. Furthermore, public power is uniquely situated in our communities to facilitate broader partnerships with a range of stakeholders who play significant roles in achieving energy savings in both existing buildings and new construction. With this being the eighth year that public power has issued this report, we would like to offer the following observations – based on our collective experience administering energy efficiency programs – that are intended to guide policy considerations going forward.

1. Customers drive success of energy efficiency programs

POUs go to great lengths to plan, develop, and implement energy efficiency incentive programs that will attract customer participation, as evidenced by the sustained success of public power programs discussed in **Chapter V** and summarized in the section above. A POU's relationships with their customers are critical to understanding the unique needs and motivations of customers in their service territory. **Chapter III** discussed some of the various factors that directly impact customer decision-making. **Chapter VI** explored the principles of EM&V report and the crucial feedback they provide regarding measure and program performance that informs utility program planning.

A thorough understanding of the factors and motivations that influence customer decision-making is vital to future success of POU and the state's energy efficiency programs. The CEC correctly states in the AB 758 Draft Action Plan that, "Consumers make decisions on energy efficiency expenditures based on many factors beyond costs. These factors can include social context, lifestyle, regional differences, cultural norms, habits, and psychology." Public power's years of experience working with customers on energy efficiency supports this concept that individuals' personal beliefs regarding energy efficiency vary a great deal and influence their decision-making. Furthermore, in many cases a customer's decision to make energy efficiency improvements is not primarily motivated by energy benefits or a specific attitude towards energy efficiency. Arthur Rosenfeld, prior to becoming a CEC Commissioner, co-authored research (Mills & Rosenfeld, 1996) that framed customer motivations as follows:

> *"From a consumer perspective, it is often the non-energy benefits that motivate (or can be used to promote) decisions to adopt energy-efficient technologies. Consumer benefits can be grouped into the following categories: (1) improved indoor environment, comfort, health, and safety (2) reduced noise, (3) labor and time savings, (4) improved process control, (5) increased amenity or convenience, (6) water savings and waste minimization, and (7) direct and indirect economic benefits from downsizing or elimination of equipment. Consumer awareness of non-energy benefits is also relevant to utilities, energy service companies, and others seeking to sell efficiency. While energy-efficient technologies help provide equivalent services at lower costs, non-energy benefits can actually add value or enhance the energy services delivered by efficient technologies. In addition, where certain market segments are not sensitive to economic arguments (e.g., in the*

proverbial "landlord-tenant" split-incentive situation) non-energy benefits can assume special importance. From the perspective of energy consumers, non-energy benefits can equal or even exceed the importance of the energy cost avoided, thus meriting greater consideration in private investment decisions, marketing strategies, design and evaluation of utility programs, and government policies designed to promote energy efficiency."

Nearly 20 years later, the findings of the research are no less true. Understanding customer motivations for investing – and not investing – in energy efficiency is particularly critical to POU and CEC programs targeting energy savings in existing buildings. While there remain significant energy savings opportunities in existing buildings, motivating customers to pursue improvements to realize those savings presents real challenges given decades of effective energy efficiency programs in California. Efforts to reduce energy in existing buildings would be greatly advantaged by additional research to contextualize customer decision-making regarding energy efficiency, and to better identify which non-energy benefits are most likely to motivate different sub-sections of the customer spectrum to pursue energy saving measures.

2. Deeper energy savings require stronger partnerships with a diverse array of stakeholders

Related to understanding customer motivations is recognizing that regulatory requirements and utility incentives represent only a couple of the strategies needed to further reduce customer energy usage in California. The state's pursuit of its aggressive energy savings goals, for which achieving success will be increasingly difficult and complex, necessitates greater collaboration amongst the CEC, utilities, and a growing universe of stakeholders.

In the AB 758 Draft Action Plan, the CEC again correctly states, "Regulatory solutions alone will not meet with sufficient success; true success will involve the widest array of participants applying creative, systemic solutions in the marketplace. Successful approaches will first and foremost meet the needs of building owners and occupants. In addition contractors, architects, local building officials, equipment manufacturers and suppliers, banks, and many others may touch any given building project, and must be part of the conversation around AB 758 implementation."

Similarly, in seeking resolution to the outstanding implementation issues in the ZNE building program the CEC acknowledges that, "At a minimum, the Energy Commission should obtain the input of the CPUC, the ARB, the Governor's Office of Planning and Research, investor-owned and publicly-owned utilities, the building industry, environmental groups, and environmental justice representatives on these issues."

The positioning of POUs in local governments and their strong working relationships with stakeholders in their communities creates opportunities for public power to facilitate partnerships that support energy efficiency in existing buildings, as well as implementation of codes and standards updates. POUs look forward to continuing to participate in workshops and forums to identify new opportunities to collaborate with other stakeholders on supporting energy efficiency investments, as well as to better understand developments that are likely to affect their own customer programs.

3. Transparent and reliable metrics are essential

The foundation of all energy efficiency programs is firmly rooted in the energy savings estimates for measures. If the energy savings estimates for measures are wrong, then no meaningful evaluation of program can be completed. As noted in **Chapter IV**, public power will shift away in the next reporting year from DEER to a technical reference manual (TRM), designed specifically for POU programs. In addition to developing more accurate energy savings estimates for POU measures, the TRM includes standardized methodologies and best practices for custom measures for which current energy savings data is limited. Overall, the TRM provides greater consistency, and improves reporting practices for all POUs.

Beyond energy savings estimates, the next major metric of energy efficiency programs is reported savings. Evaluations with different purposes will rely on different metrics for reported savings. If the purpose of the evaluation is to incorporate utility energy efficiency program results into demand forecasts, then ***gross savings*** are most appropriate. If the goal is to evaluate only the energy savings attributable to a utility program, discounting savings associated with 'free ridership' and other factors, then ***net savings*** are used. Though not entirely useful or relevant to utility resource planning or operations, net energy savings are presented in this report.

Estimating net savings has always been a difficult task because it involves comparing actual program results (gross savings) to that which cannot be observed – namely, what a customer would have done in the absence of the program. Calculating net savings is becoming even more difficult as projects and programs become increasingly complex. Utilities are also not exclusive providers of energy efficiency services and programs; in fact, the AB 758 Draft Action Plan is explicitly designed to expand the non-utility energy efficiency marketplace. More complex measures and marketplace mean the methodologies that attempt to calculate net savings are also becoming increasingly complicated.

Previous POU annual reports showed results in terms of net energy savings in order to ensure the POUs did not overstate their energy savings accomplishments. However, the CEC also uses the POU annual report to inform the state's long term electricity demand forecasts. Projections based on net energy savings have a greater propensity to be incorrect since they are not based on the actual energy reductions. Therefore, POUs will report gross savings, in addition to net savings. This supports CEC efforts to develop the state's long term electricity demand forecasts.