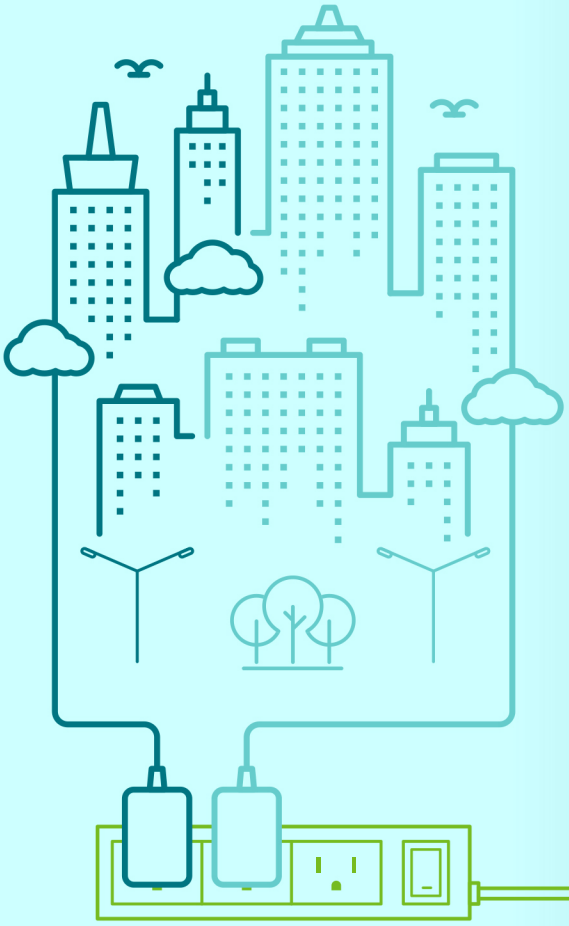

Energy EFFICIENCY

IN CALIFORNIA'S PUBLIC POWER SECTOR

13TH EDITION – 2019

TABLE OF CONTENTS

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EXECUTIVE SUMMARY

California's publicly owned utilities (POUs) have collaborated since 2006 on developing energy efficiency programs and reporting annual results to their customers and the California Energy Commission (CEC) in a consistent and comprehensive manner. This thirteenth report presents the latest results from POUs' wide range of energy efficiency programs.

During the Fiscal Year 2018 reporting cycle, POUs expended **$219 million** on energy efficiency programs, resulting in **639 GWh** of net annual energy savings and reducing peak demand by nearly **129 MW**. Since the enactment of Senate Bill 1037 (Kehoe, 2005), public power has spent more than **$1.8 billion** on energy efficiency, achieving over **81,849 GWh** in net lifecycle energy savings.

In coordination with CEC staff over the last year, POUs have developed a new cost-effectiveness tool and reporting platform (CET/RP) to improve the tracking and evaluation of energy efficiency programs. Details on the new CET/RP are presented in the section on Resources & Tools, including a review of the many enhancements that were created to evaluate POUs' energy efficiency programs.

Moving forward, public power's ability to work together and creatively solve problems will be key to the success of California's aggressive initiatives to cost-effectively reduce both energy use and greenhouse gas emissions. The successes of the past provide an excellent foundation on which public power will continue to build upon.

INTRODUCTION

Pursuant to section 9505 of the Public Utilities Code, each year POUs are required to report the following information to customers and the California Energy Commission [1]:

1. Investments in energy efficiency and demand reduction programs.
2. Descriptions 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.
3. Sources for funding of energy efficiency and demand reduction programs.
4. Methodologies and input assumptions used to determine cost-effectiveness of programs.
5. A comparison of the POUs' annual energy efficiency targets and the POUs' reported electricity efficiency savings and demand reductions.

This collaborative report compiles the required data from the individual POUs into a single, comprehensive document in compliance with section 9505.

The state's POUs supply more than one-quarter of California's electricity, to a broad range of communities with widely differing climates, customer bases, and economic conditions. This compilation is presented to foster analyses of broader energy efficiency trends and offer policymakers data-driven considerations regarding the practical impacts of related policies.

The POUs have long supported California's energy efficiency policies and administered programs to provide financial incentives and rebates to POU customers for investments in a variety of energy saving measures. The purpose of this report is not only to look back on the success of the past year, but also to look ahead and inform discussions on how to achieve additional energy savings in the future.

> "As California contemplates how best to meet our goals for deep carbon emissions reductions – roughly 85 percent reduction from today's levels by 2050 – it is clear that energy efficiency is central to whatever path we take."
>
> **CEC Commissioner Andrew McAllister**

[1] Public Utilities Code Section 9505

PROGRAM RESULTS

This section provides an overview of the energy efficiency program results for public power in California during Fiscal Year (FY) 2018. Most POUs manage and implement energy efficiency programs on a fiscal year basis; for POUs that operate on a calendar year basis, their respective report results for FY 2018 are equal to that of Calendar Year 2018.[2]

Appendix A contains additional information on each POU's portfolio, including program descriptions, expenditures, and energy savings.

In summary, during the 2018 reporting cycle, POUs collectively spent **$218.7 million** on energy efficiency programs, resulting in **639 GWh** of net annual energy savings, with **8,268 GWh** of net lifecycle energy savings and reduced peak demand by **129 MW**. **Table 1** presents a comparison of POUs' energy efficiency historic program results.

TABLE 1: Historic Program Results

Year	Net Peak Savings (kW)	Net Annual Savings (MWh)	Net Lifecycle Savings (MWh)	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
FY13/14	110,437	625,187	6,413,468	$ 169,901,735
FY14/15	124,807	644,703	7,836,316	$ 162,896,993
FY15/16	107,925	771,592	10,253,633	$ 154,796,668
FY16/17	113,549	861,942	11,991,602	$ 226,386,251
FY17/18	129,244	638,656	8,267,536	$ 218,730,235
TOTAL	**1,242,149**	**6,955,469**	**81,849,127**	**$ 1,817,494,536**

Since 2006, public power has collectively spent over **$1.8 billion** on energy efficiency, resulting in **81,849 GWh** in net lifecycle energy savings.

[2] POU fiscal years run from July 1 to June 30, except for the following POUs who operate on a calendar year basis: Imperial Irrigation District, Merced Irrigation District, Modesto Irrigation District, Plumas-Sierra Rural Electric Co-op, Sacramento Municipal Utility District, Truckee Donner Public Utility District, and Turlock Irrigation District.

As presented in **Table 2**, below, POUs' cumulative first year savings from FY 2015 through FY 2018 equals **2,429 GWh**. These cumulative savings are approximately **69 GWh** above the target cumulative goals for CA POUs, as presented in Table A11 of the California Energy Commission's *Senate Bill 350: Doubling Energy Efficiency Savings by 2030* Report.[3] The Policy Consideration section discusses in further detail the importance of POUs' efforts to help meet the State's doubling of energy efficiency goals.

TABLE 2. CA POU Cumulative Energy Savings Comparison

1st Year Savings (GWh) per Installation Year					
2015	2016	2017	2018	Cumulative Savings	CEC Cumulative Savings Target
642.9	523.9	623.8	638.7	2,429.3	2,360

Table 3 below provides a comprehensive summary of the energy efficiency savings for all POUs' respective energy efficiency Portfolios in FY2018. In terms of raw savings, the 16 largest utilities subject to Integrated Resource Plan (IRP) requirements account for the vast majority of savings within the public power community.[4] As in past years, the two largest POUs, Los Angeles Department of Water & Power (LADWP) and Sacramento Municipal Utility District (SMUD), accounted for roughly two-thirds of total POU savings during the 2018 reporting cycle. Taken as a group, the 16 IRP POUs produced 97% of the total savings. The remainder of the savings were realized by 32 smaller and mid-sized utilities located throughout California.

[3] California Energy Commission, October 2017, *Senate Bill 350: Doubling Energy Efficiency Savings by 2030*.

TABLE 3. Energy Efficiency Program Results by Utility [5]

Summary by Utility	Resource Savings Summary							Cost Summary	Cost Test Ratios		
Utility	Gross Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility ($/kWh)
Alameda	180	1,471,579	20,741,534	162	1,362,479	19,242,186	7,687	$ 875,637	1.95	1.18	$ 0.060
Anaheim	4,361	20,136,148	233,959,277	4,361	20,136,148	233,959,277	88,626	$ 4,914,824	4.56	7.10	$ 0.027
Azusa	654	3,036,347	33,783,387	637	2,872,363	32,002,410	12,625	$ 731,703	4.10	5.94	$ 0.030
Banning	1,144	150,301	1,610,310	911	124,871	1,354,002	550	$ 207,194	0.81	1.20	$ 0.191
Biggs	-	51,216	256,080	-	46,094	230,472	117	$ 20,936	0.94	0.94	$ 0.099
Burbank	4,253	14,451,356	123,765,099	4,212	14,312,559	122,344,415	47,777	$ 3,635,878	3.62	1.25	$ 0.036
Colton	315	2,001,970	20,909,142	253	1,508,946	15,796,947	6,692	$ 1,413,864	27.64	29.37	$ 0.113
Glendale	4,455	10,201,043	39,748,649	4,414	10,133,699	38,645,052	16,032	$ 1,843,996	2.32	2.17	$ 0.061
Gridley	29	104,348	1,276,213	20	86,724	982,417	412	$ 92,378	1.32	0.89	$ 0.118
Healdsburg	102	687,772	8,255,258	85	581,351	6,966,033	2,728	$ 257,685	2.82	0.83	$ 0.038
Imperial	7,403	18,626,472	250,671,076	6,151	15,432,152	209,038,646	97,703	$ 5,298,497	4.15	7.01	$ 0.037
Lassen	35	262,065	2,935,758	27	220,118	2,450,699	976	$ 102,815	2.24	1.61	$ 0.052
Lodi	371	3,190,405	38,444,771	272	2,487,074	29,641,708	12,154	$ 792,018	3.67	2.11	$ 0.033
Lompoc	40	306,406	4,483,302	28	207,818	3,040,544	1,127	$ 108,541	2.78	1.68	$ 0.041
Los Angeles	52,710	346,408,005	5,052,753,288	52,704	346,379,055	5,052,405,888	292,162	$ 131,042,086	1.72	0.85	$ 0.034
Merced	-	2,037,395	20,405,526	-	1,624,970	16,264,098	6,549	$ 1,068,008	1.35	1.53	$ 0.081
Modesto	1,285	6,719,789	74,927,724	1,045	5,523,033	61,468,862	24,892	$ 2,426,614	3.16	1.43	$ 0.040
Moreno Valley	628	4,716,930	47,271,023	563	4,236,312	42,420,820	16,721	$ 183,523	22.54	22.63	$ 0.005
Needles	1	5,875	83,542	1	4,875	71,052	28	$ 148,370	0.04	0.97	$ 2.851
Palo Alto	415	8,988,048	100,491,731	232	5,956,736	63,217,786	21,436	$ 3,080,534	1.74	0.65	$ 0.056
Pasadena	1,536	13,526,452	81,800,786	1,504	13,353,078	79,581,441	31,029	$ 4,042,594	2.26	2.26	$ 0.059
Plumas-Sierra	33	82,921	1,116,146	24	57,730	806,337	346	$ 124,828	0.73	0.46	$ 0.208
Port of Oakland	-	648,755	7,785,060	-	519,004	6,228,048	3,042	$ 45,829	13.51	1.24	$ 0.009
Rancho Cucamonga	171	480,554	7,688,864	171	480,554	7,688,864	2,760	$ 87,879	7.78	21.37	$ 0.016
Redding	1,109	7,028,979	54,926,085	861	5,518,363	42,010,053	18,871	$ 2,654,740	1.91	1.15	$ 0.072
Riverside	3,416	23,555,710	309,433,140	2,930	22,240,608	276,855,125	110,446	$ 5,974,465	5.29	19.97	$ 0.029
Roseville	1,829	15,873,872	99,313,187	1,608	14,957,621	89,520,947	39,505	$ 4,001,169	1.26	1.27	$ 0.055
Sacramento	36,823	131,521,260	1,567,460,963	28,825	110,819,702	1,333,705,655	88,853	$ 30,976,348	1.15	0.26	$ 0.028
San Francisco	126	4,262,300	63,934,500	126	4,262,300	63,934,500	29,487	$ 5,054,602	1.52	1.45	$ 0.106
Shasta Lake	40	166,772	2,223,528	22	130,745	1,661,188	672	$ 135,744	1.42	1.14	$ 0.105
Silicon Valley Power	1,943	15,620,586	212,107,277	1,660	13,515,623	182,846,581	68,650	$ 4,313,248	3.87	2.53	$ 0.031
Trinity	7	2,588	35,480	6	1,937	27,048	13	$ 128,825	0.03	0.10	$ 6.268
Truckee Donner	28	261,699	2,636,803	22	202,089	1,982,231	828	$ 411,587	0.61	0.89	$ 0.273
Turlock	2,726	13,802,965	159,746,452	2,691	13,599,570	157,066,969	59,345	$ 1,984,134	7.47	2.37	$ 0.016
Ukiah	17	135,780	1,711,500	13	102,789	1,267,873	549	$ 87,137	1.66	1.07	$ 0.087
Vernon	948	5,383,804	66,720,063	948	5,383,804	66,720,063	25,093	$ 473,988	12.57	10.89	$ 0.009
Victorville	110	340,831	5,112,465	88	272,665	4,089,972	1,516	$ 43,896	7.58	1.61	$ 0.015
TOTAL	**129,244**	**676,249,299**	**8,720,524,989**	**117,578**	**638,655,559**	**8,267,536,209**	**1,137,999**	**$ 218,786,114**	**1.99**	**0.95**	**$ 0.036**

[5] Due to challenges in converting to the new reporting tool, SMUD's TRC ratio in Table 3 is incorrect. SMUD is working to correct the issue before the next reporting cycle.

Table 4 breaks down the statewide results by end-use. As has occurred for the past few years, lighting programs once again account for the largest share of the annual energy savings (**53.1%**).

TABLE 4. Energy Efficiency Program Results by Measure Category

Summary by End-Use	Resource Savings Summary							Cost Summary	Cost Test Ratios		
End-Use Category	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility ($/kWh)
All	13,755	6,473,363	85,231,306	11,858	5,666,334	74,870,325	12,824	$ 434,643	7.96	3.63	0.008
Appliance & Plug Loads	7,077	32,481,772	259,638,170	6,361	28,749,593	232,821,714	25,320	$ 6,250,522	1.86	0.81	0.032
BROs	8	15,958,552	28,788,577	8	13,438,552	23,748,577	2,749	$ 662,864	1.15	1.15	0.028
Building Envelope	4,009	10,921,307	288,108,238	3,741	9,898,151	270,036,528	22,269	$ 7,390,993	1.54	0.46	0.049
Commercial Refrigeration	213	10,442,994	151,368,729	184	8,563,776	123,730,766	17,880	$ 2,449,952	2.01	0.90	0.026
Food Service	58	231,747	3,036,336	51	196,299	2,609,993	570	$ 60,969	3.23	2.55	0.030
HVAC - Cooling	20,828	61,430,367	778,707,826	19,313	54,533,870	680,851,403	182,045	$ 33,288,063	1.88	1.46	0.066
HVAC - Heat Pump	3	5,440	81,600	3	4,352	65,280	29	$ 5,525	2.43	2.04	0.113
HVAC - Heating	(4)	67,662	1,077,279	(7)	62,573	975,501	480	$ 1,304,974	1.12	0.93	1.802
Lighting - Indoor	45,745	318,757,629	4,359,335,345	44,451	307,051,053	4,225,979,315	532,547	$ 103,602,579	2.07	0.85	0.033
Lighting - Outdoor	2,568	18,875,038	304,650,470	2,177	16,833,482	268,456,401	128,826	$ 6,581,525	3.45	3.42	0.035
Miscellaneous	14,466	80,766,722	723,742,711	11,797	78,299,892	690,204,705	81,534	$ 19,307,411	1.80	1.33	0.037
Process	440	3,299,375	38,492,489	389	2,881,199	33,329,614	12,645	$ 703,702	4.06	3.68	0.027
Service & Domestic Hot Water	19	504,772	5,174,059	13	315,062	3,276,299	503	$ 254,766	0.53	0.47	0.095
Water Pumping / Irrigation	62	32,985,219	488,169,834	53	32,902,735	486,933,539	30,272	$ 710,313	30.70	30.07	0.002
Whole Building	14,233	42,886,934	626,655,858	11,430	39,201,995	572,540,107	44,570	$ 12,206,430	1.28	0.34	0.028
EE Subtotal	123,483	636,088,894	8,142,258,827	111,821	598,598,918	7,690,430,067	1,095,065	$ 195,215,232	2.09	0.97	0.034
Low Income	5,761	40,160,404	578,266,161	5,757	40,056,643	577,106,143	42,935	$ 23,570,882	1.11	0.79	0.056
EE and Low Income Subtotal	129,244	676,249,298	8,720,524,988	117,578	638,655,561	8,267,536,209	1,137,999	$ 218,786,114	1.99	0.95	0.036
Codes and Standards	11,254	178,180,808	2,665,115,480	11,254	178,180,808	2,665,115,480	147,423	$ 4,572,115	21.14	18.34	0.003
Transmission and Distribution	(13)	3,924,887	4,890,290	(13)	3,924,887	4,890,290	2,571	$ 215,742	5.57	4.18	0.046
Utility Total	**140,485**	**858,354,993**	**11,390,530,758**	**128,819**	**820,761,256**	**10,937,541,979**	**1,287,993**	**$ 223,573,971**	**2.38**	**1.16**	**$0.028**

Table 5 presents the statewide energy efficiency program results by sector. As can be expected, the commercial sector accounts for the majority of POUs' annual energy savings (**64.6%**) and residential programs resulted in **27.6%** of the total savings.

TABLE 5. Energy Efficiency Program Results by Sector

Summary by Sector	Resource Savings Summary							Cost Summary	Cost Test Ratios		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility ($/kWh)
Agricultural	165	739,894	10,340,114	160	701,979	9,923,051	3,911	$ 110,765	8.03	3.06	0.015
Commercial	80,911	410,813,623	5,649,293,319	74,561	388,922,452	5,365,030,271	773,159	$ 131,006,916	2.12	0.85	0.033
Industrial	1,646	11,797,802	151,471,884	1,524	10,596,621	137,128,539	52,843	$ 1,848,208	6.23	3.04	0.017
Other	1,124	37,493,649	538,930,445	1,124	37,470,827	538,714,348	49,891	$ 2,543,464	10.25	7.38	0.006
Residential	39,637	175,243,925	1,792,223,064	34,453	160,907,040	1,639,633,857	215,262	$ 59,705,880	1.55	1.05	0.050
EE Subtotal	123,483	636,088,894	8,142,258,827	111,821	598,598,918	7,690,430,067	1,095,065	$ 195,215,232	2.09	0.97	0.034
Low Income	5,761	40,160,404	578,266,161	5,757	40,056,643	577,106,143	42,935	$ 23,570,882	1.11	0.79	0.056
EE and Low Income Subtotal	129,244	676,249,298	8,720,524,988	117,578	638,655,561	8,267,536,209	1,137,999	$ 218,786,114	1.99	0.95	0.036
Codes and Standards	11,254	178,180,808	2,665,115,480	11,254	178,180,808	2,665,115,480	147,423	$ 4,572,115	21.14	18.34	0.003
Transmission and Distribution	(13)	3,924,887	4,890,290	(13)	3,924,887	4,890,290	2,571	$ 215,742	5.57	4.18	0.046
Utility Total	**140,485**	**858,354,993**	**11,390,530,758**	**128,819**	**820,761,256**	**10,937,541,979**	**1,287,993**	**$ 223,573,971**	**2.38**	**1.16**	**$0.028**

Table 6 compares the actual savings in 2018 to the POUs' adopted annual targets for each utility. In total, the actual energy savings were 24% above forecasted levels for 2018.

TABLE 6. 2018 Annual Target and Actual Savings Comparison[6]

Utility	Size	Reported (MWh)	Target (MWh)	% of Target
Alameda	Non-IRP	1,362	1,459	93.4%
Anaheim	IRP	20,136	18,756	107.4%
Azusa	Non-IRP	2,872	1,600	179.5%
Banning	Non-IRP	125	328	38.1%
Biggs	Non-IRP	46	7	674.0%
Burbank	IRP	14,313	10,874	131.6%
Colton	Non-IRP	1,509	2,606	57.9%
Glendale	IRP	10,134	8,731	116.1%
Gridley	Non-IRP	87	108	80.3%
Healdsburg	Non-IRP	581	490	118.5%
Imperial	IRP	15,432	15,674	98.5%
Lassen	Non-IRP	220	353	62.4%
Lodi	Non-IRP	2,487	1,227	202.7%
Lompoc	Non-IRP	208	213	97.5%
Los Angeles	IRP	346,379	247,849	139.8%
Merced	Non-IRP	1,625	1,258	129.2%
Modesto	IRP	5,523	9,144	60.4%
Moreno Valley	Non-IRP	4,236	766	553.2%
Needles	Non-IRP	5	19	25.1%
Palo Alto	IRP	5,957	7,280	81.8%
Pasadena	IRP	13,353	13,373	99.9%
Plumas-Sierra	Non-IRP	58	149	38.8%
Port of Oakland	Non-IRP	519	517	100.4%
Rancho Cucamonga	Non-IRP	481	293	163.8%
Redding	IRP	5,518	3,336	165.4%
Riverside	IRP	22,241	20,594	108.0%
Roseville	IRP	14,958	8,413	177.8%
Sacramento	IRP	110,820	112,626	98.4%
San Francisco	IRP	4,262	2,736	155.8%
Shasta Lake	Non-IRP	131	487	26.8%
Silicon Valley Power	IRP	13,516	12,851	105.2%
Trinity	Non-IRP	2	7	28.4%
Truckee Donner	Non-IRP	202	730	27.7%
Turlock	IRP	13,600	7,357	184.8%
Ukiah	Non-IRP	103	398	25.8%
Vernon	IRP	5,384	2,652	203.0%
Victorville	Non-IRP	273	149	183.1%
Total		**638,656**	**515,411**	**123.9%**

[6] Annual targets exclude codes & standards savings, to be consistent with energy efficiency savings reported in Table 3.

POLICY CONSIDERATIONS

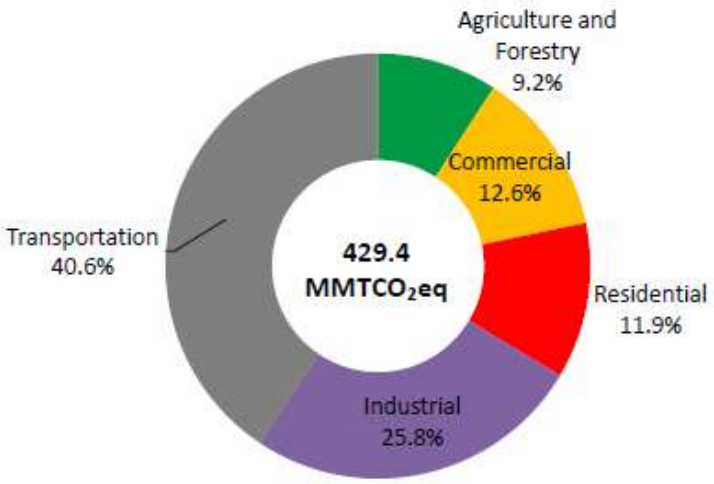
This section provides an overview of the policy considerations surrounding the development, implementation, and successes of public power's energy efficiency programs.

California is a leader in advancing energy efficiency policies and technologies, and the state's work in this area has had a well-documented dramatic impact on electricity demand. Since the establishment of the Title 24 building standards in 1978, energy efficiency programs have saved California consumers in excess of $100 billion.[7] POU communities have played a key role in supporting the state's accomplishments and look forward to a continuing partnership with all stakeholders, as the state pursues its clean energy agenda.

Energy Efficiency and Carbon Reduction

While energy efficiency remains the first resource in the state's loading order, its importance as a resource is further enhanced by its role in reducing carbon emissions. Energy use in residential and commercial existing buildings collectively accounts for nearly one quarter of statewide greenhouse gas (GHG) emissions, which includes both electricity consumption and fossil fuel consumed on-site.[8] A clear focus on programs that reduce energy consumption in existing buildings and new construction will be critical in meeting our collective carbon reduction goals.

Figure 1. California's 2016 Greenhouse Gas Emissions by End Use



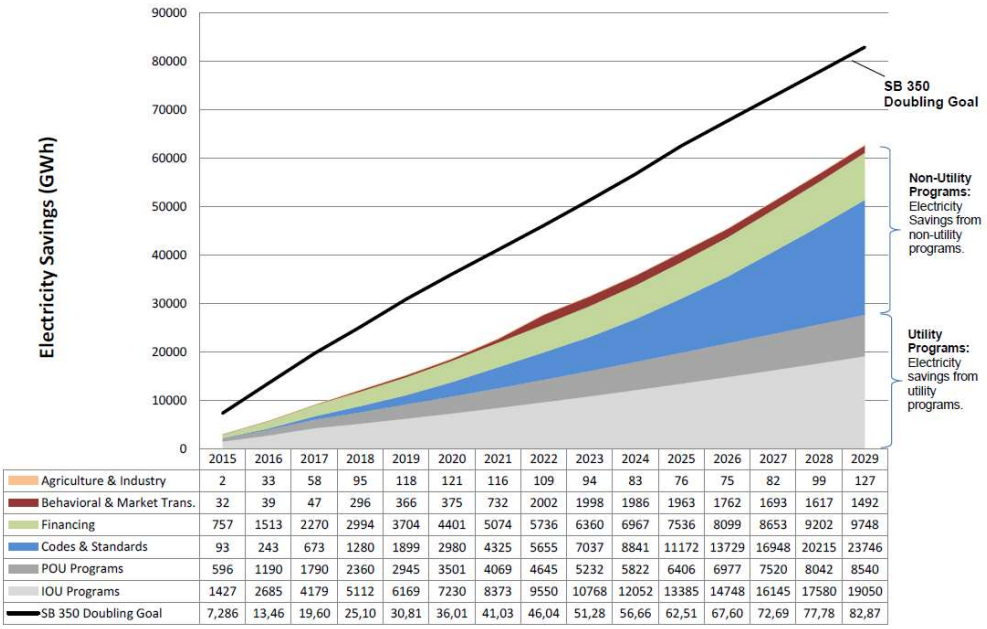
[7] California Energy Commission, September 2018, Energy Efficiency Tracking Progress, Available: https://www.energy.ca.gov/sites/default/files/2019-05/energy_efficiency.pdf.
[8] California's 2016 Greenhouse Gas Emissions by End Use. https://www.energy.ca.gov/renewables/tracking_progress/documents/Greenhouse_Gas_Emissions_Reductions.pdf

The Value of the Energy Efficiency Doubling Goal

As part of the State's carbon reduction goals, California enacted Senate Bill 350 (De León, 2015), directing the Energy Commission to establish statewide targets for the cumulative doubling of energy efficiency by 2030. These targets take into consideration increases in energy efficiency savings from utility programs, codes & standards, financing, behavioral programs, market transformation, and improvements in the agriculture & industry sectors. In establishing a statewide target, SB 350 directed the Energy Commission to rely on both the forecast for additional achievable energy efficiency in the *California Energy Demand Updated Forecast, 2014-2025*, and the POUs' latest annual energy efficiency targets, adopted in 2017. [9]

The POUs' targets include an assessment of all potentially achievable cost-effective electricity efficiency savings from POU customers and were used by the CEC to forecast the cumulative energy savings potential from POUs' energy efficiency programs.[10] The Energy Commission incorporated the POUs' adopted annual energy efficiency targets into the statewide cumulative target by combining the POUs' annual targets for 2015-2030 and used that as the combined "cumulative savings" target for POUs, as shown below in Figure 2.

Figure 2. SB 350 Doubling Target for Electricity (GWh)



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Agriculture & Industry	2	33	58	95	118	121	116	109	94	83	76	75	82	99	127
Behavioral & Market Trans.	32	39	47	296	366	375	732	2002	1998	1986	1963	1762	1693	1617	1492
Financing	757	1513	2270	2994	3704	4401	5074	5736	6360	6967	7536	8099	8653	9202	9748
Codes & Standards	93	243	673	1280	1899	2980	4325	5655	7037	8841	11172	13729	16948	20215	23746
POU Programs	596	1190	1790	2360	2945	3501	4069	4645	5232	5822	6406	6977	7520	8042	8540
IOU Programs	1427	2685	4179	5112	6169	7230	8373	9550	10768	12052	13385	14748	16145	17580	19050
SB 350 Doubling Goal	7,286	13,46	19,60	25,10	30,81	36,01	41,03	46,04	51,28	56,66	62,51	67,60	72,69	77,78	82,87

Source: California Energy Commission's Report *Senate Bill 350: Doubling Energy Efficiency Savings by 2030, October 2017.*

[9] POU governing boards are required to update their annual energy efficiency targets every four years, with the most recent update occurring in 2017, per Public Utilities Code section 9505 (b).

[10] POUs contracted with Navigant Consulting to develop the energy efficiency potential studies and goals using the Electric Resource Assessment Model (ELRAM), as discussed in the 2018 edition of this report.

POU cumulative savings through 2018 were calculated using this same methodology, as presented in **Table 2**, above, which shows that to date POUs have exceeded the State's forecast for their collective, cumulative energy efficiency savings in 2018 by more than 69 GWh.

The success of an energy efficiency program is ultimately dependent on the actions of the customer.

POUs will continue to work together to determine how best to calculate the cost effectiveness of energy efficiency portfolios and the resulting savings for their communities. The need for consistent calculations for purposes of meeting statewide goals in compliance with statutory requirements must always be balanced with the requirement to implement measures tailored to and approved by the respective POUs to optimize electric system operational needs as cost-effectively as possible for the communities that they serve. This is critical because programs must be developed with the customer in mind, as the success of an energy efficiency program is ultimately dependent on the actions of the customer.

To that end, there is a concern that the methodology used by the CEC to forecast POU contributions towards the State's energy efficiency doubling goals may not properly recognize cumulative savings, nor give sufficient attribution to utilities' energy efficiency programs. Specifically, using only the first-year savings from energy efficiency programs to calculate cumulative savings will exclude any of the long-term savings from measures and programs that last more than one year, and there are many measures that provide persistent savings over several years.

There is strong analytical support, and real-world experience, that confirm energy usage behaviors and practices do change for energy efficiency program participants. For example, a consumer who installs a high efficiency measure, such as an LED lamp, is highly unlikely to go back to an older, less efficient product like a compact fluorescent lamp once the bulb no longer works. Similarly, utilities that implement behavioral programs to increase conservation and efficiency improvements by customers are seeing their customers maintain their practices of increased conservation and efficiency, even after the behavioral program is ended. Recognizing that these paradigm changes are real, the lifetime cumulative savings from energy efficiency programs currently utilized by the CEC in their analyses could, without modification, be significantly understated. POUs are interested in utilizing algorithms and persistence factors that better reflect the actual cumulative savings that the utility energy efficiency programs have achieved and will continue to provide.

Further consideration of this methodology could fit well with upcoming efforts that POUs will soon undertake as they update their annual and cumulative 10-year energy efficiency targets in 2021, as required by Public Utilities Code section 9505 (b).

The Challenges of Attribution

As noted above, the *Senate Bill 350: Doubling Energy Efficiency Savings by 2030* report recognizes the key areas where future energy efficiency savings are likely to come from, including energy efficiency savings from utility programs, codes & standards, financing, behavioral programs, market transformation, and improvements in the agriculture & industry sectors. All of these programs are expected to continue generating considerable energy savings for consumers, but the traditional methodology for attributing savings to utilities may need to be revisited - despite energy efficiency program savings continuing to increase, utilities have received less attribution for these increases.

While energy efficiency improvements are seen as one of, if not, the most cost-effective ways to reduce energy consumption – and GHG emissions – POUs' energy efficiency savings are likely to decrease over time due to future codes and standards. As building codes continue to become increasingly more stringent, including the move towards net-zero (or near-net-zero) buildings, utilities cannot claim savings from any energy efficiency improvements incorporated into building codes.

Regardless of how energy efficiency attribution is addressed, it is important for policymakers, utilities, environmental groups, and energy efficiency advocates to work together to introduce new strategies for reductions in energy use that go above and beyond codes & standards – but remain cost-effective for the utilities and their customers. POU programs have to continuously evolve in order to find new technologies, incent customers to re-engage in new programs, and convince new customers to participate in efficiency improvement programs.

Embracing Opportunities to Use Energy More Efficiently

As referenced above, California's newest policy-driven opportunity, and challenge, is to shift the focus of energy efficiency strategies from kWh saved to GHG emissions reduced. Consistent with California policy, many POUs have committed to zero or near-zero carbon resource portfolios to meet their future energy supply needs. As California's incremental energy supplies will be nearly carbon free, new technologies and shifting consumer expectations are creating opportunities to replace current natural gas, propane, and wood-burning end-uses with clean, cost-effective electric alternatives. Cost-effectiveness metrics must begin to take into account the future carbon content of the electricity being saved by energy efficiency measures, as well as the carbon content of the additional electricity needed due to fuel substitution.

We want to see a migration of services that are now fueled by natural gas, diesel, and gasoline to being powered by this new, clean electric grid –
CEC Commissioner David Hochschild

POUs continue to evaluate how best to calculate the benefits of various energy efficiency and demand reduction measures to meet both state and local goals of reducing GHG emissions. To that end, the POUs' CET/RP was developed to model the impacts of energy efficiency programs on electric utility operations on an hourly basis, including GHG reductions. In addition, utilities are continuing to expand their resource planning platforms and analytical tools to optimize utility operations.

Building electrification and decarbonization measures can deliver both energy savings and GHG emissions reductions, but will also require a shift in many paradigms, strategies, and operational practices – for utilities, policymakers, and other stakeholder groups. For example, as the grid integrates higher percentages of renewables, the hours of energy use (or savings) will be a critical consideration when developing energy efficiency programs. The abundance of solar electricity in the California market from about 9am to 3pm has resulted in a situation where incremental energy supply is effectively carbon-free and has a zero or even negative avoided cost during these peak solar hours. Peak load reduction measures and load shifting measures have both become very important considerations, particularly in climate zones with significant ramping needs.

A growing number of stakeholders are working together on building electrification and decarbonization solutions towards a cleaner California. The Building Decarbonization Coalition released *A Roadmap to Decarbonize California Buildings,* identifying barriers and strategies for the decarbonization of new and existing buildings.[11] Recently, a partnership of LADWP, SMUD, and Southern California Edison commissioned a study to assess the energy savings, GHG savings, and the overall economics of electrifications for customers in California.[12] This E3 study found that all-electric new construction could result in savings of $130-$540 per year relative to a gas-fueled home, over the life of the equipment. In addition, there are potential savings to developers, who do not have to lay gas lines if constructing all-electric buildings.

However, the path to unlocking the benefits of building electrification must include a reconsideration of the barriers in the existing regulatory environment. For example, the Time Dependent Valuation (TDV) methodology used in Title 24 Building Energy Efficiency Standards does not fully account for the cost of carbon, thereby advantaging natural gas over electric end-uses. Additionally, the California Public Utilities Commission (CPUC) established the three-prong fuel substitution test in the 1990s and continues to use it today, which has historically deterred electrification in existing buildings. To date, only one fuel substitution measure has passed the three-prong test – and it was to switch from electricity to natural gas.

[11]Building Decarbonization Coalition, February 2019, *A Roadmap to Decarbonize California Buildings,* Available: http://www.buildingdecarb.org/resources/a-roadmap-to-decarbonize-californias-buildings

[12] Energy + Environmental Economics (E3), April 2019, *Residential Building Electrification in California*, Available: https://www.ethree.com/wp-content/uploads/2019/04/E3_Residential_Building_Electrification_in_California_April_2019.pdf

Fortunately, the Energy Commission is working in concert with the California Air Resources Board (CARB), CPUC, utilities, and other stakeholders in a combined effort to "decarbonize buildings". This joint agency proceeding, in which the POUs are participating, has begun to reevaluate the existing methodologies that the regulatory agencies have used historically to assess the cost-effectiveness of fuel substitution, particularly related to space- and water-heating. Public power supports the state's efforts to develop a comprehensive framework to implement fuel substitution programs that maximize energy savings and GHG emission reductions.

Furthermore, fuel substitution in buildings is only part of the picture for electrification – changing from gasoline or diesel to electricity in the transportation sector is defined as "fuel switching" and is not captured in fuel substitution policies. Building electrification can complement related efforts to electrify the transportation sector, as both are essential to the meeting the State's GHG emission reduction goals. However, electrification of buildings and transportation can also complicate the ability to track success with California's goal to reduce energy use, as load continues to increase due to electric vehicle adoption. Therefore, because of the increasing calls for accelerating electrification programs, further clarification is needed regarding GHG accounting for utilities that incur increased retail sales—and potentially increased electric sector GHG emissions—while decreasing overall GHG emissions in other sectors.

As energy efficiency policies, markets, and technologies evolve, POUs will continue to develop innovative programs tailored to the changing needs of their respective communities; the POUs look forward to working with the Commission to frame effective policies to that end.

RESOURCES & TOOLS

This section provides an overview of the technical resources, analytical tools, methodologies, and input assumptions used or developed by public power to evaluate its energy efficiency program and develop energy efficiency targets, in accordance with Public Utilities Code section 9505 (a)(4).

Energy Efficiency Cost-Effectiveness Tool and Reporting Platform

Energy Platforms, LLC developed a cloud-based energy efficiency cost-effectiveness tool and reporting platform (CET/RP) to improve POUs' tracking and evaluation of program performance and to support the development of reports in compliance with state and federal reporting requirements. This tool built upon the functionality of the complex spreadsheets used in prior reporting years to calculate the cost-effectiveness of energy efficiency and demand reduction measures and programs, and to summarize and report the related program expenditures and energy savings. The model continues to include all of the traditional benefit-cost ratio calculation methodologies used industry-wide to evaluate energy efficiency resource programs: Total Resource Cost (TRC), Program Administrator Cost (PAC), Ratepayer Impact (RIM), and Participant Cost Test (PCT), as developed by the California Public Utilities Commission in the 1980s and codified in the California Standard Practice Manual.

Using this new tool, POUs can analyze individual efficiency measures or full programs to determine the potential savings and cost-effectiveness before implementation. POUs are able to create unique programs and measures for their utility -- and may choose to share them with other POUs collaboratively. The model also allows each POU to be able to specify many key inputs, including but not limited to:

- retail rates,
- hourly load shapes,
- hourly GHG emissions curves,
- hourly avoided cost, and
- overhead allocations by measure, programs, portfolio, sector and/or end-use.

The new tool will allow POUs to manage reference libraries of measures, avoided costs, load shapes, and GHG emissions, allowing useful tracking and comparative scenario analyses for integrated planning purposes.

Appendix B presents a comprehensive outline of the calculations used within the CET/RP.

Technical Reference Manual

Recognizing that the Database for Energy Efficient Resources (DEER) was not a viable resource for public power to continue to use, POUs contracted for the development of a technical reference manual (TRM) modeled after the Northwest Regional Technical Forum resource in 2013. Public power retained Energy & Resource Solutions (ERS) to develop the TRM to be used by utilities across the state's different building climate zones. ERS completed the TRM in 2014 and performed updates in 2016 and 2017. The TRM has replaced DEER as the basis for which most POUs calculate the energy savings of their programs. Deviations from the TRM for individual utilities are noted in ***Appendix A.***

The TRM provides the methods, formulas, and default assumptions used for estimating energy savings and peak demand impacts from energy efficiency measures and projects in a very clear and open format. POUs use the energy savings estimates 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 TRM includes both nonresidential and residential measures, and presents each measure type in separate sections, grouped by technology type.

The TRM includes the main manual as well as supporting spreadsheets. The TRM 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. 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 TRM provides the custom measure protocol, which outlines a process for estimating and documenting custom measure savings.

The TRM includes energy savings calculators, which 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 provides a much higher degree of transparency for public power, policymakers, and interested stakeholders regarding the energy savings estimates underpinning public power's energy efficiency programs.

For more information on the 2017 TRM, visit: https://www.cmua.org/energy-efficiency-technical-reference-manual

Public power is actively involved in the efforts of the California Technical Forum (CalTF) to create a statewide electronic TRM, or eTRM. NCPA, SCPPA, SMUD, and LADWP sit on the CalTF Policy Advisory Committee, which consists of statewide energy efficiency stakeholders who advise on the organization's vision, mission, guiding principles, and affirm the annual Work Plan. In addition, POU staff also support CalTF by serving as members of the Technical Forum, which is the body of

independent subject matter experts that peer review methodologies, data, assumptions, and energy savings values.

One of CalTF's primary objectives is to implement a best-in-class eTRM as a successor to DEER. The first iteration of the eTRM focuses on measures with deemed savings, or unit energy savings. POUs will rely on the TRM for semi-custom and custom measures, and will integrate the CalTF eTRM into program planning as it becomes available.

For more information on the CalTF, visit: http://www.caltf.org/

Evaluation, Measurement & Verification

Public Utilities Code section 9505 (d) requires each POU to 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.

The Evaluation, Measurement & Verification (EM&V) process used to provide POU program managers with feedback relies 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. In addition, public power worked with the Energy Commission to develop a consistent set of EM&V guidelines for third-party consultants retained to evaluate utility programs.

EM&V reports help to define the effectiveness of individual programs with the intent of improving future offerings. Key findings from the EM&V reports confirm high realization rates for reported energy savings. This indicates that this annual report provides a reliable source of data to help policymakers gauge the progress of the state's overall energy efficiency efforts.

For more information on POU EM&V reports, visit: https://www.cmua.org/emv-reports

SOURCES OF FUNDING

This section provides an overview of the POUs' sources of funding for its investments in energy efficiency and demand reduction programs, as required by Public Utilities Code section 9505 (a)(3). The POUs collectively spent $195.4 million in FY18, from a combination of Public Goods Charge funds, Cap-and-Trade allowances, and General Fund monies.

Public Goods Charge

The Public Goods Charge (PGC) is a "non-bypassable", usage-based, charge on local distribution services, collected by POUs, in accordance with Public Utilities Code section 385. PGC funds are used by essentially all POUs to fund energy efficiency and demand reduction programs. The PGC is available to fund investments in the following:

1. Cost-effective demand-side management services to promote energy efficiency and energy conservation;
2. New investment in renewable energy resources and technologies;
3. Research, development, and demonstration programs for the public interest to advance science or technology not adequately provided by competitive and regulated markets;
4. Services provided for low-income electricity customers.

Cap and Trade Allowances

The California Cap-and-Trade program allows utilities to use proceeds from the sale of freely allocated allowances to invest in energy efficiency programs, with the intended purpose of reducing GHG emissions. Expenditures explicitly noted as acceptable include but are not limited to equipment rebates and building retrofits.

Funds are generated once a quarter, as part of CARB's regular Cap-and-Trade auctions, but the level of available revenues are expected to increase over time as minimum auction prices have escalation factors that are applied once a year.[13]

General Fund

POUs also support energy efficiency improvements and social good in the communities that they serve by using funds from their general operating reserves through programs such as home improvement and retrofit projects, appliance recycling and replacement programs, disconnection assistance programs for disadvantaged communities, and income-qualified bill assistance discounts.

[13] See Section 95892 of CARB's cap-and-trade regulations: https://www.arb.ca.gov/cc/capandtrade/capandtrade/ct_reg_unofficial.pdf

APPENDIX A

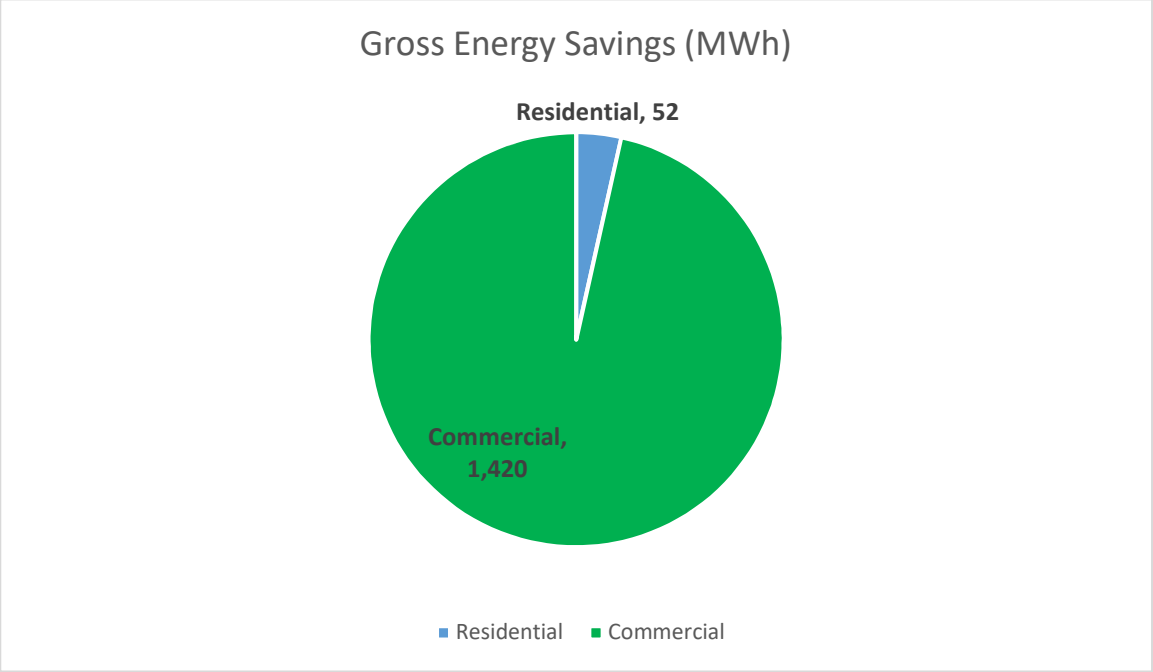
This appendix consists of detailed narratives of each POU's energy efficiency programs, as well as general descriptions of the utilities.

Summary by Utility	Resource Savings Summary						Cost Summary
Utility	Gross Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Total Utility Cost
Alameda	180	1,471,579	20,741,534	162	1,362,479	19,242,186	$ 875,637
Anaheim	4,361	20,136,148	233,959,277	4,361	20,136,148	233,959,277	$ 4,914,824
Azusa	654	3,036,347	33,783,387	637	2,872,363	32,002,410	$ 731,703
Banning	1,144	150,301	1,610,310	911	124,871	1,354,002	$ 207,194
Biggs	-	51,216	256,080	-	46,094	230,472	$ 20,936
Burbank	4,253	14,451,356	123,765,099	4,212	14,312,559	122,344,415	$ 3,635,878
Colton	315	2,001,970	20,909,142	253	1,508,946	15,796,947	$ 1,413,864
Glendale	4,455	10,201,043	39,748,649	4,414	10,133,699	38,645,052	$ 1,843,996
Gridley	29	104,348	1,276,213	20	86,724	982,417	$ 92,378
Healdsburg	102	687,772	8,255,258	85	581,351	6,966,033	$ 257,685
Imperial	7,403	18,626,472	250,671,076	6,151	15,432,152	209,038,646	$ 5,298,497
Lassen	35	262,065	2,935,758	27	220,118	2,450,699	$ 102,815
Lodi	371	3,190,405	38,444,771	272	2,487,074	29,641,708	$ 792,018
Lompoc	40	306,406	4,483,302	28	207,818	3,040,544	$ 108,541
Los Angeles	52,710	346,408,005	5,052,753,288	52,704	346,379,055	5,052,405,888	$ 131,042,086
Merced	-	2,037,395	20,405,526	-	1,624,970	16,264,098	$ 1,068,008
Modesto	1,285	6,719,789	74,927,724	1,045	5,523,033	61,468,862	$ 2,426,614
Moreno Valley	628	4,716,930	47,271,023	563	4,236,312	42,420,820	$ 183,523
Needles	1	5,875	83,542	1	4,875	71,052	$ 148,370
Palo Alto	415	8,988,048	100,491,731	232	5,956,736	63,217,786	$ 3,080,534
Pasadena	1,536	13,526,452	81,800,786	1,504	13,353,078	79,581,441	$ 4,042,594
Plumas-Sierra	33	82,921	1,116,146	24	57,730	806,337	$ 124,828
Port of Oakland	-	648,755	7,785,060	-	519,004	6,228,048	$ 45,829
Rancho Cucamonga	171	480,554	7,688,864	171	480,554	7,688,864	$ 87,879
Redding	1,109	7,028,979	54,926,085	861	5,518,363	42,010,053	$ 2,654,740
Riverside	3,416	23,555,710	309,433,140	2,930	22,240,608	276,855,125	$ 5,974,465
Roseville	1,829	15,873,872	99,313,187	1,608	14,957,621	89,520,947	$ 4,001,169
Sacramento	36,823	131,521,260	1,567,460,963	28,825	110,819,702	1,333,705,655	$ 30,976,348
San Francisco	126	4,262,300	63,934,500	126	4,262,300	63,934,500	$ 5,054,602
Shasta Lake	40	166,772	2,223,528	22	130,745	1,661,188	$ 135,744
Silicon Valley Power	1,943	15,620,586	212,107,277	1,660	13,515,623	182,846,581	$ 4,313,248
Trinity	7	2,588	35,480	6	1,937	27,048	$ 128,825
Truckee Donner	28	261,699	2,636,803	22	202,089	1,982,231	$ 411,587
Turlock	2,726	13,802,965	159,746,452	2,691	13,599,570	157,066,969	$ 1,984,134
Ukiah	17	135,780	1,711,500	13	102,789	1,267,873	$ 87,137
Vernon	948	5,383,804	66,720,063	948	5,383,804	66,720,063	$ 473,988
Victorville	110	340,831	5,112,465	88	272,665	4,089,972	$ 43,896
TOTAL	129,244	676,249,299	8,720,524,989	117,578	638,655,559	8,267,536,209	$ 218,786,114

ALAMEDA

Alameda at a Glance

- Climate Zone(s): 3
- Customers: 34,790
- Total annual retail sales (MWh): 335,026
- Annual Retail Revenue: $58,707,536
- Annual energy efficiency expenditures for reporting year: $875,637
- Gross annual savings from reporting year portfolio (MWh): 1,472



Alameda Overview

- Due to Alameda's temperate climate and small amount of industry, the peak demand for electricity is in the winter (December and January) in the early evening. Alameda Municipal Power's (AMP) electric load is relatively flat compared to most California utilities and there is no residential air conditioning.
- AMP has committed to spending all of its cap-and-trade and renewable energy credit (REC) funds to reduce greenhouse gas emissions in its service area.

Major Program and Portfolio Changes

FY 2018 savings included the continuation a very successful non-residential direct-install program and a residential online rebate portal. The only material change

was an increase to the rebated amount for non-residential self-install lighting projects, from 0.10/kWh to 0.23/kWh.

Program and Portfolio Highlights

AMP's non-residential direct-install program, Energy Plus, provided more than 81 percent of total savings. The program, which provides both lighting and refrigeration upgrades, is particularly attractive to small businesses that are eager to benefit from the energy savings, but do not have in-house expertise in energy-saving technologies and installations. The Energy Plus rebates can cover up to 90 percent of the upgrade cost for small businesses and 80 percent for all other non-residential customers.

Commercial, Industrial & Agricultural Programs

Energy Plus Program: The Energy Plus Program, which started in January 2016, is a non-residential direct-install lighting, refrigeration, heating, ventilation, and air conditioning (HVAC) program. In FY 2018, 36 customers participated in lighting and refrigeration upgrades with low co-pay amounts, due to AMP's rebates. This program will remain open until January 31, 2020.

Non-residential Self-install Program: This program, like Energy Plus, offers non-residential customers rebates for energy efficiency upgrades such as lighting, HVAC and refrigeration. While there were few participants in this program, AMP maintains this program as a means of offering customers a do-it-yourself option for energy efficiency upgrades. This is a common pathway for chain retailers who are trying to manage incentivized upgrades across various locations. This program will remain open in FY 2019.

Residential Programs

Residential Online Rebates – Lighting and Appliances: Alamedans have been able to participate in residential energy efficiency rebates using a simple web application since March 2016. In FY 2018 the tool received nearly 300 applications. Rebates were available for LED bulbs, LED fixtures, LED decorative string lights, electric clothes dryers, washing machines, heat pump water heaters, refrigerators, freezers, and refrigerator/freezer recycling. This program will remain open in FY 2019.

Complementary Programs

- Electric Vehicle Programs: AMP offers two incentive programs to encourage EV adoption. The first is in the form of a rate discount, which the utility has offered since 1998. In FY 2018, 187 customers signed up for the discount, bringing the total number of program participants to 538. On February 1, 2018, AMP launched its second incentive program in the form of rebates for purchasing level 2 chargers for homes and workplaces. The residential charger rebate is

$500 and the workplace charger rebate is $3,000. By the end of FY 2018, 81 residential customers and three workplaces had installed chargers.

- Low-Income Programs: AMP continues to provide financial assistance to Alameda's low-income families through the EASE (Energy Assistance through Supportive Efforts) and EAP (Energy Assistance Program) programs. For FY 2018, EASE, an emergency relief program, helped 59 households receive a total of $6,574 in electric bill assistance. A maximum amount of $200 is available per household within a three-year period through the EASE program. The EAP provides a 25 percent monthly discount on the electric bill. A total of $95,484 was allocated to 667 Alameda households in FY 2018. These programs are funded through the public purpose component of AMP's energy charge.
- Renewable Energy Programs: Alameda Green, AMP's voluntary green power program, provides customers with the option to choose 100% renewable energy at an additional cost of $0.020/kWh. As of the end of FY 2018, there were 3,744 customers enrolled in Alameda Green. AMP staff encouraged enrollment through Alameda Green mentions in AMP's customer newsletter, bill inserts, social media, an outreach program, and a contest among customer service representatives. In June 2018, AMP earned two national rankings for green utility programs from the U.S. Department of Energy's National Renewable Energy Laboratory (NREL). AMP's "Alameda Green" program made NREL's "Top 10" lists for its high participation rate and green power sales rate in 2017.
- Research, Development, and Demonstration: There was no AMP activity in research, development, and demonstration in FY 2018.
- Energy Storage: AMP does not have any onsite storage and an evaluation of energy storage was done again in 2017 as required by California AB 2514. The evaluation concluded that while some costs of energy storage system have decreased, energy storage for the utility was not cost-effective at this time. However, AMP continues to evaluate the potential for this technology. In FY 2018 AMP implemented an interconnection agreement for behind-the-meter storage for customers in September 2018. Also, in FY 2018, AMP partnered with Amber Kinetics, an energy storage company based in Union City, California, to install two 8 kW/32kWh flywheel energy storage systems within AMP's service territory to test their capability and operation.

Evaluation, Measurement & Verification Studies

AMP completes an EM&V study every other year with a focus on the two previous years. The most recent EM&V report, by Energy & Resource Solutions is available here. The next report will cover the residential programs for FY 2018 and FY 2019 with a projected $45,000 budget.

Major Differences or Diversions from CA POU TRM for Energy Savings

With a goal of getting the most accurate energy savings, AMP staff used a variety of sources. For the residential lighting energy savings, AMP used historical AMP customer program data, buoyed by a high realization rate in the FY 2015 EM&V report. The energy savings figures for the residential refrigerator/freezer, LED string lights, and washing machines were from the "Technical Resource Manual" (TRM 2017) for the CA Municipal Utility Association. The electric clothes dryer savings were from an Energy Star report.

Energy savings for non-residential programs were calculated using a hybrid of actual pre- and post-installation inspections and the TRM 2017. Streetlights and customized lighting projects were fully calculated. Savings from the direct-install program, Energy Plus, used a combination of the TRM 2017 and full pre- and post-calculations.

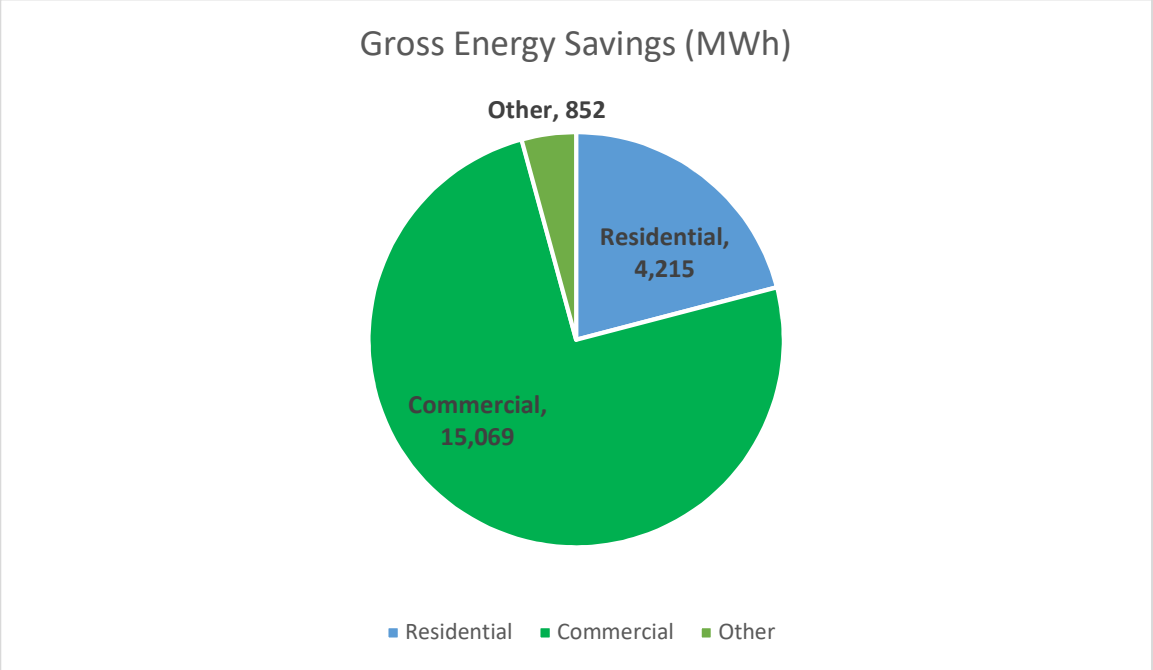
ALAMEDA MUNICIPAL POWER
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Non-Residential	70	233,889	3,478,933	59	198,315	2,951,214	1,060	44,282	5.91	0.72	0.020
Residential	7	51,511	523,143	4	37,294	388,487	162	246,279	0.16	0.16	0.807
Commercial Direct Install	103	1,186,179	16,739,458	98	1,126,870	15,902,485	6,465	585,076	2.41	1.68	0.048
EE Measures Subtotal	180	1,471,579	20,741,534	162	1,362,479	19,242,186	7,687	875,637	1.95	1.18	0.060
Low-Income Programs											
EE & LI Subtotal	180	1,471,579	20,741,534	162	1,362,479	19,242,186	7,687	875,637	1.95	1.18	0.060
T&D											
Codes & Standards											
Other Subtotal											
Total	180	1,471,579	20,741,534	162	1,362,479	19,242,186	7,687	875,637	1.95	1.18	0.060

ANAHEIM

Anaheim at a Glance

- Climate Zone(s): 8
- Customers: 122,265
- Total annual retail sales (MWh): 2,312,918
- Annual Retail Revenue: $371,357,000
- Annual energy efficiency expenditures for reporting year: $4,914,824
- Gross annual savings from reporting year portfolio (MWh): 20,136



Anaheim Overview

The City of Anaheim in climate zone 8 is Orange County's second largest city and the 10th largest in the state with 122,265 electric customers and 63,694 water customers. Additionally, the City houses the only not-for-profit, municipally owned utility in the county. Anaheim Public Utilities (APU) consistently provides electricity and water to a community of 358,000 residents, over 20,000 businesses, and more than 25 million annual visitors over an area that covers more than 50 square miles. For over 120 years, APU has provided its customers with reliable electric services at affordable rates. Over the years, APU has reached out to its customers to develop programs and services that best meet the community's needs.

APU has engaged local school districts to install utility owned community solar projects on school properties to provide the residents of Anaheim with clean energy. Currently, nine schools have committed to participation in the Solar for

Schools Program and construction was recently completed in FY17/18. The benefits include financial incentives for participating school districts, hands on educational opportunities for students, and a discount to income-qualified residents offset by the community solar installed at the schools.

Major Program and Portfolio Changes

APU continues to enhance and expand its already extensive array of energy efficiency program offerings for its customers. APU has continued to enhance its energy efficiency program portfolio in FY17/18 by taking advantage of the successful partnership with the Southern California Gas Company with doubled funds beginning in FY17/18, offering additional measures and increasing the customer eligibility for the income qualified direct installation program. Income qualified customers receive the value of a one stop approach that provides electric, gas and water savings through a host of resource efficiency measures, equipment and appliances.

In FY17/18, APU began sending welcome kits to new customers with four LED light bulbs and a guide to city services. The LED bulbs help new customers become more energy efficient upon arrival to the city.

APU continues to enhance programs by combining and streamlining programs that can benefit from single applications or one-stop-shop access.

Program and Portfolio Highlights

APU's Lighting Incentive Program achieved over 8.8 million kWh savings in FY17/18 with continued increases in participation by Anaheim's commercial and industrial customers. Participation in the program continues to grow year after year as rapid development of LED technology has led to improved products, lower prices and better utility incentives. Businesses are realizing the benefits of LED lighting technology with increased energy savings and reduced maintenance costs.

APU's Customized Energy Incentives Program provides customers the flexibility to target their greatest energy using equipment on site with incentives designed to specifically meet their needs. By documenting energy use before and after equipment upgrades at their facilities, APU customers can replace the greatest energy end users at their businesses through performance-based incentives. This can be a great alternative to selecting a one size fits all prescriptive menu of measures with pre-established incentives. Customers who need assistance in identifying their business's largest users can also reach out to APU for a comprehensive audit or design review. Commercial customers who participated in the Customized Energy Efficiency Incentives Program saved 1.78 million kWh in energy savings through process efficiency improvements this fiscal year.

In the partnership with the Southern California Gas Company, both utilities benefitted from the jointly delivered programs and services to their mutual customers. The working relationship between the two utilities streamlined implementation, facilitated the use of common contractors to implement electricity, water and natural gas efficiency measures, and allowed the utilities to cross-promote each other's conservation programs.

APU is proud to support the education efforts of Anaheim youth at all grade levels by providing classroom and outdoor education on the importance of conserving natural resources, protecting the environment, and learning to use water and energy efficiently in their daily lives. The School Education Program connected with close to 15,000 school-aged students on the value of sustainable resources. Additionally, APU hosts an annual water conservation poster contest to help celebrate the month of May as California's Water Awareness Month.

Commercial, Industrial & Agricultural Programs

Total overhead cost: $2,012,939
Resulting in 2,804 kilowatt demand reduction and 13,726202 kilowatt-hour savings

- Air Compressor Program – Non Res Comprehensive: Provides free comprehensive audits on this technology and its operation on a systemic basis and awards incentives for installing qualifying system components that improve energy system efficiency.
- Comprehensive Energy Audits – Non Res Comprehensive: Customized on-site audits and recommendations designed to improve energy operating efficiency and help customers reduce costs.
- Customized Energy Incentives Program – Non Res Comprehensive: Customized financial incentives for installation of high-efficiency air conditioning, motor controls and other production related equipment.
- Heat Pump Incentives Program – Non Res Heating: Encourage installation of high-efficiency heat pumps.
- Lighting Incentives – Non Res Lighting: Provides incentives to improve energy efficiency for a variety of lighting applications.
- New Construction – Non Res Comprehensive: Customers receive design assistance and incentives for new construction and facility expansions that install energy-efficient equipment that exceed Title 24.
- Operations Program – Non Res Comprehensive: Produces energy savings by taking large transformers offline that are not serving customers' loads.
- Small Business Energy Management Assistance Program – Non Res Lighting, Non Res Cooling, Non Res Refrigeration, Non Res Comprehensive: Provides customers of less than 50 kilowatt demand with energy use evaluations, retrofit funding and installation assistance; focusing on lighting upgrades, programmable thermostats, air conditioning and refrigeration tune-ups.

- Small/Medium Business Audits – Non Res Comprehensive: Customized on-site audits and recommendations designed to improve operating energy efficiency and help customers reduce costs.
- Upstream HVAC – Non-Res Cooling: Provides rebates to the sales channel that most influences the stocking and selling of qualifying high efficiency equipment; the goal is to facilitate the purchase of the high efficiency equipment by the end-use customer.

Residential Programs

Total overhead Costs: $2,916,138
Resulting in 1,397 kilowatt demand reduction and 4,197,592 kilowatt-hour savings.

- Air Duct Repair – Res Cooling: Provides incentives to residential customers who have a licensed HVAC contractor perform an Air Duct Repair.
- Dusk-to-Dawn Lighting – Res Lighting: Residents can receive outdoor LED security lights for new or existing installation at no cost.
- School Education Programs (Res Comprehensive): Public and Private school students in Anaheim are engaged both in the classroom and through hands-on outdoor labs to explore environmental issues in our region. Additionally, students can learn about energy and water consumption by completing in-home conservation audits. APU also donates LED bulbs to Anaheim schools for students to sell and raise funds for educational field trips or classroom materials.
- Holiday Lights Exchange – Res Lighting: Provides holiday lights to residents who turn in old incandescent holiday lights.
- Home Incentives – Res Cooling, Res Shell, Res Pool Pump, Res Refrigeration, Res Dishwashers: Rebates for purchase and installation of high efficiency ENERGY STAR® rated appliances and high efficiency conservation measures.
- Home Utility Check-Up Audits – Res Comprehensive: A customized in-home audit of water and energy use and existing appliances.
- Home Utility Check-Up Equipment and LED Direct Install – Res Lighting: Customers receive free installation of up to five LED's during the Home Utility Check-Up audit.
- On-Line Home Utility Check-Up – Res Comprehensive: Customers can click on Public Utilities to complete a detailed survey online. Customers receive money saving advice and learn about incentives designed to help them be more water and energy efficient.
- Refrigerator Recycling Program – Res Refrigeration: Provides a rebate to customers who recycle an old operational refrigerator or freezer.
- TreePower – Res Cooling: - Provides complimentary shade trees and incentives for residential customers. Shade trees when properly placed can help reduce air conditioning costs.

- Weatherization Program – Res Cooling, Res Lighting, Res Pool Pump, Res Shell, Res Comprehensive: Income qualified direct installation program that provides plug load occupancy sensors, up to 10 LED bulbs, duct sealing, refrigerant charge testing and Energy Star room air conditioners.
- Welcome Kit LED Distribution – Res Lighting: Distribution of four 8.5 watt 800 lumen bulbs to new utility customers.

Complementary Programs

Total overhead cost: $89,960

Resulting in 1,392 kilowatt demand reduction and 8,986,524 kilowatt-hour savings

- Affordable Housing New Construction Program – Res Clothes Washers, Res Lighting, Res Cooling, Res Refrigeration, Res Dishwashers, Non Res Lighting: Incentives for developers who install high efficiency energy and water measures in their developments for affordable housing projects located throughout the community.
- Commercial & Residential Water Savings Resulting from Equipment Rebates: Businesses and residents are eligible for rebates by installing or retrofitting with qualifying water-saving devices through the "SoCal Water$mart" Program in partnership with Metropolitan Water District. Water savings result from the application of measures such as;
    - Rotating Nozzle Rebates
    - SmarTimer Rebates
    - Home Utility Checkup direct installs of water saving devices
- Codes and Standards: Savings are drawn from the statewide allocation of energy savings credits for FY 2017/2018 due to Codes and Standards and based on Anaheim's percent share of statewide load.
- Transmission & Distribution (T&D): Increased efficiencies by upgrading electric infrastructure.

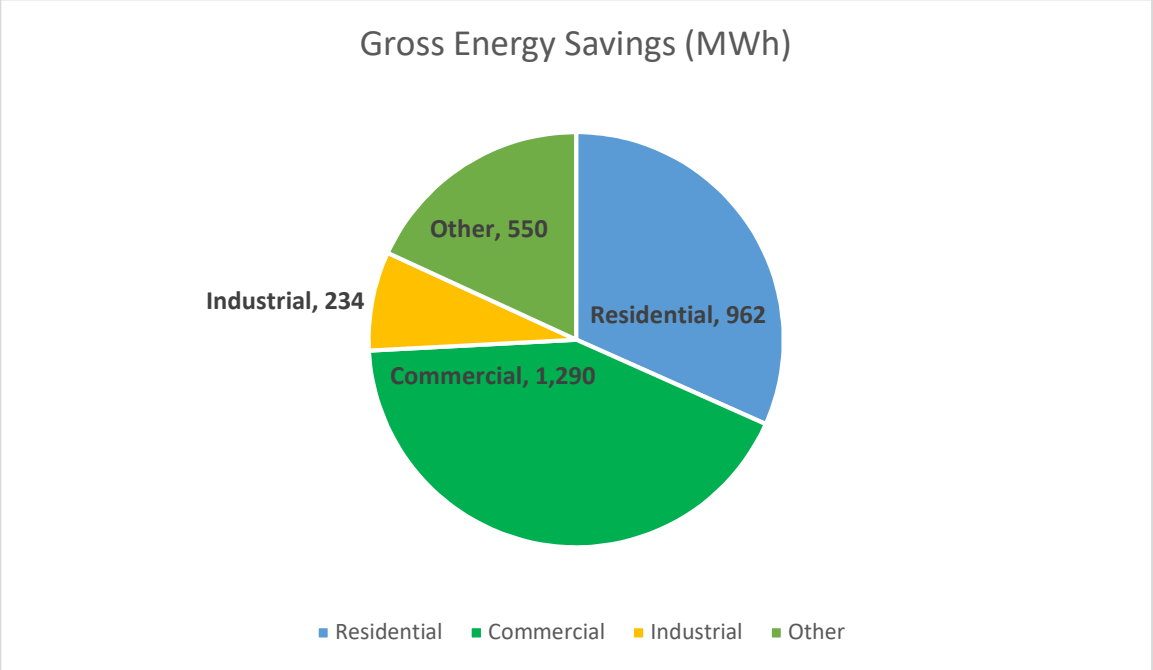
ANAHEIM PUBLIC UTILITIES
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Online Home Utility Check Up *	1	4,572	13,716	1	4,572	13,716	6	6,857	0.19	0.19	0.522
Refrigerator Freezer Recycling Program *	61	302,191	1,502,596	61	302,191	1,502,596	700	64,060	2.60	4.22	0.046
Tree Power *	133	236,740	4,734,800	133	236,740	4,734,800	2,034	479,390	2.04	2.16	0.149
Customized Energy Incentives*	184	1,782,410	35,648,200	184	1,782,410	35,648,200	12,230	224,833	13.56	57.34	0.009
Water Conservation Energy Savings *		252,281	2,270,529		252,281	2,270,529	901	30,984	6.70	57.34	0.016
Small Business Energy Management Assistance	297	662,267	6,129,998	297	662,267	6,129,998	2,386	648,879	0.85	0.85	0.129
LED Distribution *	93	828,610	12,429,151	93	828,610	12,429,151	5,182	141,660	8.23	57.34	0.015
Small Business Refrigeration Program	17	70,738	713,055	17	70,738	713,055	291	13,938	4.49	4.49	0.024
Home Utility Check-Up *	314	1,573,928	6,578,224	314	1,573,928	6,578,224	2,970	237,735	2.61	2.94	0.041
Street Lighting *		600,072	12,001,440		600,072	12,001,440	4,219	17,504	57.34	57.34	0.002
Weatherization Program *	633	1,019,310	10,172,048	633	1,019,310	10,172,048	4,453	1,447,749	1.06	1.81	0.177
Heat Pump Incentives*	7	16,217	178,387	7	16,217	178,387	78	1,396	9.48	57.34	0.010
Home Incentives Program *	152	227,830	3,286,599	152	227,830	3,286,599	1,413	403,402	1.42	3.64	0.166
Upstream HVAC Program*	443	2,300,123	36,801,965	443	2,300,123	36,801,965	12,955	377,836	8.69	57.34	0.014
New Construction	1	6,151	98,416	1	6,151	98,416	35	753	11.66	11.66	0.010
Operations Program *	155	1,360,000	4,080,000	155	1,360,000	4,080,000	1,845	6,734	57.34	57.34	0.002
Lighting Incentives*	1,798	8,812,742	96,940,162	1,798	8,812,742	96,940,162	36,755	301,772	29.02	53.12	0.004
Air Duct Repair *	35	17,589	175,890	35	17,589	175,890	83	43,168	0.97	57.34	0.297
Dusk-to-Dawn Lighting*		1,164	13,966		1,164	13,966	6	126,236	0.01	0.01	11.383
Comprehensive Energy Audit*	21	57,965	173,896	21	57,965	173,896	78	330,889	0.05	0.05	1.987
LED Holiday Lights Distribution *	15	3,248	16,240	15	3,248	16,240	8	9,048	0.18	57.34	0.607
EE Measures Subtotal	4,361	20,136,148	233,959,277	4,361	20,136,148	233,959,277	88,626	4,914,824	4.56	7.10	0.027
Low-Income Programs											
EE & LI Subtotal	4,361	20,136,148	233,959,277	4,361	20,136,148	233,959,277	88,626	4,914,824	4.56	7.10	0.027
T&D		64,530	193,590		64,530	193,590	88	320	57.34	57.34	0.002
Codes & Standards	1,237	6,709,641	20,128,923	1,237	6,709,641	20,128,923	9,278	34,418	57.34	57.34	0.002
Other Subtotal	1,237	6,774,171	20,322,513	1,237	6,774,171	20,322,513	9,366	34,738	57.34	57.34	0.002
Total	5,598	20,200,678	234,152,867	4,361	20,200,678	234,152,867	88,713	4,915,144	4.93	7.64398	0.025

AZUSA

Azusa at a Glance

- Climate Zone(s): 9
- Customers: 16,700
- Total annual retail sales (MWh): 252,893
- Annual Retail Revenue: $33,329,648
- Annual energy efficiency expenditures for reporting year: $731,703
- Gross annual savings from reporting year portfolio (MWh): 3,036



Azusa Overview

Since inception of the energy efficiency programs, Azusa Light & Water has expended over $13 million toward providing energy conservation information to the Azusa community and rewarding businesses and residents for upgrading inefficient energy consuming equipment with more energy efficient equipment. These efforts have resulted in an annual peak demand and energy use reductions of approximately one percent.

Major Program and Portfolio Changes

During the past year the residential rebate programs have been further combined, refined and simplified to make the program more cost-effective and easier to administer.

Program and Portfolio Highlights

The direct install Small Business Audit/Retrofit Program continues to provide the maximum impact on meeting the needs of the harder to reach businesses and small retailers within the service territory. These hard to reach customers have a very tight cash flow and in many times are unable to participate in the rebate programs unless there is little to no up-front monetary outlay. This program allows customers to immediately see the savings and avoid the initial cash outlay associated with the typical rebate type programs.

The joint Library Awareness and LED Lamp Distribution Program was ramped up this fiscal year and replaced the outdated CFL Distribution Program, thus achieving outstanding energy efficiency gains in a very cost-effective manner.

Commercial, Industrial & Agricultural Programs

- Business Partnership Program: Retrofit existing buildings and factories with high efficiency lighting, air conditioning and process equipment.
- Free Energy Audits: Provide suggestions on the most energy efficient equipment and more cost-effective methods of operations.
- New Business Retrofit Program: Encourage the use of the most energy efficient equipment in the design and construction of new buildings and factories.
- Small Business Audit/Retrofit Program: Provide free utility audit, free CFL retrofit, free packaged A/C tune-ups, the first $1,500 free lighting retrofit and recommendations for further energy saving measures with a corresponding 50% rebate up to a maximum rebate of $10,000 per customer account.
- "Keep Your Cool Audit/Retrofit Program": Provide free utility audit, free LED case lighting retrofits, free refrigeration tune-ups, free case seal replacements, auto door closing devices and fan controllers.

Residential Programs

- Home Weatherization and Residential EnergyStar® Appliance Rebate Program: Rebates are offered for a variety of home weatherization measures and most high efficiency appliances that have the EnergyStar® rating, including but not limited to, refrigerators, air conditions, LED Televisions and computer monitors, dishwashers, clothes washers, pool pumps, ceiling fans and various lighting measures.
- Free Home-in-Home Energy Audits: Provide recommendations for the effective use of energy within the residence.
- Free On-Line Home Energy Audit Program: Customers can enter various parameters that match their home and lifestyle, and receive an immediate list of conservation recommendations and measures along with an estimate of what each appliance within the home is using in the way of energy.

Complementary Programs

- Public Facilities Program is essentially the same as the current commercial and industrial programs; therefore they are included in that category for funding and savings.
- City Schools LivingWise Program: Provides an interactive 6th grade conservation education program to all 6th grade classes within the City of Azusa, both private and public.
- Low-Income Programs: The Azusa Light & Water Low Income Assistance Program is outlined in Rule No. 18 of Azusa Light & Water's Rules and Regulations. Interested customers are required to fill out an application and provide documentation of income. In general, Azusa Light & Water's guidelines for qualifying customers follow the low income thresholds used by the State.
- Research, Development, and Demonstration: Azusa Light & Water has, jointly with the Southern California Public Power Authority (SCPPA), is an active member of the APPA DEED Program.

Evaluation, Measurement & Verification Studies

Azusa Light & Water contracted with Lincus Energy to complete a study of the various energy efficiency programs and associated savings. The Lincus study is available on the CMUA website and the Azusa light & Water website (http://www.ci.azusa.ca.us/DocumentCenter/View/26058).

Azusa Light & Water will continue to make EM&V reports available to the CEC and other parties as they are completed and will continue with its EM&V programs and practices in the future.

Major Differences or Diversions from CA POU TRM for Energy Savings

For savings, Azusa Light & Water uses a combination of figures from TRM, E3, utility work papers and custom savings analysis along with vendor calculations when applicable.

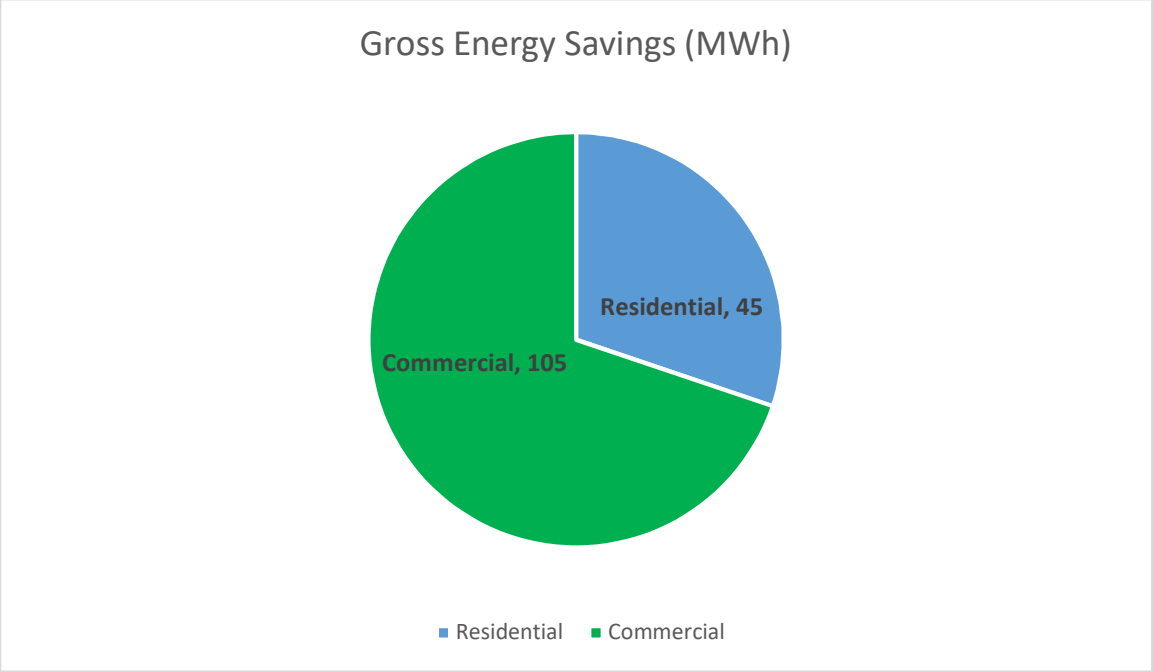
AZUSA LIGHT & WATER
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Residential Weatherization Program	3	3,653	65,754	2	2,922	52,603	23	2,258	5.58	10.85	0.061
Residential On-Line Audit Program		293,240	879,720		234,592	703,776	331	8,289	8.07	12.33	0.012
Residential Energy Star Appliance Program	18	38,002	684,036	14	30,402	547,229	214	41,515	1.18	4.42	0.107
Education Program - In Class	35	135,711	407,133	35	135,711	407,133	192	27,355	1.42	14.20	0.070
CFL/LED Lamp Exchange/Direct Install Program	66	485,025	7,275,375	53	388,020	5,820,300	2,426	42,700	12.76	13.88	0.010
Municipal Programs	51	145,957	2,189,355	51	145,957	2,189,355	777	121,790	1.67	14.20	0.074
Business Energy Partnership Program	424	1,333,673	20,005,095	424	1,333,673	20,005,095	7,650	414,324	4.48	4.48	0.028
Shade Tree Program	6	5,909	177,270	6	5,909	177,270	74	27,171	1.37	14.20	0.270
Water Conservation Programs	35	550,303	1,650,909	35	550,303	1,650,909	763	10,409	14.20	14.20	0.007
Small Business Audit/Retrofit Program	17	44,874	448,740	17	44,874	448,740	175	35,892	1.13	14.20	0.097
EE Measures Subtotal	654	3,036,347	33,783,387	637	2,872,363	32,002,410	12,625	731,703	4.10	5.94	0.030
Low-Income Programs											
EE & LI Subtotal	654	3,036,347	33,783,387	637	2,872,363	32,002,410	12,625	731,703	4.10	5.94	0.030
T&D											
Codes & Standards	130	703,550	7,035,500	130	703,550	7,035,500	2,746	44,814	14.20	14.20	0.008
Other Subtotal	130	703,550	7,035,500	130	703,550	7,035,500	2,746	44,814	14.20	14.20	0.008
Total	784	3,739,897	40,818,887	767	3,575,913	39,037,910	15,371	776,517	4.68	6.62	0.026

BANNING

Banning at a Glance

- Climate Zone(s): 15
- Customers: 12,139
- Total annual retail sales (MWh): 140,906
- Annual Retail Revenue: $27,170,238
- Annual energy efficiency expenditures for reporting year: $207,194
- Gross annual savings from reporting year portfolio (MWh): 150



Banning Overview

During FY 17/18, Banning spent $207194 in Energy Efficiency programs, which have provided 150,301 kWh energy savings. It should be noted that the City of Banning is located in an economically disadvantaged area. A significant portion of the City's population is either low income or senior citizens living on a fixed income. Due to the economic demographics of Banning's population, a significant portion of Public Benefits dollars are utilized to provide low-income assistance through reduced rates.

Major Program and Portfolio Changes

One of Banning's main goals for FY 2017/18 is to expand participation in its commercial retrofit and refrigeration programs, primarily through the adoption of significantly increased monetary incentives for our small commercial businesses. To

accomplish this goal Banning increased the budget and worked with community organizations to further increase awareness and overall participation of the Business Energy Efficiency Funds, or "B.E.E.F" program.

Program and Portfolio Highlights

Renewable Portfolio Standard. As of January 1, 2019, the City of Banning's energy portfolio is greater than 75% renewable.

Solar Energy. Banning has met its California SB1 requirements by providing $2.4 million in rebates for the installation of solar photovoltaic systems in its service territory. The rebates have helped install approximately 0.75MW of customer-owned solar photovoltaic capacity in the city.

Electric Vehicles. The State of California has set a goal of having 1.5 million zero emission vehicles on the roads by 2025. It is anticipated that the majority of these zero emission vehicles will be electric vehicles. As battery storage technology improves, the costs for electric vehicles will continue to decline, which will result in a higher participation in electrical vehicle ownership within the Utility's territory. The City received a grant to have an electrical vehicle public charging station constructed in the McDonald's parking lot, which is now completed, and running.

Commercial, Industrial & Agricultural Programs

- Business Energy Efficiency Fund: Monetary incentives for commercial customers to install energy efficiency upgrades/retrofits such as lighting, refrigeration, motors, air conditioning tune-ups, etc.
- Commercial Programs: Monetary incentives for commercial customers to install more energy-efficient equipment such as lighting, signage, refrigeration, etc.
- New Construction: Monetary incentives for new construction projects that exceed the energy efficiency above California's Title 24 standards.

Residential Programs

- Air Conditioner: Monetary incentives to replace an existing central air conditioning unit with a new high-efficiency unit.
- Air Conditioner Tune Ups: Monetary incentives for getting air conditioning units tuned up.
- EnergyStar® Appliances: Monetary incentives for purchasing products that meet the Energy Star®" criteria.
- EnergyStar® Refrigerator: A monetary incentive for replacing an old inefficient refrigerator with a new energy efficient unit.
- Recycle: Rebates offered to remove and recycle operating old and inefficient refrigerators and freezers.

- Energy Weatherization: Monetary incentives to replace inefficient materials with products that will improve the energy efficiency of their facility and reduce energy use.
- Shade Tree: Rebates offered to plant shade trees around homes to help reduce the amount of energy used for air conditioning.

Complementary Programs

- Energy Audits: Provides customers with a variety of recommendations for reducing energy consumption.
- Low Income Assistance: An electric utility reduced Baseline Rate for qualified customers. As mentioned above, the majority of the Public Benefits funds are spent providing low-income assistance.

Evaluation, Measurement & Verification Studies

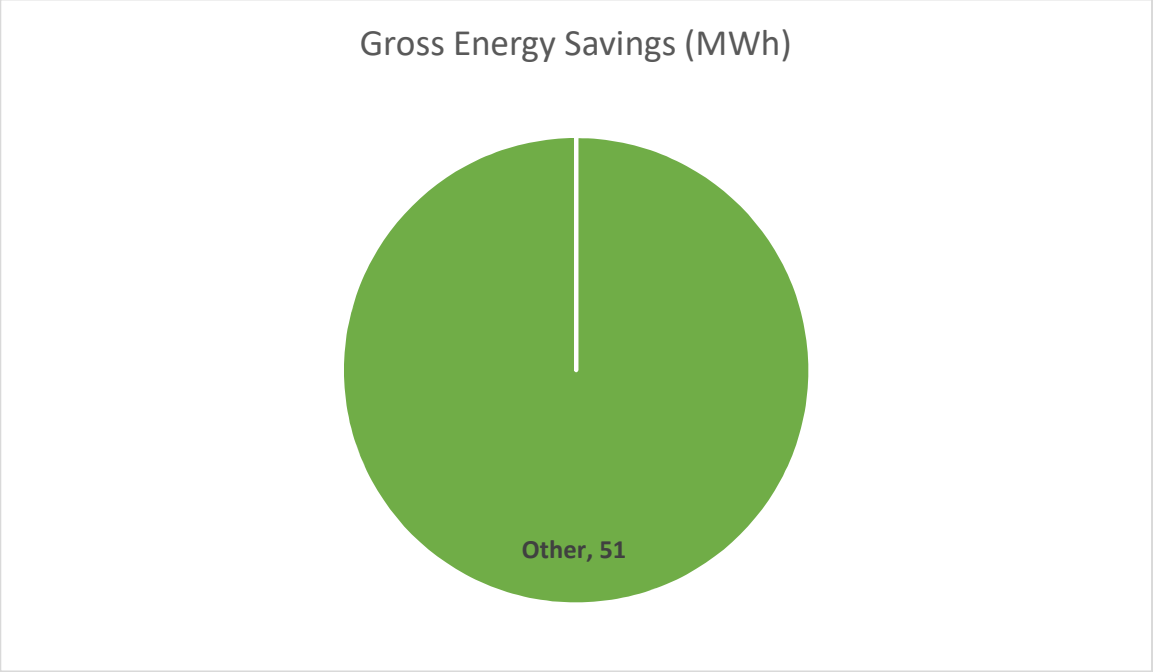
The City of Banning Electric Utility has hired third-party firms, such as Lincus, Inc., to perform EM&V studies in previous years. The City will continue with its EM&V programs and practices.

BANNING ELECTRIC UTILITY												
-- FY2018 Energy Efficiency Program Summary --												
Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Refrigerators		2,337	32,717		2,220	31,082	13	3,222	1.05	1.25	0.136
Air Conditioner	9	22,169	332,088	9	21,060	315,483	138	88,685	0.70	1.00	0.376
Refrigerator Recycling	1	5,881	29,068	1	5,503	27,278	13	2,145	1.46	1.35	0.086
Clothes Washer		2,944	32,384		2,797	30,765	13	2,904	1.31	0.82	0.116
Dishwashers		520	5,200		494	4,940	2	1,414	0.53	1.14	0.346
Air Conditioner Tune-up	9	10,829	54,145	7	8,663	43,316	22	9,093	1.02	1.02	0.229
Pool Pump	0	674	6,740	0	640	6,403	3	497	1.45	0.86	0.094
Lighting	1,124	104,948	1,117,968	894	83,494	894,736	347	99,234	0.86	1.47	0.137
EE Measures Subtotal	1,144	150,301	1,610,310	911	124,871	1,354,002	550	207,194	0.81	1.20	0.191
Low-Income Programs											
EE & LI Subtotal	1,144	150,301	1,610,310	911	124,871	1,354,002	550	207,194	0.81	1.20	0.191
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	1,144	150,301	1,610,310	911	124,871	1,354,002	550	207,194	0.81	1.20	0.191

BIGGS

Biggs at a Glance

- Climate Zone(s): 11
- Customers: 727
- Total annual retail sales (MWh): 14,317
- Annual Retail Revenue: $1,464,164
- Annual energy efficiency expenditures for reporting year: $20,936
- Gross annual savings from reporting year portfolio (MWh): 51



Biggs Overview

The City of Biggs is primarily a residential city with one large industrial customer. A significant portion of the City's population is either low income or senior citizens living on fixed incomes. The City experienced a 15% load decrease in FY 2018. This decrease is attributable to decreased activity at our large, industrial customer, Sunwest Milling. We had little public interest in residential energy efficiency programs, as solar PV continued to be the primary focus of our citizens.

Major Program and Portfolio Changes

There have been no major changes in programs offered, but budgeted funds decreased substantially as Greenhouse Gas auction revenues were allocated elsewhere because our Street Light Replacement Project reached completion. With low customer participation in offered energy efficiency programs, the City focused

on street-light replacement to capture efficiency savings and increase the safety of city neighborhoods.

Commercial, Industrial & Agricultural Programs

- Commercial Lighting Program: Customized Lighting Retrofit Rebate Program available to all commercial customers and educational facilities.
- Commercial HVAC Program: Customized HVAC Retrofit & Optimization Program provides generous incentives for businesses and educational facilities to update aging HVAC units or tune-up units that do not need replacement.

Residential Programs

- Residential Appliance Program: This program offers incentives to residential customers for the purchase of Energy-Star rated refrigerators and the recycling older units.
- Residential HVAC Program: Tiered incentives for replacement of aging HVAC units at residential properties. The greater the SEER level above Title 24 requirements, the greater the potential incentive. The Res. HVAC program also provides incentives for tune-ups of HVAC units, the installation of 7-day programmable thermostats and the installation of whole-house fans.
- Residential Shell Program: This program offers incentives for increasing insulation levels and installation of dual-pane, low E windows to replace existing single-pane. Future programs may include whole-house air sealing.
- Referral to Community Action Agency for LiHEAP grants.

Complementary Programs

- Low-Income Programs: Biggs works with Community Action Agency of Butte County to provide weatherization, appliance replacement, lighting replacement and HEAP grants to income-qualified household within our service territory. Complimentary on-site energy audits are performed by our partner, Efficiency Services Group, to resolve high usage complaints.

Evaluation, Measurement & Verification Studies

In 2007, in response to AB 2021, Biggs hired a third-party contractor to formulate an EM&V plan. In 2008, 2009 & 2010, Biggs contracted with Navigant Consulting to perform Energy Efficiency Program Evaluation studies of all programs the city offers. Those studies can be found on CMUA's website and our city website. With the understanding that all programs need not be evaluated every year, Biggs moved to evaluation of all programs, in three-year blocks. Biggs is currently working to find a consultant to perform multiple years' worth of EM&V reports and have budgeted $14,000 toward fulfilling our EM&V requirement.

Major Differences or Diversions from CA POU TRM for Energy Savings

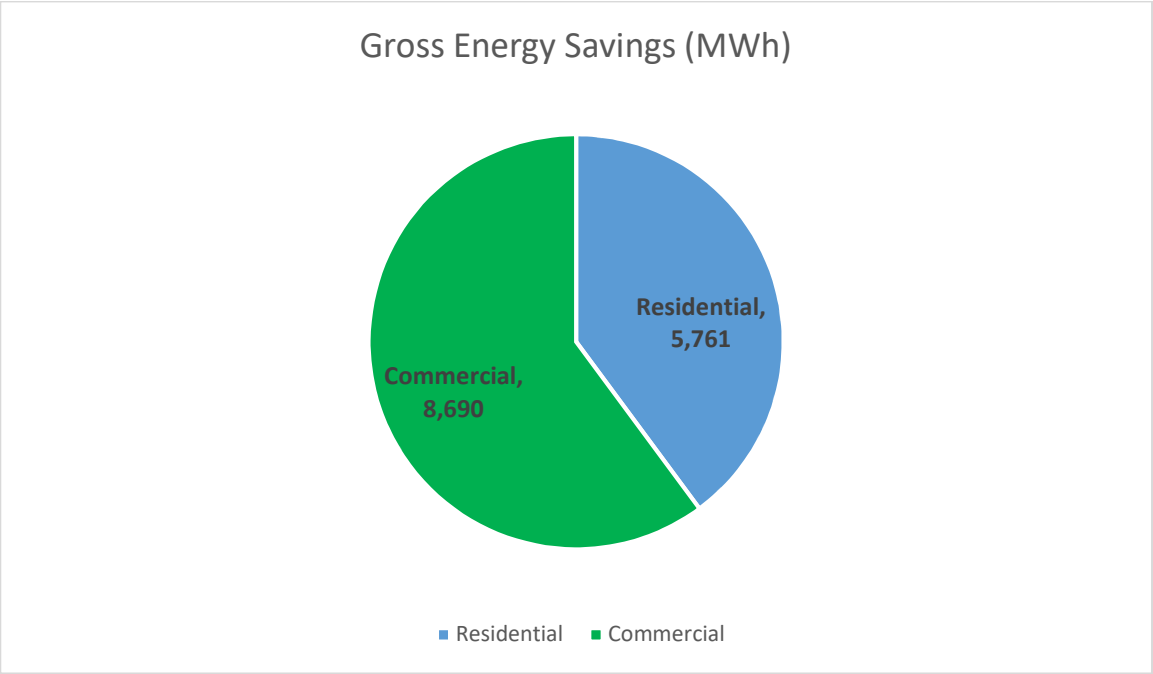
2016 TRM and 2014 DEER were used to calculate savings.

BIGGS ELECTRIC UTILITY											
-- FY2018 Energy Efficiency Program Summary --											
Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Street Lighting		51,216	256,080		46,094	230,472	117	20,936	0.94	0.94	0.099
EE Measures Subtotal	-	51,216	256,080	-	46,094	230,472	117	20,936	0.94	0.94	0.099
Low-Income Programs											
EE & LI Subtotal	-	51,216	256,080	-	46,094	230,472	117	20,936	0.94	0.94	0.099
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	-	51,216	256,080	-	46,094	230,472	117	20,936	0.94	0.94	0.099

BURBANK

Burbank at a Glance

- Climate Zone(s): 9
- Customers: 108,300
- Total annual retail sales (MWh): 1,077,593
- Annual Retail Revenue: $177,251,908
- Annual energy efficiency expenditures for reporting year: $3,635,878
- Gross annual savings from reporting year portfolio (MWh): 14,451



Burbank Overview

Located in Climate Zone 9, Burbank is known as the Media Capital of the World, and is home to two of the world's largest studios, Warner Bros. and Disney. The city is also home to thousands of smaller businesses, many of whom moved to Burbank in the early 1990s after the aerospace industry contracted and real estate became plentiful and cheap. From BWP, these businesses have come to expect cost-effective and reliable electric service, as well as additional services such as fiber optic networking.

At the same time, Burbank has a vibrant residential community, with a housing mix of about 18,500 single family homes that ranges from post-war bungalows to two story view homes. There are also about 27,000 multifamily homes, a figure that continues to increase with infill and high-density development. As a result of nearly

20 years of energy efficiency history, increasingly stringent codes and standards, and a community ethos of sustainability, the average Burbank household uses about 500 kWh per month. This efficient baseline makes it a challenge to design programs that can squeeze more energy efficiency juice out of an increasingly shrinking lemon.

BWP's energy efficiency portfolio has been designed to reflect our organizational goal of continuing to provide sustainable, affordable, and reliable service to all of our residents and businesses. At the same time, BWP is adjusting to changes in the utility industry, including concepts such as:

1. "Negative Load Growth," where energy efficiency and subsidized distributed generation are "fully" offsetting economic growth; and,
2. The "Duck Curve", where customer solar PV generation in the afternoon leads to a steep ramp up in the amount of electricity required to be supplied by the utility in the evening. This results in a daily load profile that resembles a duck, potentially invalidating current Time Of Use (TOU) rate design and resource planning criteria.

To address the operational challenges of the Duck Curve, BWP is focusing more on reducing peak demand, and streamlining operational costs through energy efficiency. BWP's continuos promotion of transportation electrification highlights one of the utility's strategies that addresses the Duck Curve and negative load growth.

Promoting the investment in purchasing electric vehicles (EVs) and offering rebates for the installation of EV chargers reinforces the utility's efforts toward increasing transportation electrification. BWP hosted EV Ride and Drive events in October 2017 and in March 2018 in order to attract area residents to the benefits of owning electric vehicles. Partnering with both the cities of Glendale and Pasadena, BWP invited guests to take the EVs on display for a spin, and receive feedback from EV owners on their personal experiences. 250 guests had attended the October event while 175 attended the March event taking an overall approximate 500 test drives on various EV models, ranging from plug-in hybrids to all-battery electrics. The events featured information on public charging station locations, and most importantly, tried to address the issue of "range anxiety". BWP also featured information on charger rebates and promoted the advantages of the TOU electric billing rate to help reduce peak demand consumption. In addition, a copy of the Electric Car Insider EV Buyer's Guide was offered featuring various model specifications on EVs for guests to explore.

Another strategy for addressing the challenges of peak demand reduction for the fiscal year was formulating a comprehensive Integrated Resource Plan (IRP) that outlined a roadmap for the utility to follow that would help it meet the city's

energy needs for the next 20 years while maintaining its overall commitment to provide customers with reliable, affordable, and sustainable sources of energy. With recent legislation requiring the state of California to have 50% of all energy produced through renewable resources by 2030, BWP had made a commitment toward helping achieve this goal and including customer feedback in shaping the IRP.

Major Program and Portfolio Changes

BWP's long-running Refrigerator Round-up program concluded its last year of operation during FY 2017-18 prompting a slight surge in program participation during the fiscal year with 192 customers participating with a 28% increase in kW savings from the previous fiscal year. BWP's marketing efforts to encourage participation before the close of the program sparked enough interest in the community to increase enrollment almost comparable to that of previous peak levels.

BWP's HVAC Upstream Program has also shown an increase in kW savings from prior fiscal year. FY 2017-2018 reported peak demand savings of 233 kW compared to FY 2016-2017 savings of 194 kW - a 20% increase in savings.

Program and Portfolio Highlights

For residents, BWP's Home Improvement Program (HIP) continues to serve customers offering free weatherization upgrade services in order to increase the energy efficiency of Burbank's single family homes. BWP introduced the program in November 2009 as a whole house, direct install program and it has been expanding ever since. In partnering with the Southern California Gas Company and the Metropolitan Water District of Southern California, BWP has been able to reduce electric usage while leveraging additional funding to also reduce natural gas and water use. HIP has several components, including an in-home audit with energy and water education and installation of LED lamps and water savings devices. In addition, BWP assesses single family homes for additional services including the installation of attic insulation, duct testing and sealing, central air conditioning tune-ups and air sealing, as well as outdoor water conservation measures. With the current program, many of our participating residents are now qualified to receive incentives through the state's Advanced Energy Upgrade California Program.

During the previous fiscal year, BWP focused its marketing efforts to target more single family homes through a redesign of communication materials and increased digital marketing. The strategy increased program enrollment by 42%. In FY 2017-18, increased, targeted marketing and the implementation of continuous quality improvement (CQI) measures had kept enrollments at a consistent level increasing program participation by an additional 13% increase from the previous

fiscal year. 762 homes had been served with 273 receiving weatherization upgrades. Overall, the program reduced peak demand by 617 kW. The increase in program activity, and the resulting increase in peak demand savings, demonstrates the link between program design and program outreach, and the need for continuous iteration and improvement.

Commercial, Industrial & Agricultural Programs

Residential Cooling and Non-Residential Cooling:
BWP provides services that address all aspects of space cooling for residential homes and commercial buildings, including rebates for the purchase of high-efficiency air conditioners and heat pumps, and free HVAC tune-ups. For FY 2017-18, these programs resulted in more than 2.3 MW of peak demand reductions.

Non-Residential Lighting:
BWP provides free direct installation services, including for high efficiency lighting, to all qualified small businesses in Burbank. In addition, BWP provides rebates per annual electricity saved for customized lighting projects, including $0.10 per kWh saved for LED lighting. Through these efforts, BWP achieved 1.7 MW in peak demand savings and 158,000 kWh in annual electricity savings for our commercial customers.

Residential Programs

Residential Refrigeration:
BWP provides rebates for the purchase of ENERGY STAR refrigerators, including 196 in FY 2017-18. BWP also provides new ENERGY STAR refrigerators at no cost to income-qualified customers. In addition, BWP also removes and recycles residents' second refrigerators at no cost in order to reduce their bills and lessen these older appliances' impact on the grid. Through these two programs, 339 inefficient refrigerators were removed or replaced with more efficient models, resulting in more than 122,854 kWh in annual electricity savings.

Complementary Programs

Low-Income Programs:
BWP offers a Lifeline rate to about 2,000 income-qualified customers, a 40 percent discount off the standard residential electric rate, making it among the most generous programs in the state. BWP also offers the Refrigerator Exchange program for Lifeline customers.

Research, Development, and Demonstration:
BWP operates a demonstration program of 23 Ice Bear units installed at City-owned buildings and large businesses. The Ice Bear is a peak-shifting thermal energy storage unit that works with air conditioners. The unit is simply a tank containing water that is frozen during off-peak hours; the ice is then used to

provide cooling, in substitution of the air conditioner's compressor, during peak hours. In FY 2017-18, the units provided about 250 kW of peak demand capacity reduction, directly mitigating the impact of the Duck Curve.

Energy Storage:
In addition to the Ice Bear units, and investment opportunities at utility-scale, BWP is investigating distribution-level and customer-owned energy storage in a number of ways, through Requests for Information and Proposals through SCPPA's Energy Storage Working Group.

Evaluation, Measurement & Verification Studies
Along with most other POUs in California, BWP uses the E3 Reporting Tool to ensure accurate reporting of electricity and peak demand savings and cost-effectiveness. In order to verify these savings, and meet the requirements of AB 2021, BWP also builds evaluation, measurement, and verification elements into every program and facilitates independent third-party studies. BWP's previous EM&V studies can be found at https://www.cmua.org/emv-reports.

Major Differences or Diversions from CA POU TRM for Energy Savings
The majority of energy savings values used to evaluate BWP's program performance were obtained from the TRM developed for California's POU by a third-party firm, ERS. In the case where an installed measure was not available in the TRM, BWP relied on vendor or other third-party data to estimate energy savings.

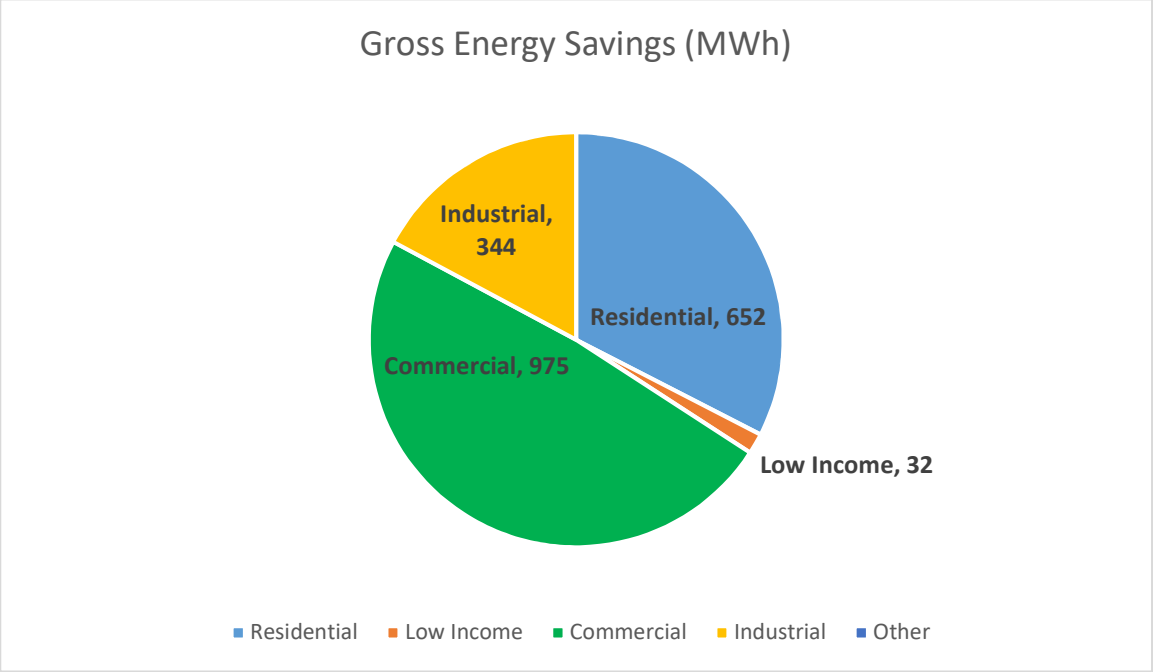
BURBANK WATER AND POWER
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Business Bucks Program	55	161,988	1,676,887	55	161,988	1,676,887	642	141,158	1.10	1.32	0.101
CFL/LED Distributions		612	9,180		612	9,180	4	9,395	0.09	0.09	1.328
Home Rewards Rebates	58	165,139	2,131,356	56	160,796	2,055,216	898	226,246	1.81	1.81	0.140
Home Energy Reports		4,338,992	8,677,984		4,338,992	8,677,984	4,159	484,483	1.70	1.70	0.057
Energy Solutions Rebates	2,957	7,980,413	90,466,299	2,917	7,845,959	89,121,755	33,512	809,486	10.24	1.07	0.011
Air Conditioning Tune-Up Program	633	456,050	4,560,500	633	456,050	4,560,500	2,165	451,521	2.76	2.76	0.117
LivingWise Program for 6th Graders		122,879	1,105,911		122,879	1,105,911	473	76,215	1.39	1.39	0.080
Upstream HVAC Program	233	540,087	8,101,305	233	540,087	8,101,305	2,876	157,128	4.95	4.95	0.025
Home Improvement Program - Electric Measures	286	485,281	3,584,766	286	485,281	3,584,766	1,627	977,776	0.79	0.79	0.335
Round-up Refrigerator Program	13	64,419	322,095	13	64,419	322,095	150	30,973	1.17	1.17	0.104
Made in the Shade	18	76,992	2,309,760	18	76,992	2,309,760	942	150,357	3.23	3.23	0.109
Low-Income Refrigerator Exchange		58,504	819,056		58,504	819,056	329	121,141	0.64	0.64	0.188
EE Measures Subtotal	4,253	14,451,356	123,765,099	4,212	14,312,559	122,344,415	47,777	3,635,878	3.62	1.25	0.036
Low-Income Programs											
EE & LI Subtotal	4,253	14,451,356	123,765,099	4,212	14,312,559	122,344,415	47,777	3,635,878	3.62	1.25	0.036
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	4,253	14,451,356	123,765,099	4,212	14,312,559	122,344,415	47,777	3,635,878	3.62	1.25	0.036

COLTON

Colton at a Glance

- Climate Zone(s): 10
- Customers: 19,620
- Total annual retail sales (MWh): 359,391
- Annual Retail Revenue: $58,297,000
- Annual energy efficiency expenditures for reporting year: $1,413,864
- Gross annual savings from reporting year portfolio (MWh): 2,002



Colton Overview

Colton Electric Department (CED) continues to increase program participation and develop new programs to meet the needs of the community. To increase participation in energy efficiency (EE) and assistance programs, CED continues to work with a marketing firm to assist the utility with marketing materials in English and Spanish to reach Colton's diverse community. Residents and businesses received marketing materials to help educate them on EE rebates and other programs CED offers for customers. CED has been successful in its "Spring into Summer" campaign to increase EE before the hottest months.

Major Program and Portfolio Changes

CED continues to expand its EE program development by entering into partnerships to expand services for residential and commercial customers. This reporting year

CED entered into an agreement with Southern California Gas Company to provide low income mobile home customers energy efficiency upgrades at the same time they are receiving gas company efficiency measures. This program assists CED in expanding its program base and provide better customer service to customers by avoiding being impacted twice when receiving energy efficiency direct installations.

Program and Portfolio Highlights

This reporting year the program that had the greatest impact for potential savings was a City of Colton facility audit of all air conditioning units. It was discovered that several of the City's Air Conditioning units were past its useful life (40 years or older). This provided the CED an opportunity to budget for future a city-wide air conditioner replacement program. The audit also provided the initial assessment to install Ice Bear technology replacements on City facilities. Not only would CED have an opportunity for energy savings but energy storage as well.

Commercial, Industrial & Agricultural Programs

- EE Rebates Non-Residential: Commercial and industrial customers participating in lighting and equipment upgrades and custom measures were rebated $0.10 per kWh saved on the projected first year's savings.
- Municipal DI: This program provided direct installation of energy efficiency measures throughout City owned facilities.
- KYC: Keep Your Cool offered small commercial businesses with inefficient refrigeration, lighting and cooling. The program provided $5,000 per location in EE upgrades.
- Commercial DI: Small business customers with less than 20 kW participated in an energy audit and direct install of EE measures up to $5,000 per business.
- Hospitality: Commercial program for lodging/hotels that provides a whole building approach for energy efficiency. EE measures included in this program are: retrofits for lighting to LED's, insulation, HVAC controls, duct test and seal, and pool and spa pump upgrades.
- The Commercial/Industrial Energy Rebate Program provides rebates to commercial/industrial customers that install new energy efficiency equipment from lighting upgrades to programs specific to the customer's business. The amount of the rebate depends upon the annual energy savings.
- Lighting and Equipment Upgrade Rebates: Commercial and industrial buildings can benefit from substantial rebates given for improving lighting and equipment by increasing energy efficiency and lowering consumption. CED offer $.10 per kWh saved on the projected first year of savings.
- Online Energy Review for TOU accounts: Automated energy is an online energy review CED offers to its TOU (Time of Use) customers. Automated energy provides access to specific interval meter data through their website.

- Commercial Energy Audit: Small commercial businesses that use less than 30 kWh annually qualify to participate in CED commercial energy audit. Businesses can be eligible for additional direct install opportunities depending on audit recommendations. CED is offering $1,000 of direct install measured recommendations. This is a program to assist small businesses who are concerned with their energy consumption and want to learn how they can minimize their usage, shift their load, and save on energy costs.
- Keep Your Cool Program: This program is a new program for FY2013/2014. Small commercial business that have inefficient refrigeration, lighting and cooling such as mini marts and fast food restaurants can benefit from participating in this program. CED will provide up to $3,000 per location in energy efficiency upgrades.
- Hospitality Audit and Direct Installation Program: CED assists hospitality businesses in energy efficiency upgrades. The goals of this program are to; provide a comprehensive energy audit, proposal that provides energy reducing measures and the savings calculations if installed, along with energy management recommendations.
- Multifamily Energy Efficiency Direct Install Program: apartment complexes throughout CED territory can apply to have common area EE upgrades in lighting, thermostats and AC tune-ups.

Residential Programs

- Energy Efficiency Upgrade Rebates: CED offers varying rebates on a number of home energy efficiency improvements. Currently CED offers rebates on: Occupancy sensors, energy star ceiling fans, box fans, pool pumps, solar attic fans, whole house fans, room ACs, evaporative coolers, solar tube lights, energy star clothes washer, energy star dishwasher and energy star refrigerators. Customers who participate in the rebate program will experience a reduction in their annual energy costs.
- AC Tune-Up Rebate: This program offers a rebate for preventative maintenance on residential customer AC units up to 5 tons in size. The program requires the customer to select their own licensed AC contractor that will replace filters, checks refrigerant levels and adjusts the AC unit to minimize seasonal air conditioning costs.
- Air Conditioner Upgrade and Replacement Program: This program offers up to $150/ton rebate to replace a SEER 11 or lower AC system with a SEER 16 or higher AC system. Upgrading AC systems will significantly lower residential customer's energy costs.
- Refrigerator Replacement Program (ARCA): CED will provide a new ENERGY STAR refrigerator to replace an existing inefficient refrigerator to qualified customers for the low cost of $240. The customer is charged $20 a month for 12 consecutive months. To qualify for the new refrigerator, customers must have an older, inefficient refrigerator that CED can recycle.

- Residential Energy Audit: CED residential customers with energy usage of over 10,000 kWh annually can qualify to participate in a residential energy audit. Participants can be eligible for additional direct install opportunities depending on audit recommendations. For customers who previously participated in an energy audit in the past two years with over 10,000 kWh of usage they can participate in up to $500 of direct install measured recommendations.
- Residential WebShop: CED residents can now purchase LED light bulbs, smart power strips, holiday lights and smart thermostats from the comfort of their own home. CED provides up to $50.00 per FY to buy down the cost of these items. The customer can order directly from CED's website and the items are shipped directly to the customer's home.
- Residential Weatherization Rebates: CED offers residential customers rebates for installing replacement windows and insulation in their homes. Windows must meet Energy Star approval with a U-Factor less than 0.35 and SHGC less than 0.30 at a rebate amount of $4.00 per sq. ft. Insulation may be added to the attic, and/or exterior walls. Rebates will also be provided for radiant barrier installed within the attic space. Insulation and radiant barrier must meet the following R-Values:
- Attic Insulation - Minimum R-30 Rebate is $0.40 per sq. ft.
- Radiant Barrier - Minimum R-19 Rebate is $0.30 per sq. ft.
- Exterior Walls - Minimum R-13 Rebate is $0.20 per sq. ft.
- Treebate: CED residents are offered up to $50.00 a tree to plant an approved tree on their property that would reduce their energy bill by providing shade to their home. Residents have a maximum of 5 trees a lifetime.
- Living Wise Program: The Living Wise Resource Action Program provides over 500 energy efficiency and water conservation kits to 6th grade Colton Unified School District students. As part of the program students and parents will install resource efficiency measure in their homes. Students and parents learn how to measure pre-existing devices to calculate saving that is generated by their efficiency upgrade. The goal of the program is to change customer behavior and experience energy savings from their actions.
- Low Income Mobile Home Energy Efficiency (EE) Program: in partnership with Southern California Gas Company (SOLCALGAS), CED offers mobile home building envelope and lighting retrofits to qualifying customers at the same time as SCGC. SCGC provides gas and water saving efficiency measure direct installation.

Complementary Programs

- Low-Income Programs: Income qualified applicants were provided a Tier 1 allotment increase of 139 kWh. This brings the Tier 1 allotment from 250 kWh to 389 kWh each month for 12 consecutive months from the date of approval.

- Low-Income Community Solar: Customers who qualify for our low income assistance program and also have low energy use, may qualify for our new Low Income Community Solar Program. Participants receive a monthly $ credit towards their bill using solar energy provided by the City's Community Solar System.
- Renewable Energy Programs: This reporting year Public Benefit Funds did not fund any renewable energy programs. The Electric Utility enterprise fund, funded the planning and construction of a community solar project.
- Research, Development, and Demonstration: CED participated in an emerging technology demonstration of a solar powered, ductless mini-split air conditioning systems in a commercial setting. CED placed the unit on the City of Colton Water Department outdoor water pumping house. The results of the study is available online at www.coltononline.com.
- Electric Vehicles: CED continues to grow its EV program. The utility currently has 12 level II public chargers available, an EV rate which adds 250 kWh to residential 2nd Tier of energy, and an EV charger rebate of $500 for level II chargers. CED also installed 7 Level II chargers for fleet and continues to work on facilitating the state incentives to expand fleet electric vehicles.
- Energy Storage: Colton Electric Utility participates in an energy storage working group through SCPPA. Energy storage is being renewed for future participation. CED has purchased 3 Ice Bear thermal energy storage units for installation in 2018 as part of trial project.
- Digital Monthly Newsletter on Energy Efficiency: residential and commercial customers receive a monthly newsletter that provides current information on energy efficiency (EE) and energy education. It is emailed in a digital print format but also includes video clips on EE. We also post the articles from the newsletter to CEDs social media platforms.

Evaluation, Measurement & Verification Studies

CED contracts with Alternative Energy Services Consulting (AESC) annually to complete CED programs studies of the residential and commercial program and associated savings. Current studies are available on CED website, www.ci.colton.ca.us/DocumentCenter/View/3225. CED will continue to make EM&V reports available to the CEC and other parties as they are completed and will continue with its EM&V programs and practices in the future budgeting $10,000 per year.

Major Differences or Diversions from CA POU TRM for Energy Savings

The sources used to calculate program performance were the TRM and DEER data. The TRM was utilized for all measures that had not been updated in the 2014 Title 24 code changes.

COLTON ELECTRIC UTILITY											
-- FY2018 Energy Efficiency Program Summary --											
Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Living Wise	41	120,626	1,206,260	41	120,626	1,206,260	533	82,198	3.58	67.03	0.084
EE Rebate Res	20	28,258	359,504	14	17,411	229,177	92	57,304	62.61	63.80	0.338
Municipal DI	6	99,300	2,482,504	6	99,300	2,482,504	890	145,907	2.31	2.31	0.099
Keep Your Cool	37	305,062	2,745,558	37	305,062	2,745,558	1,096	212,879	2.08	2.08	0.094
Commercial DI	56	560,762	6,165,475	46	278,926	3,347,109	1,308	387,585	0.97	0.80	0.149
Webshop EE	0.1	209,755	1,682,431	0.0	209,467	1,678,104	762	75,055	61.80	54.43	0.053
EE Rebate Non Res	81	349,312	2,831,876	81	348,511	2,819,861	1,428	232,061	1.53	3.36	0.097
Residential DI	8	33,632	336,320	8	33,632	336,320	149	35,465	1.46	67.03	0.130
Mobile Home DI	60	263,506	2,898,566	17	73,782	811,598	372	156,693	1.93	1.93	0.243
EE Measures Subtotal	310	1,970,214	20,708,493	250	1,486,716	15,656,492	6,630	1,385,147	27.64	29.37	0.113
Low-Income Programs	5	31,756	200,650	4	22,229	140,455	63	28,718	n/a	n/a	n/a
EE & LI Subtotal	315	2,001,970	20,909,142	253	1,508,946	15,796,947	6,692	1,413,864	27.64	29.37	0.113
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	315	2,001,970	20,909,142	253	1,508,946	15,796,947	6,692	1,413,864	27.64	29.37	0.113

CORONA

Corona at a Glance

- Climate Zone(s): 10
- Customers: 2,600
- Total annual retail sales (MWh): 149,800
- Annual Retail Revenue: $16,355,900
- Annual energy efficiency expenditures for reporting year: $0
- Gross annual savings from reporting year portfolio (MWh): 0

Corona Overview

Corona Department of Water & Power (DWP) began serving electric customers in 2001 with unbundled generation services to existing investor-owned utility customers and bundled service to customers continuing to build new facilities located in the designated service territory. The peak demand was 29.2 megawatts (2.0% more than last year). Customers reside in climate zone 10 and 96% of energy sales were to non-residential customers.

All bundled customers' facilities are less than fourteen years old and met the applicable Title 24 requirements. The recent age of these facilities provide less energy efficiency upgrade opportunities. DWP continued to offer customers the same energy efficiency programs.

Major Program and Portfolio Changes

DWP continued to offer customers the same energy efficiency programs.

- On-site energy audits that analyze customer usage and demand to develop recommendations designed to improve energy efficiency and reduce load requirements. Rebates are available for energy efficiency upgrades identified in these audits. Verification services to ensure appropriate installation of recommended measures are also provided.
- Rebates are available to residential customers who install Energy Star® washing machines.
- Incentives are available to improve energy efficiency for lighting applications, which reduce energy usage by a specified amount.
- Incentives are available to install cost-effective HVAC units that reduce annual energy usage or load requirements by a specified amount.
- Incentives are available to residential customers who install pool pumps, which reduce energy usage by a specified amount.
- Incentives are available to residential customers who install whole house fans, which reduce energy usage by a specified amount.

- Incentives are available to non-residential customers who install cost-effective energy-savings refrigeration equipment that reduces annual energy usage or load requirements by a specified amount.
- Incentives are available to non-residential customers who install cost-effective energy-savings motors, pumps, and equipment that reduce annual energy usage by a specified amount.

Program and Portfolio Highlights

No costs were expended for energy efficiency programs.
DWP serves municipal facilities that can be interrupted as scheduled.

Complementary Programs

Six customers are billed on DWP's net metering tariff schedule.
DWP has installed 350 kW of photovoltaic systems.
DWP installed eight electric charging vehicle stations.

DWP's energy storage goal is to procure cost-effective energy storage applications equal to one percent (1%) of its peak load during calendar year 2020, with installations occurring no later than the end of calendar years 2021.
No specific cost-effective energy storage application has been identified to date.

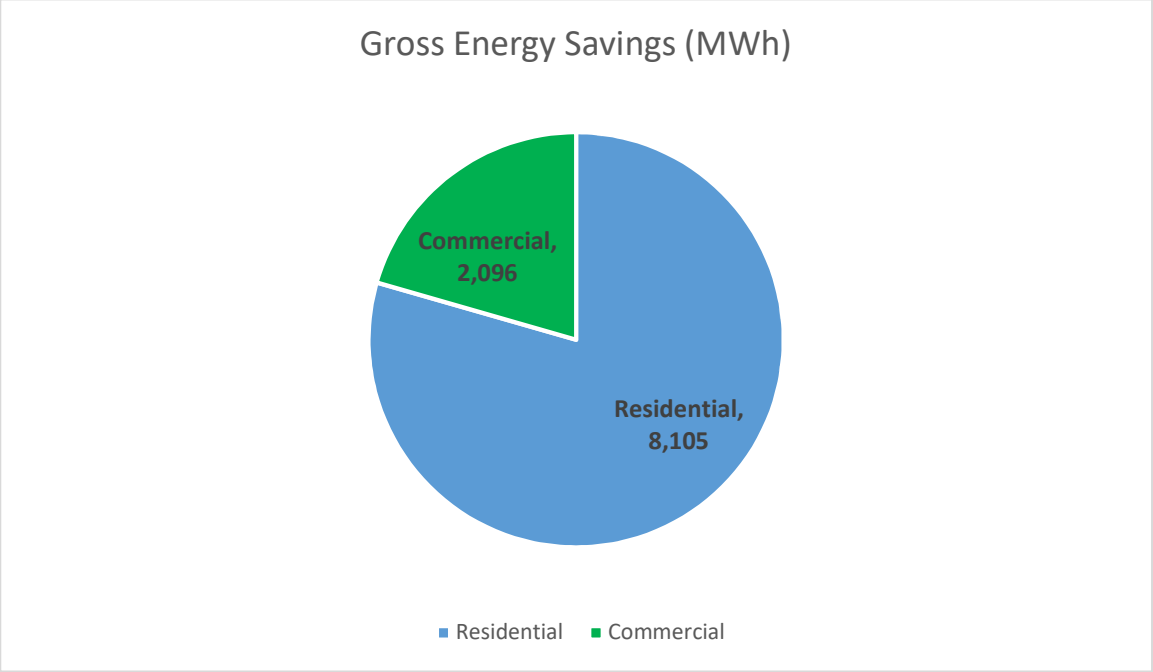
Evaluation, Measurement & Verification Studies

Engineering analysis programs are the basis for energy savings and incentive calculations.

GLENDALE

Glendale at a Glance

- Climate Zone(s): 9
- Customers: 88,849
- Total annual retail sales (MWh): 1,048,049
- Annual Retail Revenue: $201,391,000
- Annual energy efficiency expenditures for reporting year: $1,843,996
- Gross annual savings from reporting year portfolio (MWh): 10,201



Glendale Overview

With a heritage that spans a century, Glendale Water & Power is a municipal utility that serves the citizens and community of Glendale, California including over 34,181 water and 88,849 electric customers located in Climate Zone 9. Glendale Water & Power's vision is to provide our customers with reliable and sustainable water and power services that are cost-effective and innovative. Glendale Water & Power helps our residents and businesses become wise stewards of the planet's natural resources and to wisely manage energy costs at home and at work through our Community Programs, Residential Water and Energy Efficiency Programs, and Business Programs.

Being one of the first Utilities to install both electric and water advanced meters, Glendale Water & Power (GWP) is developing and implementing new and

innovative energy efficiency, load management, demand response and customer engagement programs for its customers. Our customers are eager to take advantage of the many benefits and new programs a modernized utility offers. Trends in utilities are leading towards providing digital communications that give customers near real time usage information that help consumers take charge of their energy use and give them the tools to manage it.

A modernized electric grid greatly expands data acquisition and data sharing across business units, lowers system losses, prevents energy theft and dramatically improves outage and asset management, reducing maintenance and capital costs with the goal of keeping downward pressure on consumer prices. For the current FY 2017-18 reporting year, GWP's energy efficiency programs saved a total Net Annual Energy Savings of 13,981 MWh (1.3% of retail sales) and reduced peak demand by 4.4 MW (1.2 % of peak demand). With a modernized utility system, GWP will offer more programs and increase customer engagement through mobile applications to enable our customers to be stewards in conservation by giving them the tools to empower them.

Major Program and Portfolio Changes

In FY 2017-2018 we continued the implementation of the Conservation Voltage Reduction (CVR) program. The program was expanded and yielded an increase on energy savings. A CVR program is one of the most effective ways of obtaining energy savings without having to enroll customers into a specialized program. It is also a very effective way to reduce energy loss on the system and know and track that you are reducing losses. It is also a technology that customers will not visually see or feel a difference in their usage, but can be proud that their utility invested in such a program to produce such high energy savings.

Using Dominion Voltage, Inc.(DVI) Edge system, it builds on GWP's investment in Automated Metering Infrastructure (AMI) by using the data generated by the new digital meters and SCADA to reduce customer energy consumption by maintaining optimal voltage levels on GWP's distribution transformers and feeders. CVR conserves electricity by operating electric customer voltages in the lower half of the ten percent (10%) voltage band required by ANSI equipment standards.

In FY 17-18 we also experienced a decrease in participation and a decrease in energy efficiency savings in the large Business Energy Solutions program but it continued to be ranked among our top energy savings program in our portfolio.

Program and Portfolio Highlights

Our Home Energy Reports from OPOWER, the Conservation Voltage Reduction pilot program and the Large Business Energy Solutions program produced the most energy savings from our portfolio. The Home Energy Reports had the greatest

impact on our residential customers. This program also reached the majority of our customers and provides constant communication and engagement. The Conservation Voltage Reduction pilot program was expanded and it now includes a total of 21 transformers, and 35 feeders which contributed to an increased annual energy savings. Our Business Energy Solutions program is a California Municipal Utilities Association (CMUA) award winning program that is designed to allow GWP large business customers the flexibility to define their own needs and develop their own energy efficiency projects.

Commercial, Industrial & Agricultural Programs

- Smart Business Energy Saving Upgrades - CMUA award winning program that provides small business customers with comprehensive no-cost energy surveys, customized written reports, energy education, and directly installs as much as $2,000 worth of cost-effective energy conservation measures.
- Smart Business AC Tune-Ups - Provided by Proctor Engineering, helps small business customers save energy by ensuring that their air conditioning systems are functioning at their optimal level.
- Business Energy Solutions (BES) - CMUA award winning program that provides incentives for medium and large businesses to complete pre-approved energy saving retrofit projects. Qualified customers can receive up to $50,000 in incentives per fiscal year. Projects must be cost-effective from the customer's perspective based on the value of total estimated energy savings over the life of the installed measures. Incentives for approved retrofit projects are limited to 20% of eligible project cost or 100% of the incremental costs necessary to bring a remodeling and/or new construction project above the minimum Title 24 energy standard. In no case will an incentive exceed the value saved energy over the life of the measures assuming $0.06 per kWh saved.
- Small and Medium Business Analytics - The business website portal and mobile platform engages small to medium-sized business customers over a mobile platform that provides comprehensive energy management information designed to provide insight and business customer interaction related to energy and water usage, energy efficiency and conservation, and device/appliance management for continuous improvement on energy management and energy decisions.

Residential Programs

- Home Energy Reports - Provides 6 print paper reports annually to 50,000 residential customers on their energy use. Reports also include action steps for each household to help them reduce their electricity consumption. Currently, the program is integrating the existing two month billing data and a wealth of external data sources to educate customers on how they can save energy. With the installation of digital meters throughout Glendale's service territory,

customers are mailed a home energy report that includes their Smart Grid data and access to the website where they can review their energy usage.

- OPOWER Web Portal - Provides up to 75,000 customers with web-access to electric usage information from their digital meters. The software analytics engine enables the coupling of insightful messaging with specific, targeted action steps for each household to help the customer reduce their electricity consumption. The addition of interval electric usage data has given customers the ability to view their usage in monthly, weekly, daily or hourly intervals. Access to granular information coupled with the analytic engine will provide customers with greater insight into their usage and provide more in-depth ways for them to save energy and money.
- Smart Home Energy and Water Savings Rebates - Provides incentives to promote the purchase of approved energy and water saving appliances and devices. Currently GWP offers a web portal for residents to submit their rebate applications online.
- Smart Home AC Tune-Ups - Provided by Proctor Engineering, helps residential customers save energy by ensuring that their air conditioning and duct systems are functioning at their optimal level.
- Livingwise® - Provides energy and water conservation education materials for Glendale public and private school students. These materials support 10 hours of intensive energy education as well as in-home installation of energy saving devices including LED light bulbs.
- Tree Power - Provides up to 3 free shade trees and arborist services to ensure that the trees are planted correctly. When properly sited and cared for, a healthy, mature shade tree helps provide shade that cools the home and helps reduce air conditioning use.
- Conservation Voltage Reduction (CVR) - GWP partnered with Dominion Voltage, Inc. (DVI) to provide their EDGE solution, a conservation voltage reduction (CVR) program. CVR conserves electricity by operating electric customer voltages in the lower half of the ten percent (10%) voltage band required by ANSI equipment standards. The CVR program builds on GWP's investment in Automated Metering Infrastructure (AMI) by using the data generated by the new digital meters to reduce power costs by increasing the efficiency of GWP's distribution system. During the FY 17-18, the program produced energy savings of 3,847 MWh. When fully implement, GWP expects annual energy savings to approach 22,500 MWh. Currently GWP has 21 transformers and 35 feeders in the program. When fully implemented, GWP expects to have as many 54 feeders and 38 transformers in the program.
- Mobile My Connect - CMUA award winning program that provides residential customers a free mobile application through GWP's Smart Customer Mobile engagement program which offers residential customers an interactive app called GWP- Mobile My Connect to better manage their energy and water

usage on a smart phone, tablet and web anytime and anywhere. The user-friendly portal platform, provided by Smart Energy Water, delivers real-time usage information and two-way communication between the customer and GWP. GWP- Mobile My Connect, allows residential customers to view current and historical bills as well as pay bills, set budget goals, submit service requests, view/report outages, send messages directly to GWP and obtain electric vehicle or solar panel usage information.

- In-Home Display/Thermostat Program - GWP partnered with CEIVA Energy, LLC to provide a unique In-Home Display (IHD) solution for residential customers. The CEIVA IHD is a digital picture frame that integrates customer's personal photographs with meaningful and useful historical water usage information and near real time electric consumption information. The CEIVA IHD works as a home gateway that simultaneously communicates with GWP's electric digital meters as well as the customer's existing home networks via Wi–Fi or Ethernet. In addition to providing interval energy and water consumption usage information, GWP has the ability to enhance outreach, by pushing energy efficiency program, conservation and event messages directly to the IHD. In FY 2014-15 GWP's pilot consisted of 72 IHD's with a broad cross section of residential customers. Program currently modified and integrated the installation of smart thermostats. A total of 1,150 IHD's and smart thermostats have been installed in customers' homes.
- High Bill Alerts - GWP partnered with Opower and launched the High Bill Alerts to all GWP customers that sign up for the service. High Bill Alerts are designed to analyze AMI data to help customers save energy and money when they are likely to consume more energy than usual for a billing period. Before the end of a billing period, High Bill Alerts inform customers that they are likely to have high energy use, and they provide insights to help customers reduce their consumption before the billing period ends.
- Smart Home Energy and Water Saving Upgrade Program - The program evaluates the efficiency of customer homes, installs free energy and water saving devices and makes recommendations for additional energy and water measures customers can implement.
- Behavioral Demand Response Program - GWP continued the partnership with Opower to implement a residential Behavioral Demand Response (BDR) program which leveraged AMI data analytics, behavioral science, and multi-channel communications to give customers personalized insights on how to best trim their electricity use during peak events. In FY 2017-2018 this program targeted 33,000 utility residential customers to receive electronic, IVR, and paper communication using a behavioral science approach. The communications encourages customers to adjust their energy consumption during periods of peak energy demand. BDR is an innovative approach to residential demand response because it gives customers personalized feedback on their performance shortly after a peak event is complete.

Customers no longer have to wait for their bill to see how much they saved and this is paramount to locking in positive peak shaving behaviors for future events.

Complementary Programs

Low-Income Programs: In FY 2017-2018, 37% of the annual PBC expenditure went towards funding the below low income programs.

- Senior Care - This program provides electric bill discounts for low-income seniors and disabled customers 55 and older. Senior Care was closed to new participants in 2009 when Glendale Care was implemented.
- Glendale Care - This program offers all eligible low-income customers a discount of $15 on their electric bills.
- Guardian - This program provides bill discounts for households with special electrically powered medical equipment needs.
- Helping Hand - This program provides bill payment and deposit assistance for low-income customers.

Renewable Energy Program:

- Smart Home Solar Solutions - GWP has budgeted for the Smart Home Solar Solutions program beyond the SB1 sunset date. This program provides incentives to promote the installation of grid-connected solar photovoltaic systems in Glendale. A total of 834 kW in grid-connected residential solar photovoltaic installations in FY 2017-18.
- Solar School House - In partnership with The Rahus Institute, the Solar School House program provides Glendale Unified School District and/or local private schools an array of photovoltaic training and activities for educators, and the tools to implement a K-12 solar education program.

Research, Development, and Demonstration:

- Codes & Standards - GWP has included our respective share of the energy savings that are attributable to the State's Building Codes and Appliance Standards that are applied and enforced by the City of Glendale.

Electric Vehicles:

- EV Level II Charger Rebate - This program offers a maximum $500 rebate to residential customers who install a Level II (240V) EV charger in Glendale. The program also offer a Public Access electric vehicle charging station rebates to commercial customers who install a level 2 (240 Volt) or higher plug-in electric vehicle (EV) chargers at locations accessible to patrons, multi-family dwelling residents, commuters and visitors. Under this program GWP reimburses customers for out-of-pocket expenses up to $2,000 per charging station for public access locations.

- Electric Vehicle Guest Drive Events - Glendale in partnership with Electric Car Insider plan, develop and implement stand-alone and turn-key Electric Car Guest events in Glendale annually. These events provide a peer-to-peer experiential learning driving events for prospective electric vehicle (EV) buyers. The event provides the EV experience and education required to help customers facilitate the purchase or lease of an electric car. Events are staffed by EV owners who are knowledgeable about their cars, and are able and willing to answers questions from participants as they test drive their vehicle.

Evaluation, Measurement & Verification Studies

Glendale Water & Power plans to initiate EM&V analysis of energy efficient programs in FY 2019-20 in support of AB 2021. For FY 2019-20 Glendale has budgeted $50,000 to its energy efficiency budget to conduct EM&V studies that will be conducted through the use of a third-party contractor. GWP will select energy efficiency programs based on the kWh savings. The purpose of the EM&V study is to ensure that measures are installed as claimed by GWP and to lend credibility to GWP's savings reports as compared to the industry standards that were available at the time of GWP's program processing and implementation. It is Glendale's plan to review all energy efficiency programs in terms of cost-effectiveness, customer participation and administration.

Currently Glendale Water & Power consistently performs the following in support of EM&V activities:

• A pre and post-inspection of 100% of all large commercial retrofit projects under the Business Energy Solutions program, including a review of their energy-saving calculations.

• All residential and commercial solar PV installations are field inspected and verified by city personnel for program compliance.

• Audits and installations performed by third-party contractors for Glendale's direct install Smart Business Energy Saving Upgrades program have high inspection rates that are performed by the consultant.

Major Differences or Diversions from CA POU TRM for Energy Savings

The sources of energy savings used to calculate program performance was a combination of using the TRM, work papers and third party EE verification.

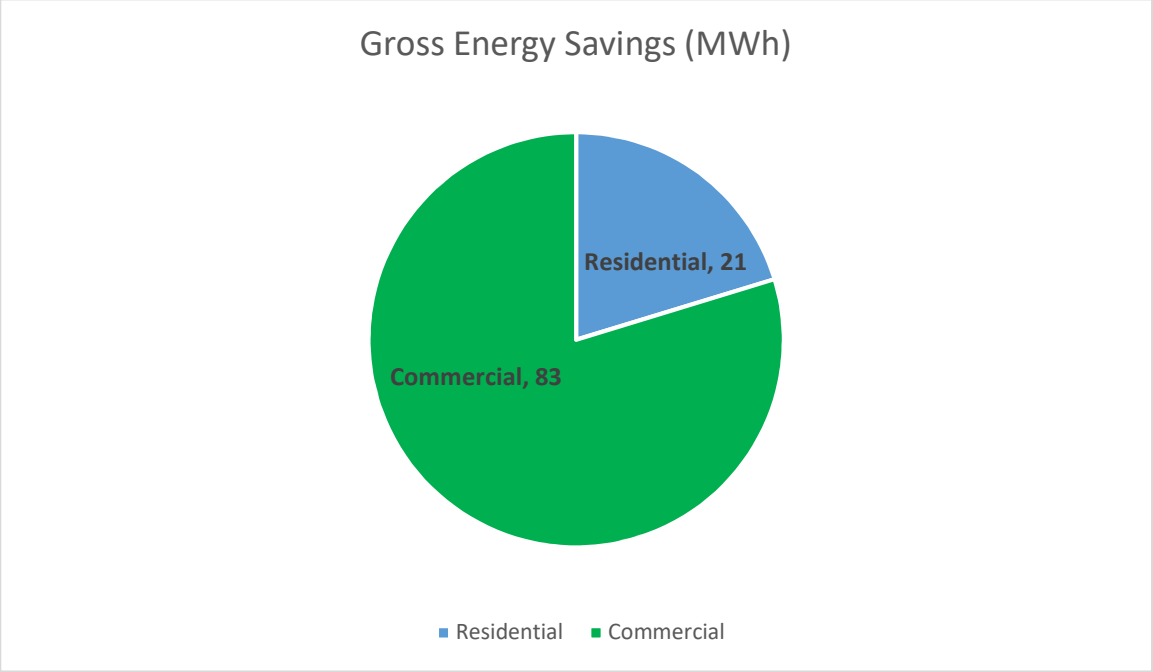
GLENDALE WATER AND POWER
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Behavioral Demand Response	3,329	17,574	17,574	3,329	17,574	17,574	10	57,111	0.09	0.09	3.250
Livingwise	124	782,316	3,774,659	124	782,316	3,774,659	1,718	80,350	4.49	4.49	0.024
Smart Business AC Tune-Ups	23	19,968	199,680	23	19,968	199,680	67	5,472	4.55	4.55	0.033
Smart Home AC Tune-Ups	307	178,050	1,780,496	307	178,050	1,780,496	845	91,627	5.19	5.19	0.062
Smart Home Energy and Water Saving Program	41	122,105	1,039,694	41	122,105	1,039,694	442	50,741	1.92	1.92	0.058
In-Home Displays and Thermostat Program	-	54,145	595,595	-	54,145	595,595	278	119,350	1.31	1.31	0.247
Home Energy Reports	-	6,762,994	6,762,994	-	6,762,994	6,762,994	3,291	636,679	1.03	1.03	0.094
Smart Home Rebates	70	138,602	1,963,256	40	81,051	1,153,446	491	111,947	1.84	0.87	0.274
Tree Power	60	48,965	1,468,935	48	39,172	1,175,148	489	46,054	5.36	5.36	0.069
Business Energy Solutions	167	1,315,222	16,378,557	167	1,315,222	16,378,557	6,115	216,103	7.06	7.06	0.017
Smart Business Energy Savings Upgrades	334	761,103	5,767,209	334	761,103	5,767,209	2,285	428,562	1.21	1.21	0.088
EE Measures Subtotal	4,455	10,201,043	39,748,649	4,414	10,133,699	38,645,052	16,032	1,843,996	2.32	2.17	0.061
Low-Income Programs											
EE & LI Subtotal	4,455	10,201,043	39,748,649	4,414	10,133,699	38,645,052	16,032	1,843,996	2.32	2.17	0.061
T&D		3,847,430	3,847,430		3,847,430	3,847,430	2,174	176,990	6.19	6.19	0.046
Codes & Standards	534	2,898,118	2,898,118	534	2,898,118	2,898,118	1,355	17,664	18.19	18.19	0.006
Other Subtotal											
Total	4,989	13,099,161	42,646,767	4,948	13,031,817	41,543,170	17,386	1,861,660	2.79	2.63	0.052

GRIDLEY

Gridley at a Glance

- Climate Zone(s): 11
- Customers: 2,940
- Total annual retail sales (MWh): 31,845
- Annual Retail Revenue: $6,550,384
- Annual energy efficiency expenditures for reporting year: $92,378
- Gross annual savings from reporting year portfolio (MWh): 104



Gridley Overview

Gridley Municipal Utility (GMU) feels a significant responsibility to its community to invest their Public Benefits funds in such a way as to impact both energy savings and financial savings/positive economics in Gridley. GMU offers a comprehensive menu of rebates to all residential, commercial and industrial customers. GMU's customer demographic has historically resulted in lower customer participation in programs that require capital investment by the customer. Because of this, GMU has offered direct install programs that provide energy efficiency measures to customers at little or no cost to customers.

Major Program and Portfolio Changes

There were no major program changes implemented in FY18. GMU has offered a comprehensive menu of energy efficiency rebate programs for many years. Both customers and local contractors find value in maintaining a consistent program.

Program and Portfolio Highlights

GMU offered the Keep Your Cool (KYC) program to commercial customers to upgrade their refrigeration equipment. The program started in late FY17 and was completed in FY18. This resulted in net annual kWh savings of 66,823 for FY18, which accounts for 78% of the total net kWh savings. The KYC program provides customers with commercial refrigeration upgrades at no cost to the customer. This overcomes the problem many customers have with lack of capital to invest in energy efficiency upgrades and supports local businesses.

Commercial, Industrial & Agricultural Programs

GMU manages a comprehensive energy efficiency incentive program for commercial customers focusing on energy efficiency and peak load reduction. Rebates are available for upgraded lighting, HVAC, appliances, refrigeration equipment, electronics, and in cases where an analysis is performed rebates can be offered for additional equipment that reduces energy use and/or demand. On-site energy audits are provided by energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request.

- Commercial Lighting Program: GMU offers rebates to business owners who invest in the installation of energy efficiency lighting upgrades. There is a prevalence of inefficient lighting throughout the city and most high bay lighting uses high intensity discharge fixtures instead of more efficiency fluorescent or LED fixtures.
- Commercial HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.
- Commercial Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
- Commercial Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Commercial Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Commercial Custom Program: GMU offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.

Residential Programs

Rebates are offered to residential customers for the installation of various energy efficiency measures, such as lighting, HVAC, appliances, and weatherization. On-

site energy audits are provided by energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request.

- Residential Lighting Program: GMU offers rebates to homeowners who install ENERGY STAR® qualified LED lamps/bulbs, ceiling fans and LED holiday lights.
- Residential HVAC Program: GMU offers rebates to homeowners who install high performance heat pumps, central air-conditioners, room air-conditioners, or whole house fans that exceed current state requirements. GMU also offers a rebate for duct sealing when not required by code.
- Residential Equipment Program: GMU offers rebates to homeowners who purchase new ENERGY STAR qualified products, including clothes washers, room air conditioners, dishwashers, pool pumps and refrigerators.
- Residential Weatherization Program: GMU offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments, window replacement or air/duct sealing.
- Residential Water Heater Rebate Program: GMU offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

When applicable, GMU refers customers to the state funded Community Action Agency HEAP Program for low income Butte County residents.

Evaluation, Measurement & Verification Studies

GMU is planning to complete EM&V in FY19 by working with several other utilities to gain economies of scale. GMU has received a proposal from an EM&V company and is reviewing the scope of work.

Major Differences or Diversions from CA POU TRM for Energy Savings

GMU has relied heavily on the savings listed in the Technical Resource Manual. Non-residential lighting and custom projects rely on custom savings calculations.

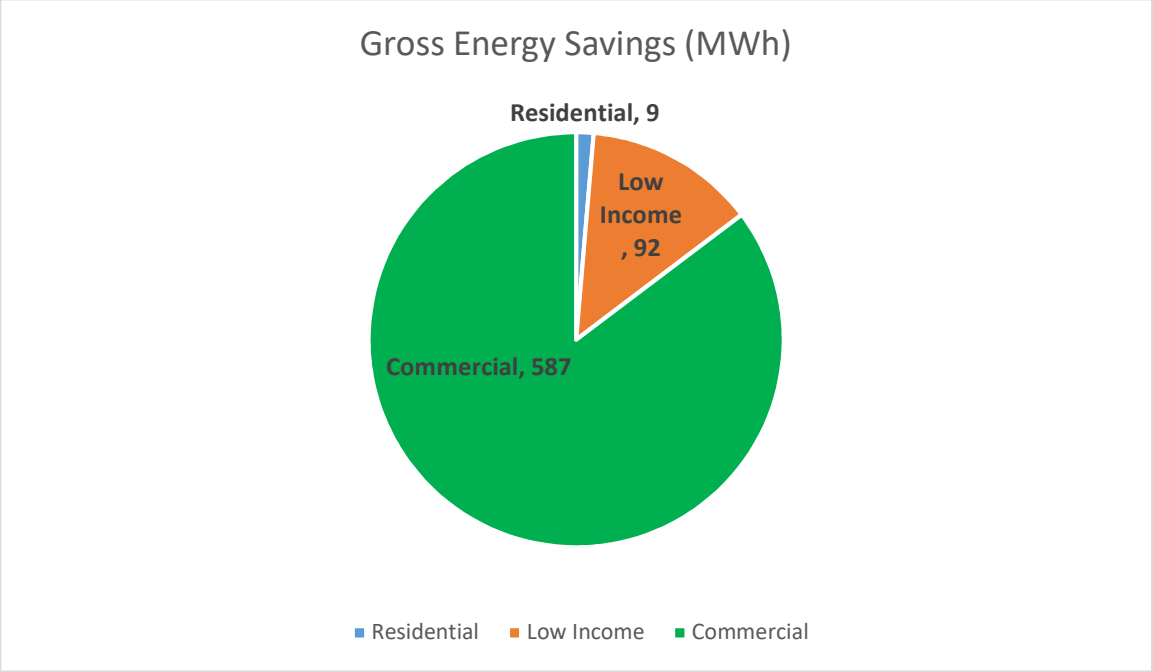
GRIDLEY ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Weatherization	15	16,005	316,321	8	8,124	161,427	74	27,670	1.55	0.68	0.252
Appliance		130	1,816		91	1,271	1	2,921	0.05	0.05	3.011
Commercial	14	83,189	857,591	13	77,102	791,583	325	45,683	1.58	1.36	0.070
HVAC		5,024	100,485		1,407	28,136	13	16,105	0.42	0.39	0.842
EE Measures Subtotal	29	104,348	1,276,213	20	86,724	982,417	412	92,378	1.32	0.89	0.118
Low-Income Programs											
EE & LI Subtotal	29	104,348	1,276,213	20	86,724	982,417	412	92,378	1.32	0.89	0.118
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	29	104,348	1,276,213	20	86,724	982,417	412	92,378	1.32	0.89	0.118

HEALDSBURG

Healdsburg at a Glance

- Climate Zone(s): 2
- Customers: 6,007
- Total annual retail sales (MWh): 73,551
- Annual Retail Revenue: $11,653,766
- Annual energy efficiency expenditures for reporting year: $257,685
- Gross annual savings from reporting year portfolio (MWh): 688



Healdsburg Overview

The City of Healdsburg's Electric Department manages a comprehensive energy efficiency program for residential and commercial customers incentivizing energy conservation as well as peak load reduction. For residential customers, rebates help to drive installations of a variety of energy efficiency measures. Residential rebates are offered in the following areas; lighting, appliance, heat, and cooling, weatherization, and pool pumps. For commercial customers, rebates are generally site specific and developed as customer programs to allow the greatest program flexibility and variety of incentives to the end users. All custom commercial incentives must be accompanied with analysis demonstrating a benefit to cost ratio greater than one and acceptable to the end user.

For fiscal year 2018 the City of Healdsburg budgeted $150,000 for energy efficiency rebates. Fiscal year 2018 budget was amended to $225,000 to allow the funding of a low-income direct install program.

Major Program and Portfolio Changes

For the 2018 calendar year, the City completed a comprehensive direct install program for low-income customers. The program installed high efficiency light bulbs, smart power strips, several water conservation measures, and collected information about each residential units future energy efficiency potential. The program was expanded in 2018 as a direct install of exterior lighting for the low-income multifamily properties.

Program and Portfolio Highlights

In 2018 the greatest energy efficiencies achieved were by the custom commercial energy efficiency program. The City's custom commercial programs allows the end user flexibility in the development of retrofits that drive measurable savings. For 2018 the City was able to work directly with commercial customers to drive lighting upgrades. Notably, a winery customer installed LEDs throughout a large facility, resulting in 321,540 kWh savings annually. In total, commercial programs achieved over 663,000 kWh in energy savings.

Commercial, Industrial & Agricultural Programs

The City offers the following commercial programs:

- Energy Audits and Rebates: This program offers complementary, on-site energy audits for both commercial and industrial customers. Energy efficiency recommendations and follow up visits support implementation of recommended energy efficiency measures. Energy efficiency rebates are available for upgrades identified through these audits.
- Commercial Lighting: This program engages local lighting and electrical contractors to promote and install energy efficient lighting upgrades through technical assistance and financial incentives available from Healdsburg's Electric Department.
- Commercial Refrigeration and HVAC: The City offers commercial customers a wide selection of refrigeration and HVAC rebates. These rebates are performance based and provided greater reward to projects that reduce system peak demand.
- Custom Energy Efficiency Programs: The Healdsburg Electric Department will consider custom energy efficiency programs for site-specific consumption. The Electric Department will require that the City's contractor review and endorse all custom programs. This review may result in a small cost adder to the proposed project but validates the benefit to cost ratio of the program. The Healdsburg Electric Department retains the sole right to approve or deny custom projects.

Residential Programs

The City offers the following residential programs:

- Free Home Audits: On-site energy and water audits are available to residential customers. Energy efficiency measures are recommended based on each audit and upon request, the customer is provided a written report summarizing findings and recommendations to reduce the customer's monthly energy consumption.
- Appliance Rebates: The City provides rebates for the purchase of several ENERGY STAR® rated appliances.
- Residential Heat Pump and Efficient Air Conditioning Rebates: The City offers rebates for residential and small business customers who install high performance heat pumps, central air-conditioners or evaporative coolers that exceed current state requirements.
- Residential Lighting Rebates: The City offers rebates to homeowners who install ENERGY STAR® qualified LED lamps and LED string/holiday lights.
- Residential Electric Water Heater: The City offers customers a rebate toward the installation of energy efficient electric water heaters.
- Weatherization/Window Incentives: The City provides financial incentives for homeowners who invest in home weatherization and window replacement projects.

Complementary Programs

- Low-Income Programs: The City of Healdsburg actively supports a low-income discount for low-income customers. Annually, this discount supports roughly 426 families, or about 9% of the City's residential customers. Income qualified customers can receive up to 25% off their electric bill through this program.
- Renewable Energy Programs: The City continues to see new activity with the solar generation. While the City has reached its limit for SB1 solar installations new installations continue to be interconnected with the City's distribution system.
- Electric Vehicles: The City of Healdsburg has one plug-in hybrid, an all-electric parking enforcement vehicle, and a hybrid electric bucket truck. Additionally, the City maintains 12 charging stations located at City Hall with a plan to expand the total number of public charging stations.
- Energy Storage: Due to high cost the City has not pursued energy storage but continues to watch the market trends for applicable and cost-effective technology.

Evaluation, Measurement & Verification Studies

The City did not complete EM&V reports in calendar year 2018.
Past EM&V reports can be found through the following link:
https://www.cmua.org/emv-reports

HEALDSBURG ELECTRIC UTILITY

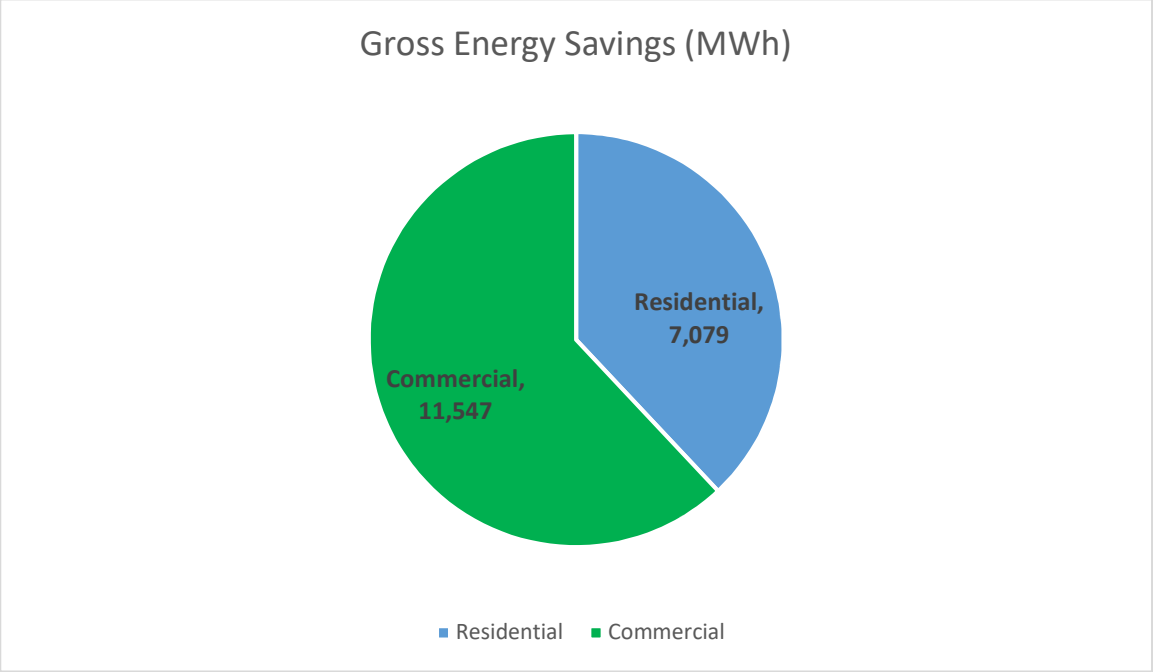
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Costs ($)	PAC	TRC	Utility ($/kWh)
Res Lighting	0.1	1,098	16,260	0	593	8,780	4	1,207	0.66	0.37	0.183
Commercial	94.8	586,146	7,048,330	81	498,224	5,991,080	2,343	169,091	3.00	0.83	0.036
HVAC	0.1	612	9,180	0	515	7,722	3	520	1.99	0.16	0.090
Weatherization	3	3,779	74,357	2	1,681	32,689	16	10,477	0.98	1.21	0.468
Appliance	-	2,917	35,303		1,444	18,159	7	2,195	0.88	0.92	0.155
Pool Pump	0.1	1,348	13,480	0	809	8,088	3	714	1.24	0.79	0.107
Heat Pump	0.0	108	1,620	0	86	1,296	1	1,019	0.22	0.09	1.051
EE Measures Subtotal	98	596,008	7,198,530	83	503,352	6,067,815	2,376	185,223	2.82	0.83	0.038
Low-Income Programs	3	91,764	1,056,728	3	77,999	898,219	351	72,463	n/a	n/a	n/a
EE & LI Subtotal	102	687,772	8,255,258	85	581,351	6,966,033	2,728	257,685	2.82	0.83	0.038
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	102	687,772	8,255,258	85	581,351	6,966,033	2,728	257,685	2.82	0.83	0.038

IMPERIAL

Imperial at a Glance

- Climate Zone(s): 15
- Customers: 153,525
- Total annual retail sales (MWh): 3,472
- Annual Retail Revenue: $426,188
- Annual energy efficiency expenditures for reporting year: $5,298,497
- Gross annual savings from reporting year portfolio (MWh): 18,626



Imperial Overview

As the sixth largest utility in California, IID controls more than 1,200 megawatts of energy derived from a diverse resource portfolio that includes its own generation, and long- and short-term power purchases. IID's Energy Department provides electric power to more than 153,000 customers in the Imperial Valley and parts of Riverside and San Diego counties.

As a consumer-owned utility, IID works to efficiently and effectively meet our customers' demands at the best possible rates, tying our area's low-cost of living directly with low-cost utilities. Our diverse resource portfolio provides our customers with some of the lowest cost rates in southern California which is critical given unemployment rates within the service territory are one of the highest in the nation.

IID's energy efficiency programs are a key factor in the utility's overall goal. These programs provide a positive impact on utility cost by stabilizing energy consumption and reducing purchases of expensive peak power. Additionally, customers are provided with an opportunity to take charge of their energy utilization and by doing so, reducing their electricity consumption and cost.

Major Program and Portfolio Changes

The program portfolio and rebate levels remained consistent from previous year, with the exception of the HVAC rebate, in which a 3rd Tier was added in order to entice customers to purchase higher SEER units.

Program and Portfolio Highlights

IID strives to provide an energy efficiency portfolio tailored toward the unique needs of the ratepayers that generates long-term energy savings while maintaining low-cost, reliable power. The district's portfolio offers residential customers with staple programs such as energy assessments and prescriptive rebates and non-residential customers with a customized program that allows flexibility necessary to encourage investments in efficient technologies.

Commercial, Industrial & Agricultural Programs

Commercial Customer Programs

- Commercial Audits: This program provides commercial customers with onsite energy evaluations of their facilities and helps the business owner identify opportunities for energy conservation. This service is offered at no cost to the customer and is recommended as the first step towards their energy conservation journey.
- Custom Energy Solutions Program (CESP): This program is designed to promote energy efficiency by offering financial incentives to commercial customers who install energy-efficiency equipment. The larger commercial customers that participate generally have their own energy efficiency specialists they've consulted with for their upgrades and have identified the details of their project prior to applying for the rebate. However, for all other commercial customers that may not have access to an energy efficiency specialist, IID offers technical expertise to assist them in identifying the energy efficiency measures and cost saving opportunities. Measures incentivized include interior and exterior lighting, process loads and HVAC/refrigeration.
- New Construction Energy Efficiency Program (NCEEP): This program combines an integrated design process with financial incentives for energy saving design at least 10 percent above the current Title 24 requirements for a building envelope; or as a systems approach method for individual measures.
- Energy Rewards Rebate Program: This program offers commercial customers prescriptive rebates for qualified energy efficient measures. Qualifying measures must retrofit, replace or upgrade old equipment with new, energy-

efficient technologies that meet and/or exceed the Title 24 standards in effect at the time of installation.

- Quality A/C Tune-Up Program: Through this program participating small commercial account customers receive HVAC services which may include duct test and seal (DTS), refrigerant charge adjustment (RCA), inspection of all electrical connections and tightening, inspection of all moving parts and lubrication, inspection of condensate drain, inspection of system controls and thermostat setting, and cleaning of evaporator and condenser air conditioning coils.
- Energy Efficient Schools Initiative: The Energy Efficient Schools Initiative (EESI) – Call for Projects was designed for K-12 educational institutions in the realization of energy efficient upgrades to their facilities through competitive grant opportunities. Qualifying energy efficient upgrades include lighting and HVAC measures.
- The EESI program was administered by IID with funding provided by Citizens Energy Corporation. IID issued a call for projects to to K-12 schools located within IID's electrical service boundaries in Imperial and Coachella valleys. Eligible projects consisted of HVAC and lighting energy efficiency retrofits attainable in 2018. Program funding was limited -- and awards were not guaranteed. Awarded applicants were selected by a committee made up of IID and Citizens Energy staff.

Residential Programs

Residential Customer Programs:

- Energy Rewards Rebate Program: This program offers residential customers prescriptive rebates for qualified energy efficient measures. Qualifying residential measures must retrofit, replace or upgrade old equipment with new, energy-efficient technologies that meet and/or exceed the Title 24 standards in effect at the time of installation.
- Quality A/C Tune-Up Program: Through this program participating residential account customers receive HVAC services which may include duct test and seal (DTS), refrigerant charge adjustment (RCA), inspection of all electrical connections and tightening, inspection of all moving parts and lubrication, inspection of condensate drain, inspection of system controls and thermostat setting, and cleaning of evaporator and condenser air conditioning coils.
- Residential Audits: Customers may receive a free home energy assessment once every three years. An assessment will identify problems that may, when corrected, save the customer a significant amount of money over time.
- Refrigerator Recycling: This program is designed to encourage customers to recycle their old refrigerators rather than using them as a secondary refrigerator usually located either in uninsulated garages or outdoors. Through the program a customer's refrigerator will be picked-up and recycled, in addition to them receiving a $50 incentive per unit.

Complementary Programs

- Low-Income Programs - As a large number of IID's residential customers participate in its income-qualified programs, a significant portion of revenue generated through the public benefits charge is allocated towards these programs. Program expenditures for the 2016 year totaled over $6.3M, with an average enrollment of 13,900 customers.
    - Residential Energy Assistance Program (REAP) – This program provides customers with a discounted rate on their electric bill. Qualification is based on the number of residents per household and the total gross income of all the income sources in the home. Qualifying customers may receive a 20 percent discount on their monthly bill. Qualifying seniors 60 or older may apply to receive a 30 percent discount.
    - Emergency Energy Assistance Program (EEAP) – This program provides financial assistance to customers in a financial crisis, facing disconnection for nonpayment.
    - Medical Equipment Energy Assistance Program (MEEUAP) – This is an assistance program that reduces the electric rate for a defined quantity of electricity used to operate medical equipment by a household that has a full-time resident who requires specific medically necessary electric equipment to sustain life or prevent deterioration of a person's medical condition.
- Energy Storage:
    - The District's first ever battery energy storage system went online in November 2016. The project is a 30-megawatt, 20-megawatt-hour lithium-ion battery storage system that will increase reliability across the IID grid by providing the ability to balance power and integrate solar while providing spinning reserve and black start power restoration capabilities. IID anticipates its customers will benefit from reduced operating costs throughout the lifetime of the project, providing a significant cost savings to ratepayers. The project is one of the largest of its kind in the western United States.
- Renewable Energy Programs:
    - Net Billing – The Net Billing Program is NEMs successor program and also compensates net-surplus customers in accordance with the Distributive Self-Generation Service Rate
    - E-Green Solar Program - On January 9, 2018, IID's Board of Directors approved a 23-year term power purchase agreement with Citizens Energy Corporation for 30 megawatts of solar energy. The agreement will be used to serve IID's low-income electric customers under the eGreen program. The district will use the solar energy purchased to provide a discount to qualified low-income customers under IID's Residential Energy Assistance Program. The program will allow low-

income customers to benefit from renewable clean solar energy without the concern and financial means needed to purchase and install rooftop solar. IID's REAP customers will receive an additional discount on their electric bills under the eGreen program. No enrollment is required and REAP customers will be automatically enrolled onto the program. The program is expected to commence third quarter 2019.

Evaluation, Measurement & Verification Studies

IID conducts EM&V studies on a two-year program cycle. The latest report is a summary of the evaluation effort of the 2014 and 2015 energy efficiency portfolio. The evaluation was led by ADM Associates Inc. and included the Energy Rewards prescriptive rebates, weatherization, Quality AC Maintenance, Customer Energy Solutions and New Construction Energy Efficiency programs. Evaluation activities consisted of calculation of energy and demand savings attributable to the efficiency programs, a process evaluation to identify actionable information aimed at program improvements and recommendations for future program years. IID's evaluation reports are available online at https://www.cmua.org/emv-reports.

Major Differences or Diversions from CA POU TRM for Energy Savings

IID utilized a combination of savings from the TRM, KEMA 2009 report, utility work papers and custom savings when applicable. For the prescriptive rebate program, the district relied on the deemed savings provided by the TRM as the individual efficiency measure's performance characteristics and use conditions were well known and consistent. Subsequently for the custom programs, custom savings were calculated taking into account the properties of existing equipment, replacement equipment and future use.

IMPERIAL IRRIGATION DISTRICT

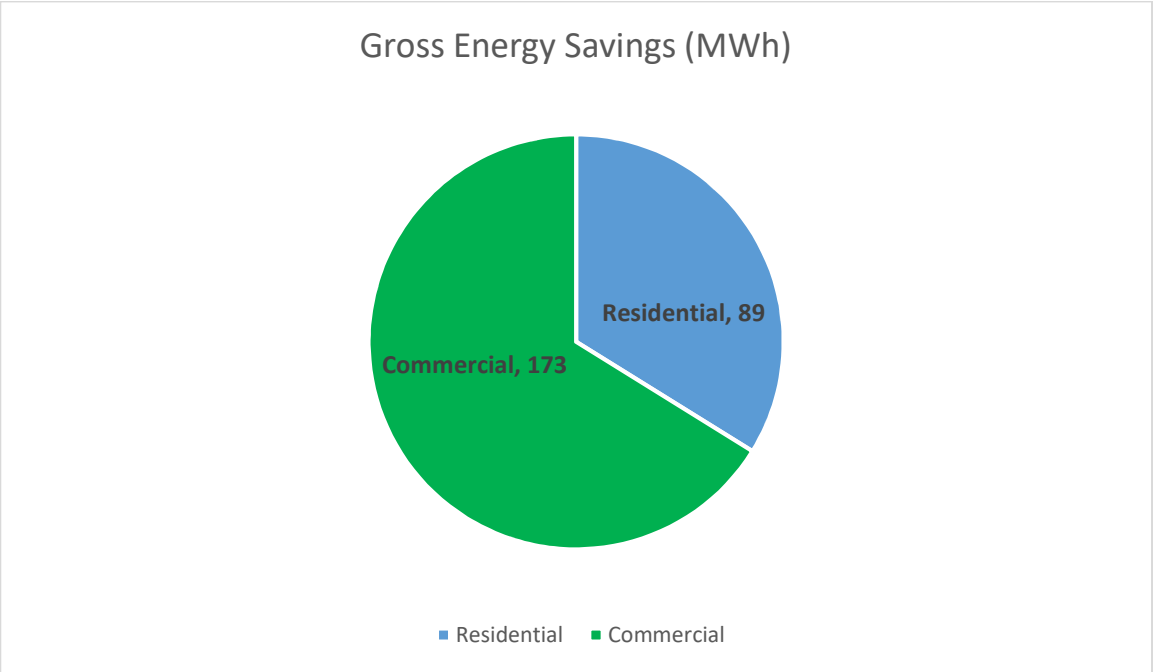
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Costs ($)	PAC	TRC	Utility ($/kWh)
EST	18.6	92,562	458,952	13	64,793	321,266	150	55,231	0.66	0.73	0.189
EE Schools Initiative	330.0	329,342	329,342	330	329,342	329,342	162	75,620	0.58	0.59	0.230
Energy Audits	23.7	62,498	199,758	17	39,472	128,839	60	146,712	0.08	0.08	1.206
Quality A/C Tune-up	2,991	5,901,044	21,282,789	2,376	4,717,699	16,948,784	8,625	1,598,666	2.12	2.12	0.101
NCEEP	5	24,634	492,689	4	20,447	408,932	146	9,815	3.50	4.55	0.037
Green Grants	3.5	10,377	10,377	3	10,377	10,377	5	2,514	0.42	73.91	0.242
Energy Rewards	1,422.7	2,709,722	37,971,336	1,237	2,356,507	33,020,795	13,862	2,053,290	2.63	8.06	0.084
CESP	2,608.8	9,496,292	189,925,833	2,171	7,893,515	157,870,310	74,694	1,356,648	9.63	22.32	0.013
EE Measures Subtotal	7,403	18,626,472	250,671,076	6,151	15,432,152	209,038,646	97,703	5,298,497	4.15	7.01	0.037
Low-Income Programs											
EE & LI Subtotal	7,403	18,626,472	250,671,076	6,151	15,432,152	209,038,646	97,703	5,298,497	4.15	7.01	0.037
T&D											
Codes & Standards	-	17,801	17,801	-	17,801	17,801	9				
Other Subtotal	-	17,801	17,801	-	17,801	17,801	9	-	-	-	-
Total	7,403	18,644,273	250,688,877	6,151	15,449,953	209,056,447	97,712	5,298,497	4.15	7.01	0.037

LASSEN

Lassen at a Glance

- Climate Zone(s): 16
- Customers: 10,500
- Total annual retail sales (MWh): 149,347
- Annual Retail Revenue: $19,994,206
- Annual energy efficiency expenditures for reporting year: $102,815
- Gross annual savings from reporting year portfolio (MWh): 262



Lassen Overview

LMUD remains committed to helping customers manage their energy use through energy education and a comprehensive offering of energy efficiency incentives. For residential customers, rebates are offered for the installation of various energy efficiency measures. For commercial customers, rebates are available for upgraded lighting, refrigeration equipment, HVAC equipment, and in cases where an analysis is performed rebates can be offered for additional equipment that reduces energy use and/or demand. Many customers are not able to participate in standard rebate programs that require significant capital investment of their own. To compensate for this, LMUD periodically offers direct install programs at no cost to commercial and residential customers that provide energy saving and other benefits.

Major Program and Portfolio Changes

LMUD offers a comprehensive menu of energy efficiency rebate programs to our residential, commercial and agricultural customers. There were no major changes to the rebates FY18. We find that the customers and local contractors value consistency in program offerings. LMUD also offered a Residential Direct Install Program in FY18. The program provides installation of LEDs, advanced power strips, showerheads, thermostatic shower valves and aerators at no cost to the customer.

Program and Portfolio Highlights

The Residential Direct Install Program delivered 32% of the total kWh savings. History has demonstrated that direct install programs are beneficial, and customers will take advantage of free give-a-ways. This is also an excellent way to serve customers with limited income.

Commercial, Industrial & Agricultural Programs

LMUD manages a comprehensive energy efficiency incentive program for commercial, industrial and agricultural customers.

- Non-Res Lighting Program: LMUD offers rebates to business owners who invest in the installation of energy efficiency lighting upgrades. There is a prevalence of inefficient lighting throughout the city and instead of more efficiency fluorescent or LED fixtures.
- Non-Res HVAC: LMUD offers rebates to commercial customers for energy efficient HVAC upgrades.
- Non-Res Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
- Non-Res Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Non-Res Electronics: LMUD offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Non-Res Custom Program: LMUD offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.
- Agricultural Custom Program: LMUD offers rebates to agricultural customers to make energy efficiency improvements at their sites.

Residential Programs

LMUD manages a comprehensive energy efficiency incentive program for residential customers.

Residential Lighting Program: LMUD offers rebates to homeowners who install ENERGY STAR® qualified LED lamps/bulbs, ceiling fans and LED holiday lights.

- Residential HVAC Program: LMUD offers rebates to homeowners who install high performance heat pumps, central air-conditioners, whole house fans and ground source heat pumps that exceed current state requirements.
- Residential Equipment Program: LMUD offers rebates to homeowners who purchase new ENERGY STAR qualified products, including clothes washers, room air conditioners, dishwashers, refrigerators, freezers and advanced power strips.
- Residential Water Heater Rebate Program: LMUD offers rebates to customers who purchase new, energy efficient electric water heaters and heat pump water heaters.
- Residential Direct Install Program: The Residential Direct Install program offers LEDs, advanced power strips and water saving measures at no cost to the customer.

Complementary Programs

- Low-Income Programs: LMUD offers two low-income programs. ECAP offers year-round rate assistance based on the type of home heating. The assistance increases in the colder winter months when usage tends to be higher. EEAP provides a one-time assistance payment to help avoid disconnection in the case of a financial emergency. This program is funded by LMUD's Public Benefits Program and administered by the local Salvation Army Office.
- Renewable Energy Programs: LMUD offers customers a Net Energy Metering program that pays customers for excess net generation. Our NEM limit of 5% total peak load of 25MW was met in 2018. LMUD no longer offers NEM for solar or other distributed generation systems. LMUD now offers a Customer Distributed Generation rate of 0.045 per exported kilowatt hour.
- Electric Vehicles: LMUD offers customers rebates on EV charging stations. Publicly accessible and residential are based on a first come, first served basis.

Evaluation, Measurement & Verification Studies

LMUD is planning to complete EM&V in FY19 by working with several other utilities to gain economies of scale. LMUD has received a proposal from an EM&V company and is reviewing the scope of work.

Major Differences or Diversions from CA POU TRM for Energy Savings

For FY18, LMUD has relied heavily on the savings listed in the Technical Resource Manual. Non-residential lighting, custom projects and non-deemed refrigeration measures use custom savings calculations.

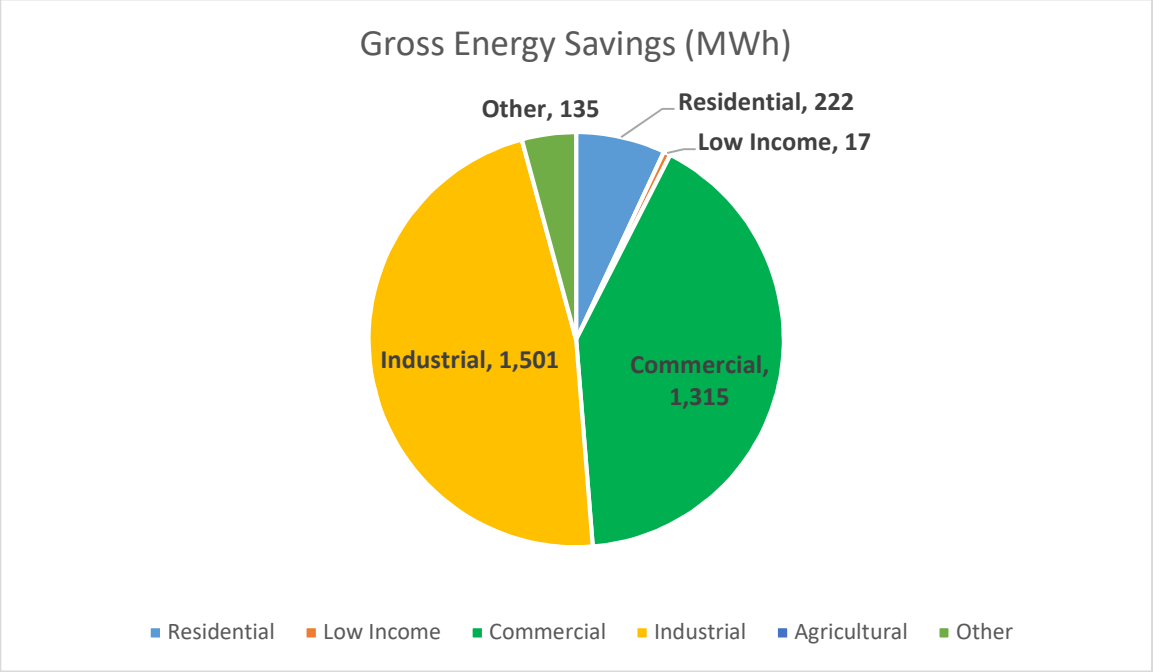
LASSEN ELECTRIC UTILITY
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Costs ($)	PAC	TRC	Utility ($/kWh)
Residential Direct Install	5	74,404	744,039	5	70,684	706,837	313	42,998	1.82	1.82	0.074
Commercial	21	173,416	2,022,976	17	141,634	1,650,290	623	23,191	6.10	2.35	0.018
Water Heating	5	4,414	44,140	3	2,648	26,484	11	10,198	0.25	0.29	0.466
HVAC	1	445	6,531	1	356	5,225	3	4,131	0.21	0.18	1.052
Residential Lighting	3	3,929	52,125	2	2,043	27,362	11	9,141	0.32	0.23	0.440
Appliance	-	5,457	65,947	-	2,754	34,502	14	13,155	0.30	0.30	0.487
EE Measures Subtotal	35	262,065	2,935,758	27	220,118	2,450,699	976	102,815	2.24	1.61	0.052
Low-Income Programs											
EE & LI Subtotal	35	262,065	2,935,758	27	220,118	2,450,699	976	102,815	2.24	1.61	0.052
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	35	262,065	2,935,758	27	220,118	2,450,699	976		2.24	1.61	0.052

LODI

Lodi at a Glance

- Climate Zone(s): 12
- Customers: 24,259
- Total annual retail sales (MWh): 425,158
- Annual Retail Revenue: $69,246,709
- Annual energy efficiency expenditures for reporting year: $792,018
- Gross annual savings from reporting year portfolio (MWh): 3,190



Lodi Overview

Lodi Electric Utility (LEU) utilizes the energy efficiency program to engage with customers, bring value to local businesses and promote economic development. The program is designed to benefit all customer segments and offers a wide variety of opportunities for participation. With median household income of $52,000 and nearly half of the housing in the city renter-occupied, many LEU customers do not have the ability or financial means to make significant EE improvements to their homes.

Major Program and Portfolio Changes

In FY18, LEU continued to offer a comprehensive selection of programs for our commercial, industrial and residential customers. There were no significant program changes.

Program and Portfolio Highlights

LEU continued to offer the Residential Direct Install and Snapshot Audit program that it started in FY16. This program offered installation of LEDs, advanced power strips, thermostatic shower valves, shower heads, and aerators in customers' homes at no cost. The intent was to provide a program for residential customers that do not traditionally participate in energy efficiency rebate programs. While open to all residential customers, the program specifically targeted multi-family and low-income properties, as they are not likely to benefit from traditional energy efficiency programs.

The Non-Residential Rebate Program continues to be the main driver in regard to overall energy savings achieved. Twenty-seven commercial and industrial customers completed EE projects in FY18. Through key accounts management, the utility maintains a proactive and positive relationship with Lodi's largest energy consumers. These relationships are vital to Lodi's overall economic development strategy and through them our large commercial and industrial customers have been effectively encouraged to engage and make investments in EE.

Commercial, Industrial & Agricultural Programs

LEU manages a comprehensive energy efficiency incentive program for commercial and industrial customers focusing on energy efficiency and peak load reduction. Rebates are available for upgraded lighting, HVAC, appliances, refrigeration equipment, electronics, and in cases where an analysis is performed rebates can be offered for additional equipment that reduces energy use and/or demand. On-site energy audits are provided by energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request. There are no Agricultural customers in LEU service territory.

- Non-Res Lighting: LEU offers rebates to business owners who invest in the installation of energy efficiency lighting upgrades.
- Non-Res HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.
- Non-Res Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
- Non-Res Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Non-Res Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips
- Non-Res Custom: LEU offers rebates to business owners based on site-specific equipment and usage. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the project.

Residential Programs

For residential customers, rebates are offered for the installation of various energy efficiency measures, such as lighting, HVAC, appliances, and weatherization. On-site energy audits are provided by energy specialists.

- Residential Lighting: LEU offers rebates to homeowners who install ENERGY STAR qualified LED lamps/bulbs, ceiling fans and LED holiday lights.
- Residential HVAC: LEU offers rebates to homeowners who install high performance heat pumps and air-conditioners that exceed current state requirements. LEU also offers a rebate for duct sealing when not required by code.
- Residential Equipment: LEU offers rebates to homeowners who purchase new ENERGY STAR qualified products, including clothes washers, dishwashers, pool pumps, refrigerators and advanced power strips.
- Residential Weatherization: LEU offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments, solar attic fans, and air sealing.
- Residential Water Heater Rebate: LEU offers rebates to homeowners who purchase a new, energy efficient electric water heater.
- Residential Direct Install: Audits are performed on residential homes and advanced smart power strips, faucet aerators, thermostatic shower valves, and ENERGY STAR rated LEDs are installed at no cost to the customer.

Complementary Programs

- Low-Income Programs:
    - Lodi C.A.R.E. Package Program: Provides grants to very low-income customers in need of assistance paying their electric utility account; the program coordination/customer screening is performed by the Lodi Salvation Army.
    - Lodi SHARE Discount Rate: LEU provides a rate discount of 30% for qualifying residential customers on their electric utility monthly billing statement; Over $450Kwas budgeted in FY18 for this rate discount from the Lodi Public Benefits Program fund.
- Renewable Energy Programs: LEU's Solar PV Rebate program ended on December 31, 2018. LEU exceeded the 5% State Net Energy Metering (NEM) target in January 2017 and the NEM program was closed to new customers. LEU has since implemented a new solar ordinance for customers interested in installing new or expanded solar facilities.
- Electric Vehicles: LEU is a proud partner with the California Municipal Utilities Association, the California Center for Sustainable Energy and the Clean Vehicle Rebate Project in the promotion of PEVs in our community and in California. LEU continues to provide a total of seven free Level 2 charging stations at five municipal parking facilities. LEU also offers customers a time-of-

use EV charging rate with installation of a separate meter. LEU is currently working to develop an EV incentive program for customers.

Evaluation, Measurement & Verification Studies

LEU has implemented an Evaluation, Measurement & Verification (EM&V) Plan, and will be commencing work two new reports in June of 2019. Previously completed EM&V reports are available for review at: https://www.cmua.org/emv-reports

Major Differences or Diversions from CA POU TRM for Energy Savings

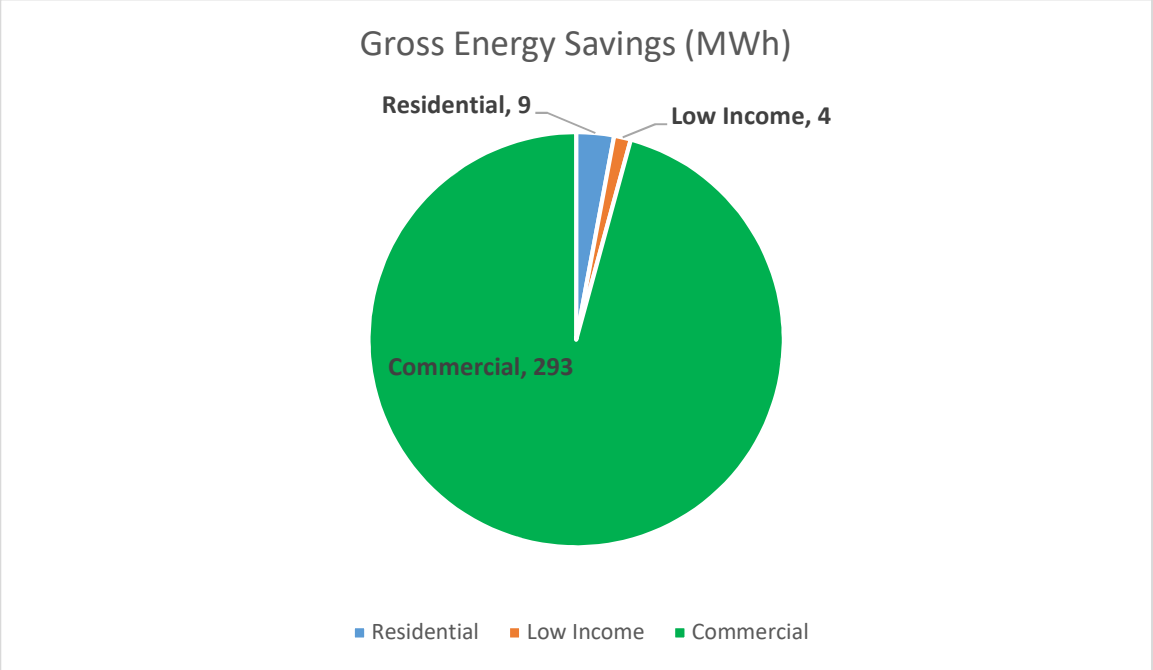
For FY18, LEU has relied heavily on the savings listed in the Technical Resource Manual. The Commercial Lighting and Commercial Custom programs use custom savings calculations based on actual pre and post equipment specifications.

LODI ELECTRIC UTILITY -- FY2018 Energy Efficiency Program Summary --											
Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Industrial	157	1,500,952	17,648,433	119	1,164,462	13,755,752	5,499	155,932	7.89	3.06	0.014
HVAC	9	67,618	1,279,572	7	25,986	461,489	234	75,194	2.31	1.61	0.231
Residential Lighting	4	25,295	376,405	2	13,502	201,688	83	12,721	1.50	0.56	0.084
Residential Direct Install Program	8	49,793	375,575	7	47,303	356,796	158	64,927	0.56	0.56	0.212
Appliance	1	44,107	492,072	1	24,716	279,479	115	51,204	0.62	0.61	0.229
Commercial	146	1,450,262	17,450,036	118	1,184,531	14,254,227	5,905	387,009	3.28	1.94	0.034
Weatherization	38	35,120	680,839	11	10,178	197,529	101	33,092	2.98	2.27	0.245
EE Measures Subtotal	364	3,173,147	38,302,931	265	2,470,679	29,506,960	12,094	780,078	3.67	2.11	0.033
Low-Income Programs	7	17,258	141,840	6	16,395	134,748	59	11,940	n/a	n/a	n/a
EE & LI Subtotal	371	3,190,405	38,444,771	272	2,487,074	29,641,708	12,154	792,018	3.67	2.11	0.033
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	371	3,190,405	38,444,771	272	2,487,074	29,641,708	12,154	792,018	3.67	2.11	0.033

LOMPOC

Lompoc at a Glance

- Climate Zone(s): 5
- Customers: 14,887
- Total annual retail sales (MWh): 119,768
- Annual Retail Revenue: $19,814,998
- Annual energy efficiency expenditures for reporting year: $108,541
- Gross annual savings from reporting year portfolio (MWh): 306



Lompoc Overview

The local climate, customer base, and demographics impact the potential savings from energy efficiency programs offered by the Utility. The majority of energy efficiency programs are focused on lighting and refrigeration since there is little need for air conditioning in our coastal climate and most buildings are heated by gas.

Residential customers make up 89% of the customer base, with an average electric use of 325 kWh per month. Only 11% of the retail customer connections are commercial and demand customers, where the majority of savings opportunities can be found. The City has no industrial or agricultural customers.

The demographics also have an impact on the participation rate of energy efficiency programs. The average medium household income in Lompoc is

$49,074 with 20.8% of the population living in poverty (2017 US Census Quick Facts). Many residential customers have limited funds or incentive to make energy efficiency improvements to their homes, especially if they are renting. To assist these customers, the City provided programs to help low income customers make energy efficiency upgrades.

Major Program and Portfolio Changes

Commercial Programs continue to provide the greatest savings all of programs offered by the City. The City reached its 10-Year Energy Efficiency Savings Target of 213 MWh. The gross annual energy saved by all programs was 306 MWh. This is an increase from the previous reporting period of 37%. There was an increase in annual gross savings from the previous reporting period of 56% in Commercial Programs. This savings can be attributed to an increase in participation in the lighting program by large, corporate owned retail stores, reducing lighting loads. Additionally, an energy efficiency retrofit project at a large aquatic center was made through the Commercial Custom Energy Efficiency Program, reducing the energy required to filter and pump water in two large pools.

Program and Portfolio Highlights

To help encourage low income customer participation in energy efficiency upgrades, the City continues to offer the Income Qualifying Energy Star Clothes Washer and Refrigerator Replacement and Recycle Programs. Success of these programs can be attributed to working with one local dealer who installs the new appliance and recycles the old appliance for the customer. This helps make it easier for a customer to participate and the City ensures that the old appliances is recycled properly at the City landfill.

Commercial, Industrial & Agricultural Programs

The City has no industrial and no agricultural customers; therefore, there are no specific programs for these sectors.

- Commercial Lighting Program: Provides rebates for the installation of energy efficient lighting.
- Commercial Custom Energy Efficiency Program: Provides a rebate for equipment and lighting retrofits not covered by existing programs.

Residential Programs

- Buy Back Refrigerator and Freezer Recycle Program: This program provides a rebate to customers who dispose of their extra refrigerator or freezer and recycle it.

- Energy Star Dishwasher Replacement Program: This program provides a rebate to customers who purchase an Energy Star dishwasher and recycle their old appliance.
- Energy Star Clothes Washer Replacement and Recycle Program: This program provides a rebate to customers who purchase an Energy Star clothes washer and recycle their old appliance.
- Energy Star Refrigerator and Freezer Replacement and Recycle Program: This program provides a rebate to customers who purchase an Energy Star refrigerator or freezer and recycle their old appliance.
- LED Bulb Rebate Program: Provides rebates for the purchase of Energy Star LED bulbs.
- LED Holiday Light Rebate Program: Res Lighting: Provides rebates for the purchase of LED Holiday light strands.
- Income Qualifying Energy Star Refrigerator & Recycle Program: In this program, the City helps purchase an Energy Star refrigerator to replace a customer's working primary refrigerator from a participating dealer. The customer must qualify for the Electric Rate Assistance Program and pay a portion of the cost back to the City over a year. Appliances must be recycled at the City of Lompoc Landfill.
- Income Qualifying Energy Star Clothes Washer & Recycle Program: In this program, the City helps purchase an Energy Star clothes washer to replace a customer's working clothes washer from a participating dealer. The customer must qualify for the Electric Rate Assistance Program and pay a portion of the cost back to the City over a year. Appliances must be recycled at the City of Lompoc Landfill.
- It should be noted that the Dishwasher and Clothes Washer Rebate programs are not funded by Public Goods charges but from a Water Conservation Fund. The City provides water service as well as electric service to its customers.

Complementary Programs

In addition to the portfolio programs, the City offers rate assistance and audit programs and has been evaluating energy storage and electric vehicle use.

- Electric Rate Assistance - The City provides financial assistance to customers who have a household income level below the 2018 Department of Housing and Urban Development (HUD) Low Income Limits Calculation for the local area. The assistance is paid toward their electric usage charge.
- Residential Medical Discount Program – residents who have qualifying medical conditions and are billed under a residential rate schedule may be billed at a lower tier on the rate schedule.

- The Customer Energy Audit Program - Customers can borrow a watt meter to measure the energy use of appliances and electronics. Because the City has automatic meter reading capability, staff is able to view electric daily and hourly use data which has proven to be helpful. Customers are provided reports of their electric use which can help them better understand their usage and implement staff suggestions to reduce energy use without making investments in energy efficiency upgrades.
- The City has also been evaluating energy storage opportunities. As of this report, the City has not identified any cost-effective energy storage projects.
- The City is researching infrastructure upgrades to accommodate electric vehicle charging station energy demand. The City owns 2 electric vehicles and 1 dual port charging station for City vehicles use only.

Evaluation, Measurement & Verification Studies

Previously completed EM&V reports are available for review at: https://www.cmua.org/emv-reports.

Major Differences or Diversions from CA POU TRM for Energy Savings

The City of Lompoc used the California Municipal Utilities Association Savings Estimation Technical Reference Manual as the primary source for calculating and reporting annual energy efficiency program performance.

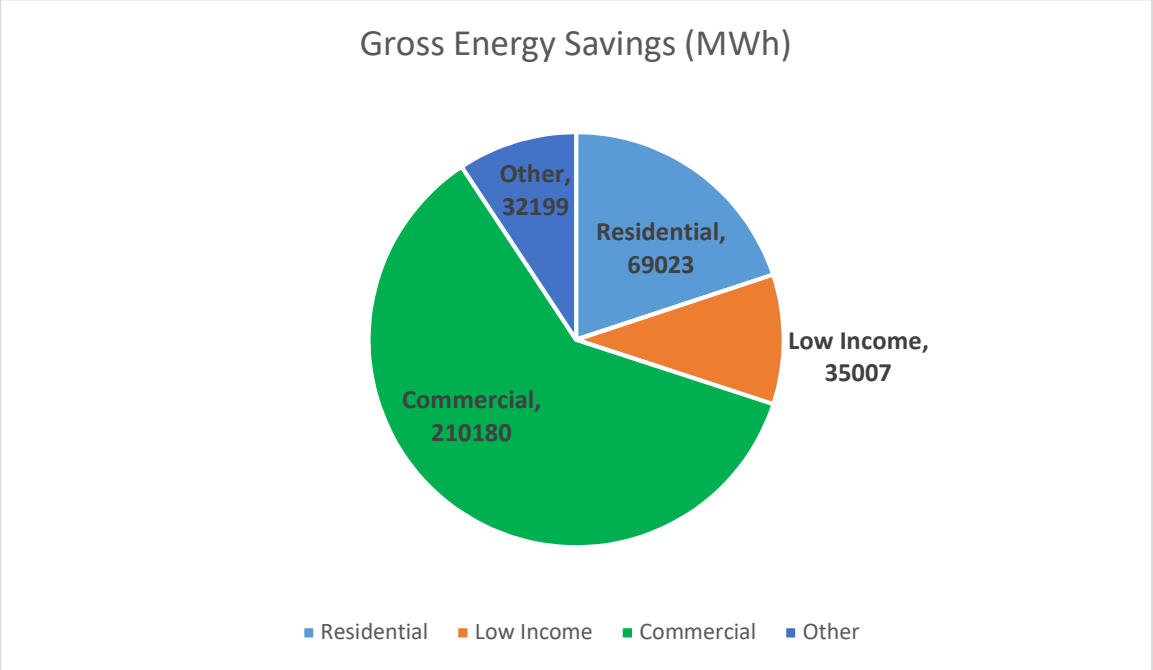
LOMPOC ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Res Clothes Washers	-	1,241	13,651	-	385	4,232	2	4,244	0.22	0.23	1.238
Res Refrigeration	1	6,247	30,224	1	4,373	21,157	10	2,653	0.93	1.14	0.136
Res Lighting	0.5	1,097	15,685	0.3	592	8,470	3	525	1.56	0.69	0.082
Non-Res Pumps	27	235,118	3,526,770	17	152,827	2,292,401	856	64,666	3.07	2.50	0.038
Res Dishwashers	-	182	1,820	-	109	1,092	0	401	0.42	0.72	0.444
Non-Res Lighting	11	58,345	873,240	8	46,676	698,592	249	21,196	2.71	0.85	0.041
EE Measures Subtotal	39	302,230	4,461,390	27	204,962	3,025,943	1,121	93,685	2.78	1.68	0.041
Low-Income Programs	1	4,176	21,912	1	2,856	14,601	7	14,856	n/a	n/a	n/a
EE & LI Subtotal	40	306,406	4,483,302	28	207,818	3,040,544	1,127	108,541	2.78	1.68	0.041
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	40	306,406	4,483,302	28	207,818	3,040,544	1,127	108,541	2.78	1.68	0.041

LOS ANGELES

Los Angeles at a Glance

- Climate Zone(s): 6, 8, 9
- Customers: 4,000,000
- Total annual retail sales (MWh): 26,000,000
- Annual Retail Revenue: $3,804,000,000
- Annual energy efficiency expenditures for reporting year: $131,042,086
- Gross annual savings from reporting year portfolio (MWh): 346,408



Los Angeles Overview

The Los Angeles Department of Water and Power (LADWP) was established in 1902 to deliver water to the City of Los Angeles and began distributing electricity in 1916. LADWP is the largest municipal utility in the nation, providing reliable energy and water services to 4 million residents and 450,000 businesses in four different climate zones: CZ6, CZ8, CZ9, and CZ16. A peak demand of 6,502 MW was registered on August 31, 2017.

Major Program and Portfolio Changes

LADWP is moving toward a clean energy future. The power system is going through a complete transformation, increasing reliance on distributed energy resources (DER) including energy efficiency for a 100% clean energy future and increasing electrification. LADWP also must comply with continuously changing targets and goals set by federal, state, and local agencies as well as international

standards. As a result, higher expenditure allocations towards direct install programs with slightly less energy savings in FY17/18 are attributed to LADWP's effort to achieve equitable access, skilled jobs, transparency, and community capacity building. In January 2018, the Commercial Direct Install Program Program eligibility increased the maximum monthly usage from 200 kW to 250 kW to increase small business customer participation.

Program and Portfolio Highlights

LED Distribution: LADWP delivered two free LED bulbs to 1.2 million residential customers

Commercial Direct Install Program: Program eligibility increased the maximum monthly usage from 200 kW to 250 kW to increase participation.

LADWP signed an agreement with the Los Angeles City Plants program to fund 42,000 additional trees to be planted throughout the City of Los Angeles over the next two years.

UCLA-LADWP 2014 Study on Job Creation from LADWP Efficiency Investments show a potential to create 16 jobs per $1M invested and an estimate of 11,000 jobs created by 2020.

Commercial, Industrial & Agricultural Programs

Commercial Direct Install: LADWP partners with Southern California Gas Company to offer a tree-source efficiency program aiming to reduce the use of electricity, water and natural gas. In FY 17/18 5,297 businesses were completed.

City Trees Program: An average of 22,000 trees are distributed annually focusing on low-canopy communities and savings resulting from trees shading buildings.

Residential Programs

The Home Energy Improvement Program is a comprehensive direct install whole-house retrofit program that offers a full suite of free products by upgrading the home's envelope and core systems. In FY 17/18 2,046 homes were completed.

The Refrigerator Exchange Program is a free refrigerator replacement program designed to target low and fixed income customers. The program was expanded to include multi-family and mobile home communities, civic, community, faith-based organizations as wee as educational institutions.

Complementary Programs

Low-Income Programs:

Refrigerator Exchange Program, Home Energy Improvement Program, and Direct Install Programs are key programs to the community, small business customers, hard to reach customers, low income customers, and multi-unit dwellings.

Green Power for a Green L.A. Program:
The Green Power for a Green L.A. Program gives Los Angeles residents, businesses, and governmental agencies a stake in helping to preserve and protect our environment through their voluntary contribution to support additional renewable energy. Customers who sign up for Green Power choose to have all, or a portion, of their electricity needs generated from renewable energy sources.

Research, Development, and Demonstration:
LADWP is involved in energy storage studies and projects using various technologies and use cases, including lithium-ion, flow batteries, compressed air, thermal energy storage at levels of the power system, including generation, transmission, distribution, and behind the meter.

Electric Vehicles Electric Vehicle Charger Rebate Program:
LADWP introduced the Electric Vehicle Charger Rebate Program, "Charge Up L.A.!" to encourage the installation of convenient electric vehicle (EV) charging stations at residential and commercial locations to support the purchase and use of EVs. This program benefits the environment and helps EV users save on fuel costs at the same time. The rebate is offered to qualifying commercial customers who purchase and install Level 2 (240-volt) chargers at their place of business. Customers who choose to install an optional dedicated time-of-use (TOU) meter will qualify for the LADWP's EV discount of 2.5 cents per kilowatt-hour (kWh). This dedicated service will add additional cost to the installation process but will yield lower electricity costs for off peak charging.

Evaluation, Measurement & Verification Studies
The total budget for EM&V over the 3 year contract period is $3,705,437 which is equivalent to 0.74% of the total portfolio budget on an annual basis.

LADWP has opted to evaluate its programs and activities from a holistic standpoint. Moving forward, LADWP will be tasking its third party EM&V consultants to evaluate the energy efficiency market impacts of all the combined efforts of City of Los Angeles (inclusive of LADWP's efficiency programs). The final EM&V report includes the preliminary Market Transformation (MT) evaluation plan. One of the end results of the MT evaluation quantifies the incremental energy savings potential due to market intervention introduced by the City of Los Angeles and a plan to track market indicators to re-calibrate early projections moving forward.

Results are published on LADWP Website:
https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=OPLADWPCCB436019&RevisionSelectionMethod=LatestReleased

LADWP intends to start a new round of EM&V activities starting Q1 of 2020.

Major Differences or Diversions from CA POU TRM for Energy Savings

Sources of energy savings include custom engineering calculations using industry standard modeling software such as EnergyPro and eQuest as well as simple engineering calculations in spreadsheet format. LADWP's Custom Performance Program and Commercial Lighting & Commercial Direct Install Programs uses these approaches respectively. For direct install and residential programs, deemed savings supported by a combination of the latest Technical Reference Manual as well as utility workpapers are used. Examples of programs using this approach include the Consumer Rebate Program, the Food Service Program, Refrigerator Exchange and Refrigerator Recycling Programs.

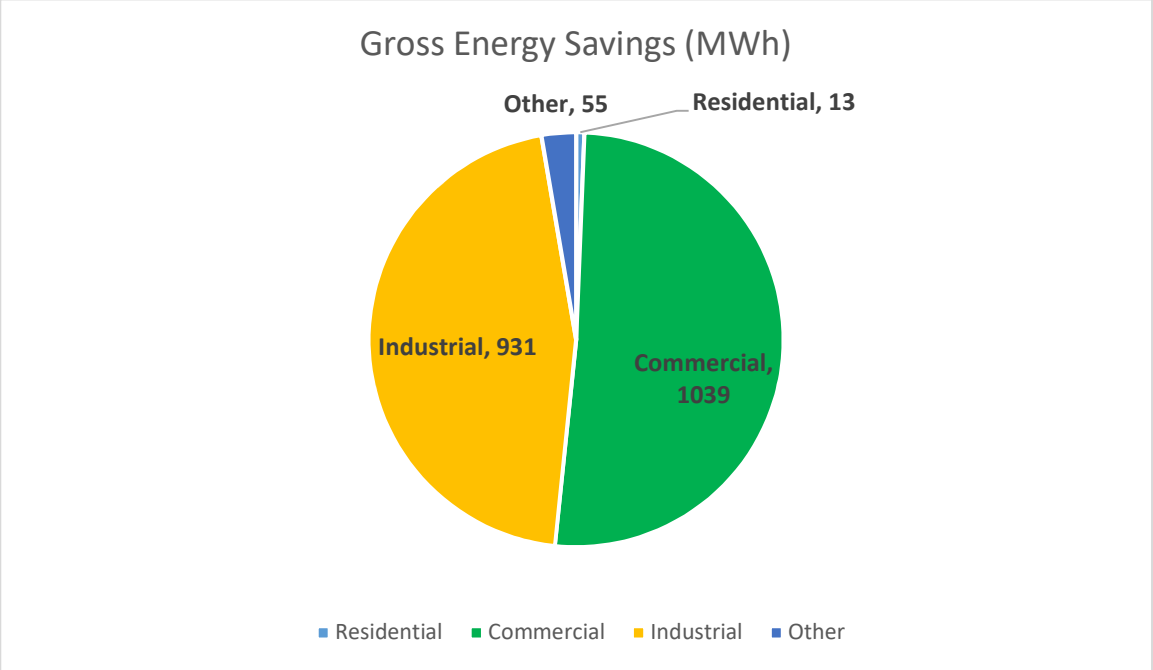
LOS ANGELES DEPARTMENT OF WATER AND POWER
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Consumer Rebate Program	6,435	14,435,156	184,893,993	6,435	14,435,156	184,893,993	11,282	2,409,018	3.13	0.29	0.018
Upstream HVAC	4,163	9,075,740	136,136,100	4,163	9,075,740	136,136,100	6,766	2,583,281	2.17	1.90	0.026
Embedded Energy from Passive Water Conservation		31,178,656	467,679,840		31,178,656	467,679,840	27,767	614,884	33.83	33.83	0.002
LAUSD Direct Install	971	2,286,462	25,151,082	971	2,286,462	25,151,082	1,515	6,459,313	0.18	0.17	0.324
Commercial Lighting Incentive Program	11,926	71,029,568	1,065,443,520	11,926	71,029,568	1,065,443,520	58,589	6,123,973	7.40	1.70	0.008
Home Energy Upgrade CA	343	332,174	6,643,480	343	332,174	6,643,480	365	876,690	0.28	0.27	0.202
Energy Efficiency Technical Assistance Program								819,371			
Savings By Design	1,574	3,397,417	67,948,340	1,574	3,397,417	67,948,340	3,468	2,503,635	0.98	0.94	0.056
Commercial Direct Install	16,239	87,972,111	1,319,581,665	16,239	87,972,111	1,319,581,665	72,564	60,158,654	0.93	0.48	0.063
Residential Lighting Efficiency Program		32,744,935	491,174,030		32,744,935	491,174,030	31,973	7,271,024	3.05	4.03	0.020
HVAC Optimization Program		9,073,741	45,368,705		9,073,741	45,368,705	4,024	11,188,098	0.23	0.19	0.271
California Advanced Homes	469	1,599,235	31,984,700	469	1,599,235	31,984,700	1,788	1,294,115	0.92	0.79	0.062
Food Service	34	204,024	2,484,887	28	175,074	2,137,487	138	77,025	1.30	0.73	0.047
Refrigerator Turn-In & Recycle	0	5,551,938	27,759,690	0	5,551,938	27,759,690	2,319	592,751	2.73	2.19	0.023
City Plants		5,857,687	175,730,610		5,857,687	175,730,610	6,138	3,823,684	1.07	1.06	0.040
Efficient Product Marketplace	77	1,359,050	15,593,740	77	1,359,050	15,593,740	1,094	1,046,936	0.70	0.37	0.086
Custom Performance Program	4,847	32,900,154	427,702,002	4,847	32,900,154	427,702,002	26,707	3,986,049	4.91	1.63	0.012
Embedded Energy from Water Measures		1,020,179	15,302,685		1,020,179	15,302,685	882	19,619	33.83	33.83	0.002
LADWP Facilities	152	1,383,033	20,745,495	152	1,383,033	20,745,495	1,141	1,116,136	0.79	0.24	0.074
EE Measures Subtotal	47,231	311,401,260	4,527,324,565	47,225	311,372,310	4,526,977,165	258,521	112,964,255	1.72	0.85	0.034
Low-Income Programs	5,479	35,006,745	525,428,723	5,479	35,006,745	525,428,723	33,641	18,077,831	n/a	n/a	n/a
EE & LI Subtotal	52,710	346,408,005	5,052,753,288	52,704	346,379,055	5,052,405,888	292,162	131,042,086	1.72	0.85	0.034
T&D											
Codes & Standards	-	129,851,760	2,597,035,200		129,851,760	2,597,035,200	132,598	4,159,672	22.46	19.23	0.003
Other Subtotal	-	129,851,760	2,597,035,200	-	129,851,760	2,597,035,200	132,598	4,159,672	22.46	19.23	0.003
I	52,710	476,259,765	7,649,788,488	52,704	476,230,815	7,649,441,088	424,760	135,201,757	2.29	1.18	0.025

MERCED

Merced at a Glance

- Climate Zone(s): 13
- Customers: 9,700
- Total annual retail sales (MWh): 515,000
- Annual Retail Revenue: $60,000
- Annual energy efficiency expenditures for reporting year: $1,068,008
- Gross annual savings from reporting year portfolio (MWh): 2,037



Merced Overview

The District provides electric services to thousands of customers in Eastern Merced County including the cities of Livingston, Atwater and Merced as well as Castle Airport and Aviation Development Center.

A large percentage of our energy efficiency savings have traditionally come from our large industrial customers. Those customers only make up approximately 15% of our customer base. We differ from other utilities in that almost all of our residential customer base is made up of relatively new construction.

Major Program and Portfolio Changes

Program savings have traditionally come from our large industrial base. It is hard to forecast the types of projects that our customers will prioritize during our reporting year.

The programs currently being offered are being evaluated. We would like to focus on offering more prescriptive measures. We are also evaluating the potential of doing a direct install program for low-income customers.

Commercial, Industrial & Agricultural Programs

The Customized/Industrial Retrofit Program enables qualifying commercial and industrial customers to apply for financial incentives on more specialized and comprehensive energy saving measures that do not fall under the Commercial Lighting Program or the Mechanical Equipment Retrofit Program. Applications for this program are evaluated and approved on an individual per application basis. Financial incentives for qualifying customer projects are paid for annual kilowatt hour savings in a one year period on approved projects.

Residential Programs

Current Residential Customer Programs:

- Residential Rebate Program: This program encourages residential customers to purchase EnergyStar® labeled products and home appliances. We also offer customers rebates for upgrading their HVAC systems, installing whole house fans, and installing ceiling fans.

We are currently evaluating and revising our programs. We are considering adding additional incentives for our low-income customers.

Complementary Programs

- Residential Energy Assistance Program (CARE): Since 2000, MID has been providing a 20 percent discount on monthly energy bills for Low-Income Families, and the Medical Baseline and Life-Support Program for those who depend on electrically powered medical equipment.

Evaluation, Measurement & Verification Studies

Merced Irrigation District partnered with Modesto and Turlock into one evaluation effort for EM&V. The three Irrigation Districts of Modesto, Turlock, and Merced (MTM) are located in California's central valley near one another and each offer similar DSM programs.

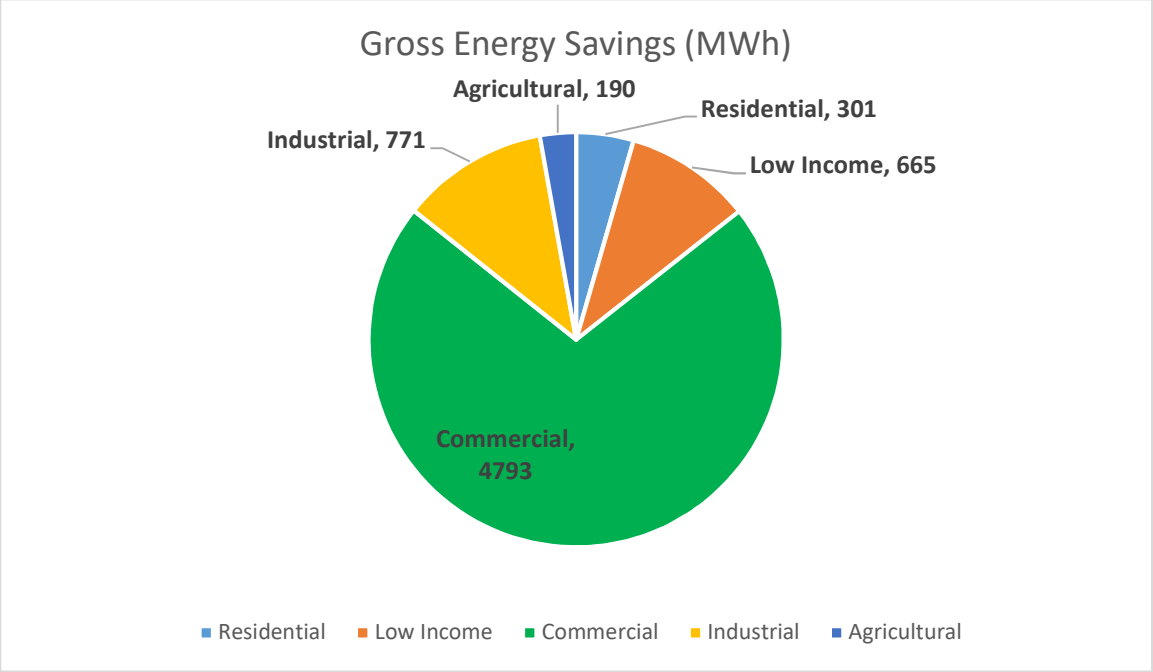
MERCED IRRIGATION DISTRICT
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Commercial Retrofit	-	2,024,316	20,243,156	-	1,619,452	16,194,525	6,520	1,059,252	1.36	1.53	0.081
Residential Air Conditioning	0.3	1,436	25,700	0.1	402	7,196	3	483	2.98	1.74	0.100
Residential Appliances	-	11,644	136,671	-	5,116	62,378	25	8,273	0.86	0.94	0.172
EE Measures Subtotal	0.3	2,037,395	20,405,526	0.1	1,624,970	16,264,098	6,549	1,068,008	1.35	1.53	0.081
Low-Income Programs											
EE & LI Subtotal	0.3	2,037,395	20,405,526	0.1	1,624,970	16,264,098	6,549	1,068,008	1.35	1.53	0.081
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	0.3	2,037,395	20,405,526	0.1	1,624,970	16,264,098	6,549	1,068,008	1.35	1.53	0.081

MODESTO

Modesto at a Glance

- Climate Zone(s): 12
- Customers: 129,000
- Total annual retail sales (MWh): 2,485,803
- Annual Retail Revenue: $349,293,416
- Annual energy efficiency expenditures for reporting year: $2,426,614
- Gross annual savings from reporting year portfolio (MWh): 6,720



Modesto Overview

Climate Zone 12 (entire service area)
Forecast Zone 15 - Rest of BANC Control Area
2018 annual retail electric sales by customer class are: 36% residential, 28% commercial, 31% industrial, 4% agricultural and pumping, 1% other
2018 load growth was -2.9% (based on Total System Input GWh)
10-year system peak of 697 MW occurred in 2017

Major Program and Portfolio Changes

2018 saw minimum program changes. MID did however launch a pilot Smart Thermostat program. This program provided a $50-$75 incentive for installation of a qualified Energy Star® Smart Thermostat. Customers and HVAC contractors praised the program and will likely be added to MID's regular MPower incentive program portfolio in 2019.

Program and Portfolio Highlights

MID increased the promotion of low to moderate income energy efficiency programs by providing staff presentations on energy efficiency to non-profit agencies and low-income advocacy groups in our area. MID also began to increase the use of social media to promote energy efficiency programs to our customers.

Commercial, Industrial & Agricultural Programs

Programs offered are MPower Business, Business Custom and Business New Construction. See MID website (www.mid.org) for program details.

Residential Programs

Programs offered are MPower Home and Weatherization. See MID website (www.mid.org) for program details.

Complementary Programs

Low-Income Programs: MID's low income programs are comprised of weatherization, CARE rate discount and educational outreach. Energy savings from the weatherization program are included in the results for the SB1037 report. Customer demand for weatherization exceeds the annual amount budgeted and the rate discount alone represents a substantial portion of the total public benefits funding allocation. However, MID continues to facilitate new partnerships with other organizations and agencies to increase its outreach and provide additional weatherization services to low-income customers.

Renewable Energy Programs: MID's renewable energy programs are conducted in accord with legislative and regulatory mandates, such as the Renewable Portfolio Standard (RPS) and the California Solar Initiative (CSI/SB1). To date, MID has procured enough renewable energy to satisfy the renewable energy trajectory that was established by the CEC for the three compliance periods through 2020, and recently executed two additional renewable energy contracts that will help MID meet compliance through at least 2023. MID continues to work toward meeting the remaining targets through 2030.

Research, Development, and Demonstration: MID remains open to partner with other utilities or agencies in opportunities to leverage the limited funding it can allocate to this program area.

Electric Vehicles: MID is developing an Electric Vehicle Charger Rebate program for 2019.

Energy Storage: In 2014, the MID board of directors adopted a policy determining that energy storage targets are not appropriate for MID. The board subsequently reviewed that policy and adopted a policy update confirming the previous determination that energy storage targets are not appropriate for MID. The district continues to evaluate the energy storage benefits that are applicable to the MID system and will consider updating this policy if warranted by operational and/or economic needs.

Evaluation, Measurement & Verification Studies

MID continued its ongoing efforts to obtain independent, third-party review of its EE programs, which is employed as part of the review and approval process for selected projects as well as after the fact for the overall portfolio.

For 2018, Power Services, Inc. (CMVP qualified) performed M&V on selected projects and Anchor Blue Consulting conducted M&V on the 2016 & 2017 EE portfolios.

MID's annual budget for EM&V work is $75,000 and completed studies can be found at: https://www.cmua.org/emv-reports

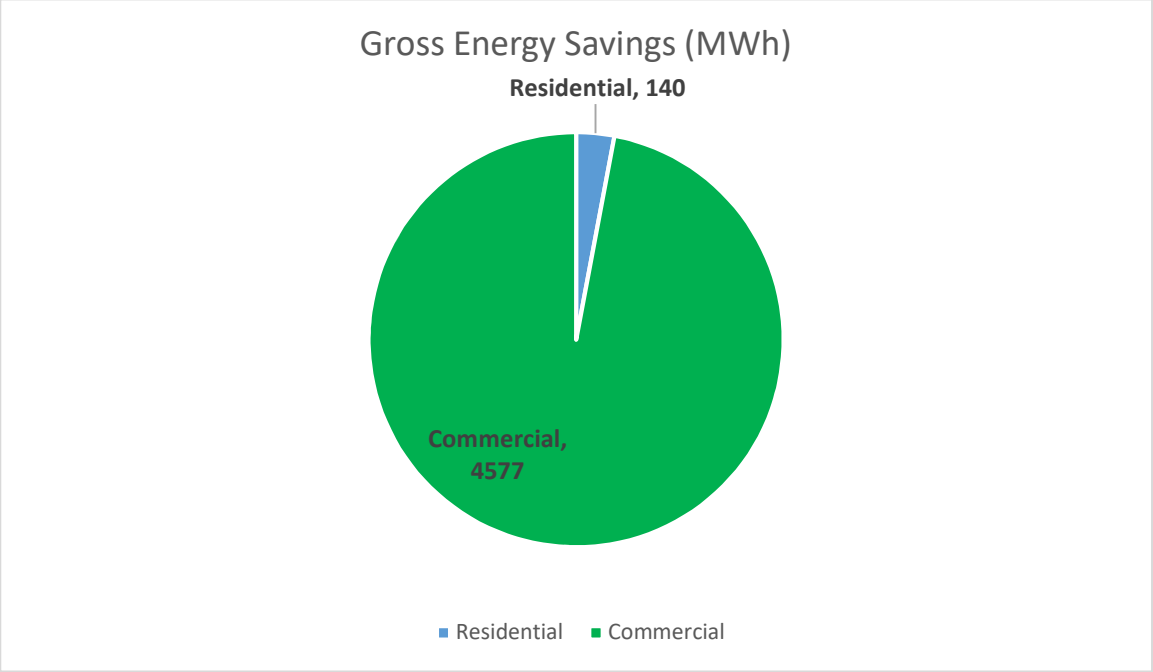
MODESTO IRRIGATION DISTRICT
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
RES_GENIMPRV	17	3,034	75,823	13.6	2,427	60,648	30	5,669	3.80	2.20	0.151
COM_REFRIG	52	300,468	2,099,662	43.8	255,397	1,784,713	729	49,187	3.17	1.27	0.034
COM_WINDOWS	-	2,040	20,400		1,632	16,320	6	432	3.75	2.55	0.032
RES_APPLIANCE	16	7,023	81,738	13.3	5,825	67,796	29	5,561	1.74	0.24	0.103
COM_LIGHTING	398	2,132,664	24,428,402	329.9	1,751,974	20,229,686	8,133	523,203	3.46	1.90	0.032
COM_POOLPUMP	0	963	9,630	0.2	770	7,704	3	736	0.96	0.75	0.116
RES_POOL_PUMP	6	119,298	1,192,980	3.6	71,579	715,788	303	51,205	1.60	1.04	0.087
RES_WINDOWS	94	95,562	1,582,735	51.9	52,559	870,504	444	91,534	3.62	1.08	0.148
COM_COOLING	126	170,742	2,561,123	100.5	136,593	2,048,898	703	104,035	1.84	1.07	0.068
COM_CUSTOM	398	3,146,742	34,982,038	318.6	2,517,394	27,985,630	11,072	630,258	4.00	1.43	0.028
RES_COOLING	45	76,191	1,107,713	35.8	61,819	895,694	464	275,399	1.32	0.97	0.408
EE Measures Subtotal	1,151	6,054,726	68,142,243	911.2	4,857,969	54,683,381	21,916	1,737,220	3.16	1.43	0.040
Low-Income Programs	134	665,063	6,785,481	134	665,063	6,785,481	2,975	689,394	n/a	n/a	n/a
EE & LI Subtotal	1,285	6,719,789	74,927,724	1,045.2	5,523,033	61,468,862	24,892	2,426,614	3.16	1.43	0.040
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	1,285.2	6,719,789	74,927,724	1,045.2	5,523,033	61,468,862	24,892	2,426,614	3.16	1.43	0.040

MORENO VALLEY

Moreno Valley at a Glance

- Climate Zone(s): 10
- Customers: 6,460
- Total annual retail sales (MWh): 200,333
- Annual Retail Revenue: $30,000,000
- Annual energy efficiency expenditures for reporting year: $183,523
- Gross annual savings from reporting year portfolio (MWh): 4,717



Moreno Valley Overview

Moreno Valley Electric Utility (MVU), municipally owned, began serving its first customers on February 6, 2004. These "first customers" are located in the Promontory Park subdivision built by Western Pacific Housing, located at Cactus Avenue and Moreno Beach Drive. Since then, MVU has witnessed significant load growth peaking at just under 50 megawatts on August 28th, 2017.

Although MVU met its Senate Bill 1 (SB1) goals in 2012 and ended solar rebates in 2016 both residents and businesses continue to express interest in solar. Local solar installers continue to engage MVU customers to install new solar, often maximizing the system size without offering cost-effective energy efficiency as a viable option. MVU is also seeing an uptick in customers adding additional panels to an existing rooftop solar system. New communities from William Lyon, KB Homes, and Beazer are building homes with solar pre-installed. MVU processed

over 200 new solar interconnections and connected more than 800 kilowatts of residential solar during this reporting period.

Major Program and Portfolio Changes

Energy efficiency programs are still relatively new at MVU so no major program changes were made last year. The Smart Thermostat Demand Response Program was discontinued due to high overhead and administrative costs; however, smart thermostats were added as a measure to the Residential Audit and Direct Install Program. MVU is exploring a Smart Thermostat Rebate Program to allow customers a wider variety of choices of smart thermostats to install.

Program and Portfolio Highlights

The commercial lighting program continues to be the most successful energy efficiency program at MVU. Amazon underwent a massive LED retrofit for its two MVU-served facilities with a total savings of nearly 10 million kilowatt hours and 1 megawatt of demand! This project was completed in phases over two fiscal years allowing Amazon to take advantage of MVU's generous rebate program.

Commercial, Industrial & Agricultural Programs

- Lighting Retrofits – rebates are available to commercial customers for LED lighting retrofits, other energy efficient lighting replacements, and for LED or photo-luminescent exit signs.
- Commercial Energy Efficiency Program – this Direct Install program provides small to medium-sized customers with an onsite energy audit and energy saving measures at no cost to the customer.
- Commercial Heating, Ventilation and Air Conditioning (HVAC) Retrofits – customers that install new high SEER HVAC units or replace older inefficient units can participate in this rebate program. The installation of new chillers that exceed Title 24 requirements or load-shifting Thermal Energy Storage (TES) systems may also qualify for rebates.
- Motor Replacements – commercial customers that install premium efficiency motors are eligible for rebates under this program. Motors covered under this program must be new, three-phase induction motors (1hp to 200hp in size) and operate for at least 2,000 hours per year.
- New Construction and Major Tenant Renovation – this program offers incentives for projects exceeding Title 24 by at least ten percent. Eligible customers are responsible for providing documentation of energy savings using energy modeling software and all calculations must be signed by a licensed mechanical engineer.
- Outreach Programs – the utility contracts with Automated Energy to provide the largest commercial customers with detailed energy usage information to help efficiently manage their energy consumption and evaluate potential energy efficiency projects.

Residential Programs

- Residential Energy Audit & Direct Install – this program targets very high energy use customers and participants in our Low Income Program. The program provides eligible residential customers with a full in-home energy audit and specific recommendations for their home plus a fixed set of maintenance and upgrades at no cost to the customer.
- Energy Star Appliance Rebates – customers who purchase Energy Star Qualified appliances can apply for a fixed rebate amount under this program.
- Weatherization – rebates are available for energy efficient windows, doors, attic insulation, and high SEER air conditioning and heat pumps.

Complementary Programs

- Low-Income Programs: MVU's Energy Bill Assistance Program provides income qualified residents with a 12% or 20% discount on monthly energy charges; this year's expenditures were over $67,000.
- Demand Response: MVU continues to maintain and operate 15 commercial Ice Bear units on both city and customer facilities.
- Research, Development, and Demonstration: MVU received an APPA DEED Student Research Grant to sponsor a UCR student's research titled "Investigation of a High Voltage Electric Field on the Soiling Rate of PV Panels". Support for transportation electrification is becoming a priority for MVU; funding is available for research and demonstration projects.
- Electric Vehicles: MVU is experiencing increased interest and activity both for workplace charging and home charging. MVU selected Alternative Energy Systems Consulting (AESC) to help develop a transportation electrification strategy and is currently working it.
- Energy Storage: A battery storage system (75kW/180kWh) was added to the City Hall Solar Carport as a demonstration project that includes a kiosk in the lobby. There have been a few proposals by commercial customers to include battery storage with new solar installations but none have actually been installed. One residential Tesla Powerwall has been installed with solar and others are being proposed. In the future MVU expects greater interest and activity in solar plus battery installations as prices move toward time-of-use (TOU).

Evaluation, Measurement & Verification Studies

Engineering analysis programs such as DOE-2 are the basis for calculated energy savings and incentive calculations. MVU requires both pre-inspections and post-inspections for all projects that result in a commercial rebate over $5000. The utility plans to use a third-party consultant (AESC) to verify energy savings for complex projects and custom measures when necessary.

Major Differences or Diversions from CA POU TRM for Energy Savings

MVU relied primarily on the values from the new CET/RP model but also used reported energy savings from trusted engineering contractors to calculate program performance.

- Commercial Codes & Standards – this reporting year MVU will record its share of the energy savings that are attributable to the State's Building Codes and Appliance Standards (Title-24) to the CEC.

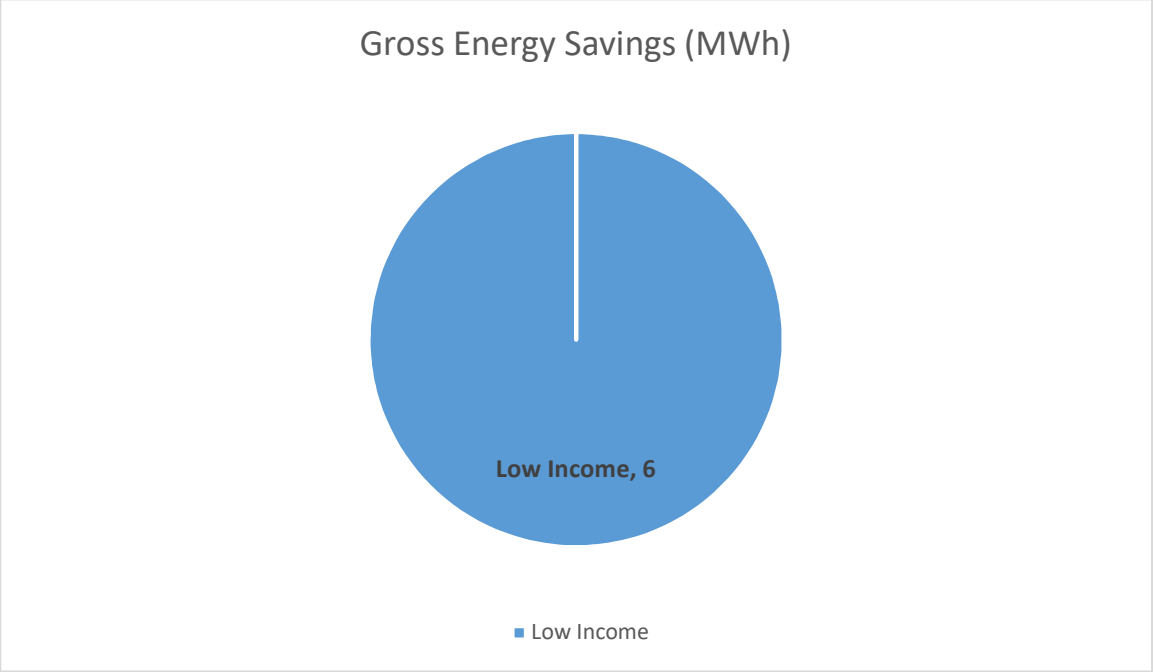
MORENO VALLEY ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Synergy Direct Install Program	-	80,490	804,900	-	72,441	724,410	306	21,180	3.26	3.26	0.035
LivingWise Educational Program	-	33,114	331,140	-	29,803	298,026	126	1,484	19.17	19.17	0.006
Commercial LED Lighting Program	621	4,524,923	45,249,230	559	4,072,431	40,724,307	16,023	148,913	26.67	26.67	0.004
AM/PM Custom Rebate	-	50,370	503,700	-	45,333	453,330	175	2,844	15.77	77.71	0.008
Residential Summer LED Giveaway	-	19,500	292,500	-	10,530	157,950	66	1,760	8.20	16.66	0.015
Residential Energy Star	1	5,183	63,053	1	3,459	43,417	19	2,196	3.17	1.03	0.065
Moval Enterprises Smart Thermostats	-	1,950	19,500	-	1,560	15,600	6	3,011	0.50	2.47	0.233
Christmas Lamp Exchange	7	1,400	7,000	4	756	3,780	2	2,135	0.17	0.15	0.615
EE Measures Subtotal	628	4,716,930	47,271,023	563	4,236,312	42,420,820	16,721	183,523	22.54	22.63	0.005
Low-Income Programs											
EE & LI Subtotal	628	4,716,930	47,271,023	563	4,236,312	42,420,820	16,721	183,523	22.54	22.63	0.005
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	628	4,716,930	47,271,023	563	4,236,312	42,420,820	16,721	183,523	22.54	22.63	0.005

NEEDLES

Needles at a Glance

- Climate Zone(s): 14
- Customers: 3,001
- Total annual retail sales (MWh): 61,207
- Annual Retail Revenue: $6,174,580
- Annual energy efficiency expenditures for reporting year: $148,370
- Gross annual savings from reporting year portfolio (MWh): 6



Needles Overview

The City of Needles is a severely disadvantaged community. The average household income is $43,372. The EE program(s) not only assist the NPUA's load factor but assist the community residences with lower monthly utility bills. The EE program also reduces Needles's peak load factor. High temperatures in the summer cause the peak load to be mostly air conditioning loads which are lessened by the 15 SEER higher installations through the EE program.

Residential Programs

The City funds the low income residential program and provides the following services; Air Conditioner, evaporated cooler with SEER 15 or higher, Sun Shade Program, Energy Star Qualified Appliances (Qualified Appliances are; Dishwashers, Clothes Washers, Refrigerators and Freezers) and Low-E Windows

CITY OF NEEDLES

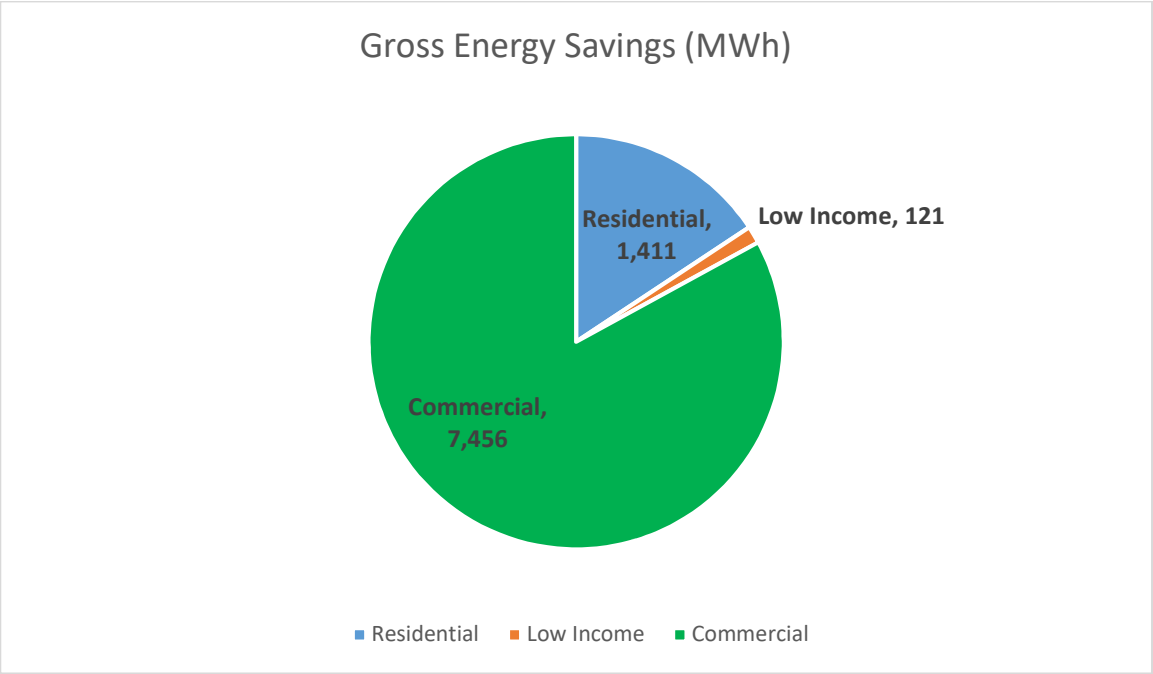
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
EE Measures	-	-	-	-	-	-	-	-	-	-	-
EE Measures Subtotal	-	-	-	-	-	-	-	-	-	-	-
Low-Income Programs	1	5,875	83,542	1	4,875	71,052	28	148,370	0.04	0.97	2.851
EE & LI Subtotal	1	5,875	83,542	1	4,875	71,052	28	148,370	0.04	0.97	2.851
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	1	5,875	83,542	1	4,875	71,052	28	148,370	0.04	0.97	2.851

PALO ALTO

Palo Alto at a Glance

- Climate Zone(s): 4
- Customers: 29,473
- Total annual retail sales (MWh): 899,997
- Annual Retail Revenue: $126,350,000
- Annual energy efficiency expenditures for reporting year: $3,080,534
- Gross annual savings from reporting year portfolio (MWh): 8,988



Palo Alto Overview

The City of Palo Alto Utilities (CPAU) has implemented a variety of energy efficiency programs since the 1970s. In 1998, in response to California's landmark energy legislation (AB 1890), CPAU established the Electric Public Benefits (PB) Program and increased the Electric PB program budget to 2.85 percent of projected annual revenue in order to fund energy efficiency programs. CPAU's electric efficiency program budget can be supplemented with supply funds in order to meet state requirements that publicly owned electric utilities, in procuring energy, first acquire all available energy efficiency and demand reduction resources that are cost-effective, reliable and feasible.

CPAU is committed to supporting environmental sustainability through promoting efficiency programs, promoting distributed renewable generation and influencing

consumer demand through incentives and education. In March 2013, Palo Alto City Council approved a Carbon Neutral Electric Resource Plan, committing CPAU to a carbon-neutral electric portfolio beginning in 2013. In FY 2018, CPAU purchased carbon offsets for its complete natural gas portfolio and is currently supplying all customers with carbon neutral gas. This move helped to spur the development of the natural gas offset market. Palo Alto took a big step into electrification and decarbonization and began designing and promoting programs to reduce greenhouse gas by taking advantage of its carbon neutral portfolio. FY 2018 is the first year that our new aggressive reach goals for 2018-2027 took effect. These reach goals are approximately 30% higher than if we had adopted a "business-as-usual" approach to programs.

CPAU reports the Net and Gross Annual Energy Savings in this report. On a gross basis we saved 1.0% of our electric load, 8,941,902 kWh exceeding our gross goal of 0.88%. On a net basis, we saved 0.66% of our electric load, 5,910,590 kWh missing our net goal of 0.75%. The discrepancy is due largely to very low net to gross ratios for retrofitting commercial lighting with LEDs. We are interested to learn how representative these net to gross ratios are for Palo Alto, or if they may be undercounting the actual impact of our programs. CPAU's adoption of these aggressive goals was based on models which predicted an average net to gross ratio of about 0.85; therefore, we need to a) reconsider how our programs can be modified; b) examine how accurate these net to gross ratios are with a local study; and c) potentially reevaluate the achievable efficiency in our service territory if these low net to gross ratios are accurate for Palo Alto.

Major Program and Portfolio Changes

FY 2018 saw a big push into building electrification efforts and increasing supply equipment for EV chargers. Staff continued working with a marketing consultant to upgrade the marketing materials for all programs – including a full website migration. CPAU for the second year continued to claim the savings associated with the development of Palo Alto's building reach code, the Green Building Ordinance, but still is working on improving internal processes to verify a higher percentage of actual savings. CPAU crafted a new requirement, which went into effect in FY 2018, for commercial retro-commissioning projects to include additional persistence procedures. This new requirement ensures that the savings persistence for these projects will increase from one year to three years. A Building Operator Certification program was offered to our Key Accounts and the savings were rigorously verified by our EM&V contractor.

Program and Portfolio Highlights

The Commercial and Industrial Energy Efficiency Program is the flagship of CPAU's commercial portfolio. With three engineering firms working closely with Key Accounts, this program is where Palo Alto sees the bulk of its energy savings. The

consultants assist customers with audits, engineering studies, vendor selection, rebate processing and post-installation inspection. They make the process as easy as possible for the customer. Seventy percent of the gross reported came from this program, with fifty percent of the gross savings coming from one very large customer. CPAU implemented this program design into the residential market with the Home Efficiency Genie as "Your Trusted Energy Advisor", and have begun seeing increased engagement with residents. CPAU began an EV Charger Rebate Program in late FY 2017, using funds from the Low Carbon Fuel Standard, and staff has been working with a variety of organizations to help them participate over the next year. FY 2017 was the first full year for the Heat Pump Water Program, and CPAU promoted the program by holding a workshop, smoothing the permit process and expanding eligibility to new construction projects. Both EV charging rebates and the Heat Pump Water Program expanded in FY 2018. Finally, CPAU started buying carbon offsets for our gas portfolio.

Commercial, Industrial & Agricultural Programs

Commercial Advantage Program (CAP): Incentives are offered to commercial customers for investments in efficiency, lighting, motors, HVAC and custom projects that target gas, peak demand and energy reductions. In FY 2018, CAP recorded net annual electric savings of 124,226 kWh.

- Commercial and Industrial Energy Efficiency Program (CIEEP): This program offers Key Accounts the option of picking one of three engineering consulting firms to assist in helping them evaluate and implement energy efficiency projects. In FY 2018, CIEEP recorded net annual electric savings of 3,268,803 kWh.
- Empower Small and Medium Business (SMB): This was the final year of this program focusing on energy efficiency savings from mostly lighting retrofits in the small and medium commercial sector. A new SMB program is planned to be launched by FY20. In FY 2018, Empower recorded net annual electric savings of 266,593 kWh.
- Business New Construction (BNC): This program ended in FY 2016 due to the more stringent Title 24 requirements and the Palo Alto Green Building Ordinance (≥10% more efficient than Title 24), which made finding savings above the local code very difficult. Although the program is closed, there are some customers with projects that are still awaiting completion. Measure costs for this program are provided as incremental costs for the more efficient equipment. During FY 2018, BNC recorded a net annual electric savings of 12,701 kWh.

Residential Programs

Multi-Family Plus: This program provides no-cost, direct installation of energy efficiency (EE) measures to multi-family residences with four or more units including hospices, care centers, rehab facilities and select small and medium commercial

properties. These properties are typically very difficult to engage and unlikely to institute EE measures on their own. The program was started in FY 2006, but was recently revamped to include more LED lighting upgrades as the price of LEDs has decreased and the quality of the lights has greatly improved. In FY 2018, the Multi-Family Plus program recorded net annual electric savings of 280,251 kWh.

- Home Efficiency Genie: The Home Efficiency Genie is CPAU's flagship residential program. Launched in June 2015, residents can call the 'Genie' to get free utility bill reviews and phone consultations. This program has a high educational value for Palo Alto residents and offers personalized consultation services for all utilities related questions, including measures such as rooftop solar and newer technologies like electric vehicles (EVs) and EV chargers, energy storage, heat pump technologies, smart home devices and carbon-reducing tactics such as electrification. At a highly-subsidized cost, residents have the option to receive an in-depth home assessment which includes air leakage testing, duct inspections, insulation analysis, energy modeling and a one-on-one review of assessment reports with an energy expert. This package is followed up with guidance and support throughout home improvement projects. During FY 2018, the Home Efficiency Genie program had net annual electric savings of 42,002 kWh that were directly attributable, while the ongoing energy education also likely led to substantial savings that are not being claimed.
- Smart Energy: This is an energy efficiency incentive program for residential customers. The City gives rebates to residents who install energy efficient measures and equipment in their homes. Among these are attic insulation, heat pump water heaters, pool pumps, smart power strips and whole-house fans. Due to federal minimum manufacturing standards for appliance efficiency, the number of appliances meeting rebate qualifying standards dropped significantly during FY 2016. In FY 2018, Smart Energy achieved net annual electric savings of 2,159 kWh.
- Residential Energy Assistance Program (REAP): This program provides weatherization and equipment replacement services to low-income residents and those with certain medical conditions, with no cost to the residents. This program has an equal focus on efficiency and comfort, and therefore is not meant to be cost-effective. With the addition of LED lighting upgrades to the list of measures in FY 2018, REAP recorded net annual electric savings of 102,988 kWh.
- Home Energy Report: CPAU stopped providing residents with individualized reports, which compared their home energy use with neighbors in similarly sized homes, in FY 2015. However, based on the results of behavior studies on Home Energy Reports, savings persist with a decay rate of 20% per year for 5 years after the program has ended. In FY 2018, the Home Energy Report recorded fourth year persistence annual electric savings of 821,387 kWh.

Complementary Programs

Codes and Standards:

- Green Building Ordinance: CPAU helped the City of Palo Alto develop a building reach code that is more stringent than the state Title 24 standard. This ordinance applies to both residential and commercial buildings. The savings associated with this effort have not previously been claimed by CPAU, so efforts were undertaken in FY 2017 to develop a methodology for claiming these savings now and in the future. In FY 2018, 836,000 kWh of savings were achieved by the building code – a number which is expected to markedly increase in future years as the City's process for recording savings from the code is improved. CPAU continues to choose not to participate in claiming savings from state-level codes and standards development.

Community Resource Education Programs:

- CPAU offers free energy efficiency advice and energy education programs to the community. Activities include hosting Facility Manager Meetings for Key Account customers, residential energy workshops on topics like the SunShares program or Heat Pump Water Heaters, and often table at neighborhood association events, local fairs and various special events throughout the City.

Low-Income Program:

- Rate Assistance Program (RAP): CPAU offers a 25% discount on gas and/or electricity charges for residents with qualifying financial or medical needs. All households receiving Social Security Income, Temporary Assistance to Needy Families or Food Stamps automatically qualify for this rate discount. This program began in FY 1993.

Public School Program:

- CPAU provides an annual grant of up to $50,000 to the Palo Alto Unified School District (17 schools with 12,000 students total) to support teacher training programs and the development of curriculums and education projects promoting renewable energy and energy and water efficiency. CPAU participates in quarterly sustainable schools committee meetings and gives educational presentations to classes on energy efficiency, renewable energy and safety.

Customer-Side Renewable Energy:

- Solar Water Heating Program: CPAU offers rebates to residential and commercial customers who install qualifying solar water heating (SWH) systems. The program is governed by state law in regard to development, implementation and administration.

- The PV Partners Program: This program provided rebates to customers who installed solar photovoltaic (PV) systems. Rebate funds were fully reserved in April 2016. The last PV installations were completed in 2018.
- SunShares Solar Discount Programs: Palo Alto has participated in regional group-buy solar programs in 2015, 2016, 2017 and 2018. These programs are administered by a non-profit agency and offer discounted prices for residential solar PV systems from a few pre-qualified contractors. Palo Alto was the top outreach partner of all cities participating in the 2018 Bay Area SunShares solar group-buy program both in terms of the number of solar contracts signed and the number of kilowatts of rooftop solar capacity that will be installed through the program. Palo Alto residents signed 23 contracts for a total of 115 kilowatts of rooftop solar. Palo Alto was also the #1 city for purchases of electric vehicles through SunShares, purchasing 40% - that's about 5 out of 12 - of the total number of EVs sold through the program Bay Area-wide.

Sustainability:

- EV Chargers: In March 2017, Palo Alto began offering EV charger rebates to schools, non-profits and MUDs (Multi-Unit Dwellings) with common area charging accommodations using Low Carbon Fuel Standard (LCFS) Credits allocated to the City by CARB (the California Air Resources Board). Rebates of up to $30,000 are available for schools and non-profits and up to $18,000 for MUDs. In FY 2018, CPAU paid EV charger rebates out to three sites. Even with a generous rebate, it became clear that despite the demand for EV infrastructure, property owners needed more support to figure out how to install EV chargers. Staff worked with the Development Center to streamline the permitting process and began work to issue an RFP for an EV Solutions and Technical Assistance program. This new program will launch in FY2019 and is expected to accelerate the installation of shared charging infrastructure at harder to reach properties. Staff is also looking into raising its rebate amounts as industry is reporting that the cost for installing one commercial grade EV charging connector is costing an average of $13,000. The City also used LCFS funds to host two EV ride-and-drive events and two EV workshops attracting close to 400 potential new EV drivers.
- Heat Pump Water Heater Pilot: The City launched a Heat Pump Water Heater (HPWH) pilot program in late spring 2016 to encourage residents to replace their gas water heaters with efficient electric HPWHs. This program offers rebates of up to $1,500 for qualifying models that meet the minimum efficiency standard required by the California Energy Commission. The Development Center and Utilities, collaborated to develop a streamlined permit submittal checklist for installing HPWHs. In the spring of 2018, the City co-hosted a HPWH workshop with Passive House California, as well as a mini-summit with various stakeholders including local non-profits, CCA's, installers,

designers, architects, distributors and manufacturers. The outcome of this event spurred the City to pursue a regional mid-stream program to accelerate market-transformation. This lead to working with StopWaste to apply for a 2018 BAAQMD (Bay Area Air Quality Management District) Climate Protection Grant. A $300,000 grant was awarded to StopWaste at the end of FY2018 to develop and launch a mid-stream HPWH program as well as, organize trainings and supply chain engagement. In FY 2018, CPAU completed 27 HPWH projects compared to 3 in FY 2017.

Utility-Interconnected Renewable Generation in Palo Alto:

- Palo Alto CLEAN: The CLEAN (Clean Local Energy Accessible Now) program offers a feed-in tariff for any-sized renewable generation systems installed on the utility-side of the electric meter where all of the generated electricity is procured for use in Palo Alto's Renewable Portfolio Standard (RPS). CPAU has accepted applications for six systems for a total of 2.915 MW. For fiscal year 2017, the available prices were 16.5 ¢/kWh fixed for 15, 20 or 25 years for solar renewable energy resources, up to a capacity limit of 3 MW (and 8.8 ¢/kWh for a 15-year contract term, 8.9 ¢/kWh for a 20-year contract term or 9.1 ¢/kWh for a 25-year contract term beyond that limit), and 8.3 ¢/kWh for a 15-year contract term, 8.4 ¢/kWh for a 20-year contract term and 8.5 ¢/kWh for a 25-year contract term for non-solar eligible renewable energy resources.
- PaloAltoGreen: This program was launched on Earth Day in 2003 to give customers the option to voluntarily reduce greenhouse gas emissions associated with their electricity use. Participants paid an additional charge per kWh to cover the purchase of Renewable Energy Certificates (RECs) so that their electric use was supplied with 100% renewable energy. As of June 2014, the residential program was closed because the City's electric supply became 100% carbon neutral. PaloAltoGreen is still available for commercial customers who wish to be recognized under the U.S. EPA Green Power Leadership program or to earn Leadership in Energy and Environmental Design (LEED) Green Power credits. At the end of FY 2018, CPAU had 129 customers enrolled in PaloAltoGreen, representing approximately 27 GWh of annual load.

Customer Connect Pilot Program and AMI Implementation:

- The 5-year Customer Connect pilot program that began in 2013 uses advanced electric, gas and water meters and related systems (known as Advanced Metering Infrastructure, or AMI) to help residential customers evaluate changes in their energy and water use and view their consumption through an online portal. This program has approximately 400 participating customers, of which 96 have enrolled in the pilot Time-of-Use electricity rate. Enrolled customers are able to save money by shifting electric usage to off-

peak hours. The pilot also offers water leak-detection capability, and has detected over 200 leaks at customer premises. Staff communicated with customers to resolve the leaks on over a quarter of these incidents, saving them money and thousands of gallons of water. The 5-year pilot phase ended in December 2017, but the advanced customer meters, networks and customer portals are expected to be maintained through 2022. By that date, CPAU plans to roll out an AMI system for all utility customers so that the community can more effectively manage its consumption.

Commercially-Focused Programs:
CPAU's Demand Response (DR) pilot program offers incentives to large commercial customers to voluntarily reduce their electricity use during periods of high demand in the summer months. In the past four years, 0.63 MW (2015), 0.24 MW (2016), 0.28 MW (2017), and 0.23 MW (2018). A commercial benchmarking data request webpage was added to the City's webpage to assist customers in their compliance with AB 802. Building consumption data will be sent to the customer in a format which can be easily uploaded to the EPA's Portfolio Manager website.

Evaluation, Measurement & Verification Studies
For FY 2018, CPAU contracted with TRC Engineers, Inc. to undertake impact and process evaluation for the CIEEP (Enovity, BASE & Ecology Action), Green Building Ordinance and Building Operator Certification. The budget for this work is $124,737. A final EM&V report is expected to be available by the end of May 2019.

Major Differences or Diversions from CA POU TRM for Energy Savings
The energy savings data used for almost all of CPAU's programs were taken from the 2016 Technical Resources Manual and Database for Energy-Efficient Resources (DEER). Some programs had savings determined by a consultant or other data sources. For example, CPAU's CIEEP program relied on Itron 2019, 2017 Nonresidential ESPI Deemed Lighting Impact Evaluation for the net to gross ratio. All savings data claimed by CPAU was vetted by staff and relies on conservative assumptions. Many utilities use net to gross ratios between 0.85 and 1 for large commercial programs, where we used between 0.55 and 0.85, with an average of 0.58.

CITY OF PALO ALTO UTILITIES

-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
BNC	-	21,169	211,690	-	12,701	127,014	46	13,865	0.66	0.07	0.127
Genie	1	52,502	629,396	1	42,002	503,517	184	42,335	2.51	2.51	0.107
BOC	-	500,000	3,500,000	-	425,000	2,975,000	1,109	21,646	11.21	11.21	0.008
GBO	-	1,100,000	14,800,000	-	836,000	11,356,000	3,995	59,580	13.68	13.68	0.006
MFP	-	329,707	3,548,360	-	280,251	3,016,106	1,172	418,055	0.55	0.92	0.165
CIEEP - EA	-	966,220	6,606,970	-	561,432	3,777,404	1,289	302,940	1.09	0.42	0.092
CIEEP - Enovity	-	915,222	12,266,330	-	541,823	7,323,248	2,380	434,221	1.69	0.41	0.074
CIEEP - BASE	414	3,477,251	49,727,830	231	1,940,173	27,929,297	8,991	1,261,198	1.65	0.50	0.057
SMB	-	469,443	5,248,624	-	266,593	2,993,451	991	236,505	0.92	0.68	0.094
CAP	-	207,043	1,166,173	-	124,226	699,704	247	53,702	1.16	1.48	0.084
Smart Energy	0	6,941	132,087	0	2,159	39,141	14	6,970	2.39	1.58	0.238
Home Energy Report	-	821,387	1,478,497	-	821,387	1,478,497	628	4,309	27.21	27.21	0.003
EE Measures Subtotal	415	8,866,886	99,315,958	232	5,853,748	62,218,378	21,047	2,855,326	1.74	0.65	0.056
Low-Income Programs		121,162	1,175,774		102,988	999,408	389	225,208	n/a	n/a	n/a
EE & LI Subtotal	415	8,988,048	100,491,731	232	5,956,736	63,217,786	21,436	3,080,534	1.74	0.65	0.056
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	415	8,988,048	100,491,731	232	5,956,736	63,217,786	21,436	3,080,534	1.74	0.65	0.056

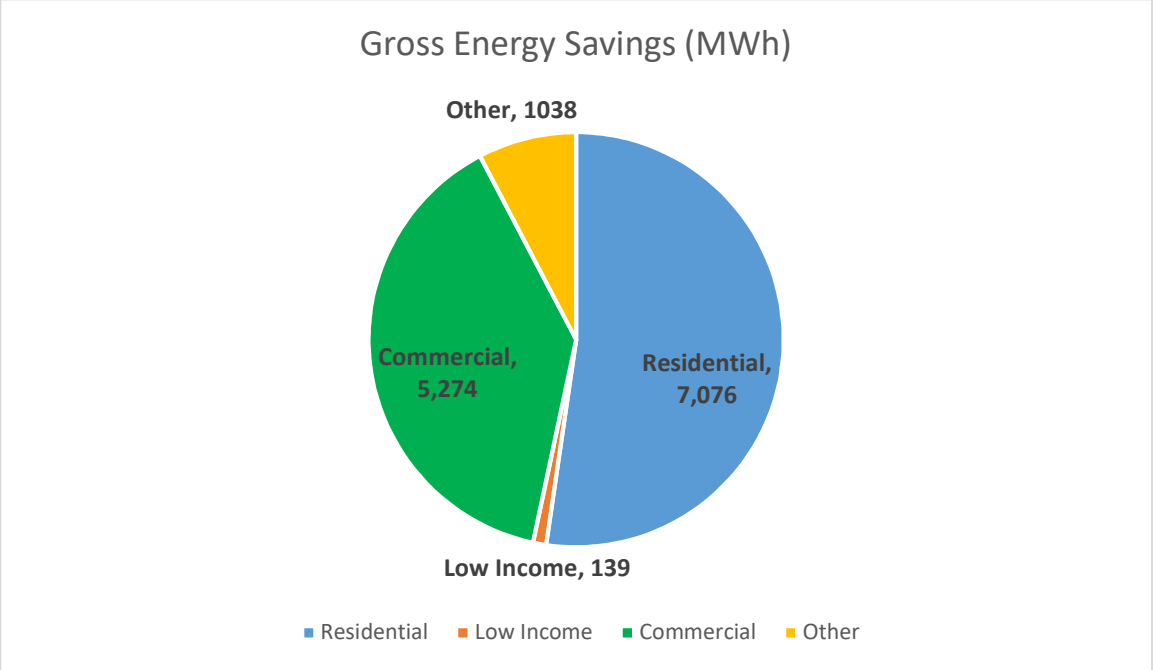
* note:

CPAU's Heat Pump Building electrification program is not shown in the table above. Based on average CAISO electricity emissions the program avoided 15 Metric Tons of CO_2 in the first year. POUs will continue to refine the CET/RP software tool to accurately represent net energy savings and GHG reductions from building electrifciation programs.

PASADENA

Pasadena at a Glance

- Climate Zone(s): 9
- Customers: 66,505
- Total annual retail sales (MWh): 1,040,640
- Annual Retail Revenue: $182,755,000
- Annual energy efficiency expenditures for reporting year: $4,042,594
- Gross annual savings from reporting year portfolio (MWh): 13,526



Pasadena Overview

In the past decade, PWP has experienced an estimated 15% decline in annual retail energy sales. Nevertheless, Pasadena's local economy remains robust. Several developments are expected to be completed in the next few years, including commercial office and medical buildings; coupled with various affordable and market rate multifamily housing projects. While the record breaking levels of development activity has slowed, the City's Planning Department still issued over 8,200 construction permits for projects totaling $174 million dollars.

Pasadena's City Council has also consistently adopted aggressive energy-efficiency and demand reduction goals since2007, with the latest update in 2017 calling for 13,500 kWh of annual savings, about 1.3% of retail sales, each year. New codes and standards, efficiency improvements and continued increase in

renewable local distributed generation are expected to result in means consistently flat energy load projections for the near future.

In FY18, energy efficiency programs expenditures totaled $4.65 million (including incentives, administration, program marketing as well as EM&V), which is roughly 2.5% of its retail revenue. PWP funds procurement of all energy efficiency through Public Benefits Charge ("PBC") revenues, with current PBC revenue rate at $0.00685 per kWh. As a whole, energy-efficiency programs represented approximately 76% of Pasadena's PBC expenditures in FY17/18. The solar incentives represented 14%, transportation electrification incentives represented 1%, and bill payment assistance accounted for 9%.

Major Program and Portfolio Changes

PWP is constantly seeking innovative ways to provide conservation programs that bring value to different customer segments while meeting annual energy efficiency goals adopted by the City Council.

- As part of ongoing efforts to align energy efficiency programs with utility goals, PWP has continued to shift its focus from rebates to direct install programs. PWP plans to utilize its direct install programs to better serve low/moderate income residential customers, elderly and small businesses in the disadvantaged communities (DAC) within PWP's service territory.
- In partnership with the Southern California Gas Company (SoCalGas), PWP relaunched its Water Energy Direct Install Program (WeDIP) towards the end of June 2018. The WeDIP provides no-cost direct installation of efficiency upgrades for small and select medium commercial customers, with an emphasis on businesses in the DAC area. As part of the relaunch, newly added measures include kitchen equipment and expansion of existing refrigeration measures.
- PWP also commenced efforts to re-design both of its existing commercial energy efficiency rebate programs to improve cost-effectiveness and allow for more streamlined processes and online application submittal. The commercial custom and deemed rebate program offerings officially launched in Fall 2018.
- In partnership with SoCalGas, PWP completed first year implementation of its no-cost residential direct install program and served 539 homes with various efficiency upgrades during FY17-18. Through the Home Improvement Program (HIP), customers receive an in-home evaluation, summary report and efficiency installs to conserve water and energy. The target customer group for this program includes moderate income households, elderly and high energy users. In an effort to expand program offerings and capture additional energy savings, PWP added additional measures like the smart thermostat and adjusted program requirements to allow for more weatherization projects.
- Launched the Online Residential Rebate Portal, which allows the utility's residential electric customers to submit online applications for home energy

rebates, expedite the rebate approval process, reduce utility admin expenses and allows customers to track application status.

- PWP successfully revamped its "Under One Roof" program, a one-stop shop that consolidates all of the available City services for income qualified customers. Through the "Under One Roof" program, the utility provides no-cost direct install services to qualified income qualified customers through the Energy Savings Assistance program (ESAP) partnership withSoCalGas. Enhancements include establishing a single phone number for inquiries through the Citizen Service Center as well as a single point of contact to enroll qualified customers in various City programs and services. Recent enhancements to the Under One Roof has resulted in a significant boost to the ESAP and various other income qualified programs, which is a result of continued collaboration between City departments
- After many years of contributing towards market transformation, the "Pasadena Solar Initiative" is expected to reach 10.54 MW of total solar capacity installed. Established in accordance with the requirements of the Senate Bill 1, the Pasadena Solar Initiative provided generous rebates for solar installations from January 2008 through December 2017. PWP continues to enable customers to interconnect new solar photovoltaic systems and enjoy the benefits of net energy metering rates.

Program and Portfolio Highlights

In summary, energy savings results for FY17/18 are broken down into five separate categories. Commercial programs contributed 5,274 MWh, residential programs contributed 7,223 MWh, C&S contributed 2,999 MWh, T&D contributed 36 MWh and water transfer (embedded energy) contributed 1,037 MWh. In total, the annual energy savings come out to 16,569 MWh.

The Transmission and Distribution "T&D" energy savings represent distribution system upgrades while the Codes and Standards "C&S" are energy and peak demand savings that are allocated to PWP's service territory as a result of the state's updated building codes that are enforced by the City of Pasadena's Planning and Community Development department.

PWP has four energy efficiency programs that account for roughly 70% of annual savings for FY17/18, programs with the greatest impact are as follows:

1. On the commercial side, the Energy Efficiency Partnering (EEP) rebate program provided customers with customized incentives on various LED lighting and mechanical projects to encourage energy conservation and load reduction. In its last year of operation, the EEP contributed 4,480 MWh (27%) towards the annual energy savings. Starting FY19, the EEP will be replaced by the Customized Incentive Program and Business Rebate Program.
2. The WeDIP provided customers with no cost direct install services to select small/medium commercial customers. Measures include LED Lighting and

commonly found refrigeration measures. The existing WeDIP ended in December 2017 due to the expiration of the existing program contract. Soft launch for the newly expanded WeDIP did not commence until June of fiscal year 2017/2018. In total, the WeDIP contributed 699 MWh (4%) towards the annual energy savings.

3. On the residential side, the Home Energy Report, a behavioral program that is available to all PWP residential electric customers, contributed 5,897 MWh (36%) towards the annual energy savings. The personalized quarterly behavioral reports provide insightful and easy to understand information about household energy use, empowering homeowners with the knowledge to take action and make their home more energy efficient.
4. Lastly, the HIP provides residential electric customers with no cost direct install services. Measures include lighting, HVAC Tune-up, weatherization, high efficiency toilets, smart thermostats and smart irrigation systems. The HIP was newly launched in fiscal year 17/18 and contributed 463 MWh (3%) towards the annual energy savings.

Commercial, Industrial & Agricultural Programs

PWP's three commercial offerings fall into three distinct categories: rebates, direct-install and upstream programs.

1. The EEP program provides rebates to any commercial electric customer to help offset the upfront costs of efficiency upgrades and capital improvement projects.
2. The no-cost direct install WeDIP program serves small businesses and includes a free evaluation to go with a customized report. Efficiency measures offered through the WeDIP include LED Lighting, refrigeration upgrades, aerators and efficient kitchen equipment/low-flow toilet replacements.
3. Lastly, the upstream program conducts outreach and incentivizes distributors to upsell/stock efficient HVAC equipment that meet eligibility requirements.

PWP does not have any industrial or agricultural programs within its portfolio.

Residential Programs

PWP has seven residential offerings also fall into three distinct categories, rebates, direct-install and behavioral programs.

1. The Home Energy Rebate program provides rebates on the purchase of Energy Star certified appliances, qualifying variable speed pool pumps, efficient air conditioning/heat pump equipment and various building shell improvements (insulation, whole house ventilation fans, cool roofs, skylights, window film, shade trees, etc.). The rebates offer through this program covers typical sector-category classifications used in the previous years,

which includes residential refrigeration, pool pump as well as heating and cooling.

2. The online web shop is an online portal where PWP provides "rebates" so residential electric customers can purchase LEDs, smart power strips and smart thermostats at a discounted price. The popular program officially closed at the end of FY17/18, with a large majority of customers purchasing or redeeming vouchers for a variety of LED bulbs.
3. The appliance-recycling program is a free service that encourages PWP electric customers to recycle their old refrigerator/freezer (functioning) and purchase a newer, more efficient model. Participants will also receive a rebate for allowing the appliance to be recycled.
4. The ESAP is a partnership with the SoCalGas that provides no cost direct install services to qualifying income qualified customers. As part of the program, eligible residential customers will receive various efficiency upgrades to help improve the comfort of their home while lowering energy/water consumption. Measures include attic insulation, AC Tune-up, LED light bulbs, smart power strips, smart thermostats, low-flow toilets and much more.
5. The Home Improvement program provides no cost direct install services to all residential electric customers. As part of the program, eligible residential customers will receive various efficiency upgrades to help improve the comfort and efficiency of their home. Measures include attic insulation, duct sealing, AC Tune-up, smart irrigation systems and much more. The utility has dedicated resources to target specific customer segments that include moderate-income homeowners, elderly and high energy/water users.
6. The income qualified refrigerator exchange program provides Energy Star certified refrigerators at no cost to eligible customers. Eligible participants must possess a functioning refrigerator that can be swapped out with the new Energy Star certified model.
7. The Home Energy Report is a residential behavioral program that is mailed to approximately 40,000 customers on a quarterly basis, helping residents better understand their energy consumption and how it compares with similar households in the vicinity. The report also has customizable sections that help promote other PWP efficiency programs that may be of interest.

The Public Benefits fund also help share the cost of the utility's education programs for school-aged children. For fiscal year 2017- 2018, this involved educational field trips for students of the Pasadena Unified School District (PUSD), scholarship for high school seniors, the Living wise green curriculum, and the Solar Cup through the Metropolitan Water District. On average, the utility is able to reach about 5,000 students each year. In particular, the green curriculum is available to all 2nd

grade PUSD students and emphasizes ways to incorporate sustainability as part of their daily lifestyles.

Complementary Programs

1. Income Qualified Bill Assistance Programs: PWP has offered electric rate assistance programs to eligible low-income seniors or disabled customers for several decades. The current Electric Utility Assistance Program ("EUAP") became effective in 2006 and provides monthly assistance to low income, seniors, and customers with qualifying medical equipment. Project APPLE ("Assisting Pasadena People with Limited Emergencies" provides a one-time utility bill payment assistance program that provides eligible customers who need help paying their bills, up to $100 per year. Funding for Project APPLE is possible through donations from PWP customers as well as PBC revenues.

   In addition, PWP partners with other City departments that offers specific income-qualified services through the "Under One Roof" program to income qualified customers. Services include a limited number of low-to-no interest loans, exterior house painting, wheel chair ramps, weatherization services, an ENERGY STAR refrigerator exchange, no-cost solar energy systems, free turf replacement to drought tolerant landscapes and double the rebates on qualifying efficiency products offered through the Home Energy Rebates program.

2. Renewable Energy Programs: The goal of the Pasadena Solar Initiative ("PSI") is to provide incentives for a 10-year period from 2008-2017, with incentives decreased by a minimum set amount each year. The PSI incentives was designed to encourage customers to install photovoltaic systems on their home or business. A goal of 14 MW was established in line with Senate Bill 1, California's "Million Solar Rooftops" initiative. PSI incentives are paid upfront through an Expected Performance Based Buydown ("EPBB") for smaller systems, whereas all systems larger than 100 kilowatts ("kW") are now paid over two-years based on metered output through a Performance Based Incentive ("PBI"). PWP officially stopped accepting new applications after December 31, 2017, after the tenth and final year of the PSI program. PWP continued to process and close out applications that were submitted prior to the deadline. For fiscal year 17/18 ending in June 2018, 138 PWP customers installed an additional 1 MW of solar PV. After many years of contributing towards market transformation, the PSI is expected to reach 10.54 MW of total solar capacity installed.

PWP also offers a Green Power Program, where customers can opt to pay a premium (2.5 cents/kWh) on their electricity bill for clean, renewable power. This program is open to both residential and commercial customers.

3. Research, Development, and Demonstration: PWP has invested resources in a variety of different RD&D projects to align with industry trends and utility objectives. For fiscal year 2017/2018, PWP continued its support for transportation electrification, with a focus on Plug-in Electric Vehicles ("EV"). During FY17/18, PWP procured new electric vehicles to replace its existing fleet. The utility is also encouraging the private sector to build additional charging sites for public and private fleet use through a robust incentive program offering rebates of up to $50,000 per commercial account. Commercial customers that install charging infrastructure are eligible to receive $3,000 per unit, which doubles to $6,000 if the chargers are in DAC locations or made available for public use. Incentives are also in place to encourage Pasadena residents to buy or lease an EV and EV charger to enable charging at home. In particular, PWP residential electric customers can receive up to $750 for a new or used EV and up to $600 for a new Wi-Fi enabled EV charger. For FY17/18, PWP approved 106 qualifying residential EV notification rebates and paid out $21,200 in incentives. For residential EV charging, PWP approved 42 qualifying applications and paid out $9,987.38 in incentives. Lastly, for commercial EV chargers, PWP approved 6 qualifying applications and paid out $3,600 in incentives.

4. To support public EV awareness and education, PWP participates in regular events that display EV technology. In March 2018, PWP continued its partnership with the cities of Glendale and Burbank for a third "ride-n-drive" event, which invited local residents from the tri-cities area to test drive various EV modes and learn more about the EV directly from the owners.

Evaluation, Measurement & Verification Studies

PWP expended $47,580.88 on energy efficiency program EM&V to justify program design, expenditures and verify results:

Residential Rebate Program: Third party contractors performed site verifications on at least 10% of all residential energy-efficient equipment purchases and installations

- Residential Direct Install Program: Program implementer performed QA inspections on the first 10 jobs completed by all new subcontractors and 10% of direct installations afterwards.

- Income Qualified Residential Direct Install Program: Third party contractors performed site verifications on at least 10% of all residential energy-efficient direct installations
- Solar Rebate Program: Utility staff perform on-site post-installation verification, for 100% of customer projects.

Non-Residential Programs:

- EEP Program: Utility staff and contractors performed pre-and post-installation equipment and installation verification, on site, for 100% of customer projects with rebates exceeding $5,000.
- Of the 51 non-residential custom projects completed, all applications were reviewed by either PWP staff or had an independent engineering analysis conducted by a PWP's third party engineering consultant ☐
- Mechanical Equipment Retrofits: PWP's engineering contractor calculated energy savings and demand reduction using accepted engineering analysis such as DOE's eQuest building modeling software and the DOE Motor Master.
- Lighting: Engineer-certified Excel workbook used to calculate lighting retrofit project energy savings based on the actual hours of operation.
- All mechanical projects and a majority of lighting projects had both pre- and post-inspections.
- WeDIP Program: All water and energy direct install projects completed were pre and post-inspected.

Major Differences or Diversions from CA POU TRM for Energy Savings

PWP relies on the POU TRM data, where available, supplemented by best available technical data from independent engineering analysis where TRM measures are not yet available. For commercial programs, as discussed above, PWP relies on independent engineering analysis conducted by PWP's engineering consultant and industry models (e.g., DOE's eQuest building modeling software). The EEP program provide commercial customers with the ability to participate with any proven technology that saves energy, provided it meets the program requirements and the energy savings can be demonstrated.

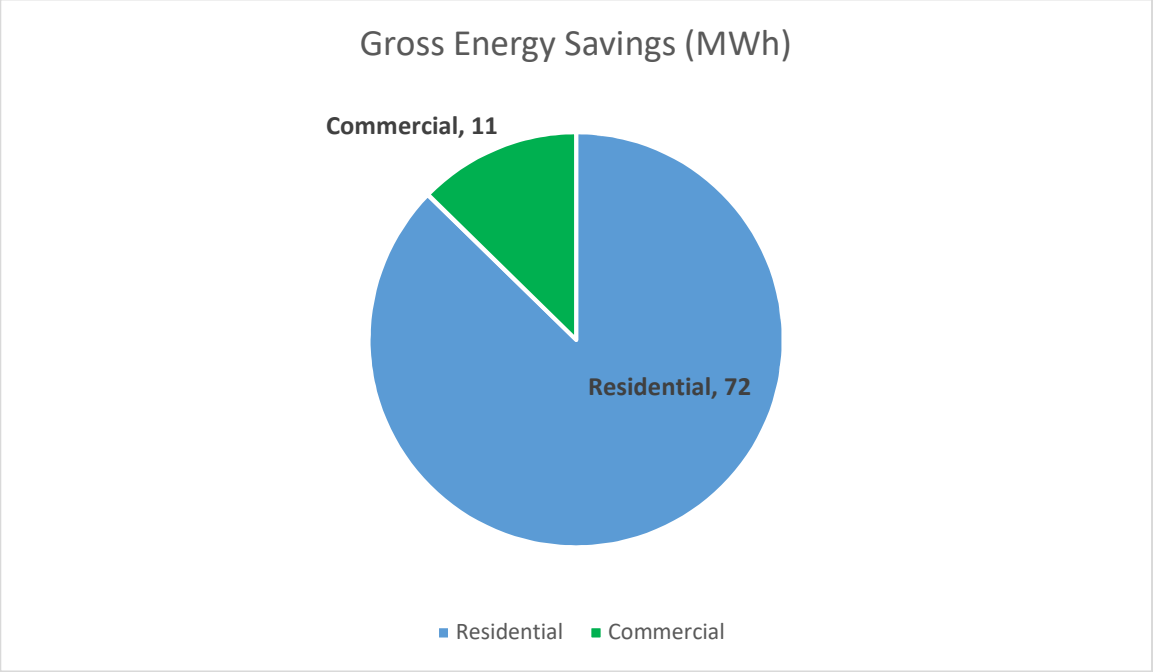
PASADENA WATER AND POWER
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Commercial Direct Install WeDIP	182	698,632	7,680,116	182	698,632	7,680,116	2,913	441,262	1.57	1.57	0.071
Home Energy Reports	-	5,896,699	5,896,699	-	5,896,699	5,896,699	2,870	449,168	1.28	1.28	0.076
Residential Recycling - FY18	16	79,492	393,859	11	55,644	275,701	128	25,737	1.19	1.19	0.102
Water Energy Transfer - FY18	-	1,037,533	1,037,533	-	1,037,533	1,037,533	497	115,401	0.91	0.91	0.111
Upstream HVAC - FY18	67	71,482	1,072,230	67	71,482	1,072,230	381	90,020	1.11	1.11	0.112
PWP WebShop - FY18	26	226,272	3,324,514	14	124,034	1,806,699	756	180,424	0.96	0.95	0.133
Home Improvement Program (HIP)	437	463,471	4,801,455	437	463,471	4,801,455	2,199	948,147	1.91	1.91	0.258
On Demand Efficiency (ODE)	3	24,200	362,993	3	24,200	362,993	136	13,705	2.29	2.29	0.050
Commercial Rebates (EEP and PEER)	688	4,479,947	54,352,790	688	4,479,947	54,352,790	20,130	1,359,858	3.61	3.61	0.032
Low Income Energy Savings Assistance Program	1	9,338	140,063	1	9,338	140,063	56	21,283	0.60	0.57	0.203
Livingwise	-	198,462	198,462	-	198,462	198,462	97	42,143	0.46	0.46	0.212
Residential Audits - FY18	30	74,168	74,168	30	74,168	74,168	36	801	9.00	9.00	0.011
Residential Rebates - FY18	47	127,729	1,518,667	31	80,520	936,863	409	137,706	1.28	1.28	0.187
EE Measures Subtotal	1,496	13,387,424	80,853,548	1,465	13,214,129	78,635,772	30,607	3,825,656	2.26	2.26	0.059
Low-Income Programs	40	139,028	947,237	40	138,950	945,669	422	216,938	n/a	n/a	n/a
EE & LI Subtotal	1,536	13,526,452	81,800,786	1,504	13,353,078	79,581,441	31,029	4,042,594	2.26	2.26	0.059
T&D		36,000	1,080,000		36,000	1,080,000	395	9,426			
Codes & Standards	553	2,999,938	2,999,938	553	2,999,938	2,999,938	1,437	33,679			
Other Subtotal	553	3,035,938	4,079,938	553	3,035,938	4,079,938	1,833	43,105			
Total	2,089	16,562,390	85,880,724	2,057	16,389,016	83,661,379	32,862	4,085,699	2.26	2.26	0.059

PLUMAS-SIERRA

Plumas-Sierra at a Glance

- Climate Zone(s): 16
- Customers: 7,974
- Total annual retail sales (MWh): 143,755
- Annual Retail Revenue: $24,277,642
- Annual energy efficiency expenditures for reporting year: $124,828
- Gross annual savings from reporting year portfolio (MWh): 83



Plumas-Sierra Overview

Plumas-Sierra Rural Electric Cooperative is a member-owned, not-for-profit utility located in the eastern Sierras of Northern California. PSREC provides electricity to more than 7,000 rural residents in portions of Plumas, Sierra and Lassen counties in California and part of Washoe County, Nevada.

The areas PSREC serves are outside the small towns in our region that were considered unprofitable by the investor-owned utilities. Local ranchers and farmers banded together in 1937 to form the cooperative with funding from the Rural Electrification Administration (now the Rural Utilities Service).

Plumas-Sierra's service territory encompasses more than 1,700 square miles with more than 1,300 miles of transmission and distribution power line. PSREC serves

just five members per mile of line, compared to the average of 34 customers per mile of line for investor-owned utilities.
PSREC's rural members were hard-hit by the economic downturn, but are now recovering and homeowners are upgrading their homes to improve efficiency and comfort with new windows, upgraded insulation and efficient air source and ground source heat pumps, resulting in increased participation in efficiency programs offered by PSREC.

An important aspect to note is PSREC's unique peak demand occurs during winter. Therefore, the most cost-effective program concentration is to reduce demand in the winter. The reporting model has limitations in how coincident peak demand savings are reported since PG&E's load profile is applied as the default.

Major Program and Portfolio Changes
For 2018, there were no major changes to the PSREC programs or portfolios.

Program and Portfolio Highlights
During 2018, 27% of members participating in PSREC's efficiency programs upgraded their heating/cooling systems resulting in net lifecycle savings of more than 400 MWh.

Commercial, Industrial & Agricultural Programs
PSREC provides free energy audits to businesses to assist with energy conservation and troubleshooting high energy consumption. This program has been successful in assisting business owners in making decisions in efficiency upgrades and conservation.
PSREC offers rebates for commercial and industrial members who perform efficiency upgrades including lighting.
To encourage the installation of energy efficient equipment in agricultural irrigation systems PSREC offers rebates for pump tests and efficiency improvements

Residential Programs
- Geothermal Heating/Cooling Loans: 0% interest ground source heat pump loop loans available for installation of ground-source heat pumps.
- HVAC Rebates: PSREC provides members with rebate options to encourage installation of energy-efficient electric heat pumps and ground-source heat pumps in new construction and existing homes and small businesses. Upgrading to an energy-efficient heating and cooling system will contribute to increased comfort in homes while helping to reduce overall energy use.
- ENERGY STAR® Rebates: Rebates available for the purchase of an ENERGY STAR® refrigerator, dishwasher, clothes washer or other small electronics.

- Appliance Recycling: Rebates offered for recycling a non-essential freezer or refrigerator.
- ENERGY STAR® Lighting Rebates: Offers rebates for the purchase and installation of LED lamps.
- LED Holiday Light Rebate: Provides an incentive to replace incandescent holiday light strands with qualified new ENERGY STAR LED holiday light strands.
- Water Heater Sales and Rebates: Discounted sales of, and rebates for the purchase of high-efficiency electric water heaters, including heat pump water heaters.
- Weatherization Rebates: PSREC offers members rebates for upgrading windows and insulation in their homes. By retrofitting a home to above-code R-Values, and upgrading windows to double-pane high-performance windows, members not only realize the added comfort, but also gain increased home values. PSREC encourages members to invest in weatherization measures prior to, or in addition to, investing in a new heating source for energy conservation.
- Annual Member Meeting Efficiency Giveaways: PSREC provides members who attend the annual meeting with efficiency items such as LED lights, low-flow showerheads, faucet aerators, etc.
- Efficiency Education: PSREC provides energy efficiency and conservation information, as well as kilowatt meters, to interested members to help them reduce their bill, understand their energy consumption and make their home more efficient. This program has successfully addressed high bill concerns by empowering members to use information such as our 'Do-It-Yourself Energy Audit' to learn more about their home and how they use energy.
- Efficiency Education - Energy Audits: PSREC provides free comprehensive energy audits to assist members with energy conservation and troubleshooting high energy consumption in their home. This program has been successful in educating members about efficiency and conservation and assisting in reduction of energy use, especially in low-income homes.

Complementary Programs

- Low Income Winter Rate Assistance Program: Income-qualified members can apply for a discounted rate during the heating season. In conjunction, a home energy audit is offered, and efficiency information is provided to assist members with energy conservation.
- Net Metering Program: PSREC offers net-metering for members who install renewable energy generation systems.
- Community Shared Solar: PSREC completed construction of a 250KW community shared solar installation to offer solar energy to our members who currently cannot install solar on their homes or businesses due to cost, location or ownership status.

- Lending Library and Resource Center: Provides energy efficiency and renewable energy resources to members through a book lending library and resource center in our office lobby.
- Research, Development, and Demonstration: PSREC is researching electric vehicle charging infrastructure and other program options to encourage the adoption of electric vehicles in its service area.

Evaluation, Measurement & Verification Studies

PSREC EM&V reports can be found online at: https://www.cmua.org/emv-reports

PSREC performs a yearly internal review to evaluate program effectiveness and improvement areas. PSREC has committed to seek third party evaluation of its programs every five years, dependent upon budget.

Major Differences or Diversions from CA POU TRM for Energy Savings

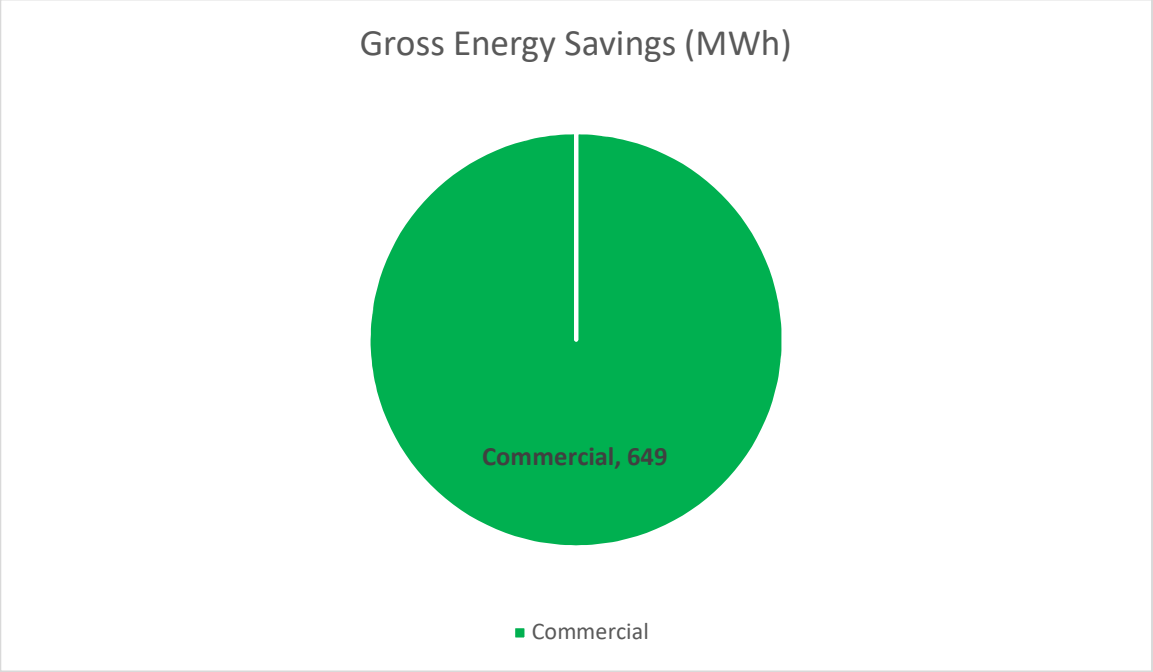
PSREC uses the TRM as the source for the majority of reported energy savings. Some measures rely on savings from the Bonneville Power Administration's UES measure list. Savings for the commercial lighting program are custom calculations.

PLUMAS SIERRA RURAL ELECTRIC CO-OP											
-- FY2018 Energy Efficiency Program Summary --											
Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
HVAC	17	26,073	517,869	13	20,858	414,295	185	69,349	0.74	0.52	0.246
Commercial	3	10,508	126,100	2	8,407	100,880	39	7,140	1.24	0.80	0.089
Water Heating	9	37,680	376,800	5	22,608	226,080	93	17,144	1.29	1.03	0.092
Appliance	1	5,805	45,725	1	3,929	30,557	13	11,905	0.30	0.30	0.467
Residential Lighting	1	1,206	16,670	0	651	9,002	4	6,624	0.14	0.12	0.974
Weatherization	3	1,649	32,982	2	1,276	25,523	12	12,666	0.35	0.09	0.730
EE Measures Subtotal	33	82,921	1,116,146	24	57,730	806,337	346	124,828	0.73	0.46	0.208
Low-Income Programs											
EE & LI Subtotal	33	82,921	1,116,146	24	57,730	806,337	346	124,828	0.73	0.46	0.208
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	33	82,921	1,116,146	24	57,730	806,337	346	124,828	0.73	0.46	0.208

PORT OF OAKLAND

Port of Oakland at a Glance

- Climate Zone(s): 3
- Customers: 157
- Total annual retail sales (MWh): 81,180
- Annual Retail Revenue: $14,587,909
- Annual energy efficiency expenditures for reporting year: $45,829
- Gross annual savings from reporting year portfolio (MWh): 649



Port of Oakland Overview

The Port of Oakland (the Port) oversees the Oakland seaport, Oakland International Airport, and 20 miles of waterfront. Together with its business partners, the Port supports more than 84,000 jobs in the region and nearly 827,000 jobs nationwide. The Port exemplifies a unique combination of public/private endeavors. It encompasses a world-class container port, a thriving airport, an array of retail and commercial buildings and acres of recreational and open space. The Port has approximately 157 commercial electric customers.

Major Program and Portfolio Changes

In FY16, the Port restructured our incentives and procedures to promote EE programs and make it easier for customers and contractors to participate. The Port is working to update our energy efficiency program to match the changes our

unique customer base requires. This was started in FY18 and will continue into FY19.

Program and Portfolio Highlights

In FY18, one project in the Non-Residential Lighting Program delivered all the net annual energy savings. Our revised procedures for the lighting program made it easy for the Port's tenants to participate and resulted in total net annual savings of 648,755 kWhs.

Commercial, Industrial & Agricultural Programs

- Energy Audits: The Port provides Energy Audits that focus on five major energy saving retrofit/improvement projects that will result in load reduction and more efficient use of energy.
- Energy Saving Measures Exceeding Title 24 Standards: Port will provide a rebate for any new facility constructed within the Port by its electricity customers that exceed the title 24 standards in energy saving measures. Eligible facility must reduce energy usage by a minimum of 10% compared to the standard title 24 facility.
- Energy Saving Equipment Retrofits/Improvements Rebates: The Port has implemented a program that provides generous rebates and solid technical support for the installation of new energy efficiency equipment/improvements by our commercial customers.
- Lighting Retrofit: A program providing rebates for the installation of energy efficiency lighting upgrades.

Residential Programs

The Port does not have any residential customers.

Complementary Programs

The Port recognizes the unique opportunities available in renewable energy, energy storage and electric vehicles due to our customer base. We are working with customers to identify needs and assess potential for renewable energy, storage, EV adoption and EV charging infrastructure programs and investments.

Evaluation, Measurement & Verification Studies

Go to https://www.cmua.org/emv-reports for more information on EM&V.

Major Differences or Diversions from CA POU TRM for Energy Savings

Reported savings for the Commercial Lighting Program are based on a lighting calculator that was developed for use by our customers and contractors.

PORT OF OAKLAND

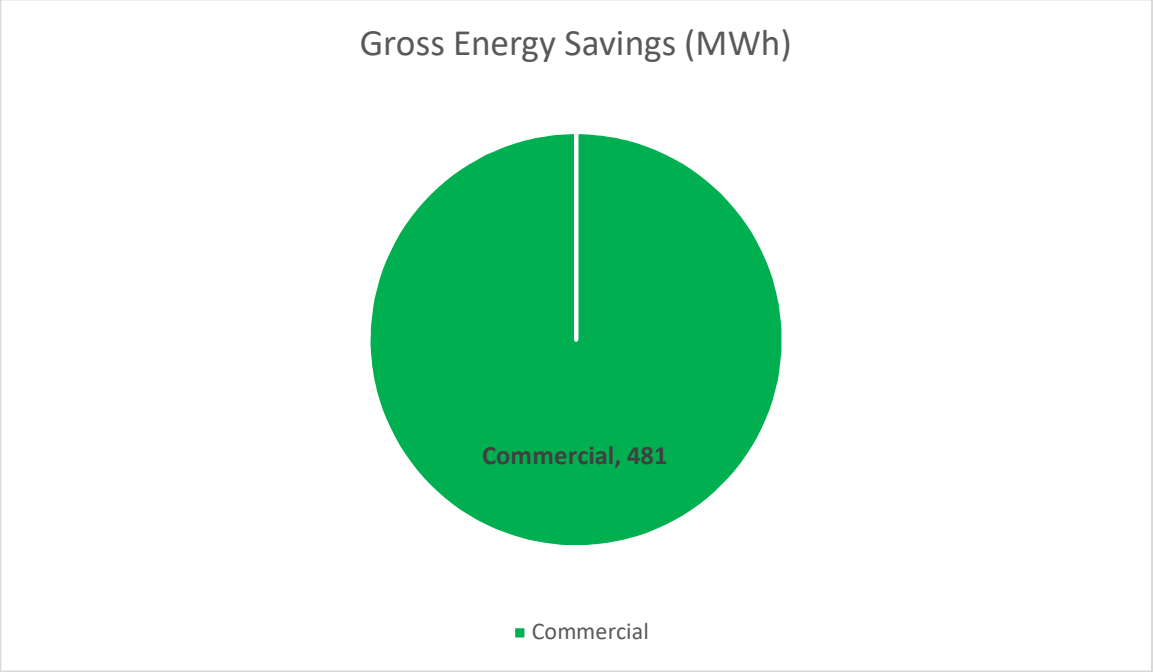
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Commercial	-	648,755	7,785,060	-	519,004	6,228,048	3,042	45,829	13.51	1.24	0.009
EE Measures Subtotal	-	648,755	7,785,060	-	519,004	6,228,048	3,042	45,829	13.51	1.24	0.009
Low-Income Programs											
EE & LI Subtotal	-	648,755	7,785,060	-	519,004	6,228,048	3,042	45,829	13.51	1.24	0.009
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	-	648,755	7,785,060	-	519,004	6,228,048	3,042	45,829	13.51	1.24	0.009

RANCHO CUCAMONGA

Rancho Cucamonga at a Glance

- Climate Zone(s): 10
- Customers: 933
- Total annual retail sales (MWh): 76,083
- Annual Retail Revenue: $10,960,000
- Annual energy efficiency expenditures for reporting year: $87,879
- Gross annual savings from reporting year portfolio (MWh): 481



Rancho Cucamonga Overview

The amount of energy efficiency rebates in fiscal year 2018 were comparable to the previous years, with the trend continuing to be with lighting retrofits replacing inefficient lamps with LEDs.

Major Program and Portfolio Changes

The Energy Efficiency rebate program continues to have the greatest impact and participation among RCMU customers. Participation in the direct installation program remained low, however, there has been a slight increase in customer inquiries regarding the program, as new customer/tenants move-in to existing spaces and buildings.

Program and Portfolio Highlights

RCMU promotes the rebate programs and energy efficiency practices online and offers free energy audits to educate customers on energy savings and potential upgrades on existing equipment.

Commercial, Industrial & Agricultural Programs

- Energy Efficiency Program – Non-Res Lighting, Non-Res Refrigeration: RCMU has adopted an "Express Solution" model for energy efficiency rebates. Customers receive a rebate for estimated kilowatt hour savings for the first year in the following categories: Lighting, Interior LED, Exterior LED, Delamping, HVAC, Motors and Refrigeration.
- Direct Savings Program – Non-Res Lighting: To encourage and assist small and medium sized businesses to reduce their energy usage, RCMU will pay and install up to $1,500 of recommended retrofit items that are determined from the complimentary energy audit. Any cost above the $1,500 limit is paid by the customer.

Residential Programs

During this year, RCMU residential customers were leasing tenants. The energy efficiency program is available but since they are not the owner of the home, it is unlikely any will participate in the program and make upgrades. Additional residential developments are currently under construction with some single family homes that may bring more interest to these programs in the future.

Complementary Programs

- Energy Audits: RCMU offers free, customized energy audits including lighting, HVAC and equipment assessment and a review of energy usage. Specific cost-effective recommendations to improve energy efficiency and reduce energy use are provided.
- Low Income: The program is intended to assist customers with their bill and is funded by the RCMU Public Benefit Fund. The household size and gross income requirements will be based off of the San Bernardino County Income Limits and Documentation system.
- Medical Support Assistance Program: The program will assist eligible residential customers where a full-time resident of the household regularly requires the use of essential medical support equipment. An application with supporting documentation from the patient's doctor is required to receive the credit each month.
- New Development Incentive: This incentive is for new development that is built to exceed a minimum of 15% above Title 24 Code. The incentive payment is based off of the final Title 24 report created by a Certified Energy Plans Examiner (CEPE) and verified by a third party certified Home Energy Rating Systems (HERS) Rater.

- Electric Vehicle Commercial Charger Rebate Program: The program will provide an incentive of up to $4,000 per Level 2 (240-volt) charging station to RCMU commercial customers who install a workplace or public EV charger.

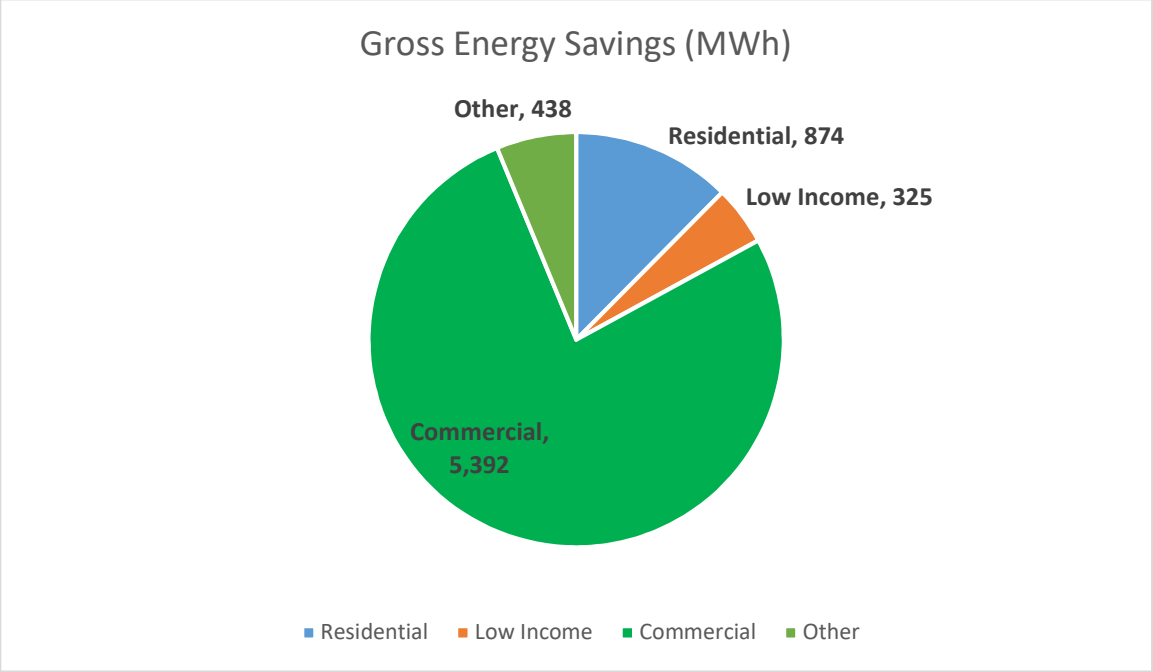
RANCHO CUCAMONGA ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
LED Lighting	170	477,454	7,639,264	170	477,454	7,639,264	2,742	84,882	8.01	21.37	0.016
Direct Savings - LED	1	3,100	49,600	1	3,100	49,600	18	2,997	1.47	21.37	0.085
EE Measures Subtotal	171	480,554	7,688,864	171	480,554	7,688,864	2,760	87,879	7.78	21.37	0.016
Low-Income Programs											
EE & LI Subtotal	171	480,554	7,688,864	171	480,554	7,688,864	2,760	87,879	7.78	21.37	0.016
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	171	480,554	7,688,864	171	480,554	7,688,864	2,760	87,879	7.78	21.37	0.016

REDDING

Redding at a Glance

- Climate Zone(s): 11
- Customers: 43,838
- Total annual retail sales (MWh): 745,209
- Annual Retail Revenue: $125,500,000
- Annual energy efficiency expenditures for reporting year: $2,654,740
- Gross annual savings from reporting year portfolio (MWh): 7,029



Redding Overview

- Total sales for FY 2018 were 745,209 MWh - a 0.05 percent decrease compared to FY 2017. Redding will continue to forecast declining electric sales. REU attributes this decline to lower economic activity and the impacts of energy efficiency programs, more stringent building and appliance standards, and increased customer-owned distributed generation.
- Due to Redding's hot summer climate and high residential load, REU's peak demand typically occurs in the summer between 4:00-5:00 p.m. and is more than double the peak demand during non-cooling months.
- Redding has committed much of our Cap and Trade auction proceeds to efforts that reduce greenhouse gas emissions, combat poverty, and achieve reliable energy savings.

Major Program and Portfolio Changes

In an effort to maximize REU's benefits to the community and maintain compliance with State and Federal regulations, REU implemented a variety of changes to the public benefits programs in FY 2018. These changes are as follows:

- In April 2018, Redding City Council approved the expenditure of $10.8 million of Cap and Trade allowance proceeds on programs that save energy and/or reduce greenhouse gas emissions in the categories below. Upon Council Approval, the following programs were developed in FY 2017 and will be included in future annual program reports:
    - $2 Million: Transportation Electrification including incentives for residential vehicle purchase and chargers, commercial vehicle purchase and chargers, public level 3 fast charger installation, and electrification of the City's Fleet.
    - $3 Million: Affordable Housing Energy Efficiency to incentivize housing.
    - $0.5 Million: Low-Income Electrification including installation of heat pump technology.
    - $0.8 Million: Non-motorized transportation enhancements.
- In December 2017, the Redding City Council approved REU's recommendation to update the residential and commercial rebate programs.
    - Enhanced commercial offerings to add new food service equipment and refrigeration efficiency improvements.
    - Expanded custom incentive programs to replace existing $0.04/kWh custom refrigeration program.
    - Effective January 1, 2018, retired rebates included clothes washers, clothes dryers, duct sealing, window films, shade screens, radiant barriers, and small window air conditioners rated under 8,000 Btu/h).
    - Effective January 1, 2018, modified rebates include reducing the incentive for variable speed pool pump from $400 to $200 and specifying wall insulation as "drill and fill" type only.
    - Effective January 1, 2018, new rebates include Energy Star refrigerators and dual pane windows replacing single pane windows.
    - Effective January 1, 2019, retired new construction rebates.
- In December 2017, the Redding Council approved REU's recommendation to have professional services to provide automated rebate processing services, including database hosting, rebate processing, and technical review of deemed rebates.

Program and Portfolio Highlights

- In FY 2018, REU's total commercial sector lighting savings increased over 2017 levels to 4.1 million kWh (net). REU anticipates that lighting rebates will continue to deliver savings in Redding for the foreseeable future, as we have not aggressively pursued these savings in the past.

Commercial, Industrial & Agricultural Programs

- HVAC - Non-Res – Cooling: Rebates for heating, air conditioning, and Wi-Fi enabled thermostats.
- Lighting - Non-Res – Lighting: Retrofit lighting projects. Calculated lighting retrofit program uses a custom calculator to determine savings based on existing equipment, retrofit equipment and hours of operation. Utility funded program for replacing City of Redding owned streetlights with new LED fixtures.
- Refrigeration - Non-Res – Refrigeration: Custom rebate calculated based on existing equipment, retrofit equipment, and hours of operation.
- HVAC - Non-Res – Shell: Rebates for commercial window coverings.

Residential Programs

- Appliances - Res - Clothes Washer: Rebates for clothes washers and dryers. Only makes and models on the current ENERGY STAR eligibility list qualify for a rebate.
- HVAC - Res – Cooling: Rebates for heating, air conditioning, Wi-Fi enabled thermostats, and whole house fans.
- Pool Pump - Res – Pool Pump: Residential rebates for programmable, variable speed-drive pool pumps installed on existing or new in-ground pools.
- HVAC - Res – Shell: Residential rebates for insulation, window treatments, radiant barrier, and window replacement.
- Water Heating - Res – Water Heating: Residential rebate for electric storage water heaters and heat pump water heaters.

Complementary Programs

- Shade Trees Program: Utility funded program to provide Shade Trees for residential and commercial customer
- Low-Income Programs: Low-income assistance spending (through the CARES Program and Lifeline Rate Discounts) continues to be the second largest area of our Public Benefits Program expenditures. During FY 2017, rate discounts represented about $1.2 million paid with public benefits funds. Low-income programs have been most beneficial to a significant portion of our customer base that has limited situational and/or financial means to participate in other EE programs.
- Electric Vehicle(EV) Charging Infrastructure: In FY 2017, REU developed the framework for Transportation Electrification incentives for residential chargers

and vehicle purchase, commercial chargers and vehicle purchase, public level 3 fast charger installation, and electrification of the City Fleet. In April 2017, Redding City Council approved $1.7 million of Cap and Trade funding to fund these initiatives which were launched in FY 2018. Status updates will be provided in future reports.

- Residential Education: Redding offers a variety of in-home services through the Residential Energy Advisor program. This includes guiding customers through the rebate programs while educating them with energy saving tips.
- Commercial Education: Redding offers a variety of in-business services through the Commercial Energy Advisor program. This includes guiding customers through the rebate programs while educating them with energy saving tips.

Evaluation, Measurement & Verification Studies

REU participated in a professional services EM&V study for the FY17 Commercial Lighting Rebate Program during the FY 2018 reporting year. The study provided valuable insight to the program and many of the recommendations included in the report were already implemented in the FY18 program prior to the study. The results of Redding EM&V reports are available here: https://www.cmua.org/emv-reports

In addition to these activities, rebate processing includes technical review on 100% of the rebate applications submitted to ensure that projects align with program requirements. Furthermore, REU performs pre- and post field inspections on large projects that account for the majority of savings.

Major Differences or Diversions from CA POU TRM for Energy Savings

For the vast amount of its EE programs, REU uses the standard measures as constructed within the Energy Services Platform's (ESP) reporting tool. For REU's unique programs (Low Income Weatherization, streetlights) REU used the custom measure feature in ESP to represent the energy and demand impacts of those programs. For the commercial lighting program, REU utilizes a custom excel calculator.

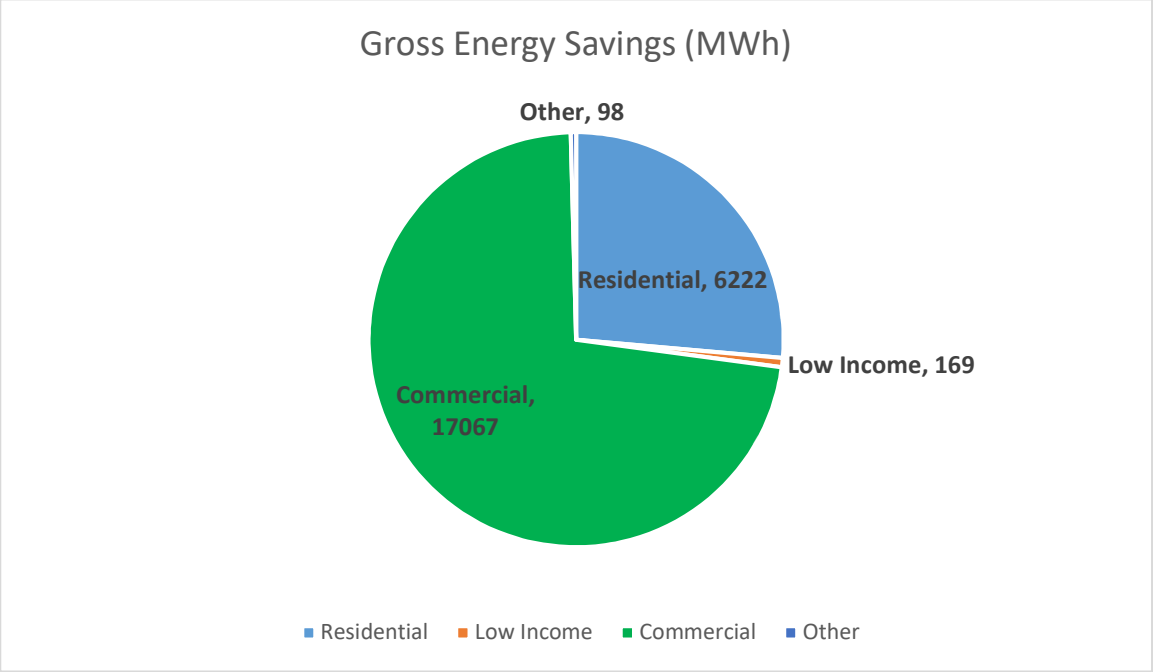
REDDING ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Commercial Deemed	7	35,779	558,057	6	26,672	401,721	145	46,433	0.88	1.23	0.160
Residential Deemed	243	818,474	9,944,440	150	473,677	5,304,017	2,485	718,018	1.71	1.13	0.181
Commercial Custom	34	219,053	2,194,636	23	146,932	1,394,282	561	78,628	1.61	0.43	0.070
Commercial Lighting	716	5,137,618	32,819,549	572	4,110,094	26,255,639	11,660	1,011,697	2.37	1.23	0.045
Shade Trees	-	55,440	1,108,800	-	47,124	942,480	432	155,123	1.43	1.92	0.252
LED Street Light Replacement	109	437,602	4,376,017	109	437,602	4,376,017	2,171	284,897	1.32	1.08	0.080
EE Measures Subtotal	1,109	6,703,965	51,001,499	861	5,242,101	38,674,155	17,455	2,294,796	1.91	1.15	0.072
Low-Income Programs	-	325,014	3,924,586	-	276,262	3,335,898	1,417	359,945	n/a	n/a	n/a
EE & LI Subtotal	1,109	7,028,979	54,926,085	861	5,518,363	42,010,053	18,872	2,654,741	1.91	1.15	0.072
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	1,109	7,028,979	54,926,085	861	5,518,363	42,010,053	18,872	2,654,741	1.91	1.15	0.072

RIVERSIDE

Riverside at a Glance

- Climate Zone(s): 10
- Customers: 109,000
- Total annual retail sales (MWh): 2,195,423
- Annual Retail Revenue: $306,656,506
- Annual energy efficiency expenditures for reporting year: $5,974,465
- Gross annual savings from reporting year portfolio (MWh): 23,556



Riverside Overview

In Fiscal Year (FY) 147/18, Riverside Public Utilities (RPU) met 95% of the kilowatt-hour (kWh) savings goal of 1% of retail sales as adopted by the Board of Public Utilities in 2017. RPU assisted its customers in saving over 22 million kWh at an average cost of $0.21 per kWh saved.

RPU helped revitalize the local economy by stabilizing utility rates through a rate freeze adopted by the City Council in 2010. This rate freeze provided customers with stable and predictable rates during the economic recovery period; however, the rate freeze also eroded utility and public benefit fund revenues. RPU has begun the implementation of the new 5 year rate plan, which will roll out in phases in an effort to make the smallest possible impact on our ratepayers.

Major Program and Portfolio Changes

RPU continues to enhance and expand its energy efficiency program portfolio for the benefit of its customers and the Riverside community. Staff examines the overall portfolio quarterly and recommends incentive level adjustments for consideration and direction by the RPU General Manager.

Although the local economy has stabilized and is moderately expanding, RPU is experiencing leveled participation in energy efficiency rebate and incentive programs. Overall program participation has remained flat over the past 8 years at approximately 20,000 rebates per year. This flattening demand for energy efficiency programs is likely due to a combination of market saturation, customer perception that solar generation is of higher value than energy efficiency, and overall weak consumer confidence.

Our solar rebate program sunsetted at the end of calendar year 2017, which allowed us to shift funds to focus on more low income programs. During FY 17/18, the RPU team focused on revamping our low income programs to be most beneficial to our rate payers. For this reason, there was very low participation in our low income programs. FY 18/19 will show more programs and more participation for our low income customers.

Program and Portfolio Highlights

RPU's Commercial Lighting, Small Business Direct Installation (SBDI) and Keep Your Cool (KYC) Direct Installation programs continue to be a highlight of RPU's overall program portfolio in terms of both customer acceptance and kWh savings.

Although commercial customers only represent 10% of total utility customers, they represent the majority of RPU's load. As a result, RPU has dedicated additional program resources to assist commercial customers in achieving energy efficiency savings.

RPU's small business customers have often been reluctant to participate in traditional rebate programs due to lack of upfront capital, time, or technical ability to implement energy efficiency projects. RPU's SBDI Program was designed to address these primary customer concerns. The SBDI program is a comprehensive direct installation program combining measures such as lighting retrofits and controls, HVAC tune-ups, LED exit and "open" signs, Tier 2 advanced power strips, and various weatherization measures. Each project starts with an energy audit of the business's facility to prioritize recommended energy efficiency measures. SBDI offers businesses up to $2,000 in free energy efficiency upgrades, and allows the business customer to fund additional improvements through contractor co-payments. The program is available throughout RPU's service territory and has been expanded to medium-sized business customers.

RPU contractors have found that the market potential for this program is substantial and that there is no shortage of businesses that can realize significant savings from energy efficiency upgrades provided through this program. Customer feedback regarding this program has been very positive, with almost 1,400 customers served in FY 17/18.

The Keep Your Cool (KYC) Program is similar but more specifically focused on a direct installation of cooling and refrigeration measures in mini-markets, delis, convenience stores and restaurants.
Combined, the Commercial Lighting, KYC and SBDI programs have resulted in over 16 million kWh saved in this reporting year. Although on the higher end of measure costs within RPU's program portfolio, these direct installation programs maintain an average cost of $0.04-$0.08 per kWh saved for lighting and $0.36 to $0.60 for SBDI. In addition, RPU receives additional benefits from increased customer engagement and customer satisfaction.

Commercial, Industrial & Agricultural Programs

- Air Conditioning Incentives – Rebates for replacement of energy inefficient AC units (Non-Res Cooling).
- Energy Star Appliances – Rebates for purchase of Energy Star-rated refrigerators, dishwashers, commercial clothes washers, solid door refrigerator/freezers, ceiling fans and televisions (Non Res-Lighting, Non Res-Cooling, and Non-Res Refrigeration).
- Lighting Incentive – Rebates for kWh savings on installation of more energy efficient lighting and controls (Non-Res Lighting).
- Tree Power – Rebates for purchase and planting of up to 5 qualifying shade trees per year (Non-Res Cooling).
- Weatherization – Rebates for installation of insulation, window film and cool roofs (Non-Res Shell).
- Performance Based Incentive – Rebates for customers who can demonstrate a kWh savings based on custom energy-efficiency measures (Non-Res Comprehensive).
- Commercial Food Service Program – Program specifically targeting commercial food service customers such as restaurants, hospitality providers, institutional, medical/hospital customers, schools and government customers. The program is offered in conjunction with Southern California Gas Company (SCGC) and provides customers with a comprehensive facility audit offering recommendations on specific energy efficiency measures, estimated return on investment, and applicable utility incentives.
- Key Account Energy Efficiency Program (KEEP) – Program targeting RPU's largest Time of Use Customers. This customer segment includes the top 300 RPU customers in terms of consumption. KEEP is intended to provide Key Account

customers with a comprehensive energy efficiency plan including a priority list of recommended energy efficiency measures along with an estimated return on investment and applicable utility incentives. RPU is also working with SCGC on this program. Customers are also offered additional technical and contracting assistance to bring large energy efficiency projects from concept to completion (Non-Res Comprehensive).

- Custom Energy Technology Grants – Grants awarded for research, development, and demonstration of energy efficiency and renewable energy projects that are unique to the business or manufacturing process and can demonstrate energy savings, demand reduction or renewable power generation (RD&D Program).
- Energy Innovation Grants – Grants available to public or private universities within RPU's service territory for the purpose of research, development, and demonstration of energy efficiency, renewable energy, energy storage, strategic energy research, and electric transportation (RD&D Program).
- Upstream HVAC Rebate Program – Rebate incentive for commercial high efficiency HVAC equipment purchases that exceed Title 24 requirements, provided upstream at the wholesale distribution channel level, thereby encouraging distributors to stock and sell more efficient HVAC equipment (Non-Res Cooling).
- Energy Management Systems – Rebates for the purchase and installation of energy management systems for monitoring and controlling facility energy load.
- New Construction and LEED construction Incentives – Rebates for energy savings exceeding Title 24 standards for pre-approved new construction projects.
- Pool and Spa Pumps Incentive – Rebates for purchase of qualifying multi-flow or variable speed high-efficiency pumps and motors.
- Premium Motor Incentives – Rebates for the purchase of premium high efficiency electric motors (none claimed this FY).
- Thermal Energy Storage Incentive – Feasibility study and incentives available for use of thermal energy storage based on program guidelines (none claimed this FY).
- Ice Energy Thermal Energy Storage Pilot Program – Combined thermal energy storage program and energy efficiency pilot program created in FY 14/15 and implemented in FY 15/16 to replace old HVAC equipment with new energy efficient equipment installed concurrently with Ice Bear thermal energy storage equipment.

Residential Programs

- Energy Star Appliances – Rebates for purchase of Energy Star-rated refrigerators, dishwashers, clothes washers, room air conditioners, ceiling fans,

and televisions (Res Cooling, Res dishwashers, Res Clothes Washers, Res Electronics).

- Cool Cash – Rebates for replacing Central Air Conditioners with a SEER rating of 15 above (Res Cooling).
- Tree Power – Rebates for purchasing and planting of up to five qualifying shade trees per year and one free qualifying shade tree coupon printed on the March back of the bill (Res Cooling).
- Pool Saver – Rebates for purchase and installation of high efficiency, variable speed, or multi-flow pool pump motors (Res Pool Pump).
- Weatherization – Rebates for installing attic insulation or wall insulation, standard rebates for duct replacement, duct testing/sealing, window film, solar and standard attic fans, whole house fans, and cool roofs (Res Shell, Res Cooling).
- Appliance Recycling – Free recycling service for old inefficient refrigerators and freezers (Res Refrigeration).
- Whole House Rebate Program – Rebates for completing multiple energy efficiency measures as one project. Points are awarded for each type of measure and then multipliers are given at specific point intervals on a sliding scale to encourage implementation of multiple energy efficiency measures as one project under one application (Res Comprehensive).
- Multi-Family and Mobile Home Direct Installation – Program offering multi-family and mobile home residents direct installation measures including HVAC tune-ups, lighting efficiency upgrades, weatherization, and Tier 2 advanced power strips. Also addresses energy efficiency measures in common areas (Res Lighting).
- Energy Savings Assistance Program (ESAP) – Direct installation program targeting low-income customers, offered in partnership and cooperation with SCGC. Measures include lighting efficiency upgrades, HVAC tune-ups, smart power strips, and refrigerator recycling (low-income assistance, Res Lighting, Res Cooling, Res Refrigeration).

Complementary Programs

- Electric Vehicles (EV): In 2016, RPU received a $50,000 CEC grant to install a Level 3 EV charger at City Hall. RPU has committed $25,000 of public benefit funds to offer free charging to all patrons of the station. This free charging period will cover a 24-month period to allow us to analyze charging frequency and customer habits in order to create an EV-only electric rate for RPU customers.
- • Solar Rebate Program (SB1) – Throughout Calendar year 2017, RPU continued to promote residential and commercial participation in its solar rebate program to reduce peak load and offset customer electricity bills. In support of Senate Bill 1 (SB1) RPU has allocated a budget of $2.5 million annually through December 31, 2016 for customer installed systems. RPU

extended its program through December 31, 2017. RPU will continue through June 2019 to honor rebate applications submitted before December 31, 2017.

- SHARE – This low-income assistance program credits up to $150 toward electric deposit or bill payment assistance for qualified low-income applicants annually. In FY 17/18, RPU served approximately 4300 low-income customers through the SHARE program for a total of over $650,000 in public benefit funds credited to low-income families for bill payment assistance. RPU is currently revising this program in hopes to double participation in the coming years.
- Research, Demonstration and Development (RD&D) – RPU continues to invest in RD&D programs through partnerships with both businesses and local higher education institutions. RPU has expended over $1,000,000 in public benefit funds over the last ten years through its Energy Innovation Grant Program (see description above) to support energy research at local institutions of higher learning. Additional RD&D funding is provided to local commercial customers under the Custom Energy Technology Grant Program (see description above). RPU also participates in SCPPA-directed RD&D efforts and will continue to explore future RD&D opportunities as they occur on a case-by-case basis.
- Demand Response – RPU continues to manage a highly successful voluntary (non NERC certified) demand response program. This program, known as Power Partners, was developed in partnership with RPU's largest commercial customers. These important Key Account customers agree to voluntarily shed or shift a combined total of 11MW of electric load during the peak summer months from June-September if it is deemed necessary to call on this resource by RPU in cooperation with the CAISO.
- Pool Pump Timer Credit Load Shift Program – This program offers a bill credit of $5 per month for customers who agree to install and program their residential pool pump timer so that the pump operates only during off-peak hours. RPU has implemented an ongoing inspection program to inspect 100% of these timers for program compliance.

Evaluation, Measurement & Verification Studies

RPU is committed to providing cost-effective, ongoing evaluation, measurement, and verification (EM&V) efforts for its energy efficiency programs. EM&V costs are covered in the individual program budgets.

In addition to periodic program audits, RPU consistently performs the following in support of EM&V activities:

- An onsite inspection rate of no less than 10% for all residential program participants, performed by RPU staff and contractors.

- A pre-and post-inspection of 100% of commercial rebate participants, including a review of historical energy usage, energy-saving calculations and post-measure bill analysis.
- All residential and commercial solar PV installations are field inspected and verified by city personnel for program compliance, system inter-connection standards, and rated production output.
- Contracted with the engineering firm Partner Energy to verify claimed energy savings on large, complex, or technical commercial projects prior to issuing a rebate incentive.
- Audits and installations performed by third-party contractors for RPU direct installation programs have high inspection rates that are performed by both the contractor and RPU staff.
- Refrigerator recycling program administered by Appliance Recycling Centers of America (ARCA) assures full inspection when the contractor picks up old appliances.

RIVERSIDE PUBLIC UTILITIES

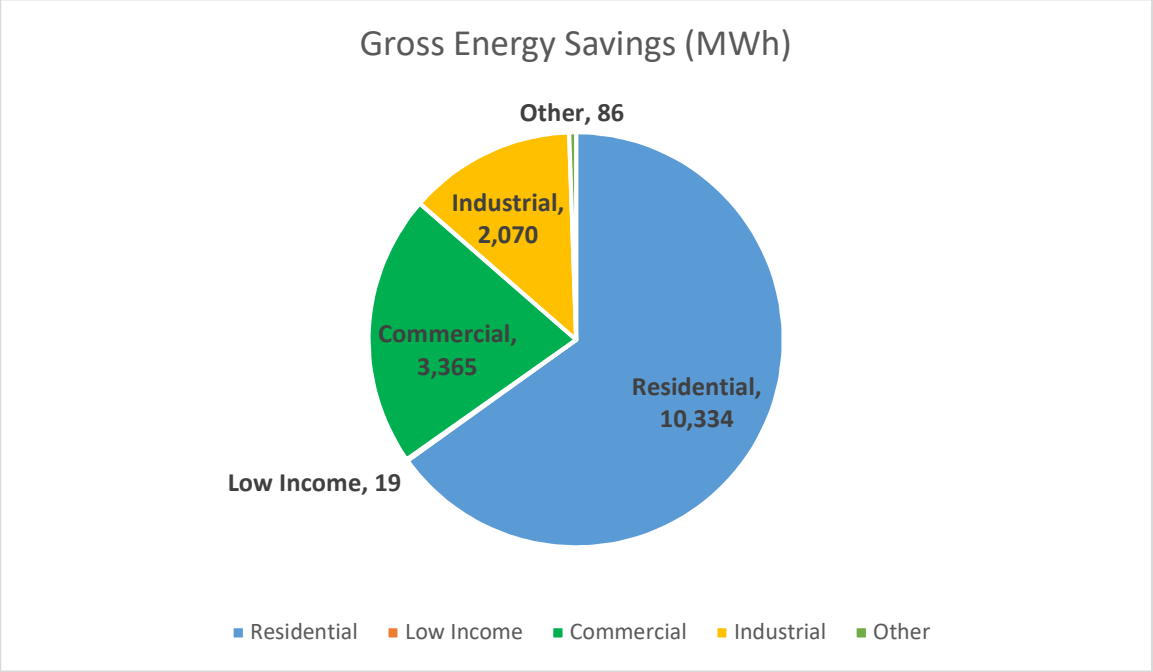
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
All Program Measures	3,327	23,387,088	306,932,290	2,842	22,071,986	274,354,275	109,373	5,909,647	5.29	19.97	0.029
EE Measures Subtotal	3,327	23,387,088	306,932,290	2,842	22,071,986	274,354,275	109,373	5,909,647	5.29	19.97	0.029
Low-Income Programs	88	168,622	2,500,850	88	168,622	2,500,850	1,073	64,818	n/a	n/a	n/a
EE & LI Subtotal	3,416	23,555,710	309,433,140	2,930	22,240,608	276,855,125	110,446	5,974,465	5.29	19.97	0.029
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	3,416	23,555,710	309,433,140	2,930	22,240,608	276,855,125	110,446	5,974,465	5.29	19.97	0.029

ROSEVILLE

Roseville at a Glance

- Climate Zone(s): 11
- Customers: 59,601
- Total annual retail sales (MWh): 1,183,292
- Annual Retail Revenue: $162,298,199
- Annual energy efficiency expenditures for reporting year: $4,001,169
- Gross annual savings from reporting year portfolio (MWh): 15,874



Roseville Overview

The City of Roseville is the largest city in Placer County significantly influencing the economy in South Placer County. Municipal-owned Roseville Electric Utility offers affordable electric rates and reliable power to just over 53,000 residential customers and 6000 commercial customers.

In 2018 Roseville issued 814 new home and 28 new building construction permits. Industrial vacancy rate is at 2 %, Office at 9 % and Retail at 3 %.The median household income in Roseville is $80,658 and 39% of residents over 25 have a bachelor's degree or higher. Interest in rooftop solar and electric vehicles is high.

Major Program and Portfolio Changes

Roseville maintained a broad portfolio of residential and non-residential programs through 2018. The approach was to have a program available for a wide variety of energy efficiency projects our customers may invest in.

Tracking the performance of these programs however, indicated a segment of programs that are less utilized by our customers. As the reportable savings declines among many of these measures, Roseville is exploring alternate strategies that will allow us to maximize the impact we make with our customers through fewer, but more engaging, program offerings. We expect changes to begin to roll out in 2019.

Program and Portfolio Highlights

Residential customers participating in the Home Energy Reports behavioral program contributed 49% of Roseville Electric's energy efficiency savings for FY 18. Through the Home Energy Reports program, Roseville Electric is able to educate customers with tips to save energy in their homes.

The 7,835,968 kWh reduction represents a full year of energy reports to approximately 38,000 customers. Interior and exterior commercial LED lighting retrofits contributed an additional 21% of total energy savings. The combination of energy efficiency savings achieved through LED lighting and the Home Energy Reports program resulted in a reduction of 15,873,872 kWh for the fiscal year.

Commercial, Industrial & Agricultural Programs

Commercial LED and Other Lighting: Offers business customers a wide variety of energy efficient LED interior and exterior LED lighting retrofits and control options for updating their facilities.
Commercial Food Service Equipment: Program provides rebates to commercial restaurants to install energy efficient electric food service equipment listed on the PG&E food technology website.

Commercial HVAC: Includes package and split system retrofits along with several measures to reduce heat gain in the facility, including shade trees, window film, VFD and VSM retrofits to existing HVAC supply and return fans.

Commercial Custom: Customer driven rebate option targets projects that reduce peak loads and energy consumption and offers unlimited energy efficiency technology opportunities for the large and key account customers.

Residential Programs

Low-Income Rate Assistance: Roseville Electric assisted approximately 1,400 customers with a rate reduction to their utility bills in FY 17-18. Roseville works with local agencies and libraries to promote this program to low income residents.

- Residential Windows: Roseville Electric added windows as a measure for residential customers in FY 18. Windows must be Energy Star rated with a U-value of .30 and an SHGC of .25 or less and bear the National Fenestration Rating Council label.
- Residential Whole House Fan: Program offering a rebate to customers installing a permanently installed 2000 cfm (or greater) whole house fan.
- Residential Home Energy Reports: Industry-recognized, contractor-managed energy efficiency behavior program providing education, feedback and tips to residential customers.
- Residential HVAC: Provides rebates to customers installing higher efficiency systems upon retrofit, performing annual HVAC tune-ups and installing Smart Thermostats.
- Residential Shade Tree: Rebate program designed to incent and educate customers to plant drought-tolerant shade trees to keep their home cool. A local urban forester recommends trees. Savings are estimated from an EM&V performed by Navigant in 2010.
- Residential Pool Pump: Rebate program designed to incent customers to upgrade from a single speed to a variable speed pool pump.
- Residential New Construction: Programs offering incentives to builders to achieve greater savings than those required by building code have transitioned to a program modeled after the California Advanced Home Program. Savings estimates are obtained from HERS energy reports.
- Residential Sunscreens: Rebate program designed to incent customers to install permanent sunscreens on their windows to keep their home cool.

Complementary Programs

EZ Energy Low-Income Home Audit and Install Program:
This program offers low-income residents an onsite energy efficiency audit and installation of weatherization measures that include attic insulation, HVAC tune-ups and a programmable Smart Thermostat. This program is funded through greenhouse gas (GHG) allowance auction proceeds.

Electric Vehicle Program:
Customers purchasing new electric vehicles are eligible for a rebate for both the vehicle and the plug in charger. Over 230 residential customers purchased electric vehicles in Roseville and received a rebate. Of the 230, 137 customer installed a Level II charger. This program and research in the area of Electric Vehicles is supported through funding provided by Roseville Electric. In 2018, an independent

assessment of the potential impact of electric vehicles to the City of Roseville Electric grid was prepared for Roseville Electric Utility and provided recommendations for a strategic approach to address the electrification of the transportation industry.

Community Solar:
Roseville introduced a 986 kW community solar project, Roseville Solective, to residential households in March 2019. A portion of the program was set aside for low-income customers. The project is funded by the participants and the energy contributes to the Utility RPS requirements.

City of Roseville Utility Exploration Center:
Roseville Electric contributed $400,892 to the Utility Exploration Center in FY 2018 for the ongoing development and maintenance of exhibits for this 4000 sq. ft. educational facility. The mission of this facility is to educate visitors of all ages with information about water and energy conservation and achieving a sustainable lifestyle.

Evaluation, Measurement & Verification Studies
Roseville Electric conducts third party EM&V or M&V on an annual basis. Selection of the programs to review is prioritized by the dollars spent and savings claimed for the program or when a provisional or custom measure is introduced to our customers.

The budget for pre- and post-EM&V is determined by the program selected for review, and can vary from $20,000 up to $150,000. The budget depends on the extent of field measurement or customer surveys required to evaluate the program within the guidelines established by the California Energy Commission.

All third party EM&V and M&V reports are published on CMUA's website: https://www.cmua.org/emv-reports.

Recent Reports include:
- EM&V-Commercial Exterior Lighting (2017)
- EM&V- Residential HVAC, Pool Pump, Whole House Fan and Sunscreen (2016)
- M&V- Smart Thermostats (2018)
- M&V- HVAC Tune Ups (2018)

The O Power Home Energy Reports program is scheduled for EM&V in FY 18-19

Major Differences or Diversions from CA POU TRM for Energy Savings

Roseville Electric's avoided costs are entered to the 1037 reporting model. All modeling is performed using these costs.

Roseville Electric relies on the savings documented in the California Public Utilities Technical Resource Manual (TRM). If not available, the measure is entered to the 1037 reporting model as a custom measure. When a custom program is entered to the model, the source of energy savings is documented as coming from an industry approved method (Energy Reports), a published industry white paper or published EM&V. HERS reports are provided by Builders for new construction programs and reviewed by a third party consultant. Some measures utilize calculation for watts reduction with calculations for kW and kWh performed with standard industry hours of use data.

ROSEVILLE ELECTRIC

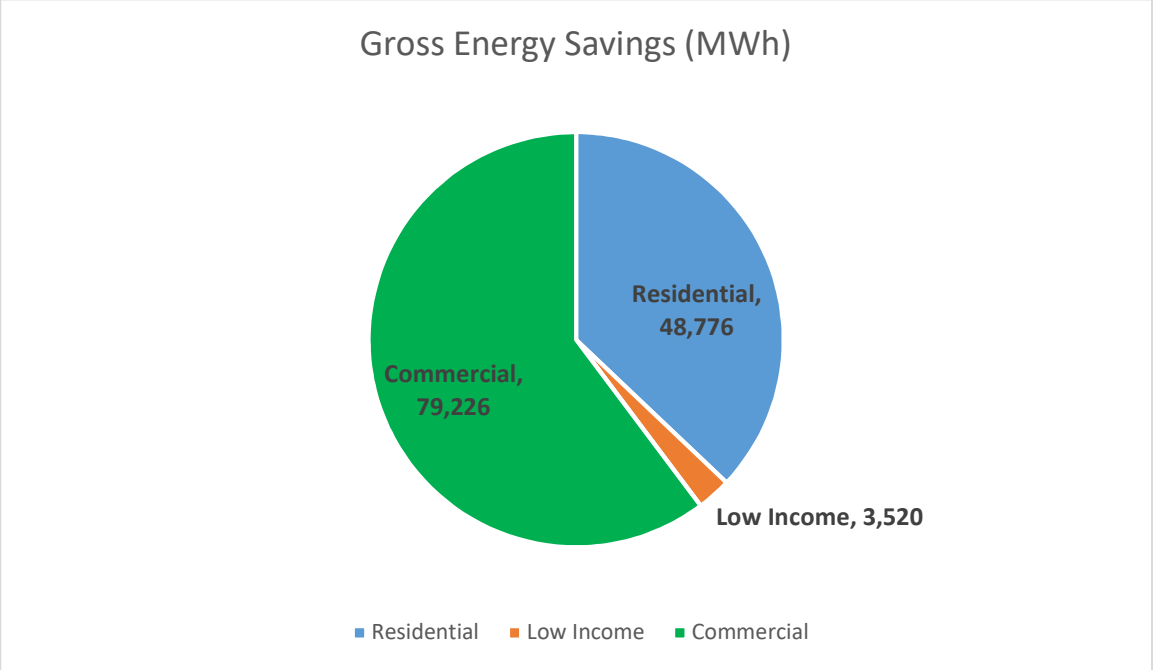
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Residential Shade Tree	7	27,565	551,300	5	19,296	385,910	194	23,012	1.15	1.39	0.086
Residential HVAC	252	1,157,768	6,539,212	202	952,554	5,522,974	3,018	751,971	0.55	0.63	0.162
Residential Fan Program	5	421,386	8,370,340	3	377,526	7,516,092	3,122	282,247	1.60	0.66	0.054
Residential New Construction	127	125,152	1,877,280	114	112,637	1,689,552	676	256,231	0.35	0.61	0.199
Residential Home Envelope	169	173,384	3,369,766	168	171,425	3,350,184	1,684	210,176	1.07	2.46	0.090
Commercial Lighting	239	3,284,929	41,671,212	196	2,979,403	37,554,486	17,039	1,364,114	1.43	1.37	0.046
Commercial Custom	169	2,096,304	21,041,040	153	1,886,674	18,936,936	7,150	193,865	5.33	13.23	0.012
Residential Energy Reports	-	7,835,968	7,835,968	-	7,835,968	7,835,968	3,784	499,742	0.94	0.94	0.064
Residential Pool Pump	8	161,086	1,610,860	5	96,652	966,516	409	64,249	0.85	0.54	0.079
Residential Upstream Lighting	798	431,716	5,180,592	718	388,544	4,662,533	1,979	129,845	1.93	3.11	0.035
Commercial HVAC	53	139,854	1,059,257	45	118,183	893,435	340	199,513	0.25	0.33	0.274
EE Measures Subtotal	1,829	15,855,112	99,106,827	1,608	14,938,861	89,314,587	39,394	3,974,964	1.26	1.27	0.055
Low-Income Programs	-	18,760	206,360	-	18,760	206,360	111	26,204	n/a	n/a	n/a
EE & LI Subtotal	1,829	15,873,872	99,313,187	1,608	14,957,621	89,520,947	39,505	4,001,169	1.26	1.27	0.055
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	1,829	15,873,872	99,313,187	1,608	14,957,621	89,520,947	39,505	4,001,169	1.26	1.27	0.055

SACRAMENTO

Sacramento at a Glance

- Climate Zone(s): 12
- Customers: 628,950
- Total annual retail sales (MWh): 10,776,350
- Annual Retail Revenue: $1,559,336,000
- Annual energy efficiency expenditures for reporting year: $30,976,348
- Gross annual savings from reporting year portfolio (MWh): 131,521



Sacramento Overview

SMUD is planning program changes to respond to the following industry trends and changing customer expectations:

- The expectations of residential and commercial customers are growing. Besides low-cost and reliable service, the expectation of the customer is now quality customer service and products that meet their business needs and personal lifestyles.
- Carbon reduction is becoming a driving force with regard to the electric and transportation industries in California. SMUD finished a new, Board-approved, Integrated Resource Plan in 2018, which will impact energy efficiency direction and goals into the future.
- The increased emphasis on carbon reduction goals will also direct the utility industry to encourage the use of an increasingly renewable electric portfolio over natural gas.

- With the advent and proliferation of the Internet of Things (IoT), there are expanded levels of data, new communication and marketing channels and new opportunities to meet the needs of utility customers.
- LED have become the norm. The influence of energy efficiency programs have moved from the standard style lamp to specialty lamps and fixtures.
- While agreements were made in 2017 on how energy efficiency savings should be reported to the California Energy Commission (CEC), SMUD is still expecting a greater emphasis on energy efficiency in the future to meet the spirit of SB350.
- In 2018, SMUD started the transition toward TOU rates for all residential rates. The transition to Time of Day (TOD) rates will be completed in early 2019, which will make TOD the default residential rate. It will also be mandatory for participation in some of SMUD's programs. This will place a greater focus on measures that impact peak demand and load management strategies.
- Commercial customers' interest in Zero Net Energy (ZNE) solutions is growing.
- More and more customers prefer to access information and communicate via mobile devices.
- Consumers are becoming increasingly interconnected, fundamentally shifting channels of social interaction.
- Customers want clear and simple choices.

Major Program and Portfolio Changes

The overall budget, energy and peak savings achieved in 2018 were relatively unchanged from 2017. Also, the following program changes were made to facilitate customer demand and prepare for the future:

- The Retail Lighting program continued the transition toward closure. This program will close in 2019 as the market has successfully transformed, regardless of continued litigation around lighting regulations.
- 2018 started SMUD's transition to cumulative carbon reduction as the primary focus of customer programs as defined in SMUD's recently completed IRP. Consequently, the transition from natural gas to electricity for space heating and water heating was included in SMUD's energy efficiency programs for the first time.
- An efficient, all-electric, new construction homes program was introduce as a replacement to SMUD's previous residential new construction program. This program includes SolarShares, SMUD's community solar program, as an option to help drive homes toward a net carbon-zero home.

Program and Portfolio Highlights

In 2018, SMUD continued their courageous and needed change in focus from utility needs to customer needs and customer satisfaction. The Value For What You Pay (VFP) initiative required significant organizational changes. The Distributed Energy

Resources (DER) delivery team, Advanced Energy Solutions (AES), was reorganized into Commercial, Residential, and Planning teams focused on all of the DER components (Energy Efficiency, Demand Response, Electric Vehicles, Storage, Electrification and Green Pricing), This has enabled the individual groups to focus on the specific needs of the commercial and residential sub-segments in a more holistic view as the bundling of the DER items becomes a better customer solution.

Commercial, Industrial & Agricultural Programs

- Customized Energy Efficiency Incentives: Promotes the installation of energy-efficient equipment, controls, and processes at commercial and industrial customer facilities. Provides incentives to contractors and/or customers to promote the installation of energy efficient lighting, HVAC, motors, and refrigeration equipment and controls. The program also provides incentives for retro-commissioning, process improvements, and data center storage projects that result in energy savings.
- Express Energy Solutions: Provides prescriptive incentives to participating qualified contractors for high-efficiency equipment across a variety of end-uses: lighting, HVAC, refrigeration, and food-service equipment. Incentives are targeted to the contractor/supplier in an effort to stimulate the market for energy-efficient equipment and services and are designed to cover a significant portion of the incremental cost of the equipment.
- Complete Energy Solutions: Third party administrator performs comprehensive energy audits of small and medium-sized businesses. Customer receives a customized report detailing recommended energy improvements, estimated savings, estimated cost and payback. Third party administrator then assist customer in hiring a contractor to complete the project.
- Savings by Design: Provides incentives to builders and their design teams to design new commercial and industrial buildings 10-30 percent more energy efficient than required by Title 24 (or typical new construction in the case of Title 24-exempt buildings and processes).

Residential Programs

- Equipment Efficiency: Provides rebates and/or SMUD financing for qualifying (Energy Star, Consortium for Energy Efficiency, and/or other high-efficiency) efficiency improvements to homes' building shells and equipment. Improvements include mini split heat pump, whole fans, central air conditioners and heat pumps, heat pump water heaters, and cool roofs.
- Home Performance Program: Participating contractors use building-science principles and diagnostic equipment to evaluate the current performance of the whole house, and then recommend comprehensive improvements that will yield an optimal combination of savings and comfort for homeowners. Once the homeowner selects the improvements that fit their needs and budget,

participating contractors will do the work to Building Performance Institute standards.

- Appliance Efficiency Program: Provides rebates for qualifying (Energy Star or Consortium for Energy Efficiency-listed) appliances: smart thermostat, refrigerators, variable speed pool pumps, and room air-conditioners. Also included in this program are Refrigerator/Freezer Recycling, Pool Pumps and the Retail Partnership Program.
- Refrigerator/Freezer Recycling provides rebates for the free pick-up and environmental recycling of old refrigerators and freezers.
- Retail Partnership Program is an upstream program that works with big box retailers to pay retailer incentives for all the energy efficiency items they sell in their stores.
- Retail Lighting: Promotes energy efficient residential lighting products by providing incentives for manufacturers and their retail partners to sell Energy Star lighting at a discount. Implemented through agreements with manufacturers and retailers that involve cost buy-downs, marketing, and/or advertising. SMUD has been steadily decreasing rebates in this program as market transformation reduces the need for this program.
- All Electric Homes- New construction program that integrates energy efficiency, no natural gas, demand response and other technologies in an aligned vision. The program is designed to complement SMUD's other portfolio programs (EE, DR, EV, etc.) to support SMUD's future load requirements. The resulting home design from those builders that participate will be an innovative use of energy-efficient design technologies, integrated built-in DR capabilities, automated peak shifting strategies, and other "smart" connected options desired by homeowners.

Complementary Programs

- Shade Trees: Provides free shade trees to SMUD customers. Implemented through the community-based non-profit Sacramento Tree Foundation (STF). STF foresters review tree selection and site locations with customers, who plant the trees.
- Renewable Energy Programs: Voluntary green pricing programs including SolarShares, which supports expansion of distributed PV; commercial and residential REC purchase programs; and a community solar program aimed at enhancing K-12 curricula on renewable energy.
- Low-Income Programs: SMUD provides a low-income rate subsidy, a medical assistance rate subsidy, and no-cost weatherization services to our low-income customers. Pilot programs are currently in-place to try other energy efficiency options to assist our low-income customers.
- Research, Development, and Demonstration: SMUD has a centralized research and development program that conducts public good research across the electricity enterprises from the supply side to demand side. Research is

conducted in eight research areas which include renewable energy, electric transportation, climate change, distributed generation, energy efficiency, demand response, storage and smart grid. These programs seek to track emerging technologies, demonstrate promising technologies and prepare SMUD and SMUD customers for adoption of these emerging technologies.

- Codes & Standards: SMUD continues to pursue the development and implementation of codes and standards (e.g. T24, T20, etc.) as the most cost-effective source of Energy Savings. SMUD participates in several working groups, drives code compliance through programs, assists with workforce training, conducts research, and develops data management systems to improve tracking and reporting. SMUD is claiming 35,000 net MWH energy savings associated with the Statewide Codes and Standards Team for 2018.
- Electric Vehicles: In 2018, SMUD's Drive Electric program continued to promote adoption of plug-in electric vehicles through special PEV rate offerings, participation in educational events, educational offerings through our website SMUD.org/PEV, and collaboration with local auto dealers and the local EV advocacy group Sac EV including its members such as City of Sacramento office of sustainability, SMAQMD, etc. SMUD's coordination of a large scale Ride-N-Drive event at the Sacramento International Auto Show resulted in test drives of plug-in electric vehicles and was one highlight of our PEV education efforts in 2018.
- Energy Storage: SMUD conducted field studies to examine grid-scale storage applications, risks and benefits. Additionally, SMUD offered to the Residential and Non-Residential customers started the first phases of a program to fulfill AB 2514 requirements.

Evaluation, Measurement & Verification Studies

SMUD completed two evaluation studies in 2018:

- Commercial Custom Energy Efficiency Program Impact Evaluation Report
- Low Income Weatherization HVAC and Solar Evaluation Report

For the Commercial Custom Energy Efficiency Program Impact Evaluation Study, the research found an Ex Post Net Annual Energy Savings of 47.3 GWh (28.7 GWh for 2015, and 18.6 GWh for 2016), with a net-to-gross ration of 93%. The Low Income Weatherization HVAC and Solar Evaluation Study found $32 annual bill savings for deep retrofits with HVAC replacements, $22 annual bill savings for HVAC replacements only, and $345 for solar panel installations (paid through State of California).

For 2019, SMUD began two evaluation studies for 2019. This includes:

- The Home Electricity Reports Evaluation Study
- The Residential HVAC Rebates Evaluation Study

Major Differences or Diversions from CA POU TRM for Energy Savings

SMUD uses previous experience and previous M&V studies to determine program savings first. Secondly, it uses calculations or deemed savings through calculations. TRM energy savings are used if SMUD savings are not available for a particular measure.

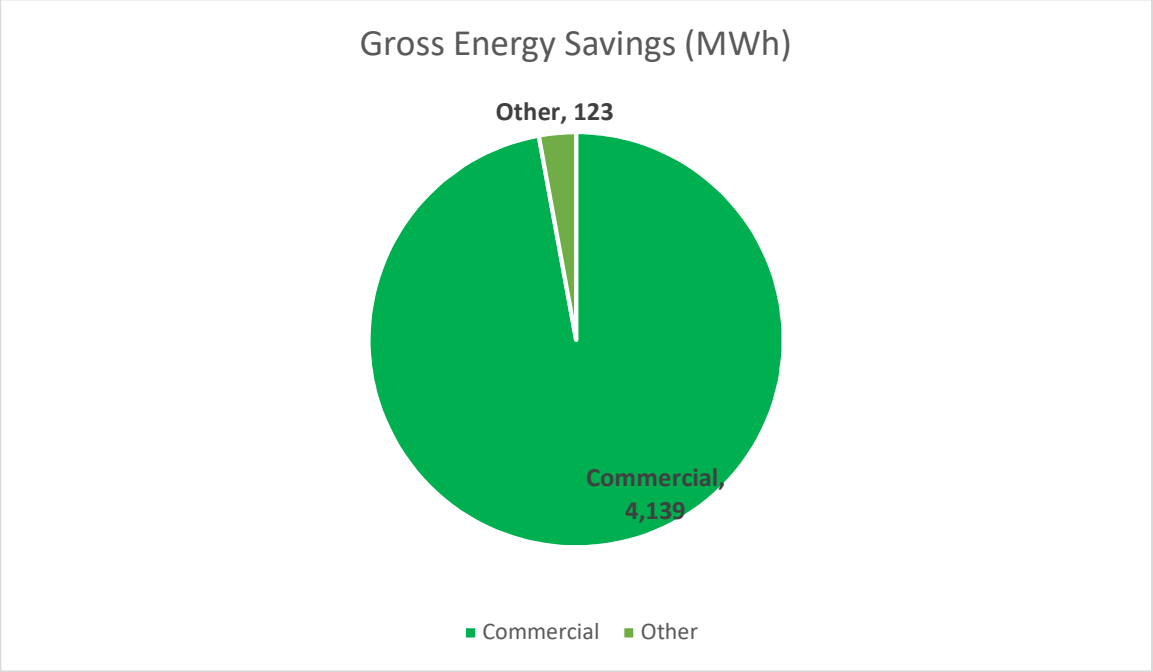
SACRAMENTO MUNICIPAL UTILITY DISTRICT
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Refrigerator Recycling	768	7,577,697	37,888,485	537	5,304,388	26,521,940	1,780	1,121,832	0.51	0.74	0.046
Retail Products Portfolio	499	2,766,321	33,800,380	393	2,182,199	26,633,437	1,789	459,632	1.43	0.26	0.022
Retail Lighting	1,308	11,189,795	179,036,715	1,243	10,630,305	170,084,879	11,025	2,607,618	1.69	1.10	0.021
Complete Energy Solutions	5,128	22,384,635	335,769,525	4,102	17,907,708	268,615,620	17,850	4,623,518	1.42	0.11	0.023
HPP	13,954	8,302,633	124,539,496	11,164	6,642,106	99,631,597	6,560	4,581,255	0.56	0.35	0.061
Express Energy Solutions	4,528	22,406,321	193,777,933	3,860	19,128,928	164,015,097	11,709	3,462,404	1.11	0.48	0.025
Equipment Efficiency	5,724	6,596,136	99,673,393	3,091	3,576,538	53,199,649	3,412	3,016,760	0.47	0.60	0.076
Pool Pump	105	1,792,713	26,890,695	86	1,470,025	22,050,370	1,447	799,689	0.70	0.33	0.048
Home Electricity Report		12,600,000	25,200,000		10,080,000	20,160,000	971	265,185	1.03	1.03	0.013
Custom Incentives	2,182	18,196,356	272,945,333	2,117	17,650,465	264,756,973	17,913	3,459,173	1.85	0.21	0.017
Appliance Efficiency	1,166	1,345,257	10,088,057	903	1,039,548	7,523,729	482	610,158	0.30	0.17	0.085
Savings By Design	1,461	12,843,397	192,650,951	1,330	11,687,491	175,312,365	11,699	2,472,392	1.74	0.89	0.019
EE Measures Subtotal	36,823	128,001,260	1,532,260,963	28,825	107,299,702	1,298,505,655	86,636	27,479,615	1.15	0.26	0.028
Low-Income Programs	-	3,520,000	35,200,000	-	3,520,000	35,200,000	2,217	3,496,733	n/a	n/a	n/a
EE & LI Subtotal	36,823	131,521,260	1,567,460,963	28,825	110,819,702	1,333,705,655	88,853	30,976,348	1.15	0.26	0.028
T&D											
Codes & Standards	8,800	35,000,000	35,000,000	8,800	35,000,000	35,000,000	-	281,840	n/a	n/a	n/a
Other Subtotal	8,800	35,000,000	35,000,000	8,800	35,000,000	35,000,000	-	281,840	n/a	n/a	n/a
	45,623	166,521,260	1,602,460,963	37,625	145,819,702	1,368,705,655	88,853	31,258,188	n/a	n/a	n/a

SAN FRANCISCO

San Francisco at a Glance

- Climate Zone(s): 3
- Customers: 3,547
- Total annual retail sales (MWh): 977,677
- Annual Retail Revenue: $131,455
- Annual energy efficiency expenditures for reporting year: $5,054,602
- Gross annual savings from reporting year portfolio (MWh): 4,262



San Francisco Overview

Hetch Hetchy Power manages a portfolio of electric generation, which includes the SFPUC's Hetch Hetchy Water and Power system, which generates an average of 1.6 million MWh of clean hydroelectric power each year, 23 municipal solar photovoltaic installations (8.1 MW), and 2 biogas cogeneration facilities (3.1 MW). Hetch Hetchy Power has made a commitment to energy efficiency as its highest priority resource.

Historically, Hetch Hetchy Power's energy efficiency programs mainly have targeted its municipal customers, and most of its programs have been provided at no charge to these civic agencies. Today, fee-for-service programs represent a growing portion of energy efficiency offerings. Hetch Hetchy Power is also developing new programs for its growing residential and commercial customer sectors.

Major Program and Portfolio Changes

This year's energy savings are primarily derived from completion of a number of comprehensive HVAC and lighting retrofits of municipal buildings located throughout the city, including a major LED lighting retrofit at the De Young Museum and a large boiler project at Laguna Honda Hospital. Additionally, Hetch Hetchy Power continues to achieve significant savings through LED streetlight retrofits.

Program and Portfolio Highlights

Energy efficiency has been an essential component of Hetch Hetchy Power's resource portfolio for more than a decade. In the current reporting period, FY 2017-18, completed energy efficiency projects are estimated to save 4,258 MWh (net savings) of electricity per year, at a utility cost of $5.2 million. Hetch Hetchy Power's energy efficiency projects also achieve significant natural gas savings each year, which are accounted for separately from this report.

Program level highlights for FY 2017-18 include:

- Direct-install style retrofits provided most of the reported electricity savings, including HVAC upgrades at various fire stations, Laguna Honda Hospital, and major Real Estate Division buildings and a large LED lighting upgrade at the De Young Museum.
- 12,390 streetlights were replaced with LED technology. Hetch Hetchy Power plans to eventually convert all of its 18,000 streetlights to LED.
- Hetch Hetchy Power's annual report benchmarking the energy performance of San Francisco's municipal buildings includes 492 buildings representing almost 49.5 million square feet of building area.

Commercial, Industrial & Agricultural Programs

Hetch Hetchy Power's energy efficiency programs are generally tailored to the particular customer (almost all of which are other City departments), because most of these customers are large, and have varied property characteristics. These programs include:

- Direct-Install Program: This program provides complete retrofit services to targeted municipal customers, usually at no cost to the customer. The program focuses on City agencies that are funded primarily through local tax receipts, fees, and federal/state-funded programs. These customers are considered hard-to-reach (due to limited access to capital and engineering, as well as insufficient price signals).
- Civic Center Sustainability District: Through a partnership with the Clinton Global Initiative, this program demonstrates green, renewable and energy efficient technologies as a national model for sustainability in historic districts. For energy efficiency projects, the program provides free energy audits,

design, construction management, construction services, and full funding to buildings in the City's Civic Center historic district.

- LED Street Light Conversion Project: The capital-funded program aims to convert about 18,000 high pressure sodium street lights to LED lights. The program will reduce energy use and maintenance costs, and improve pedestrian and vehicular safety. The project scope includes the installation of networked wireless controls, which will further reduce energy consumption via fixture dimming. The project launched in FY15-16. This year, 12,390 streetlight fixtures were replaced with LEDs, with a projected annual electricity savings of 3.3 million kWh.
- Green Commissioning and Design Review Program: Hetch Hetchy Power provides commissioning and related green building design review services on a fee-for-service basis for municipal new construction and major renovations. For existing buildings, the program offers retro-commissioning services.
- Energy Benchmarking Program: San Francisco requires owners of non-residential buildings over 10,000 square feet to annually benchmark and disclose the energy performance of their buildings. In FY 17-18, Power Enterprise released its seventh annual report benchmarking the energy performance of San Francisco's municipal buildings, including 492 buildings representing nearly 49.5 million square feet of building area.

Residential Programs

Hetch Hetchy Power primarily serves municipal loads. Hetch Hetchy Power provides distribution service to the former military installations at Treasure Island and Hunters Point, both of which are in the process of being redeveloped to residential/commercial uses. Additional energy efficiency activities for this new residential use is limited as these new units are being built to the latest code and energy efficiency standards.

Complementary Programs

Hetch Hetchy Power offers several related programs, among them:

- Municipal Renewable Program: Under this program, Hetch Hetchy Power directly installs, maintains and operates solar PV systems on municipal buildings throughout the City and County of San Francisco; and
- GoSolarSF: The program provides incentive payments to San Francisco residents and businesses installing rooftop solar projects. The program includes a component for low income residents, which complements a statewide program administered by Grid Alternatives, a nonprofit organization.

Evaluation, Measurement & Verification Studies

Historically, the majority of energy efficiency retrofit projects funded by Hetch Hetchy Power have included an individual M&V study following the International

Performance Measurement and Verification Protocol (IPMVP). These projects have included an M&V plan with a sampling plan, a logging plan, an approach to data recovery and analysis, and a written report.

Major Differences or Diversions from CA POU TRM for Energy Savings

Hetch Hetchy Power's mostly direct-install energy efficiency portfolio allows it to report energy savings based on site-specific engineering studies with detailed ex ante savings estimates. These studies base savings on on-site collected data for hours of operation, nameplate data for replaced equipment, and detailed site-specific costs. As such, Hetch Hetchy Power assumes an "existing conditions" baseline for energy savings calculations, and accordingly, Hetch Hetchy Power does not separately claim savings from code advocacy.

SAN FRANCISCO

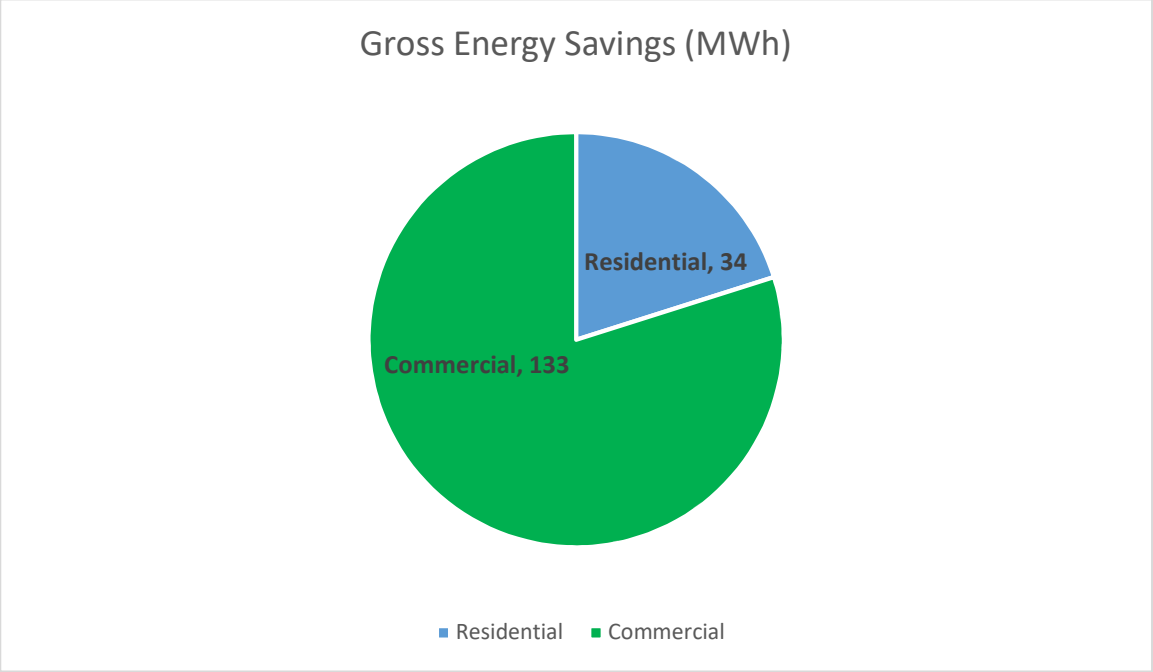
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Direct Install	126	917,000	13,755,000	126	917,000	13,755,000	5,344	1,659,742	1.60	1.39	0.161
LED Streetlight Conversions		3,345,300	50,179,500		3,345,300	50,179,500	24,143	3,394,860	1.49	1.49	0.090
EE Measures Subtotal	126	4,262,300	63,934,500	126	4,262,300	63,934,500	29,487	5,054,602	1.52	1.45	0.106
Low-Income Programs											
EE & LI Subtotal	126	4,262,300	63,934,500	126	4,262,300	63,934,500	29,487	5,054,602	1.52	1.45	0.106
T&D											
Codes & Standards											
Other Subtotal	126	4,262,300	63,934,500	126	4,262,300	63,934,500	29,487	5,054,602	1.52	1.45	0.106
Total	126	4,262,300	63,934,500	126	4,262,300	63,934,500	29,487	5,054,602	1.52	1.45	0.106

SHASTA LAKE

Shasta Lake at a Glance

- Climate Zone(s): 11
- Customers: 4,537
- Total annual retail sales (MWh): 196,388
- Annual Retail Revenue: $21,219,400
- Annual energy efficiency expenditures for reporting year: $135,744
- Gross annual savings from reporting year portfolio (MWh): 167



Shasta Lake Overview

The City of Shasta Lake (CSL) invests its Public Benefit funds to promote positive community impacts by promoting electricity-saving measures. CSL utilizes a comprehensive set of traditional rebate programs available to all customer under retrofit projects. Participation was relatively low in this reporting cycle, which is likely driven by persistent impacts from the economic downturn and the income demographics of the community.

Major Program and Portfolio Changes

CSL offered the Keep Your Cool (KYC) Program to commercial customers in FY17 to encourage them to upgrade their older refrigeration equipment. The program offers ECM motors, strip curtains, ASH controllers and other refrigeration measures at no cost to the customer. There were no major program changes to CSLs standard rebate programs offered to customers.

Program and Portfolio Highlights

The KYC program delivered 40% of the total kWh savings. This program is an excellent way to serve small business customers. History has demonstrated that direct install programs such as KYC are beneficial, and customers will take advantage of no-cost programs.

Commercial, Industrial & Agricultural Programs

CSL manages a comprehensive energy efficiency incentive program for commercial customers focusing on energy efficiency and peak load reduction. Rebates are available for upgraded lighting, HVAC, appliances, refrigeration equipment, electronics, and in cases where an analysis is performed rebates can be offered for additional equipment that reduces energy use and/or demand. On-site energy audits are provided by CSL energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request.

- Commercial/Industrial Lighting Program: CSL offers rebates to business owners who invest in the installation of energy efficiency lighting upgrades. There is a prevalence of inefficient lighting throughout the city and most high bay lighting uses high intensity discharge fixtures instead of more efficiency fluorescent or LED fixtures.
- Commercial HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.
- Commercial Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
- Commercial Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Commercial Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Commercial/Industrial Custom Program: CSL offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.
- Keep Your Cool Program: The Keep Your Cool program offers ECM motors, strip curtains, ASH controllers and other refrigeration measures at no cost to the customer.

Residential Programs

CSL manages a comprehensive energy efficiency incentive program for residential customers. Rebates are offered for the installation of various energy efficiency measures, such as lighting, HVAC, appliances and weatherization. On-site energy

audits are provided by CSL energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request.

- Residential Lighting Program: CSL offers rebates to homeowners who install ENERGY STAR® qualified LED lamps/bulbs, ceiling fans and LED holiday lights.
- Residential HVAC Program: CSL offers rebates to homeowners who install high performance heat pumps, central air-conditioners, room air-conditioners, or whole house fans that exceed current state requirements. CSL also offers a rebate for duct sealing when not required by code.
- Residential Equipment Program: CSL offers rebates to homeowners who purchase new ENERGY STAR qualified products, including clothes washers, room air conditioners, dishwashers, pool pumps, and refrigerators.
- Residential Weatherization Program: CSL offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments/replacement, air/duct sealing and radiant barriers.
- Residential Water Heater Rebate Program: CSL offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

- Low-Income Programs: Lifeline monthly rate discount program and one-time bill assistance known as SHARE
- Renewable Energy Programs: Focus on customized solar projects that benefit the City
- Research, Development, and Demonstration: Focuses on LED lighting in various applications, community solar charging station(s) and latest HVAC applications in City owned facilities
- Electric Vehicles: Support of local business in conversion of combustion engine vehicles to electric vehicles

Evaluation, Measurement & Verification Studies

The CSL is planning to complete EM&V in FY19 by working with several other utilities to gain economies of scale. CSL has received a proposal from an EM&V company and is reviewing the scope of work.

Major Differences or Diversions from CA POU TRM for Energy Savings

CSL has relied heavily on the savings listed in the Technical Resource Manual. Non-residential lighting, custom projects and non-deemed measures utilize custom savings calculations.

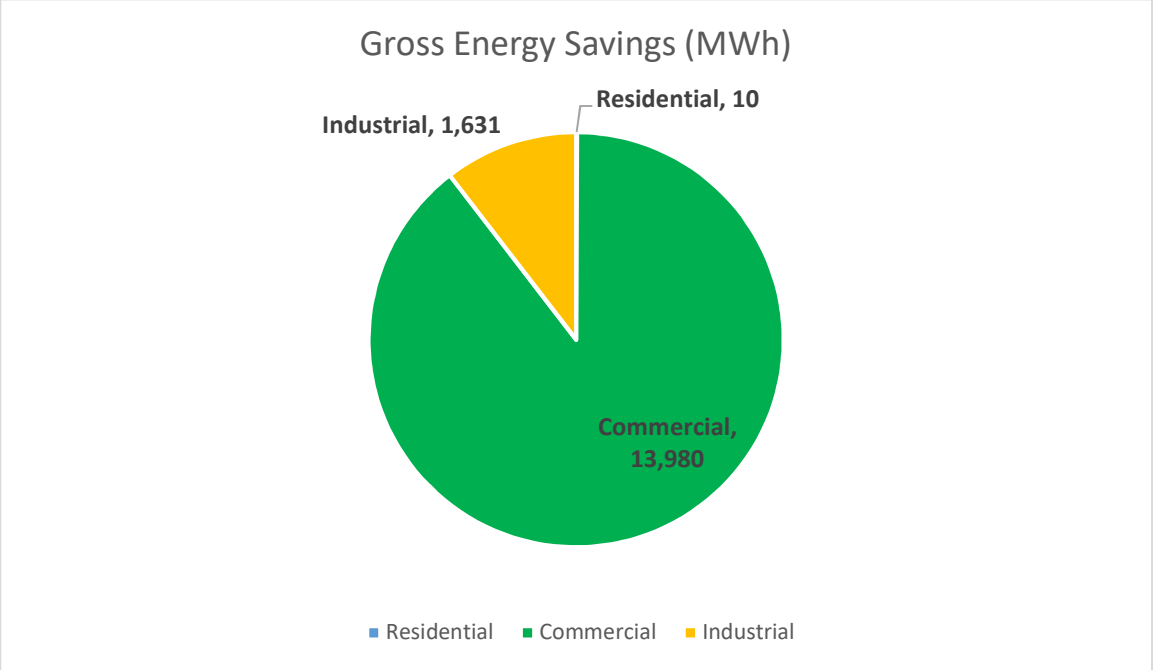
SHASTA LAKE ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Commercial	10	66,783	820,000	8	53,736	660,653	260	24,715	2.47	2.60	0.047
HVAC	1	2,193	32,400	1	1,754	25,920	12	10,502	0.64	0.67	0.540
Keep Your Cool Refrigeration Retrofit	4	66,432	797,187	3	63,111	757,327	302	21,550	3.07	3.07	0.036
Residential Lighting	1	2,590	35,925	1	1,359	19,007	8	8,100	0.22	0.19	0.564
Weatherization	24	24,379	486,743	8	8,637	172,509	80	60,002	0.90	0.58	0.512
Appliance	0	4,395	51,273	0	2,148	25,773	11	10,875	0.26	0.27	0.534
EE Measures Subtotal	40	166,772	2,223,528	22	130,745	1,661,188	672	135,744	1.42	1.14	0.105
Low-Income Programs											
EE & LI Subtotal	40	166,772	2,223,528	22	130,745	1,661,188	672	135,744	1.42	1.14	0.105
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	40	166,772	2,223,528	22	130,745	1,661,188	672	135,744	1.42	1.14	0.105

SILICON VALLEY POWER

Silicon Valley Power at a Glance

- Climate Zone(s): 4
- Customers: 55,101
- Total annual retail sales (MWh): 3,543,618
- Annual Retail Revenue: $410,003,438
- Annual energy efficiency expenditures for reporting year: $4,313,248
- Gross annual savings from reporting year portfolio (MWh): 15,621



Silicon Valley Power Overview

Silicon Valley Power is unique in its mix of customers. While 84% of the customers are residential, over 90% of the utility retail sales are to commercial and industrial customers. Approximately 74% of our electric load is attributable to our largest "Key" Customers. Over 46% comes from data centers. Historically, it is those customers, including the large data centers, who implement a few large projects each year that make up the majority of our energy savings for the year. Combined with this unique customer mix and our mild climate, very little energy savings comes from the residential sector, as we do not have a high residential air conditioning load which often makes up a large percentage of energy portfolio savings in other climate zones.

Major Program and Portfolio Changes

In Fiscal Year 2017-2018, the following changes were made to Silicon Valley Power's energy efficiency programs:

- Residential Electric Dryer Rebate Program: This program combined both the previous Emerging Technology Award Winning Dryer program and the Heat Pump Clothes Dryer program under a single rebate program. The rebate is now $100 for any Energy Star-qualified electric clothes dryer having a Combined Energy Factor (CEF) of 4.3-5.4. For Energy Star-qualified clothes dryers with a CEF of 5.5 or greater, the rebate is $200.
- Commercial Prescriptive Lighting Rebate: We began offering a prescriptive rebate for three types of LED retrofits: LED integral troffers at $30, LED high bay fixtures at $200, and LED low bay fixtures at $125. These three categories of lamp have the lowest program adoption rates and require a higher incentive than provided through the standard lighting rebate calculator to encourage adoption. The simplicity of a prescriptive rebate also makes this easier for contractors to sell.
- Emerging Technologies Grant: The program provides grants to encourage businesses to develop new energy-related technologies. The incentive structure was redesigned to increase the incentive to $0.35/kWh but the project caps remain in place. The incentive is now paid in two payments. The first payment of 50% of the incentive is paid upon completion of the project and the second payment of 50% is paid upon verification of energy savings. This is intended to encourage customers to implement innovative energy efficiency projects and minimize some of the risks involved if the savings do not materialize as expected, which has been one of the barriers to program adoption.
- Data Center Efficiency Program – This program targets data centers with IT server load greater than 350 kW or cooling load greater than 100 tons. A peak demand savings component of $150/kW will be added to the program performance incentive and the project cap will be raised to $750,000 for projects completed in FY 2017-2018.
- Commercial New Construction Rebate: This program provides a rebate to customers who exceed Title 24 by 10% for the measure being incentivized, in line with our other prescriptive rebates for retrofit projects. A Design Team Incentive was introduced to match the Investor Owned Utilities' program as follows: at 10% savings, the incentive rate is $0.033 per kWh. The incentive rate increases as the savings increase, up to 30% savings and $0.10 per kWh. The incentive rate remains at $0.10 per kWh until the project savings exceed 40%. At 40% and above, the incentive rate is $0.13 per kWh. The Design Team Incentive will also include an incentive of $33 per peak kW reduction. The Incentive is capped at $50,000.
- Customer Directed Rebate – This program provides incentives based on actual energy saved for energy efficiency measures that do not fall into SVP's standard business rebate programs. A peak demand incentive of $150 kW

was introduced. The project cap was raised to $750,000 for projects completed in FY 2017-2018.

- Residential Attic Insulation Rebate – This program was a new program addition for FY 2017-2018 and pays $0.10/square foot for attic insulation of R-38 over conditioned space in single family homes or in multifamily homes where the attic space is completely separated from that of the other multifamily units. Eligible customers must have electric heat either in the form of a heat pump or electric resistance heat and no more than R19 existing attic insulation.
- Overall, net energy savings from Silicon Valley Power's energy efficiency programs was lower in FY 2017-2018 than it was in FY 2016-2017 due to fewer large projects completed. However, energy savings still exceeded the utility's adopted energy efficiency goals. Several large projects were underway toward the end of FY 2017-2018 that are anticipated to close in FY 2018-2019 and savings from that program year are expected to be much higher.

Program and Portfolio Highlights

In Fiscal Year 2017-2018, Silicon Valley Power customers completed a total of 20 custom incentive projects under the Customer Directed Rebate and Date Center Rebate programs. These projects contributed over 10 million kWh in energy savings to the program's overall goal.

The Customer Directed Rebate and Data Center Rebate programs were developed many years ago in recognition of the unique customer base served by Silicon Valley Power and provides unique opportunities for energy-efficiency projects that may not otherwise fit into the utility's standard rebate and customer assistance offerings. Any energy efficiency project that decreases energy consumption at a facility in Santa Clara and is not already covered under a prescriptive rebate program may qualify. Customers must provide a measurement and verification plan that is approved by Silicon Valley Power before work can begin. Pre- and post-inspection and validation of energy consumption is required. Under the data center program, performance payments are made annually to ensure savings are actually achieved, as data centers do not always build out as planned and occupancy can vary. The performance incentive component has been very well-received by Silicon Valley Power's customers, as the rebate is paid to the facility's operating budget annually after the initial capital project is closed. This was a benefit to the customer that utility staff did not anticipate and is being carried into other program design in the future.

Commercial, Industrial & Agricultural Programs

- Deep Energy Retrofit Pilot Program – This pilot is targeted at customers who are interested in deep energy retrofits and able to make a commitment to a

multi-year effort in reaching an energy savings of at least 30%. Incentives match the levels offered for the same measures incentivized under SVP's other programs, with a range from $0.02-$0.20 per kWh in first year savings. The program target is to enroll three customers.

- Enhanced Ventilation Controls Demonstration Projects –The program is targeted at smaller customers with rooftop package units of 15 tons or smaller. This customer segment is not at the forefront of adopting new technology. In order to educate customers on the technology and validate the energy savings, we are aiming for demonstration projects at customers' facilities and will fund up to the lesser of 100% of the project cost or $3,500. The customers are required to allow SVP to install metering equipment to validate energy savings and to write a case study on the project. The case study will be used in promoting the rebate program to other customers and educating them on the energy savings and payback of the project.
- Emerging Technologies Grant: The program provides grants to encourage businesses to develop new energy-related technologies. The incentive is $0.35/kWh, paid in two payments. The first payment of 50% of the incentive will be paid upon completion of the project and the second payment of 50% will be paid upon verification of energy savings. This is intended to encourage customers to implement innovative energy efficiency projects and minimize some of the risks involved if the savings do not materialize as expected, which has been one of the barriers to program adoption. SVP is actively researching emerging technologies and reaching out to customers to inform them about the program and appropriate emerging technologies for their business.
- Commercial New Construction Rebate: This program provides a rebate to customers who exceed Title 24 by 10% for the measure being incentivized, in line with our other prescriptive rebates for retrofit projects. A Design Team Incentive matching the Investor Owned Utilities' program is provided as follows: at 10% savings, the incentive rate is $0.033 per kWh. The incentive rate increases as the savings increase, up to 30% savings and $0.10 per kWh. The incentive rate remains at $0.10 per kWh until the project savings exceed 40%. At 40% and above, the incentive rate is $0.13 per kWh. The Design Team Incentive, capped at $50,000, also includes an incentive of $33 per peak kW reduction.
- Business Energy Audits: Provides free energy efficiency audits to business customers. Energy & Resource Solutions administers this and other business PBC programs.
- Business Rebates: Encourages businesses to install energy efficient lighting, air conditioners, motion sensors, programmable thermostats, food service equipment, etc. The programs are occasionally changed to match statewide programs.

- Enhanced Ventilation Controls Rebate: This program provides an incentive of $160 per ton for adding enhanced ventilation controls to HVAC rooftop packaged units 15 tons or smaller.
- Small Business Efficiency Services Program – This program is targeted at small business customers, and provides assistance in identifying energy efficiency projects, selecting and managing contractors, and help with filling out rebate application paperwork. The program also provides a 35% incentive for lighting and HVAC rebates, provided that customers to install the lighting measures within 6 months of program enrollment and HVAC measures within 12 months of enrollment in order to receive the additional incentive.
- Controls Program – This program is available for projects where at least 80% of the savings come from the control strategies. Incentives are paid on a performance basis with 6 payments made over 5 years at a rate of $0.02/kWh saved annually, capped at 65% of total project cost, which is above the statewide program cap of 50%. The first payment is made upon project completion and each additional annual payment will be subject to commissioning of the controls system and validation of persistent energy savings.
- Public Facilities' Energy Efficiency Program: SVP provides technical assistance and financial incentives for the expansion, remodel, and new construction of City of Santa Clara buildings. Included in this program are higher levels of rebates for qualifying equipment and energy management assistance.
- Compressed Air Management Program was run from 2007-2010 and provided successful implementation of energy efficiency measures in compressed air systems. It was reintroduced in FY 2015-2016, following an RFP issued in December 2013, and is ongoing.
- Keep Your Cool, which focused on replacement of refrigeration gaskets and use of strip curtains in commercial refrigeration facilities was launched in 2007. A second version of this program ran in FY 2014/2015 and focused on strip curtains, efficient refrigeration motors, and LED case lighting. The latest version was launched in April 2017 and adds additional energy efficiency measures.
- Specialized Commercial and Industrial Operational Optimization Program - This program provides engineering support and analysis to large customer facilities to effectively engage these customers in taking a long-term view of developing energy savings strategies geared towards implementing measures that will continually optimize the operations of their facilities. The program also provides project management support to customers during the implementation phase to make the recommended energy efficiency improvements and data analytics support to assist with ongoing savings validation.
- Energy Efficient Water Systems Program - This program provides engineering support and analysis to large customer facilities with cooling towers, significant wastewater systems, and significant pumping loads to assist in implementing

energy efficiency measures which will also likely result in water conservation. The program provides an audit of the facilities and project management support to customers during the implementation phase to make the recommended energy efficiency improvements and validate the energy savings.

- Small Business Exterior Lighting Program – This program provides a free snapshot audit of exterior lighting efficiency opportunities. It then provides free LED exterior lights to eligible small businesses. The businesses are responsible for the installation cost and can use their own staff, the contractor of their choice, or one of the contractors working with the program provider.
- City Revolving Energy Efficiency Loan Program – Established a revolving loan fund for qualifying energy efficiency measures at City owned and occupied facilities. Funds were repaid on utility bills through the energy savings achieved by the project. Total available funding was $250,000, but individual projects are capped at a lower level in order to ensure multiple projects could be implemented. Project paybacks must be under 5 years to qualify. Utilization of the program was low.
- Data Center Efficiency Program – This program targets data centers with IT server load greater than 350 kW or cooling load greater than 100 tons. The incentive is paid as a performance incentive, where the customer will receive five annual payments based on actual measured energy savings, with the first payment made three months after project completion. The incentive payment is $0.03 per kWh in energy savings.
- Customer Directed Rebate – This program provides incentives based on actual energy saved for energy efficiency measures that do not fall into SVP's standard business rebate programs. Lighting with network lighting controls will be removed from the Customer Directed rebate program and will now be covered under the standard lighting rebate.
- Commercial Lighting Rebates – Incentives are determined through a lighting rebate calculator based on energy savings exceeding Title 24. This is available online so that customers and contractors can easily enter information about the project, facility, and operating hours in order to determine the amount of the rebate.
- Commercial Prescriptive Lighting Rebate: We offer a prescriptive rebate for three types of LED retrofits: LED integral troffers, LED high bay fixtures, and LED low bay fixtures. These three categories of lamp have the lowest program adoption rates and require a higher incentive than provided through the standard lighting rebate calculator to encourage adoption. The simplicity of a prescriptive rebate also makes this easier for contractors to sell.

Residential Programs

- Residential Pool Pump Rebate: This program provides a $100 rebate to residential customers installing a new variable speed pool pump with a qualifying controller.
- Energy Star Ceiling Fan: Residents who purchase Energy Star qualified ceiling fans (limit 3 per household) will be able to receive a $35 rebate per ceiling fan. The program will encourage customers to use ceiling fans to help cool their homes instead of using air conditioning.
- ENERGY STAR Residential Heat Pump Electric Water Heater Rebate – SVP offers a maximum rebate of $500 per household for the purchase of an ENERGY STAR-qualified electric heat pump water heater.
- Residential In-Home Energy Audits, Education, and Hot Line: The program encourages residents to become more energy efficient and reduce their energy bills. Staff members visit homes and provide information and energy saving items. Also, the SVP information booth will continue to be displayed at several City events, providing education on energy efficiency and solar electric generation systems to residents.
- Residential Attic Insulation Rebate – This program pays $0.10/square foot for attic insulation of R-38 over conditioned space in single family homes or in multifamily homes where the attic space is completely separated from that of the other multifamily units. Eligible customers must have electric heat either in the form of a heat pump or electric resistance heat and no more than R19 existing attic insulation.
- Residential Electric Dryer Rebate Program: This program provides a rebate of $100 for any ENERGY STAR -qualified electric clothes dryer having a Combined Energy Factor (CEF) of 4.3-5.4. For Energy Star-qualified clothes dryers with a CEF of 5.5 or greater, the rebate is $200.

Complementary Programs

- Financial Rate Assistance Program (FRAP) – This program provides a 25% discount on the electric portion of utility bills for income-qualified residential customers, up to the first 800 kWh of use per month.
- Low Income EV Charging Station Grant for Multi-family properties – Under its low income programs, SVP will offer a grant of up to $1,000 per charging station for multi-family properties where a specified percentage of customers residing at the property qualify for SVP's low income programs.
- Residential Solar Electric Rebate – the state legislation that required utilities to provide solar electric rebates expired on December 31, 2016. Silicon Valley Power continued to offer rebates for commercial solar installations through June 30, 2017. Residential Solar rebates were extended through June 30, 2018 under the current program design.

Evaluation, Measurement & Verification Studies

Silicon Valley Power did not conduct an EM&V study in FY 2017-2018, but is in the process of developing a contract for an EM&V study on its Exterior Lighting program. The study will be available in March 2020. All past EM&V studies conducted on behalf of Silicon Valley Power can be found on the California Municipal Utilities Association website.

Major Differences or Diversions from CA POU TRM for Energy Savings

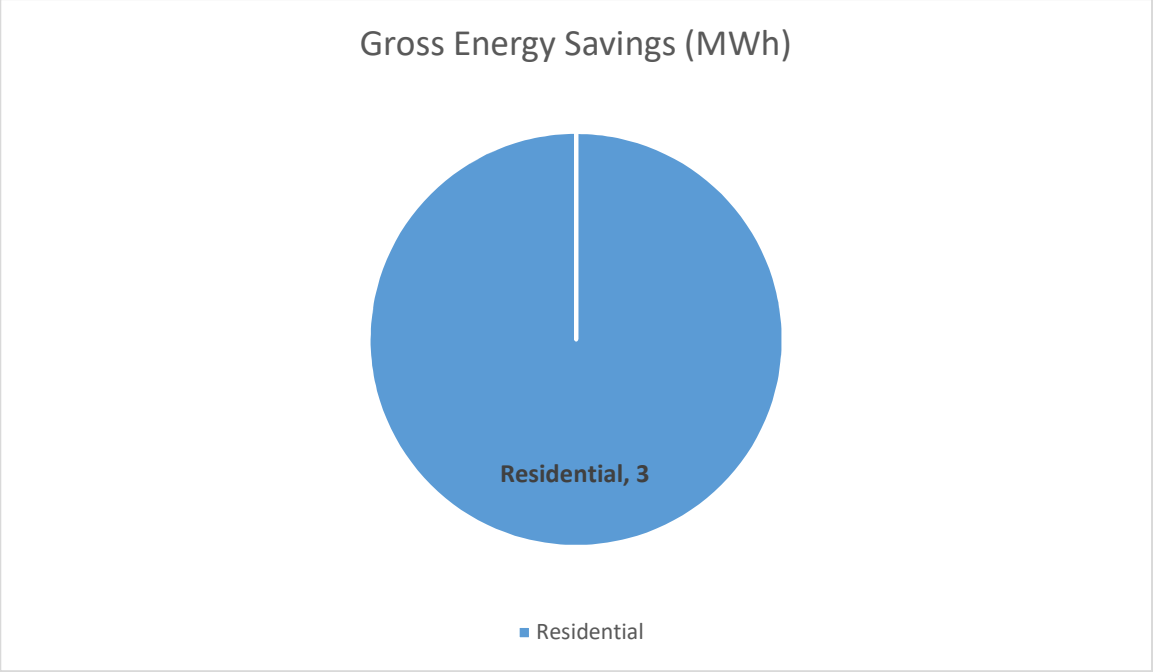
Silicon Valley Power uses the California Publicly Owned Utilities Technical Reference Manual (TRM) for the majority of its energy savings. Where no savings value exists, Silicon Valley Power uses actual savings verified through metering or an approved measurement and verification plan. In the case of lighting projects, Silicon Valley Power uses a lighting calculator that utilizes actual operating hours. A copy of the calculator can be found at http://www.siliconvalleypower.com/for-businesses/energy-savings-and-rebates/rebates/lighting.

SILICON VALLEY POWER											
-- FY2018 Energy Efficiency Program Summary --											
Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Commercial HVAC & Food Service	4	162,030	1,656,301	2	133,225	1,353,853	523	172,903	0.75	0.59	0.155
Residential Pool Pumps	2	6,844	39,404	1	4,106	23,642	10	72,018	0.05	0.04	3.001
City Streetlights		1,033,805	10,752,015		1,033,805	10,752,015	5,265	206,369	4.84	4.84	0.023
Residential HPWH		1,725	17,250		1,035	10,350	4	16,882	0.04	0.04	1.777
Commercial Lighting	645	4,403,535	54,390,568	555	3,799,771	47,081,957	17,797	1,235,899	3.50	1.95	0.034
Residential Education								330,752			
Customer Directed	1,292	10,011,287	145,238,148	1,101	8,543,300	123,620,958	45,049	2,232,392	5.02	3.22	0.024
Residential Fans	1	1,359	13,590	0	381	3,805	2	46,032	0.04	0.04	18.475
EE Measures Subtotal	1,943	15,620,586	212,107,277	1,660	13,515,623	182,846,581	68,650	4,313,248	3.87	2.53	0.031
Low-Income Programs											
EE & LI Subtotal	-	-	-	-	-	-	-	-	-	-	-
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	1,943	15,620,586	212,107,277	1,660	13,515,623	182,846,581	68,650	4,313,248	3.54	2.31	0.031

TRINITY

Trinity at a Glance

- Climate Zone(s): 16
- Customers: 7,268
- Total annual retail sales (MWh): 109,676
- Annual Retail Revenue: $9,962,817
- Annual energy efficiency expenditures for reporting year: $128,825
- Gross annual savings from reporting year portfolio (MWh): 3



Trinity Overview

Created in 1982 as a result of the Trinity River Division Act of 1955, in which Congress provided mitigation for the economic devastation to the local economy resulting from the Act.

The Congressional mitigation provides the Trinity Public Utilities District (TPUD) enough low cost and clean hydroelectric power to meet its entire load for the next several decades, but forbids the TPUD from selling any of the energy it does not need to meet load.

TPUD serves a small economically depressed area in northern California consisting of approximately 7,300 meters in mountainous terrain covering an area the size of Delaware. TPUD is comprised of nine small substations serving 600 miles of

distribution line. TPUD has a peak coincident demand of approximately 25 megawatts, which may occur in winter or summer. More than 60 percent of TPUD's load is residential.

Major Program and Portfolio Changes

There are no major changes to TPUD's Programs or Portfolio for this reporting period.

Program and Portfolio Highlights

High Efficiency Heat Pump Rebate Program: Provides incentive to replace wood stoves, propane furnaces/heaters, and kerosene heating systems with high efficiency electric heat pumps. No natural gas is available within TPUD's service territory.

High Efficiency Electric Water Heater Rebate Program: Provides incentive to replace propane water heaters with high efficiency electric water heaters.

Residential Programs

The High Efficiency Heat Pump Rebate Program and the High Efficiency Electric Water Heater Rebate Program are both residential programs.

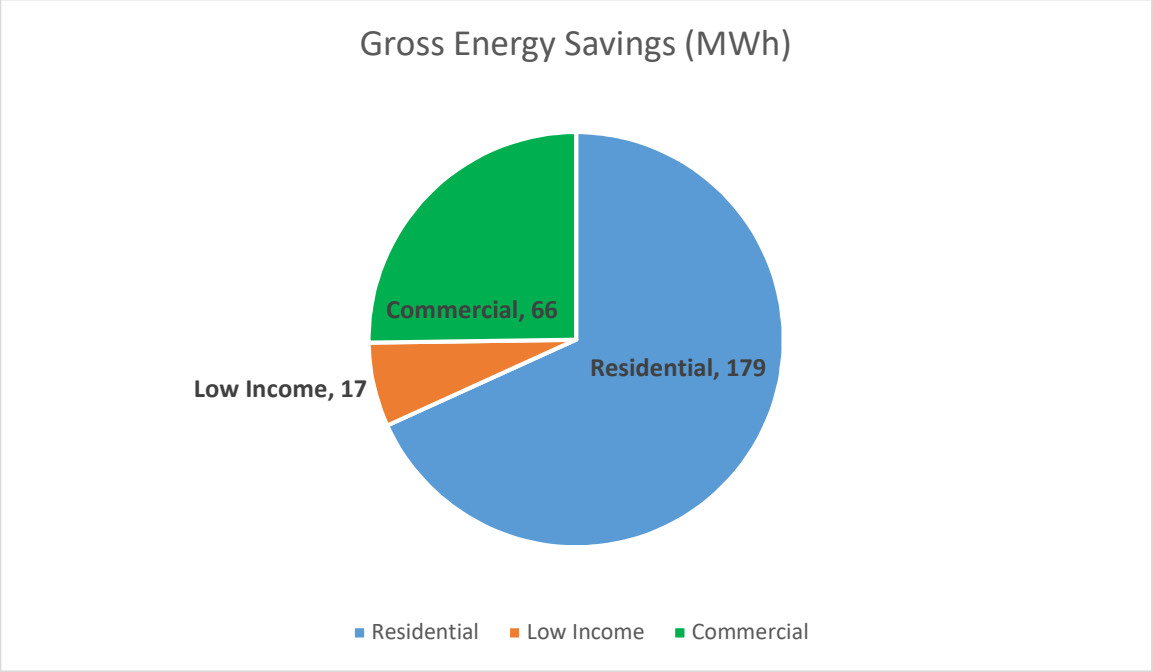
TRINITY PUBLIC UTILITY DISTRICT
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Electric Heat Pump Rebate Program	7	1,920	28,800	6	1,536	23,040	11	128,609	0.03	0.10	7.461
Electric Water Heater Rebate		668	6,680		401	4,008	2	216	1.46	0.49	0.065
EE Measures Subtotal	7	2,588	35,480	6	1,937	27,048	13	128,825	0.03	0.10	6.268
Low-Income Programs											
EE & LI Subtotal	7	2,588	35,480	6	1,937	27,048	13	128,825	0.03	0.10	6.268
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	7	2,588	35,480	6	1,937	27,048	13	128,825	0.03	0.10	6.268

TRUCKEE DONNER

Truckee Donner at a Glance

- Climate Zone(s): 16
- Customers: 13,768
- Total annual retail sales (MWh): 151,943
- Annual Retail Revenue: $24,049,547
- Annual energy efficiency expenditures for reporting year: $411,587
- Gross annual savings from reporting year portfolio (MWh): 262



Truckee Donner Overview

TDPUD serves electricity and water to the greater Truckee area comprised of approximately 44 square miles in eastern Nevada County and approximately 1.5 square miles in adjacent Placer County. TDPUD is governed by a locally elected Board of Directors consisting of 5 members with staggered 4-year terms and operates on a calendar year budget. TDPUD is a transmission-dependent utility within NV Energy's control area and secures electric resources primarily through the Utah Associated Municipal Power System (UAMPS). TDPUD has been successful in the past in transitioning to renewable energy sources, keeping rates stable, and investing in accessible, cost-effective, energy efficiency programs.

In 2018, TDPUD continued to invest in public benefit, low income and renewable power programs spending over 2.85% of retail sales on energy efficiency programs. TDPUD's energy efficiency results included a first year 'Gross' energy

savings of 0.17% of retail sales, first year 'Net' energy savings of 0.13% of retail sales, and TRC of 0.93.
TDPUD treats energy efficiency as an electric resource ('first loading order') and is therefore motivated by actual savings. However, the E3 model does not consider actual savings and the E3 'Gross' savings are based on codes & standard baselines (not what was actually replaced). Thus, the savings and associated cost-effectiveness from E3 understate the true value of the energy efficiency resource.

Major Program and Portfolio Changes

- Energy savings and program spending decreased in 2018 due to a restructuring of the department and a change in personnel.
- This is the fourth year that the EISA (Federal) lighting standards were applied as a baseline to screw in bulb measures and TDPUD continues to see a dramatic change in associated Residential programs (~37% of our portfolio based on annual kWh savings).
- The E3 'Gross' and 'Net' energy efficiency results that the TDPUD is able to claim in this report are diverging further and further away from the actual results. TDPUD will continue to use energy efficiency performance as a resource as the primary benchmark for program design.
- The community in Truckee still has a significant amount of older lighting technology in our community (T12's, incandescent, etc.). Despite the current Title 24 code and claimable savings methodology, TDPUD will target these loads for cost-effective retrofits.
- TDPUD began an AMI installation project this year that is targeted to be completed in Q3 2019. We have begun to explore behavioral and data driven programs to maximize the customer facing value of this asset.
- The annual Holiday Light program was converted this year from an exchange program to a rebate program, in partnership with our local retailers. Customer engagement was still very high and they continued to recycle their old incandescent bulbs despite it no longer being a requirement for participation.

Program and Portfolio Highlights

- TDPUD's Residential Energy Survey's remain a very popular program with customers. The 'visual survey' comes complete with over 20 free energy and water saving measures – including up to 50 free LED bulbs - that are delivered at the end of the survey for free. This program allows customers to implement the 'low hanging fruit' immediately and the educational component empowers customers to pursue more complicated energy efficiency opportunities.
- Residential lighting remains a critical program area (TDPUD is 89% residential with a large number of vacation homes). TDPUD continues to effectively deliver residential lighting through our Residential Energy Survey's, low-income program, at numerous events throughout the community, and at our office. The

vast majority of light bulbs delivered to our customers is done face-to-face and the customers must ask for the light bulbs. As stated previously, customers have embraced LED lighting and favor it over the CFL technology.

- TDPUD's LED Holiday Light Program remains very popular with ~3% of our customers visiting the conservation department in less than 1-month. Not only is the program cost-effective and very well received by our customers, but TDPUD takes the face-to-face opportunity to educate customers about other programs and to distribute free residential lighting.

Commercial, Industrial & Agricultural Programs

- Business Green Partners Lighting Program (Non-Res Lighting): Provides energy efficient screw-in light emitting diode (LED) bulbs, free of charge, to replace existing incandescent and halogen bulbs. TDPUD conservation specialist visits business to evaluate lighting needs and provide solutions.
- Commercial Lighting Rebate (Non-Res Lighting): Provides incentives to commercial customers for replacing inefficient lighting equipment with high efficiency lighting. Customers may receive a rebate equal to 1/3 of project cost (up to $10,000) for replacing old linear fluorescent fixtures with reduced wattage T8 fluorescent or LED fixtures. Other lighting retrofits may qualify for a rebate equivalent to projected first year energy saving.
- Commercial Custom Rebate (Non-Res Process): Provides incentives to commercial electric customers for replacing inefficient plant equipment with high efficiency equipment. Customers may receive a rebate equal to the projected first year energy savings.

Residential Programs

- Residential Green Partner Lighting Program (Res Lighting): Encourages customers to replace incandescent and halogen light bulbs with energy efficient lighting by distributing, mostly in person and for free, 5-types of LED's to customers who visit the TDPUD Conservation Department or at a local event. LED give-a-ways include up to 16 mix-n-match specialty LEDs.
- Residential Lighting Rebate (Res Lighting): Encourages customers to replace incandescent and halogen light bulbs with energy efficient lighting by providing incentives for Light Emitting Diode ($5 per LED Energy Star, $2 per LED non-Energy Star) screw-in or plug in lamps.
- Residential Energy Survey – RES (Res Lighting): Provides free residential energy surveys and free energy and water-saving measures including the installation of up to 16 energy efficient LED bulbs, and 2 low-flow shower heads at the time of survey. Customers are also informed about TDPUD conservation programs that they may benefit from and provided with associated literature.
- Residential Appliance Rebate (Appliance): Provides increasing incentives to customers to purchase more energy efficient appliances (clothes washers,

dishwashers, and refrigerators) as identified by Energy Star and the Consortium for Energy Efficiency (CEE). Rebates range from $75 to $125.

- Refrigerator Recycle (Res Refrigeration): Promotes the recycling of older, working refrigerators and freezers by providing customers with free pick-up and a $30 rebate.
- LED Holiday Light Program (Res Lighting): Provides a $5/$10 rebate for 100/300 LED light strands respectively.
- Energy Saving Program – ESP, Income-Qualified (Res Lighting): Provides a one-time bill credit and a free residential energy survey to income qualified customers. Customers are qualified by an intermediary agency and are eligible for a one-time credit equal to their highest energy charge in the past 12-months (not to exceed $200) upon completion of the required Residential Energy Survey (RES).
- Residential Building Efficiency Rebates (Res Shell): Provides an incentive of up to $75 each for building envelope and/or duct air leakage tests and up to $250 (50% of project cost) each for building envelope or duct leakage mitigation.
- Thermally Efficient Windows Rebate (Res Shell): Provides an incentive of $5 per square foot of window to replace qualifying single-pane windows. Primary heating source must be a permanent electric space heating system.
- Water-Efficient Toilet Rebate (Non-Res Process): Encourages customers to replace high-water use toilets with low water use toilets (1.28 and 1.6 GPF) by providing increasing incentives for more efficient toilets. Rebates range from $25 to $100.
- Water-Efficient Toilet Exchange (Non-Res Process): Encourages customers to replace high-water use toilets with low 1.28 GPF water use toilets by offering a free toilet exchange or the option to apply a credit towards the purchase of any toilet carried by the exchange vendor that meets the program rules. Toilet exchange is conducted during regular business hours at a local toilet vendor.
- Customer Leak Repair Rebate (Non-Res Process): Provides a $100 incentive to help customers locate and repair a water leak on their property. Requires the use of a licensed contractor for the repairs.
- HE Clothes Washer Water Rebate (Non-Res Process): Provides a $50 incentive to customers who purchase a qualifying high water efficiency clothes washer. This is in addition to any applicable energy rebate.
- Residential Green Partners Water Program (Non-Res Process): Distributes, in person and for free, a variety of water saving measures to customers. Give-a-ways range from low-flow shower heads to sink aerators to hose spray nozzles.
- Patricia S. Sutton Conservation Garden (Not Evaluated): Promotes water-efficient landscaping by demonstrating, at the TDPUD's headquarters, native and drought tolerant plants, hardscaping/mulching techniques, and efficient

irrigation. Plant lists, design, and materials used in the project are all available via a web-based resource at www.tdpud.org.

- School Conservation Education (Res Lighting): Promotes energy and water conservation through an innovative series of programs designed to both educate students and deliver, for free, energy and water savings measures. 2017 handouts included 2 free LED A19 bulbs for every elementary and middle school student in TDPUD's service territory.

Complementary Programs

- Low-Income Programs: The TDPUD's income-qualified program, Energy Saving Program (ESP), was also described in the Program Descriptions as the participation requires that customers also implement energy efficiency measures. ESP provides a one-time bill credit and a free residential energy survey to income qualified customers. Customers are qualified by an intermediary agency and are eligible for a one-time credit equal to their highest energy charge in the past 12-months (not to exceed $200) upon completion of the required Residential Energy Survey (RES). TDPUD's income-qualified program achieves a solid return on investment for both the customer and utility.
- Renewable Energy Programs: TDPUD has a successfully fully subscribed our SB1 Solar Rebate program for our customers. TDPUD also achieved an estimated 67% Renewable Portfolio Standard (RPS) in 2017 using the methodology defined by the California Energy Commission. This number would be higher if we considered carbon-free resources. TDPUD has been able to transition our energy resource portfolio from primarily fossil fuel based in 2008 to a diversified mix that includes wind, solar, landfill gas, and small hydro while maintaining stable and competitive rates.
- Research, Development, and Demonstration: It is not practical for a small utility like TDPUD to run direct RD&D programs. However, through the Northern California Power Agency, TDPUD does participate in the American Public Power Associations DEED R&D program, the FLEX lab project and TDPUD Staff does investigate new energy and water conservation products and programs. TDPUD is researching innovative ways to capture residential EV charging data other than cost-prohibitive electric utility meters.
- Electric Vehicles: TDPUD installed two Plug-In Electric Vehicle (PEV) public access charging stations locations in 2015. Each location is monetized and has two, Level 2 PEV charging stations and are open to the public. One location is in the Truckee Train Depot in historic downtown Truckee and the other is located in the Pioneer Commerce Center. TDPUD has partnered with the Tahoe Regional Planning Agency (TRPA) on a Truckee-Tahoe PEV Readiness Plan and TRPA received a $200,000 grant from the California Energy Commission (CEC). TDPUD also offers a rebate up to $500 off Residential charging stations.

- Energy Storage: TDPUD has not identified any cost-effective energy storage projects for our customers or for a utility with our demand profile and size.

Evaluation, Measurement & Verification Studies

TDPUD has been conducting EM&V on an annual basis since 2008 and plans to continue to do so. The budget for EM&V is ~$30,000 per year which is ~4% of program spending. TDPUD's EM&V reports can be found at http://www.tdpud.org/departments/conservation/em-v-and-reporting.

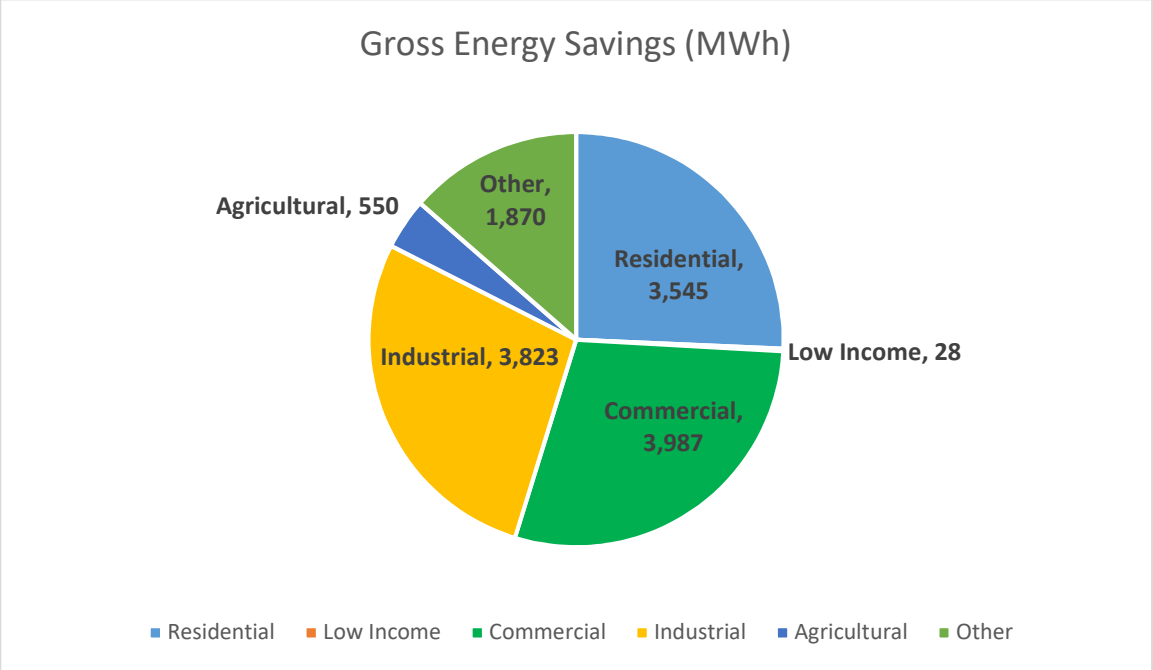
TRUCKEE DONNER PUBLIC UTILITY DISTRICT
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Residential Energy Survey/RES	0.0	703	7,733	0	471	5,181	2	79,616	0.01	0.01	19.381
Refrigerator Recycling Rebate	8	40,138	200,690	5	27,695	138,476	64	29,228	0.56	0.88	0.232
Toilet Rebate Program	-	3,778	37,780	-	3,249	32,491	14	19,706	0.29	0.51	0.748
He Clothes Washer Water Rebate	-	1,096	12,056	-	745	8,198	3	7,209	0.19	0.30	1.109
Commercial Lighting	12	61,552	430,864	11	57,243	400,704	168	22,827	1.58	3.52	0.066
Residential Green Partners (BIG6+)	4	42,540	638,100	2	28,502	427,527	175	102,769	0.42	0.56	0.331
ApplianceRebate	-	26,609	319,308	-	17,562	210,743	86	49,902	0.47	0.74	0.305
Residential Lighting Rebate & POS	1	21,741	326,115	1	14,566	218,497	90	7,052	3.16	4.33	0.044
Commercial Green Partners LED/CFL	1	4,449	62,286	1	2,091	29,274	11	13,404	0.18	0.21	0.617
Toilet Exchange Program	-	4,127	41,270	-	3,549	35,492	15	25,751	0.24	0.43	0.895
Customer Leak Repair Rebate	-	35,450	354,500	-	27,297	272,965	116	13,438	5.75	7.20	0.061
Building Efficiency Rebates	3	1,099	10,990	2	813	8,133	4	7,487	0.18	0.30	1.136
LED Holiday Light Swap	-	1,246	6,230	-	1,134	5,669	3	11,025	0.05	0.08	2.139
EE Measures Subtotal	28	244,528	2,447,922	22	184,918	1,793,350	751	389,414	0.61	0.89	0.273
Low-Income Programs	0.2	17,171	188,881	0.2	17,171	188,881	78	22,173	n/a	n/a	n/a
EE & LI Subtotal	28	261,699	2,636,803	22	202,089	1,982,231	828	411,587	0.61	0.89	0.273
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	28	261,699	2,636,803	22	202,089	1,982,231	828	411,587	0.61	0.89	0.273

TURLOCK

Turlock at a Glance

- Climate Zone(s): 12
- Customers: 102,950
- Total annual retail sales (MWh): 2,045,839
- Annual Retail Revenue: $284,330,879
- Annual energy efficiency expenditures for reporting year: $1,984,134
- Gross annual savings from reporting year portfolio (MWh): 13,802



Turlock Overview

TID continues to help customers achieve energy savings through the implementation and promotion of a variety of energy efficiency programs for all rate classes. Many programs provide rebate opportunities to encourage customers to conserve energy. A significant portion of the energy efficiency measures adopted by our customers were implemented by industrial and commercial segments. The majority of our savings are derived from LED lighting. However, TID provides a variety of options for businesses that are looking to make changes in their existing systems by making upgrades or retrofitting their existing facility. Rebates are available that address areas such as lighting, compressed air systems, refrigeration systems, motors, gaskets, chillers and many other systems components.

Major Program and Portfolio Changes

There were no major changes to our programs in 2018. However, we did increase our budget for our air conditioning rebates for our residential customers. Our customers appreciate this program and we were able to increase our savings with our HVAC rebate program.

Program and Portfolio Highlights

TID's behavioral modification program, home energy analysis, had the largest savings impact of our residential programs. The home energy analysis reports, graph how each household is performing compared to similar homes, which has helped our customers save over 16 million kWh's. Our customers are reacting to the home energy analysis by installing energy efficiency measures and implementing behavioral changes. In addition to the analysis reports, TID is pleased to provide our customers with a customized web portal. The web portal includes an interactive home energy audit tool and provides helpful energy saving tips.

Commercial, Industrial & Agricultural Programs

Commercial, Industrial and Agricultural Customer Programs

- Commercial LED rebate programs: TID offers our non-residential customers a lighting rebates that is paid based on kWh savings. Our non-residential LED rebate program is 53% of our overall savings.

Residential Programs

- Home energy analysis-Comprehensive: TID supplies our residential customers, a home energy analysis (HEA) report each month. The HEA provides the customer with information regarding their monthly usage compared to similar homes in our community or compared to their prior year(s) usage. In addition, a web portal gives our customers access to customize their home energy use, using the energy audit tool, and access to helpful energy saving tips.

Complementary Programs

ASSISTANCE PROGRAMS:

- TID CARES Program: An energy assistance program for qualified customers to receive a discount on their monthly energy bills. The CARES program reduces the monthly customer charge of $17 to $6, a savings $11, and provides a 15% discount on the first 800 kWh energy charges.
- Medical Rate Assistance: The District provides a 50% discount on the first 500-kWh energy charges for customers who use additional energy due to life-support equipment or a medical condition.
- Weatherization: TID has contracted with organizations within our community to provide weatherization services for families who meet the income qualification

guidelines. The program enables families to reduce their energy bills by making their homes more energy efficient.

TID RENEWABLE ENERGY PROGRAM HIGHLIGHTS:

- Tuolumne Wind Project: TID purchased a 136.6 megawatt wind facility in 2008
- Solar: TID offered solar rebates for residential customers that are interested.
- Solar: In 2009, TID installed a 70.7 kW array of photovoltaic panels atop the newly renovated parking structure.
- Small Hydroelectric: TID was the first in California to construct small-scale hydroelectric power plants using its own canal system and those of neighboring irrigation districts that were not in the retail electric business. Combined the eight plants constructed, beginning in the mid 1970's provide a total of 20 megawatts of electric power. TID also owns and operates a 5 megawatt hydroelectric power plant at La Grange Dam on the Tuolumne River.
- Geothermal: In 1984, TID acquired an interest in a geothermal power plant in the Geysers Steam Field located in California's Lake County. The project has a capacity of generating 6.8 megawatts.
- In November of 2015, TID executed a 20 year Purchase Power Agreement for the full output of a 54 MW solar facility. The facility started generating mid-2017.

Evaluation, Measurement & Verification Studies

TID is currently working on our 2018 EM&V.
Our 2014 & 2015 EM&V is available at: https://www.cmua.org/emv-reports

Major Differences or Diversions from CA POU TRM for Energy Savings

TID has primarily used the Technical Reference Manual to determine our savings. The majority of our commercial and industrial savings are driven by lighting projects. TID calculates the savings for each project, since our lighting rebate is paid by first year kWh savings. TID calculates the cost-effectiveness using levelized utility cost for each program and as an overall portfolio. In 2018, our portfolio utility cost was $.02/kWh.

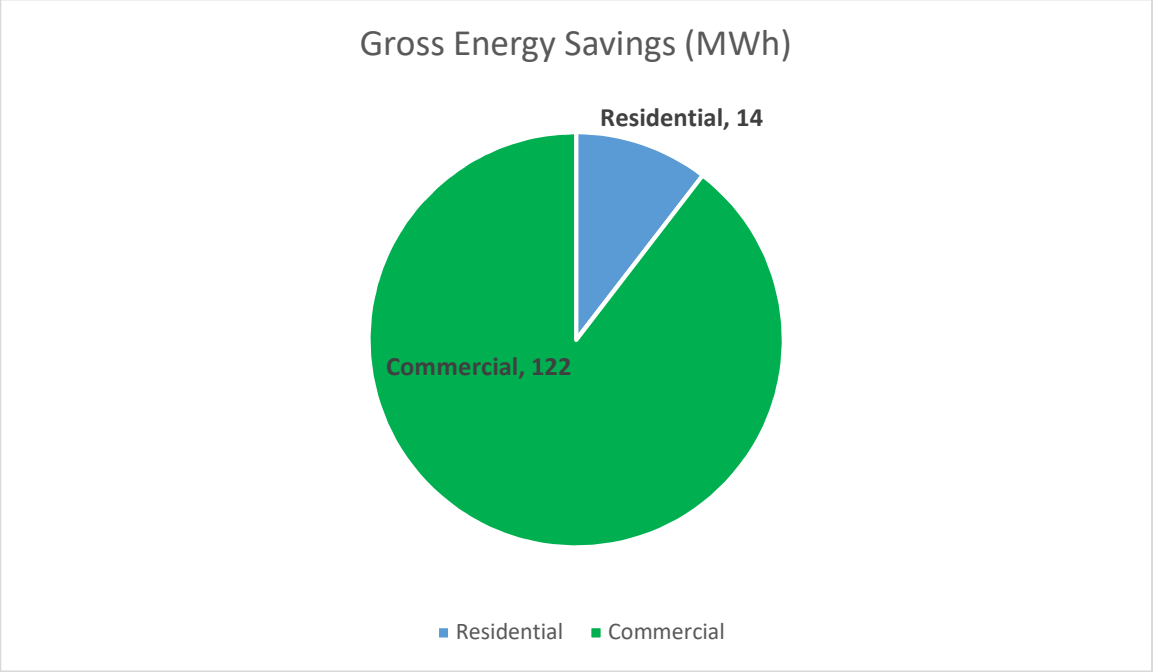
TURLOCK IRRIGATION DISTRICT
-- CY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Res - Refrigeration	-	35,640	392,040	-	11,048	121,532	51	5,050	2.93	1.43	0.051
Res - Heating	4	10,138	152,070	4	8,110	121,656	56	8,823	3.01	2.32	0.097
Res - Clothes Washer	-	36,990	406,890	-	11,467	126,136	52	5,241	2.93	1.43	0.051
Res-Behavioral Modification	-	3,301,046	3,301,046	-	3,301,046	3,301,046	1,644	242,022	1.77	1.77	0.073
Ind - Refrigeration	9	98,952	1,484,280	7	79,162	1,187,424	456	5,121	19.49	12.52	0.006
Res-Pool Pumps	3	66,726	667,260	2	40,036	400,356	169	21,119	2.15	0.41	0.064
Ind-Condensor	-	1,665	24,975	-	1,332	19,980	6	208	12.37	0.03	0.014
Non-Res Refrigeration	-	209,948	2,519,370	-	167,958	2,015,496	801	9,584	18.19	8.09	0.006
Res - Shell	10	29,545	584,300	3	8,273	163,604	73	4,990	8.00	3.56	0.045
Res - Cooling	31	46,991	688,249	24	36,223	536,907	246	145,439	0.80	0.52	0.361
Non-Res Lighting	2,624	9,850,935	147,764,025	2,624	9,850,935	147,764,025	55,277	1,401,896	9.17	2.83	0.013
Com-HVAC	7	46,288	694,320	5	37,030	555,456	211	5,272	14.34	0.13	0.013
Ind-Compressor	11	16,231	243,465	9	12,985	194,772	72	2,068	7.39	1.02	0.014
Com-Refrigeration	1	6,384	95,760	1	5,107	76,608	29	698	9.23	0.57	0.012
Res - Shade Tree	-	6,510	195,300	-	5,208	156,240	68	1,490	20.08	15.07	0.017
Res - Lighting	24	10,967	129,505	13	5,922	69,933	29	9,821	0.65	0.44	0.182
EE Measures Subtotal	2,724	13,774,955	159,342,854	2,691	13,581,842	156,811,171	59,241	1,868,842	7.47	2.37	0.016
Low-Income Programs	2	28,010	403,598	1	17,728	255,798	104	115,292	n/a	n/a	n/a
EE & LI Subtotal	2,726	13,802,965	159,746,452	2,691	13,599,570	157,066,969	59,345	1,984,134	7.47	2.37	0.016
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	2,726	13,802,965	159,746,452	2,691	13,599,570	157,066,969	59,345	1,984,134	7.47	2.37	0.016

UKIAH

Ukiah at a Glance

- Climate Zone(s): 3
- Customers: 8,101
- Total annual retail sales (MWh): 108,496
- Annual Retail Revenue: $14,314,330
- Annual energy efficiency expenditures for reporting year: $87,137
- Gross annual savings from reporting year portfolio (MWh): 136



Ukiah Overview

The City of Ukiah (the City) is committed to helping their customers manage energy use through energy education and a comprehensive menu of energy efficiency incentives. The City also provides funding to assist income-qualified customers.

In recent years, incentives were scaled back to reduce the rate at which PB funds were being utilized after the large PB balance being carried forward had been utilized. The reduced incentives slowed participation more than anticipated, resulting in a decrease in customer participation. The City has developed a strategy for marketing the programs to increase awareness and participation. Once implemented, the rebates levels will be assessed again and adjusted if necessary, to find the right rebate strategy that will utilize PB funds at the desired rate.

The City's customer base has not typically responded well to a "standard" energy efficiency incentive program. The main reason for this is many customers do not have the discretionary income to fund energy efficiency projects. Residential and commercial customers enthusiastically participate when the cost of their energy efficiency project is covered in full by the City's incentive programs. The City has responded by offering programs in the past to provide programs that deliver energy savings at no cost to residential and commercial customers.

There has also been an increased interest by developers to initiate new construction projects/developments to provide quality housing for the City's low-income and senior citizens.

Major Program and Portfolio Changes

There were no major program changes in FY18. The City is planning increased marketing of EE programs to encourage more customer participation. The City is also considering adjusting rebate caps and offering a Low-Income Direct Install program.

Program and Portfolio Highlights

The Commercial Lighting Program delivered the greatest percentage of savings in FY17-18, accounting for 86% of the total savings. The City has worked diligently over the years to build a network of lighting contractors and strived to keep them engaged in the program. By restructuring the incentives and caps, the result has reduced participation in the program by some contractors.

Commercial, Industrial & Agricultural Programs

The City provides comprehensive energy efficiency incentive program offerings for commercial and industrial customers focusing on energy efficiency and peak load reduction. Rebates are available for upgraded lighting, HVAC, appliances, refrigeration equipment, electronics, and in cases where an analysis is performed rebates can be offered for additional equipment that reduces energy use and/or demand. On-site energy audits are provided by energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request.

- Non-Res Lighting: The City offers rebates to business owners who invest in the installation of energy efficiency lighting upgrades. There is a prevalence of inefficient lighting throughout the city instead of more efficiency fluorescent or LED fixtures.
- Non-Res HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.
- Non-Res Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.

- Non-Res Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Non-Res Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Non-Res Custom: The City offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.

Residential Programs

The City provides comprehensive energy efficiency incentive program offerings for residential customers. Rebates are offered for the installation of various energy efficiency measures, such as lighting, HVAC, appliances, and weatherization. On-site energy audits are provided by energy specialists. Energy efficiency measures are recommended, and additional visits are completed upon request.

- Residential Lighting: The City offers rebates to homeowners who install ENERGY STAR® qualified LED lamps/bulbs, ceiling fans and LED holiday lights.
- Residential HVAC: The City offers rebates to homeowners who install high performance heat pumps and air-conditioners that exceed current state requirements. The City also offers a rebate for duct sealing when not required by code.
- Residential Equipment: The City offers rebates to homeowners who purchase new ENERGY STAR qualified products, including clothes washers, dishwashers, pool pumps, refrigerators and advanced power strips. Rebates are also available for refrigerator and freezer recycling.
- Residential Weatherization: The City offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments/replacement, solar attic fans, and air sealing.
- Residential Water Heater Rebate: The City offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

- Low-Income Programs: The City offers a low-income bill assistance program to eligible customers.
- Renewable Energy Program: The City offers assistance and net metering agreements to customers wishing to install Solar PV. The City also provides final performance inspections at no cost to the customer to ensure the solar PV system is performing properly.
- Electric Vehicles: In addition to the 8 Tesla Fast Charging stations, the Electric Utility is planning placement of Level II chargers at strategic locations throughout the City. The City has also received approval to offer a rebate for installation of a Level 2 EV charger in customer homes and up to $4,000 for public or workplace Level 2 chargers.

Evaluation, Measurement & Verification Studies

The City has received a proposal for partnering with a group of other NCPA utilities on an EM&V effort to gain economies of scale. The City plans to complete an EM&V project in FY19.

Major Differences or Diversions from CA POU TRM for Energy Savings

For FY17, the City has relied heavily on the savings listed in the Technical Resource Manual. The Commercial Lighting and Commercial Custom programs use custom savings calculations.

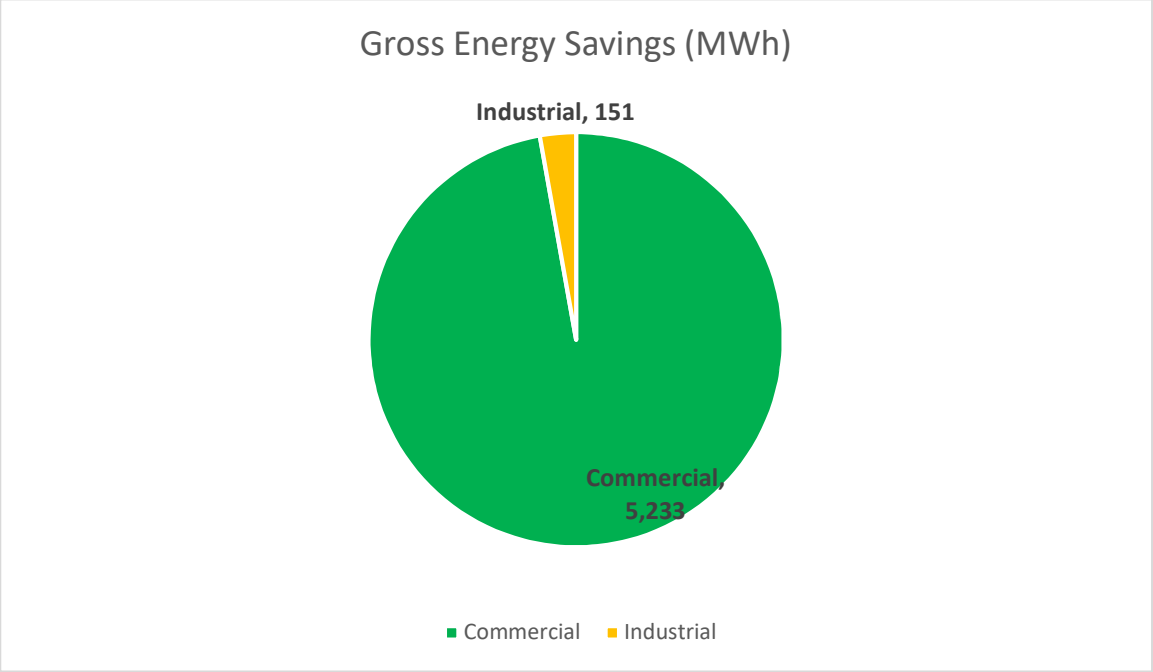
UKIAH ELECTRIC UTILITY
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
HVAC		2,612	39,182		2,090	31,346	15	9,368	1.06	0.96	0.399
Appliance	0	2,209	21,368	0	1,356	12,949	5	7,742	0.19	0.20	0.733
Commercial	16	121,594	1,470,642	12	96,149	1,163,574	500	44,030	2.46	1.23	0.048
Residential Lighting	0	1,068	16,020	0	577	8,651	4	3,469	0.24	0.21	0.536
Weatherization	1	8,132	162,638	1	2,518	50,363	24	21,883	1.10	0.99	0.639
Water Heating	0	165	1,650	0	99	990	0	645	0.14	0.14	0.788
EE Measures Subtotal	17	135,780	1,711,500	13	102,789	1,267,873	549	87,137	1.66	1.07	0.087
Low-Income Programs											
EE & LI Subtotal	17	135,780	1,711,500	13	102,789	1,267,873	549	87,137	1.66	1.07	0.087
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	17	135,780	1,711,500	13	102,789	1,267,873	549	87,137	1.66	1.07	0.087

VERNON

Vernon at a Glance

- Climate Zone(s): 9
- Customers: 1,916
- Total annual retail sales (MWh): 1,078,012
- Annual Retail Revenue: $157,923,292
- Annual energy efficiency expenditures for reporting year: $473,988
- Gross annual savings from reporting year portfolio (MWh): 5,384



Vernon Overview

The City of Vernon, in climate zone 8, finished conducting a comprehensive Integrated Resource Plan. The results of this study will guide the Utility's decision making in the procurement of resources and delivery of energy efficiency services. VPU has identified action plans to implement new energy efficiency measures throughout its city-owned facilities. VPU realized approximately 3 GWh of energy efficiency savings. VPU has a goal to double its energy efficiency from FY 17/18 and contribute toward the statewide goal of doubling energy efficiency. VPU also has a goal is to achieve 6 GWh, double the amount, by implementing the following energy efficiency action plans in cooperation with other City departments:

1) Continue existing energy efficiency programs and educate customers on more efficient uses of electricity;

2) Perform energy efficiency upgrades at all city-owned facilities as needed; and
3) Purchase energy efficient transformers, capacitors and other distribution equipment when appropriate.

Major Program and Portfolio Changes

Vernon Public Utilities has not made any a major changes in their programs but the 2017/18 fiscal year has pointed to the business community that energy saving can be achieved by looking into great detail to the operation process side of the their respectable businesses. The City of Vernon business community continues to explore smart efficient ways to be resourceful. By focusing on more projects like compressors, heat conversion, and refrigeration controls and not always relying on the lighting aspect of savings. As our customers get smarter and efficient to increase their bottom line, Vernon Public Utilities has been a key ally to assist in any way possible to be more efficient. The challenges for VPU is that our customer baseline is 99 percent commercial/industrial which limits the type measures/projects can be implemented each year without proper planning or funds being allocated for each project and/or budgeting for capital improvements. This creates a challenge to meet our projected goals every year.

Program and Portfolio Highlights

This year highlights have been spread out to the lighting sector. Since Vernon Public Utilities customer base is consist of a lot of long-standing buildings. We had wide range of small to large companies convert to LED's. Our lighting program was really popular this year and a lot of companies has benefited.

Commercial, Industrial & Agricultural Programs

- Customer Incentive Program: Fund the exploration and implementation of energy efficient technologies and equipment, such as lighting technologies, variable speed drives, air compressors, motors, refrigeration, and air conditioning. Provide cash incentives to businesses that install energy efficient technologies.
- Customer-Directed Program: Fund customized projects demonstrating energy and cost savings and/or commercial market potential in the area of energy efficiency. Customers must fund at least 25 percent of total project cost. Projects are only eligible if they do not qualify for any of the other programs.
- Energy Education & Demonstration Workshops: Provide customers with an array of information resources to encourage energy efficiency measures through energy efficiency workshops and other forms of customer outreach.
- Energy Audit Program: Provide on-site audits for commercial/industrial businesses. A comprehensive audit includes an analysis of energy usage and costs, identification of energy conservation measures, and recommended actions.

- Time of Use Rate Programs: All customers loads exceeding 100 kilowatts demand are eligible to receive time-of-use rate; enabling them to reduce their energy cost through time management of their energy usage.
- This year highlights have been spread out to the lighting sector. Since Vernon Public Utilities customer base is consist of a lot of long-standing buildings. We had wide range of small to large companies convert to LED's. Our lighting program was really popular this year and a lot of companies has benefited

Complementary Programs

Distributed Solar

VPU is in the process of designing a Green Power Program. The Program will allow Vernon residents and businesses to meet their own sustainability goals by purchasing clean and affordable renewable energy through this program. The Program enables customers to offset all or a portion of their electricity usage with either renewable energy or renewable energy credits. In addition to the Green Power Program VPU is investigating programs that will:

1) Install solar systems at city-owned facilities and partner with customers to install at their facilities;
2) Evaluate a community solar product offering; and
3) Assist customers with installation of rooftop solar systems under existing net-metering tariffs.

Transportation Electrification

VPU is working to incentivize transportation electrification through investments in electric vehicle charging infrastructure. The presence and convenience of EV charging stations will motivate public purchases of electric vehicles, having a direct impact on local air quality conditions. The City of Vernon lacks open space (parks, libraries etc.) requiring greater participation from Vernon businesses for siting and installation of EV charging stations. Load impacts from EVs are minimal today, by 2030 VPU intends to develop a plan to increase EVs to add 1.7 MW of load representing less than 0.5% of energy demand through cooperation with other City departments to:

1) Explore partnering with customers and car dealerships to install and maintain EV charging stations at customer facilities;
2) Evaluate increasing the number of City-owned electric vehicles; and
3) Coordinate with local air quality agencies on available programs and initiatives.

Demand Response and Energy Storage

Demand response is one of the ways customers can conserve energy by curtailing electricity usage when it is most needed by the electric grid. Demand response programs have proven to be an effective means for utilities to manage system peaks by controlling customer loads. By participating in demand response

programs, customers can help VPU achieve California GHG emissions reduction goals and delay infrastructure investments by the utility. Further, customers can be financially compensated for reducing usage when the price of energy is at its highest.

VPU has a reliability driven interruptible load program, but no DR customer programs based upon market pricing. Below is a list of demand response program and energy storage action plans VPU intends to evaluate and undertake in the coming years:

1) Implement a Voluntary Load Reduction Program offering discounted rates to customers that reduce their load;

2) Provide customer education on demand response programs available through the CAISO and encourage participation in these programs; and

3) Participate in strategic partnerships with customers to advance energy storage opportunities.

Evaluation, Measurement & Verification Studies

The City of Vernon continues to have numerous projects this past fiscal year which require an in depth analysis of the energy, measurement & verification of their projects to prove the validity of the energy savings. Since we have the distinctiveness of being a small commercial/industrial city, we can provide smart and efficient reports to our customers proving their worth.

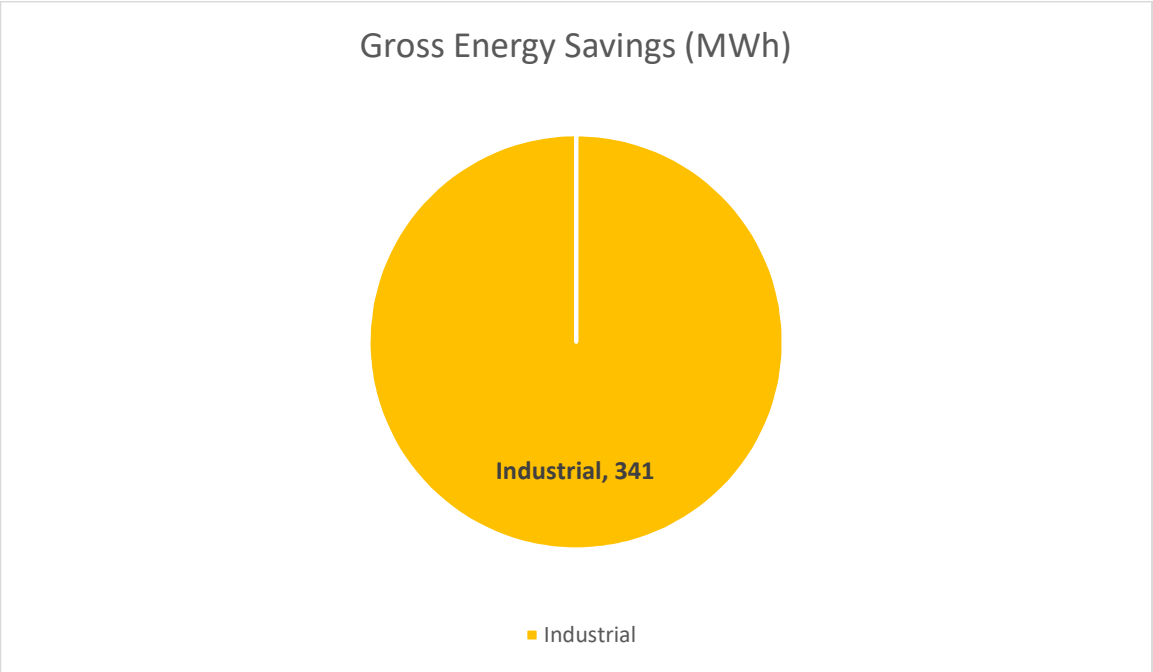
CITY OF VERNON PUBLIC UTILITES
-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Vernon Customer Incentive Program	948	5,383,804	66,720,063	948	5,383,804	66,720,063	25,093	473,988	12.57	10.89	0.009
EE Measures Subtotal	948	5,383,804	66,720,063	948	5,383,804	66,720,063	25,093	473,988	12.57	10.89	0.009
Low-Income Programs											
EE & LI Subtotal	948	5,383,804	66,720,063	948	5,383,804	66,720,063	25,093	473,988	12.57	10.89	0.009
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	948	5,383,804	66,720,063	948	5,383,804	66,720,063	25,093	473,988	12.57	10.89	0.009

VICTORVILLE

Victorville at a Glance

- Climate Zone(s): 14
- Customers: 68
- Total annual retail sales (MWh): 96,485
- Annual Retail Revenue: $12,143,300
- Annual energy efficiency expenditures for reporting year: $43,896
- Gross annual savings from reporting year portfolio (MWh): 341



Victorville Overview

Victorville Municipal Utility Services (VMUS) was established to provide safe, reliable and cost-effective service to non-residential customers that continue to build new facilities located in the designated service territory. The peak demand was 16.9 megawatts (1.8% more than last year) and the load factor was 70.4%. Customers reside in climate zone 14 and all customers' facilities are less than fifteen years old and met the applicable Title 24 requirements. The recent age of these facilities provide less energy efficiency upgrade opportunities. VMUS continued to offer customers the same energy efficiency programs.

Major Program and Portfolio Changes

VMUS continued to offer customers the same energy efficiency programs.

- Audits – Industrial – Non-Res Audits: On-site energy audits of customer facilities to develop recommendations designed to improve energy operating efficiency and reduce load requirements.
- Lighting – Industrial – Non-Res Lighting: Provides incentives to improve energy efficiency for lighting applications, based on rate of $0.064/kWh for one year of energy savings but shall not exceed 50 percent of the cost of the lighting product/equipment.
- HVAC – Industrial – Non-Res Cooling/Refrigeration: Financial incentives for the replacement of cost-effective energy-savings HVAC/Refrigeration units that reduces annual energy usage by at least 20 percent, based on rate of $0.064/kWh or $0.525/therm for one year of energy savings, and/or reduces peak demand and exceeds state-mandated codes, federal-mandated codes, industry-accepted performance standards or other baseline energy performance standards, based on rate of $100/kW for each on-peak kW that has been reduced, but shall not exceed 50 percent of the cost of associated equipment/materials.
- Refrigeration – Industrial – Non-Res Refrigeration: Financial incentives for the replacement of cost-effective energy-savings refrigeration units that reduces annual energy usage by at least 20 percent, based on rate of $0.064/kWh or $0.525/therm for one year of energy savings, and/or reduces peak demand and exceeds state-mandated codes, federal-mandated codes, industry-accepted performance standards or other baseline energy performance standards, based on rate of $100/kW for each on-peak kW that has been reduced, but shall not exceed 50 percent of the cost of associated equipment/materials.
- Process – Industrial – Non-Res Process: Financial incentives for the replacement of cost-effective energy-savings motors, pumps, and equipment that reduces annual energy usage by at least 20 percent, based on rate of $0.064/kWh or $0.525/therm for one year of energy savings, and/or reduces peak demand and exceeds state-mandated codes, federal-mandated codes, industry-accepted performance standards or other baseline energy performance standards, based on rate of $100/kW for each on-peak kW that has been reduced, but shall not exceed 50 percent of the cost of associated equipment/materials.
- Comprehensive - Industrial – Non-Res New Comprehensive: Reimbursement for new equipment in construction projects that exceed state-mandated codes, federal-mandated codes, industry-accepted performance standards, or other baseline energy performance standards by more than 10 percent. The program payment is based on 25 percent of the cost difference between standard and upgraded equipment and/or materials, or $50,000, whichever is less.

Program and Portfolio Highlights

- $25,000 in energy efficiency incentive payments was disbursed for industrial LED lighting installation.
- Time-of-use meters and customers' access to their daily usage on the web portal provide the data to assess the cost of their energy usage and demand requirements.
- Cost-effective, reliable, and feasible energy efficiency improvements are a priority in the VMUS' integrated resource plan.
- VMUS serves municipal facilities that can be interrupted as scheduled.
- Customers are served through 12 kV underground facilities with larger gauge ASCR conductors to improve system reliability and reduce system losses.
- VMUS evaluates circuit load performance to optimize performance and reduce system losses.
- VMUS purchases and installs energy efficient transformers to reduce system losses.

Commercial, Industrial & Agricultural Programs

VMUS continued to offer customers the same energy efficiency programs.

Complementary Programs

Energy Storage: VMUS' energy storage goal is to procure cost-effective energy storage applications equal to one percent (1%) of its peak load during calendar year 2020, with installations occurring no later than the end of calendar years 2021. No specific cost-effective energy storage application has been identified to date.

Evaluation, Measurement & Verification Studies

Engineering analysis programs are the basis for energy savings and incentive calculations.

VICTORVILLE ELECTRIC UTILITY

-- FY2018 Energy Efficiency Program Summary --

Program	Gross Coincident Peak Savings (kW)	Gross Annual Energy Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Coincident Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost ($)	PAC	TRC	Utility ($/kWh)
Industrial Lighting	110	340,831	5,112,465	88	272,665	4,089,972	1,516	43,896	7.58	1.61	0.015
EE Measures Subtotal	110	340,831	5,112,465	88	272,665	4,089,972	1,516	43,896	7.58	1.61	0.015
Low-Income Programs											
EE & LI Subtotal	110	340,831	5,112,465	88	272,665	4,089,972	1,516	43,896	7.58	1.61	0.015
T&D											
Codes & Standards											
Other Subtotal	-	-	-	-	-	-	-	-	-	-	-
Total	110	340,831	5,112,465	88	272,665	4,089,972	1,516	43,896	7.58	1.61	0.015

ESP®

APPENDIX B

Energy Platforms, LLC

Calculation Reference

Lori Bovitz

Last Updated: 4-26-2019

Version: 1.0

COST BENEFIT CALCULATIONS

The Cost/Benefit calculations in ESP are based on the Cost/Benefit tests described in the California Standard Practice Manual. ESP calculates all the tests described in that manual. The following describes process used to calculate these and the other results in ESP.

Load Shape Assignment

The default Load Shape for a Measure is determined using a process that involves multiple fields in the Measure:

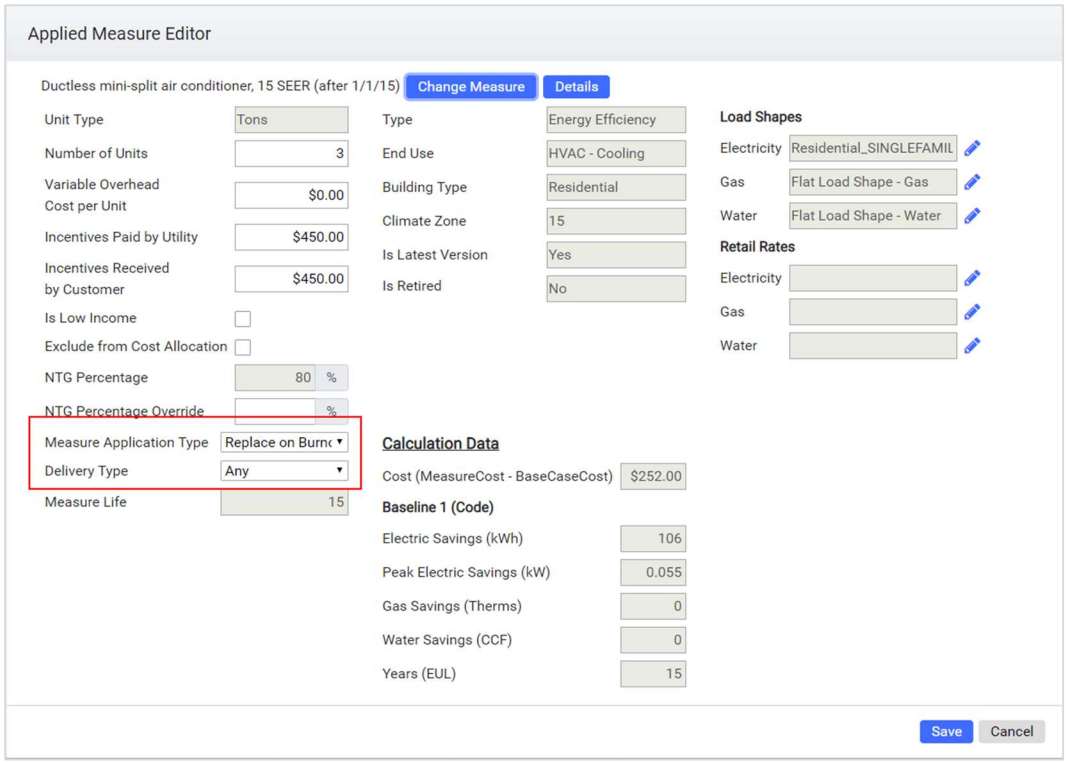
- Current version of the Load Shape
- Load Shape is either local to the organization or "Shared"
- The following attributes of the Load Shape match the same attribute of the Measure:
    - Climate Zone, or "All"
    - Building Type, or "All"
    - End Use
    - Sector, or "All"
- If an IOU is defined for the Load Shape, then the IOU for the Load Shape must match the IOU for the organization
    - If no IOU is defined for the Load Shape, the Load Shape is available to all Measures

If more than one Load Shape matches the above criteria, ESP uses the following additional process to determine the Load Shape for the Measure:

- ESP gives precedence to the following:
    - Load Shapes local to your organization (as opposed to shared Load Shapes)
    - Specific Building Type over "All"
    - Specific Sector over "Non-Residential" or "All"
    - Specific Climate Zone over "All"

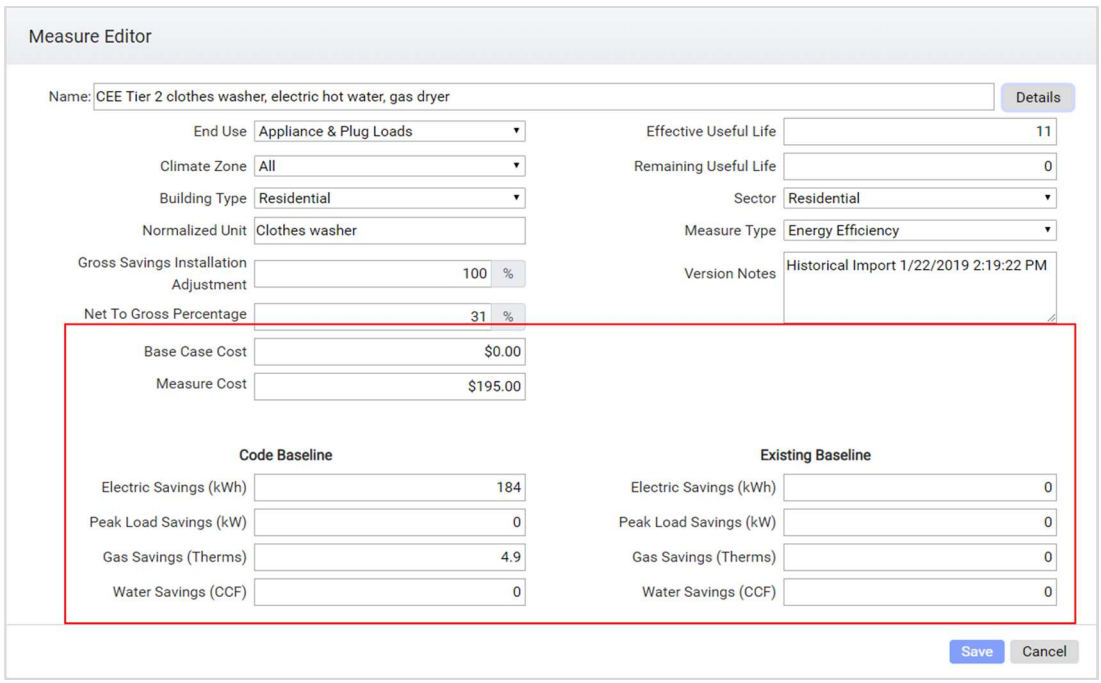
Dual Baseline Savings, Cost, and Measure Life

The calculations for Gross Savings, Cost, and Measure Life in ESP depend on the selection of Measure Application Type and Delivery Type in the Applied Measure Editor.



> *Note: You must enter non-zero savings values in both Code Baseline and Existing Baseline for the Measure to support calculations that require Dual Baseline.*

Each Measure contains the following fields used to calculate the Baseline values:



ESP calculates the actual 1st and 2nd Baseline values used in the calculations from these fields. The derivation of 1st and 2nd Baseline values depends on the Delivery Type and Measure Application Type selected in the Applied Measure.

Each Delivery Type selected in the Applied Measure belongs to either Group 1 or Group 2:

ESP Name	eTRM Name	Group
Upstream Prescriptive Rebate	PreRebUp	Group 1
Downstream Prescriptive Rebate	PreRebDown	Group 1
Non-upstream	NonUpStrm	Group 1
Building Design Incentive	BldgDesInc	Group 1
Custom Incentive	CustIncent	Group 1
Downstream Custom Incentive	CustIncentDown	Group 1
On-line Audit	OnLineAudit	Group 1
On-site Audit	OnSiteAudit	Group 1
Prescriptive Rebate	PreReb	Group 1
Any	Any	Group 1
Direct Install	DirInstall	Group 2
Direct Install Prescriptive Rebate	PreRebDI	Group 2

Based on the following Delivery Type "Group" and the selected Measure Application Type, the following describes the first and second baseline savings, cost, and years for single and dual baseline.

Delivery Type	Measure Application Type	1st Baseline	2nd Baseline	1st Baseline Costs	2nd Baseline Costs	1st Baseline Years	2nd Baseline Years
Group 1	Early retirement	Existing	Code	MC	MC – BC	RUL	EUL – RUL
	Replace on Burnout	Code	n/a	MC – BC	n/a	EUL	n/a
	New Construction	Code	n/a	MC – BC	n/a	EUL	n/a
	Retro-Commissioning	Existing	n/a	MC	n/a	EUL	n/a
	Retrofit	Existing	Code	MC	MC – BC	RUL	EUL – RUL
	Retrofit Add-on	Existing	n/a	MC	n/a	EUL	n/a
Group 2	Early retirement	Existing	Code	MC	MC – BC	RUL	EUL – RUL
	Replace on Burnout	Existing	n/a	MC	n/a	EUL	n/a
	New Construction	Existing	n/a	MC	n/a	EUL	n/a

Delivery Type	Measure Application Type	1st Baseline	2nd Baseline	1st Baseline Costs	2nd Baseline Costs	1st Baseline Years	2nd Baseline Years
	Retro-Commissioning	Existing	n/a	MC	n/a	EUL	n/a
	Retrofit	Existing	Code	MC	MC – BC	RUL	EUL – RUL
	Retrofit Add-on	Existing	n/a	MC	n/a	EUL	n/a

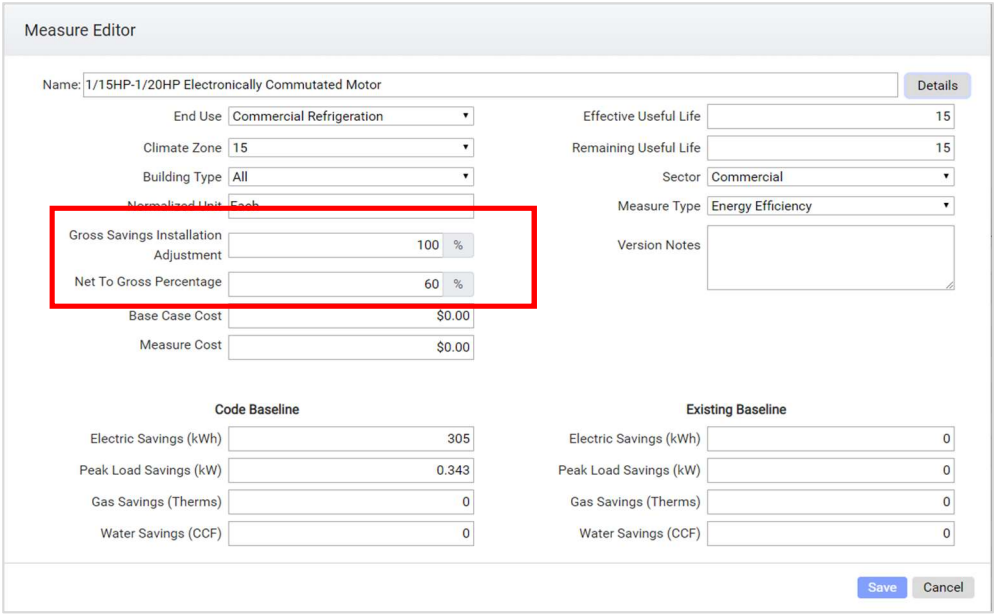
MC = Measure Costs
BC = Base Costs
RUL = Remaining Useful Life (years)
EUL = Estimated Useful Life (years)

If the Measure is dual Baseline, the cost/benefit calculation engine uses the first Baseline savings and costs for the first years of the Measure life, and the second Baseline savings and costs for the remaining years.

Gross Savings, Adjusted Gross Savings, and Net Savings

ESP calculates 1st and 2nd Baseline Gross Savings values based on the Measure Application Type and Delivery Type (see table above).

Fields are available for the Measure for Gross Savings Installation Adjustment (GSIA) and Net to Gross Percentage in the Measure Editor.



GSIA is a factor typically used to account for the following impacts:

- In-Service Rate – number of actual units installed
- Realization Rate – differences between actual and Measure savings based on impact evaluation studies

Adjusted Gross Savings

The value for Adjusted Gross Savings is determined by the following formula:

Adjusted Gross Savings = Gross Savings * GSIA

The cost/benefit calculations use Adjusted Gross Savings to derive participant avoided costs.

Net Savings

The value for Net Savings is determined by the following formula:

Net Savings = Adjusted Gross Savings * Net to Gross Percentage

The cost/benefit calculations use Net Savings to derive utility avoided costs.

Annual Data Calculations

Cost/benefit calculations for full calendar years and are in U.S. dollars. For each hour of each year for the lifetime of the measure, ESP calculations the savings benefit using the following formulas.

Adjusted Gross Savings Benefit

1. Multiply annual Adjusted Gross Savings (unit = kWh, kW, etc.) by the Load Shape value which results in the Adjusted Gross savings for the hour.

Annual Savings (unit) * 8760 Fraction (unit) = Hourly Savings (unit)

2. Multiply the hourly Adjusted Gross Savings by the hourly Retail Rate to get the Adjusted Gross hourly benefit.

Hourly Savings (unit) * Retail Rate ($/unit) = Hourly Benefits ($)

3. Add up the Adjusted Gross hourly benefits for a year to get annual Adjusted Gross Benefit ($).

Net Savings Benefit

1. Multiply the annual Net savings by the Load Shape hourly value, which results in the Net savings for that hour.

Annual Savings (unit) * 8760 Fraction (unit) = Hourly Savings (unit)

2. Multiply the hourly Net savings by the hourly Avoided Cost rate to get the Net hourly benefit ($).

Hourly Savings(unit) * Avoided Cost Rate($/unit) = Hourly Benefit ($)

ESP treats each type of savings this way; Adjusted Gross Savings, Net Savings, Gas Savings, and Water Savings to get annual dollar benefit values.
Cost values in ESP are already annual dollar values and thus do not require 8760 hourly data or a rate for conversion.

In ESP, Retail Rate and Avoided Cost Rates in ESP are multi-year hourly values. As a result, each year of the calculation uses different hourly values throughout the measure lifetime.

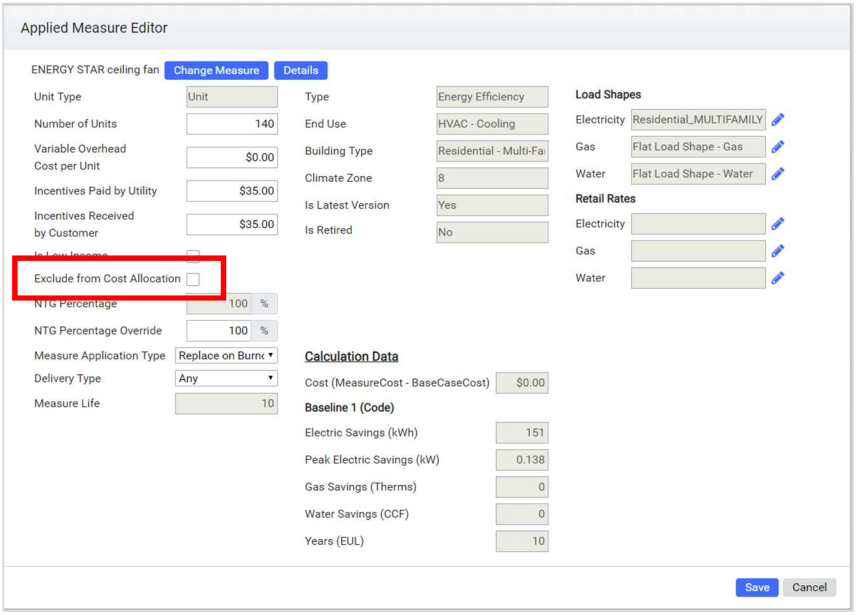
In ESP, each Load Shape resource contains one year of hourly data. As a result, each year of the calculation uses the same values for each year in the Measure lifetime.

Cost Allocation

ESP allocates Portfolio and Program costs down to the Applied Measure level according to the following rules. This allows the grouping of Applied Measures and their associated cost/benefit values in different ways for analysis.

- Allocates Portfolio overhead costs to each Applied Measure in the Portfolio in proportion to the Net Savings of the measure.
- Allocates Program overhead costs to each Applied Measure in the Program in proportion to the Net Savings of each measure.
- Allocates Sector overhead costs to each Applied Measure according to the Measure Sector setting, in proportion to the Net Savings of each measure.

Applied Measures have a checkbox setting that prevents the allocation of any overhead costs to that Applied Measure.

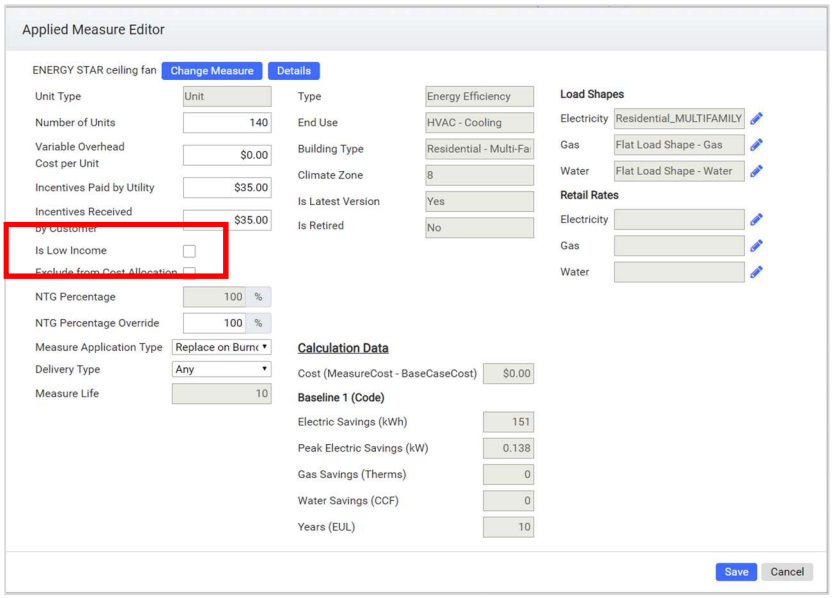


Cost Benefit calculations will not run if it cannot allocate a cost to any Applied Measures. For example, if you enter a cost in the Sector Overhead Residential field, but there are no Residential Measures to allocate the overhead costs, the cost benefit calculation will not run. This also applies to Portfolio Overhead and Program Overhead costs.

Costs are applied to Low Income Applied Measures just like any other Applied Measure even though they are presented separately from the main Portfolio in the results.

Low-Income

Low income Applied Measures results are separate from the main Portfolio results. So are Transmission & Distribution and Codes & Standards Applied Measures. There is a setting in the Applied Measure, "Is Low Income." Select that option to consider that Applied Measure as Low Income, even if its underlying Measure is not of type Low Income.



Cost Benefit Calculations

ESP supports the following cost/benefit tests:

- Participant Test
- Ratepayer Impact Measure Test (RIM)
- Total Resource Cost Test (TRC)
- Societal Test
- Program Administrator Cost Test (PA)

ESP calculates the cost/benefit tests using elements that correspond to the specific costs and benefits in each of the tests. Each Element has an Element Type that describes it in the context of the California Standard Practice Manual.

Element Type	General	Participant	TRC	Societal	RIM	PA
AB_AvoidedBillAlternative		Benefit				
SAB_SocietalAddedBenefit				Benefit		
BI_BillIncreases		Cost				
BR_BillReductions		Benefit				
INC_Incentives		Benefit			Cost	Cost
PACa_ParticipantAvoidedCostsAlternative		Benefit	Benefit	Benefit		
PC_ParticipantCosts		Cost				
PCN_NetParticipantCosts			Cost	Cost		
PRC_ProgramAdministratorCosts			Cost	Cost	Cost	Cost
RG_RevenueGain					Benefit	
RL_RevenueLoss					Cost	
RLa_RevenuLossAlternative					Cost	

Element Type	General	Participant	TRC	Societal	RIM	PA
TC_TaxCredits		Benefit	Benefit	Benefit		
UAC_UtilityAvoidedCosts			Benefit	Benefit	Benefit	Benefit
UACa_UtilityAvoidedCostsAlternative			Benefit	Benefit	Benefit	
UIC_UtilityIncreasedSupplyCosts			Cost	Cost	Cost	Cost
BEN_Benefit	Benefit					
COS_Cost	Cost					

Net Present Value Calculations

Formulas in the California Standard Practice Manual use a divisor of $(1+d)^{t-1}$, which equals 1 in the first year. In other words, the application of the discount rate should not happen in the first year. This is the implementation of the calculation in ESP.

Important Note: Many spreadsheet cost benefit calculations, including the original CMUA CET, use the Excel NPV function to calculate net present values. The NPV function in Microsoft Excel assumes that payments occur at the end of the term, which means the application of the discount rate is to first year costs and benefits. This approach is technically incorrect.