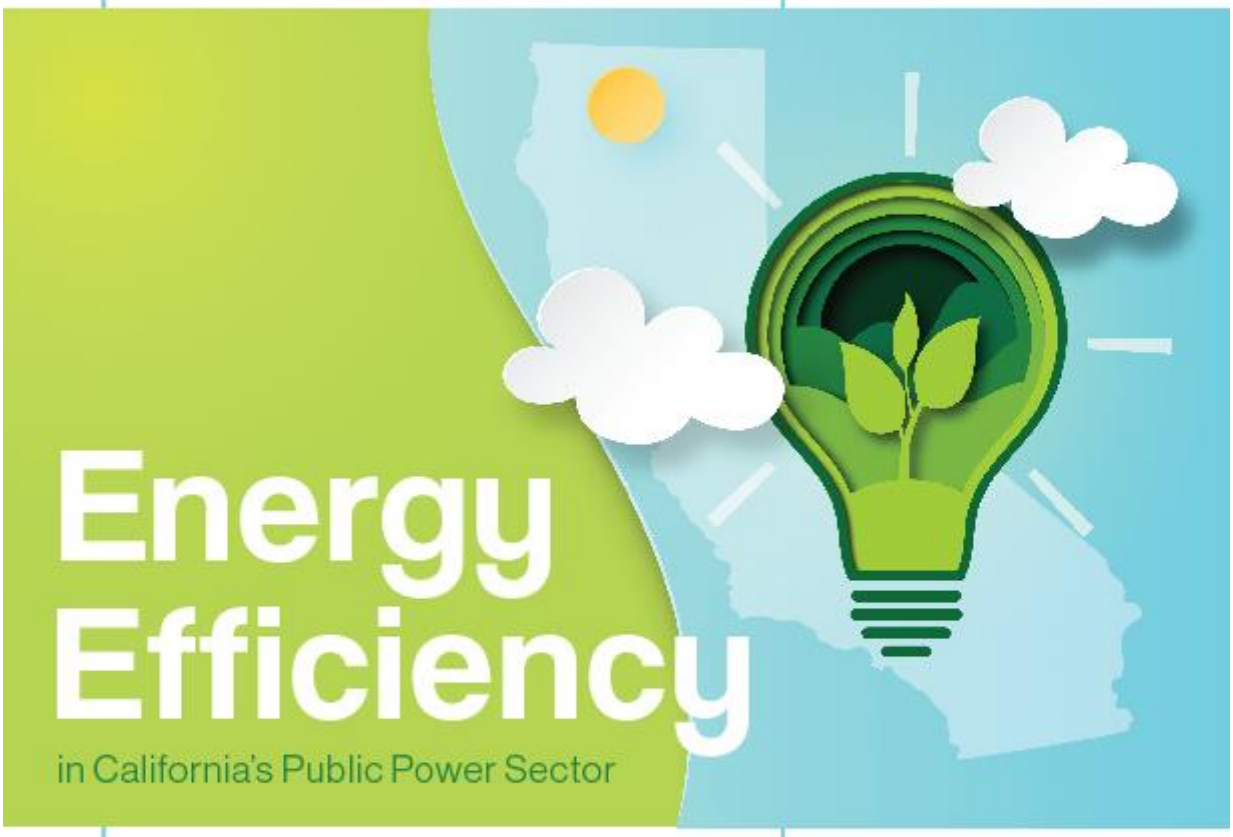

Energy Efficiency

in California's Public Power Sector

14th Edition — 2020

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EXECUTIVE SUMMARY

California's publicly owned utilities (POUs) continue to collaborate to develop cost-effective energy efficiency programs and report annual results to their customers and the California Energy Commission (Energy Commission) in a consistent and comprehensive manner. This 14th report presents the latest results from POUs' wide range of energy efficiency programs.

During the Fiscal Year (FY) 2019 reporting cycle, POUs expended **$261 million** on energy efficiency programs for their communities, including low-income customers, resulting in **646 Gigawatt hours (GWh)** of net annual energy savings and reducing peak demand by **147 Megawatts (MW)**. Since the enactment of Senate Bill (SB) 1037 (Kehoe, 2005), public power has spent nearly **$2.1 billion** on energy efficiency and demand reduction, achieving over **89,162 GWh** in net lifecycle energy savings and avoiding the need for **1,390 MW** of new peak load generation resources.

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.

INTRODUCTION

Pursuant to the Public Utilities Code, each year POUs are required to report the following information to customers and the 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 California Public Utilities Code.

The state's POUs supply approximately 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] California Public Utilities Code (Cal. Pub. Util. Code) § 9505

PROGRAM RESULTS

This section provides an overview of the energy efficiency program results for public power in California during FY 2019. 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 2019 are equal to that of Calendar Year 2019.[2]

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

In summary, during the 2019 reporting cycle, POUs collectively spent **$261** million on energy efficiency programs, resulting in **646 GWh** of net annual energy savings, with **7,312 GWh** of net lifecycle energy savings and reduced peak demand by **147 MW**. **Table 1** presents a summary POUs' historic energy efficiency 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	568,980	6,414,228	$169,940,735
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
FY18-19	147,405	646,281	7,312,304	$260,675,319
Total	**1,389,555**	**7,545,544**	**89,162,191**	**$2,078,208,855**

Since 2006, public power has collectively spent **$2.1 billion** on energy efficiency programs, resulting in **89,162 GWh** in net lifecycle energy savings – and avoided the development of **1,390 MW** of generation resources to serve peak demand during that time.

[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.

POUs continue to support the statewide goal of doubling energy efficiency by 2030 under the Energy Commission's direction. Using the Energy Commission's methodology to determine cumulative energy savings, POUs' cumulative first year savings from FY 2015 through FY 2019 equals **3,563 GWh,** as presented in **Table 2,** below. These cumulative savings are approximately **618 GWh** above the target cumulative goals for California POUs, as presented in Table A11 of the 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. California POU Cumulative 1st Year Energy Savings Comparison

1st Year Savings (GWh) per Installation Year					Cumulative Savings	CEC Cumulative Savings Target
2015	2016	2017	2018	2019		
644.7	771.6	861.9	638.7	646.3	3,563.2	2,945

The Energy Commission methodology used to calculate "cumulative" savings shown in Table 2 only combines the "first year savings" from each of the POUs' portfolios in the respective reporting years to calculate "cumulative savings". POUs are concerned that this calculation does not account for any expected useful life of the efficiency measures in the portfolios or savings persistence from behavioral changes after an efficiency improvement has been made.

Therefore, in addition to the representation of POUs' cumulative savings in Table 2, POUs have also calculated alternative representations of the cumulative energy savings from their combined portfolios that potentially better reflect the true cumulative impact of energy efficiency savings on the electric grid. This has been done to begin an important discussion on POUs' and the Energy Commission's ability to assess and value energy savings from energy efficiency programs on an equivalent basis.

Table 3, shown below, represents the cumulative savings as the Lifecycle Savings from all the measures energy efficiency installed each year in the POUs' energy efficiency portfolios.

TABLE 3. California POU Cumulative Lifecycle Savings Comparison

Lifecycle Savings (GWh) per Installation Year					Cumulative Savings
2015	2016	2017	2018	2019	
7,836.6	10,253.6	11,991.6	8,267.5	7,312.3	45,661.6

Table 3 data truly accounts for the savings achieved by all measures over their expected useful life. However, at this time there is no degradation factor included in the modeling to reflect

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

potential loss of use, nor is there any measure or estimation of customers' behavioral changes to gauge a level of persistence in use of efficient measures – rather than revert to less efficient equipment upon burnout or end of the efficient measure's life. Regardless, Lifecycle savings, as calculated today, may be a better representation of cumulative savings than 1st year, Annual Savings.

Table 4 shows the cumulative energy savings from all the measures that are in effect or active in each of the years depicted, including current and historical measures. Whereby, when a measure's life ends, the savings for that measure are not counted any more. There is strong potential that this representation is the closest to the definition of cumulative savings. However, the primary drawback to this method when considering a single point forecast, such as "cumulative savings in 2030", is that a utility receives no "credit" for any energy savings achieved from measures installed between 2015 and 2029 whose expected useful life has expired. That is, a measure, no matter when installed, would have to be active in 2030 to count towards the cumulative doubling of efficiency savings goal.

TABLE 4. California POU Cumulative Active Measure Energy Savings Comparison

Cumulative Savings (GWh) per Installation Year					Cumulative Savings
2015	2016	2017	2018	2019	
1,172.0	1,645.7	2,225.1	2,774.9	3,289.0	11,106.7

Table 5 below provides a comprehensive summary of the energy efficiency savings for all POUs' respective energy efficiency Portfolios in FY 2019. The 16 largest utilities subject to Integrated Resource Plan (IRP) requirements account for the majority of savings within the public power community. 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 2019 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.

TABLE 5. Energy Efficiency Program Results by Utility

Summary by Utility	Resource Savings Summary								Cost Test Results		
Utility	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)
Alameda	226	2,481,533	35,159,147	207	2,311,731	32,871,259	12,555	$1,461,704	2.02	1.49	0.059
Anaheim	5,884	26,739,840	316,799,334	5,884	26,739,840	316,799,334	117,005	$6,676,840	4.61	10.26	0.027
Azusa	922	5,477,787	69,739,443	855	4,935,869	62,423,242	21,941	$863,622	6.87	24.05	0.018
Banning	1,922	260,699	3,156,438	1,547	217,485	2,633,665	1,030	$207,328	1.64	1.95	0.101
Biggs	-	24,444	122,220	-	22,000	109,998	56	$11,488	0.88	0.88	0.114
Burbank	3,097	10,757,180	103,901,935	2,833	10,514,274	99,344,763	37,067	$3,257,708	3.25	1.60	0.041
Colton	696	2,124,058	23,828,737	653	2,043,216	22,981,330	9,344	$1,430,391	1.67	0.87	0.079
Glendale	1,584	12,644,267	73,910,052	1,560	12,584,914	72,894,599	27,843	$2,321,018	3.13	3.08	0.039
Gridley	12	159,854	1,919,501	9	127,844	1,535,056	672	$115,384	1.24	1.19	0.095
Healdsburg	38	210,071	2,463,352	30	170,203	1,990,576	769	$123,118	1.50	1.23	0.078
Imperial	6,728	14,743,378	277,111,997	6,023	12,835,473	241,794,529	106,949	$7,093,943	4.05	8.13	0.044
Lassen	101	392,047	3,967,546	83	322,037	3,224,156	1,264	$112,741	2.72	1.31	0.043
Lodi	208	922,596	11,508,114	142	694,922	8,275,484	3,337	$417,854	2.29	1.07	0.064
Lompoc	50	466,646	5,546,509	40	371,920	4,425,877	1,580	$113,781	3.38	3.45	0.032
Los Angeles	89,467	353,242,115	3,866,799,794	89,467	353,242,115	3,866,799,794	233,760	$169,906,198	1.10	0.75	0.055
Merced	0	2,224,945	22,278,524	0	1,775,764	17,770,933	6,945	$1,717,991	0.94	0.61	0.119
Modesto	1,652	7,464,094	88,629,472	1,470	6,659,006	78,867,354	30,360	$2,399,593	3.27	1.16	0.038
Moreno Valley	654	8,049,680	80,603,429	588	7,236,943	72,428,867	28,059	$639,782	11.77	11.95	0.011
Needles	1	4,973	70,908	1	4,243	62,209	24	$152,534	0.04	0.89	3.354
Palo Alto	1,042	8,234,557	113,440,176	569	4,914,713	64,057,769	27,648	$1,699,867	3.00	1.18	0.033
Pasadena	1,862	16,366,460	100,000,842	1,840	16,297,384	99,266,851	37,807	$3,974,193	2.82	2.82	0.048
Pittsburg	52	225,342	2,253,420	52	225,342	2,253,420	857	$35,850	5.40	32.89	0.019
Plumas-Sierra	41	67,645	1,298,668	33	52,663	1,021,103	458	$146,111	1.05	0.62	0.209
Port of Oakland	4	12,493	149,920	3	9,995	119,936	58	$13,494	0.93	0.61	0.142
Rancho Cucamonga	236	660,603	10,569,654	236	660,603	10,569,654	3,650	$111,748	8.67	30.29	0.015
Redding	960	5,760,640	47,056,405	727	4,570,641	36,363,646	16,817	$2,550,041	1.79	1.22	0.087
Riverside	3,568	26,684,769	378,823,563	2,956	24,940,324	336,517,635	132,677	$6,658,541	6.04	10.26	0.027
Roseville	1,369	15,356,645	73,703,815	1,198	11,274,861	60,284,350	25,880	$4,450,327	0.83	1.09	0.090
Sacramento	29,130	114,947,870	1,394,160,395	21,319	91,848,217	1,125,864,410	80,552	$29,865,267	0.30	0.22	0.035
San Francisco	606	1,911,210	28,668,150	606	1,911,210	28,668,150	10,542	$2,185,767	1.30	1.13	0.102
Shasta Lake	274	1,509,123	17,862,453	209	1,205,981	14,113,474	5,361	$382,154	3.58	3.00	0.034
Silicon Valley Power	3,086	31,639,268	426,424,499	2,401	25,396,178	348,839,188	123,887	$5,725,867	5.83	3.00	0.022
Trinity	7	4,036	50,520	6	2,828	36,408	17	$2,068	2.61	0.28	0.073
Truckee Donner	183	848,787	10,524,355	156	669,917	8,834,824	3,377	$625,710	1.64	2.82	0.096
Turlock	2,035	11,513,125	171,908,098	1,991	11,318,254	169,158,677	64,520	$1,999,449	8.39	2.29	0.016
Ukiah	39	614,742	7,418,197	31	490,012	5,902,671	2,673	$318,482	1.82	1.84	0.068
Vernon	1,669	7,653,962	92,782,191	1,669	7,653,962	92,782,191	33,500	$866,488	9.81	7.77	0.012
Victorville	9	32,658	489,870	8	27,759	416,390	154	$37,840	0.94	6.24	0.125
EE and Low Income Programs Total	**159,418**	**692,434,142**	**7,865,101,645**	**147,405**	**646,280,644**	**7,312,303,775**	**1,210,995**	**$260,675,319**	**1.67**	**1.19**	**0.045**

Table 6 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 (**56%**) of the gross annual energy efficiency program savings.

TABLE 6. Energy Efficiency Program Results by End-Use Category

Summary by End-Use	Resource Savings Summary								Cost Test Results		
End-Use	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	1,821	26,610,974	332,889,085	1,613	24,473,378	302,225,748	111,506	5,736,153	4.88	3.62	0.024
Appliance & Plug Loads	5,488	23,417,836	201,211,094	4,750	18,621,034	172,528,018	18,009	$10,792,625	0.70	0.51	0.077
BROs	-	-	-	-	-	-	-	-	0.00	0.00	0.000
Building Envelope	13,219	14,836,893	195,438,413	12,658	13,652,506	174,472,308	38,620	$7,452,458	1.96	0.84	0.055
Codes & Standards	3,920	9,000,000	18,000,000	3,136	7,200,000	14,400,000	1,317	59,595	1.93	1.93	0.004
Commercial Refrigeration	906	4,136,882	59,438,602	695	3,364,176	47,658,433	10,422	$1,101,229	2.20	1.72	0.031
Food Service	1,050	11,129,754	112,346,462	1,046	11,102,586	112,030,310	7,665	1,106,605	5.05	5.95	0.012
HVAC - Cooling	47,373	107,388,794	1,710,647,254	43,742	96,298,365	1,534,146,710	292,960	$55,552,888	2.01	1.25	0.050
HVAC - Heat Pump	423	2,308,364	23,668,970	396	1,609,757	16,677,647	3,075	1,882,843	0.42	0.65	0.138
HVAC - Heating	35	53,062	1,094,184	28	41,072	854,468	1,926	$175,178	1.63	1.14	0.264
Lighting - Indoor	58,905	327,509,461	3,505,922,283	55,767	311,600,696	3,308,154,695	445,396	117,365,853	1.50	1.08	0.044
Lighting - Outdoor	5,939	44,819,967	544,489,885	5,377	42,880,576	511,225,603	137,980	$20,481,227	1.82	1.78	0.052
Miscellaneous	3,511	33,046,936	84,585,429	1,759	29,366,172	71,117,081	28,149	4,547,271	1.35	1.18	0.072
Process	2,051	11,451,049	102,891,162	1,982	10,926,555	97,311,290	27,688	$1,593,025	5.44	1.51	0.020
Service & Domestic Hot Water	4	27,038	311,090	3	21,934	258,392	1,952	49,530	4.42	1.43	0.243
Transmission & Distribution	-	-	-	-	-	-	-	$0	0.00	0.00	0.000
Water Pumping / Irrigation	2,215	13,298,284	188,025,365	2,199	13,117,356	185,316,571	12,013	916,732	8.83	6.61	0.007
Whole Building	4,814	30,648,687	435,566,424	4,553	29,532,576	418,870,209	31,849	$7,906,132	0.72	0.42	0.025
EE Subtotal	**151,677**	**659,683,982**	**7,516,525,700**	**139,706**	**613,808,737**	**6,967,247,482**	**1,170,525**	**$236,719,344**	**1.74**	**1.21**	**0.043**
Low Income	7,741	32,750,160	348,575,946	7,699	32,471,907	345,056,293	40,469	$23,955,974	0.90	0.94	0.086
EE and Low Income Subtotal	**159,418**	**692,434,142**	**7,865,101,645**	**147,405**	**646,280,644**	**7,312,303,775**	**1,210,995**	**$260,675,319**	**1.67**	**1.19**	**0.045**
Codes and Standards	34,861	218,402,237	2,614,607,850	34,861	218,106,107	2,610,802,235	150,128	$1,433,112	73.59	73.59	0.001
Electrification	(20)	(9,227,286)	(126,295,757)	(17)	(7,608,220)	(105,177,059)	(8,362)	$3,753,318	-0.18	-0.20	0.000
Transmission and Distribution	4	4,364,574	5,479,411	4	4,364,574	5,479,411	2,799	$176,698	7.03	7.03	0.035
C&S, T&D and Electrification Subtotal	**34,845**	**213,539,525**	**2,493,791,504**	**34,848**	**214,862,461**	**2,511,104,587**	**144,564**	**$5,363,127**	**19.77**	**21.20**	**0.003**
Utility Total	**194,262**	**905,973,667**	**10,358,893,149**	**182,252**	**861,143,105**	**9,823,408,362**	**1,355,559**	**$266,038,445**	**2.03**	**1.46**	**0.035**

Table 7 presents the statewide energy efficiency program results by sector. As has historically been the case, the commercial sector accounts for the majority of POUs' annual energy savings (70%) and residential programs resulted in 27% of the gross annual energy efficiency program savings.

TABLE 7. Energy Efficiency Program Results by Sector

Summary by Sector	Resource Savings Summary								Cost Test Results		
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	198	1,005,162	14,322,840	197	971,510	13,919,021	5,340	$125,717	10.38	4.47	0.012
Commercial	89,723	461,339,188	5,444,938,752	85,221	438,637,306	5,144,074,310	829,007	$164,211,072	1.75	1.17	0.041
Industrial	2,117	15,826,453	206,290,767	1,973	14,895,207	195,819,198	71,216	$1,690,622	11.23	2.74	0.011
Other	264	2,214,940	20,808,035	264	2,212,496	20,795,813	8,482	$1,051,778	1.77	1.41	0.064
Residential	59,375	179,298,239	1,830,165,306	52,051	157,092,219	1,592,639,141	256,480	$69,640,156	1.48	1.18	0.056
EE Subtotal	**151,677**	**659,683,982**	**7,516,525,700**	**139,706**	**613,808,737**	**6,967,247,482**	**1,170,525**	**$236,719,344**	**1.74**	**1.21**	**0.043**
Low Income	7,741	32,750,160	348,575,946	7,699	32,471,907	345,056,293	40,469	$23,955,974	0.90	0.94	0.086
EE and Low Income Subtotal	**159,418**	**692,434,142**	**7,865,101,645**	**147,405**	**646,280,644**	**7,312,303,775**	**1,210,995**	**$260,675,319**	**1.67**	**1.19**	**0.045**
Codes and Standards	34,861	218,402,237	2,614,607,850	34,861	218,106,107	2,610,802,235	150,128	$1,433,112	73.59	73.59	0.001
Electrification	(20)	(9,227,286)	(126,295,757)	(17)	(7,608,220)	(105,177,059)	(8,362)	$3,753,318	-0.18	-0.20	0.000
Transmission and Distribution	4	4,364,574	5,479,411	4	4,364,574	5,479,411	2,799	$176,698	7.03	7.03	0.035
C&S, T&D and Electrification Subtotal	**34,845**	**213,539,525**	**2,493,791,504**	**34,848**	**214,862,461**	**2,511,104,587**	**144,564**	**$5,363,127**	**19.77**	**21.20**	**0.003**
Utility Total	**194,262**	**905,973,667**	**10,358,893,149**	**182,252**	**861,143,105**	**9,823,408,362**	**1,355,559**	**$266,038,445**	**2.03**	**1.46**	**0.035**

Table 8, on the next page presents the statewide energy efficiency program results by building type.

TABLE 8. Energy Efficiency Program Results by Building Type

Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	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	34,663	193,660,561	2,287,601,651	32,686	183,690,377	2,156,053,317	505,109	$46,232,282	3.38	2.44	0.027
Assembly	8,363	18,310,210	173,807,400	8,282	17,959,697	168,747,520	11,114	$8,791,953	0.89	0.79	0.063
Education - Community College	9	56,028	560,280	9	56,028	560,280	34	$55,350	0.51	0.51	0.119
Education - Primary School	1,203	7,537,398	110,536,084	1,157	7,262,623	106,563,122	9,159	$1,041,788	1.36	0.62	0.013
Education - Secondary School	3,877	10,383,796	113,571,657	3,720	10,038,202	108,567,508	19,553	$3,378,198	1.92	0.30	0.039
Education - University	1,033	6,976,411	100,414,489	963	6,632,286	95,055,660	7,607	$1,694,864	1.28	0.67	0.024
Grocery	2,598	10,139,394	128,005,711	2,102	8,272,448	102,609,611	8,085	$2,758,917	0.50	0.39	0.035
Health/Medical - Hospital	1,895	16,310,644	196,906,373	1,690	14,154,674	166,554,539	25,694	$6,325,547	1.29	0.90	0.047
Health/Medical - Nursing Home	117	971,838	9,717,536	117	971,775	9,717,030	589	$385,619	1.29	1.29	0.048
Lodging - Hotel	1,027	6,444,505	69,530,013	956	6,199,315	66,006,349	4,175	$3,025,051	0.88	0.75	0.057
Lodging - Motel	15	29,244	435,360	15	28,521	425,005	35	$13,313	1.69	0.60	0.042
Manufacturing Biotech	69	345,962	4,206,458	51	242,902	3,046,848	193	$58,736	0.91	0.25	0.025
Manufacturing Light Industrial	607	5,131,765	71,995,260	534	4,765,381	67,690,638	14,850	$810,822	4.10	1.12	0.016
Office - Large	9,066	35,622,577	443,871,941	8,738	33,654,458	415,802,900	53,806	$10,059,058	1.90	0.59	0.031
Office - Small	3,371	26,542,924	270,198,923	3,313	26,288,265	266,682,031	16,868	$19,635,768	0.66	0.65	0.089
Other Agricultural	827	3,851,496	50,000,760	774	3,653,976	47,037,967	7,726	$681,742	2.31	1.49	0.019
Other Commercial	10,701	55,184,256	756,068,543	10,408	53,299,873	736,774,323	144,380	$20,046,117	2.25	1.42	0.036
Other Industrial	4,301	35,261,793	384,471,848	4,225	34,706,715	378,380,075	54,509	$19,462,621	1.21	1.05	0.064
Residential	23,737	122,704,033	1,098,775,405	20,352	107,277,672	956,574,055	174,818	$30,141,152	2.23	1.64	0.040
Residential - Mobile Home	1	650	10,741	1	358	5,908	3	$690	3.35	1.10	0.164
Residential - Multi-Family	11,706	23,770,380	293,152,357	11,557	23,140,014	285,846,132	19,922	$12,170,182	1.05	0.93	0.055
Residential - Single-Family	23,821	30,887,731	419,207,664	19,987	24,490,155	327,833,641	49,116	$25,836,806	0.75	0.62	0.104
Restaurant - Fast-Food	404	1,716,693	24,737,053	333	1,397,919	20,021,118	1,402	$549,911	0.33	0.27	0.036
Restaurant - Sit-Down	976	5,784,146	59,121,156	960	5,731,852	58,419,087	3,919	$3,260,871	0.86	0.85	0.068
Retail - Big Box	186	929,102	6,597,687	161	777,997	5,511,977	2,096	$417,374	1.17	0.64	0.092
Retail - Large	2,323	9,470,789	117,862,208	1,953	8,062,028	99,479,265	11,303	$2,362,931	1.05	0.62	0.031
Retail - Small	4,261	26,571,572	265,975,409	4,190	26,232,958	261,578,844	16,394	$15,613,486	0.74	0.73	0.072
Storage - Conditioned	12	922,181	13,427,842	12	920,446	13,413,961	3,869	$29,367	53.02	10.51	0.003
Storage - Unconditioned	281	2,414,656	25,256,984	263	2,297,061	23,526,150	1,486	$1,566,395	0.67	0.64	0.081
Warehouse - Refrigerated	224	1,751,248	20,500,906	198	1,602,760	18,762,621	2,713	$312,434	2.41	1.08	0.021
EE Subtotal	**151,677**	**659,683,982**	**7,516,525,700**	**139,706**	**613,808,737**	**6,967,247,482**	**1,170,525**	**$236,719,344**	**1.74**	**1.21**	**0.043**
Low Income	7,741	32,750,160	348,575,946	7,699	32,471,907	345,056,293	40,469	$23,955,974	0.90	0.94	0.086
EE and Low Income Subtotal	**159,418**	**692,434,142**	**7,865,101,645**	**147,405**	**646,280,644**	**7,312,303,775**	**1,210,995**	**$260,675,319**	**1.67**	**1.19**	**0.045**
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C&S, T&D and Electrification Subtotal	**34,845**	**213,539,525**	**2,493,791,504**	**34,848**	**214,862,461**	**2,511,104,587**	**144,564**	**$5,363,127**	**19.77**	**21.20**	**0.003**
Utility Total	**194,262**	**905,973,667**	**10,358,893,149**	**182,252**	**861,143,105**	**9,823,408,362**	**1,355,559**	**$266,038,445**	**2.03**	**1.46**	**0.035**

Table 9 compares the actual savings in 2019 to the POUs' adopted annual targets for each utility. In total, the actual energy savings were approximately 36% above forecasted levels for 2019.

TABLE 9. 2019 Annual Target and Actual Savings Comparison [4] [5]

Utility	Utility Relative Size	Net or Gross Potential Savings	Potential Includes C&S?	2019 Total Incremental Market Potential (MWH)	C&S (MWH)	Potential - C&S = Forecast EE (MWh)	Actual EE + LI Savings (MWh)	% of Target
Alameda	Non-IRP	Net	No	1,614		1,614	2,312	143.3%
Anaheim	IRP	Gross	Yes	28,104	8,866	19,239	26,740	139.0%
Azusa	Non-IRP	Net	Yes	3,089	1,482	1,606	4,936	307.3%
Banning	Non-IRP	Net	No	367		367	217	59.3%
Biggs	Non-IRP	Net	No	7		7	22	316.2%
Burbank	IRP	Gross	No	11,207		11,207	10,757	96.0%
Colton	Non-IRP	Net	Yes	4,137	1,542	2,595	2,043	78.7%
Glendale	IRP	Net	Yes	14,723	5,914	8,809	12,585	142.9%
Gridley	Non-IRP	Net	No	106		106	128	120.6%
Healdsburg	Non-IRP	Net	No	486		486	170	35.0%
Imperial	IRP	Net	Yes	33,760	17,685	16,075	12,835	79.8%
Lassen	Non-IRP	Net	No	314		314	322	102.6%
Lodi	Non-IRP	Net	No	1,313		1,313	695	52.9%
Lompoc	Non-IRP	Gross	No	236		236	467	198.1%
Los Angeles	IRP	Gross	Yes	382,463	154,711	227,752	353,242	155.1%
Merced	Non-IRP	Net	No	1,346		1,346	1,776	132.0%
Modesto	IRP	Net	No	10,060		10,060	6,659	66.2%
Moreno Valley	Non-IRP	Net	Yes	1,748	994	754	7,237	960.1%
Palo Alto	IRP	Net	Yes	7,284		7,284	4,915	67.5%
Pasadena	IRP	Net	Yes	15,999	2,800	13,199	16,297	123.5%
Plumas-Sierra	Non-IRP	Net	No	122		122	53	43.2%
Port of Oakland	Non-IRP	Gross	No	196		196	12	6.4%
Rancho Cucamonga	Non-IRP	Gross	No	293		293	661	225.2%
Redding	IRP	Net	No	3,466		3,466	4,571	131.9%
Riverside	IRP	Net	No	20,815		20,815	24,940	119.8%
Roseville	IRP	Gross	No	8,549		8,549	15,357	179.6%
Sacramento	IRP	Gross	Yes	154,902	42,000	112,902	114,948	101.8%
San Francisco	IRP	Net	No	2,853		2,853	1,911	67.0%
Shasta Lake	Non-IRP	Net	No	519		519	1,206	232.5%
Silicon Valley Power	IRP	Net	No	13,032		13,032	25,396	194.9%
Trinity	Non-IRP	Net	No	6		6	3	45.0%
Truckee Donner	Non-IRP	Gross	No	639		639	849	132.9%
Turlock	IRP	Net	Yes	15,001	5,445	9,556	11,318	118.4%
Ukiah	Non-IRP	Net	No	250		250	490	196.0%
Vernon	IRP	Net	Yes	5,218	2,217	3,001	7,654	255.1%
Victorville	Non-IRP	Net	No	163		163	28	17.1%
Total				**744,384**	**243,656**	**500,728**	**673,751**	**137.3%**

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

[5] Not all Small, Non-IRP POUs are included in this list because they either did not exist when the 2017 forecasts were developed, did not develop forecasts in 2017, or did not have any energy savings in 2019.

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.[6] 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

California's SB 100 (De León, 2018) establishes the state's goal that retail electricity will be greenhouse gas (GHG) emission free by 2045.[7] Therefore, as utilities continue to add renewable resources to their resource mix, the net reduction in GHG from energy efficiency improvements will also decline.

Until the time that the majority or all of California's generation is emission free, energy efficiency will remain the first resource in the state's loading order and maintain its important role in reducing carbon emissions. As displayed in Figure 1 below, energy use in residential and commercial existing buildings has collectively accounted for nearly one quarter of statewide GHG emissions historically, 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 the State's carbon reduction goals.

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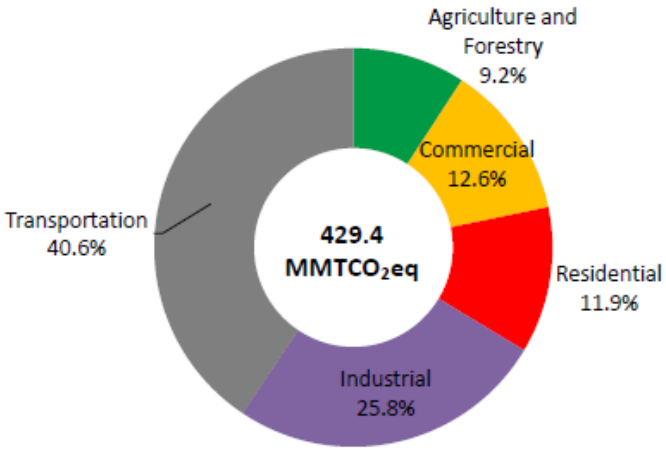
6 Energy Commission, September 2018, Energy Efficiency Tracking Progress, Available: https://www.energy.ca.gov/sites/default/files/2019-12/Greenhouse_Gas_Emissions_Reductions_ada.pdf

7 Cal. Pub. Util. Code § 399.15(b)(2)(B).

8 See Figure 6, Energy Commission, September 2018, Energy Efficiency Tracking Progress, Available: https://www.energy.ca.gov/sites/default/files/2019-12/Greenhouse_Gas_Emissions_Reductions_ada.pdf

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



The Value of the Energy Efficiency Doubling Goal

As part of the State's carbon reduction goals, California enacted SB 350 (De León, 2015), directing the Energy Commission to establish statewide targets for the cumulative doubling of energy efficiency by 2030.[9] These targets take into consideration increases in energy efficiency savings from utility programs, codes and standards, financing, behavioral programs, market transformation, and improvements in the agriculture and 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. [10]

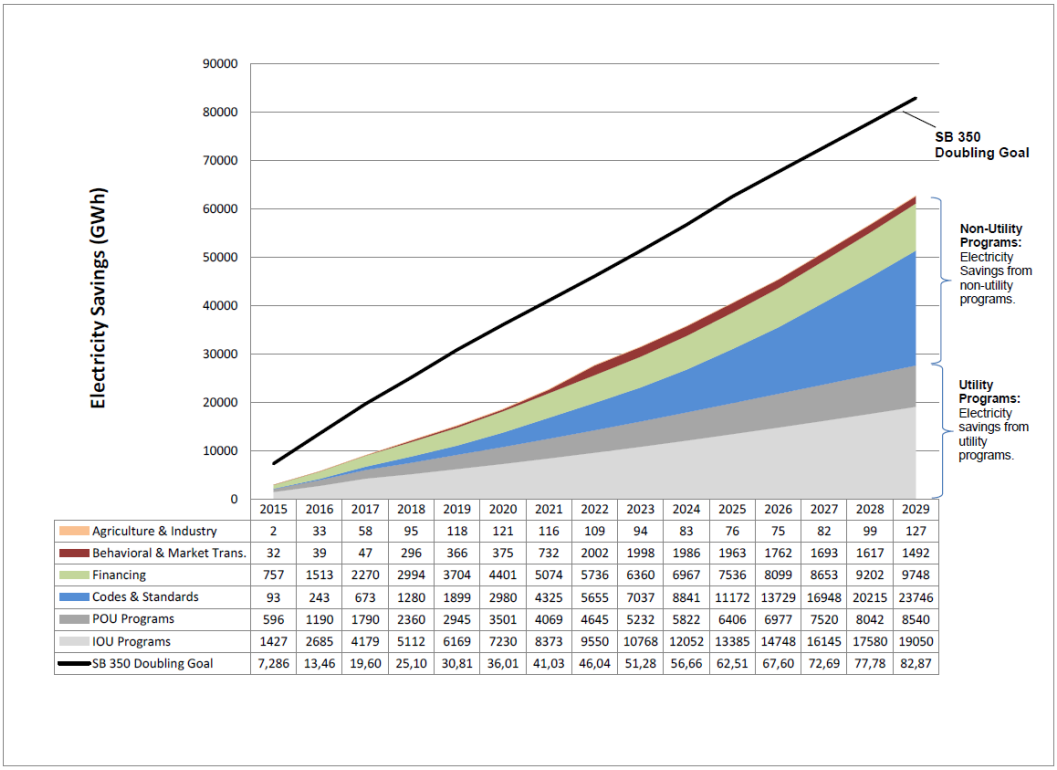
The POUs' own forecasts of all potentially achievable cost-effective electricity efficiency savings from POU customers were used by the CEC to forecast the cumulative energy savings potential from POUs' energy efficiency programs.[11] The Energy Commission incorporated the POUs' adopted annual energy efficiency targets into the statewide cumulative target by combining the POUs' 1st year savings as the annual targets for 2015-2030 and used that as the aggregate "cumulative savings" target for POUs, as shown below in Figure 2.

[9] Cal. Pub. Util. Code § 454.55(b)(1).

[10] POU governing boards are required to update their annual energy efficiency targets every four years, with the most recent update occurring in 2017, per Cal. Pub. Util. Code § 9505 (b).

[11] 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.

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

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 2019 by more than 618 GWh.

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.

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 a light emitting diode (LED) lamp, is highly unlikely to go back to an older, less efficient product like a compact fluorescent lamp once the LED no longer works.[12] 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.[13]

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 and standards, financing, behavioral programs, market transformation, and improvements in the agriculture and industry sectors.[14] 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.

Energy efficiency improvements are one of, if not, the most cost-effective ways to reduce energy consumption and GHG emissions.[15] However, 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,

[12] Energy Trust of Oregon, October 19, 2017, *Persistence of O&M Energy-Efficiency Measures,* https://www.energytrust.org/wp-content/uploads/2018/07/Energy-Trust-OM-Measure-Persistence-Report-final-with-staff-response.pdf.
[13] Cal. Pub. Util. Code, § 9505(b).
[14] Energy Commission, October 2017, *Senate Bill 350: Doubling Energy Efficiency Savings by 2030.*
[15] Gillingham, Kenneth, and James H. Stock. 2018. "The Cost of Reducing Greenhouse Gas Emissions." *Journal of Economic Perspectives*, 32 (4): 53-72.

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 and standards – but remain cost-effective for the utilities and their customers. POU programs must 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 kilowatt-hours (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 account for 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' cost effectiveness tool (CET) reporting platform (RP) (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 9 AM to 3 PM 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. In February 2019 the Building Decarbonization Coalition released *A Roadmap to Decarbonize California Buildings,* identifying barriers and strategies for the decarbonization of new and existing buildings.[16] 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 electrification for California customers.[17] This 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.

The path to unlocking the benefits of building electrification must include a reconsideration of the barriers in the existing regulatory environment. Fortunately, the Energy Commission is working in concert with the California Air Resources Board (CARB), California Public Utilities Commission (CPUC), utilities, and other stakeholders in a combined effort to "decarbonize buildings".[18] These joint agency proceedings, in which the POUs are participating, have 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.

As part of the State's efforts to decarbonize buildings, the Time Dependent Valuation (TDV) methodology used in Title 24 Building Energy Efficiency Standards is being reevaluated for the 2022 Standards to better account for the cost of carbon, which may result in a reduction of natural gas' economic advantage over electric end-uses. Additionally, the CPUC updated its three-prong fuel substitution test on August 1, 2019 to be applied at the Program or Portfolio level, rather require fuel-substitution measures to pass the rigorous test individually.[19]

However, more work is needed to address the obstacles faced by electrification. For example, 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

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

[17] 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

[18] Energy Commission Docket 19-IEPR-06 and CPUC Rulemaking (R.)19-01-011.

[19] CPUC Decision 19-08-009, Ordering Paragraph 1, issued on August 5, 2019.

ability to track success with California's goal to reduce energy use, as load continues to increase due to EV 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 Energy Commission to frame effective policies to that end.

RESOURCES AND 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.[20]

Energy Efficiency Cost-Effectiveness Tool and Reporting Platform

Energy Platforms, LLC developed a cloud-based energy efficiency 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 CPUC in the 1980s and codified in the California Standard Practice Manual.[21]

Using this 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 tool allows 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. Energy Platforms, LLC continues to update and improve the CET/RP to improve reporting functionality.

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

[20] Cal. Pub. Util. Code § 9505(a)(4).

[21] CPUC. February 1983. *Standard Practice for Cost-Benefit Analysis of Conservation and Load Management Programs*. The TRC and RIM were presented in the 1987-1988 version of the Standard Practice Manual.

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.[22] 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.

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 are members of 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.

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[22] California Municipal Utilities Association Savings Estimation Technical Reference Manual, 3rd. Ed. 2017. https://www.cmua.org/energy-efficiency-technical-reference-manual.

In addition, POU staff 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 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.[23]

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

[23] Cal. Pub. Util. Code § 9505(d).

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.[24] The POUs collectively spent $261 million in FY 2019, 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.[25] 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, and
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.[26]

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

[24] Cal. Pub. Util. Code § 9505(a)(3).
[25] *Id.* § 385.
[26] California Code of Regulations (CCR), Title 17, § 95801.

assistance programs for disadvantaged communities, and income-qualified bill assistance discounts.

APPENDIX A

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

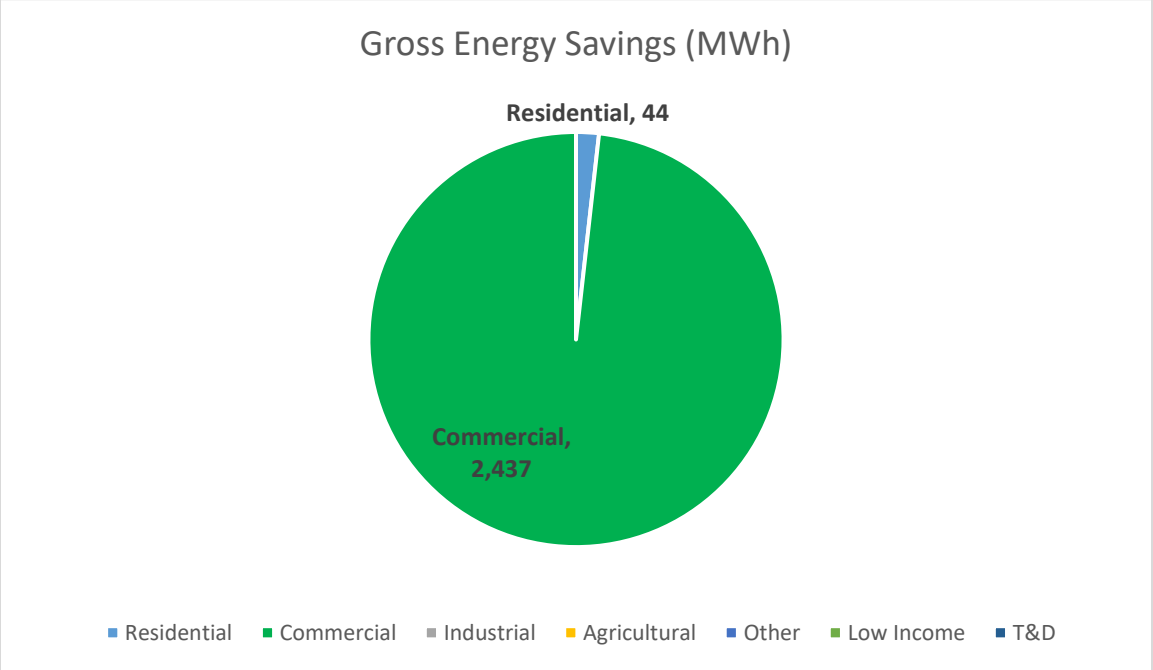
TABLE 10. 2019 Annual Energy Efficiency Program Summary

Summary by Utility	Resource Savings Summary						Cost Summary
Utility	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)	Total Utility Cost
Alameda	226	2,481,533	35,159,147	207	2,311,731	32,871,259	$1,461,704
Anaheim	5,884	26,739,840	316,799,334	5,884	26,739,840	316,799,334	$6,676,840
Azusa	922	5,477,787	69,739,443	855	4,935,869	62,423,242	$863,622
Banning	1,922	260,699	3,156,438	1,547	217,485	2,633,665	$207,328
Biggs	-	24,444	122,220	-	22,000	109,998	$11,488
Burbank	3,097	10,757,180	103,901,935	2,833	10,514,274	99,344,763	$3,257,708
Colton	696	2,124,058	23,828,737	653	2,043,216	22,981,330	$1,430,391
Corona	-	-	-	-	-	-	$0
Glendale	1,584	12,644,267	73,910,052	1,560	12,584,914	72,894,599	$2,321,018
Gridley	12	159,854	1,919,501	9	127,844	1,535,056	$115,384
Healdsburg	38	210,071	2,463,352	30	170,203	1,990,576	$123,118
Imperial	6,728	14,743,378	277,111,997	6,023	12,835,473	241,794,529	$7,093,943
Industry	-	-	-	-	-	-	$3,035
Lassen	101	392,047	3,967,546	83	322,037	3,224,156	$112,741
Lodi	208	922,596	11,508,114	142	694,922	8,275,484	$417,854
Lompoc	50	466,646	5,546,509	40	371,920	4,425,877	$113,781
Los Angeles	89,467	353,242,115	3,866,799,794	89,467	353,242,115	3,866,799,794	$169,906,198
Merced	0	2,224,945	22,278,524	0	1,775,764	17,770,933	$1,717,991
Modesto	1,652	7,464,094	88,629,472	1,470	6,659,006	78,867,354	$2,399,593
Moreno Valley	654	8,049,680	80,603,429	588	7,236,943	72,428,867	$639,782
Needles	1	4,973	70,908	1	4,243	62,209	$152,534
Palo Alto	1,042	8,234,557	113,440,176	569	4,914,713	64,057,769	$1,699,867
Pasadena	1,862	16,366,460	100,000,842	1,840	16,297,384	99,266,851	$3,974,193
Pittsburg	52	225,342	2,253,420	52	225,342	2,253,420	$35,850
Plumas-Sierra	41	67,645	1,298,668	33	52,663	1,021,103	$146,111
Port of Oakland	4	12,493	149,920	3	9,995	119,936	$13,494
Rancho Cucamonga	236	660,603	10,569,654	236	660,603	10,569,654	$111,748
Redding	960	5,760,640	47,056,405	727	4,570,641	36,363,646	$2,550,041
Riverside	3,568	26,684,769	378,823,563	2,956	24,940,324	336,517,635	$6,658,541
Roseville	1,369	15,356,645	73,703,815	1,198	11,274,861	60,284,350	$4,450,327
Sacramento	29,130	114,947,870	1,394,160,395	21,319	91,848,217	1,125,864,410	$29,865,267
San Francisco	606	1,911,210	28,668,150	606	1,911,210	28,668,150	$2,185,767
Shasta Lake	274	1,509,123	17,862,453	209	1,205,981	14,113,474	$382,154
Silicon Valley Power	3,086	31,639,268	426,424,499	2,401	25,396,178	348,839,188	$5,725,867
Trinity	7	4,036	50,520	6	2,828	36,408	$2,068
Truckee Donner	183	848,787	10,524,355	156	669,917	8,834,824	$625,710
Turlock	2,035	11,513,125	171,908,098	1,991	11,318,254	169,158,677	$1,999,449
Ukiah	39	614,742	7,418,197	31	490,012	5,902,671	$318,482
Vernon	1,669	7,653,962	92,782,191	1,669	7,653,962	92,782,191	$866,488
Victorville	9	32,658	489,870	8	27,759	416,390	$37,840
EE and Low Income Total	**159,418**	**692,434,142**	**7,865,101,645**	**147,405**	**646,280,644**	**7,312,303,775**	**$260,675,319**

ALAMEDA

Alameda at a Glance

- Climate Zone(s): 3
- Customers: 35,396
- Total annual retail sales (MWh): 332,419
- Annual Retail Revenue: $61,027,633
- Annual energy efficiency expenditures for reporting year: $1,461,704
- Gross annual savings from reporting year portfolio (MWh): 2,482



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 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 2019 savings included the continuation a very successful non-residential direct-install program and a residential online rebate portal.

Program and Portfolio Highlights

AMP's non-residential direct-install program, Energy Plus, provided more than 87 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 and 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 2019, 33 customers participated in lighting and refrigeration upgrades with low co-pay amounts, due to AMP's rebates. This program will remain open until February 28, 2021.
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 2020.

Residential Programs

Residential Online Rebates – Lighting and Appliances: Alamedians have been able to participate in residential energy efficiency rebates using a simple web application since March 2016. In FY 2019 the tool received 426 applications. Rebates were available for LED bulbs, LED fixtures, LED decorative string lights, electric clothes dryers, washing machines, heat pump water heaters, refrigerators, freezers, refrigerator/freezer recycling and EV chargers. This program will remain open in FY 2020.

Complementary Programs

- EV 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 2019, 313 customers signed up for the discount, bringing the total number of program participants to 834. 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 2019, 144 residential customers and four 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 2019, EASE, an emergency relief program, helped 88 households receive a total of $14,733 in electric-bill assistance. A maximum amount of $200 is available per household within a three-year period through the EASE program. EAP provides a 25% monthly discount on the electric bill. A total of $116,433

was allocated to 809 Alameda households in FY 2019. 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 per kWh. As of the end of FY 2019, there were 4,184 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 September 2019, 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 2018.
- Research, Development, and Demonstration: There was no AMP activity in research, development, and demonstration in FY 2019.
- 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.

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 residential programs for FY 2018 and FY 2019 with a projected $45,000 budget.

Major Differences or Diversions from California 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) for the CMUA. The electric clothes dryer savings were from an ENERGY STAR® report.

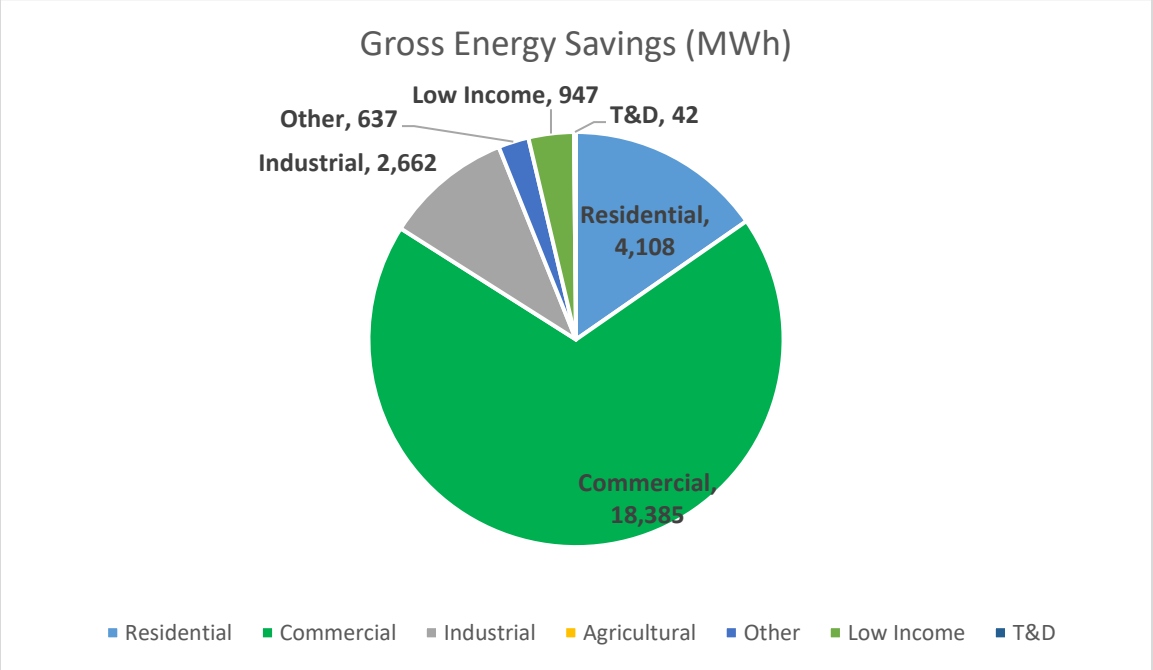
Energy savings for non-residential programs were calculated using a hybrid of actual pre- and post-installation inspections and the TRM 2017. Customized lighting projects were fully calculated. Savings from the direct-install program, Energy Plus, used a combination of the TRM 2017 and full pre- and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

ALAMEDA	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
ENERGY STAR clothes washer, elec	0	2,556	28,116	0	792	8,716	3	30	$8,556	$1.21	0.12	0.12
Refrigerator recycling	3	16,324	81,620	2	11,427	57,134	25	195	$55,651	$1.06	0.13	0.13
ENERGY STAR Freezer	0	43	602	0	30	421	0	1	$354	$1.10	0.14	0.13
ENERGY STAR HP water heater, 50	0	1,504	15,040	0	902	9,024	4	31	$6,163	$0.83	0.13	0.13
LED holiday lights	0	70	350	0	38	189	0	1	$166	$0.96	0.12	0.09
ENERGY STAR Electric Dryer	0	5,063	81,008	0	3,038	48,605	19	166	$37,620	$1.05	0.12	0.13
Freezer recycling	0	1,011	4,044	0	708	2,831	1	10	$2,797	$1.05	0.13	0.12
Res LED Bulb Online Rebate Progra	0	9,452	141,780	0	8,034	120,513	48	411	$85,569	$0.95	0.14	0.14
ENERGY STAR Refrigerator: >7.75 c	0	4,929	69,006	0	3,450	48,304	19	165	$39,446	$1.07	0.14	0.14
Res LED Fixtures Online Rebate Prc	0	3,211	48,165	0	2,729	40,940	16	140	$30,399	$0.99	0.13	0.12
Commercial Lighting Direct Install I	0	359,713	4,316,560	0	341,728	4,100,732	1,983	13,981	$189,532	$0.06	2.27	1.69
Commercial Refrigeration Direct In	2	18,246	273,695	2	17,334	260,011	98	887	$9,380	$0.05	2.45	2.30
Commercial Lighting Direct Install I	176	1,806,113	27,091,698	167	1,715,808	25,737,113	9,354	87,751	$924,277	$0.05	2.41	1.81
Commercial Custom Direct Install F	1	20,504	205,036	1	19,478	194,784	76	664	$6,142	$0.04	2.90	2.82
Commercial Refrigeration Self-Inst	0	1,418	17,016	0	1,134	13,613	5	46	$229	$0.02	5.28	0.91
Commercial Window Film Self Inst	2	2,970	44,552	1	2,376	35,642	12	122	$520	$0.02	6.16	0.54
Commercial Lighting Self-Install Pr	41	161,269	1,935,228	33	129,015	1,548,182	579	5,279	$45,377	$0.04	3.03	1.20
Commercial Lighting Self-Install Pr	0	67,136	805,632	0	53,709	644,506	312	2,197	$19,525	$0.04	3.47	0.88
Subtotal	226	2,481,533	35,159,147	207	2,311,731	32,871,259	12,555	112,075	$1,461,703.73	$0.06	2.02	1.49
Low-Income												
Codes & Standards												
T&D												
Electrification												
Subtotal	-	-	-	-	-	-	-	-	-	-	-	-
Total	226	2,481,533	35,159,147	207	2,311,731	32,871,259	12,555	112,075	$1,461,704	$0.06	2.02	1.49

ANAHEIM

Anaheim at a Glance

- Climate Zone(s): 8
- Customers: 122,265
- Total annual retail sales (MWh): 2,290,260,190
- Annual Retail Revenue: $352,795,100
- Annual energy efficiency expenditures for reporting year: $6,697,997
- Gross annual savings from reporting year portfolio (MWh): 26,781



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 FY 2018 with income qualified customers receiving a discount from the reduced costs

in FY 2019. 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 as of FY 2019.

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 FY 2019 by taking advantage of the successful partnership with the Southern California Gas Company (SoCalGas) with doubled funds beginning in FY 2018, 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 FY 2019, APU began offering a variety of LED bulbs through a buydown program at local stores, offered to customers at a discounted rate. In addition, APU's new LED buydown program has resulted in 585 thousand kWh in savings.

In addition, several of the Commercial programs have been modified for operational efficiency, and continue to be refined into FY 2020

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 12 million kWh savings in FY 2019 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 2.23 million kWh in energy savings through process efficiency improvements this fiscal year.

In addition, APU's new LED buydown program has resulted in 585 thousand kWh in savings

In the partnership with SoCalGas, both utilities benefited 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 and Agricultural Programs

- 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 (kW) 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

- 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.
- LED Buydown Program: The LED buydown program offers LED's at local stores at discounted rates funded by APU, a variety of LEDs offer customers a variety of choices for their use.
- 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

- Multi-Family and Affordable Housing New Construction/Retrofit 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.

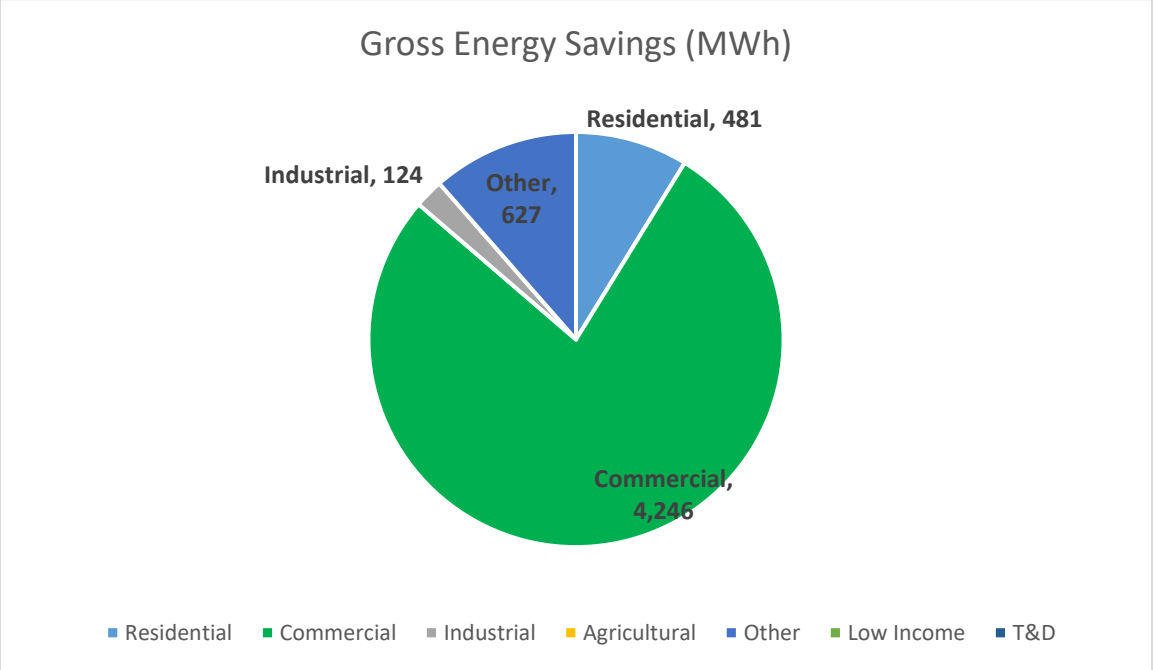
- Commercial and Residential Water Savings Resulting from Equipment Rebates: Businesses and residents are eligible for rebates by installing or retrofitting with qualifying water-saving devices through the "SoCal Water$mart" Program in partnership with Metropolitan Water District. Water savings result 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 2018 due to codes and standards and based on Anaheim's percent share of statewide load.
- Transmission and Distribution (T&D): Increased efficiencies by upgrading electric infrastructure.

ANAHEIM	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Smart Blinds (Solar Motorized Roll	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Smart Power Strip Tier 1	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
LED Holiday Lights Distribution	16	3,297	16,485	16	3,297	16,485	8	56	$4,696	$0.31	0.36	0.36
Operations Program	155	1,360,000	4,080,000	155	1,360,000	4,080,000	1,737	13,911	$5,222	$0.00	76.07	76.07
LED Distribution FY 1718	144	1,289,013	19,335,190	144	1,289,013	19,335,190	7,882	65,924	$223,462	$0.02	8.41	18.14
LED Buydown 15W PAR38 DD	0	176,832	2,652,480	0	176,832	2,652,480	1,069	9,044	$18,455	$0.01	14.10	17.69
LED Buydown 4W/E12 Chandelier	0	7,320	109,800	0	7,320	109,800	44	374	$1,615	$0.02	6.67	17.69
LED Buydown 15W/A19	0	139,104	2,086,560	0	139,104	2,086,560	841	7,114	$26,692	$0.02	7.67	17.69
LED Buydown 8W/BR30	0	64,995	974,925	0	64,995	974,925	393	3,324	$11,906	$0.02	8.03	17.69
LED Buydown 11W/A19	0	67,200	1,008,000	0	67,200	1,008,000	406	3,437	$12,310	$0.02	8.03	17.69
LED Buydown 9W	0	114,483	1,717,245	0	114,483	1,717,245	692	5,855	$19,680	$0.02	8.56	17.69
LED Buydown 9W A19 LED DD	0	114,432	1,716,480	0	114,432	1,716,480	692	5,852	$11,824	$0.01	14.24	17.69
Dusk to Dawn Commercial 1819	0	406	4,871	0	406	4,871	2	17	$12,811	$3.31	0.04	0.04
Dusk to Dawn Income Qualified 18	0	533	6,400	0	533	6,400	3	22	$17,953	$3.53	0.04	0.04
Dusk to Dawn Lighting 1819	0	4,714	56,565	0	4,714	56,565	23	193	$158,677	$3.53	0.04	0.04
Upstream HVAC 1819	434	960,677	15,370,832	434	960,677	15,370,832	5,256	52,407	$298,256	$0.03	4.68	12.74
Small Business DI 1819	470	1,051,270	11,563,970	470	1,051,270	11,563,970	4,284	39,427	$501,642	$0.05	2.13	2.13
Small Business Audits 1819	253	408,701	4,495,715	253	408,701	4,495,715	1,665	15,328	$195,023	$0.05	2.13	2.13
Energy Star Room AC Rebates	1	1,092	9,828	1	1,092	9,828	5	34	$3,169	$0.38	0.77	5.19
Swimming Pool Pump Rebates	3	62,008	620,080	3	62,008	620,080	256	2,114	$26,157	$0.05	2.65	5.19
Energy Star Refrigerator Rebates	0	29,510	413,140	0	29,510	413,140	162	1,409	$19,980	$0.06	2.24	5.19
Air Duct Repair Rebates	37	18,450	184,500	37	18,450	184,500	84	629	$52,876	$0.35	0.85	5.19
Smart Thermostat	0	71,300	784,300	0	71,300	784,300	354	2,674	$59,234	$0.09	3.18	5.19
AC Tune-up 1819	28	13,416	67,082	28	13,416	67,082	33	229	$10,664	$0.17	1.64	5.19
High Performance Windows	76	41,580	831,600	76	41,580	831,600	350	2,835	$46,388	$0.08	3.78	5.19
Central AC Split System Rebates	29	37,404	561,060	29	37,404	561,060	242	1,913	$232,177	$0.55	0.54	5.19
Energy Star Dishwasher Rebates	0	5,486	54,860	0	5,486	54,860	23	187	$12,532	$0.28	0.49	5.19
Ceiling Fan Rebates	3	3,473	34,730	3	3,473	34,730	16	118	$2,089	$0.07	4.05	5.19
Attic Fan Rebates	7	3,510	35,100	7	3,510	35,100	16	120	$2,457	$0.08	3.48	5.19
Whole House Fan Rebates	0	31,040	620,800	0	31,040	620,800	261	2,117	$33,219	$0.08	3.94	5.19
Street Lighting 1819	0	1,302,004	26,040,076	0	1,302,004	26,040,076	8,949	88,784	$29,463	$0.00	76.07	76.07
Water Conservation Baseline 1	0	637,420	5,736,780	0	637,420	5,736,780	2,188	19,560	$36,474	$0.01	14.76	14.76
School Education Program Audits	117	557,022	1,671,066	117	557,022	1,671,066	752	5,698	$71,376	$0.04	2.31	2.31
Home Utility Checkup Audits	129	614,553	1,843,659	129	614,553	1,843,659	830	6,286	$78,748	$0.04	2.31	2.31
LED 14-18 W replacing 75 W halogen	21	183,190	2,747,850	21	183,190	2,747,850	1,120	9,369	$141,941	$0.07	1.88	2.31
Tree Power	91	162,514	3,250,280	91	162,514	3,250,280	1,368	11,082	$436,213	$0.20	1.57	1.57
Air Compressor Rebates 1819	19	145,890	1,604,790	19	145,890	1,604,790	595	5,472	$27,809	$0.02	5.32	24.99
Lighting Incentives 1819	2,314	13,007,034	143,077,377	2,314	13,007,034	143,077,377	52,209	487,824	$1,804,483	$0.02	7.34	31.21
Heat Pump 1819	352	559,152	6,150,672	352	559,152	6,150,672	2,221	20,971	$106,661	$0.02	6.27	76.07
Refrigerator Recycling Program	57	282,128	1,410,640	57	282,128	1,410,640	630	4,810	$61,728	$0.05	2.64	4.20
Freezer Recycling Program	2	8,359	33,436	2	8,359	33,436	15	114	$1,568	$0.05	2.46	4.20
Customized Energy Incentive 1819	470	2,233,035	44,660,707	470	2,233,035	44,660,707	15,349	152,271	$230,800	$0.01	16.65	76.07
Comprehensive Energy Audit 1819	7	19,322	57,965	7	19,322	57,965	25	198	$338,572	$6.10	0.02	0.02
Subtotal	5,235	25,792,870	307,697,896	5,235	25,792,870	307,697,896	113,049	1,049,099	$5,387,001	$0.02	5.41	9.98
Low-Income	649	946,970	9,101,438	649	946,970	9,101,438	3,956	31,031	$1,289,839	$0.18	2.93	20.18
Codes & Standards	0	5,259,848	15,779,544	0	5,259,848	15,779,544	6,882	53,801	$20,998	$0.00	76.07	76.07
T&D	0	41,590	124,770	0	41,590	124,770	53	425	$160	$0.00	76.07	76.07
Electrification												
Subtotal	649	6,248,408	25,005,752	649	6,248,408	25,005,752	10,891	85,257	$1,310,996	$0.06	2.47	31.79
Total	5,884	32,041,278	332,703,648	5,884	32,041,278	332,703,648	123,940	1,134,357	$6,697,997	$0.03	4.84	10.72

AZUSA

Azusa at a Glance

- Climate Zone(s): 9
- Customers: 16,859
- Total annual retail sales (MWh): 248,413
- Annual Retail Revenue: $36,005,653
- Annual energy efficiency expenditures for reporting year: $884,174
- Gross annual savings from reporting year portfolio (MWh): 5,478



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 and 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 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

- ALW's 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, jointly with 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 California POU TRM for Energy Savings

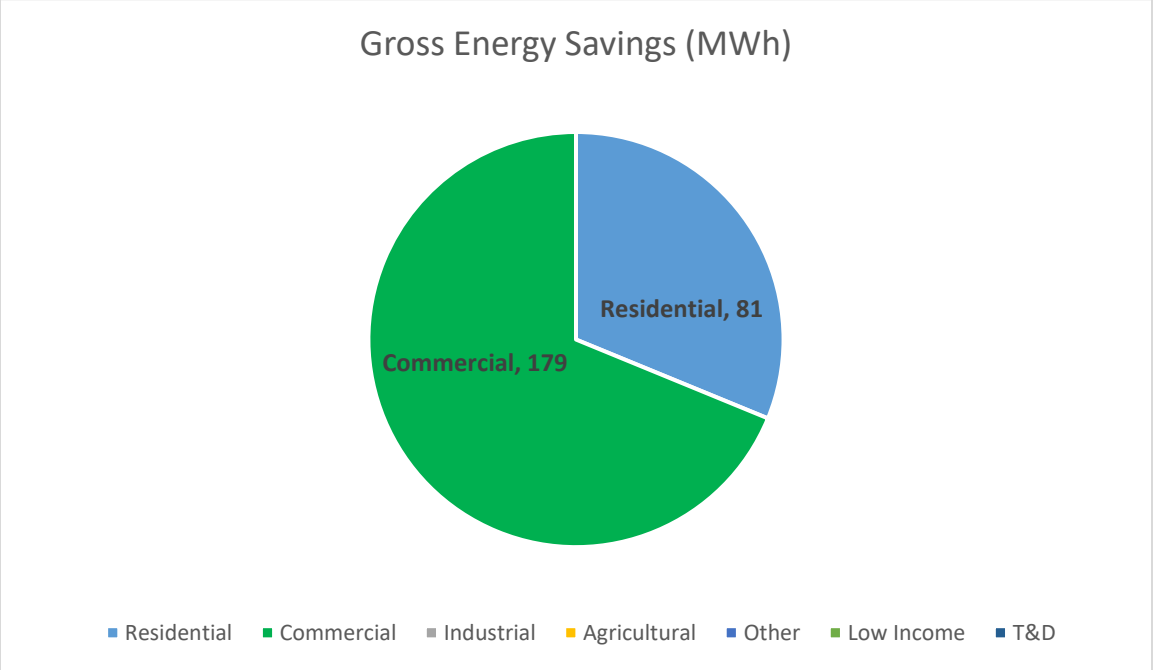
For savings, Azusa Light & Water uses a combination of figures from TRM, E3, utility workpapers and custom savings analysis along with vendor calculations when applicable.

AZUSA	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Education Programs-In Class 20	25	95,402	1,431,030	25	95,402	1,431,030	558	4,879	$22,642	$0.02	5.93	25.21
Municipal Programs 20	95	273,491	4,102,358	95	273,491	4,102,358	1,413	13,987	$216,768	$0.07	1.80	25.21
Residential Energy Star Appliance	15	31,942	574,956	12	25,554	459,965	179	1,568	$33,942	$0.10	1.44	5.87
CFL/LED Lamp Exchange/Direct Install Program 20	318	2,331,092	34,966,380	255	1,864,874	27,973,104	9,632	95,375	$125,974	$0.01	21.06	24.26
Residential On-Line Audit 20	0	346,556	1,039,668	0	277,245	831,734	374	2,836	$7,490	$0.01	10.99	20.03
Water Conservation Programs 20	40	626,822	1,880,466	40	626,822	1,880,466	830	6,411	$6,938	$0.00	25.21	25.21
Shade Tree Program 20	7	7,061	211,830	7	7,061	211,830	87	722	$31,135	$0.26	1.46	25.21
Small Business Audit/Retrofit Program	70	189,712	1,897,120	70	189,712	1,897,120	713	6,468	$146,644	$0.09	1.20	25.21
Business Energy Partnership-	35	123,835	1,857,525	35	123,835	1,857,525	658	6,333	$60,849	$0.04	2.71	25.21
Business Energy Partnership-Commercial 20	318	1,451,874	21,778,110	318	1,451,874	21,778,110	7,499	74,253	$211,240	$0.01	9.78	25.21
Subtotal	922	5,477,787	69,739,443	855	4,935,869	62,423,242	21,941	212,833	$863,622	$0.02	6.87	24.05
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	111	560,728	5,607,280	111	560,728	5,607,280	2,783	19,118	$20,552	$0.00	25.21	25.21
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	-	-	-	-	-	-	-	-	$0.00	$0.00	0	0
Subtotal	111	560,728	5,607,280	111	560,728	5,607,280	2,783	19,118	20,552	$0.00	25.21	25.21
Total	1,033	6,038,515	75,346,723	966	5,496,597	68,030,522	24,724	231,951	884,174	$0.02	7.30	24.14

BANNING

Banning at a Glance

- Climate Zone(s): 15
- Customers: 12,015
- Total annual retail sales (MWh): 139,624
- Annual Retail Revenue: $26,987,813
- Annual energy efficiency expenditures for reporting year: $207,328
- Gross annual savings from reporting year portfolio (MWh): 261



Banning Overview

During FY 2019, Banning spent $207,328 in Energy Efficiency programs, which have provided 260,699 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 2019 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. Banning adopted 2019 Title 24 Construction Standards.

Program and Portfolio Highlights

Renewable Portfolio Standard. In 2018, the City of Banning's energy portfolio was 61% 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. Banning met the NEM Cap of 2.3 MW in 2018.

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 EVs. As battery storage technology improves, the costs for ECs 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. The City is currently in the process of adding a public charging station at City Hall and another restaurant.

Commercial, Industrial and 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.
- ENERGY STAR Appliances: Monetary incentives for purchasing products that meet the ENERGY STAR criteria.
- ENERGY STAR 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 discount for qualified customers. As mentioned above, the majority of the Public Benefits funds are spent providing low-income assistance.
- Medical Equipment Assistance: An electric utility discount for qualified customers.

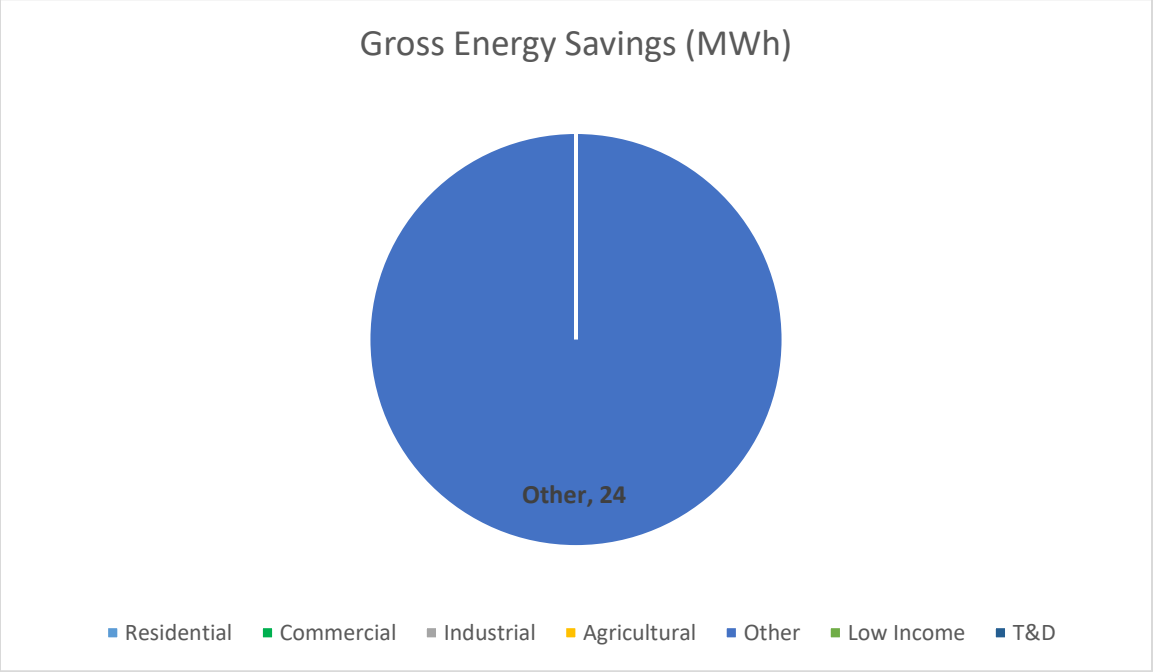
Evaluation, Measurement & Verification Studies

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	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
4ft 2L LED New Fixture Delamping	37	7,277	80,047	37	7,277	80,047	30	273	$1,008	$0.02	7.73	9.08
4ft 2L 32W T8 High Perf w/EB	56	2,080	22,880	45	1,664	18,304	7	62	$592	$0.04	3.01	6.47
Window Replacement - Tinted Wi	15	25,075	501,500	12	20,060	401,200	166	1,368	$15,285	$0.06	5.09	5.09
4ft 4L (8pc) LED Retrofit	237	27,410	301,514	189	21,928	241,212	90	822	$4,798	$0.02	4.90	7.75
8ft 4L Linear LED Retrofit - New Fix	3	11,180	122,980	2	8,944	98,384	37	335	$1,303	$0.02	7.35	8.67
Variable speed residential pool pu	0	4,718	47,180	0	4,482	44,821	19	153	$1,376	$0.04	3.77	1.43
ENERGY STAR dishwasher, standar	0	364	3,640	0	346	3,458	1	32	$759	$0.27	0.71	2.37
ENERGY STAR clothes washer, elec	0	3,128	34,408	0	2,972	32,688	13	172	$1,309	$0.05	3.18	1.32
HP Pkg Unit-5 Tons (55-64 kBtuh)-1	1	2,103	31,538	1	1,787	26,807	8	91	$1,814	$0.09	1.82	3.52
Wall insulation - R-13 - Single Fami	0	1	20	0	0	6	0	0	$43	$11.33	0.03	0.03
ENERGY STAR room air conditioner	0	72	648	0	58	518	0	2	$162	$0.37	0.68	0.68
Split-system air conditioner, 20 SEI	2	5,451	81,765	2	5,178	77,677	33	265	$13,222	$0.23	1.18	2.26
Split-system air conditioner, 15 SEI	0	279	4,185	0	223	3,348	1	11	$374	$0.15	1.80	1.34
Split-system air conditioner, 18 SEI	2	3,969	59,535	2	3,771	56,558	24	193	$14,754	$0.35	0.77	1.55
Split-system air conditioner, 21 SEI	1	2,910	43,650	1	2,765	41,468	18	141	$5,919	$0.19	1.41	2.63
Ceiling insulation, increase to R-38	0	2	34	0	0	9	0	0	$320	$50.08	0.01	0.01
ENERGY STAR room air conditioner	0	75	675	0	71	641	0	2	$65	$0.12	2.10	2.10
Split-system air conditioner, 17 SEI	1	1,521	22,815	0	1,217	18,252	8	62	$4,305	$0.32	0.85	1.09
Split-system air conditioner, 16 SEI	1	3,360	50,400	1	3,192	47,880	20	163	$6,918	$0.19	1.39	1.48
Split-system air conditioner, 19 SEI	3	8,235	123,525	3	7,823	117,349	50	400	$25,102	$0.29	0.94	1.85
Air Conditioner Tune-up	4	4,421	22,105	3	3,537	17,684	9	60	$1,935	$0.12	2.04	2.04
Refrigerator recycling	2	8,624	43,120	2	8,193	40,964	18	140	$1,323	$0.04	3.70	3.56
ENERGY STAR Refrigerator: Top Fre	0	6,661	93,254	0	6,328	88,591	35	302	$4,815	$0.07	2.07	2.71
ENERGY STAR Refrigerator: Bottom	0	2,311	32,351	0	2,195	30,734	12	105	$1,941	$0.08	1.78	2.84
ENERGY STAR Refrigerator: Side Fr	0	171	2,396	0	163	2,276	1	8	$78	$0.05	3.27	3.73
30W LED Flood Light	0	102	1,121	0	82	897	0	3	$78	$0.11	1.12	3.75
120W LED Canopy Light 5000K	5	5,958	65,538	4	4,766	52,430	20	179	$2,610	$0.06	1.96	1.96
-- MANY ADDITIONAL LIGHTING MEASURES ARE LISTED -- (see electronic file for details)												
Outdoor Photo Cell Sensor	0	600	6,599	0	360	3,959	1	13	$542	$0.17	0.71	1.59
Freezer Curtain 3ft Quick Mount D	0	495	2,970	0	396	2,376	1	8	$398	$0.19	0.61	0.61
1/15HP-1/20HP Electronically Com	80	8,235	123,525	64	6,588	98,820	38	337	$6,888	$0.09	1.32	1.32
Subtotal	1,922	260,699	3,156,438	1,547	217,485	2,633,665	1,030	9,060	$207,328	$0.10	1.64	1.95
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	1,922	260,699	3,156,438	1,547	217,485	2,633,665	1,030	9,060	$207,328	$0.10	1.64	1.95

Biggs at a Glance

- Climate Zone(s): 11
- Customers: 727
- Total annual retail sales (MWh): 15,028
- Annual Retail Revenue: $714,192
- Annual energy efficiency expenditures for reporting year: $11,488
- Gross annual savings from reporting year portfolio (MWh): 24



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 5% load increase in FY 2019. This increased load occurred across all sectors. 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 it was found that our Streetlight Replacement Project was incomplete, having missed a small, older neighborhood. 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.

Program and Portfolio Highlights

Commercial, Industrial and Agricultural Programs

- Commercial/Industrial Lighting Program: Customized Lighting Retrofit Rebate Program available to all commercial customers and educational facilities.
- Commercial HVAC Program: Customized HVAC Retrofit and 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

Limited complimentary Energy Efficiency audits are conducted by Efficiency Services Group for high-use customers.

Residential Rebate Programs were suspended in FY 2019 as we did not choose to renew our Weatherization Program through Community Action Agency. We are currently analyzing a potential contract with RWI to provide energy audits and weatherization measures.

Complementary Programs

- Low-Income Programs: Biggs works with Community Action Agency of Butte County to provide 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 and 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 the NCPA website and our city website. With the understanding that all programs do not need to 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 $16,000 toward fulfilling our EM&V requirement.

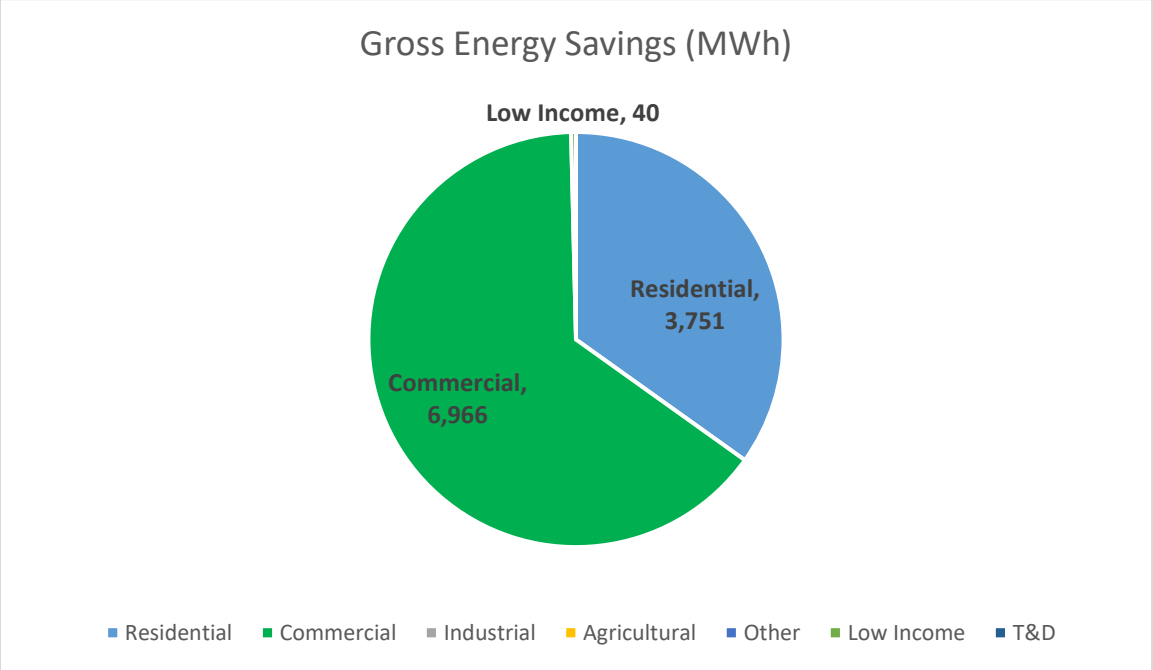
Major Differences or Diversions from California POU TRM for Energy Savings

2016 TRM and 2014 DEER were used to calculate savings.

BIGGS	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
LED Street Lighting Retrofit	0	24,444	122,220	0	22,000	109,998	56	375	$11,488	$0.11	0.88	0.88
Subtotal	0	24,444	122,220	0	22,000	109,998	56	375	$11,488	$0.11	0.88	0.88
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	0	24,444	122,220	0	22,000	109,998	56	375	$11,488	$0.11	0.88	0.88

Burbank at a Glance

- Climate Zone(s): 9
- Customers: 53,307
- Total annual retail sales (MWh): 1,060,549
- Annual Retail Revenue: $163,483,837
- Annual energy efficiency expenditures for reporting year: $3,371,648
- Gross annual savings from reporting year portfolio (MWh): 10,757



Burbank Overview

Burbank is known as the "Media Capital of the World." It is home to numerous media and entertainment companies, including two of the world's largest studios, Warner Bros. and the Walt Disney Company. There are also thousands of smaller businesses in the City, many of whom moved to Burbank in the early 1990s after the aerospace industry was contracted, and real estate became plentiful and cheap.

Burbank also has a vibrant residential community, with a housing mix of about 21,750 single-family homes that range from post-war bungalows to two-story homes. There are also about 22,500 multi-family homes, a figure that continues to increase with infill and high-density development.

BWP provides affordable and reliable utility services to its residential and business customers. In addition, BWP offers a fiber optic networking service to its business customers. BWP's energy efficiency portfolio is designed to reflect its organizational mission to provide sustainable, affordable, and reliable service to all of the residents and businesses.

BWP continuously advocates for accelerated Transportation Electrification (TE) adoption by promoting EV purchases and EV charger rebates. The Burbank City Council adopted the utility's IRP in December 2018, which directs BWP to "encourage growth in beneficial electrification that reduces GHG emissions, including EVs." The plan outlined that TE is vital for reducing GHG emissions and integrating renewable energy. To carry out the action items of the IRP, the utility developed a comprehensive TE plan to increase EV adoption by Burbank customers. In FY 2019 alone, BWP installed 16 new Level 2 (240 volts) EV chargers at the Burbank Town Center Mall, making it the largest public EV charging location in the City. BWP also collaborated with the Hollywood Burbank Airport to install a new Direct Current (DC) Fast Charger at the entrance of the airport's short-term parking structure, where visitors can charge their EVs in 20-30 minutes.

Furthermore, BWP continues to host regional EV Ride and Drive events to educate, engage, and empower BWP customers with up-to-date TE knowledge and benefits. BWP collaborated with the City of Glendale and the City of Pasadena to display EVs for the event attendees who could take a test drive and engage with EV owners and experts. The EV Ride and Drive event took place in January 2019 and was attended by 110 guests. The event featured information on public charging station locations, and most importantly, it addressed the issue of "range anxiety." BWP also featured information on EV charger rebates and promoted the advantages of the Time of Use (TOU) electric billing rate to help reduce peak demand consumption. In addition, BWP distributed a print edition of the Electric Car Insider's EV Buyer's Guide to the event attendees.

Major Program and Portfolio Changes

There were no major program changes implemented in FY 2019.

Program and Portfolio Highlights

BWP manages a comprehensive portfolio of energy efficiency programs for residential and commercial customers focusing on energy efficiency, peak load reduction, and greenhouse gas savings.

Among them, the Home Improvement Program (HIP) continues to serve BWP's residential customers offering energy and water conservation services through several home visits at no cost for customers. The first phase of HIP includes in-home energy and water surveys, education on energy and water efficiency and conservation, and direct installation of energy and water conservation measures. The second phase includes attic insulation, duct sealing and measuring, air sealing, and combustion safety tests.

Burbank Water and Power (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 SoCalGas and the Metropolitan Water District of Southern California, BWP has been able to reduce energy and water use at customers' homes.

During FY 2019, BWP focused on increasing energy and GHG savings through HIP by maintaining its marketing target on single-family homes and increasing its packaged weatherization retrofits on qualified homes. In FY 2019, the program realized a 21 percent increase in weatherization retrofits

compared to the previous fiscal year, prompting a 2 percent increase in peak demand savings and a 7 percent increase in energy and greenhouse gas savings.

Commercial, Industrial and Agricultural Programs

Expenditures for commercial, industrial, and institutional programs were $1,343,155.21, with the delivery of 2.2 MW of peak-load reduction and 6,966 MWh in annual energy savings.

- Business Rebates: Rebates are awarded to Burbank businesses who retire their inefficient equipment and install new energy-efficient products.
- Business Bucks Program: The program offers an energy efficiency survey and retrofits to small and mid-sized businesses.
- Upstream HVAC Program: The program provides rebates to the wholesale distributors to encourage stocking and promotion of high efficiency HVAC equipment.

BWP offers two additional programs that fall into both residential and commercial categories. They include:

- Made in the Shade Program: The program provides complimentary shade trees and arborist consulting services to residential and commercial customers to ensure that the trees are properly sited and planted. When properly sited, mature shade trees provide shade that helps reduce air conditioning costs.
- AC Tune-Up Program: The program provides air conditioning tune-up services to residential and commercial customers to help them save energy by ensuring that their air conditioning and duct systems are functioning at the optimal level.

Electric Vehicles (EV)

EV Charging Station Rebates: Residential and commercial customers who install a Level 2 (240V) EV charger are eligible for a rebate from BWP. Residential customers can get a reimbursement for up to $500 per charging station for their homes, and commercial customers can get a rebate for up to $2,000 per charging station for their businesses.

Codes and Standards

BWP has recorded 2,564 MWh and 0.508 MW of energy and peak demand savings that are drawn from the statewide allocation of energy and peak demand savings credits for FY 2019 due to the State's Building and Appliance Standards that are applied and enforced in the Burbank service territory.

Residential Programs

Expenditures for residential programs were $2,028,492.84, with the delivery of 0.91 MW of peak-load reduction and 3,791 MWh in annual energy savings.

- Home Rewards Rebates Program: BWP provides rebates for the purchase and installation of ENERGY STAR rated appliances and high-efficiency measures.
- LED Distribution: BWP distributes LED light bulbs to residents at numerous events throughout the community, as well as through energy programs and surveys.
- The Livingwise Program: The program provides energy and water education services, materials, and conservation kits to sixth-grade students attending public school in Burbank.
- Home Energy Reports Web Portal: The portal provides residential customers with web access to their electric usage information in hourly, daily, weekly, and monthly intervals to help them better understand their energy use and reduce their electricity consumption.

Complementary Programs

- Lifeline Program: BWP's Lifeline Program offers a reduced electric rate, an exemption from the monthly Customer Service Charge and the Utility User's Tax for income-qualified customers.
- Low-Income Refrigerator Exchange Program: BWP offers a program to income-qualified and Lifeline approved customers for the replacement of an old inefficient refrigerator with a new ENERGY STAR certified refrigerator at no cost. Through this program, 98 inefficient refrigerators were removed and replaced with more efficient models, resulting in more than 40,376 kWh of annual electricity savings.

Evaluation, Measurement & Verification Studies

BWP is committed to providing cost-effective, ongoing EM&V efforts for its energy efficiency programs. EM&V costs are covered in the individual program budgets. In addition to periodic program audits, BWP performs the following in support of EM&V activities:

BWP uses a third party to perform home improvement quality inspections for 10% of HIP participants to ensure that services performed comply with the standards described by the Building Performance Institute, Inc. (BPI). BWP uses a third-party verifier to perform quality inspections for 100% of AC Tune-Up Program participants.

Major Differences or Diversions from California POU TRM for Energy Savings

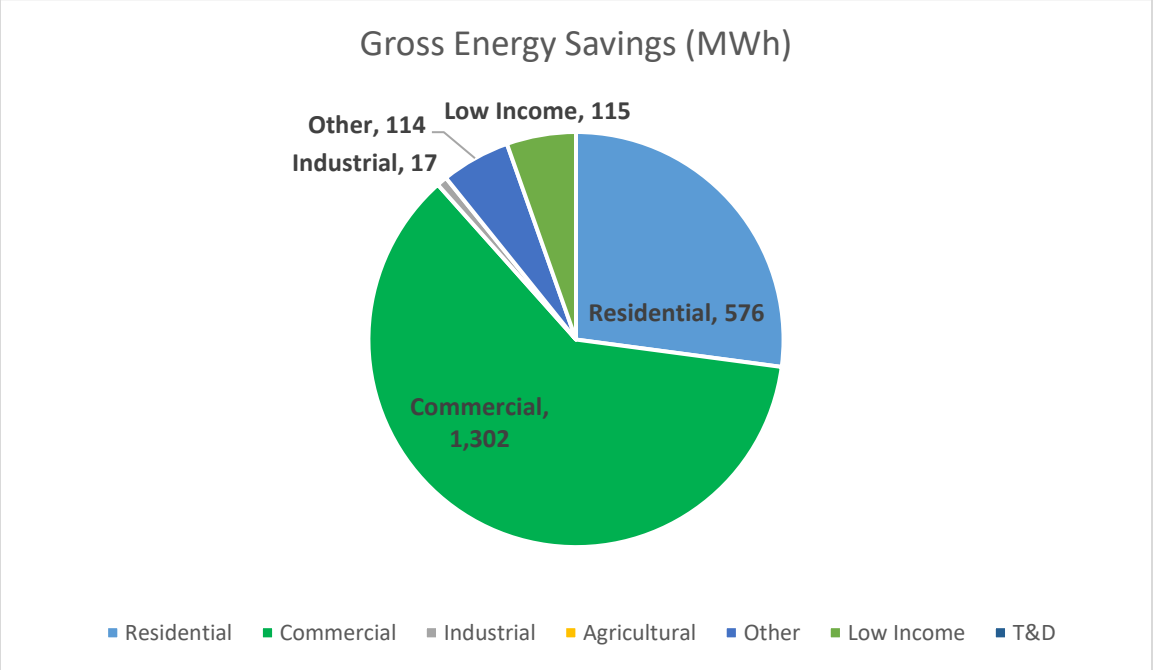
Most energy savings values used to evaluate BWP's program performance were obtained from the Technical Reference Manual (TRM) developed for California's Publicly Owned Utilities (POUs) by a third-party firm, ERS. If a specific measure cannot be found in the TRM, BWP will generally rely on a verified utility work paper or custom savings analysis along with vendor calculations to estimate energy savings.

BURBANK	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
LED Distribution	0	248	3,720	0	248	3,720	2	13	$652	$0.23	0.55	0.55
AC Tune-Up Program	223	178,863	1,788,630	223	178,863	1,788,630	818	6,098	$98,684	$0.07	4.95	4.95
Business Rebates - HVAC	21	26,343	395,145	21	26,343	395,145	136	1,347	$14,656	$0.05	2.56	0.50
Business Rebates - LED Lighting	1,581	5,257,777	57,835,547	1,581	5,257,777	57,835,547	21,104	197,191	$838,186	$0.02	6.40	1.76
Business Rebates - LEED Gold Certification	0	415,225	4,567,475	0	415,225	4,567,475	1,692	15,573	$62,095	$0.02	6.77	0.41
Business Rebates - Chiller	183	226,266	4,525,320	183	226,266	4,525,320	1,516	15,429	$58,796	$0.02	6.98	1.96
Business Rebates - HVAC Control System	0	95,130	1,426,950	0	95,130	1,426,950	491	4,865	$16,693	$0.02	8.11	3.66
Home Improvement Program - LED Lighting	0	4,548	68,220	0	4,548	68,220	28	233	$13,938	$0.27	0.47	0.47
Home Improvement Program - Duct Sealing	135	84,968	1,699,360	135	84,968	1,699,360	715	5,794	$325,744	$0.28	1.25	1.25
Home Improvement Program - Audit	0	279,654	838,962	0	279,654	838,962	378	2,860	$141,901	$0.18	0.59	0.59
Home Improvement Program - AC Tune-Up	132	89,859	539,151	132	89,859	539,151	264	1,838	$105,898	$0.22	1.48	2.57
Home Improvement Program - Attic Insulation	365	292,925	5,858,495	102	82,019	1,640,379	690	5,593	$670,306	$0.60	0.59	0.59
Home Improvement Program - Air Sealing	0	2,510	27,612	0	2,510	27,612	12	94	$84,385	$3.77	0.09	0.09
Home Rewards Rebates - Central Air Conditioning SEER 18	1	1,890	28,350	1	1,890	28,350	12	97	$7,120	$0.34	1.01	1.01
Home Rewards Rebates - Energy Star Refrigerator	0	11,594	162,316	0	8,116	113,621	45	387	$10,913	$0.13	1.13	1.13
Home Rewards Rebates - Central Air Conditioning SEER 16	1	9,516	142,740	1	7,613	114,192	49	389	$32,946	$0.39	0.88	0.88
Home Rewards Rebates - Central Air Conditioning SEER 15	1	1,058	15,870	1	1,058	15,870	7	54	$3,730	$0.31	1.08	1.08
Home Rewards Rebates - Variable Speed Pool Pump	3	55,942	559,420	2	33,565	335,652	139	1,144	$21,358	$0.08	1.76	1.76
Home Rewards Rebates - Energy Star Ceiling Fan	1	906	9,060	1	906	9,060	4	31	$402	$0.05	6.15	6.15
Home Rewards Rebates - Smart Thermostat	0	33,673	336,730	0	33,673	336,730	154	1,148	$19,164	$0.07	4.80	4.80
Home Rewards Rebates - Energy Star Room Air Conditioner	1	1,870	16,830	1	1,870	16,830	8	57	$1,270	$0.09	3.68	3.68
Home Rewards Rebates - Attic Insulation	34	27,451	549,027	34	27,451	549,027	231	1,872	$20,004	$0.05	6.56	6.56
Home Rewards Rebates - Wall Insulation	0	1,559	31,173	0	436	8,728	4	30	$788	$0.13	2.65	2.65
Made in the Shade Program	13	55,413	1,662,375	13	55,413	1,662,375	682	5,668	$70,034	$0.07	5.10	5.10
Business Bucks - Retrofits	0	1,511	22,669	0	1,511	22,669	8	77	$1,161	$0.07	1.74	1.74
Business Bucks - LED Lighting	17	80,911	809,110	17	80,911	809,110	299	2,759	$42,182	$0.06	1.79	1.79
Business Bucks - LED Exit Signs	0	326	3,586	0	326	3,586	1	12	$286	$0.10	1.16	1.16
Refrigerator Round-Up Program	2	10,400	52,000	1	7,280	36,400	16	124	$4,322	$0.13	0.98	0.98
LivingWise Program	0	150,147	1,351,323	0	150,147	1,351,323	560	4,607	$63,200	$0.06	2.08	2.08
Home Energy Reports	0	2,455,910	4,911,820	0	2,455,910	4,911,820	2,270	16,747	$135,092	$0.03	3.57	3.57
Upstream HVAC Program	383	862,412	12,936,180	383	862,412	12,936,180	4,454	44,106	$309,101	$0.03	3.97	3.97
Subtotal	3,097	10,716,804	103,175,167	2,833	10,473,898	98,617,995	36,790	336,239	3,175,010	$0.04	3.31	1.60
Low-Income	0	40,376	726,768	0	40,376	726,768	277	2,478	$82,698	$0.16	0.93	0.93
Codes & Standards	508	2,564,237	12,821,185	508	2,564,237	12,821,185	5,343	43,714	$113,940	$0.01	11.34	11.34
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	508	2,604,613	13,547,953	508	2,604,613	13,547,953	5,619	46,192	$196,638	$0.02	6.96	6.96
Total	3,605	13,321,417	116,723,120	3,341	13,078,511	112,165,948	42,410	382,431	$3,371,648	$0.04	3.52	1.76

COLTON

Colton at a Glance

- Climate Zone(s): 10
- Customers: 19,716
- Total annual retail sales (MWh): 347,400
- Annual Retail Revenue: $56,009,007
- Annual energy efficiency expenditures for reporting year: $1,430,391
- Gross annual savings from reporting year portfolio (MWh): 2,124



Colton Overview

Colton Electric Department (CED) continues to provide cost-effective energy efficiency and conservation programs for residents and businesses in the Colton Electric Service territory. CED has developed new strategies to engage residents and businesses to participate in energy efficiency by expanding its participation base to a new generation of online users. CED continues to focus on energy efficiency rebates, direct installation programs, inter-utility partnerships with SoCalGas, programs to better serve the low income, and education and outreach.

Major Program and Portfolio Changes

CED service territory has demographically begun to change with an increase of 2,442 in the ages of 21-34. With a more computer literate population growing in Colton, the Energy Services Division has begun to focus on online platforms to better serve customers with energy efficiency. During this reporting period, CED launched an online audit platform. The online audit has two levels for customers. One is a fast audit that takes less than 5 minutes and one is an advanced

audit that dives into more of the details of the home they live in. CED residential customers can select the one that best fits their time.
The online audit platform not only assists customers from home on their energy efficiency deficiencies but also links customers to an online Web shop that buys down the costs of energy efficiency products such as LED light bulbs, smart thermostats, and smart power strips. CED customers can now purchase energy efficiency items from the comfort of their homes and have the items directly shipped to their home at half the cost and free shipping.

Program and Portfolio Highlights

This reporting year the program that had the greatest impact was the launch of CED business sustainability partners programs. CED developed a sustainability partners program to encourage businesses to invest in sustainability. When a business does, an exemplary job in energy efficiency updates, water conservation, and or organic/recycling they receive a triangle for each sector. The business is provided a clear wall plaque to display in the lobby from CED showing the community they are a sustainability partner. Once the business receives all three triangles, they are honored during Earth Month in April receiving a proclamation.

Commercial, Industrial and Agricultural Programs

- Non-Residential energy efficiency Rebates: 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.
- Commercial DI: Small business customers with less than 20 kW participated in an energy audit and direct install of energy efficiency measures up to $5,000 per business.
- 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 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: Commercial businesses that have inefficient refrigeration, lighting and cooling such as grocery stores can benefit from participating in this program. CED will provide funds for energy efficiency upgrades based on an energy efficiency audit.
- Multifamily Energy Efficiency Direct Install Program: apartment complexes throughout CED territory can apply to have common area energy efficiency 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.
- Online Energy Audit: Colton Electric Utility's new online energy assessment tool assists customers find ways to save energy and money. The MyEnergyXpert is easy to use and designed to be completed in just a few minutes. This assessment tool provides an easy to follow improvement plan. Residents will also be connected to rebates available through the online platform that also links to the website.
- Refrigerator Replacement Program Appliance Recycling Centers of America (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 fiscal year to buy down the cost of these items and provides free shipping.

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 Program: in partnership with SoCalGas, CED offers mobile home building envelope and lighting retrofits to qualifying customers at the same time as SoCalGas. SoCalGas 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 paid for the planning and construction of a community solar project.
- Research, Development, and Demonstration: CED participated in an emerging technology demonstration of 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 are available online at www.coltononline.com.

- Electric Vehicles: CED continues to grow its EV program. The utility currently has 17 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 1 fast charger. CED continues to work on facilitating the state incentives to expand fleet EVs with participation in LCFS and developing rebate programs to incentivize customers to participate.
- 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 5 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 and energy education. It is emailed in a digital print format but also includes video clips on energy efficiency. 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 California 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 2016 Title 24 code changes.

COLTON	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Street Light Retrofit	10	114,318	2,857,950	10	114,318	2,857,950	1,360	9,744	$54,895	$0.04	3.86	1.29
Split-system air conditioner, 16 SEI	1	780	11,700	0	624	9,360	4	32	$541	$1.65	0.16	0.39
Whole house fan	0	2,088	41,760	0	585	11,693	4	33	$644	$0.18	1.52	1.11
ENERGY STAR Refrigerator: Bottom	0	1,739	24,340	0	1,217	17,038	7	58	$556	$0.11	1.37	1.71
Ductless mini-split air conditioner,	0	248	3,720	0	198	2,976	1	10	$48,172	$0.80	0.33	0.30
Occupancy Sensors	1	3,799	30,389	1	3,799	30,389	12	104	$619	$0.03	4.03	5.00
Solar attic fan	2	2,065	20,650	0	578	5,782	3	20	$354	$0.37	0.69	0.62
PTAC - <7,000 Btuh - motel, replace	3	4,200	63,000	2	3,570	53,550	17	183	$1,362	$0.08	2.03	1.66
Residential Ceiling Insulation Reba	0	2,070	41,402	0	2,070	41,402	17	141	$2,325	$0.17	1.69	0.27
ENERGY STAR dishwasher, standar	0	338	3,380	0	203	2,028	2	19	$92	$0.64	0.29	0.56
LED holiday lights	17	2,184	10,920	9	1,179	5,897	3	20	$172	$0.44	0.25	0.00
Programmable Thermostats	0	13,341	146,751	0	13,341	146,751	53	500	$2,863	$0.03	3.71	5.00
Split-system air conditioner 21 SEE	0	113	1,695	0	90	1,356	1	5	$78	$0.32	0.81	0.90
ENERGY STAR ceiling fan	3	3,171	31,710	1	888	8,879	4	30	$542	$0.15	1.73	1.55
Window Replacement Rebate	7	5,987	119,745	7	5,987	119,745	50	408	$6,724	$0.16	1.81	0.33
-- MANY ADDITIONAL LIGHTING MEASURES ARE LISTED -- (see electronic file for details)												
Smart Power Strip	0	72	576	0	43	346	0	1	$12	$0.14	0.96	0.65
Programmable Thermostats	0	2,668	29,350	0	2,668	29,350	11	100	$573	$0.03	3.71	5.00
CBM Motorsports Lighting Retrofit	1	17,297	172,970	1	17,297	172,970	65	590	$54,519	$0.39	0.30	0.29
Small Business Direct Install	34	292,960	3,515,524	34	292,960	3,515,524	1,329	11,986	$63,573	$0.07	1.65	1.65
Keep Your Cool Refrigeration	14	334,107	3,006,963	14	334,107	3,006,963	1,152	10,252	$60,460	$0.07	1.70	1.70
LED holiday lights	5	658	3,290	3	355	1,777	1	6	$52	$0.80	0.14	0.00
Multi-Family DI	7	65,751	657,510	7	65,751	657,510	252	2,242	$12,849	$0.09	1.33	1.33
Residential EE DI	485	400,077	4,000,770	485	400,077	4,000,770	1,717	13,641	$113,960	$0.11	1.12	1.12
Municipal Energy Efficiency DI Proj	9	31,367	784,175	9	31,367	784,175	276	2,674	$13,251	$0.23	0.59	0.87
Living Wise Home Energy School ki	5	120,435	1,204,350	5	120,435	1,204,350	541	4,106	$73,464	$0.10	2.43	2.44
Subtotal	653	2,009,363	22,732,660	638	1,996,248	22,580,579	9,169	77,011	$632,763	$0.08	1.74	1.25
Refrigerator recycling	6	30,184	150,920	4	21,129	105,644	47	360	$3,659	$0.08	1.66	0.09
ENERGY STAR Refrigerator: Top Fre	0	5,181	72,531	0	3,627	50,772	20	173	$1,656	$0.56	0.26	0.01
Low Income Mobile Home Program	37	79,330	872,626	10	22,212	244,335	109	839	14,734	$0.33	0.78	0.78
Low-Income Subtotal	43	114,694	1,096,076	15	46,968	400,751	176	1,372	$20,049	$0.28	0.73	0.08
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	43	114,694	1,096,076	15	46,968	400,751	176	1,372	$20,049	$0.28	$0.73	$0.08
Total	696	2,124,058	23,828,737	653	2,043,216	22,981,330	9,344	78,384	652,812	$0.08	1.67	0.87

CORONA

Corona at a Glance

- Climate Zone(s): 10
- Customers: 2,800
- Total annual retail sales (MWh): 143,300
- Annual Retail Revenue: $15,580,300
- Annual energy efficiency expenditures for reporting year: $0
- Gross annual savings from reporting year portfolio (MWh): 0

Corona Overview

Corona Department of Water & Power (CDWP) 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 27.4 MW (4.8% less than last year). Customers reside in climate zone 10 and 95% of energy sales were to non-residential customers.

All bundled customers' facilities met the applicable Title 24 requirements. The recent age of these facilities provides fewer energy efficiency upgrade opportunities.

Major Program and Portfolio Changes

CDWP continued to offer customers the same energy efficiency programs.

Program and Portfolio Highlights

No costs were expended for energy efficiency programs.

CDWP serves municipal facilities that can be interrupted as scheduled.

Commercial, Industrial and Agricultural 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.
- Incentives are available to install cost-effective lighting applications, that 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 install cost-effective refrigeration equipment that reduces annual energy usage or load requirements by a specified amount.
- Incentives are available to install cost-effective motors, pumps, and equipment that reduce annual energy usage by a specified amount.

- Incentives are available for the direct funding of projects on the utility-side of the meter that provide benefits to customers in terms of improved safety, system integrity, energy efficiency, conservation, or research and development.

Residential 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.
- Offer energy efficiency kits that include low flow showerheads, low flow faucet aerators, and energy conservation tips brochure.
- Rebates are available to 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 install pool pumps, which reduce energy usage by a specified amount.
- Incentives are available to install whole house fans, which reduce energy usage by a specified amount.

Complementary Programs

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

CDWP'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.

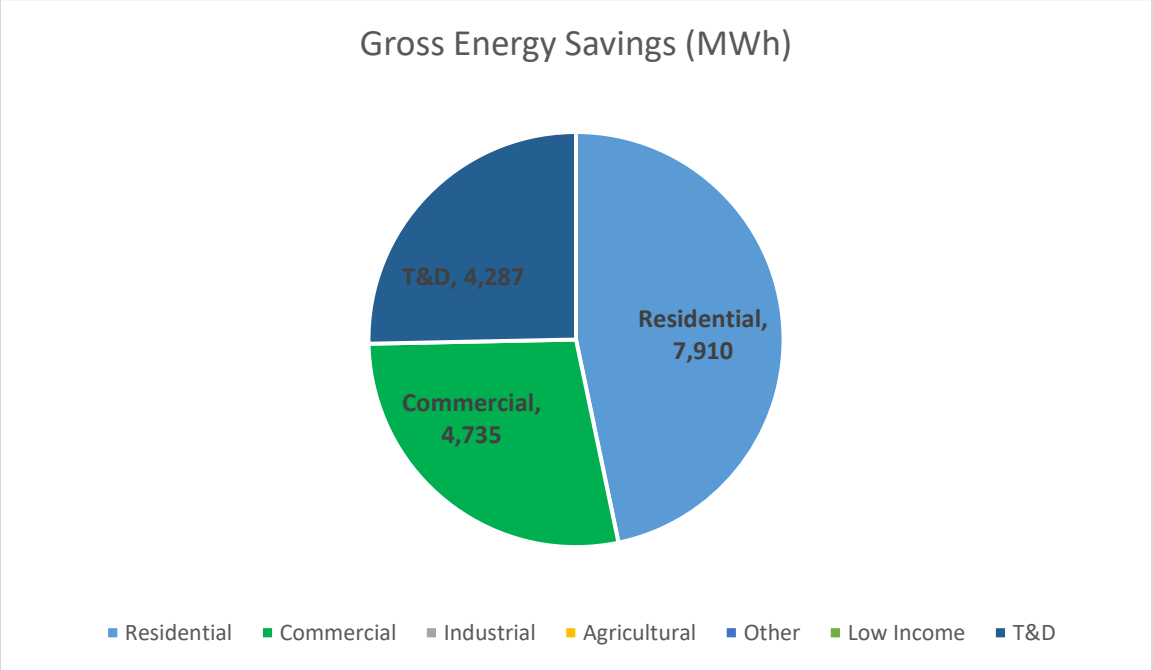
Evaluation, Measurement & Verification Studies

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

GLENDALE

Glendale at a Glance

- Climate Zone(s): 9
- Customers: 89,564
- Total annual retail sales (MWh): 1,026,505
- Annual Retail Revenue: $189,972,000
- Annual energy efficiency expenditures for reporting year: $2,502,100
- Gross annual savings from reporting year portfolio (MWh): 16,932



Glendale Overview

Glendale Water & Power (GWP) is a municipal utility that serves the citizens and community of Glendale, California including over 34,205 water and 89,564 electric customers located in Climate Zone 9. GWP continues to help 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. For the current FY 2019 reporting year, GWP 's energy efficiency programs saved a total Gross Annual Energy Savings (excluding codes and standards) of 16,932 MWh (1.6% of retail sales) and reduced peak demand by 1.6 MW (0.5% 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.

GWP is on a journey of maintaining our electric and water reliability while incorporating new technologies to make us a better utility provider, improve the customer experience, optimize performance, and measure our effectiveness. This past year, our utility has made many strides forward to change the way we conduct business by becoming a more innovative reliable service provider.

In 2019 the City of Glendale released a Request for Proposals for clean energy to potentially offset capacity being planned for repowering at our local Grayson Power Plant. These proposals were for clean energy project options for potentially incorporating them into GWP's integrated power supply portfolio. These project options will ideally incorporate sound alternatives that further GWP's efforts to meet state clean energy mandates, which are environmentally sustainable, and ensure reliable, efficient and cost-effective power provision to our customers now and into the future.

Major Program and Portfolio Changes

In FY 2019 we experienced an increase participation in multiple energy efficiency programs which resulted in higher kWh savings for this reporting year. The Business Energy Solutions program, Smart Business Energy Savings Upgrade program and the Smart Home energy and Water Saving Upgrade program resulted in higher participation and therefore yielded a higher energy savings for our overall portfolio. We also experience a decrease in our kW energy savings compared to previous reporting year. This was due to the unavailability of the behavioral demand response (DR) program for FY 2019 and therefore a total decrease in kW energy savings.

Program and Portfolio Highlights

Our Home Energy Reports, Business Energy Solutions program, Smart Business Energy Savings Upgrades and the Conservation Voltage Reduction pilot program continue to produce 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. Our Business Energy Solutions program is a 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. The Smart Business Energy Savings Upgrade program offers small and medium size customers the ability to participate in a comprehensive no-cost energy surveys and offers up to $2,000 worth of cost-effective energy conservation measures. The Conservation Voltage Reduction pilot program continued to expand which contributed to a slight annual energy savings increase.

Commercial, Industrial and Agricultural Programs

- 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.

- 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.
- 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.
- Business Customer eNewsletter - GWP is committed to promoting strong relationships with our business customers while maximizing customer interaction. Recognizing that a cornerstone in establishing trust and long-term customer satisfaction is the provision of consistent, targeted and engaging content, GWP utilizes an electronic newsletter solution that is able to provide news, builds relationships and provides water conservation and energy efficiency information to GWP's commercial customers.

Residential Programs

- Home Energy Reports - Provides six 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 three 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 2019, the program produced energy savings of 4,287 MWh.
- 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 EV 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 enhances our outreach, by pushing energy efficiency program, conservation and event messages directly to the IHD. In FY 2015 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 1,425 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.

Complementary Programs

Low-Income Programs: In FY 2019, 38% of the annual Public Benefits Charge (PBC) expenditures 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 - Residents and businesses in Glendale have taken action to go solar. As of 2019, the City had 1,805 interconnected solar systems, with the total capacity of 19.5 MW. Of these systems, 1,243 were incentivized, with a total capacity of 10.5 MW. The Smart Home Solar Solutions program continues to provide incentives to promote the installation of grid-connected solar photovoltaic systems in Glendale. GWP also offers program participants the ability to utilize PowerClerk, which is an online service that integrates best practices and self-service features for GWP's solar program staff and ability for solar applicants to fill out applications, electronically sign documents and review their application status.
- 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 and 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 offers Public Access EV charging station rebates to commercial customers who install a level 2 (240 Volt) or higher plug-in 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 peer-to-peer experiential learning driving events for prospective 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 2021 in support of AB 2021. For FY 2021 Glendale has budgeted $50,000 to its energy efficiency budget to conduct EM&V studies that will be conducted using 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 GWP 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 California POU TRM for Energy Savings

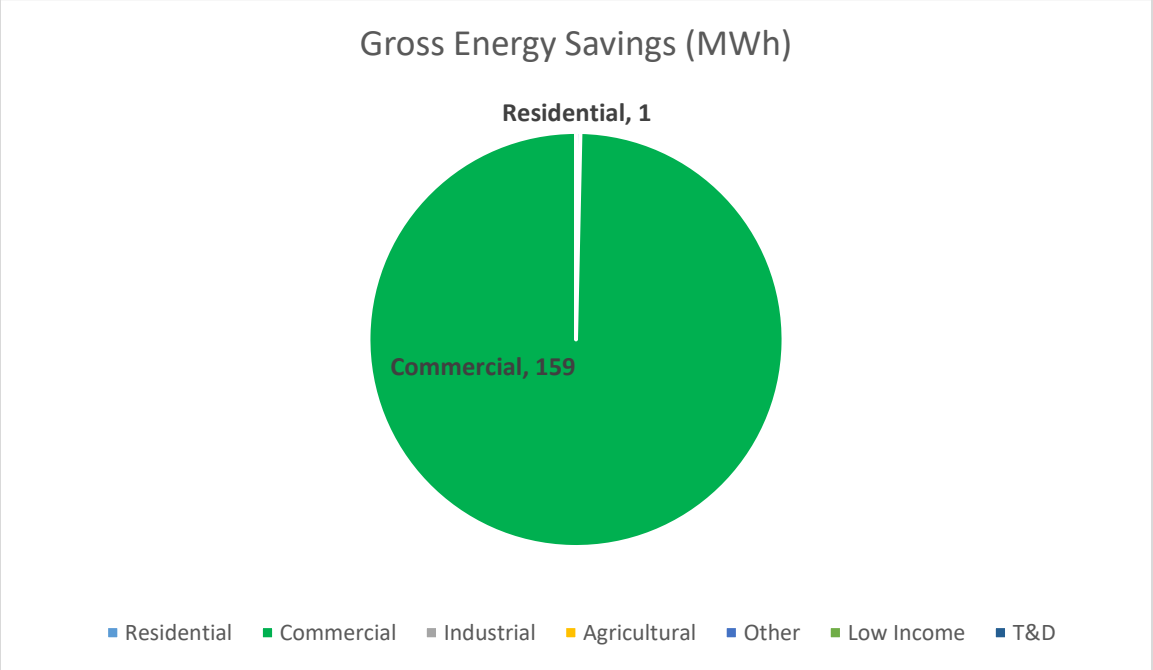
The sources of energy savings used to calculate program performance was a combination of using the TRM, workpapers and third-party Energy Efficiency verification.

GLENDALE	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Variable speed residential pool pu	1	28,982	289,820	1	17,389	173,892	72	593	$10,739	$0.07	1.82	0.99
ENERGY STAR dishwasher, standar	0	2,756	27,560	0	1,654	16,536	12	152	$4,164	$0.30	0.60	0.91
Energy Star Room Air Conditioner-	0	34	306	0	34	306	0	1	$126	$0.49	0.67	3.24
Solar attic fan	1	868	8,680	0	243	2,430	1	9	$605	$0.30	1.10	0.80
ENERGY STAR ceiling fan	1	1,510	15,100	0	423	4,228	2	14	$536	$0.15	2.15	1.88
Split-system air conditioner, 20 SEI	3	3,136	47,040	2	2,509	37,632	16	128	$5,748	$0.20	1.66	1.16
ENERGY STAR room air conditioner	0	218	1,962	0	174	1,570	1	5	$254	$0.19	1.71	1.83
- MANY ADDITIONAL A/C and LIGHTING MEASURES ARE LISTED (see electronic file for details)												
Split-system air conditioner, 18 SEI	0	280	4,200	0	224	3,360	1	11	$663	$0.26	1.29	0.84
Smart Thermostat- FY 18-19	0	0	0	0	0	0	0	0	$13,200	$0.00	0.00	0.00
ENERGY STAR clothes washer, elec	0	11,360	124,960	0	3,522	38,738	16	132	$3,947	$0.13	1.09	0.83
Whole house fan	0	4,961	99,220	0	1,389	27,782	10	71	$2,904	$0.15	2.24	1.33
ENERGY STAR dishwasher, standar	0	1,508	15,080	0	905	9,048	4	31	$1,144	$0.15	0.89	1.27
Shade Trees- FY 18-19	93	76,570	2,297,100	74	61,256	1,837,680	754	6,266	$68,371	$0.07	5.77	5.77
Small Business Energy Savings Retr	242	745,390	7,453,900	242	745,390	7,453,900	2,792	25,414	$475,626	$0.08	1.44	1.44
Small Business Energy Savings Aud	172	277,641	832,923	172	277,641	832,923	344	2,840	$58,093	$0.07	1.35	1.35
Smart Thermostat and Installation	0	33,371	367,081	0	33,371	367,081	166	1,252	$43,085	$0.14	2.29	2.29
Home Energy Reports- Opower FY	0	6,395,943	6,395,943	0	6,395,943	6,395,943	3,018	21,807	$627,462	$0.10	0.99	0.99
Education Programs- Audits FY 18-	116	540,258	1,620,774	116	540,258	1,620,774	730	5,526	$7,128	$0.00	22.51	22.51
Education Programs- Retrofits FY 1	0	190,522	1,905,225	0	190,522	1,905,225	818	6,496	$67,513	$0.04	2.81	2.81
Smart Home Upgrade- Audits- FY 1	0	134,112	402,336	0	134,112	402,336	181	1,372	$79,484	$0.21	0.50	0.50
BES- Compressor Replacement Pro	204	484,159	9,683,180	204	484,159	9,683,180	3,294	33,015	$91,541	$0.01	10.21	10.21
BES- Commercial Lighting Project-	456	2,621,300	28,834,300	456	2,621,300	28,834,300	10,651	98,311	$308,138	$0.01	8.54	8.54
BES- VFD and EMS Projects - FY 18-	68	591,442	8,280,188	68	591,442	8,280,188	2,920	28,231	$73,027	$0.01	11.55	11.55
Small Business HVAC Tune Up- FY	17	14,664	146,640	17	14,664	146,640	47	500	$3,543	$0.03	5.17	5.17
Online Marketplace- LED 6 W repla	0	918	13,770	0	496	7,436	3	25	$1,191	$0.21	0.61	0.26
Online Marketplace- LED 6-9 W rep	0	2,079	31,185	0	1,123	16,840	7	57	$2,544	$0.20	0.64	0.47
Subtotal	1,584	12,639,985	73,853,886	1,560	12,582,532	72,863,716	27,830	248,778	2,309,731	$0.04	3.13	3.08
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	458	2,309,794	2,309,794	458	2,309,794	2,309,794	1,042	7,875	$11,153	$0.00	22.51	22.51
T&D	0	4,287,410	4,287,410	0	4,287,410	4,287,410	2,360	14,618	$169,928	$0.04	6.72	6.72
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	458	6,597,204	6,597,204	458	6,597,204	6,597,204	3,401	22,493	$181,082	$0.03	7.70	7.70
Total	2,042	19,237,189	80,451,090	2,018	19,179,736	79,460,920	31,231	271,271	$2,490,813	$0.04	3.46	3.41

GRIDLEY

Gridley at a Glance

- Climate Zone(s): 11
- Customers: 2,986
- Total annual retail sales (MWh): 30,195
- Annual Retail Revenue: $6,196,709
- Annual energy efficiency expenditures for reporting year: $115,384
- Gross annual savings from reporting year portfolio (MWh): 160



Gridley Overview

Gridley is a neighborhood community with agricultural roots and an historic downtown located in Butte County, California, United States, 29 miles south of Chico, California and 56 miles north of Sacramento, California.

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.

Major Program and Portfolio Changes

There were no major program changes implemented in FY 2019. 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.

Net annual energy savings have increased from last year by 47%. The program activity tends to fluctuate from year to year. The increase from FY 2018 was due to higher participation in the commercial programs.

Program and Portfolio Highlights

The commercial program was responsible for 99.7% of the total net kWh savings. GMU is pleased to be able to support local businesses with the program.

Commercial, Industrial and 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 FY 2020 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 California POU TRM for Energy Savings

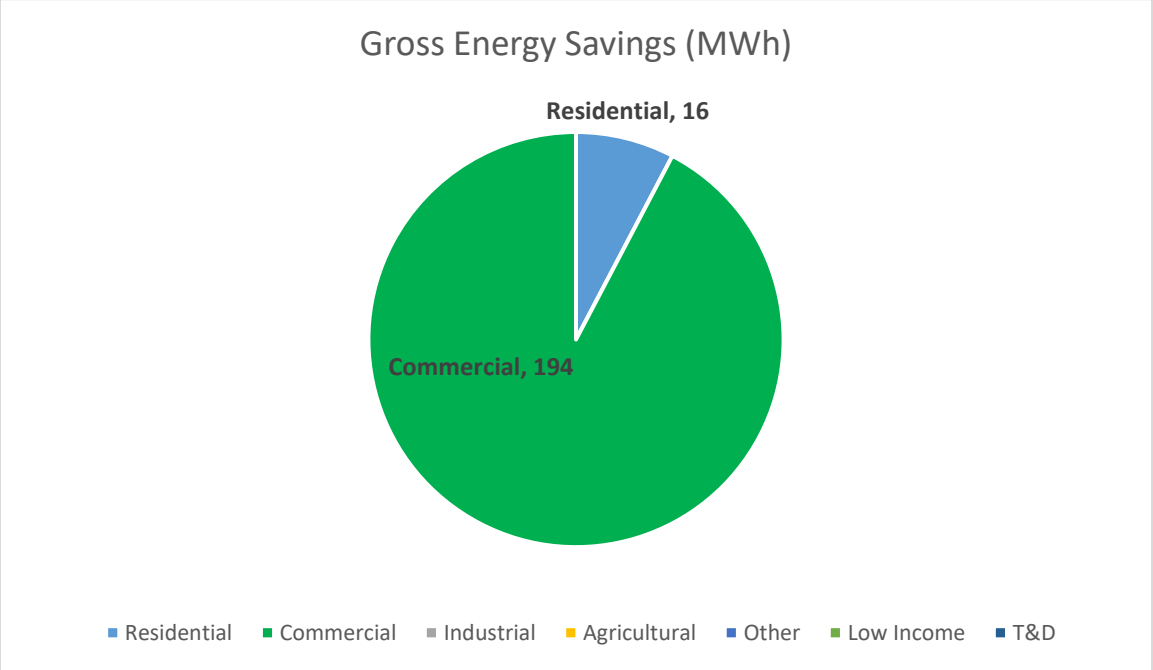
GMU has relied heavily on the savings listed in the TRM. Non-residential lighting and custom projects rely on custom savings calculations.

GRIDLEY	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
ENERGY STAR Refrigerator: >7.75 c	0	389	5,448	0	272	3,813	1	13	$8,602	$2.96	0.04	0.04
Non-Residential Lighting Program	12	68,620	823,439	9	54,896	658,751	248	2,246	$23,632	$0.05	2.61	2.16
Non-Residential Lighting Program	0	90,688	1,088,255	0	72,550	870,604	422	2,968	$79,328	$0.11	1.02	1.02
Split-system air conditioner, 16 SE	0	157	2,360	0	126	1,888	1	6	$3,822	$2.71	0.13	0.13
Subtotal	12	159,854	1,919,501	9	127,844	1,535,056	672	5,234	$115,384	$0.09	1.24	1.19
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	12	159,854	1,919,501	9	127,844	1,535,056	672	5,234	$115,384	$0.09	1.24	1.19

HEALDSBURG

Healdsburg at a Glance

- Climate Zone(s): 2
- Customers: 5,999
- Total annual retail sales (MWh): 75,132
- Annual Retail Revenue: $12,280,289
- Annual energy efficiency expenditures for reporting year: $123,118
- Gross annual savings from reporting year portfolio (MWh): 210



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.

Major Program and Portfolio Changes

In FY 2020, the Healdsburg Electric Department implemented a direct install commercial refrigeration program called "Keep Your Cool". In calendar year 2019, $15,000 was expended

for refrigeration measures yielding in 64,600 kWh savings and 12.38 peak demand reduction. The remainder of the funding will be expended in calendar year 2020. The Keep Your Cool program is designed to be easy to participate in, increase energy efficiency in refrigeration demands, an improve customer satisfaction.

The residential LED rebate was discontinued at the end of 2019. The administrative costs of processing residential LED rebates were adversely impacting cost effectiveness. While the Electric Department does not offer a rebate, residents can receive free screw-in LEDs at community events, in-home audits, DIY energy tool kit rentals, and pickup requests.

Program and Portfolio Highlights

In 2019 the greatest energy efficiencies achieved were by the custom commercial energy efficiency program. The City's custom commercial programs allow the end user flexibility in the development of retrofits that drive measurable savings. For 2019 the City was able to work directly with commercial customers to drive lighting upgrades.

Commercial, Industrial and Agricultural Programs

The City offers the following commercial programs:

- Commercial Lighting Rebates: 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 Rebates: The City offers commercial customers a wide selection of refrigeration and HVAC rebates. In addition to the Keep Your Cool direct install program, custom rebates are performance based and provide greater financial incentives 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:

- 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 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 such as ceiling, wall, and duct insulation, 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 423 families, or about 7% 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 PV solar array installations in both residential and commercial sectors. In 2019, the City had 233 PV arrays installed with a total of 2.10 MW AC capacity.
- 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 2019.

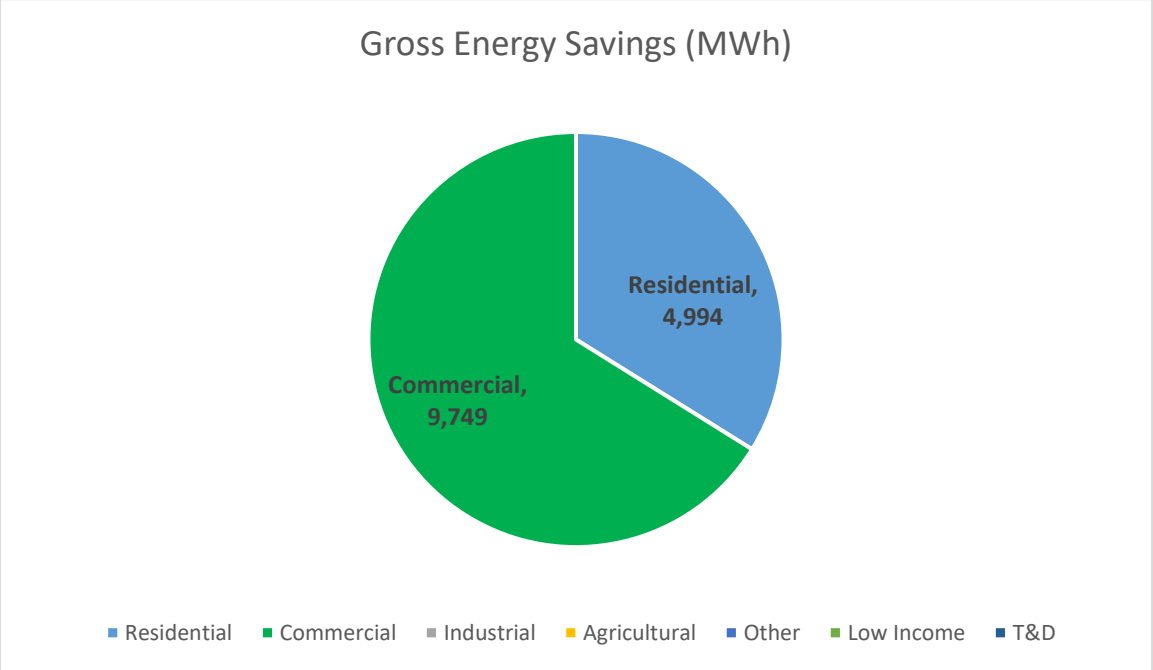
Past EM&V reports can be found through the following link: https://www.cmua.org/emv-reports

HEALDSBURG	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Ceiling insulation, increase to R-38	0	1,361	27,212	0	381	7,619	20	305	$4,714	$0.91	0.63	0.64
Custom Window Replacement: Cle	4	2,635	52,702	2	1,449	28,986	13	99	$7,524	$0.38	0.66	0.80
Residential Home Energy Audit	0	0	0	0	0	0	0	0	$772	$0.00	0.00	0.00
Chevron_Refrigeration	3	13,445	134,449	2	10,353	103,526	41	353	$4,855	$0.06	1.88	1.88
Healdsburg Gas_Refrigeration	3	10,220	102,200	3	7,869	78,694	30	268	$3,422	$0.05	2.28	2.28
El Sombrero_Refrigeration	1	7,064	70,636	1	5,439	54,390	21	185	$2,517	$0.06	2.14	2.14
Healdsburg Liquor_Refrigeration	2	16,197	161,965	2	12,471	124,713	47	425	$6,971	$0.07	1.77	1.77
Casa del Mole_Refrigeration	3	17,748	177,484	3	13,666	136,663	52	466	$7,226	$0.06	1.87	1.87
Ductless mini-split heat pump, 16 S	0	2,280	34,200	0	1,824	27,360	13	93	$9,647	$0.47	0.51	0.54
Split-system air conditioner, 16 SEI	0	217	3,255	0	174	2,604	1	9	$1,015	$0.52	0.46	0.30
Split-system air conditioner, 15 SEI	0	232	3,480	0	186	2,784	1	9	$924	$0.44	0.54	0.32
HVAC Tune Up	0	0	0	0	0	0	0	0	$300	$0.00	0.00	0.00
ENERGY STAR Refrigerator: >7.75 c	0	1,816	25,423	0	1,271	17,796	7	61	$3,090	$0.23	0.63	0.71
CEE Tier 3 clothes washer, electric	0	730	8,030	0	226	2,489	1	8	$441	$0.22	0.63	0.49
LED holiday lights	0	21	105	0	11	57	0	0	$27	$0.52	0.21	0.15
LED 10-13 W replacing 13-15 W CFL	0	327	4,905	0	177	2,649	1	9	$533	$0.27	0.47	0.14
LED 9W Giveaway	0	900	13,500	0	486	7,290	3	25	$717	$0.22	0.56	0.56
Variable speed residential pool pu	0	1,711	17,110	0	1,027	10,266	4	35	$1,335	$0.16	0.86	0.51
Arbor Day_Shade Tree_Earth Day 2	0	3,908	78,150	0	3,321	66,428	24	226	$5,964	$0.34	0.37	0.37
Healdsburg Fire Dept_Lighting	1	13,617	163,408	1	11,575	138,897	51	474	$5,095	$0.05	2.30	2.01
Sonoma County Library_Lighting	5	20,815	249,779	4	17,693	212,312	76	724	$9,178	$0.05	1.89	0.77
Healdsburg Police Dept_Lighting	2	10,110	121,323	2	8,594	103,125	38	352	$4,123	$0.05	2.11	1.83
Healdsburg Corporation Yard_Light	0	13,991	167,892	0	11,892	142,708	53	487	$4,841	$0.04	2.48	2.76
Sauers Properties 1411 Grove St_Li	3	9,816	117,792	2	8,344	100,123	38	341	$4,546	$0.06	1.91	0.69
CVS_Lighting	10	60,542	726,504	9	51,461	617,528	232	2,105	$23,289	$0.05	2.33	2.04
Subtotal	38	209,702	2,461,506	30	169,889	1,989,007	768	7,061	$113,065	$0.08	1.50	1.23
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	38	209,702	2,461,506	30	169,889	1,989,007	768	7,061	$113,065	$0.08	1.50	1.23

IMPERIAL

Imperial at a Glance

- Climate Zone(s): 15
- Customers: 157,293
- Total annual retail sales (MWh): 3,325,115
- Annual Retail Revenue: $421,369,042
- Annual energy efficiency expenditures for reporting year: $7,580,171
- Gross annual savings from reporting year portfolio (MWh): 14,743



Imperial Overview

As the sixth largest utility in California, Imperial Irrigation District (IID) controls more than 1,200 MW of power 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 157,293 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 the previous year. Some new introductions during the 2019 year include:

- Low-income Appliance Recycling Program – This targeted program provides low-income customers with high electric bills the opportunity to request a new refrigerator to replace their older models, at no cost to customer.
- Electric Vehicle Charger Program – Provides a rebate to customers that install a Level 2 EV charger in their residence.
- Online Energy Rebate applications – IID now offers customers the opportunity to apply for their energy rebates online, as well as track the status of their payments.

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 and 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 have 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.
- 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, refrigerant charge adjustment, 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 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.
- Low-Income Refrigerator Replacement Program: This targeted program provides low-income customers with high electric bills the opportunity to request a new refrigerator to replace their older models, at no cost to customer.

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. In 2019, IID modified its rate assistance eligibility criteria to allow for greater participation such as a reduction in age for qualifying seniors and an increase in the maximum income level Residential Energy Assistance Program expenditures for the 2019 year totaled over $3.3M, with an average enrollment of 11,120 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.

Grant Funding

In addition to IID's energy efficiency portfolio, the IID awarded over $2M in scholarships and grant awards through alternative funding mechanisms. The awards promote education, energy efficiency and services/programs that benefit local ratepayers and the communities it serves.

Energy Storage:

The District's first ever battery energy storage system went online in November 2016. The project is a 30 MW, 20 MWH 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 also compensates net-surplus customers in accordance with the Distributive Self-Generation Service Rate
- E-Green Solar Program - in 2019, IID finalized its e-Green Community Solar Program that benefits all IID's qualified, low-income customers. The program utilizes a 23-year term power purchase agreement with Citizens Energy Corporation for 30 MW of solar energy, of which 10 MW has been allocated specifically for the e-Green program. The program allows 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.
- Green Energy Rate Program – Under the green energy rate, customers can designate how much renewable energy they wish to be served with. Customers can elect to be served up 100% of their energy needs with renewables through renewable energy or renewable energy credits.

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 California POU TRM for Energy Savings

IID utilized a combination of savings from the TRM, KEMA 2009 report, utility workpapers 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	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Heat pump, 15 SEER, 8.4 HSPF, Natu	58	152,280	2,284,200	50	132,484	1,987,254	683	6,776	$99,099	$0.07	1.95	8.61
Heat pump, 15 SEER, 8.4 HSPF, Early	87	230,698	3,460,470	76	200,707	3,010,609	1,278	10,265	$91,731	$0.04	6.40	14.34
Shade Screens	8	7,583	75,830	7	6,597	65,972	(9)	(435)	$8,102	$0.15	1.13	6.07
VSD Pool Pump - Natural Replacem	10	199,504	1,995,040	9	173,568	1,735,685	717	5,918	$70,376	$0.05	2.79	10.42
VSD Pool Pump - Early Retirement	37	165,967	1,659,670	33	144,391	1,443,913	596	4,923	$28,697	$0.02	5.70	13.84
ENERGY STAR Refrigerator	0	28,644	401,016	0	24,920	348,884	137	1,190	$18,439	$0.07	2.07	8.90
Split AC 15 SEER (12.5 EER) - Early R	25	57,343	860,145	22	49,888	748,326	318	2,551	$26,166	$0.05	5.58	13.74
Packaged AC 15 SEER (12.5 EER) - Ea	1	25,664	384,960	1	22,328	334,915	115	1,142	$9,850	$0.04	3.30	11.26
Packaged Terminal Air-Conditioner	10	25,326	506,520	9	22,034	440,672	156	1,502	$4,255	$0.01	8.91	15.62
-- MANY ADDITIONAL LIGHTING & A/C MEASURES ARE LISTED -- (see electronic file for details)												
Split AC 17 SEER (13 EER) - Early Ret	143	310,128	4,651,920	124	269,811	4,047,170	1,719	13,799	$263,241	$0.09	3.00	10.77
Ductless Mini-Split â‰¥ 18 SEER -	7	4,887	73,305	5	3,910	58,644	25	200	$6,050	$0.14	1.89	6.61
Packaged HP 15 SEER (12 EER) 8 HSF	39	91,847	1,377,710	34	79,907	1,198,608	509	4,087	$42,530	$0.05	5.49	13.68
ENERGY STAR room air conditioner	2	1,279	11,509	2	1,113	10,013	5	34	$1,219	$0.15	1.72	8.00
Split AC 16 SEER (12.5 EER) - Early R	46	108,468	1,627,020	40	94,367	1,415,507	601	4,826	$68,083	$0.07	4.05	12.27
Split AC 15 SEER (12.5 EER) Natural	3	7,070	106,050	3	6,151	92,264	39	315	$9,788	$0.15	1.84	8.32
ENERGY STARÂ® Dual Pane Windo	36	65,504	1,310,072	32	56,988	1,139,763	471	3,886	$46,694	$0.06	4.54	12.80
Split AC 16 SEER (13 EER) - Natural I	62	141,132	2,116,980	54	122,785	1,841,773	782	6,280	$268,006	$0.20	1.34	6.83
Split AC 17 SEER (13 EER) - Natural I	36	87,984	1,319,760	31	76,546	1,148,191	488	3,915	$238,321	$0.29	0.94	5.32
CESP- Refrigeration	0	437,892	8,757,840	0	372,208	7,444,164	2,769	25,381	$137,615	$0.03	4.64	14.33
CESP- Envelope	10	6,304	126,080	8	5,295	105,907	35	361	$934	$0.01	10.44	19.10
CESP- Lighting	3,075	8,025,834	160,516,676	2,559	6,680,223	133,604,450	63,913	455,526	$1,291,333	$0.01	8.95	18.04
CESP- HVAC	211	481,653	9,633,060	180	409,405	8,188,101	2,740	27,917	$148,105	$0.03	5.09	14.94
Refrigerator Recycling	14	69,608	348,040	10	48,726	243,628	109	831	$50,508	$0.23	0.57	0.62
Freezer Recycling	1	4,501	18,004	1	3,151	12,603	6	43	$2,672	$0.23	0.56	0.62
QACM - RCA Comm <5	208	421,240	8,424,800	208	421,240	8,424,800	2,819	28,724	$282,700	$0.05	2.74	5.20
QACM - WCC	922	487,514	9,750,280	922	487,514	9,750,280	4,031	33,244	$822,068	$0.13	2.20	5.20
QACM - RCA	1,120	1,871,739	37,434,780	1,120	1,871,739	37,434,780	15,477	127,634	$2,022,610	$0.08	3.44	5.20
QACM - DTS	24	23,779	475,580	24	23,779	475,580	197	1,621	$37,368	$0.12	2.36	5.20
QACM - RCA Comm >5	30	64,275	1,285,500	30	64,275	1,285,500	430	4,383	$48,925	$0.06	2.42	5.20
Subtotal	6,706	14,634,346	275,476,517	6,008	12,759,150	240,649,693	106,505	821,374	$6,958,023	$0.04	4.11	8.42
Low-Income	22	109,032	1,635,480	15	76,322	1,144,836	445	3,903	$135,920	$0.16	0.91	0.91
Codes & Standards	0	17,685,000	17,685,000	0	17,685,000	17,685,000	8,514	60,297	$26,952	$0.00	74.22	74.22
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$459,276	$0.00	0.00	0.00
Subtotal	22	17,794,032	19,320,480	15	17,761,322	18,829,836	8,958	64,201	$622,148	$0.03	3.41	12.64
Total	6,728	32,428,378	294,796,997	6,023	30,520,473	259,479,529	115,463	885,575	$7,580,171	$0.04	4.05	8.62

INDUSTRY

IPUC at a Glance

- Climate Zone(s): 9
- Customers: 109
- Total annual retail sales (MWh): 39,300
- Annual Retail Revenue: $4,501,000
- Annual energy efficiency expenditures for reporting year: $3,035
- Gross annual savings from reporting year portfolio (MWh): 0

IPUC Overview

Industry Public Utilities Commission (IPUC) began serving electric customers in 2002. The peak demand was 8.4 MW. Customers reside in climate zone 9, and 99.6% of energy sales were to non-residential customers. All bundled customers' facilities met the applicable Title 24 requirements. The recent age of these facilities and their efficient construction reduces the number of cost-effective energy efficiency upgrade opportunities.

Major Program and Portfolio Changes

The IPUC Energy Efficiency Program provides incentives in four program categories: Large General Service Program; General Service Program; Domestic Service Program; and IPUC energy efficiency measures.

- A large General Service Program customer is eligible to receive up to $25,000 over the two-year budget cycle, unless otherwise approved by the IPUC Board.
- A General Service Program customer is eligible to receive up to $1,000 every two years for the installation of specified energy measures.
- A Domestic Service Program customer is eligible to receive up to $250 per residence, for approved Energy Star appliances, and $500 every two years for the installation of specified energy measures.
- IPUC energy efficiency measures are eligible to receive up to $10,000 per year.

Program and Portfolio Highlights

An on-site energy audit was completed for a Large General Service Customer.

Commercial, Industrial and Agricultural Programs

- On-site energy survey, at no cost to the customer, that analyze usage and demand to develop recommendations designed to improve energy efficiency and reduce load requirements. Incentives are available for the installation of specified energy measures.
- On-site energy audits, at no cost to the customer, that analyze usage and demand to develop recommendations designed to improve energy efficiency and reduce load requirements. Incentives are available for energy efficiency upgrades identified in these audits. Verification services to ensure appropriate installation of recommended measures are also provided.

- Incentives are available to improve energy efficiency for lighting applications, based on a rate of $0.125/kWh for one year of energy savings and shall not exceed 50% of the cost of the lighting material costs.
- Incentives are available for the replacement of energy efficient equipment/technology that conserves energy and permanently reduces coincident summer/winter on-peak load and exceeds state-mandated codes, federal-mandated codes, industry accepted performance standards or other baseline energy performance standards. Incentive payments are based on a rate of $0.125/kWh for one year of energy savings and $150 per kW for each on-peak kW that has been reduced and shall not exceed 50% of the total cost associated with the equipment/materials.
- Incentives are available for new equipment components that exceed state-mandated codes, federal-mandated codes, industry-accepted performance standards, or other baseline energy performance standards by more than 10%. The rebate is based upon the lessor of 25% of the cost difference between standard and upgraded new equipment and/or materials.
- Incentives are available for the direct funding of projects/activities on the utility side of the meter that have been approved by the IPUC Board.

Residential Programs

On-site energy survey, at no cost to the customer, that analyze usage and demand to develop recommendations designed to improve energy operating efficiency and reduce load requirements. Incentives are available for approved ENERGY STAR appliances and program allowance for the installation of specified energy measures.

Complementary Programs

IPUC Photovoltaic Solar Installations: Industry Metrolink 1,600 kW Photovoltaic-1 Solar project.

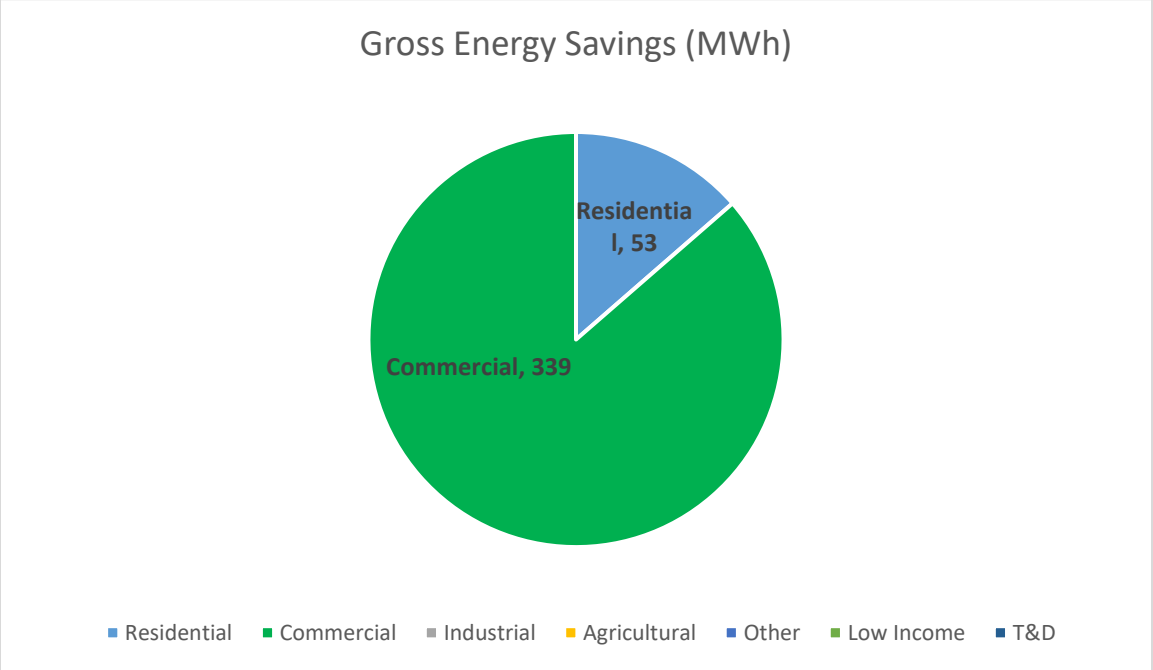
Evaluation, Measurement & Verification Studies

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

LASSEN

Lassen at a Glance

- Climate Zone(s): 16
- Customers: 10,500
- Total annual retail sales (MWh): 127,295
- Annual Retail Revenue: $17,184,825
- Annual energy efficiency expenditures for reporting year: $112,741
- Gross annual savings from reporting year portfolio (MWh): 392



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 in FY 2019.

We find that the customers and local contractors value consistency in program offerings. LMUD also offered a Residential Direct Install Program in FY 2018 and FY 2019. The program provides installation of LEDs, advanced power strips, showerheads, thermostatic shower valves and aerators at no cost to the customer.
LMUD's net annual energy savings for FY 2019 increased 46% from FY 2018. This is largely due to an increase in commercial lighting activity.

Program and Portfolio Highlights

The Residential Direct Install Program delivered 8% 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 and provides the opportunity for both renters and homeowners to participate in LMUD programs.

Commercial, Industrial and 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 rate assistance, November through April based on the type of home heating. 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 kWh.
- 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 FY 2020 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 California POU TRM for Energy Savings

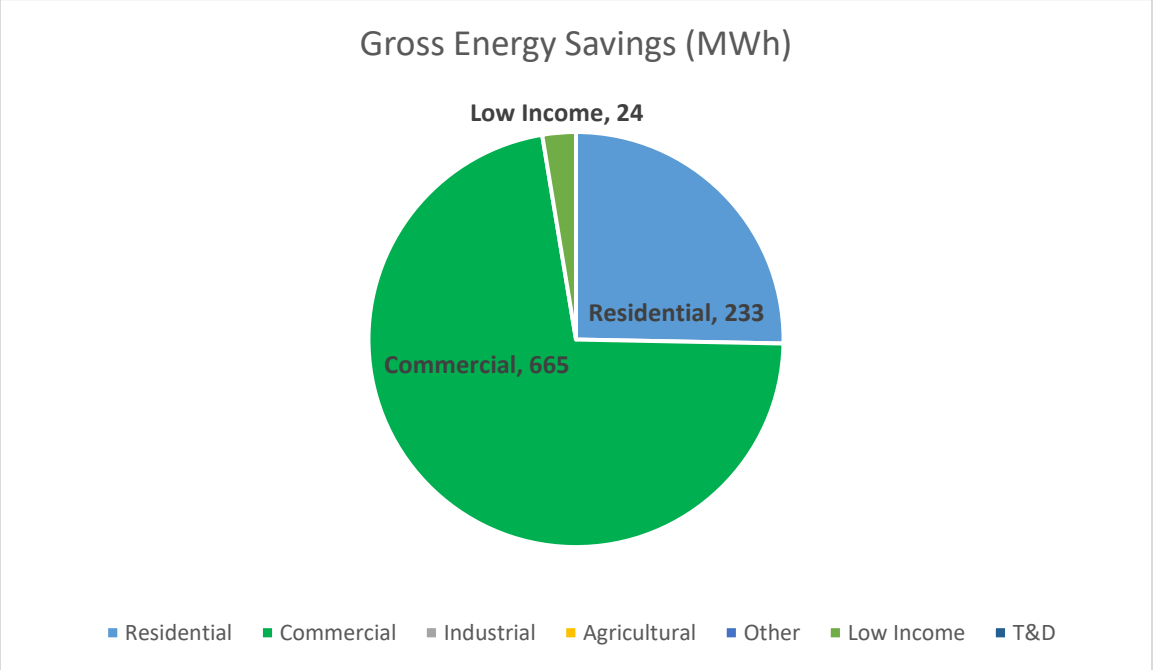
LMUD has relied heavily on the savings listed in the TRM. Non-residential lighting, custom projects and non-deemed refrigeration measures use custom savings calculations.

LASSEN	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Residential Direct Install Program -	0	1,861	18,612	0	1,768	17,681	7	60	$609	$0.04	2.96	2.96
Residential Direct Install Program -	1	14,596	145,960	1	13,866	138,662	63	473	$4,697	$0.04	3.71	3.71
Residential Direct Install Program -	3	11,777	117,770	3	11,188	111,882	47	381	$25,514	$0.28	0.49	0.49
ENERGY STAR HP water heater, 50	0	1,279	12,790	0	767	7,674	3	26	$1,315	$0.21	0.59	0.47
Electric hot water storage, 40-80 ga	2	990	9,900	1	594	5,940	2	20	$1,947	$0.40	0.31	0.41
LED 14-18 W replacing 75 W haloge	0	2,812	42,180	0	1,518	22,777	9	78	$2,430	$0.14	0.99	0.80
LED holiday lights	4	805	4,025	2	435	2,174	1	7	$457	$0.23	0.54	0.21
LED 7-9 W replacing 35 W halogen	1	3,975	59,625	0	2,147	32,198	13	110	$3,913	$0.16	0.87	0.45
ENERGY STAR room air conditioner	0	168	1,512	0	134	1,210	1	4	$782	$0.77	0.23	0.28
Heat pump 15 SEER 8.5 HSPF	1	469	7,041	1	376	5,633	3	19	$1,623	$0.39	0.53	0.47
Heat pump, 16 SEER, 8.4 HSPF (afte	0	46	683	0	36	547	0	2	$388	$0.95	0.22	0.16
Ductless mini-split heat pump, 16 S	0	76	1,140	0	61	912	0	3	$700	$1.03	0.20	0.13
Heat pump, 15 SEER, 8.4 HSPF (afte	0	61	910	0	49	728	0	2	$539	$0.99	0.21	0.16
Whole house fan	0	592	11,840	0	166	3,315	2	(1)	$632	$0.28	0.67	0.32
Heat pump, 16 SEER, 8.4 HSPF (afte	1	201	3,008	0	160	2,407	1	8	$1,708	$0.95	0.22	0.16
Heat pump 16 SEER, 9.5 HSPF	2	1,215	18,219	2	972	14,575	7	50	$3,672	$0.34	0.61	0.57
Ductless mini-split heat pump, 16 S	1	394	5,908	1	315	4,726	2	16	$3,628	$1.03	0.20	0.13
ENERGY STAR clothes washer, elec	0	920	10,120	0	285	3,137	1	16	$512	$0.20	0.60	0.43
ENERGY STAR dishwasher, standar	0	522	5,220	0	313	3,132	1	11	$722	$0.28	0.52	0.64
ENERGY STAR clothes washer, elec	0	852	9,372	0	264	2,905	1	10	$377	$0.16	0.66	0.50
ENERGY STAR Refrigerator: >7.75 cı	0	9,728	136,196	0	6,810	95,337	37	325	$13,501	$0.19	0.66	0.69
AC Unit-10 Tons (110-134 kBtuh)-12	64	171,539	1,360,706	55	145,808	1,156,600	433	3,943	$15,558	$0.02	6.56	1.09
Non-Residential Lighting Program I	0	30,377	364,524	0	24,302	291,619	141	994	$5,274	$0.02	6.39	2.67
Non-Residential Lighting Program I	19	131,427	1,577,124	15	105,142	1,261,699	474	4,302	$21,430	$0.02	5.32	2.38
AC Pkg Unit-5 Tons (55-64 kBtuh)-1	2	5,367	43,162	2	4,562	36,688	14	125	$813	$0.03	3.97	1.22
Subtotal	101	392,047	3,967,546	83	322,037	3,224,156	1,264	10,987	$112,741	$0.04	2.72	1.31
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	101	392,047	3,967,546	83	322,037	3,224,156	1,264	10,987	$112,741	$0.04	2.72	1.31

LODI

Lodi at a Glance

- Climate Zone(s): 12
- Customers: 26,798
- Total annual retail sales (MWh): 410,567
- Annual Retail Revenue: $67,961,354
- Annual energy efficiency expenditures for reporting year: $417,854
- Gross annual savings from reporting year portfolio (MWh): 923



Lodi Overview

Lodi Electric Utility (LEU) utilizes the energy efficiency program to engage with residential customers, bring value to local businesses and through its commercial energy efficiency programming, expand the business relationship with key accounts. The energy efficiency program is designed to benefit all customer segments and offers a wide variety of opportunities for participation. Residential programs give households the opportunity to not only receive rebates by purchasing energy efficient appliances, but also learn how a new way of looking at household energy use and making a few simple changes can make a difference in their personal carbon footprint. With median household income of $52,000 and nearly half of the housing in the city renter-occupied, many LEU customers would not have the ability or financial means to make significant energy efficiency improvements to their homes. Business accounts large and small can also take advantage of similar energy efficient rebates and measures which serve to increase their bottom-line and help Lodi Electric Utility meet their renewable energy goals.

Major Program and Portfolio Changes

In FY 2019, LEU continued to offer a comprehensive selection of programs for our commercial, industrial and residential customers. There were no significant program changes. Reportable energy savings have decreased from last year due to a decrease in commercial and industrial projects. Over the past three years, Lodi has achieved 116% of savings targets.

Program and Portfolio Highlights

LEU continued to offer the Residential Direct Install and Snapshot Audit program that it started in FY 2016. 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 source of energy savings achieved. Seventeen commercial and industrial customers completed energy efficiency projects in FY 2019. 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 and 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. In addition, the Utility offers zero percent energy financing that allows commercial customers to install energy efficient improvements up to $150,000. The loan requirements are simple, easy to administer, and are paid back to the Utility over a 24-month period. The amounts due are invoiced on the customer's monthly utility bill.

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 $450K was budgeted in FY 2018 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: In 2019, LEU launched its EV program. In addition to its ongoing partnership with the CMUA, the California Center for Sustainable Energy and the Clean Vehicle Rebate Project in association with the American Public Power Association, LEU now

offers rebates for EV residential and commercial charging stations, and a separate rebate to offset the permitting and installation of a charging station and meter.

- The residential rebates for Level 2 Chargers if $500, and $500 for permitting and installation. Commercial rebates for Level 2 or DC fast Chargers if $1,000, and $1,000 for permitting and installation.
- An EV Ride and Drive Event is being planned for Summer 2020.
- In late 2019, LEU applied for a CaleVIP grant from the State of California's San Joaquin County's Incentive Project. The grant is intended to replace the City's seven first-generation EV public chargers and expand the number of public chargers by one. LEU also offers customers a time-of-use EV charging rate with installation of a separate meter.
- Energy Efficiency and Conservation Curriculum:
- Lodi Electric Utility has successfully implemented a K-12 educational curriculum designed to teach students about how to use energy responsibly. Content and classroom activities are aligned to support federal and state education standards, feature hands-on activities and are combined with take-home Energy Efficiency Kits for reach student. Over 300 students are enrolled in this curriculum in the current school year.

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 California POU TRM for Energy Savings

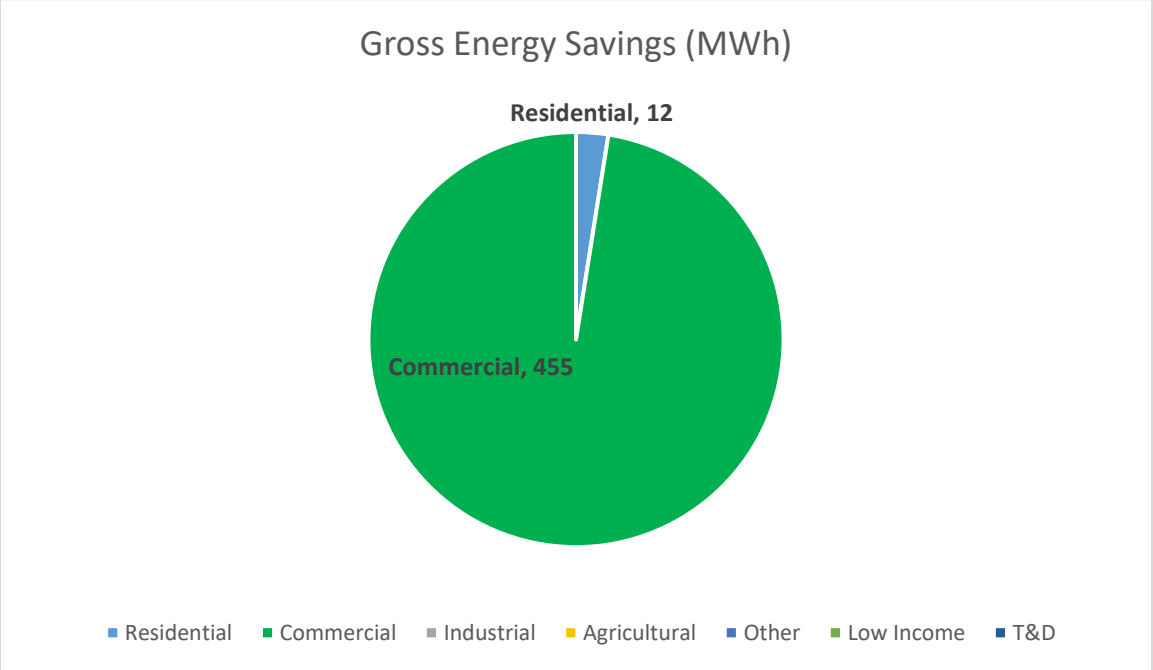
For FY 2019, LEU has relied heavily on the savings listed in the TRM. The Commercial Lighting and Commercial Custom programs use custom savings calculations based on actual pre and post equipment specifications.

LODI	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
ENERGY STAR clothes washer, elec	0	1,104	12,144	0	342	3,765	1	19	$901	$0.30	0.45	0.39
ENERGY STAR dishwasher, standar	0	1,566	15,660	0	940	9,396	4	32	$2,268	$0.29	0.49	0.68
Variable speed residential pool pu	3	15,399	107,325	2	9,239	64,395	27	220	$8,235	$0.15	0.88	0.45
Variable speed residential pool pu	1	10,784	107,840	0	6,470	64,704	27	221	$9,916	$0.19	0.72	0.60
ENERGY STAR Refrigerator: >7.75 cı	0	12,582	176,146	0	8,807	123,302	47	420	$19,899	$0.21	0.62	0.78
ENERGY STAR clothes washer, elec	0	6,816	74,976	0	2,113	23,243	8	79	$4,262	$0.23	0.53	0.47
Ceiling insulation, increase to R-38	33	29,145	582,896	9	8,161	163,211	69	4,277	$30,291	$0.27	1.86	1.88
Ceiling insulation, increase to R-30	15	13,034	260,679	4	3,650	72,990	31	1,911	$13,453	$0.27	1.87	1.89
ENERGY STAR Replacement Windo	8	6,931	138,624	5	4,159	83,174	28	488	$6,828	$0.12	1.71	0.18
Wall insulation - R-13 - Single Fami	0	895	17,903	0	251	5,013	2	261	$1,477	$0.43	1.69	1.21
Reduced building leakage, single s	0	21	233	0	6	65	0	8	$36	$0.69	2.28	0.47
Solar attic fan	0	297	2,970	0	83	832	0	3	$215	$0.31	1.64	1.23
Reflective window film, 0.39 SHGC	0	139	1,392	0	39	390	0	(3)	$59	$0.18	0.41	0.16
LED 10-13 W replacing 43 W halogе	0	2,052	30,780	0	1,108	16,621	7	57	$2,207	$0.18	0.72	0.48
LED 15-21 W replacing 53 W halogе	0	200	3,000	0	108	1,620	1	6	$221	$0.18	0.70	0.43
LED 6-9 W replacing 29 W halogen	0	858	12,870	0	463	6,950	3	24	$862	$0.17	0.77	0.38
ENERGY STAR ceiling fan	0	151	1,510	0	42	423	0	1	$247	$0.71	0.73	0.73
Residential Direct Install Program -	1	15,308	76,540	1	14,543	72,713	35	248	$4,572	$0.07	1.94	1.94
Residential Direct Install Program -	13	57,666	576,659	12	54,783	547,826	232	1,868	$120,358	$0.27	0.45	0.45
AC Unit-6to8.5 Tons (65-109 kBtuh)	1	726	10,893	0	617	9,259	3	32	$588	$0.08	1.50	1.91
Commercial Custom Program FY19	0	52,860	634,320	0	44,931	539,172	204	1,838	$9,724	$0.02	5.10	2.23
AC Unit-20to60 Tons (240-759 kBtul	2	3,005	45,075	2	2,554	38,313	13	131	$2,409	$0.08	1.52	0.74
Reach-in display case with doors, M	1	1,079	12,953	0	648	7,772	3	154	$635	$0.10	2.46	0.53
Non-Residential Lighting Program	113	484,744	5,816,928	90	387,795	4,653,542	1,745	15,866	$85,936	$0.02	4.98	1.15
Non-Residential Lighting Program	0	121,642	1,459,704	0	97,314	1,167,763	564	3,982	$22,155	$0.02	4.87	1.38
AC Pkg Unit-< 5 Tons (55kBtuh)-15 S	0	1,020	15,300	0	867	13,005	4	44	$1,269	$0.13	0.98	1.37
Split-system air conditioner, 15 SEI	3	3,314	49,705	2	2,651	39,764	20	136	$10,593	$0.36	1.51	1.13
Web-Enabled Programmable Therı	0	1,093	12,027	0	875	9,621	5	33	$1,079	$0.14	3.73	0.16
-- MANY ADDITIONAL A/C MEASURES ARE LISTED -- (see electronic file for details)												
ENERGY STAR room air conditioner	0	41	369	0	33	295	0	1	$42	$0.17	3.04	2.05
Split-system air conditioner, 17	0	500	7,507	0	400	6,006	3	20	$1,677	$0.37	1.44	0.99
Split-system air conditioner, 16 SEI	2	3,432	51,481	2	2,746	41,185	21	140	$10,153	$0.33	1.63	1.14
Split-system air conditioner, 20 SEI	0	161	2,410	0	129	1,928	1	7	$399	$0.28	1.94	1.56
Subtotal	197	898,534	11,299,301	132	672,063	8,077,112	3,252	33,342	$400,244	$0.06	2.34	1.07
Low-Income	11	24,061	208,813	11	22,858	198,372	86	676	$17,611	$0.11	$1.14	$1.14
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	11	24,061	208,813	11	22,858	198,372	86	676	$17,611	$0.11	1.14	1.14

LOMPOC

Lompoc at a Glance

- Climate Zone(s): 5
- Customers: 14,880
- Total annual retail sales (MWh): 129,754
- Annual Retail Revenue: $21,262,391
- Annual energy efficiency expenditures for reporting year: $113,781
- Gross annual savings from reporting year portfolio (MWh): 467



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 304 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 $52,543 with 19.1 of the population living in poverty (2019 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 gross annual energy saved by all programs was 467 MWh. 97% of these savings can be attributed to the Commercial Lighting Program.

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 Refrigerator Replacement and Recycle Program. Success of this program 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 and Agricultural Programs

The Commercial Lighting Program had the greatest participation rate among the Commercial Programs. Several large, corporate-owned retail stores took advantage of the rebate program to retrofit to LED lighting after staff worked with store managers. The City has no industrial and no agricultural customers; therefore, there are no specific programs for these sectors.

Residential Programs

The City offers several residential appliance programs such as ENERGY STAR Appliance Replacement and Recycle Programs and Led Lighting Programs. The ENERGY STAR Clothes Washer Replacement and Recycle and ENERGY STAR Refrigerator Replacement and Recycle programs provided a small percentage of the overall energy savings. It should be noted that the ENERGY STAR Clothes Washer Replacement and Recycle program is not funded from Public Benefit charges, but from a Water Conservation Fund. The City provides water service as well as electric service to its customers.

The City continues to see good participation in the ENERGY STAR Low-Income Refrigeration Replacement and Recycle program. The City helps to purchase an appliance to replace a customer's inefficient appliance 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.

Complementary Programs

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

The City provides financial assistance to customers who have a household income level below the Department of Housing and Urban Development (HUD) Low-income Limits Calculation for the local area. The assistance is paid toward their electric usage charge.

The Customer Energy Audit Program continues to be successful in meeting customers' needs. 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.

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 California POU TRM for Energy Savings

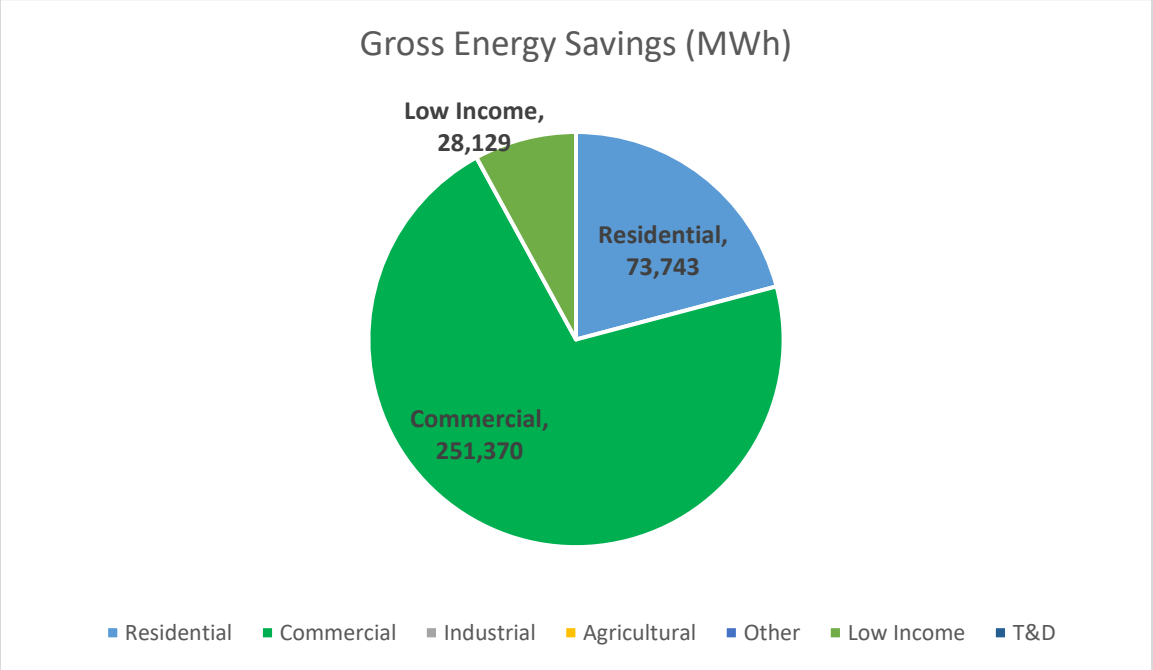
The City of Lompoc used CMUA's Savings Estimation Technical Reference Manual as the primary source for calculating and reporting annual energy efficiency program performance.

LOMPOC	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
LED 6-9 W replacing 29 W halogen	0	275	4,125	0	149	2,228	1	8	$26,013	$15.61	0.01	0.01
LED holiday lights	0	60	300	0	32	162	0	1	$2,015	$13.55	0.01	0.01
Refrigerator recycling	1	2,772	13,860	0	1,940	9,702	4	33	$7,438	$0.84	0.14	0.13
ENERGY STAR Refrigerator: >7.75 c	0	1,167	16,343	0	817	11,440	4	39	$11,114	$1.27	0.10	0.12
Non-Residential Lighting Program	48	454,970	5,459,640	39	363,976	4,367,712	1,555	14,892	$31,511	$0.01	12.02	12.02
ENERGY STAR clothes washer, top	0	100	1,100	0	31	341	1	24	$3,094	$11.20	0.06	0.06
ENERGY STAR clothes washer, top	0	351	3,861	0	109	1,197	0	4	$1,236	$1.27	0.09	0.09
Freezer recycling	0	1,348	5,392	0	944	3,774	2	13	$3,581	$1.01	0.11	0.11
ENERGY STAR Freezer	0	172	1,892	0	120	1,324	1	5	$1,596	$1.49	0.08	0.10
ENERGY STAR Refrigerator: >7.75 c	0	1,427	19,975	0	999	13,983	5	48	$13,054	$1.22	0.11	0.11
Refrigerator recycling	1	4,004	20,020	1	2,803	14,014	6	48	$13,130	$1.02	0.11	0.11
Subtotal	50	466,646	5,546,509	40	371,920	4,425,877	1,580	15,113	$113,781	$0.03	3.38	3.45
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	$0.00	$0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	50	466,646	5,546,509	40	371,920	4,425,877	1,580	15,113	$113,781	$0.03	3.38	3.45

LOS ANGELES

Los Angeles at a Glance

- Climate Zone(s): 6, 8, 9
- Customers: 1,500,000
- Total annual retail sales (MWh): 22,382,000
- Annual Retail Revenue: $4,200,000,000
- Annual energy efficiency expenditures for reporting year: $170,564,808
- Gross annual savings from reporting year portfolio (MWh): 353,242



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 (1.5M customer accounts) 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 starting in FY 2018 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 eligibility increased the maximum monthly usage from 200 kW to 250 kW to increase small business customer participation. On January 1, 2019, LADWP relaunched its Custom Performance Program with enhanced features to help guide customers through the application process. CPP's Custom Express fast tracks smaller, less energy intensive projects with deemed energy savings projections, while Custom Calculated conducts an in-depth energy savings analysis utilizing the customer's existing facility conditions as baseline.

Program and Portfolio Highlights

Residential Lighting Efficiency Program:
LADWP delivered two free LED bulbs to 1.4 million residential customers

Charge Up L.A.: Used EV Rebate Program:
To encourage drivers to choose EVs over gas-powered vehicles, LADWP offers rebates designed to promote equitable access to EVs. Customers can now receive a $450 rebate for the purchase of a pre-owned EV. From July 2018 through May 2019, 167 used EVs were rebated, for a total of $75,150 in payments issued and $824,850 in program funds remaining.

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

Custom Performance Program (CPP):
The Custom Performance Program continues to receive engineering assistance through its partnership with SoCalGas. Engineering service providers perform evaluations of customer efficiency projects to determine the energy savings. In FY 2019, 139 projects were submitted for review.

Additionally, the Custom Performance Program entered into a new agreement for engineering assistance to provide additional resources to the program.

External Studies:
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.[27]

Commercial, Industrial and Agricultural Programs

City Plants:
The City Plants (CP) Program provides free shade trees for residents and property owners in Los Angeles to promote the planting of trees to improve the city's tree canopy, air quality, storm

[27] DeShazo, J.R., Alex Turek and Michael Samulon. Efficiently Energizing Job Creation in Los Angeles, 2014. https://innovation.luskin.ucla.edu/wp-content/uploads/2019/03/Efficiently_Energizing_Job_Creation_in_LA.pdf

water retention and importantly, building energy efficiency. This program is operated by the City Plants team under the city's Board of Public Works and supported by LADWP.
Through this partnership, City Plants provides free shade trees for residents and property owners along with information on where to plant the trees for maximum energy efficiency benefits. City Plants currently focuses on providing trees for residential customers but also provides trees to commercial customers and plants trees on residential parkways, commercial parkways, and other city property (Res Cooling, Res Shell, Commercial Shell).

Codes and Standards:
The Codes, Standards and Ordinances Program conducts advocacy activities to improve building, appliance and water use efficiency regulations. These activities include monitoring and active participation in code and standard development, compliance and enforcement support with our sister agency LA Department of Building and Safety, legislative review, sponsorship of local ordinances, and participation in policy efforts with other City departments, state agencies, and utilities. The goal of this program is to promote sustainability with regard to water and energy use.

The principal audience includes the LA City Department of Building and Safety, LA City Planning, LA City Department of Public Works, and the LA City Council, which together develop and adopt codes and standards specific to Los Angeles that go beyond state and federal regulation. Other audiences include state agencies, which conduct periodic rulemakings to update energy efficiency and water conservation regulations and standards, and industry groups that conduct research and develop industry specific standards. (Non-Res Process)

Commercial Direct Install:
The Commercial Direct Install Program is a free direct-install program that targets small, medium and large business customers in the LADWP service territory. LADWP partners with SoCalGas on this program to offer a tri-resource efficiency program aiming to reduce the use of electricity, water and natural gas. (Non-Res Lighting)

Commercial Lighting Incentive Program:
The Commercial Lighting Incentive Program (CLIP) offers incentives to help make a wide variety of high-performance lamps and lighting fixtures cost-effective. CLIP currently offers incentives to mid and large size customers with demand above 200 kW. CLIP is designed to encourage customers to replace existing systems with high-efficiency systems that meet or exceed California's efficiency standards. (Non-Res Lighting)

Custom Performance Program (CPP):
The Custom Performance Program (CPP) offers cash incentives for general energy efficiency measures energy saving measures not covered by existing prescriptive programs, such as equipment controls, industrial processes, Retrocommissioning, chiller efficiency and innovative energy saving strategies meeting or exceeding Title 4 or Industry Standards that are not included in other LADWP non-residential energy efficiency programs.

The program can also apply to projects with multiple measures being implemented simultaneously. Other program offerings include incentives for equipment controls, CO monitoring systems, hotel guest room controls, variable frequency drives, cutting edge high-efficiency lighting technologies, and other innovative strategies. (Non-Res Cooling, Non-Res Comprehensive, Non-Res Motors, Non-Res Lighting, Non-Res Refrigeration)

Energy Savings Assistance Program:
The Energy Savings Assistance Program (ESAP) is a collaborative program with the SoCalGas that offers, free of charge, energy efficient electric, water, and natural gas upgrades to income-qualified multi-family (MF) residential customers. (Res Comprehensive).

Food Service:
LADWP, in cooperation with SoCalGas, offers incentives to encourage retrofit measures and technologies to reduce energy consumption in supermarkets, liquor stores, convenience stores, restaurants, etc. Rebates are offered for ovens, griddles, steam cookers, holding cabinets, glass and solid door refrigerators/freezers, ice makers, and kitchen demand ventilation controls. (Non-Res Refrigeration, Non-Res Cooking)

LADWP Facilities:
The LADWP Facilities Upgrade Program strives to improve energy and water efficiency throughout LADWP's facilities with energy efficiency upgrades in HVAC and lighting and water efficiency upgrades in plumbing fixtures, leak correction and landscaping improvements. It identifies and assists those LADWP facilities to reduce energy and water usage, which will result in a reduction in energy and water consumption and procurement expense for LADWP that would otherwise be borne by LADWP customers. (Non-Residential Cooling)

Los Angeles Unified School District (LAUSD) Direct Install:
The LAUSD Direct Install Program is designed to improve energy and water efficiency throughout LAUSD's facilities through upgrades in electric, water and natural gas consuming systems, in partnership with SoCalGas. This Program provides energy efficiency design assistance, project management experience and retrofitting installation, utilizing LADWP engineering and ISS (Integrated Support Staff), to assist LAUSD facilities in need of aid in reducing energy usage and corresponding utility expenses. (Non-Res Lighting)

Savings by Design (SBD):
The SBD Program is a California statewide non-residential new construction program, in which LADWP will partner with SoCalGas to offer a uniform, multi-faceted program designed to consistently serve the needs of the commercial building community. SBD encourages energy-efficient building design and construction practices, promoting the efficient use of energy by offering up-front design assistance, owner incentives, design team incentives, and energy design resources. (Non-Res Comprehensive)

Upstream HVAC:
The nonresidential Upstream Heating, Ventilation and Air Conditioning (HVAC) Program is a market transformation-oriented program. This program offers incentives to upstream market actors who sell qualifying high efficiency HVAC equipment. The logic that underscores this program's design is that a small number of upstream market actors are in a position to impact thousands of customers and influence their choice of equipment by increasing the stocking and promotion of high efficiency HVAC equipment.

The upstream model cost-effectively leverages this market structure and existing relationships. The upstream program is designed to adapt to market changes, and therefore LADWP will continue working with relevant industry players to continually enhance the program to include new beyond-code upstream incentives. (Commercial Cooling)

Residential Programs

California Advanced Homes (CAHP):
The CAHP is an incentive program that utilizes the statewide CAHP through its partner utility, SoCalGas, to incentivize builders and designers to create environmentally friendly, energy efficient communities for potential home buyers. CAHP targets single and multi-family residential new construction, helping builders to prepare for future code changes by encouraging them to build homes better than code, ultimately driving new homes to Zero Net Energy (ZNE). (Res Comprehensive)

Consumer Rebate Program (CRP):
The CRP offers incentives of up to $500 or more, to its residential customers to promote and advance comprehensive energy efficiency measures, including whole house solutions, plug load efficiency, performance standards and opportunities for integration. CRP is designed to offer and promote specific and comprehensive energy solutions within the residential market sector. (Res Cooling, Res Shell, Res Refrigeration, Res Pool Pump)

Efficient Product Marketplace (EPM):
The EPM program provides customers an opportunity to research, locate, and purchase energy efficient products from a single website. EPM is a convenient, one-stop web-based solution that provides a selection of popular energy efficient brands available at numerous stores and online retailers, pricing and available rebate information on eligible products, and quick rebate turnaround. The program is designed to simplify shopping for a product and streamline obtaining a rebate. (Res Cooling, Res Lighting, Res Refrigeration)

Home Energy Improvement Program:
The Home Energy Improvement Program is a comprehensive direct install whole-house retrofit program that offers residential customers a full suite of free products and services to improve the energy and water efficiency in the home by upgrading/retrofitting the home's envelope and core

systems. While not limited to low-income customers, HEIP's priority is to serve the neediest customers. (Res Shell, Res Lighting)

Home Energy Upgrade California:
The Home Energy Upgrade Program is a collaborative effort in which LADWP partners with SoCalGas to deliver a whole house residential retrofit energy efficiency program. The HU Program offers incentives to homeowners who complete selected energy-saving home improvements on single-family residences or 3-4 unit buildings, such as townhouses, condominiums, etc. (Res Cooling, Res Comprehensive, Res Lighting, Res Water Heating, Res Shell)

HVAC Optimization Program:
LADWP's Air Conditioning Optimization Program (ACOPT) provides services to certified AC technicians to analyze cooling systems and provide basic maintenance and efficiency services. This service is free for all eligible residential and commercial LADWP customers. LADWP provides residential and commercial customers with complimentary AC diagnostic and maintenance services. The program was redesigned in FY 2018 to better serve customers and to include an incentive for early replacement of older AC units where warranted. (Res Cooling)

Refrigerator Exchange (REP) / Window AC:
The Refrigerator Exchange Program is a free refrigerator replacement program designed to target customers that qualify on either LADWP's Low-Income or its Senior Citizen/Disability Lifeline Rates as well as Multi-Residential or Non-Profit customers. The program was expanded to include the following entities, multi-family or mobile home communities, civic, community, faith-based organizations, and educational institutions. This Program leverages a 3rd Party Contractor, ARCA, to administer the delivery of the Program and provides energy efficient refrigerators for this customer segment to replace older, inefficient, but operational models. (Res Refrigeration)

Refrigerator Turn-In and Recycle:
The Refrigerator Turn-in and Recycle Program offers a $50 rebate, along with free pick-up, to residential customers to turn-in old refrigerators and freezers, for recycling. Eligible units must be fully operational and satisfy certain age and size requirements. LADWP leverages ARCA to administer the delivery of the Program. (Res Refrigeration)

Residential Lighting Efficiency Program:
The Residential Lighting Efficiency Program (RLEP) provides light-emitting diode (LED) lamps to customers to assist in reducing their home electrical use. The primary channel for distribution of the LED lamps is by way of Direct-to-Door to residential customers within LADWP's service territory. The lamps are being dispersed over several years in order to reach the entire targeted audience. Lamps are also distributed at community events and by community-based organizations. (Res Lighting)

Complementary Programs
Low-Income Programs:

Refrigerator Exchange Program, Home Energy Improvement Program, Energy Savings Assistance Program, and Commercial Direct Install Program are key programs offered 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.

EV Charger Rebate Program:
LADWP introduced the EV Charger Rebate Program, "Charge Up L.A.!" to encourage the installation of convenient 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 TOU meter will qualify for the LADWP's EV discount of 2.5 cents per 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 previous round of 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 intends to start a new round of EM&V activities starting Q1 of 2020 in both retroactive and concurrent timeframes for impact evaluations and concurrent only for process evaluations. The upcoming round of EM&V contract will also have a contract term of 3 years. With comparable budgets as proportioned to the portfolio savings.

LADWP has opted to evaluate its programs and activities from a holistic standpoint, offering an emphasis on effects of energy efficiency programs. 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. [28]

Major Differences or Diversions from California POU TRM for Energy Savings

Sources of energy savings include custom engineering calculations using building simulation modeling software such as EnergyPro and eQuest, Openstudio/Energyplus, as well as simple engineering calculations in spreadsheet format. LADWP's Custom Performance Program and Commercial Lighting incentive Programs apply these methods, 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 Commercial Direct Install, Consumer Rebate Program, the Food Service Program, Refrigerator Exchange and Refrigerator Recycling Programs.

LADWP intends to utilize the California Technical Forum Electronic Technical Reference Manual for statewide workpaper values at the earliest time all applicable measures become available.

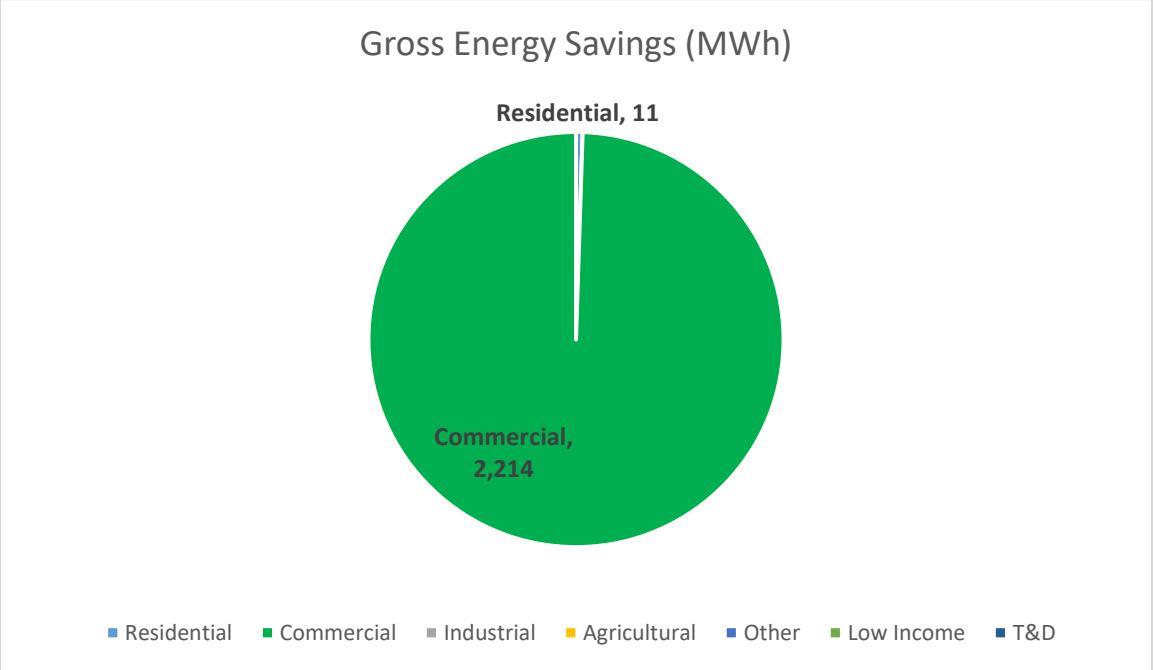
[28] Past results are published on the LADWP website at https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=OPLADWPCCB436019&RevisionSelectionMethod=LatestReleased

LOS ANGELES	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
500+ Measures & Programs -- see e-file for details												
Subtotal	82,615	325,112,995	3,572,854,880	82,615	325,112,995	3,572,854,880	214,762	12,349,548	$150,473,754	$0.05	1.15	0.75
Low-Income	6,852	28,129,120	293,944,915	6,852	28,129,120	293,944,915	18,997	1,002,208	$19,432,444	$0.07	2.62	2.53
Codes & Standards	23,395	125,351,540	2,486,713,000	23,395	125,351,540	2,486,713,000	108,594	8,478,474	$658,610	$0.00	146.87	146.87
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	30,247	153,480,660	2,780,657,915	30,247	153,480,660	2,780,657,915	127,591	9,480,683	$20,091,054	$0.01	5.55	5.55
Total	112,862	478,593,655	6,353,512,794	112,862	478,593,655	6,353,512,794	342,354	21,830,231	$170,564,808	$0.04	1.66	1.14

MERCED

Merced at a Glance

- Climate Zone(s): 13
- Customers: 10,600
- Total annual retail sales (MWh): 515,000
- Annual Retail Revenue: $60,000,000
- Annual energy efficiency expenditures for reporting year: $1,717,991
- Gross annual savings from reporting year portfolio (MWh): 2,225



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 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.

Program and Portfolio Highlights

Commercial, Industrial and 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 kWh 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

Complimentary 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.

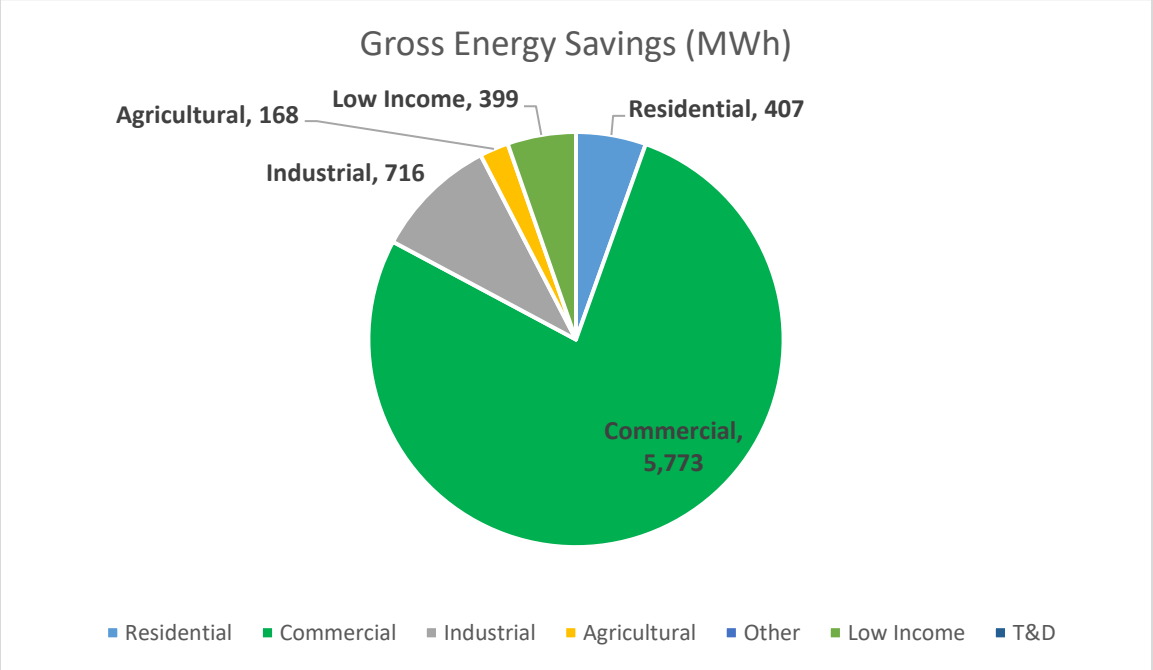
Evaluation, Measurement & Verification Studies

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 in California's central valley near one another and each offer similar DSM programs.

MERCED	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
ENERGY STAR dishwasher, standar	0	928	9,280	0	557	5,568	2	19	$1,289	$0.29	0.49	0.96
ENERGY STAR Refrigerator: Top Fre	0	2,960	41,446	0	2,072	29,012	11	99	$3,247	$0.15	0.98	1.54
ENERGY STAR clothes washer, elec	0	5,888	64,768	0	1,825	20,078	8	106	$2,753	$0.17	0.92	0.69
Commercial Lighting Upgrade - Lee	0	13,899	138,990	0	11,119	111,192	43	379	$19,282	$0.21	0.53	0.32
Commercial Lighting Upgrade - VH	0	15,503	155,030	0	12,402	124,024	48	423	$7,398	$0.07	1.53	1.10
Refrigeration Lighting Display - Tar	0	4,836	48,360	0	3,869	38,688	15	132	$5,976	$0.19	0.61	0.37
Commercial Lighting Upgrade - Cos	0	227,920	2,279,200	0	182,336	1,823,360	713	6,217	$171,870	$0.12	1.00	0.65
Commercial HVAC Upgrade	0	6,760	67,600	0	5,408	54,080	21	184	$33,009	$0.75	0.20	0.12
Commercial Lighting Upgrade - Wa	0	145,022	1,450,220	0	116,018	1,160,176	454	3,956	$65,491	$0.07	1.67	1.23
Commercial Lighting Upgrade - Bes	0	74,443	744,430	0	59,554	595,544	225	2,031	$81,236	$0.17	0.71	0.44
Commercial Lighting Upgrade - Me	0	1,725,199	17,251,990	0	1,380,159	13,801,592	5,402	47,057	$1,325,898	$0.12	0.93	0.60
ENERGY STAR ceiling fan	0	453	4,530	0	127	1,268	1	4	$161	$0.16	1.82	1.76
Whole house fan	0	1,134	22,680	0	318	6,350	3	18	$380	$0.09	3.38	1.79
Subtotal	0	2,224,945	22,278,524	0	1,775,764	17,770,933	6,945	60,623	$1,717,991	$0.12	0.94	0.61
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	$0.00	$0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	1	2,224,945	22,278,524	0	1,775,764	17,770,933	6,945	60,623	1,717,991	$0.12	0.94	0.61

Modesto at a Glance

- Climate Zone(s): 12
- Customers: 129,000
- Total annual retail sales (MWh): 2,486,393
- Annual Retail Revenue: $354,590,646
- Annual energy efficiency expenditures for reporting year: $2,399,593
- Gross annual savings from reporting year portfolio (MWh): 7,464



Modesto Overview

The Modesto Irrigation District (MID) was formed in 1887 to provide irrigation water within a service area of over 100,000 acres. MID began providing electric service in 1923 within an original service area of 160 square miles, which was expanded by 7.5 square miles in 2001. Since 1996, MID has also provided non-exclusive electric service in an adjacent 400 square mile area. In 1994, MID began providing treated domestic water to the City of Modesto on a wholesale basis.

MID's 2019 annual retail electric sales by customer class are: 37% residential, 28.3% commercial, 29.8% industrial, 3.8% agricultural and pumping, 1.1% other. For 2019 load growth was 0.024% (based on Total System Input GWh) and the 10-year system peak of 697 MW occurred in 2017.

MID has robust energy efficiency program offerings, but savings can fluctuate year to year independent of changes to the programs or to the economic outlook. A key contributor is multi-year construction cycles for energy efficiency projects of large industrial customers. Typically, when lower energy savings are reported in the current year, we anticipate a surge in the following year as projects complete.

Major Program and Portfolio Changes

Refrigerator and Freezer recycling were added to the 2019 MID program portfolio for a rebate of $35 per unit. The Energy Star Smart Thermostat rebate was upgraded from a pilot program and added to MID's MPower rebate portfolio. MID's MPower rebate portfolio has received excellent feedback from customers as the program offers a substantial number of diverse and effective rebate options for our commercial and residential customers.

Program and Portfolio Highlights

MID continued to promote 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 in 2019. Social media promotions have improved the customer awareness of MID programs.

Commercial, Industrial and 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 approved the procurement of an additional renewable energy project that will help MID meet compliance through at least 2024. 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: In 2019 MID launched an EV Charger rebate program. Qualified Level 2 residential and commercial chargers received a $500 rebate per unit. Demand for the program was brisk as the adoption of EVs is growing in the MID service territory. MID hopes to expand the program to DC Quick-Charging in 2020 with greater incentives.

Energy Storage: In 2014, the MID board of directors adopted a policy determining that energy storage targets are not appropriate for MID, and subsequently adopted a policy update confirming the original determination that energy storage targets are not appropriate for MID. Although mandatory energy storage targets have not been adopted, the district's ongoing efforts to evaluate the benefits of energy storage have resulted in the inclusion of energy storage capacity with the most recent renewable energy procurement.

Evaluation, Measurement & Verification Studies

MID continued its ongoing efforts to obtain independent, third-party review of its energy efficiency 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 2019, Power Services, Inc. (CMVP qualified) performed M&V on selected projects and Anchor Blue Consulting conducted M&V on the 2018 energy efficiency portfolio.

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

Major Differences or Diversions from California POU TRM for Energy Savings

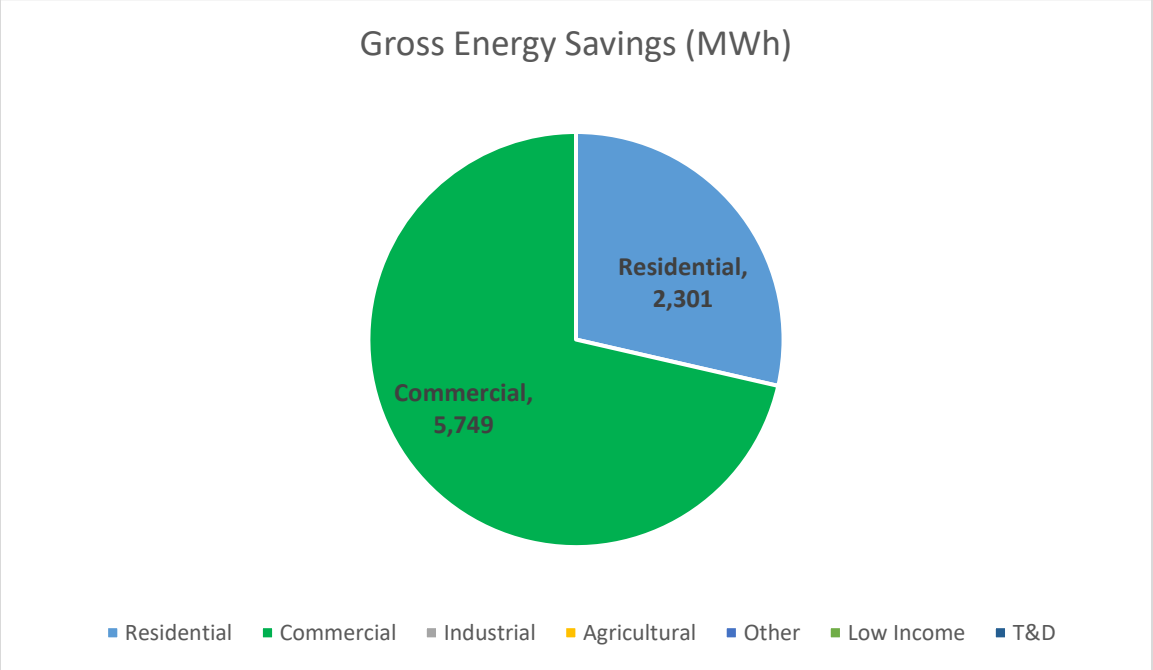
None.

MODESTO	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Whole Building Approach	49	79,893	958,716	40	63,914	766,973	291	2,615	$32,187	$0.05	2.21	0.03
Lighting - Systems Approach	45	203,911	2,446,932	36	163,129	1,957,546	743	6,674	$38,760	$0.02	4.69	1.17
Ductless mini-split - Heat Pump 16	1	2,987	44,798	0	2,389	35,838	18	122	$5,264	$0.20	2.73	2.33
Heat pump, 16 SEER, 8.4 HSPF (afte	3	1,358	20,370	3	1,086	16,296	8	56	$5,928	$0.49	1.10	1.41
Whole House Fan with Air Conditi	1	840	16,800	1	672	13,440	7	46	$11,306	$1.24	0.45	0.08
Smart Thermostat - AC	0	30,456	335,016	0	27,410	301,514	159	6,556	$39,838	$0.16	4.12	1.81
Split-system air conditioner, 16 SEI	219	90,758	1,361,366	175	72,606	1,089,093	550	3,713	$290,174	$0.36	1.51	1.51
-- MANY ADDITIONAL A/C MEASURES ARE LISTED -- (see electronic file for details)												
Split-system air conditioner, 15 SEI	26	23,193	347,888	21	18,554	278,310	141	949	$43,699	$0.21	2.56	1.98
Smart Thermostat - AC	0	756	8,316	0	680	7,484	3	163	$614	$0.10	2.74	0.90
Occupancy Sensor Wall Box or Ceil	0	2,319	18,553	0	2,203	17,625	7	60	$445	$0.03	3.77	1.09
-- MANY ADDITIONAL LIGHTING MEASURES ARE LISTED -- (see electronic file for details)												
Exterior Linear Fluorescent 176 - 3	3	16,056	176,616	2	12,845	141,293	69	482	$2,528	$0.02	5.16	1.99
Occupancy Sensor Wall Box	0	715	5,720	0	572	4,576	2	16	$87	$0.02	5.00	1.14
LED Screw In Canister or Track Light	2	1,470	23,520	1	1,176	18,816	7	64	$404	$0.03	4.16	1.49
Variable speed residential pool pu	6	122,668	1,226,680	4	73,601	736,008	299	2,509	$50,002	$0.08	1.73	1.11
Strip-Curtains for Walk-in Enclosur	0	3,171	12,684	0	2,695	10,781	5	37	$222	$0.02	4.56	2.89
Door Gaskets	4	24,882	99,528	4	21,150	84,599	36	288	$3,162	$0.04	2.51	5.18
LED Case Lighting (from T8, electro	7	41,440	663,040	6	35,224	563,584	210	1,922	$11,453	$0.03	4.31	1.14
Indoor Lighting	58	258,709	3,104,508	46	206,967	2,483,606	931	8,468	$54,250	$0.03	4.21	1.60
Indoor Lighting	216	1,266,205	15,194,460	173	1,012,964	12,155,568	4,559	41,445	$277,306	$0.03	4.03	1.14
Outdoor Lighting	0	69,767	837,204	0	55,814	669,763	324	2,284	$15,286	$0.03	4.04	1.62
Refrigeration	3	13,766	206,490	2	11,013	165,192	62	563	$4,351	$0.04	3.35	1.72
Freezer recycling	1	6,066	24,264	1	4,246	16,985	8	58	$955	$0.20	0.65	1.06
Refrigerator recycling	5	27,720	138,600	4	19,404	97,020	43	331	$5,008	$0.18	0.73	1.19
Hot Water Heater, electric high eff	0	711	9,246	0	413	5,363	2	18	$224	$0.05	2.11	0.66
ENERGY STAR Qualified Electric He	0	3,049	45,735	0	2,897	43,448	16	148	$1,093	$0.03	3.46	2.56
Clothes Washer	11	4,278	51,336	9	3,636	43,636	17	149	$3,208	$0.09	1.57	0.17
Window Replacement: Tinted Win	1	424	8,479	0	233	4,663	2	16	$538	$0.17	3.31	0.93
Shade Screen	19	20,939	209,394	11	11,517	115,167	61	393	$13,119	$0.14	3.72	3.29
Window Film: Single Pane Clear Gl	3	3,162	31,619	2	1,739	17,391	9	59	$2,036	$0.14	3.61	2.59
Window Replacement: Tinted Win	66	64,732	1,294,638	36	35,603	712,051	352	2,428	$81,720	$0.17	3.33	0.94
Subtotal	1,621	7,065,463	85,025,371	1,439	6,260,375	75,263,253	28,834	262,276	$1,948,950	$0.03	3.77	1.16
Low-Income	31	398,631	3,604,101	31	398,631	3,604,101	1,526	12,288	$437,143	$0.15	1.04	1.04
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	31	398,631	3,604,101	31	398,631	3,604,101	1,526	12,288	$437,143	$0.15	$1.04	$1.04
Total	1,652	7,464,094	88,629,472	1,470	6,659,006	78,867,354	30,360	274,564	$2,386,093	$0.04	$3.27	$1.16

MORENO VALLEY

Moreno Valley at a Glance

- Climate Zone(s): 10
- Customers: 6,709
- Total annual retail sales (MWh): 190,964
- Annual Retail Revenue: $32,405,000
- Annual energy efficiency expenditures for reporting year: $639,782
- Gross annual savings from reporting year portfolio (MWh): 8,050



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 MW 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 per the state's loading order. MVU processed almost 300 new solar interconnections and connected more than 1 MW of residential solar during this reporting period. MVU is also seeing customers express an interest in pairing battery storage with solar.

Major Program and Portfolio Changes

Energy efficiency programs are still relatively new at MVU, so no major program changes were made last year. MVU increased the annual funding (and customer participation) for the residential energy audit and direct install program in order to ensure MVU can make the doubling of energy efficiency goals per Senate Bill 350.

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 kWh and 1 MW of demand. This project was completed in two separate phases over two fiscal years allowing Amazon to take advantage of MVU's generous rebate program. Phase 2 was completed during this reporting year.

Commercial, Industrial and 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 and 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 energy efficiency upgrades, including the Nest thermostat, 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.
- Building Electrification - MVU offers rebates for electric heat pump water heaters for those customers who want to remove their natural gas appliances.

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 $74,000.
- DR: MVU continues to maintain and operate 15 commercial Ice Bear units on both city and customer facilities.
- Research, Development, and Demonstration: MVU utilized a CivicSpark fellow to conduct research and analysis of the impact of solar on the grid at the circuit level. MVU is also exploring a potential battery storage project at the MoVal Substation.
- Electric Vehicles (EVs): MVU is experiencing increased interest and activity both for workplace charging and home charging. As one of the utility's Strategic Goals, MVU selected Alternative Energy Systems Consulting (AESC) to help develop a Transportation Electrification Roadmap and is currently working it. MVU has budgeted for the installation of additional EV charging stations at its Annex location across from City Hall.
- Energy Storage: A few Tesla Powerwalls have been installed with solar at residential homes and other storage systems are being proposed. In the future MVU expects greater interest and activity in solar plus battery installations as prices move toward TOU.
- Educational Program: MVU has contracted with Franklin Energy, formerly Resource Action Programs, in partnership with the SoCalGas to provide teachers, students, and their families a school-based energy efficiency program.

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 now has a third-party consultant (AESC) available to verify energy savings for complex projects and custom measures when necessary.

Sources of 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 and 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 Energy Commission.

Major Differences or Diversions from California POU TRM for Energy Savings

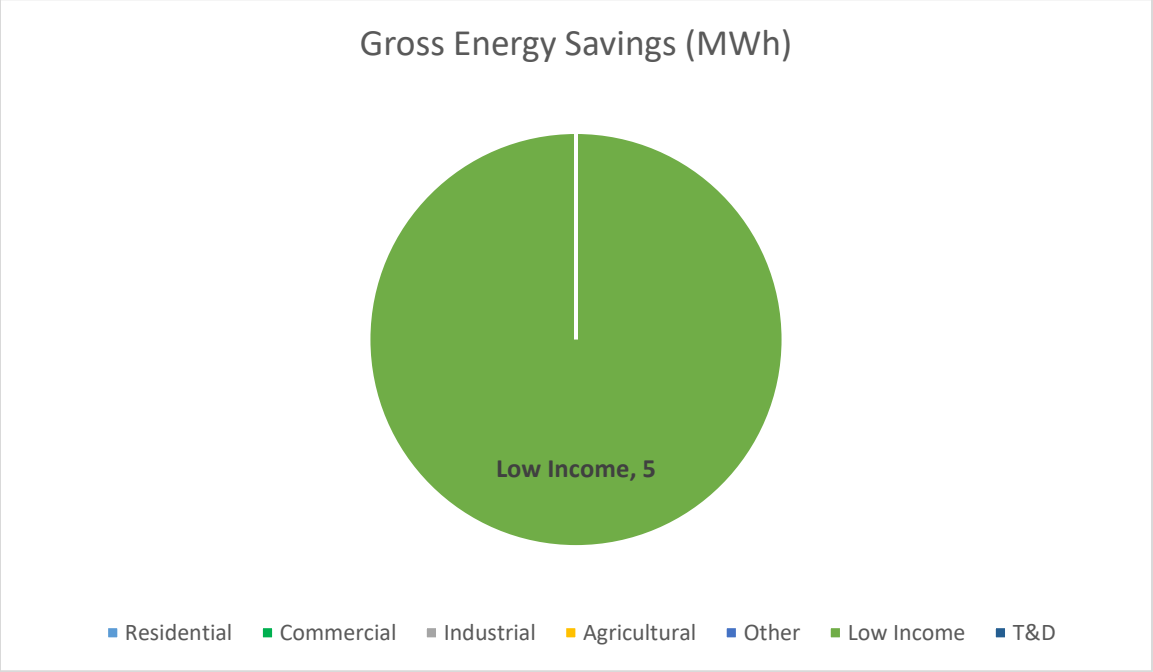
None

MORENO VALLEY	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
CEE Tier II Refrigerator: Bottom Fre	0	654	9,156	0	458	6,409	3	22	$201	$0.04	3.55	4.12
Variable speed residential pool pu	0	674	6,740	0	404	4,044	2	14	$101	$0.03	4.60	0.44
ENERGY STAR dishwasher, standar	0	116	1,160	0	70	696	0	2	$70	$0.12	1.14	1.99
Heat pump, 16 SEER, 8.4 HSPF (afte	0	1,092	16,380	0	874	13,104	6	45	$6,864	$0.70	0.38	1.11
CEE Tier 1 clothes washer, top load	0	404	4,444	0	125	1,378	1	5	$200	$0.18	0.78	0.46
CEE Tier II Refrigerator: Bottom Fre	0	164	2,289	0	114	1,602	1	5	$50	$0.04	3.55	4.12
City Hall LED Retrofits (2019)	40	154,569	1,545,690	36	139,112	1,391,121	527	4,743	$10,526	$0.01	13.24	8.68
CVS LED Lighting Retrofit (2019)	0	56,178	561,780	0	50,560	505,602	190	1,724	$4,002	$0.01	12.56	108.62
Amazon LED Lighting Retrofit (Phas	608	5,491,966	54,919,660	547	4,942,769	49,427,694	18,740	168,524	$106,834	$0.00	46.33	46.33
Walmart LED Lighting Retrofit (201	5	45,907	459,070	5	41,316	413,163	155	1,409	$3,270	$0.01	12.56	108.62
Synergy Residential Energy Audit &	0	2,204,931	22,049,310	0	1,984,438	19,844,379	8,099	67,660	$501,602	$0.03	4.52	4.52
LivingWise Educational Program (2	0	73,525	735,250	0	66,173	661,725	271	2,256	$4,626	$0.01	14.12	120.09
LED 10-13 W replacing 43 W haloge	0	19,500	292,500	0	10,530	157,950	64	539	$1,436	$0.01	10.41	22.26
Subtotal	654	8,049,680	80,603,429	588	7,236,943	72,428,867	28,059	246,947	$639,782	$0.01	11.77	11.95
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	654	8,049,680	80,603,429	588	7,236,943	72,428,867	28,059	246,947	$639,782	$0.01	11.77	11.95

NEEDLES

Needles at a Glance

- Climate Zone(s): 14
- Customers: 3,010
- Total annual retail sales (MWh): 63,274
- Annual Retail Revenue: $6,806,445
- Annual energy efficiency expenditures for reporting year: $152,534
- Gross annual savings from reporting year portfolio (MWh): 5



Needles Overview

The City of Needles is a severely disadvantaged community. The average household income is $43,372. The energy efficiency program(s) not only assist the NPUA's load factor but assist the community residences with lower monthly utility bills. The energy efficiency 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 energy efficiency program.

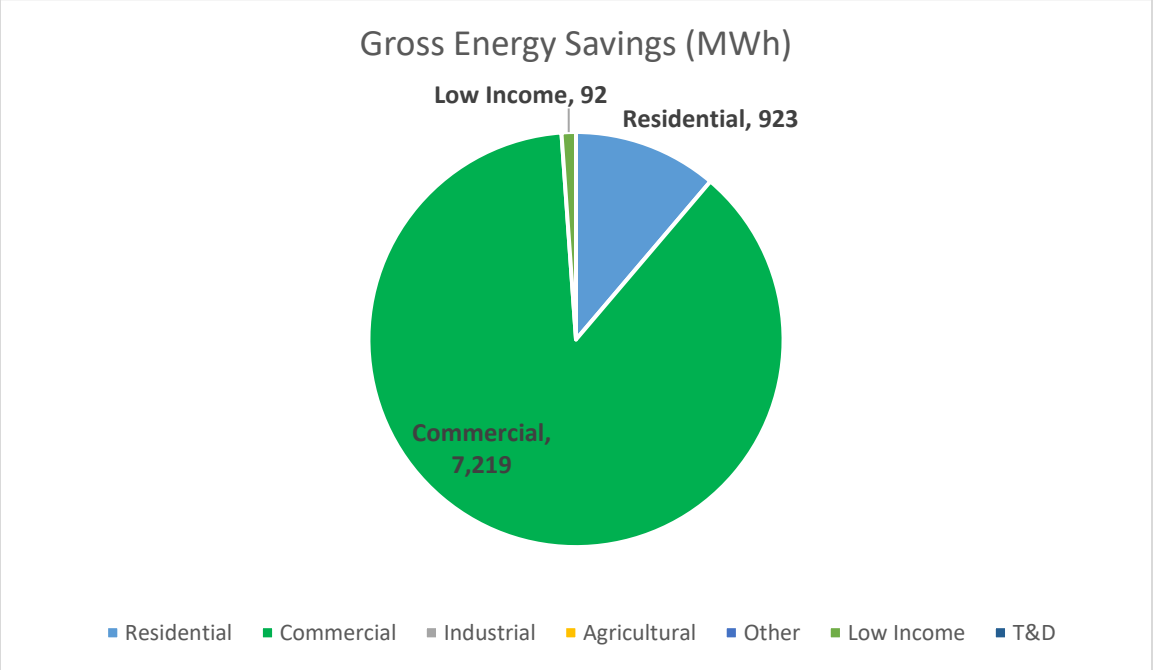
Residential Programs

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.

NEEDLES	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Low-Income Programs	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Heat pump, 15 SEER, 8.4 HSPF (afte	1	3,024	45,360	1	3,024	45,360	17	155	$3	$3.03	0.04	1.81
Split-system air conditioner, 15 SEI	0	465	6,975	0	465	6,975	3	24	$9	$8.80	0.01	1.81
ENERGY STAR Refrigerator: Side Fr	0	752	10,528	0	526	7,370	3	25	$1	$0.80	0.16	0.43
Residential solar screen	0	2	15	0	2	15	0	(0)	$43	$42.81	0.00	1.81
CEE Tier 3 clothes washer, electric	0	730	8,030	0	226	2,489	1	8	$2	$1.58	0.08	0.11
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	1	4,973	70,908	1	4,243	62,209	24	212	$3	$3.35	0.04	0.89
Total	1	4,973	70,908	1	4,243	62,209	24	212	$3	$3.35	0.04	0.89

Palo Alto at a Glance

- Climate Zone(s): 4
- Customers: 29,573
- Total annual retail sales (MWh): 883,170
- Annual Retail Revenue: $136,372,059
- Annual energy efficiency expenditures for reporting year: $1,787,240
- Gross annual savings from reporting year portfolio (MWh): 8,235



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 2019 CPAU continued purchasing carbon offsets for its complete natural gas portfolio and is currently supplying all customers with carbon neutral gas. Palo Alto continued investment into electrification and decarbonization by expanding services around EV charging and heat pump water heaters. FY 2019 is the second year the 2018-2027 reach goals have been in place. These reach goals are approximately 30% higher than a "business-as-usual" approach.

This report includes both Net and Gross Annual Energy Savings. On a gross basis 1.0% of CPAU's electric load (8,979,809 kWh) were saved, exceeding the gross goal of 0.88%. On a net basis, 0.60% of CPAU's electric load (5,366,723 kWh) were saved, missing the net goal of 0.75%. The discrepancy is due largely to very low net to gross ratios for retrofitting commercial lighting with LEDs. CPAU's adoption of these goals was based on models which predicted an average net to gross (NTG) ratio of about 0.85. CPAU plans to a) reconsider how existing programs can be modified b) implement a local study to test the accuracy of the NTG ratios; and c) reevaluate the achievable efficiency in our service territory if the low NTG ratios are determined to be accurate for Palo Alto.

Major Program and Portfolio Changes

In FY 2019 CPAU continued efforts on building electrification efforts and increasing supply equipment for EV chargers while preparing to implement 3 new programs in 2020 including a small and medium business customer program, residential Home Energy Reports, and a marketplace for customers to purchase energy efficiency-related products. CPAU, for the third year, continued to claim the savings associated with the development of Palo Alto's building reach code, the Green Building Ordinance. Finally, the Business New Construction program realized significant savings from one large project that took a couple of years for the project to close out and for the savings to be recorded.

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 yields the bulk of CPAU's energy savings. The consultants assist customers with audits, engineering studies, vendor selection, rebate processing and post-installation inspection, making the process as easy as possible for the customer. Approximately thirty percent of the gross savings reported are attributable to this program. CPAU applied this program design to the residential market with the Home Efficiency Genie as "Your Trusted Energy Advisor", and residential engagement has increased. CPAU began an EV Charger Rebate Program in late FY 2017, using funds from the sale Low Carbon Fuel Standard (LCFS) credits, and in FY 2019 staff worked with a variety of organizations to increase participation. The Heat Pump Water Program continued in FY 2019, and CPAU promoted the program by holding a workshop, smoothing the permit process and expanding eligibility to new construction projects.

Commercial, Industrial and 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 2019, the CAP program resulted in net annual electric savings of 309,219 kWh.

Commercial and Industrial Energy Efficiency Program (CIEEP): This program offers Key Accounts the option of picking one of three engineering consulting firms to evaluate and implement energy efficiency projects. In FY 2019, the CIEEP program produced net annual electric savings of 1,246,727 kWh.

Empower Small and Medium Business (SMB): This program focusing on energy efficiency savings from mostly lighting retrofits in the small and medium commercial sector was inactive during this program year. A new SMB program is planned to be launched in FY 2020. •

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 achieving savings above the local code challenging. Although the program is inactive, one large project was completed during the fiscal year. During FY 2019, BNC recorded a net annual electric savings of 2,523,521 kWh.

Residential Programs

Multi-Family Plus: This program provides no-cost, direct installation of energy efficiency 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 energy efficiency measures on their own. In FY 2019, the Multi-Family Plus program resulted in net annual electric savings of 115,320 kWh.

Home Efficiency Genie: The Home Efficiency Genie is CPAU's flagship residential program. Launched in June 2015, residents can call the 'Genie' to receive 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 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 2019, the Home

Efficiency Genie program had net annual electric savings of 15,835 kWh that were directly attributable, while the ongoing energy education also likely led to substantial savings that are not claimed.

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. Since this program serves only low-income residents, costs nor the savings are included in CPAU's calculation of portfolio cost effectiveness. With the

addition of LED lighting upgrades to the list of measures in FY 2019, REAP recorded net annual electric savings of 46,980 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. A new program is set to launch in FY 2020. In FY 2019, the Home Energy Report recorded fifth year persistence annual electric savings of 657,110 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. During the review of the Green Building Ordinance data, CPAU discovered an additional 4,896 kWh of net annual savings that were not claimed in FY 2018, which have been included in our totals for FY 2019. In FY 2019, 465,516 kWh of savings were achieved by the building code. 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 tabling 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 which 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 laws regarding development, implementation and administration.

The PV Partners Program: This program provided 5-year performance-based incentive payments to customers who installed solar photovoltaic (PV) systems. Program funds were fully reserved in April 2016. The last PV installations were completed in 2018 and payments will finish in 2023.

SunShares Solar Discount Programs: Palo Alto has participated in regional group-buy solar programs in 2015, 2016, 2017, 2018, and 2019. 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 2019 Bay Area SunShares solar group-buy program both in terms of the number of solar contracts signed and the number of kW of rooftop solar capacity that will be installed through the program. Palo Alto residents signed 15 contracts for a total of 76 kW of rooftop solar.

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 2019, CPAU issued EV charger rebates to four sites. Even with a generous rebate, it became clear that despite the demand for EV infrastructure, property owners needed more support EV charger installation. CPAU worked with the Palo Alto's 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 FY 2020 and is expected to accelerate the installation of shared charging infrastructure at harder to reach properties.
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 Energy Commission. This is a pilot program from which data will be gathered and analyzed, therefore costs nor the savings are included in the portfolio cost effectiveness calculation. In FY 2019, CPAU completed 10 HPWH projects.

Evaluation, Measurement & Verification Studies

In FY 2019, CPAU contracted with TRC Engineers, Inc. to undertake impact and process evaluation for the Green Building Ordinance. The budget for this work was $25,000. A final EM&V report is expected to be available by the end of February 2020.

Major Differences or Diversions from California POU TRM for Energy Savings

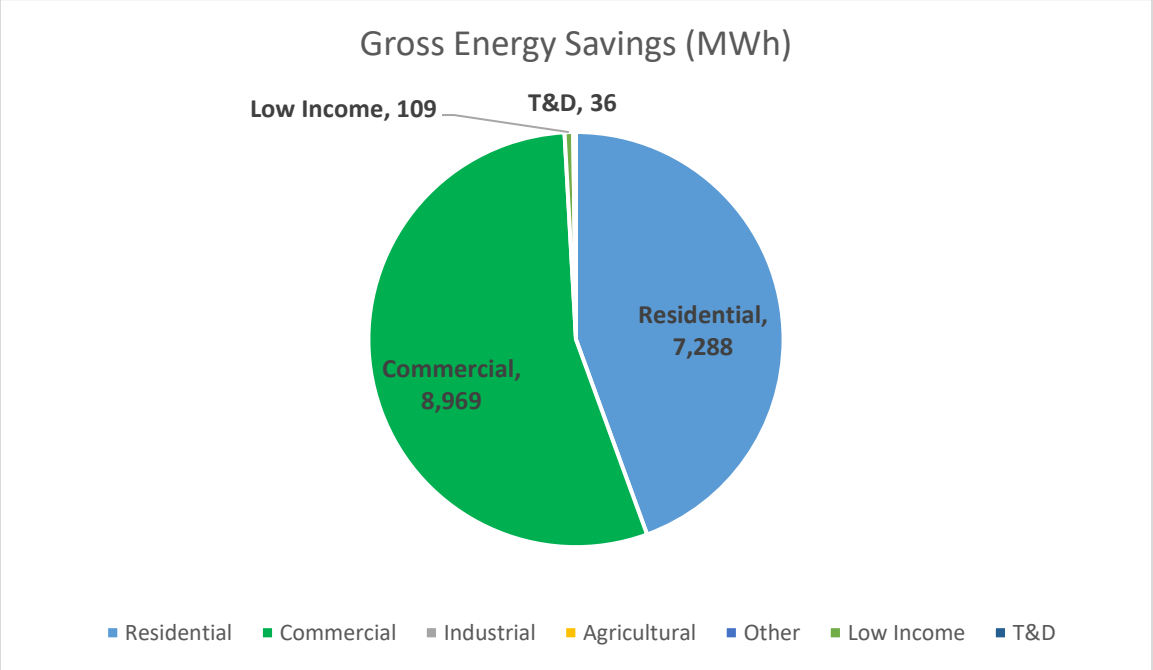
The energy savings data used for most of CPAU's programs were taken from the 2017 Technical Resources Manual and Database for Energy-Efficient Resources (DEER). The Green Building Ordinance savings were determined by TRC Engineers based on an audit of the program data. All savings data claimed by CPAU 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 CPAU used between 0.55 and 0.85, with an average of 0.59.

PALO ALTO	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Multi-family Building Interior LED I	18	224,491	3,367,365	9	112,245	1,683,682	563	5,741	$34,674	$0.03	3.41	1.40
Office Building Interior LED Lightin	3	11,751	176,265	1	5,875	88,132	29	300	$1,731	$0.02	3.55	0.76
Grocery Interior LED Lighting Proje	0	52,614	526,140	0	26,307	263,070	91	897	$7,197	$0.03	2.64	0.42
Office Building Interior LED Lightin	37	248,142	3,722,130	18	124,071	1,861,065	614	6,345	$37,506	$0.03	3.46	1.85
Office Building Interior LED Lightin	0	13,056	195,840	0	6,528	97,920	32	334	$1,968	$0.03	3.47	1.05
-- MANY ADDITIONAL LIGHTING MEASURES ARE LISTED -- (see electronic file for details)												
Office Building Exterior LED Lightin	0	55,581	833,715	0	27,791	416,858	197	1,421	$8,512	$0.03	3.61	0.87
EC Motor for Cold Storage Evaporat	1	8,274	124,110	0	3,723	55,850	20	190	$984	$0.02	3.99	1.22
New Construction Hospital	451	4,205,869	63,088,035	271	2,523,521	37,852,821	12,960	134,534	$464,546	$0.02	5.75	1.37
Interior LED 10-13 W replacing 43 W	0	6,984	104,760	0	3,492	52,380	20	179	$2,222	$0.05	1.73	1.73
Tier II Advanced Power Strip	0	13,992	69,960	0	7,696	38,478	14	131	$1,733	$0.05	1.73	1.73
Whole House Ventilation Fan	0	161	3,220	0	89	1,771	1	10	$90	$0.07	1.73	1.73
Interior LED 15-21 W replacing 53 W	0	304	4,560	0	152	2,280	1	8	$97	$0.05	1.73	1.73
Duct Sealing (20% - No AC	0	0	0	0	0	0	5	84	$278	$0.00	1.73	1.73
Duct Sealing (49%) - w/ AC	0	198	3,564	0	154	2,780	6	85	$373	$0.18	1.73	1.73
Interior LED 6-9 W replacing 29 W I	0	96	1,440	0	48	720	0	2	$31	$0.05	1.73	1.73
Interior LED 22 W replacing 72 W h	0	308	4,620	0	154	2,310	1	8	$98	$0.05	1.73	1.73
Ceiling Insulation R-38	0	12,719	254,380	0	3,561	71,226	160	2,530	$10,065	$0.19	1.73	1.73
Faucet Aerators - 1.0 GPM (Gas)	0	0	0	0	0	0	2	42	$145	$0.00	1.73	1.73
T8 to LED 1- bulb with ballast switc	0	367	5,502	0	183	2,751	1	8	$164	$0.07	1.18	1.18
Attic Insulation R-0 to Standard R-3	0	1,000	20,000	0	500	10,000	27	434	$2,455	$0.33	1.18	1.18
LED A Type 8W replacing 40W Incar	2	13,344	200,160	1	6,672	100,080	37	341	$6,230	$0.08	1.18	1.18
Home Energy Report	0	657,110	657,110	0	657,110	657,110	612	8,229	$15,771	$0.02	5.56	5.56
Office HVAC Retrofit	27	89,231	1,338,465	16	53,539	803,079	241	2,738	$28,324	$0.04	1.91	0.47
Office HVAC Retrofit	2	408,479	6,127,185	1	245,087	3,676,311	4,222	65,895	$230,501	$0.08	2.42	1.74
School Interior LED Lighting Project	307	659,902	9,898,530	154	329,951	4,949,265	1,518	16,875	$188,843	$0.05	1.82	0.49
Exterior LED Lighting Project	0	48,983	489,830	0	24,492	244,915	117	835	$11,544	$0.05	1.61	0.86
Office Building Interior LED Lightin	115	899,240	13,488,600	57	449,620	6,744,300	2,226	22,995	$258,405	$0.05	1.82	1.55
Office Interior LED Lighting Project	66	288,076	4,321,140	33	144,038	2,160,570	713	7,366	$82,782	$0.05	1.82	1.00
Subtotal	1,039	8,131,700	112,047,763	567	4,862,364	63,350,791	27,228	321,653	$1,581,271	$0.03	3.18	1.20
Low-Income	3	92,119	1,231,350	2	46,980	626,447	391	4,816	$113,658	$0.19	0.54	0.54
Codes & Standards	0	761,646	9,782,603	0	465,516	5,976,988	2,035	20,362	$15,657	$0.00	27.17	27.17
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	(2)	(8,610)	(86,100)	(2)	(8,610)	(86,100)	52	1,116	$71,716	$0.00	0.03	0.02
Subtotal	1	845,155	10,927,853	(0)	503,886	6,517,335	2,478	26,295	$201,031	$0.04	2.43	1.90
Total	1,040	8,976,855	122,975,616	567	5,366,250	69,868,126	29,705	347,947	$1,782,302	$0.03	3.09	1.24

PASADENA

Pasadena at a Glance

- Climate Zone(s): 9
- Customers: 67,025
- Total annual retail sales (MWh): 1,025,472
- Annual Retail Revenue: $180,264,325
- Annual energy efficiency expenditures for reporting year: $4,158,342
- Gross annual savings from reporting year portfolio (MWh): 16,402



Pasadena Overview

General

Number of Retail Customers: 67,025

- Residential: 87%
- Commercial: 13%

Climate Zone: 9

FY 2019 energy efficiency program expenditures: $4.16 million

FY 2019 total retail electric sales by customer class:

- Residential: 31%
- Commercial: 69%

Pasadena is home to the iconic Rose Bowl, world-class institutions like the California Institute of Technology and a variety of small businesses, many of which of are restaurants. At the same time, Pasadena has a vibrant residential community, with a diverse mix of single-family homes that

ranges from craftsman homes to bungalows and two-story tract homes. In the recent years, there has been an increase in presence of large multifamily properties; a sector that will continue to see growth with infill and higher-density development.

Pasadena Water and Power's (PWP) energy efficiency portfolio has been designed to align with the utility's goals of providing sustainable, affordable and reliable service to all of its residential and commercial customers. At the same time, PWP is also trying to overcome industry wide challenges like negative load growth while consistently meeting aggressive energy efficiency and demand reduction goals set forth by its City Council since 2007. The latest update in 2017 called for 13,500 MWh of annual savings (about 1.3 % of retail sales/year). PWP's long standing energy efficiency programs, combined with new codes and standards, independent efficiency improvements and customer investments in clean/local distributed generation have resulted in a net 17.5% decline in retail energy sales over the past decade, and are expected to maintain a consistently flat energy load projections in the near future.

In FY 2019, energy efficiency programs expenditures totaled $4.16 million, which is roughly 2.31% of its retail revenue. PWP funds procurement of all energy efficiency programs through its Public Benefits Charge ("PBC") revenues, with current PBC revenue rate at $0.00685 per kWh. As a whole, energy-efficiency programs and related expenses represented approximately 73% of Pasadena's PBC expenditures in FY 2019. The solar incentives represented 10%, transportation electrification incentives represented 6%, and bill payment assistance accounted for 11%.

Major Program and Portfolio Changes

PWP has continued to develop and implement various conservation programs for all its customers, 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 kept its focus on direct-install programs and plans to use these programs to continue to serve low/moderate income residential customers, elderly and small businesses in the disadvantaged communities (DAC) within its service territory.
- PWP renewed its master inter-utility agreement with SoCalGas to the end of 2024. The long-standing partnership will allow the utility to continue its joint programs like the Water Energy Direct Install Program (WeDIP), which was re-launched at the start of FY 2019. 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. In its first year, the revamped WeDIP served 342 businesses, with 64% of them being in the DAC.
- PWP also expanded program measures for income-qualified customers through its Under One Roof/Energy Savings Assistance Program (ESAP) partnership with SoCalGas. In particular, smart thermostats and smart irrigation controllers are now available to eligible customers, free of charge. In FY 2019, this no-cost residential direct install program served 112 qualifying customers.

- In partnership with SoCalGas, PWP's no-cost residential direct install program served 698 homes with various efficiency upgrades in its second year. 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.
- After re-designing both of its existing commercial energy efficiency rebate programs to improve cost-effectiveness, lower administrative burden and provide streamlined submittal process; PWP successfully processed 19 commercial custom and deemed rebate program offerings, resulting in over 5,152 MWh in savings.
- Introduced EV and EV charger (EVSE) rebates to the utility's online residential rebate portal, which meant customers can apply directly through the PWP website. The utility provides a $250 base rebate when residential electric customers purchase/lease a new/used EV, plus additional bonuses if vehicle is purchased from a local dealer or if customer is enrolled in bill assistance. A $200 rebate is also offered for customers who purchase/install a standard level 2 EV charger and a $600 rebate for level 2 Wi-Fi enabled EV chargers.

Program and Portfolio Highlights

In summary, energy savings for FY 2019 are broken down into five separate categories. Commercial programs contributed 8,226 MWh, residential programs contributed 7,404 MWh, C&S contributed 2,390 MWh and water transfer (embedded energy) contributed 737 MWh. In total, 18,758 MWh of additional annual energy savings were added to PWP's efficiency program results. The codes and standards 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 and not included as part of the "gross annual savings" figure. PWP has four energy efficiency programs that account for roughly 75% of its annual savings for FY 2019, programs with the greatest impact are as follows:

- On the commercial side, the customized incentive program (CIP) rebate program provided customers with customized incentives on various LED lighting and mechanical projects to encourage energy conservation and load reduction. In its first year of implementation, the CIP contributed 4,197 MWh (22%) towards the annual energy savings.
- The WeDIP provides 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. The newly expanded WeDIP officially launched in the 1st month FY 2018/2019. In total, the WeDIP contributed 3,065 MWh (16%) towards the annual energy savings.
- On the residential side, the Home Energy Report, a behavioral program that is available to all PWP residential electric customers, contributed 6,225 MWh (33%) 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 act and make their home more energy efficient.

- 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 contributed 747 MWh (4%) towards the annual energy savings.

Commercial, Industrial and Agricultural Programs

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

- The Custom Incentive and Business Rebate program provides incentives to any commercial electric customer to help offset the upfront costs of efficiency upgrades and capital improvement projects.
- 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.
- 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.

- 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 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.
- 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, smart irrigation controllers, low-flow toilets and much more.
- 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 thermostats, smart irrigation controllers and much more.

- The income qualified refrigerator exchange program provides ENERGY STAR certified refrigerators at no cost to eligible customers. Eligible participants must have a functioning refrigerator that can be swapped out with the new ENERGY STAR certified model.
- 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 FY 2019, 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

- 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, wheelchair ramps, weatherization services, an ENERGY STAR refrigerator exchange, free turf replacement to drought tolerant landscapes and double the rebates on qualifying efficiency products offered through the Home Energy Rebates program.
- 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. PWP officially stopped accepting new applications after December 31, 2017, after the tenth and final year of the PSI program. PWP finished processing all remaining applications in the queue at the end of FY 2019. PWP also offers a Green Power Program, where customers can opt to pay a premium of 2.5 cents per kWh on their electricity bill for clean, renewable power. This program is open to both residential and commercial customers.
- 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 FY 2019,

PWP continued its support for transportation electrification, with a focus on EVs and procured new EVs to replace its existing fleet.

- Transportation Electrification: 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 FY 2019, PWP approved 565 qualifying residential EV notification rebates and paid out $142,400 in incentives. For residential EV charging, PWP approved 88 qualifying applications and paid out $41,345 in rebates. Lastly, for commercial EV chargers, PWP approved 40 qualifying applications and paid out $107,000 in incentives.
    - To support public EV awareness and education, PWP participates in regular events that display EV technology

Evaluation, Measurement & Verification Studies

PWP expended $38,610 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.
- Commercial CIP/BRP Program: Utility staff and third-party engineers performed pre-and post-installation equipment and installation verification, on site, for 100% of customer projects with rebates exceeding $5,000.
- Of the 19 commercial energy efficiency rebate applications approved, all were reviewed by either PWP staff or had an independent engineering analysis conducted by a PWP's third party engineering consultant.

Major Differences or Diversions from California POU TRM for Energy Savings

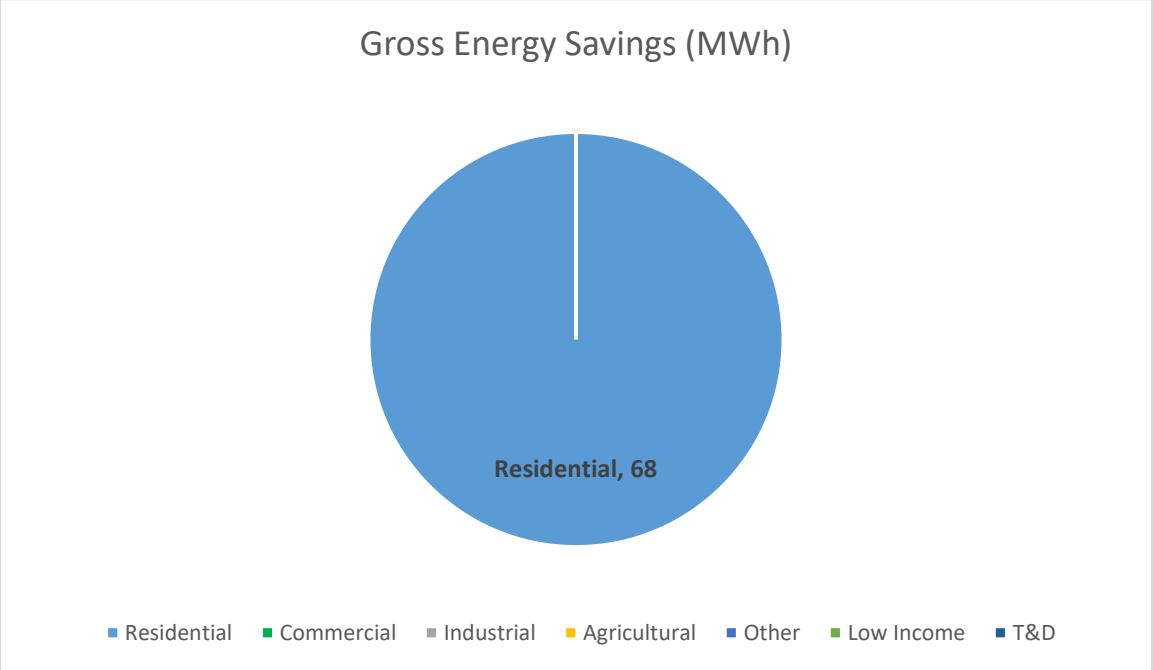
PWP relies on the POU TRM data, where available, supplemented by best available technical data from independent engineering analysis where TRM measures are not yet available. For commercial programs, as discussed above, PWP relies on independent engineering analysis conducted by PWP's engineering consultant and an online rebate estimator with industry models. The CIP program provide commercial customers with the ability to participate with any proven technology that saves energy, provided it meets the program requirements and above code energy savings can be demonstrated.

PASADENA	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
On Demand Efficiency Program - FY	1	4,667	69,998	1	4,667	69,998	25	239	$886	$0.05	2.29	2.29
Residential Audits - Onsite/Phone	2	14,478	14,478	2	14,478	14,478	7	49	$124	$0.01	13.09	13.09
Home Energy Reports - FY19	0	6,225,632	6,225,632	0	6,225,632	6,225,632	2,938	21,226	$45,970	$0.07	1.46	1.46
Water Energy Transfer - FY19	0	737,509	737,509	0	737,509	737,509	335	2,515	$5,393	$0.11	0.89	0.89
Livingwise - FY19	0	85,354	85,354	0	85,354	85,354	40	291	$630	$0.53	0.18	0.18
CIP Motors - FY19	7	86,483	1,297,245	7	86,483	1,297,245	484	4,423	$17,604	$0.02	6.66	6.66
BRP Misc - FY19	0	85,590	1,027,080	0	85,590	1,027,080	383	3,502	$14,597	$0.02	6.45	6.45
BRP Lighting - FY19	150	741,873	3,709,365	150	741,873	3,709,365	1,480	12,647	$56,666	$0.02	6.40	6.40
BRP HVAC - FY19	52	127,628	1,914,420	52	127,628	1,914,420	678	6,527	$37,003	$0.03	4.60	4.60
CIP Lighting - FY19	6	51,118	511,180	6	51,118	511,180	189	1,743	$12,232	$0.03	3.91	3.91
CIP HVAC - FY19	59	4,059,530	48,714,360	59	4,059,530	48,714,360	17,255	166,092	$472,328	$0.01	10.14	10.14
HIP Central AC Tune-Up	38	93,886	281,658	38	93,886	281,658	147	960	$14,537	$0.37	0.81	0.81
HIP LED Lamp 9-13W	4	28,060	420,900	4	28,060	420,900	172	1,435	$7,300	$0.04	3.42	3.42
HIP Air Sealing (<1800 sq ft)	392	174,194	870,971	392	174,194	870,971	434	6,424	$50,004	$0.07	4.94	4.94
HIP LED Lamp 3.5W	0	2,304	34,560	0	2,304	34,560	14	118	$599	$0.10	1.34	1.34
HIP Smart Thermostats	0	29,376	323,136	0	29,376	323,136	147	4,270	$19,423	$0.44	0.95	0.95
HIP - Blower Door Testing	0	574	2,869	0	574	2,869	1	10	$150	$13.92	0.02	0.02
HIP LED Lamp 5W	0	882	13,230	0	882	13,230	5	45	$229	$0.10	1.25	1.25
HIP Attic Insulation (R38)	205	164,976	3,299,527	205	164,976	3,299,527	1,407	76,172	$210,477	$0.21	2.44	2.44
HIP Level 2 Advanced Power Strip	1	58,512	292,560	1	58,512	292,560	131	997	$6,072	$0.06	2.03	2.03
HIP Attic Access Weather Stripping	0	1,370	15,065	0	1,370	15,065	8	3,700	$5,181	$0.57	4.14	4.14
HIP - Attic Plane Sealing	0	32,872	361,592	0	32,872	361,592	163	1,233	$17,405	$0.29	1.14	1.14
HIP Duct Sealing (Weatherization F	43	27,004	270,040	43	27,004	270,040	124	3,296	$16,127	$0.32	1.27	1.27
HIP LED Exterior Lamp	0	1,131	16,965	0	1,131	16,965	7	58	$330	$0.03	4.44	4.44
HIP Duct Sealing (AC Tune-Up Pkg)	84	52,976	529,760	84	52,976	529,760	243	6,466	$31,637	$0.30	1.34	1.20
HIP LED Interior PAR/BR Lamp	1	4,945	74,175	1	4,945	74,175	30	253	$1,286	$0.04	3.53	3.53
HIP LED Interior Candelabra	0	110	1,650	0	110	1,650	1	6	$29	$0.20	0.65	0.65
Home Improvement Program Audi	10	76,780	383,900	10	76,780	383,900	171	1,309	$8,057	$0.52	0.25	0.27
Reflective window film, 0.39 SHGC	0	94	936	0	26	262	0	(2)	$41	$0.19	1.32	0.61
Split-system air conditioner 15 SEE	13	15,548	233,220	10	12,438	186,576	81	636	$45,485	$0.33	1.04	1.04
ENERGY STAR dishwasher, standar	0	1,856	18,560	0	1,114	11,136	5	104	$3,480	$0.38	0.49	0.49
ENERGY STAR room air conditioner	1	2,035	18,315	1	1,628	14,652	7	50	$2,308	$0.19	1.76	1.76
Wall Insulation, Single Family >=R-	0	1,314	26,285	0	1,314	26,285	11	1,028	$2,863	$0.16	4.15	4.15
Variable speed residential pool pu	3	49,876	498,760	2	29,926	299,256	124	1,020	$40,139	$0.16	0.84	0.84
Smart / Internet Connected Therm	0	10,508	115,592	0	6,305	69,355	31	236	$17,701	$0.31	1.05	1.05
Heat Pump 15 SEER 8.4 HSPF	3	5,304	79,560	3	4,243	63,648	27	217	$5,849	$0.12	2.29	2.23
ENERGY STAR Refrigerator:Bottom	0	16,287	228,018	0	11,401	159,613	63	544	$20,466	$0.17	0.85	0.85
Whole house fan	0	9,471	189,420	0	2,652	53,038	22	136	$7,149	$0.20	1.74	1.74
Solar attic fan	6	3,038	30,380	2	851	8,506	4	30	$2,014	$0.29	1.16	1.16
Ceiling insulation, increase to R-30	8	4,703	94,060	2	1,317	26,337	11	670	$9,960	$0.56	0.98	0.98
ENERGY STAR ceiling fan	1	906	9,060	0	254	2,537	1	9	$321	$0.15	2.16	2.16
Central AC Tune Up	21	11,661	58,305	18	9,912	49,559	25	169	$4,507	$0.10	3.21	3.21
Upstream HVAC - FY19	10	8,562	128,430	10	8,562	128,430	44	438	$5,802	$0.06	2.10	2.10
Freezer Recycling - FY19	1	3,601	14,404	1	2,521	10,083	5	34	$369	$0.09	1.31	1.31
Refrigerator Recycling - FY19	12	61,230	306,150	9	42,861	214,305	96	731	$6,870	$0.09	1.43	1.43
ESAP LED Lamps 6-9W	0	3,638	54,563	0	3,638	54,563	21	186	$4,997	$0.24	0.53	0.53
ESAP Ceiling Fan	9	11,627	116,270	9	11,627	116,270	48	396	$10,987	$0.31	0.37	0.37
ESAP - SmartStrip Tier 1	0	96	768	0	96	768	0	3	$74	$0.28	0.40	0.40
WeDIP Refrigeration - FY19	124	557,619	5,576,190	124	557,619	5,576,190	2,223	19,012	$38,878	$0.03	4.29	4.29
WeDIP Lighting - FY19	569	2,508,218	20,065,744	569	2,508,218	20,065,744	7,660	68,414	$146,264	$0.05	2.03	2.03
Subtotal	1,836	16,257,005	99,362,168	1,814	16,188,335	98,636,290	37,527	420,068	$1,428,797	$0.05	2.94	2.94
Low-Income	26	109,455	638,674	26	109,049	630,561	280	2,150	$35,581	$0.34	0.46	0.47
Codes & Standards	474	23,909,444	23,909,444	474	23,909,444	23,909,444	11,080	81,520	$177,540	$0.01	13.09	13.09
T&D	4	35,574	1,067,231	4	35,574	1,067,231	386	3,639	$6,609	$0.01	13.09	13.09
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	504	24,054,473	25,615,349	504	24,054,068	25,607,236	11,746	87,308	$219,731	$0.02	6.49	6.53
Total	2,340	40,311,479	124,977,517	2,319	40,242,402	124,243,526	49,274	507,376	$1,648,528	$0.04	3.27	3.27

PLUMAS-SIERRA

Plumas-Sierra at a Glance

- Climate Zone(s): 16
- Customers: 7,951
- Total annual retail sales (MWh): 145,381
- Annual Retail Revenue: $24,854,020
- Annual energy efficiency expenditures for reporting year: $146,111
- Gross annual savings from reporting year portfolio (MWh): 68



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.

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.

The goal of PSREC's energy efficiency programs is to help members understand and control their energy use.

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 Pacific Gas and Electric Company's load profile is applied as the default.

Major Program and Portfolio Changes

For 2019, there were no major changes to the PSREC programs or portfolios.

Program and Portfolio Highlights

During 2019, 39% of members participating in PSREC's efficiency programs upgraded their heating/cooling systems. The energy savings from these projects represents 88% of the gross annual energy savings for the entire portfolio.

Commercial, Industrial and 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 and other custom measures.

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 or clothes washer.
- 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 kW 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 250 kW 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 EV charging infrastructure and other program options to encourage the adoption of EVs 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 California POU TRM for Energy Savings

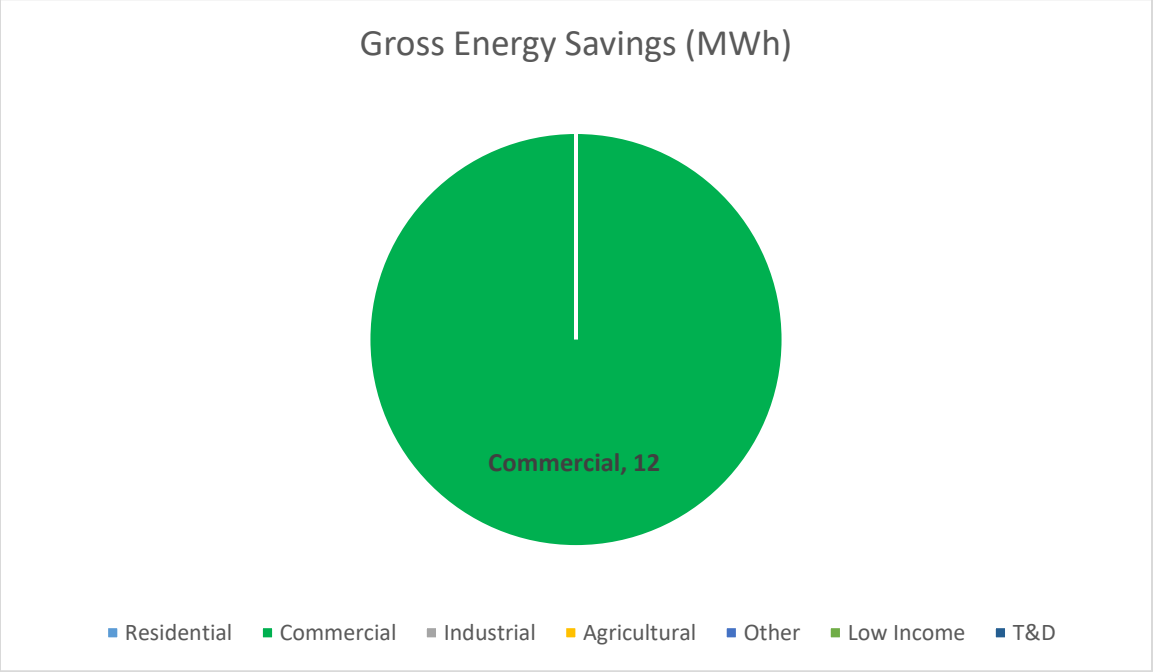
PSREC uses the TRM as the source for the majority of reported energy savings. Some measures rely on savings from the Bonneville Power Administration's UES measure list. Savings for the commercial lighting program are custom calculations based on the specific equipment replaced.

PLUMAS SIERRA	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Heat pump 14 SEER 8.0 HSPF (no sa	0	0	0	0	0	0	0	0	$746	$0.00	0.00	0.00
Heat pump, 16 SEER, 8.4 HSPF (afte	2	794	11,906	2	635	9,525	4	32	$12,257	$1.72	0.12	0.16
Heat pump, 16 SEER, 8.4 HSPF (afte	1	267	3,998	1	213	3,199	1	11	$5,684	$2.38	0.09	0.14
ENERGY STAR Web-Enabled Smart	0	261	5,218	0	209	4,174	2	14	$436	$0.15	1.63	2.25
ENERGY STAR Web-Enabled Smart	0	414	8,273	0	331	6,618	3	23	$554	$0.12	1.81	2.31
Ductless mini-split heat pump, 16 S	0	102	1,530	0	82	1,224	1	4	$1,955	$2.13	0.10	0.12
Ground Source Heat Pump	35	59,371	1,187,416	28	47,497	949,932	429	3,239	$97,000	$0.15	1.49	0.83
Ductless mini-split heat pump, 16 S	0	33	499	0	27	399	0	1	$462	$1.55	0.13	0.13
ENERGY STAR Freezer	0	249	2,739	0	174	1,917	1	7	$858	$0.55	0.21	0.23
Freezer recycling	0	337	1,348	0	236	944	0	3	$373	$0.42	0.25	0.24
ENERGY STAR clothes washer, elec	0	1,420	15,620	0	440	4,842	2	17	$1,614	$0.41	0.26	0.23
ENERGY STAR dishwasher, standar	0	522	5,220	0	313	3,132	1	11	$1,610	$0.62	0.23	0.25
ENERGY STAR Refrigerator: >7.75 c	0	1,557	21,791	0	1,090	15,254	6	52	$6,460	$0.56	0.22	0.25
Refrigerator recycling	0	308	1,540	0	216	1,078	0	4	$422	$0.43	0.25	0.25
Electric hot water storage, 40-80 ga	1	330	3,300	0	198	1,980	1	7	$580	$0.35	0.35	0.41
Electric hot water storage, 40-80 ga	1	495	4,950	0	297	2,970	1	10	$1,470	$0.60	0.20	0.31
Ceiling insulation, R-19 addition	0	102	2,037	0	29	570	0	25	$1,856	$4.79	0.11	0.10
Floor insulation R-0 to R-30 (Heat P	0	351	7,014	0	98	1,964	1	7	$2,629	$1.97	0.13	0.11
ENERGY STAR Replacement Windo	1	323	6,462	1	258	5,169	2	18	$3,102	$0.88	0.13	0.04
ENERGY STAR Replacement Windo	0	384	7,673	0	307	6,138	2	70	$5,501	$1.32	0.14	0.07
LED holiday lights	0	27	135	0	15	73	0	0	$539	$8.05	0.02	0.01
Subtotal	41	67,645	1,298,668	33	52,663	1,021,103	458	3,553	$146,111	$0.21	1.05	0.62
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	41	67,645	1,298,668	33	52,663	1,021,103	458	3,553	$146,111	$0.21	1.05	0.62

PORT OF OAKLAND

Port of Oakland at a Glance

- Climate Zone(s): 3
- Customers: 167
- Total annual retail sales (MWh): 83,811,606
- Annual Retail Revenue: $17,593,594
- Annual energy efficiency expenditures for reporting year: $13,494
- Gross annual savings from reporting year portfolio (MWh): 12



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 167 commercial electric customers.

Major Program and Portfolio Changes

In FY 2019, the Port provided incentives and procedures to promote energy efficiency programs and encouraged 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 FY 2018 and will continue into FY 2019.

Program and Portfolio Highlights

In FY 2019, Port provided incentives for demand control modules to help a customer install multiple EV chargers, provided an incentive for electric class 8 trucks, and helped a tenant install more efficiency cold storage technology.

Commercial, Industrial and 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 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 EVs 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/ for more information on EM&V.

Major Differences or Diversions from California POU TRM for Energy Savings

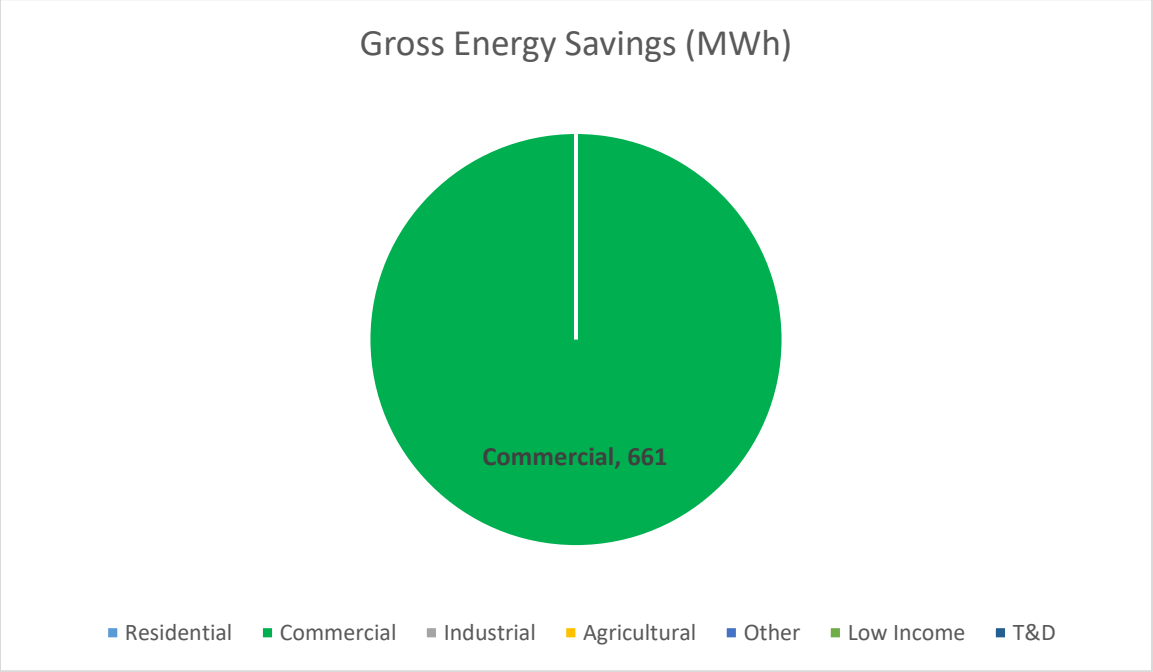
Reported savings for the Commercial Lighting Program are custom calculations based on actual equipment replaced and installed.

PORT of OAKLAND	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Non-Residential Lighting Program	4	12,493	149,920	3	9,995	119,936	58	409	$13,494	$0.14	0.93	0.61
Subtotal	4	12,493	149,920	3	9,995	119,936	58	409	$13,494	$0.14	0.93	0.61
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	4	12,493	149,920	3	9,995	119,936	58	409	$13,494	$0.14	0.93	0.61

RANCHO CUCAMONGA

Rancho Cucamonga at a Glance

- Climate Zone(s): 10
- Customers: 1,247
- Total annual retail sales (MWh): 78,356
- Annual Retail Revenue: $10,860,400
- Annual energy efficiency expenditures for reporting year: $111,748
- Gross annual savings from reporting year portfolio (MWh): 661



Rancho Cucamonga Overview

The Rancho Cucamonga Municipal Utility (RCMU) began providing electric service in 2004 to primarily commercial customers. Over the past five years, RCMU has expanded to residential and industrial with the customer base continuing to grow from new developments. Interest and participation in energy efficiency programs continues to be a challenge, due to the growth coming from new construction that meets or exceeds Title 24 requirements.

Major Program and Portfolio Changes

There were no major program changes implemented in FY 2019. RCMU continued to offer the same energy efficiency programs with the rebate program continuing to have the greatest impact and participation among RCMU customers. Participation in the direct installation program remained low which is partially due to new tenants moving into existing spaces with already updated fixtures or doing upgrades during tenant improvements and construction.

Program and Portfolio Highlights

Replacing inefficient lamp fixtures with LEDs continues to be the trend for energy efficiency rebates during FY 2019. Large retail box and warehouse lighting retrofits accounted for the rebates this year and were comparable to previous years. 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 and 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 kWh 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.

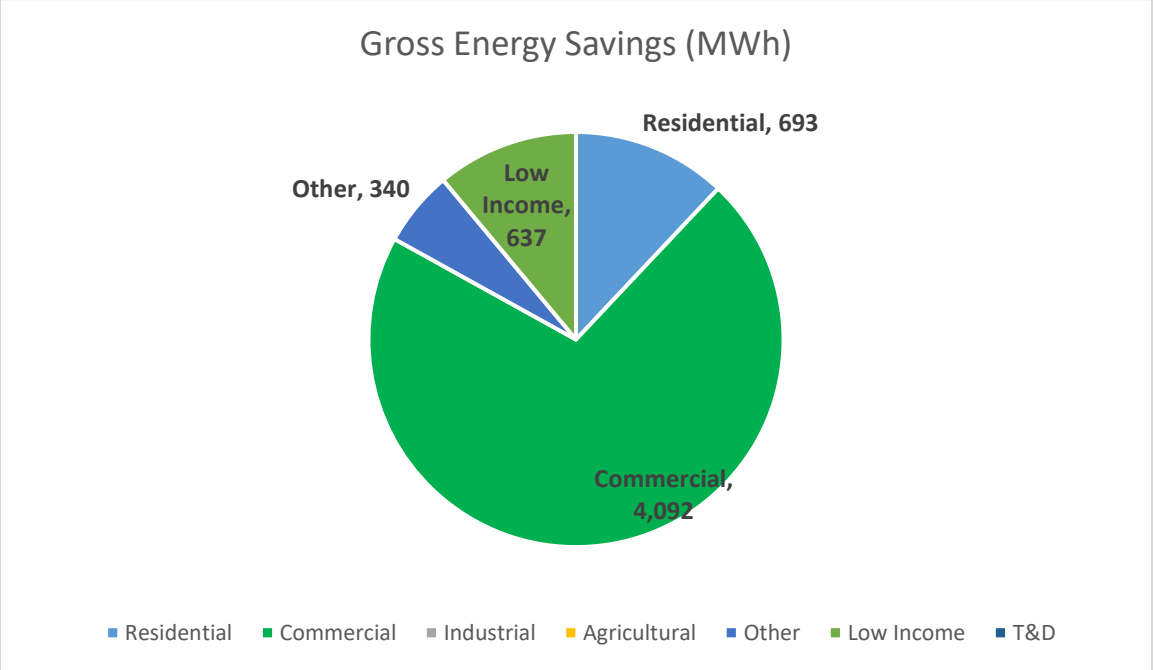
Complementary Programs

- 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 on 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	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Non-Res Lighting	221	595,324	9,525,184	221	595,324	9,525,184	3,295	32,476	$74,059	$0.01	11.70	30.29
Non-Res Lighting	14	62,179	994,870	14	62,179	994,870	338	3,392	$9,654	$0.01	10.22	30.29
Non-Res Lighting (Outdoor)	0	0	0	0	0	0	0	0	$26,431	$0.00	0.00	0.00
Non-Res Lighting	1	3,100	49,600	1	3,100	49,600	17	169	$1,605	$0.05	2.81	30.29
Subtotal	236	660,603	10,569,654	236	660,603	10,569,654	3,650	36,037	$111,748	$0.01	8.67	30.29
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	236	660,603	10,569,654	236	660,603	10,569,654	3,650	36,037	$111,748	$0.01	8.67	30.29

Redding at a Glance

- Climate Zone(s): 11
- Customers: 44,264
- Total annual retail sales (MWh): 721,363
- Annual Retail Revenue: $118,816,000
- Annual energy efficiency expenditures for reporting year: $2,550,041
- Gross annual savings from reporting year portfolio (MWh): 5,761



Redding Overview

Total sales for FY 2019 were 721,363 MWh – a 3.2 percent decrease compared to FY 2018. 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 2019. These changes are as follows:

- Effective September 2018, REU added electrification measures to the Low Income Energy Efficiency Program to install heat pump technology.
- Effective September 2018, REU enhanced the Residential Energy Advisor program to include the installation of LED light bulbs and Smart Power Strips.

Program and Portfolio Highlights

In FY 2019, REU's total commercial sector lighting savings decreased over FY 2018 levels to 3.2 million kWh (net). REU anticipates that lighting rebates will continue to deliver the majority savings in Redding for the foreseeable future. However, REU expects projects to decrease in savings as Redding reaches saturation.

Commercial, Industrial and Agricultural Programs

HVAC – Deemed rebates for air conditioning and/or heat pump equipment, and Wi-Fi enabled thermostats. Custom rebate calculated based on existing equipment, retrofit equipment, and hours of operation.

Food Service – Deemed rebates for ice machines, glass door refrigerators/freezers, solid door freezers, holding cabinets, and electric combination/convection ovens, steam cookers, fryers, griddles, and vending machine controllers.

Refrigeration – Deemed rebates for auto door closers, anti-sweat heater controls, and electronically commutated evaporator fans for walk-in coolers or display cases.

Lighting – Rebates for retrofit lighting projects calculated using a custom calculator to determine savings based on existing equipment, retrofit equipment, and hours of operation.

Residential Programs

HVAC – Deemed rebates for air conditioning and/or heat pump equipment, Wi-Fi enabled thermostats, and whole house fans.

Water Heating – Deemed rebates for electric storage and heat pump water heaters.
Appliances – Deemed rebates for variable speed pool pumps, room air conditioners, refrigerators, and ceiling fans.

Building Shell – Deemed rebates for installation of dual pane windows, drill and fill wall insulation, and ceiling insulation.

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 2018, rate discounts represented about $1.6 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 energy efficiency 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 FY 2017 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 FY 2019 program prior to the study. The results of Redding EM&V reports are available on CMUA's website: 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.

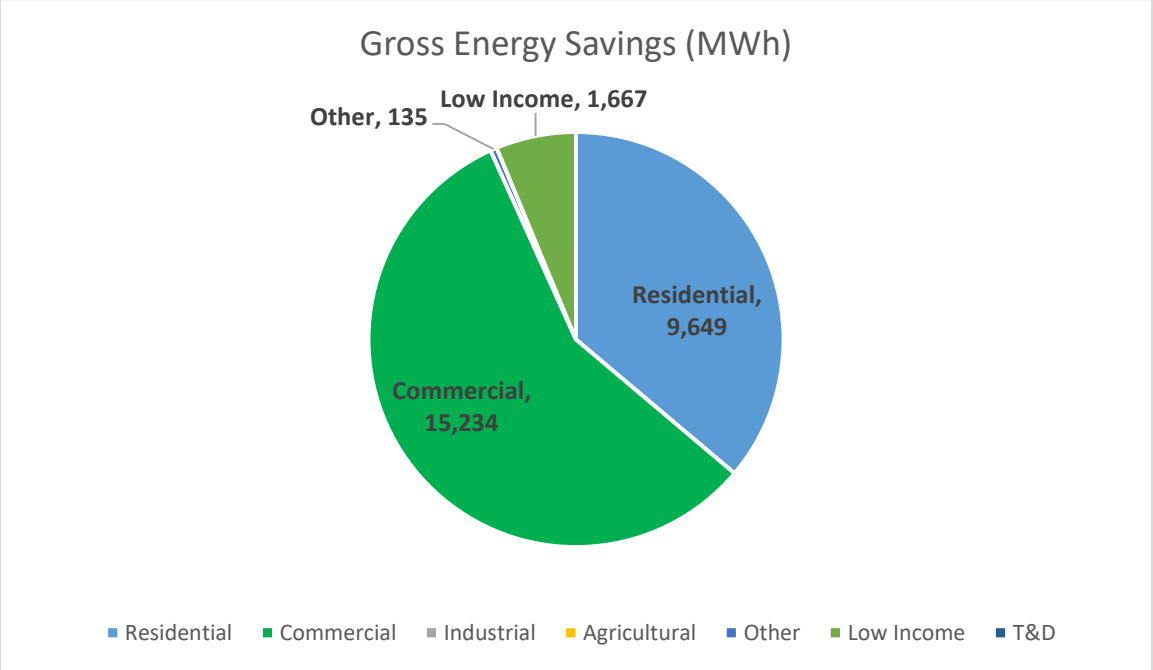
Major Differences or Diversions from California POU TRM for Energy Savings

For the vast amount of its energy efficiency programs, REU uses the standard measures as constructed within the Energy Services Platform's (ESP) reporting tool. For REU's unique programs (Low Income Energy Efficiency, 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 calculation.

REDDING	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Shade Trees FY19	0	69,146	1,382,912	0	58,774	1,175,475	530	4,008	$176,693	$0.23	1.61	1.94
Ductless mini-split heat pump, 16 S	6	18,799	151,706	4	15,039	121,365	58	414	$16,835	$0.17	1.78	2.48
Energy Star Refrigerator - CEE Leve	0	470	6,580	0	259	3,619	1	12	$228	$0.09	1.53	1.53
Window Replacement Energy Effic	12	11,988	239,759	6	6,593	131,868	54	687	$11,154	$0.13	1.47	0.58
Add Insulation R8 to R38	0	27,797	555,940	0	7,783	155,663	63	531	$17,659	$0.17	1.74	0.74
Split-system air conditioner, 18 SEI	1	2,678	40,163	1	2,142	32,130	15	110	$4,868	$0.21	1.69	1.21
Ceiling insulation, increase to R-30	99	94,017	1,880,345	28	26,325	526,497	793	11,739	$42,425	$0.12	3.80	3.28
Heat pump, 16 SEER, 8.4 HSPF (afte	5	18,582	149,910	4	14,866	119,928	57	409	$15,006	$0.16	1.98	2.95
Add R19 insulation to preexisting i	0	18,365	367,307	0	5,142	102,846	41	351	$20,714	$0.31	0.98	0.40
Add R30 insulation to preexisting i	0	26,333	526,658	0	7,373	147,464	59	503	$16,729	$0.17	1.74	0.74
Split-system air conditioner, 18 SEI	0	340	5,100	0	272	4,080	2	14	$685	$0.23	1.53	1.19
ENERGY STAR HP water heater, 50	0	3,525	35,250	0	2,115	21,150	9	72	$2,384	$0.14	0.69	0.62
Whole house fan	0	9,920	198,400	0	2,778	55,552	23	154	$6,022	$0.17	2.20	1.54
Heat pump, 15 SEER, 8.4 HSPF (afte	1	3,496	52,440	1	2,797	41,952	19	143	$7,998	$0.26	1.23	1.95
Heat pump, 15 SEER, 8.4 HSPF (afte	15	44,280	358,200	12	35,424	286,560	137	977	$34,547	$0.15	2.05	3.15
Split-system air conditioner, 15 SEI	27	43,740	326,700	21	34,992	261,360	128	891	$35,188	$0.16	2.03	2.12
-- MANY ADDITIONAL LIGHTING & A/C MEASURES ARE LISTED -- (see electronic file for details)												
Split-system air conditioner, 16 SEI	20	32,868	250,140	16	26,294	200,112	98	682	$29,021	$0.18	1.88	2.00
Energy Star Refrigerator	0	3,162	44,268	0	1,739	24,347	9	83	$2,231	$0.12	1.06	1.06
Package System, 14.5 SEER, 12 EER	0	113,206	1,698,096	0	62,264	933,953	430	3,184	$103,409	$0.15	2.31	1.90
Variable speed residential pool pu	22	95,816	551,656	13	57,490	330,994	120	1,129	$13,561	$0.05	2.15	0.45
Ductless mini-split heat pump, 16 S	1	7,439	111,578	1	5,951	89,262	40	304	$18,798	$0.29	1.11	1.51
Wi-Fi Enabled Thermostat	0	21,555	237,109	0	17,244	189,688	222	2,905	$15,952	$0.11	4.15	8.61
Heat pump, 16 SEER, 8.4 HSPF (afte	0	2,775	41,625	0	2,220	33,300	15	114	$6,033	$0.25	1.29	1.85
Split-system air conditioner, 15 SEI	2	4,206	63,090	1	3,365	50,472	23	172	$11,849	$0.32	1.09	1.10
Energy Star LED Bulb BR30	0	1,201	18,018	0	1,021	15,315	6	52	$8,647	$0.78	0.16	0.16
Energy Star LED Bulb G25	0	728	10,920	0	619	9,282	4	32	$5,240	$0.78	0.16	0.16
Energy Star LED Bulb A19	0	5,296	79,443	0	4,502	67,527	27	230	$38,124	$0.78	0.16	0.16
Energy Star LED Bulb B10	0	1,188	17,813	0	1,009	15,141	6	52	$8,637	$0.79	0.16	0.16
Smart Power Strip	0	1,060	5,300	0	901	4,505	2	15	$3,636	$0.89	0.15	0.15
Commercial Lighting Rebate - Exte	0	1,153,119	10,784,005	0	922,495	8,627,204	4,222	29,415	$257,241	$0.04	3.04	2.48
Commercial Lighting Rebate - Inter	647	2,869,957	14,710,604	518	2,295,966	11,768,483	4,840	40,125	$545,731	$0.05	2.08	1.02
Web Enabled Programmable Therr	0	20,336	223,696	0	17,286	190,142	69	648	$11,305	$0.07	1.84	1.71
LED Street Light Replacement	85	339,571	3,395,710	85	339,571	3,395,710	1,666	11,578	$97,647	$0.11	1.05	1.05
Subtotal	959	5,123,822	39,086,882	727	4,029,582	29,594,272	13,967	113,306	$1,667,385	$0.08	1.90	1.15
Low-Income	1	636,818	7,969,523	0	541,059	6,769,373	2,850	23,096	$685,540	$0.14	1.49	1.49
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	1	636,818	7,969,523	0	541,059	6,769,373	2,850	23,096	$685,540	$0.14	1.49	1.49
Total	960	5,760,640	47,056,405	727	4,570,641	36,363,646	16,817	136,402	$2,352,926	$0.09	1.79	1.22

Riverside at a Glance

- Climate Zone(s): 10
- Customers: 110,480
- Total annual retail sales (MWh): 2,149,900
- Annual Retail Revenue: $305,083,100
- Annual energy efficiency expenditures for reporting year: $6,658,541
- Gross annual savings from reporting year portfolio (MWh): 26,685



Riverside Overview

In FY 2019, Riverside Public Utilities (RPU) met 100% of the kWh savings goal of 1% of retail sales as adopted by the Board of Public Utilities in 2017. RPU assisted its customers in saving almost 25 million kWh (net annual average savings).

Through the recession, 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. A new 5-year rate plan was adopted by the City Council in 2018 with an effective date in January 1, 2019. The rate plan is rolling out in phases over the 5-year period to reduce impacts 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 9 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 sunset at the end of calendar year 2017, which allowed us to shift funds to focus on more low-income programs. During FY 2019, the RPU team continued to focus on revamping our low-income programs to be most beneficial to our rate payers.

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.

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.

Commercial, Industrial and 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 SoCalGas 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 SoCalGas 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 2015 and implemented in FY 2016 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 SoCalGas. 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

- EVs: 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.
- SHARE – This low-income assistance program credits up to $150 toward electric deposit or bill payment assistance for qualified low-income applicants annually. RPU has opened a facility in a low-income area of the city in an effort to make the program more accessible to our low-income customers.
- 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.
- DR – RPU continues to manage a highly successful voluntary (non NERC certified) DR 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 California Independent System Operator (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.

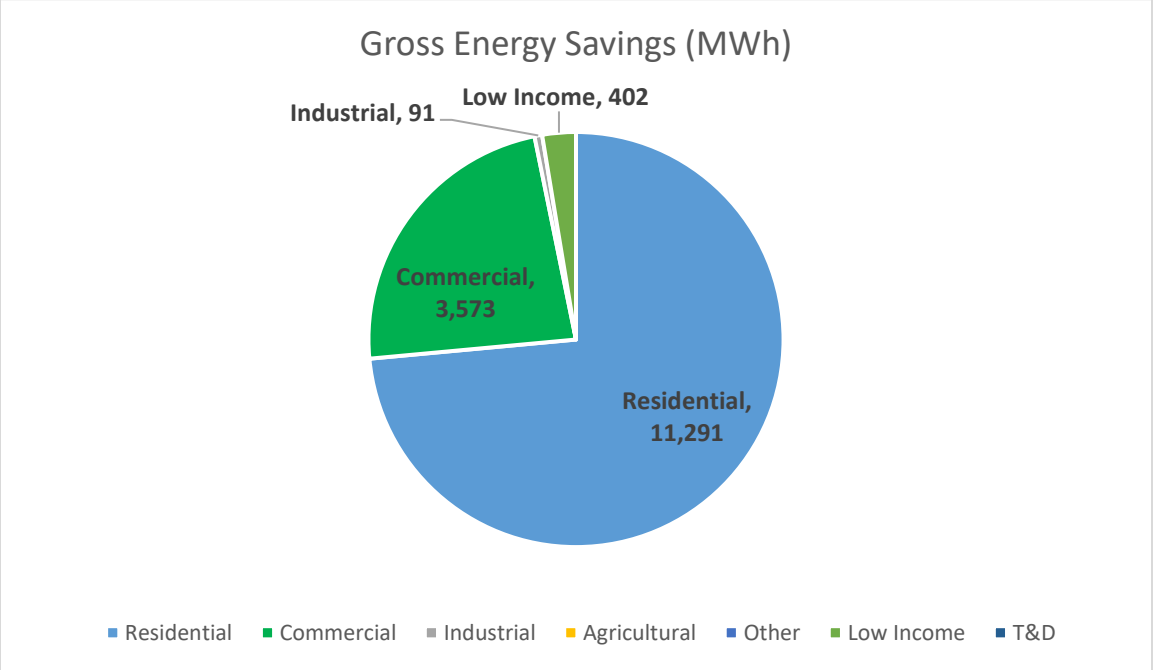
In addition to periodic program audits, RPU consistently performs the following in support of EM&V activities:

- 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 ARCA assures full inspection when the contractor picks up old appliances.

RIVERSIDE	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
A/C Split 19 SEER	8	7,575	113,626	8	7,196	107,945	46	368	$11,324	$0.14	1.88	19.15
Refrigerator Recycling Rebate w/o	20	90,083	450,415	19	85,579	427,894	191	1,459	$7,314	$0.02	6.91	30.44
Weatherization - Cool Roof, Flat Sl	4	7,068	106,020	4	6,361	95,418	41	325	$5,969	$0.08	3.15	17.86
Weatherization - Solar Attic Fan	3	3,245	32,450	2	2,921	29,205	13	100	$1,264	$0.05	4.81	22.19
A/C WiFi Enabled Thermostat	0	100,854	1,815,372	0	95,811	1,724,603	719	5,880	$30,577	$0.03	10.95	33.13
Lighting Efficiency Retrofit Progran	0	1,109,775	11,097,750	0	1,109,775	11,097,750	4,199	37,838	$131,519	$0.01	8.24	8.24
Weatherization - Wall Insulation, F	2	3,726	74,520	1	3,353	67,068	28	229	$1,697	$0.04	7.58	26.69
Weatherization - Attic Insulation, F	34	81,236	1,624,720	31	73,112	1,462,248	605	4,986	$9,397	$0.01	29.82	36.20
Weatherization - Duct Replacemer	43	9,272	166,896	38	8,345	150,206	63	512	$9,936	$0.09	2.93	17.14
LED Buydown - 4.5W/LEDX/Globe/	13	138,556	2,078,340	10	110,845	1,662,672	678	5,669	$17,722	$0.01	8.88	22.68
Upstream HVAC - FY 18/19	0	1,852,136	33,338,448	0	1,852,136	33,338,448	11,690	113,668	$319,478	$0.01	9.52	9.52
ARCA Refrigerator Pick-Up Recyclir	53	240,726	1,203,630	50	228,690	1,143,449	510	3,899	$27,606	$0.03	4.90	27.91
Weatherization - Attic Fan	11	3,122	46,830	10	2,810	42,147	18	144	$1,074	$0.03	7.74	26.89
A/C Split 16 SEER	222	102,640	1,847,514	211	97,508	1,755,138	732	5,984	$266,436	$0.22	1.28	15.45
Public Works Curbside Refrigerato	28	130,961	654,805	22	104,769	523,844	234	1,786	$8,149	$0.02	7.60	20.88
Small Business Direct Install - EE In	0	1,698,048	16,980,480	0	1,698,048	16,980,480	6,425	57,895	$1,003,390	$0.07	1.65	1.65
Small Business Direct Install - Keep	0	369,630	2,217,780	0	369,630	2,217,780	885	7,562	$105,332	$0.05	2.13	2.13
-- MANY ADDITIONAL LIGHTING & A/C MEASURES ARE LISTED - (see electronic file for details)												
A/C Split 18 SEER	0	5,400	97,200	0	5,130	92,340	39	315	$13,983	$0.21	1.28	15.47
Shade Trees - Free Tree Coupon	1,018	3,716,430	111,492,900	713	2,601,501	78,045,030	31,469	266,095	$881,495	$0.02	15.75	26.37
CEE Tier 1 Split AC 14.5 SEER (12 EEF	45	20,900	376,200	40	18,810	338,580	114	1,154	$62,581	$0.26	0.50	4.49
A/C Split 20 SEER	7	6,694	100,414	7	6,360	95,393	41	325	$10,007	$0.14	1.88	19.15
Small Business Direct Install - Busir	0	1,852,280	18,522,800	0	1,852,280	18,522,800	9,176	63,154	$1,008,864	$0.07	1.64	37.08
Lighting Efficiency Retrofit Progran	0	3,608,649	36,086,490	0	3,608,649	36,086,490	13,655	123,037	$304,678	$0.01	11.57	11.57
LED Buydown - 11W LED OMNI - D	35	686,673	10,300,095	28	549,338	8,240,076	3,359	28,095	$63,117	$0.01	12.36	26.48
A/C Tune Up Refrigerant Charge	139	154,440	1,544,400	132	146,718	1,467,180	659	5,002	$16,661	$0.01	18.33	35.28
Lighting Efficiency Retrofit Progran	0	1,292,670	12,926,700	0	1,292,670	12,926,700	4,891	44,074	$138,201	$0.01	9.13	9.13
LED Buydown - 8W LED BR30	549	480,060	7,200,900	439	384,048	5,760,720	2,348	19,641	$48,036	$0.01	11.35	25.51
LED Buydown - 7W/LEDX/OMNI/D/	17	273,216	4,098,240	14	218,573	3,278,592	1,337	11,178	$28,263	$0.01	10.98	25.13
Refrigerator Recycling Rebate with	60	274,791	1,373,955	57	261,051	1,305,257	583	4,450	$40,511	$0.03	3.81	25.81
HVAC Tier 3 (DR Capable) (Ice Bear	0	245,116	3,676,739	0	245,116	3,676,739	1,264	12,536	$109,372	$0.04	3.14	37.08
AC Tune up - Refrigerant Charge	353	390,720	5,860,800	353	390,720	5,860,800	2,015	19,982	$36,824	$0.01	14.86	37.08
Weatherization - Whole House Far	0	35,496	709,920	0	31,946	638,928	264	2,178	$10,102	$0.02	12.12	30.75
LED Buydown - 15W/LED/OMNI/D3	22	502,182	7,532,730	17	401,746	6,026,184	2,457	20,546	$89,838	$0.02	6.35	4.85
Performance Based Incentive - FY 1	0	2,450,310	24,503,100	0	2,450,310	24,503,100	9,272	83,544	$225,725	$0.01	10.60	10.60
A/C Split 21 SEER	5	4,404	66,062	5	4,184	62,758	27	214	$6,558	$0.14	1.89	19.19
LED Buydown - 9W LED OMNI	604	468,131	7,021,965	483	374,505	5,617,572	2,290	19,153	$42,580	$0.01	12.49	26.60
Energy Star - Refrigerator	15	84,700	1,185,800	14	80,465	1,126,510	441	3,841	$73,382	$0.09	1.71	18.22
Whole House Program 17/18	0	134,782	1,752,163	0	128,043	1,664,555	659	5,675	$134,399	$0.10	1.20	14.84
Subtotal	3,507	25,017,562	354,634,403	2,895	23,273,117	312,328,475	122,671	1,064,887	$6,112,256	$0.03	6.09	10.81
Low-Income	61	1,667,207	24,189,161	61	1,667,207	24,189,161	10,006	82,473	$546,286	$0.03	5.54	6.29
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	61	1,667,207	24,189,161	61	1,667,207	24,189,161	10,006	82,473	$546,286	$0.03	5.54	6.29
Total	3,568	26,684,769	378,823,563	2,956	24,940,324	336,517,635	132,677	1,147,360	$6,658,541	$0.03	6.04	10.26

Roseville at a Glance

- Climate Zone(s): 11
- Customers: 61,385
- Total annual retail sales (MWh): 1,147,398
- Annual Retail Revenue: $159,278,408
- Annual energy efficiency expenditures for reporting year: $4,450,327
- Gross annual savings from reporting year portfolio (MWh): 15,357



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 over 54,600 residential customers and 6,772 commercial customers.

In 2019 Roseville issued 998 new home, 65 multi-family and 19 commercial building construction permits. Industrial vacancy rate is 3.6 %, Office at 9.6 % and Retail at 5.8 %.

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 EVs is high.

Major Program and Portfolio Changes

Roseville maintained a broad portfolio of residential and non-residential programs in 2019. These programs offer declining reportable energy efficiency savings but are popular with customers. Roseville intends to continue offering these programs to customers but may eliminate existing programs as technology provides an opportunity to do so.

Roseville is developing a fuel switching pilot program for residential retrofit homes in 2020 and working with a consultant to develop a new construction electrification program.

Program and Portfolio Highlights

Residential customers participating in the Home Energy Reports behavioral program contributed 53 % of Roseville Electric's energy efficiency savings for FY 2019. Through the Home Energy Reports program, Roseville Electric is able to educate customers with tips to save energy in their homes. The 5,931.000 kWh savings represents a full year of energy reports to approximately 38,000 customers and is reported with a NTG of 66% as recommended by the EM&V performed on this program in 2019.

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 7,984,000 kWh for the fiscal year, 70 % of the total energy savings reported for FY 2019.

Commercial, Industrial and 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 Pacific Gas and Electric Company's 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 1,350 customers with a rate reduction to their utility bills in FY 2019. Roseville worked with local agencies and libraries to implement workshops that aided low income residents.

Low Income Energy Efficiency: Roseville offered two direct install programs designed for low income households in 2019. Both programs were possible through funding provided from the California Air Resources Board Greenhouse Gas Cap and Trade program. The multifamily program provides energy education, a smart thermostat, HVAC tune up, a bathroom occupancy sensor and the installation of several water conservation measures. The refrigerator replacement program gives low income residents the opportunity to have an older refrigerator recycled and replaced with a new ENERGY STAR unit.

Residential Windows: Program for retrofit 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 fixed 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. Energy efficiency savings for the trees was obtained from an EM&V performed 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 Home Energy Reports and reviewed by a third-party consultant for this program.

Residential Sunscreens: Rebate program designed to incent customers to install permanent sunscreens on their windows to reduce air conditioner runtime.

Complementary Programs

EV Program:

Customers purchasing new EVs are eligible for a rebate for both the vehicle and the plug-in charger. Over 330 residential customers purchased EVs in Roseville and received a rebate in FY 2019. Of the 330, 187 customers installed a Level II charger. This program received initial funding from Roseville Electric and from the sale of GHG credits. This program is now fully funded through the Low Carbon Fuel Program. In FY 2020 Roseville added an enhanced rebate to assist low income customers purchase a new EV and vehicle charger. Vehicle rebates will sunset when the statewide carbon fuel rewards program becomes available.

In 2018, an independent assessment of the potential impact of EVs 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. Roseville staff is using this report and other industry research to identify opportunities for improvements and expansion of our existing EV program to low income and commercial customers. This includes incentives for infrastructure upgrade for DC fast chargers; offering rebates for charging stations for commercial workplace charging and free downtown charging at Level II chargers in the two City owned parking structures.

Roseville Electric is reaching out to the community to promote EVs through exhibits at the Roseville Utility Exploration Center and a dealership engagement program.

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 $456,600 to the Utility Exploration Center in FY 2019 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 Energy Commission.

All third-party EM&V reports are published on CMUA's website under resources in the document library.

Recent Reports include:

- EM&V- Residential Home Energy Reports (2019)
- 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)

Major Differences or Diversions from California POU TRM for Energy Savings

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

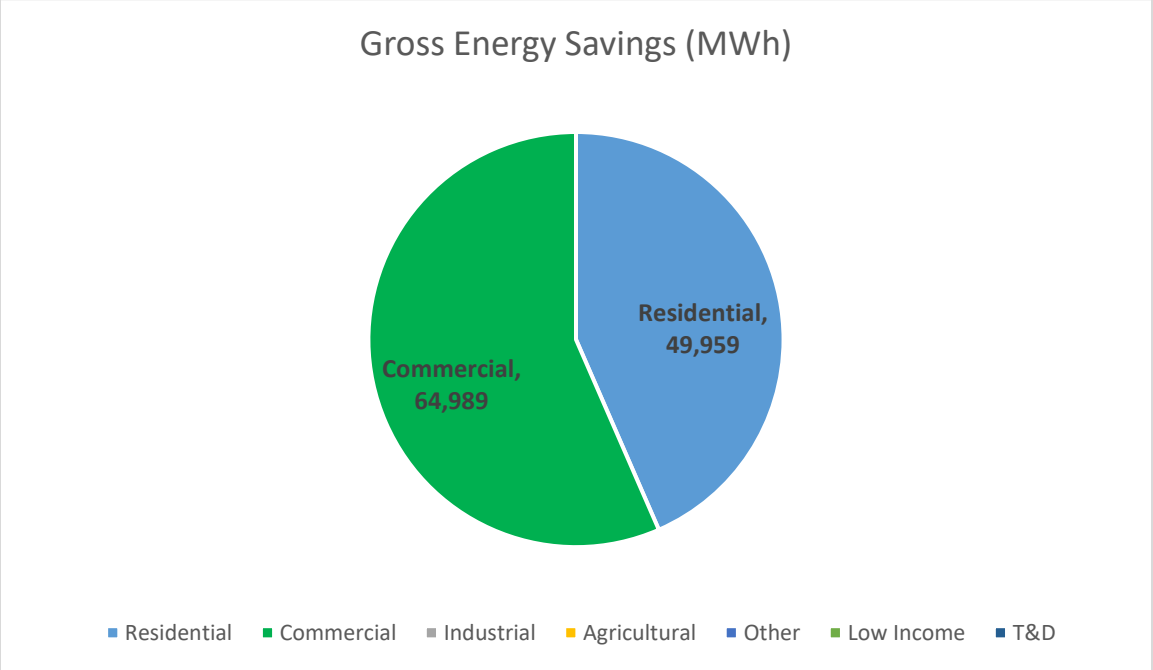
Roseville Electric relies on the savings documented in the CMUA TRM. If not available, the measure is entered to the 1037 reporting model as a custom measure. When a custom program is entered to the model, the source of energy savings is documented as coming from an industry approved method (Home Energy Reports), a published industry white paper or published EM&V. Home Energy 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	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Custom-COR Residential Windows	183	186,951	3,739,020	183	186,951	3,739,020	1,848	12,748	$219,915	$0.08	1.20	3.95
Residential solar screen	8	6,304	63,042	5	3,782	37,825	(3)	(259)	$7,726	$0.24	0.02	0.01
Behavior-Energy Reports 2018-201	0	8,986,492	8,986,492	0	5,931,085	5,931,085	2,778	20,222	$500,776	$0.08	0.71	0.71
Whole house fan	0	435,488	8,709,760	0	304,842	6,096,832	2,783	16,854	$256,235	$0.06	1.58	0.69
Interior Lighting All Other- custom	9	38,751	310,008	7	31,001	248,006	98	846	$12,167	$0.06	1.12	2.11
LED Interior Lighting-FY 18-19	395	1,653,090	16,530,900	316	1,322,472	13,224,720	5,096	45,090	$784,094	$0.07	0.91	1.95
LED Exterior Lighting-FY 18-19	213	874,620	9,620,820	170	699,696	7,696,656	2,926	26,242	$259,689	$0.04	1.59	2.38
New Home Construction 2018-201	100	233,321	3,499,815	100	233,321	3,499,815	1,768	11,933	$397,743	$0.15	0.64	3.18
Kitchen Vent Controls	2	8,972	8,972	1	8,075	8,075	4	28	$2,373	$0.29	0.20	1.22
Reach-In Refrigerator, solid door, 1	0	493	5,916	0	394	4,733	2	16	$291	$0.08	0.86	0.22
Commercial Ice machine - 301 to 5(	0	1,117	11,170	0	670	6,702	3	23	$831	$0.15	0.44	0.63
Custom- COR Shade Tree	16	69,696	1,393,920	13	55,757	1,115,136	551	3,802	$47,706	$0.07	1.49	1.78
AC Pkg Unit-< 5 Tons (55kBtuh)-15	8	31,752	186,732	7	26,989	158,722	58	541	$30,567	$0.24	0.32	0.16
AC Unit-12to17 Tons (135-239 kBtu	99	319,440	777,744	84	271,524	661,082	247	2,254	$145,836	$0.26	0.26	0.24
Copy of COR Smart T Stat- 1 project	0	7,380	73,800	0	7,380	73,800	29	252	$2,363	$0.04	1.71	2.76
AC Pkg Unit-< 5 Tons (55kBtuh)-15	1	2,469	13,431	1	2,099	11,416	4	39	$1,746	$0.19	0.39	0.20
-- MANY ADDITIONAL A/C MEASURES ARE LISTED -- (see electronic file for details)												
Variable speed residential pool pu	8	160,412	1,604,120	5	96,247	962,472	391	3,282	$61,670	$0.08	0.90	0.57
Pool Pump	21	307,139	3,685,668	21	307,139	3,685,668	1,391	12,566	$83,584	$0.03	2.34	2.76
Machine Shop Equipment	61	90,862	1,362,930	61	90,862	1,362,930	497	4,647	$41,451	$0.04	1.71	14.58
Indirect Evaporative AC (Climate W	94	89,395	1,340,925	94	89,395	1,340,925	398	4,572	$84,804	$0.08	0.92	2.76
Split-system air conditioner, 16 SEI	51	127,335	1,910,025	41	101,868	1,528,020	772	5,210	$245,553	$0.21	0.45	0.33
Split-system air conditioner, 15 SEI	7	17,520	262,800	6	14,016	210,240	106	717	$36,352	$0.23	0.42	0.33
Custom- COR Residential Smart Th	0	273,280	3,006,080	0	245,952	2,705,472	1,416	9,224	$178,220	$0.08	1.14	1.04
Split-system air conditioner, 18 SEI	4	11,390	170,850	4	9,112	136,680	69	466	$35,612	$0.34	0.28	0.31
Custom- COR HVAC Tune Up 3.5 To	0	775,368	2,326,104	0	620,294	1,860,883	1,075	6,345	$153,946	$0.09	0.99	2.48
Heat pump, 15 SEER, 8.4 HSPF (afte	3	7,676	115,140	2	6,141	92,112	47	314	$12,451	$0.18	0.54	0.67
Subtotal	1,338	14,955,064	70,639,455	1,167	10,873,281	57,219,990	24,662	190,771	$3,803,115	$0.08	0.92	1.08
Low-Income	31	401,581	3,064,361	31	401,581	3,064,361	1,219	10,448	$642,172	$0.19	0.33	3.10
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	31	401,581	3,064,361	31	401,581	3,064,361	1,219	10,448	$642,172	$0.24	0.27	1.41
Total	1,369	15,356,645	73,703,815	1,198	11,274,861	60,284,350	25,880	201,219	$4,445,287	$0.09	0.83	1.09

SACRAMENTO

Sacramento at a Glance

- Climate Zone(s): 12
- Customers: 635,137
- Total annual retail sales (MWh): 10,233,511
- Annual Retail Revenue: $1,403,354,000
- Annual energy efficiency expenditures for reporting year: $33,475,302
- Gross annual savings from reporting year portfolio (MWh): 114,948



Sacramento Overview

Sacramento Municipal Utility District (SMUD) is planning program changes to respond to the following industry trends, utility direction and changing customer expectations:

- In 2019, SMUD submitted an IRP to the Energy Commission and it was accepted. This was a 20-year plan, which included moves to a more carbon-free resource mix, building and transportation electrification and continuation of energy efficiency. SMUD intends to be net-carbon free by 2040.
- SMUD's future energy efficiency portfolio will be aligned with a net carbon free future. This transition has already started, with major changes expected in the next five years.
- 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.
- Predominate use of natural gas is used in homes compared to commercial businesses, so programs will more likely be focused on the residential sector.

- 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.
- There will be a continuation of more complex rate schedules that will mimic the cost and availability of renewable power and the intensities of carbon in the power mix.
- Energy efficiency, building electrification, transportation electrification, solar and storage will continue to converge toward complete energy solutions, customized to meet the needs of the customer and the utility.
- 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, which may be in conflict with complex rates and carbon reduction efforts.

Major Program and Portfolio Changes

The overall budget, energy and peak savings achieved in 2019 were relatively unchanged from 2018. For SMUD's goals and forecasting purposes, SMUD includes 40 GWh of energy savings associated with SMUD's work on codes and standards. Also, the following program changes were made to facilitate customer demand and to prepare for the future:

- The residential retail lighting program was discontinued early in 2019. While this has been a major component of the SMUD portfolio for years, it is clear that SMUD's participation in this market transformation is complete.
- The Home Electricity Reports, a behavior-based program was stopped during the year in 2019 for renovation. The messaging in the reports were in conflict with the TOU messaging in SMUD's broader Time of Day (TOD) campaign. This program is expected to return in 2020.
- Toward the end of 2019, SMUD rolled out a retooled version of a major component of the residential energy efficiency programs. The Whole House Performance program and the traditional HVAC replacement program were combined into a singular, trade ally network-based program. This program will be the platform for a majority of the residential programs associated with energy efficiency, electrification, storage, and EV chargers.
- Based upon the direction of SMUD's newly adopted IRP and the ensuing focus on carbon reduction, numerous electrification measures were introduced to residential, multi-family and commercial segments. The primary additions were designed for the replacement of residential gas furnaces with heat pump space heating and residential gas water heaters with heat pump water heating.
- SMUD recommitted to residential new construction with a new program dedicated to encouraging developers and builders to offer all electric homes. While these homes offer

all the energy efficiency provided by Title 24, they also include heat pump space heaters, heat pump water heaters, induction cooktops and no natural gas service to the home. Other incentives are offered for prepping the homes for future EVs and battery storage.

Program and Portfolio Highlights

Following the SMUD Board of Directors far-sighted direction toward a net carbon neutral utility by 2040, SMUD started the transition of the energy efficiency programs toward a portfolio of carbon reduction programs. While the energy efficiency portfolio had been traditionally focused on savings energy, this switch toward carbon reduction helped add building electrification, EVs and carbon free pricing to the portfolio. While early in this transition, SMUD had tremendous program success in offering heat pump technologies as a replacement for the traditional use of natural gas in homes and businesses. SMUD expects more of this transition over the next five to six years.

SMUD has been continuously operating energy-conservation, load management, and energy-efficiency programs since 1976. Over that 43 year time period, SMUD's customers have saved over 3 TWh of first year energy savings.

In 2007, the SMUD Board of Directors approved a significant expansion in annual savings goals for its energy-efficiency resources, from approximately 0.6% of annual sales to an annual average of approximately 1.5% over the following years. While SMUD's dedication toward energy efficiency will continue, the transition toward a net carbon free utility will require a balance between energy efficiency, building electrification and transportation electrification. This revised focus is part of the Board's vision to "empower our customers with solutions and options that increase energy efficiency, protect the environment, reduce global warming, and lower the cost to serve our region." SMUD is continually redesigning its energy-efficiency portfolio to expand existing programs, plan and implement new programs, and develop and implement a broader marketing and engagement plan that will meet these expanded goals and the Board's vision.

For 2019, SMUD spent $28.3 million for residential and commercial energy-efficiency programs, compared to a budget of $29.0 million. All expenditures are public-goods funded. These programs delivered 45.0 MW of peak-load reduction and 157 million kWh of annual energy savings.

Commercial, Industrial and Agricultural Programs

Expenditures for commercial/industrial energy efficiency retrofit programs for existing buildings and facilities were $14.3 million, with delivery of 13.1 MW of peak-load reduction and 65.5 GWh in annual energy savings.

- 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

Expenditures for residential energy-efficiency programs for existing homes were $15.5 million and achieved 12.1 MW of peak-load reduction and 40.4 GWh in annual energy savings.

- 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 and heat pump water heaters.
- 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: 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 increasing the percentage of LED bulbs rebated through this program.

Information/Education Programs
Expenditures for Information and Education programs were $0.9M in 2019 and achieved 4.0 MW of peak-load reduction and 9.0 GWh in annual energy savings.
Home Electricity Reports: A scientifically designed program to measure the impact of sending electricity-usage reports to residential customers. The reports compare the customer's monthly usage to that of the previous year and to about 100 neighbors in similar-size homes with the same heat energy source. The reports are customized to each house and provide energy tips to assist the customer in making behavior changes that reduce their energy use.

Demand-Reduction Programs

- Peak Corps (Residential Air Conditioner Load Management Program): In the past, customers volunteered to allow SMUD to install a radio-controlled cycling device on their central air conditioners and to send a radio signal to switch, or cycle, off their air conditioners to reduce peak load on the electric-system. In the late 1990's the program was transitioned into maintenance mode with no new installations. In 2010 the program was modified for emergency use only and all service and maintenance related work was discontinued. In an Emergency Situation the Power System Operators have the ability to activate the entire ACLM cycling program within a 3-minute time span, but the program has not been activated since 2000.
- Power Direct (Automated DR Program): Enhances facilities' energy performance by seamlessly integrating automated response capabilities into energy management, lighting and HVAC systems. Automatically reduces electricity consumption on Conservation Days in times of high demand.

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.
- Smart Homes- New construction program that integrates energy efficiency, DR and other technologies in an aligned vision. The program is designed to complement SMUD's other portfolio programs (energy efficiency, 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. Planning began in 2017 for an All-Electric Smart Homes program that

focuses on increasing the opportunities for reducing carbon emissions in residential new construction and the program is available to builders and developers now.

- Renewable Energy Programs: Incentives for net-energy-metered PV; a feed-in tariff for mid-scale systems (currently closed); voluntary green pricing programs including SolarShares, which supports expansion of distributed PV; and commercial and residential REC purchase programs.
- 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, DR, 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 and 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 40 net GWh energy savings associated with the Statewide Codes and Standards Team for 2019.
- Electric Vehicles: In 2019, SMUD's Drive Electric program continued to promote adoption of plug-in EVs through special PEV rate offerings, participation in educational events, and educational offerings through our website SMUD.org/PEV.
- Energy Storage: SMUD conducted field studies to examine grid-scale storage applications, risks and benefits. Additionally, SMUD is piloting an energy storage program, StorageShares, in order to fulfill AB 2514 requirements.

Evaluation, Measurement & Verification Studies

SMUD has established a framework to develop yearly measurement and verification (M&V) action plans. SMUD is planning M&V activities for all of its major programs, scheduled at fixed intervals (2-4 years apart), with the intention of evaluating all programs on a continued cyclical basis through 2020. For methodological approaches needed to perform specific types of evaluations, SMUD will be guided by the CPUC's "California Evaluation Framework" (June 2004) and "California Energy Efficiency Evaluation Protocols" (April 2006).

SMUD is planning to allocate approximately one percent of its total energy-efficiency budget towards impact- and persistence-focused M&V studies. These studies will be conducted primarily through the use of third-party contractors, with management and oversight by SMUD's Business Planning Department.

SMUD completed the following M&V activities in 2019:

- Home Electricity Reports

In 2020, M&V will be conducted for the following:

- Residential Space and Water Heating / Electrification
- Residential New Construction – Smart Homes

Major Differences or Diversions from California POU TRM for Energy Savings

In order to determine energy savings, programs may rely on several sources: The Database for Energy Efficient Resources (DEER), TRM, Energy Modeling Software, or specific studies conducted by utilities or recognized working groups. The goal is to use the most current studies/workpapers which best represent CZ12 and SMUD customers.

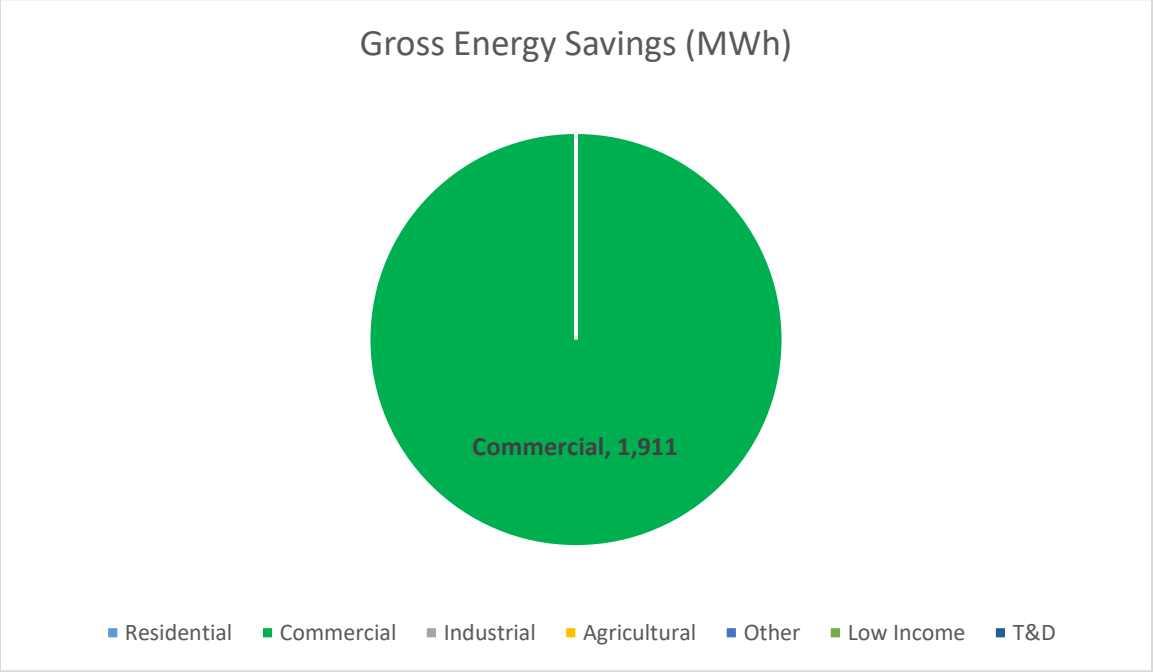
Electrification impacts--which include increased electricity usage, decreased natural gas usage, and increased energy efficiency--are aggregated and reported in kWh equivalents.

SACRAMENTO	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
-- MORE THAN 300 MEASURES ARE LISTED -- (see electronic file for details)												
Subtotal	29,130	114,947,870	1,394,160,395	21,319	91,848,217	1,125,864,410	80,552	3,838,647	$29,865,267	$0.03	0.30	0.22
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	9,915	40,000,000	40,000,000	9,915	40,000,000	40,000,000	3,855	136,380	$387,710	$0.01	0.82	0.82
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	(18)	(9,218,676)	(126,209,657)	(15)	(7,599,610)	(105,090,959)	(8,414)	(358,309)	$3,222,325	$0.00	-0.27	-0.27
Subtotal	9,897	30,781,324	(86,209,657)	9,900	32,400,390	(65,090,959)	(4,560)	(221,928)	$3,610,035	$0.09	-0.10	-0.10
Total	39,027	145,729,194	1,307,950,738	31,219	124,248,607	1,060,773,451	75,992	3,616,718	$33,475,302	$0.04	0.25	0.19

SAN FRANCISCO

San Francisco at a Glance

- Climate Zone(s): 3
- Customers: 3,708
- Total annual retail sales (MWh): 990,871
- Annual Retail Revenue: $125,248,057
- Annual energy efficiency expenditures for reporting year: $2,185,767
- Gross annual savings from reporting year portfolio (MWh): 1,911



San Francisco Overview

Hetch Hetchy Power manages a portfolio of electric generation, which includes the San Francisco Public Utility Commission's (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 two 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 major LED lighting retrofits at the Opera House and Asian Art Museum, as well as retro-commissioning efforts in the Civic Center District. Additionally, Hetch Hetchy Power continues to achieve savings through LED streetlight retrofits, though is nearing full conversion of all city-owned poles.

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 2019, completed energy efficiency projects are estimated to save 1,911 MWh (net savings) of electricity per year, at a utility cost of $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 2019 include:

- Direct-install style retrofits at various police stations, LED lighting upgrades at the Asian Art Museum and Opera House, major retro-commissioning and LEED certification efforts at Civic Center facilities.
- 544 streetlights were replaced with LED technology. Hetch Hetchy Power is nearing full conversion of all 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 and 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:

- General Fund Program: This program provides complete retrofit services and customized incentives to targeted municipal customers. 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 streetlights 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 FY 2016.

- 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 2019, Power Enterprise released its eighth 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:
Renewable Energy Programs:

- 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 California POU TRM for Energy Savings

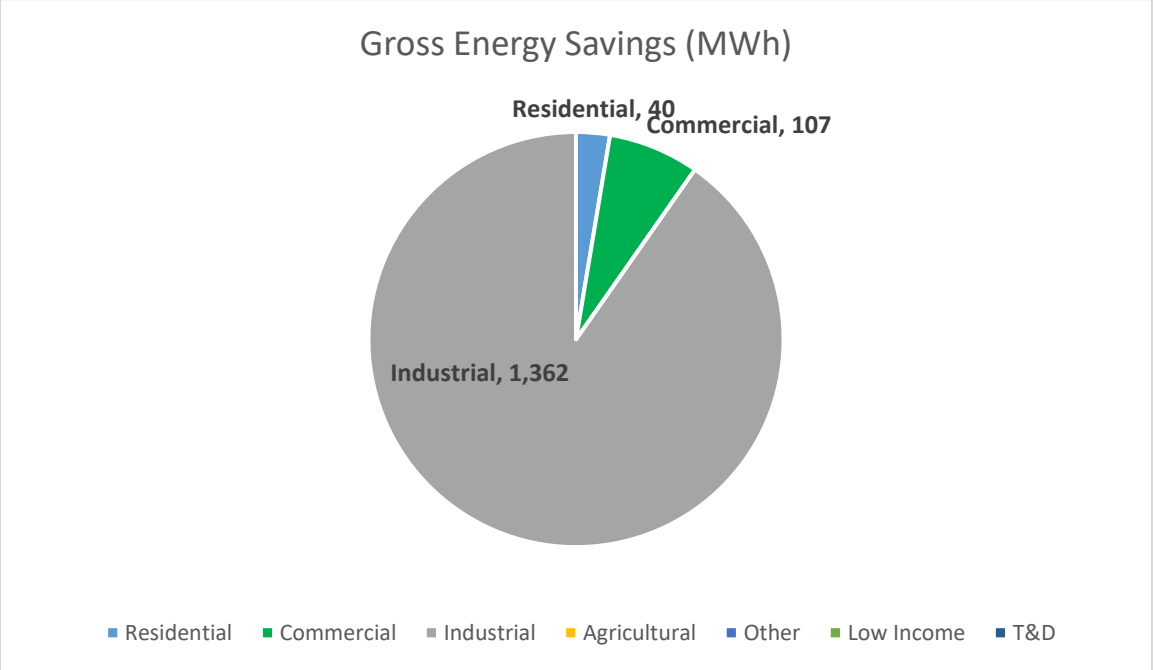
Hetch Hetchy Power's mostly direct-install energy efficiency portfolio allows it to report energy savings based on site-specific engineering studies with detailed ex ante savings estimates. These studies base savings on on-site collected data for hours of operation, nameplate data for replaced equipment, 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	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
LED streetlights FY1819	0	95,744	1,436,160	0	95,744	1,436,160	686	4,897	$244,800	$0.23	0.62	0.62
Asian Art Museum Lighting	49	252,000	3,780,000	49	252,000	3,780,000	1,374	12,888	$94,771	$0.03	3.46	3.46
Asian Art Museum - LEED Certificat	0	200,288	3,004,320	0	200,288	3,004,320	1,087	53,704	$259,751	$0.12	2.03	2.03
Main Library - LEED Certification ar	0	54,844	822,660	0	54,844	822,660	295	3,835	$137,090	$0.22	0.54	0.54
Davies Hall - LEED Certification and	3	193,590	2,903,850	3	193,590	2,903,850	1,040	11,588	$156,978	$0.07	1.59	1.59
Opera House Lighting	549	988,200	14,823,000	549	988,200	14,823,000	5,387	50,539	$788,867	$0.07	1.63	1.63
SFPD Controls Ph 2	0	110,220	1,653,300	0	110,220	1,653,300	585	17,044	$487,511	$0.39	0.42	0.26
Joseph Lee Gym Lighting	4	16,324	244,860	4	16,324	244,860	89	835	$16,000	$0.09	1.33	1.33
Subtotal	606	1,911,210	28,668,150	606	1,911,210	28,668,150	10,542	155,331	$2,185,767	$0.10	1.30	1.13
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	606	1,911,210	28,668,150	606	1,911,210	28,668,150	10,542	155,331	$2,185,767	$0.10	1.30	1.13

SHASTA LAKE

Shasta Lake at a Glance

- Climate Zone(s): 11
- Customers: 4,547
- Total annual retail sales (MWh): 194,017
- Annual Retail Revenue: $21,635,900
- Annual energy efficiency expenditures for reporting year: $382,154
- Gross annual savings from reporting year portfolio (MWh): 1,509



Shasta Lake Overview

The City of Shasta Lake (CSL) is located in Shasta County north of Redding. 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.

Major Program and Portfolio Changes

The net annual energy savings for FY 2019 has increased 822% from FY 2018. Program participation increased slightly, but most of the savings reported in FY 2019 are attributed to projects at one large industrial customer site. Reportable savings tend to fluctuate dramatically from year to year. In the last five years, CSL has achieved 101% of program savings targets.

Program and Portfolio Highlights

CSL offered a Residential Direct Install Program for customers in FY 2019. LEDs, advanced power strips and water savings measures were installed in customer's homes at no cost. The program received positive feedback from customers. CSL was pleased to offer this program to homeowners and renters, who are not able to participate in traditional rebate programs.

Commercial, Industrial and 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.

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 EVs

Evaluation, Measurement & Verification Studies

The CSL is planning to complete EM&V in FY 2020 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 California POU TRM for Energy Savings

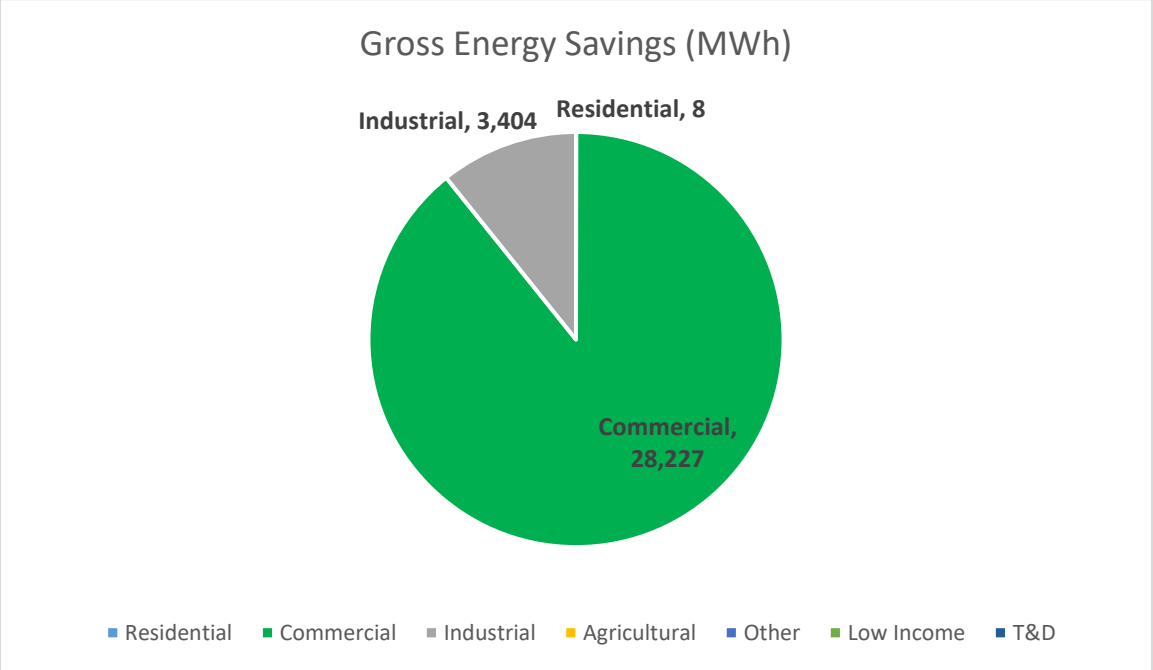
CSL has relied heavily on the savings listed in the TRM. Non-residential lighting, custom projects and non-deemed measures utilize custom savings calculations.

SHASTA LAKE	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Residential solar screen	0	269	2,691	0	75	754	0	(5)	$269	$0.43	0.18	0.10
Ceiling insulation, increase to R-38	18	17,836	356,722	5	4,994	99,882	41	2,232	$31,101	$0.46	1.02	1.09
Ceiling insulation, R-30 addition	0	254	5,086	0	71	1,424	1	30	$3,308	$3.42	0.13	0.14
Ceiling insulation, increase to R-30	2	2,287	45,744	1	640	12,808	5	286	$4,021	$0.46	1.02	1.08
ENERGY STAR Replacement Windo	3	3,143	62,863	2	1,886	37,718	11	129	$5,463	$0.21	0.82	0.42
Reflective window film, 0.39 SHGC	0	43	429	0	12	120	0	(1)	$40	$0.41	0.20	0.12
ENERGY STAR Replacement Windo	0	271	5,419	0	163	3,251	1	11	$659	$0.30	0.58	0.14
Electric hot water storage, 40-80 ga	0	165	1,650	0	99	990	0	3	$1,663	$2.03	0.05	0.05
Industrial Lighting Program Interio	238	1,362,421	16,349,057	190	1,089,937	13,079,245	4,931	44,594	$236,023	$0.02	5.19	4.11
Non-Residential Lighting Program	3	16,338	196,050	2	13,070	156,840	59	535	$4,638	$0.04	3.17	1.76
Non-Residential Custom Program F	0	17,642	211,703	0	14,114	169,362	61	577	$8,101	$0.06	2.32	1.61
Split-system air conditioner, 15 SEE	0	1,076	16,142	0	861	12,914	6	44	$5,085	$0.53	0.67	0.67
Ductless mini-split heat pump, 16 S	0	1,226	18,383	0	980	14,707	7	50	$5,541	$0.50	0.64	0.78
ENERGY STAR room air conditioner	0	164	1,476	0	131	1,181	1	4	$324	$0.32	0.99	0.99
Whole house fan	0	773	15,465	0	217	4,330	2	12	$1,256	$0.43	0.86	0.76
Heat pump, 16 SEER, 8.4 HSPF (afte	0	593	8,888	0	474	7,110	3	24	$2,688	$0.51	0.64	0.84
Split-system air conditioner, 16 SEE	0	839	12,587	0	671	10,070	5	34	$3,803	$0.50	0.70	0.67
Ductless mini-split heat pump, 15 S	0	166	2,486	0	133	1,989	1	7	$745	$0.50	0.65	0.79
Residential Direct Install Program -	3	13,761	137,607	3	13,073	130,726	55	446	$33,650	$0.31	0.40	0.40
Residential Direct Install Program -	4	59,234	296,168	4	56,272	281,359	136	959	$18,398	$0.07	1.84	1.84
Residential Direct Install Program -	0	6,044	60,440	0	5,742	57,418	24	196	$1,656	$0.03	2.77	2.77
ENERGY STAR ceiling fan	0	151	1,510	0	42	423	0	1	$552	$1.58	0.20	0.20
LED 15-21 W replacing 53 W haloge	0	84	1,260	0	45	680	0	2	$356	$0.70	0.19	0.17
LED 10-13 W replacing 43 W haloge	0	323	4,845	0	174	2,616	1	9	$1,351	$0.69	0.19	0.17
LED 6-9 W replacing 29 W halogen	0	299	4,485	0	161	2,422	1	8	$1,158	$0.64	0.20	0.16
ENERGY STAR dishwasher, standar	0	348	3,480	0	209	2,088	1	7	$1,137	$0.66	0.21	0.24
Variable speed residential pool pu	0	674	6,740	0	404	4,044	2	14	$1,994	$0.60	0.23	0.23
ENERGY STAR dishwasher, compac	0	129	1,290	0	77	774	0	3	$410	$0.64	0.22	0.25
ENERGY STAR Refrigerator: >7.75 c	0	1,167	16,343	0	817	11,440	4	39	$4,828	$0.55	0.24	0.26
ENERGY STAR clothes washer, top	0	1,404	15,444	0	435	4,788	2	16	$1,937	$0.50	0.23	0.22
Subtotal	274	1,509,123	17,862,453	209	1,205,981	14,113,474	5,361	50,267	$382,154	$0.03	3.58	3.00
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	274	1,509,123	17,862,453	209	1,205,981	14,113,474	5,361	50,267	$382,154	$0.03	3.58	3.00

SILICON VALLEY POWER

Silicon Valley Power at a Glance

- Climate Zone(s): 4
- Customers: 55,383
- Total annual retail sales (MWh): 3,566,293
- Annual Retail Revenue: $414,019,316
- Annual energy efficiency expenditures for reporting year: $5,725,867
- Gross annual savings from reporting year portfolio (MWh): 31,639



Silicon Valley Power Overview

Silicon Valley Power (SVP) 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 76.5% 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 FY 2019, the following changes were made to SVP's energy efficiency programs:

- 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 in FY 2018, but it did not result in any additional project applications, so this was removed for simplicity.
- 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. A peak demand incentive of $150 kW was introduced in FY 2018, but it did not result in any additional project applications, so this was removed for simplicity.
- Commercial Lighting Rebates – Networked lighting controls were moved from the Customer Directed Rebate program to the Commercial Lighting Rebate program. The lighting rebate was increased to $0.25 per kWh for the installation of network lighting control systems. This incentive applies to lighting retrofits only and helps to cover the customer's additional cost of measurement and verification of the energy savings.
- 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, so this program will end. City energy efficiency projects will still be eligible for rebates through our standard programs, but loan funds will no longer be available.

Program and Portfolio Highlights

In FY 2019, SVP customers completed a total of 27 custom incentive projects under the Customer Directed Rebate and Date Center Rebate programs. These projects contributed over 27 million kWh in gross 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 SVP 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 SVP 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 SVP'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 and 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 per 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 aids 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 per 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 2016, following an RFP issued in December 2013, and ran through June 30, 2019.
- 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 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.

- 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.

Evaluation, Measurement & Verification Studies

SVP recently conducted an EM&V study of its Exterior Lighting program. The study will be available in March 2020. All past EM&V studies conducted on behalf of SVP can be found on CMUA's website.

Major Differences or Diversions from California POU TRM for Energy Savings

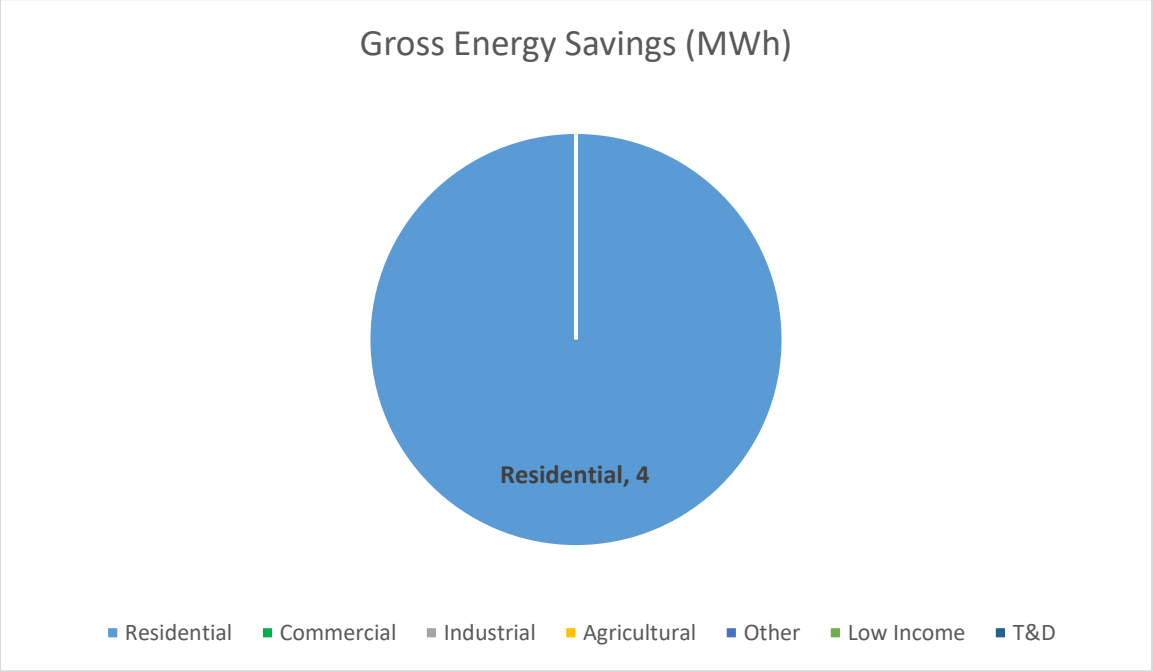
SVP uses the California Publicly Owned Utilities Technical Reference Manual (TRM) for the majority of its energy savings. Where no savings value exists, SVP uses actual savings verified through metering or an approved measurement and verification plan. In the case of lighting projects, SVP uses a lighting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

SILICON VALLEY POWER	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Process - other (2019)	426	2,979,179	29,791,790	362	2,532,302	25,323,022	9,274	86,339	$337,919	$0.02	8.27	1.77
Process - motors & VFDs (2019)	32	424,761	6,371,415	27	361,047	5,415,703	1,872	18,465	$25,534	$0.01	22.19	12.48
New Construction (2019)	31	284,549	5,690,980	26	241,867	4,837,333	1,640	16,493	$133,138	$0.04	3.53	0.58
Data Center (2019)	1,954	22,771,927	341,578,905	1,661	19,356,138	290,342,069	102,051	989,924	$2,623,527	$0.01	10.43	5.85
ENERGY STAR HP water heater, 50	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
2018 Residential Education	0	0	0	0	0	0	0	0	$357,375	$0.00	0.00	0.00
ENERGY STAR ceiling fan	0	151	1,510	0	42	423	0	1	$10,311	$29.49	0.02	0.02
Emerging Tech Electric Clothes Dry	0	818	8,180	0	818	8,180	3	28	$25,371	$3.75	0.04	0.04
Emerging Tech Electric Clothes Dry	0	325	3,250	0	325	3,250	1	11	$10,021	$3.73	0.04	0.04
2019 R&D Energy Efficiency	0	0	0	0	0	0	0	0	$337,387	$0.00	0.00	0.00
2019 Commercial Audits	0	0	0	0	0	0	0	0	$60,160	$0.00	0.00	0.00
Lighting - HID & induction (2019)	0	33,088	132,352	0	33,088	132,352	56	451	$16,020	$0.13	0.83	0.83
Lighting - LED (2019)	634	4,520,042	39,809,826	317	2,260,021	19,904,913	7,614	67,866	$1,219,566	$0.07	1.56	0.81
Lighting LED (2019)	0	566,295	2,265,178	0	566,295	2,265,178	1,148	7,723	$306,397	$0.14	0.67	0.67
Lighting - other (2019)	1	9,905	110,940	1	4,953	55,470	21	189	$2,739	$0.06	1.92	1.76
Refrigeration (2019)	4	34,587	518,798	4	29,399	440,979	166	1,504	$159,278	$0.48	0.26	0.26
HVAC (2019)	3	6,798	101,970	2	5,778	86,675	30	296	$36,942	$0.57	0.22	0.03
Ceiling insulation, increase to R-38	0	0	0	0	0	0	0	0	$44	$0.00	0.00	0.00
2018 Variable speed residential po	2	6,844	39,404	1	4,106	23,642	10	81	$64,137	$3.12	0.05	0.04
Subtotal	3,086	31,639,268	426,424,499	2,401	25,396,178	348,839,188	123,887	1,189,371	$5,725,867	$0.02	5.83	3.00
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	3,086	31,639,268	426,424,499	2,401	25,396,178	348,839,188	123,887	1,189,371	$5,725,867	$0.02	5.83	3.00

TRINITY

Trinity at a Glance

- Climate Zone(s): 16
- Customers: 7,261
- Total annual retail sales (MWh): 107,666
- Annual Retail Revenue: $9,817,028
- Annual energy efficiency expenditures for reporting year: $2,068
- Gross annual savings from reporting year portfolio (MWh): 4



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.

Serves 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 MW, 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.

Commercial, Industrial and Agricultural Programs

TPUD does not currently have Commercial, Industrial or Agricultural Energy Efficiency Programs.

Residential Programs

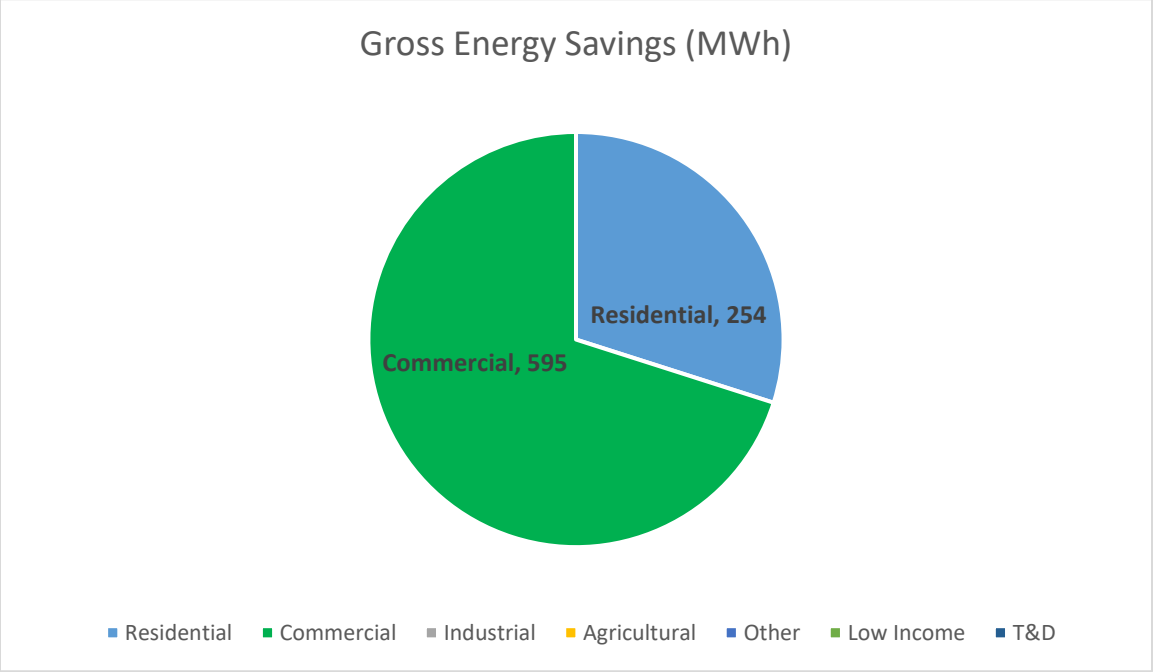
The High Efficiency Heat Pump Rebate Program and the High Efficiency Electric Water Heater Rebate Program are both residential programs.

TRINITY	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Heat pump, 15 SEER, 8.4 HSPF (afte	7	2,032	30,480	6	1,626	24,384	12	83	$150,071	$0.11	2.07	0.24
ENERGY STAR HP water heater, 50	0	2,004	20,040	0	1,202	12,024	5	41	$1,048	$0.00	25.67	0.73
Subtotal	7	4,036	50,520	6	2,828	36,408	17	124	151,119	$0.07	2.61	0.28
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	7	4,036	50,520	6	2,828	36,408	17	124	$151,119	$0.07	2.61	0.28

TRUCKEE DONNER

Truckee Donner at a Glance

- Climate Zone(s): 16
- Customers: 14,111
- Total annual retail sales (MWh): 848
- Annual Retail Revenue: $25,430,506
- Annual energy efficiency expenditures for reporting year: $625,710
- Gross annual savings from reporting year portfolio (MWh): 849



Truckee Donner Overview

The Truckee Donner Public Utilities District (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 2019, 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 treats energy

efficiency as an electric resource ('first loading order') and is therefore motivated by actual savings.

Major Program and Portfolio Changes

- Energy savings and program spending increase YOY in 2019, thanks to marketing and customer engagement efforts that lead to increased program participation.
- 2019 was the last year for our Residential lighting programs.
- TDPUD completed its AMI installation project this year and implemented a Prepay program as its first Behavioral program. We have also begun to explore Home Energy Reports and other customer engagement tools.
- Our low-income program was changed from a one-time bill credit up to $200 to an annual credit up to the customer's highest bill. This will better support our community and bring our program in line with other POU's programs.
- TDPUD added a Heat Pump Water Heater rebate of $1,000 for electric upgrades, or $3,000 for gas to electric conversions.

Program and Portfolio Highlights

- The community in Truckee still has a significant amount of older lighting technology in our community (T12's, incandescent, etc.). Commercial lighting was heavily targeted for conversion to LEDs to great success, as shown by the program spending and savings from this segment.
- TDPUD's Residential Energy Surveys 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.

Commercial, Industrial and 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.
- Heat Pump Water Heater (Res Electric Water Heater): Provides a $1,000 rebate for electric water heaters with a UEF > 2.85, and $3,000 for gas to electric conversions.
- 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.
- High Efficiency (HE) Clothes Washer Water Rebate (Non-Res Process): Provides a $50 incentive to customers who purchase a qualifying high, water efficient, 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 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 EV (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 Energy Commission. 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

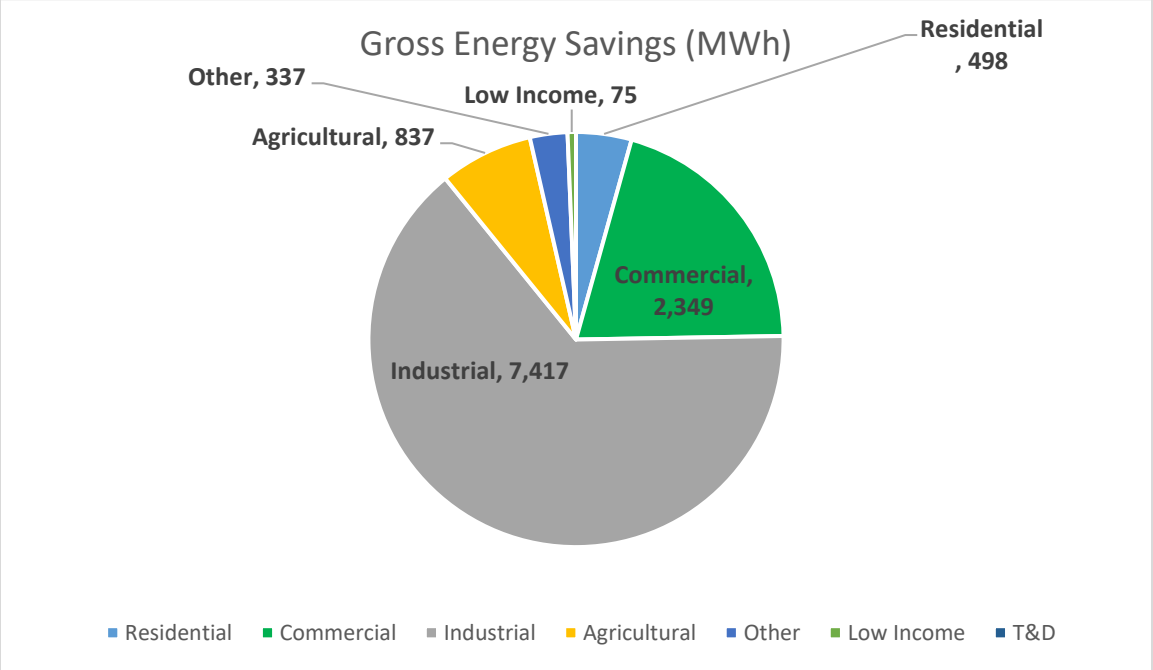
TDPUD has been conducting EM&V on an annual basis since 2008 and plans to continue to do so. The budget for EM&V is ~$30,000 per year which is ~4% of program spending. TDPUD's EM&V reports can be found at http://www.tdpud.org/departments/conservation/em-v-and-reporting.

TRUCKEE DONNER	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Residential Lighting Rebate_2019	1	16,563	248,447	1	9,772	146,583	59	500	$2,545	$0.02	6.07	10.28
Residential Holiday Light Exchange	0	284	1,419	0	258	1,292	1	4	$1,620	$1.38	0.09	1.02
Residential Green Partners_2019	3	26,224	393,357	1	14,161	212,413	85	724	$73,725	$0.48	0.30	0.38
Commercial Lighting_2019	62	285,718	5,142,920	61	280,003	5,040,062	1,804	17,184	$159,137	$0.05	2.64	8.25
Residential Energy Survey_2019	2	76,406	916,867	1	39,967	479,602	205	1,908	$89,809	$0.24	1.12	1.39
Residential Building Efficiency_201	3	1,298	12,980	2	961	9,605	16	222	$7,763	$1.00	0.37	0.54
Commercial Custom_2019	73	167,857	1,678,571	70	161,143	1,611,428	623	5,494	$28,820	$0.02	5.03	15.08
Residential High Efficiency Washe	0	1,849	20,335	0	1,350	14,845	6	51	$9,109	$0.77	0.39	0.50
Residential Toilet Exchange_2019	0	3,537	35,370	0	3,183	31,833	13	109	$38,058	$1.47	0.38	0.52
Residential Heat Pump Water Heat	0	2,615	26,150	0	1,961	19,613	8	67	$7,000	$0.44	0.33	1.31
Residential Leak Repair_2019	0	16,881	168,811	0	12,998	129,984	53	443	$5,389	$0.05	22.58	29.42
Commercial Green Partners LED/CI	27	141,206	988,445	12	62,131	434,916	176	1,483	$59,385	$0.16	0.68	0.81
Residential Refrigerator Recycling_	11	53,414	267,072	7	35,253	176,267	78	601	$29,835	$0.19	0.72	1.34
Residential Energy Savings Partner	0	28,705	315,758	0	28,705	315,758	141	1,324	$49,938	$0.20	1.61	4.28
Residential Toilet Rebate_2019	0	3,453	34,531	0	3,108	31,078	13	106	$29,893	$1.19	0.47	0.65
Residential Appliance_2019	0	22,777	273,323	0	14,962	179,546	98	1,079	$33,684	$0.24	0.71	1.30
Subtotal	183	848,787	10,524,355	156	669,917	8,834,824	3,377	31,299	$625,710	$0.10	1.64	2.82
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	183	848,787	10,524,355	156	669,917	8,834,824	3,377	31,299	$625,710	$0.10	1.64	2.82

TURLOCK

Turlock at a Glance

- Climate Zone(s): 12
- Customers: 103,266
- Total annual retail sales (MWh): 2,045,817
- Annual Retail Revenue: $285,052,904
- Annual energy efficiency expenditures for reporting year: $1,999,449
- Gross annual savings from reporting year portfolio (MWh): 11,513



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

In 2019 TID added an ENERGY STAR web enabled thermostat rebate. As customer's interest in technology and web enabled energy saving devices has risen TID saw this as an opportunity to

increase customers interest. TID also brought back our once popular recycle refrigerator/freezer program.

Program and Portfolio Highlights

In 2019 TID began to change all of our utility owned and maintained dusk to dawn lights. This year was the first of our two-year plan to covert over 5000 HID dusk to dawn lamps to LED.

Commercial, Industrial and Agricultural 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 50% of our overall savings.

Residential Programs

In addition to our residential rebate portfolio in 2019 TID sold customers shade trees at a discounted price through a partnership with a local nursery. We also had a holiday light exchange and gave out LED bulbs during public power week.

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.

Evaluation, Measurement & Verification Studies

Our 2014 and 2015 EM&V is available at:
https://www.cmua.org/emv-reports

Our 2018 EM&V is available at:
https://www.cmua.org/emv-reports

Major Differences or Diversions from California POU TRM for Energy Savings

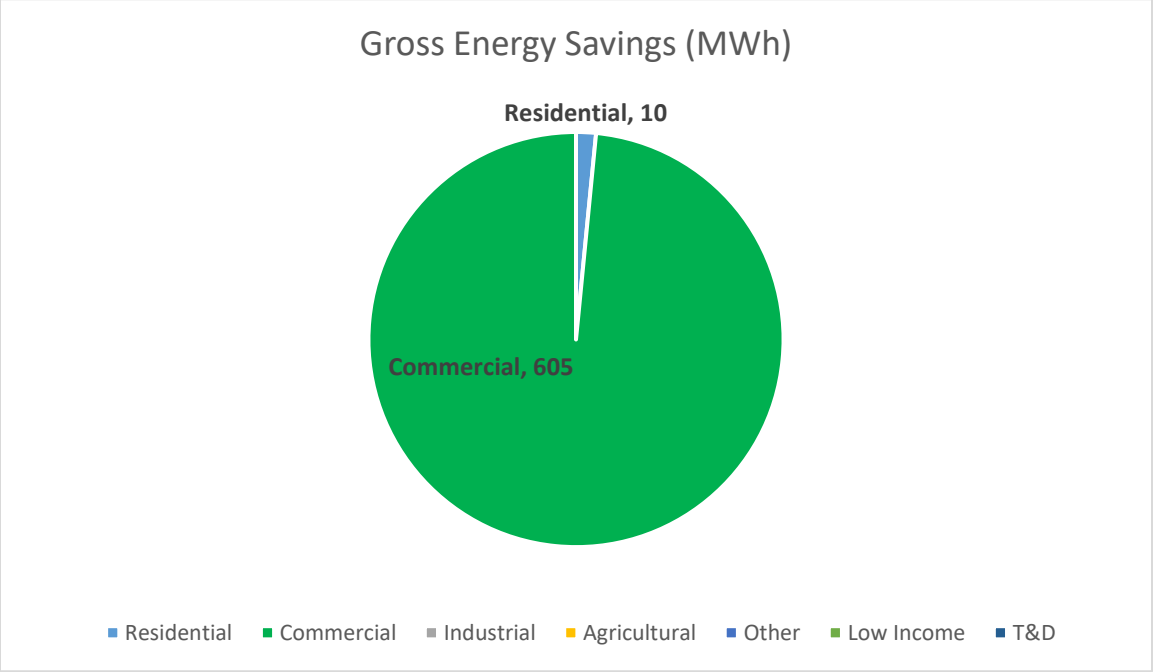
TID has primarily used the Technical Reference Manual to determine our savings. The majority of our commercial and industrial savings are driven by lighting projects. TID calculates the savings for each project since our lighting rebate is paid by first year kWh savings. TID calculates the cost effectiveness using levelized utility cost for each program and as an overall portfolio.
TID calculates all non-residential LED lighting savings. We establish baseline and determine actual savings for new LED lighting installed. We are capturing actual savings and verifying quantities per project.

TURLOCK	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
2019 Non Res - Pumps	12	62,454	686,994	12	62,454	686,994	266	2,342	$5,600	$0.01	11.85	3.67
2019 Non Res - Pool Pump	0	35,159	386,749	0	35,159	386,749	134	1,319	$3,096	$0.01	10.05	109.95
2019 Compressor	0	23,602	354,030	0	23,602	354,030	132	1,207	$2,194	$0.01	15.33	1.15
2019 - Commercial HVAC	19	28,458	426,870	19	28,458	426,870	148	1,455	$2,717	$0.01	17.81	0.35
2019 - Municipal HVAC	0	33,190	497,850	0	33,190	497,850	184	1,697	$3,318	$0.01	21.97	0.12
Split-system air conditioner, 16 SEI	17	26,101	391,515	14	20,881	313,212	140	1,068	$92,162	$0.39	0.79	0.72
ENERGY STAR room air conditioner	0	533	4,797	0	426	3,838	2	13	$659	$0.20	1.44	1.44
2019 Ductless mini-split air conditi	3	2,664	39,960	2	2,131	31,968	14	109	$6,008	$0.25	1.24	1.52
Web Enabled Smart Energy Star Th	0	105,610	528,048	0	84,488	422,438	212	1,440	$14,582	$0.04	7.44	3.14
Split-system air conditioner, 17 SEI	4	8,418	126,270	4	6,734	101,016	45	344	$26,714	$0.35	0.88	0.65
2019 Split-system air conditioner 1	4	5,129	76,928	3	4,103	61,542	28	210	$9,380	$0.20	1.53	0.79
Residential solar screen	1	942	9,420	0	264	2,638	1	9	$948	$0.43	0.68	0.94
Freezer recycling	3	14,828	59,312	2	10,380	41,518	19	142	$8,710	$0.22	0.58	1.13
Refrigerator recycling	9	43,736	218,680	6	30,615	153,076	68	522	$28,132	$0.20	0.66	1.29
ENERGY STAR Refrigerator: Bottom	0	9,128	127,787	0	6,389	89,451	34	305	$2,858	$0.04	3.57	3.25
Premier Shade Tree	0	110,250	3,307,500	0	88,200	2,646,000	1,139	9,022	$23,594	$0.02	22.77	37.76
Shade Tree	1	3,780	113,400	1	3,024	90,720	39	309	$528	$0.01	34.92	76.91
Kitchen Steamer	0	16,517	165,170	0	16,517	165,170	65	563	$1,473	$0.01	11.29	1.57
2019 Process Improvement	112	2,196,285	32,944,275	112	2,196,285	32,944,275	12,352	112,324	$203,528	$0.01	15.03	1.42
2019 Ind - Refrigeration	0	864,342	12,965,130	0	864,342	12,965,130	3,832	44,205	$24,107	$0.00	64.44	11.05
Solar attic fan	0	220	2,200	0	62	616	0	2	$101	$0.20	1.49	0.96
Whole house fan	0	22,113	442,260	0	6,192	123,833	50	346	$3,171	$0.04	8.52	2.69
2019 Res Radiant Barrier (Ceiling in	18	18,367	367,336	5	5,143	102,854	168	2,449	$2,158	$0.03	16.38	18.40
LED 10-13 W replacing 43 W haloge	1	8,702	130,530	0	4,699	70,486	28	240	$591	$0.01	11.37	1.12
2019 Giveaway Res LED 10-13 W re	2	15,200	228,000	1	8,208	123,120	49	420	$5,747	$0.06	2.04	1.25
2019 LED Holiday Lights	28	16,677	83,385	15	9,006	45,028	20	154	$7,595	$0.18	0.60	0.53
Variable speed residential pool pu	3	52,572	525,720	2	31,543	315,432	128	1,075	$15,938	$0.06	2.33	1.33
Heat pump, 15 SEER, 8.4 HSPF (afte	4	9,864	147,960	3	7,891	118,368	53	404	$7,250	$0.08	3.80	2.63
ENERGY STAR clothes washer, top l	0	22,950	252,450	0	7,115	78,260	38	374	$3,065	$0.05	3.22	1.52
2019 Ag LED Lighting	183	774,450	11,616,750	183	774,450	11,616,750	4,332	39,607	$83,238	$0.01	13.09	5.63
2019 Industrial LED Lighting	917	4,332,848	64,992,717	917	4,332,848	64,992,717	24,054	221,593	$482,058	$0.01	12.87	2.89
2019 - Direct Install Lighting	36	146,026	2,190,390	36	146,026	2,190,390	1,046	7,468	$74,720	$0.05	2.74	3.21
2019 Municipal LED Lighting	130	337,082	5,056,230	130	337,082	5,056,230	1,702	17,239	$33,646	$0.01	12.33	0.97
2019 Commercial LED Lighting	186	751,395	11,270,925	186	751,395	11,270,925	4,171	38,428	$90,593	$0.01	11.87	2.91
2019 Dusk to Dawn Light LED Retrof	333	1,338,412	20,076,183	333	1,338,412	20,076,183	9,589	68,450	$603,245	$0.04	3.11	3.11
Subtotal	2,026	11,438,003	170,813,720	1,987	11,277,713	168,565,676	64,282	576,856	$1,873,424	$0.01	8.93	2.32
Low-Income	9	75,123	1,094,378	4	40,542	593,001	238	2,022	$126,025	$0.28	0.47	0.48
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	9	75,123	1,094,378	4	40,542	593,001	238	2,022	$126,025	$0.28	0.47	0.48
Total	2,035	11,513,125	171,908,098	1,991	11,318,254	169,158,677	64,520	578,877	$1,999,449	$0.02	8.39	2.29

UKIAH

Ukiah at a Glance

- Climate Zone(s): 3
- Customers: 8,100
- Total annual retail sales (MWh): 105,845
- Annual Retail Revenue: $14,484,171
- Annual energy efficiency expenditures for reporting year: $318,482
- Gross annual savings from reporting year portfolio (MWh): 615



Ukiah Overview

The City of Ukiah (the City) is located in Mendocino County on highway 101 approximately 100 miles north of San Francisco. The City is committed to helping 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 adjusted to better match the rate at which Public Benefits (PB) funds were being utilized after the large PB balance being carried forward had been utilized. The incentives have resulted in a decrease in customer participation. The City has implemented a marketing plan to increase awareness and participation in the programs and is reassessing rebates levels to find the right rebate strategy that will utilize PB funds at the desired rate. The City has experienced lower participation rates with "standard - cost sharing" energy efficiency incentive programs. 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

Other than increased program marketing, there were no major program changes in FY 2019. The City is considering offering Low-Income and Commercial Lighting Direct Install programs.

Program and Portfolio Highlights

The Commercial Lighting Program delivered the greatest percentage of savings in FY 2019, accounting for 99% of the total savings. Twelve commercial customers participated in the rebate program. A substantial amount of the savings can be attributed to the City's LED streetlight upgrades.

Commercial, Industrial and 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 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 FY 2020.

Major Differences or Diversions from California POU TRM for Energy Savings

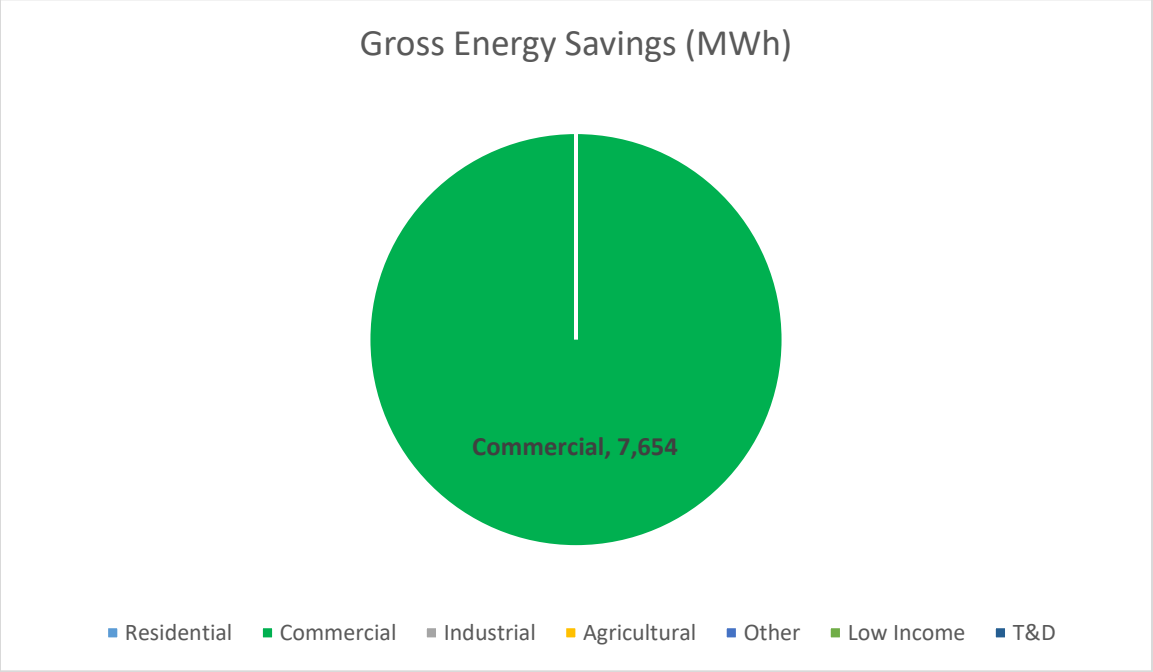
The City has relied heavily on the savings listed in CMUA's TRM. The Commercial Lighting and Commercial Custom programs use custom savings calculations.

UKIAH	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
Ductless mini-split heat pump, 16 S	0	2,559	38,392	0	2,048	30,713	14	105	$6,924	$0.30	1.03	1.10
Ductless mini-split heat pump, 15 S	0	752	11,275	0	601	9,020	4	31	$2,546	$0.38	0.82	0.89
Ductless mini-split air conditioner,	0	67	1,010	0	54	808	0	3	$305	$0.50	0.83	0.30
Split-system air conditioner, 15 SEI	0	145	2,177	0	116	1,741	1	6	$773	$0.59	0.70	0.45
Ceiling insulation, increase to R-38	0	2,658	53,164	0	744	14,886	6	620	$7,375	$0.73	0.76	0.82
Wall insulation - R-13 - Single Fami	0	162	3,247	0	45	909	0	74	$666	$1.08	0.83	0.72
Non-Residential Lighting Program I	36	165,867	1,990,405	29	132,694	1,592,324	599	5,429	$17,646	$0.01	8.03	2.05
AC Split Unit-< 5 Tons (55 kBtuh)-15	0	1,585	23,775	0	1,347	20,209	7	69	$2,081	$0.14	0.79	1.98
Non-Residential Lighting Program I	0	435,537	5,226,440	0	348,429	4,181,152	2,023	14,256	$267,610	$0.08	1.56	1.93
AC Split Unit- 5 Tons (55-64 kBtuh)-	0	648	9,720	0	551	8,262	3	28	$1,033	$0.17	0.65	2.09
AC Unit-6to8.5 Tons (65-109 kBtuh)	1	1,581	23,715	1	1,344	20,158	7	69	$1,081	$0.07	1.51	1.60
ENERGY STAR Refrigerator: >7.75 cı	0	1,686	23,607	0	1,180	16,525	6	56	$6,864	$0.54	0.24	0.26
Refrigerator recycling	0	308	1,540	0	216	1,078	0	4	$489	$0.49	0.23	0.25
Freezer recycling	0	337	1,348	0	236	944	0	3	$446	$0.50	0.23	0.24
ENERGY STAR clothes washer, elec	0	284	3,124	0	88	968	0	3	$410	$0.52	0.22	0.21
ENERGY STAR dishwasher, standar	0	58	580	0	35	348	0	1	$193	$0.67	0.22	0.25
LED holiday lights	1	210	1,050	1	113	567	0	2	$560	$1.08	0.11	0.08
LED 6-9 W replacing 29 W halogen	0	132	1,980	0	71	1,069	0	4	$1,005	$1.26	0.11	0.09
Electric hot water storage, 40-80 ga	0	165	1,650	0	99	990	0	3	$475	$0.58	0.16	0.17
Subtotal	39	614,742	7,418,197	31	490,012	5,902,671	2,673	20,765	$318,482	$0.07	1.82	1.84
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	39	614,742	7,418,197	31	490,012	5,902,671	2,673	20,765	$318,482	$0.07	1.82	1.84

VERNON

Vernon at a Glance

- Climate Zone(s): 9
- Customers: 1,915
- Total annual retail sales (MWh): 1,072,794
- Annual Retail Revenue: $157,534,745
- Annual energy efficiency expenditures for reporting year: $866,488
- Gross annual savings from reporting year portfolio (MWh): 7,654



Vernon Overview

Vernon Public Utilities (VPU), in climate zone 8, finished conducting a comprehensive IRP. The results 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 has a goal to double its energy efficiency from FY 2019 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:

- Continue existing energy efficiency programs and educate customers on more efficient uses of electricity;
- Perform energy efficiency upgrades at all city-owned facilities as needed; and
- Purchase energy efficient transformers, capacitors and other distribution equipment when appropriate.

Major Program and Portfolio Changes

Vernon Public Utilities has not made any major changes in their programs, but FY 2019 has pointed to the business community that energy saving can be achieved by looking into great detail to the operation process side of their 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 in the lighting sector. Since Vernon Public Utilities customer base is consist of commercial and industrial type buildings. We had one company, C. R. Lawrence with over million square feet, convert to LED's. This was a nationwide capital improvement project. Our lighting program was very popular this year and a lot of companies has benefited.

Commercial, Industrial and Agricultural Programs

VERNON 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 and 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 utility loads exceeding 100 kW 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.

Complementary Programs

Distributed Solar

VPU is still 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:

- Install solar systems at city-owned facilities and partner with customers to install at their facilities;
- Evaluate a community solar product offering; and
- 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 EV charging infrastructure. The presence and convenience of EV charging stations will motivate public purchases of EVs, 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:

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

DR and Energy Storage

DR is one of the ways customers can conserve energy by curtailing electricity usage when it is most needed by the electric grid. DR programs have proven to be an effective means for utilities to manage system peaks by controlling customer loads. By participating in DR 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 DR program and energy storage action plans VPU intends to evaluate and undertake in the coming years:

- Implement a Voluntary Load Reduction Program offering discounted rates to customers that reduce their load;
- Provide customer education on demand response programs available through the CAISO and encourage participation in these programs; and
- Participate in strategic partnerships with customers to advance energy storage opportunities.

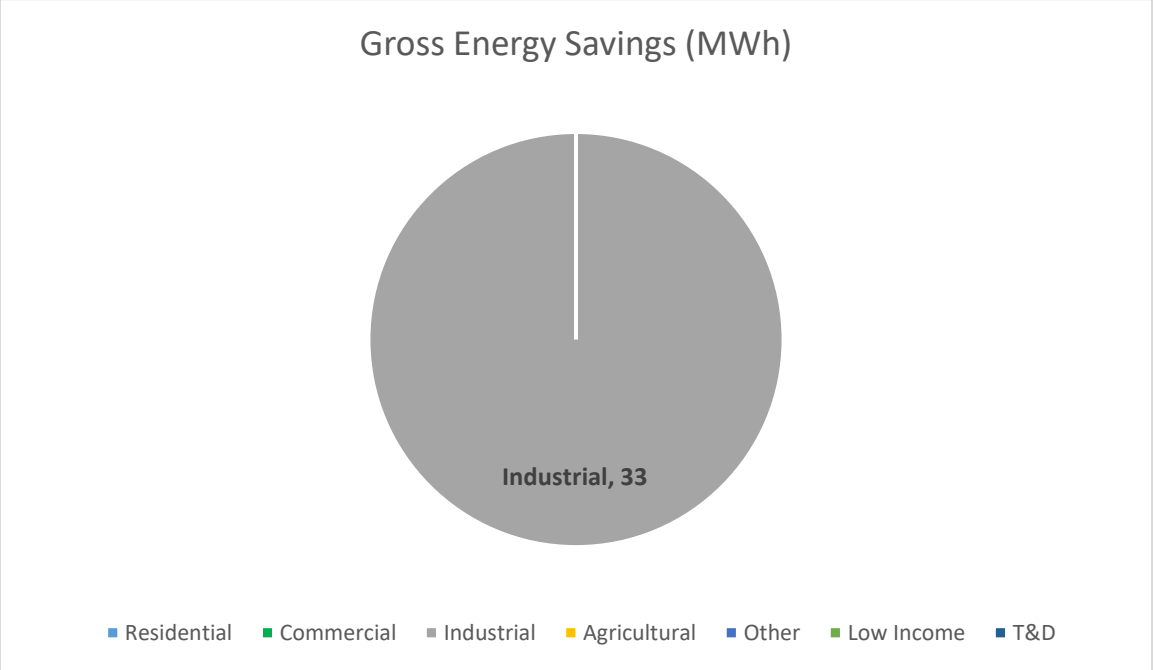
Evaluation, Measurement & Verification Studies

The City of Vernon continues to have numerous projects this past fiscal year which require an in-depth analysis of the EM&V 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.

VERNON	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
High Speed Refrigeration Doors	0	133,484	1,601,808	0	133,484	1,601,808	623	5,461	$13,455	$0.01	10.71	1.39
AC Unit->70 Tons (840 kBtuh)-10.2	0	644	9,660	0	644	9,660	3	33	$14,022	$1.94	0.07	0.03
Lighting Retrofit	1,669	7,208,930	86,507,163	1,669	7,208,930	86,507,163	31,106	294,947	$805,607	$0.01	9.84	8.62
Evaporator Motors and Controls	0	310,904	4,663,560	0	310,904	4,663,560	1,768	15,900	$33,405	$0.01	12.64	10.97
Subtotal	1,669	7,653,962	92,782,191	1,669	7,653,962	92,782,191	33,500	316,342	$866,488	$0.01	9.81	7.77
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	1,669	7,653,962	92,782,191	1,669	7,653,962	92,782,191	33,500	316,342	$866,488	$0.01	9.81	7.77

Victorville at a Glance

- Climate Zone(s): 14
- Customers: 71
- Total annual retail sales (MWh): 93,496
- Annual Retail Revenue: $11,691,700
- Annual energy efficiency expenditures for reporting year: $37,840
- Gross annual savings from reporting year portfolio (MWh): 33



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 16.3 MW (3.9% less than last year) and the load factor was 70.0%. Customers reside in climate zone 14 and all customers' facilities met the applicable Title 24 requirements. Due to their recent age, these facilities provide fewer energy efficiency upgrade opportunities.

Major Program and Portfolio Changes

- Combined the HVAC, Refrigeration and Process energy efficiency programs into the Custom Energy Efficiency Program.
- Increased the rebate for one year of energy savings from $0.064 per kWh to $0.10 per kWh for the installation of energy efficient lighting and equipment/technology.

- The level on energy efficiency financial incentives provided to qualifying City facilities shall be determined on a case by case basis.

Program and Portfolio Highlights

- $37,840 in energy efficiency incentive payment was disbursed to replace an aging HVAC unit and air handler system at a City facility.
- 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' IRP.
- 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 and Agricultural Programs

- On-site energy assessment and recommendations designed to potentially improve energy operating efficiency and reduce load requirements.
- Incentives are available to improve energy efficiency for lighting applications, based on a rate of $0.10 per kWh for one year of energy savings and shall not exceed 50% of the cost of the lighting material costs (including installation) or $15,000 per fiscal year, whichever is lower.
- Incentives are available for new equipment components that exceed state-mandated codes, federal-mandated codes, industry-accepted performance standards, or other baseline energy performance standards by more than 10%. The rebate is based upon the lessor of 25% of the cost difference between standard and upgraded new equipment and/or materials, or $50,000, whichever is lower.
- Incentives are available for the replacement of energy efficient equipment/technology that conserves energy and permanently reduces coincident summer/winter on-peak load and exceeds state-mandated codes, federal-mandated codes, industry accepted performance standards or other baseline energy performance standards. Incentive payments are based on a rate of $0.10 per kWh for one year of energy savings and $100 per kW for each on-peak kW that has been reduced and shall not exceed 50% of the total cost associated with the equipment/materials (including installation) or $50,000 per fiscal year, whichever is lower.
- Incentives available for City facilities are determined on a case by case basis.
- Incentives are available for the direct funding of projects/activities on the utility side of the meter that promote a benefit to VMUS customers in terms of improved safety, system integrity, energy efficiency, conservation, or Research and Development (R&D). Projects

must be authorized by the City Council as part of the annual operating budget or through a subsequent request in a public meeting.

Residential Programs

VMUS does not provide electric service to its customers.

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	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)	Net Lifecycle Combined Energy Savings (MMBtu)	Total Utility Cost ($)	Utility Cost ($/kWh)	PAC	TRC
HP Split Unit-7.5 Tons (55-64 kBtuh	9	32,658	489,870	8	27,759	416,390	154	1,420	$37,840	$0.13	0.94	6.24
Subtotal	9	32,658	489,870	8	27,759	416,390	154	1,420	$37,840	$0.13	0.94	6.24
Low-Income	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Codes & Standards	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
T&D	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Electrification	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Subtotal	0	0	0	0	0	0	0	0	$0	$0.00	0.00	0.00
Total	9	32,658	489,870	8	27,759	416,390	154	1,420	$37,840	$0.13	0.94	6.24

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:

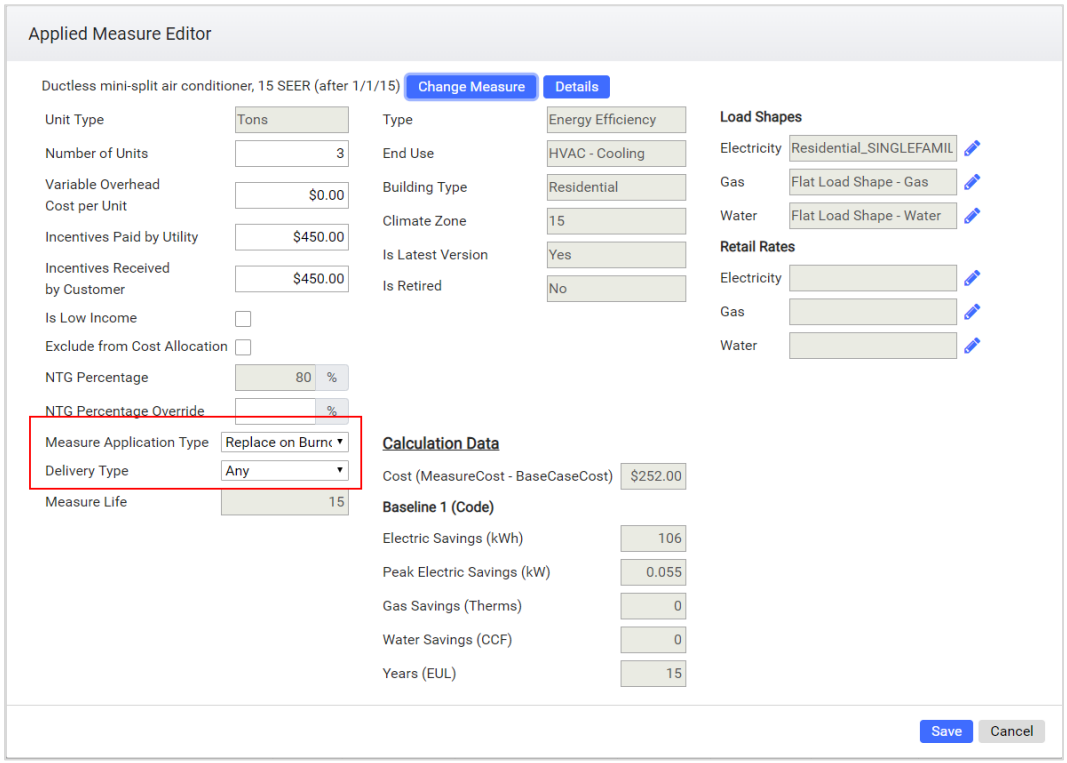
- Current version of the Load Shape
- Load Shape is either local to the organization or "Shared"
- The following attributes of the Load Shape match the same attribute of the Measure:
    - Climate Zone, or "All"
    - Building Type, or "All"
    - End Use
    - Sector, or "All"
- If an IOU is defined 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"

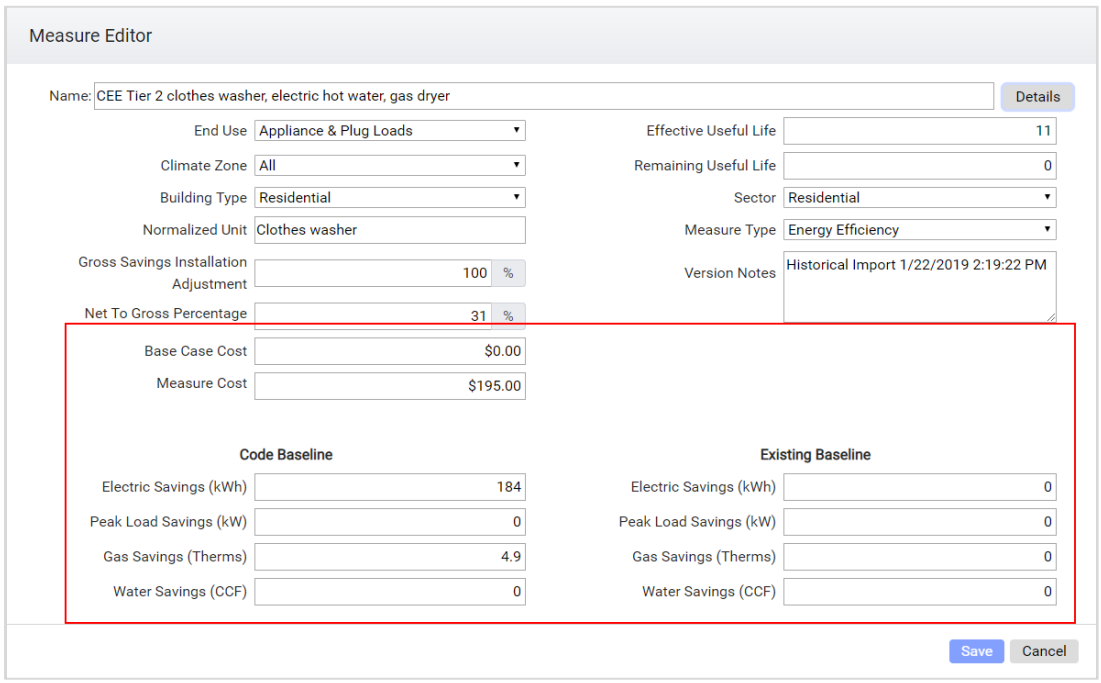
Dual Baseline Savings, Cost, and Measure Life

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
	Retro-Commissioning	Existing	n/a	MC	n/a	EUL	n/a

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

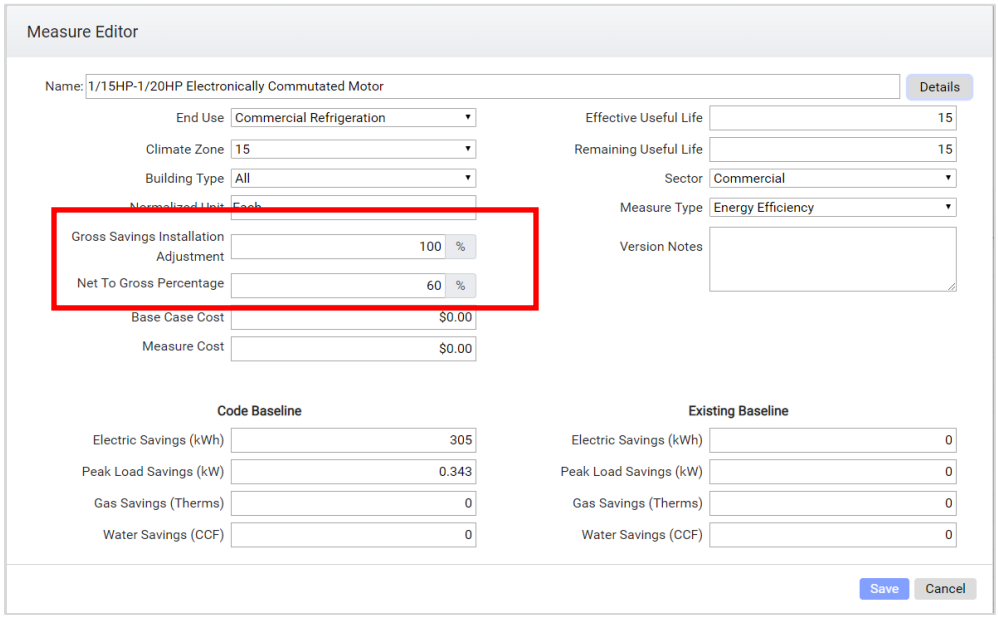
MC = Measure Costs
BC = Base Costs
RUL = Remaining Useful Life (years)
EUL = Estimated Useful Life (years)

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.

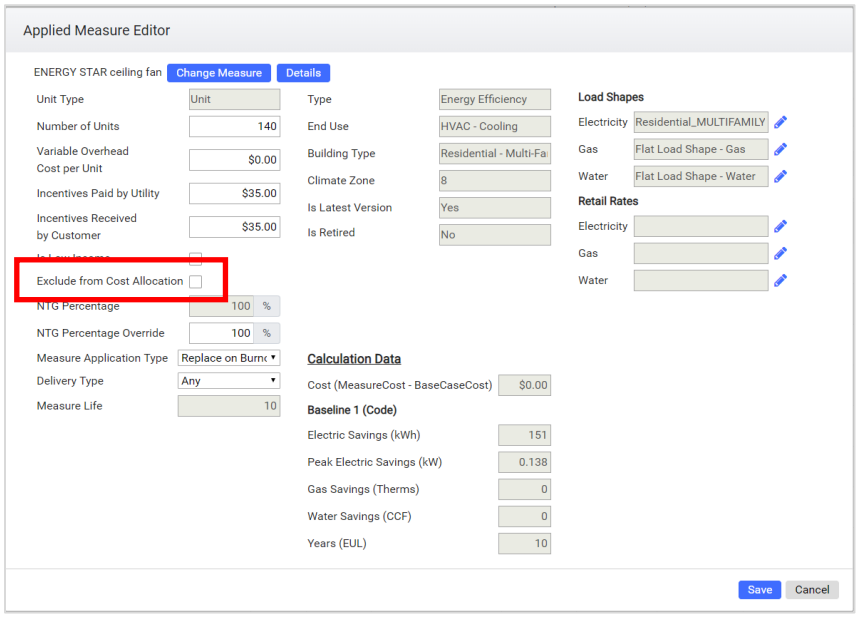
In ESP, each Load Shape resource contains one year of hourly data. As a result, each year of the calculation uses the same values for each year in the Measure lifetime.

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.

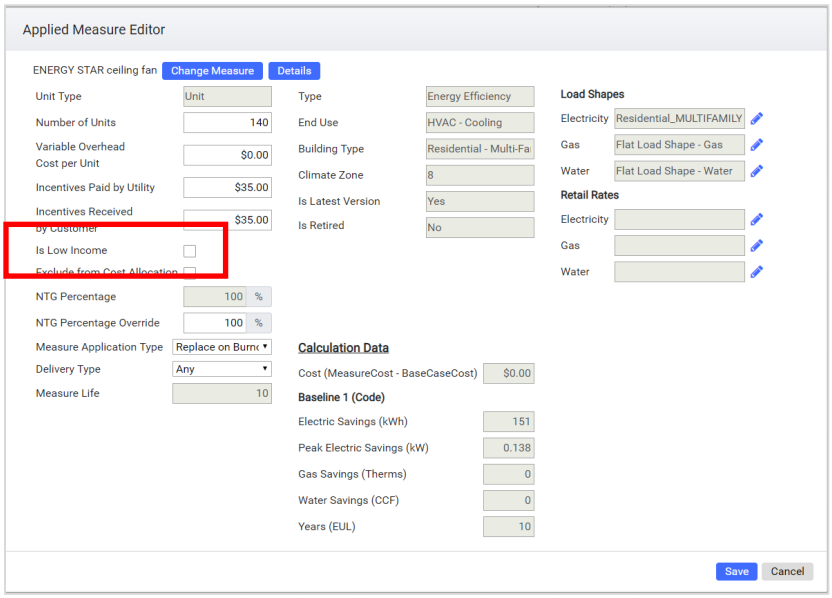


Cost Benefit calculations will not run if it cannot allocate a cost to any Applied Measures. For example, if you enter a cost in the Sector Overhead Residential field, but there are no Residential Measures to allocate the overhead costs, the cost benefit calculation will not run. This also applies to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

	General	Participant	TRC	Societal	RIM	PA
Element Type						
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.