

Energy Efficiency

— in California's
Public Power Sector



17TH EDITION – 2023

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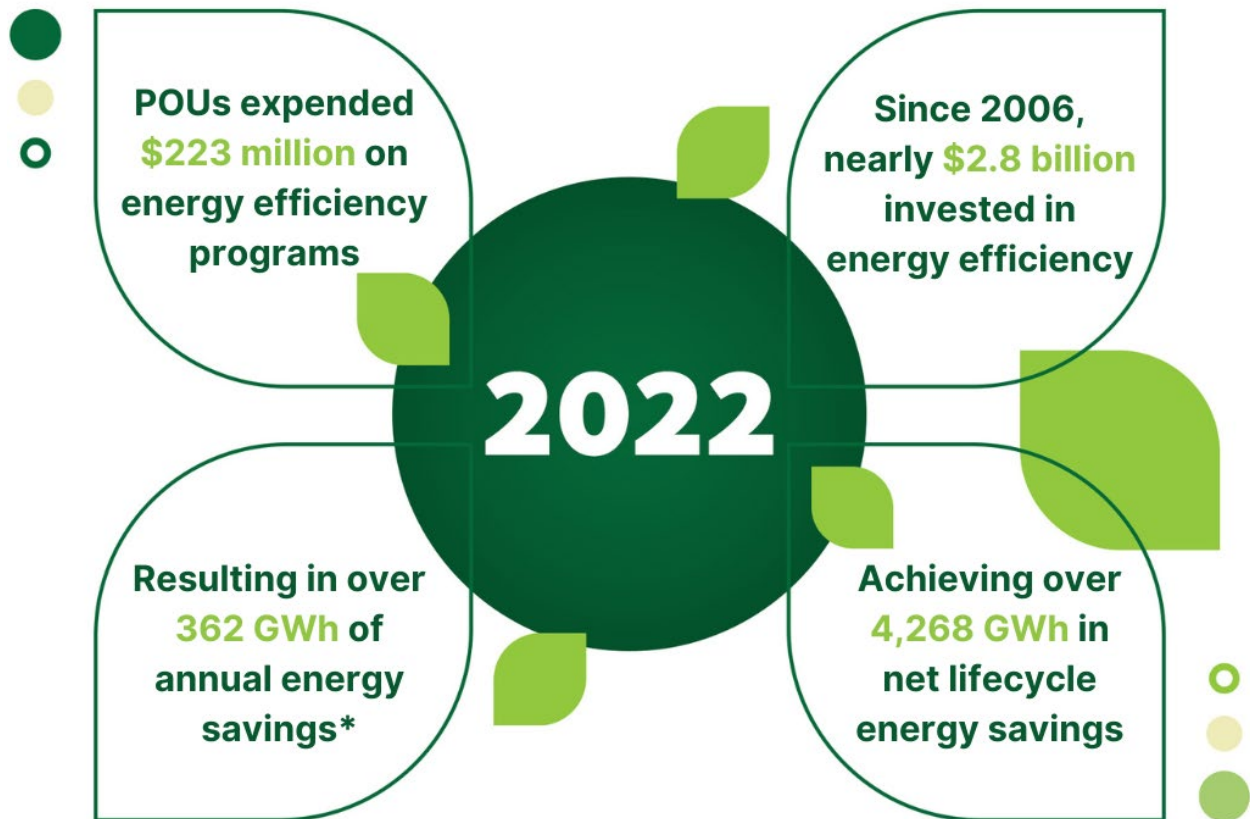
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EXECUTIVE SUMMARY

California's Publicly Owned Utilities (POUs) continue to collaborate to develop cost-effective Energy Efficiency (EE) programs and report annual results to their customers and the California Energy Commission (Energy Commission) in a consistent and comprehensive manner. This 17th edition report presents the latest results from POU's wide range of EE programs.

During the Fiscal Year (FY) 2022 reporting cycle, POU's expended **\$223 million** on EE programs for their communities, including low-income customers, resulting in **362 Gigawatt hours (GWh)** of net annual energy savings and reducing peak demand by **71 Megawatts (MW)**. Since the enactment of Senate Bill (SB) 1037 (Kehoe, 2005), public power has spent nearly **\$2.8 billion** on EE and demand reduction, achieving over **101,503 GWh** in net lifecycle energy savings.



*This includes EE and LI. It does not include C&S.

Comparing these numbers with those of previous years shows the clear impact that the Coronavirus (COVID-19) pandemic continues to have on EE performance and California's energy economy in general. California's electricity demand continued to be down in 2022. While annual energy savings bounced back from the low of FY 2021, EE program yields continue to

remain below pre-pandemic levels. Additionally, in order to protect the health of our customers, staff, and the general public, some programs had to be suspended during the pandemic. For example, programs requiring direct interaction, such as Direct Install (DI), had to be suspended due to state and local health restrictions. As indicated in the utility narratives, some of California's POU's began to return to programs that require direct interaction but have not returned to pre-pandemic levels. Moving forward, it will be useful to observe what new methods of program administration have been developed during the pandemic. Work styles are changing following the pandemic,

California's POU's are evaluating new methods to cost-effectively reduce both energy use and Greenhouse Gas (GHG) emissions. As indicated in some utility narratives, many POU's have expanded their electrification and GHG gas reduction efforts, focusing on clean energy solutions that demonstrate greater cost-effectiveness than remaining EE opportunities. The successes of the past provide an excellent foundation on which public power will continue to build.

Appendix A contains additional information on each POU's portfolio including program descriptions, expenditures, and energy savings. **Appendix B** presents a comprehensive outline of the calculations used within the Cost Effectiveness Tool (CET) Reporting Platform (RP) (CET/RP).

INTRODUCTION

Pursuant to the Public Utilities Code, each year POU's are required to report the following information to customers and the Energy Commission :¹

- Investments in EE and demand reduction programs.
- Descriptions of each EE and demand reduction program, program expenditures, cost-effectiveness of each program, and expected and actual EE savings and demand reduction results.
- Sources for funding of EE and demand reduction programs.
- Methodologies and input assumptions that are used to determine cost-effectiveness of programs.
- A comparison of the POU's' annual EE targets and the POU's' reported electricity efficiency savings and demand reductions.

This collaborative report compiles the required data from the individual POU's into a single, comprehensive document in compliance with the California Public Utilities Code.

The State's POU's 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 EE trends and offer policymakers data-driven considerations regarding the practical impacts of related policies.

The POU's have long supported California's EE 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 to look back on the success of the past year, in addition to looking ahead to inform discussions on how best to achieve additional energy savings in the future.

“The Golden State serves as a leader for other states by saving energy on multiple fronts with adoption of advanced clean energy building codes, stringent vehicle emissions standards, and industry-leading appliance standards.”

ACEEE 2022 State EE Scorecard²

¹ California Public Utilities Code (Cal. Pub. Util. Code) § 9505.

² See <https://www.aceee.org/research-report/u2206>.

PROGRAM RESULTS

This section provides an overview of the EE program results for public power in California during FY 2022. Most POU manage and implement EE programs on a fiscal year basis; for POU that operate on a calendar year basis, their respective report results for FY 2022 are equal to that of Calendar Year 2022.³

In summary, during the 2023 reporting cycle, POU collectively spent **\$223 million** on EE programs, resulting in **362 GWh** of net annual energy savings, with **4,268 GWh** of net lifecycle energy savings and reduced peak demand by **nearly 71,000 kilowatts (kW)**.

TABLE 1: Historic Program Results

Fiscal Year	Net Peak Savings (kW)	Net Annual Savings (MWh)	Net Lifecycle Savings (MWh)	Total Utility Expenditures
2006	52,552	169,303	2,249,214	\$54,412,728
2007	56,772	254,332	3,062,361	\$63,151,647
2008	82,730	401,919	4,473,801	\$103,907,266
2009	117,435	644,260	6,749,912	\$146,093,107
2010	93,712	522,929	5,586,299	\$123,433,250
2011	81,121	459,459	4,604,364	\$132,372,795
2012	82,561	439,710	4,638,521	\$126,936,631
2013	89,305	521,478	5,722,100	\$134,475,230
2014	110,437	568,980	6,414,228	\$169,940,735
2015	124,807	644,703	7,836,316	\$162,896,993
2016	107,925	771,592	10,253,633	\$154,796,668
2017	113,549	861,942	11,991,602	\$226,386,251
2018	129,244	638,656	8,267,536	\$218,730,235
2019	147,405	646,281	7,312,304	\$260,675,319
2020	126,522	475,631	5,221,787	\$261,918,171
2021	81,596	254,310	2,850,853	\$158,527,378
2022	70,879	362,051	4,267,760	\$222,949,982
Total	1,668,552	8,637,536	101,502,591	\$2,721,604,386

As shown in **Table 1**, public power has collectively spent nearly **\$2.8 billion** on EE programs, resulting in **101,503 GWh** in net lifecycle energy savings since 2006 and avoided the

³ POU fiscal years run from July 1 to June 30, except for the following POU 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.

development of **1,669 MW** of generation resources to serve peak demand during that time. Table 1 also shows that Net Annual Savings continue to be below that realized prior to the pandemic, providing further evidence of the impact COVID-19 has had on the State’s energy economy.

California’s POU’s continue to support the statewide goal of doubling EE by 2030 under the Energy Commission’s direction. Using the Energy Commission’s methodology to determine cumulative energy savings, POU’s cumulative first year savings from FY 2015 through FY 2022 equals **4,659 GWh**, as presented in **Table 2** below. In spite of the effects of the pandemic, these cumulative savings remain **14 GWh** above the target cumulative goals for California POU’s.⁴ The Policy Consideration section discusses in further detail the importance of POU’s efforts to help meet the State’s doubling of EE goals.

TABLE 2. California POU Cumulative 1st Year Energy Savings Comparison

Net 1st Year Savings per Installation Year (GWh)								CEC	
2015	2016	2017	2018	2019	2020	2021	2022	Cumulative Savings	Cumulative Savings Target
644.7	771.6	861.9	638.7	646.3	475.6	254.3	366.0	4,659.1	4,645.0

The Energy Commission methodology used to calculate “cumulative” savings shown in Table 2 combines only the “first year savings” from each of the POU’s portfolios in the respective reporting years to calculate “cumulative savings”. POU’s 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 POU’s cumulative savings in Table 2, POU’s have also calculated alternative representations of the cumulative energy savings from their combined portfolios that potentially better reflect the true cumulative impact of EE savings on the electric grid. This has been done to begin an important discussion on POU’s and the Energy Commission’s ability to assess and value energy savings from EE programs on an equivalent basis.

Table 3, shown below, represents the cumulative savings as the Lifecycle Savings from all the EE measures installed each year in the POU’s EE portfolios.

TABLE 3. California POU Cumulative Lifecycle Savings Comparison

Cumulative Savings Per Installation Year (GWh)								Cumulative Savings
2015	2016	2017	2018	2019	2020	2021	2022	
7,836.6	10,253.6	11,991.6	8,267.5	7,312.3	5,221.8	2,850.9	4,267.7	58,010.3

⁴ Energy Commission, October 2017, *Senate Bill 350: Doubling EE Savings by 2030*, Table A-11.

Table 3 accurately 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 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 of 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 no longer counted. 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

Lifecycle Savings Per Installation Year (GWh)								Cumulative Savings
2015	2016	2017	2018	2019	2020	2021	2022	
1,172.0	1,645.7	2,225.1	2,774.9	3,289.0	3,649.6	3,818.0	3,968.0	22,542.3

Table 5 below provides a comprehensive summary of the EE savings for all POU’s respective EE Portfolios in FY 2022. 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 POU’s, Los Angeles Department of Water & Power (LADWP) and Sacramento Municipal Utility District (SMUD), accounted for roughly two-thirds of the total POU savings during the 2022 reporting cycle. Taken as a group, the 16 IRP POU’s produced 96% of the total savings. The remainder of the savings were realized by 25 smaller and mid-sized POU’s located throughout California.

TABLE 5. EE Program Results by Utility

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	89	770,388	11,114,924	85	727,988	10,501,664	3,932	\$563,798	1.88	1.14	0.075
Anaheim	1,445	6,528,637	95,026,154	1,445	6,528,637	95,026,154	32,890	\$2,472,626	3.86	4.73	0.037
Azusa	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
Banning	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
Biggs	-	-	-	-	-	-	-	\$12,782			0.000
Burbank	1,678	7,279,669	114,349,328	1,677	7,278,395	114,328,944	41,995	\$1,907,947	9.19	3.38	0.023
Colton	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
Corona	-	-	-	-	-	-	-	\$0			0.000
Glendale	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
Gridley	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
Healdsburg	35	210,851	2,798,583	30	177,954	2,355,388	777	\$147,745	1.44	0.84	0.086
Imperial	6,420	16,308,841	228,147,602	6,292	15,615,519	214,099,698	77,479	\$6,971,966	3.89	6.26	0.048
IPUC	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
Lassen	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
Lodi	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
Lompoc	8	96,873	1,230,306	6	70,015	893,155	345	\$109,671	0.85	0.71	0.168
Los Angeles	36,714	150,941,980	1,620,767,694	36,714	150,941,980	1,620,767,694	66,358	\$157,989,347	0.79	0.79	0.132
Merced	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
Modesto	301	2,124,169	28,584,730	212	1,642,540	22,109,125	8,517	\$1,200,612	2.57	0.85	0.071
Moreno Valley	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
Palo Alto	150	1,135,867	18,735,542	120	908,693	14,988,434	4,828	\$890,568	1.41	1.13	0.082
Pasadena	2,044	10,643,248	46,147,017	2,018	10,588,984	45,548,611	17,501	\$2,518,103	3.29	3.29	0.065
Pittsburg	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
Plumas-Sierra	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
Port of Oakland	-	-	-	-	-	-	-	\$12,984			0.000
Rancho Cucamonga	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
Redding	827	5,267,198	51,350,286	673	4,369,456	42,120,748	16,685	\$2,559,038	0.95	1.46	0.072
Riverside	2,510	10,387,956	160,402,582	2,294	9,718,532	142,139,699	48,240	\$3,423,265	5.46	11.74	0.035
Roseville	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
Sacramento	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
San Francisco	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
Shasta Lake	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
Silicon Valley Power	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
Truckee Donner	13	98,765	1,399,164	8	63,552	893,038	325	\$1,652,838	0.08	0.12	2.651
Turlock	600	4,847,788	76,838,272	561	4,630,428	73,650,968	26,045	\$1,379,620	5.60	0.97	0.027
Ukiah	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
Vernon	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
Victorville	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE and Low Income Subtotal	75,246	397,735,370	4,729,556,343	70,858	361,939,635	4,265,854,640	588,668	\$223,075,217	1.37	1.20	0.072

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 (**34%**) of the gross annual EE program savings.

TABLE 6. EE Program Results by End-Use Category

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	1,892	8,521,488	127,238,771	1,870	8,405,417	125,924,146	42,101	2,777,993	5.72	2.71	0.030
Appliance & Plug Loads	2,282	11,861,993	122,891,027	2,007	10,135,176	102,711,497	18,814	\$4,000,652	1.74	0.66	0.050
BROs	1,356	18,860,632	36,490,739	1,354	14,352,498	27,166,561	7,649	1,159,119	3.22	3.22	0.066
Building Envelope	12,322	12,308,239	231,290,443	11,799	11,716,702	219,581,993	31,741	\$7,150,816	4.68	3.96	0.049
Codes & Standards	5,461	51,494,047	774,594,523	4,369	41,195,238	619,675,619	22,829	2,098,293	2.72	2.72	0.005
Commercial Refrigeration	130	3,378,302	62,056,933	115	2,947,791	54,013,137	17,496	\$804,742	6.06	2.00	0.022
Food Service	25	180,184	2,351,295	25	177,409	2,317,418	92	515,245	0.26	0.22	0.303
HVAC - Cooling	17,047	51,890,082	723,606,895	16,301	46,002,176	634,358,574	123,921	\$34,317,297	2.23	1.91	0.077
HVAC - Heat Pump	2,982	6,944,501	35,861,941	2,979	6,941,222	35,812,618	2,057	11,099,861	0.26	0.27	0.397
HVAC - Heating	-	6,892,384	103,241,812	-	4,029,683	60,354,675	1,932	\$2,061,410	0.10	0.06	0.046
Lighting - Indoor	15,559	112,502,553	1,089,417,397	14,907	108,777,229	1,055,737,542	134,485	95,257,465	0.78	0.75	0.117
Lighting - Outdoor	2,220	22,321,227	236,318,810	2,126	21,559,239	225,070,624	64,289	\$11,311,322	1.54	1.96	0.069
Miscellaneous	4,454	30,125,566	305,922,391	3,937	26,895,744	244,418,419	70,625	8,235,703	2.41	2.59	0.048
Process	1,335	11,258,147	163,459,249	1,334	11,249,194	163,369,743	7,240	\$5,696,595	1.77	1.73	0.049
Service & Domestic Hot Water	404	2,506,604	18,425,013	319	1,956,886	14,229,942	1,170	1,254,422	0.16	0.21	0.103
Transmission & Distribution											
Water Pumping / Irrigation	2,539	17,584,063	234,149,487	2,539	17,551,228	233,624,130	16,618	5,919,596	2.73	3.96	0.036
Whole Building	3,763	23,936,735	388,202,235	3,658	23,206,617	377,235,230	15,940	\$20,605,335	0.53	0.32	0.076
EE Subtotal	73,771	392,566,747	4,655,518,964	69,637	357,099,449	4,195,601,868	579,000	\$214,265,865	1.39	1.22	0.070
Low Income	1,476	5,168,622	74,037,380	1,221	4,840,187	70,252,772	9,668	\$8,809,352	0.66	0.67	0.175
EE and Low Income Subtotal	75,246	397,735,370	4,729,556,343	70,858	361,939,635	4,265,854,640	588,668	\$223,075,217	1.37	1.20	0.072
C&S	33,171	224,926,318	2,967,356,063	33,171	224,926,318	2,967,356,063	120,064	\$18,228,871	11.66	7.69	0.009
Electrification	2,795	20,390,042	287,950,321	2,711	19,762,496	277,951,058	11,789	\$23,917,348	0.13	0.13	0.115
Transmission and Distribution	0	4,062,875	8,148,494	0	4,062,875	8,148,494	1,886	\$137,656	2.74	2.74	0.034
C&S T&D and Electrification Subtotal	35,966	249,379,235	3,263,454,878	35,882	248,751,689	3,253,455,615	133,739	\$42,283,874	5.11	4.23	0.018
Utility Total	111,213	647,114,605	7,993,011,222	106,740	610,691,324	7,519,310,255	722,407	\$265,359,091	1.96	1.71	0.049

Table 7 presents the statewide EE program results by sector. As has historically been the case, the Commercial and Industrial (C&I) sectors account for the majority of California POU’s annual energy savings (**60%**), while residential programs resulted in **39%** of the gross annual EE program savings.

TABLE 7. EE Program Results by Sector

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	26	814,764	13,036,222	26	781,929	12,510,865	4,356	\$79,166	14.75	4.93	0.009
Commercial	31,237	228,015,737	2,733,325,984	29,564	215,373,597	2,557,293,520	369,351	\$132,951,643	1.41	1.32	0.070
Industrial	1,116	7,523,738	113,565,065	1,032	6,999,079	106,644,936	36,021	\$1,522,846	6.46	2.19	0.020
Other	1,079	2,203,278	25,959,877	1,079	2,203,278	25,959,877	9,733	\$1,544,874	1.38	0.36	0.076
Residential	40,312	154,009,230	1,769,631,817	37,935	131,741,565	1,493,192,670	159,539	\$78,167,337	1.25	1.07	0.073
EE Subtotal	73,771	392,566,747	4,655,518,964	69,637	357,099,449	4,195,601,868	579,000	\$214,265,865	1.39	1.22	0.070
Low Income	1,476	5,168,622	74,037,380	1,221	4,840,187	70,252,772	9,668	\$8,809,352	0.66	0.67	0.175
EE and Low Income Subtotal	75,246	397,735,370	4,729,556,343	70,858	361,939,635	4,265,854,640	588,668	\$223,075,217	1.37	1.20	0.072
C&S	33,171	224,926,318	2,967,356,063	33,171	224,926,318	2,967,356,063	120,064	\$18,228,871	11.66	7.69	0.009
Electrification	2,795	20,390,042	287,950,321	2,711	19,762,496	277,951,058	11,789	\$23,917,348	0.13	0.13	0.115
Transmission and Distribution	0	4,062,875	8,148,494	0	4,062,875	8,148,494	1,886	\$137,656	2.74	2.74	0.034
C&S T&D and Electrification Subtotal	35,966	249,379,235	3,263,454,878	35,882	248,751,689	3,253,455,615	133,739	\$42,283,874	5.11	4.23	0.018
Utility Total	111,213	647,114,605	7,993,011,222	106,740	610,691,324	7,519,310,255	722,407	\$265,359,091	1.96	1.71	0.049

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

TABLE 8. EE Program Results by Building Type

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	17,660	131,618,060	1,975,891,855	15,514	113,364,602	1,681,888,861	294,236	\$24,629,176	4.66	3.40	0.020
Assembly	302	2,307,903	19,555,123	294	2,252,149	19,161,536	920	\$2,594,582	0.44	0.44	0.168
Education - Community College	104	677,209	9,243,157	104	677,209	9,243,157	329	\$1,274,950	0.54	0.89	0.193
Education - Primary School	399	4,321,124	58,655,660	383	4,219,006	57,938,619	2,272	\$13,763,612	0.28	0.21	0.325
Education - Relocatable Classroom											
Education - Secondary School	461	5,158,399	73,770,054	461	5,158,399	73,770,054	2,747	\$16,121,638	0.31	0.31	0.302
Education - University	791	6,716,625	73,808,893	782	6,661,058	73,176,139	3,594	\$3,634,210	1.30	1.72	0.066
Grocery	297	2,165,649	24,015,257	281	2,038,266	22,529,353	1,461	\$968,380	0.97	0.86	0.057
Health/Medical - Hospital	884	6,458,830	80,726,878	864	6,309,069	78,624,694	3,312	\$2,107,759	0.88	0.91	0.036
Health/Medical - Nursing Home	301	2,351,308	19,506,328	301	2,351,308	19,506,328	968	\$1,371,460	0.79	0.79	0.087
Lodging - Hotel	149	897,576	12,839,055	149	897,576	12,839,055	454	\$798,506	1.07	1.02	0.090
Lodging - Motel	118	704,193	5,829,360	118	704,193	5,829,360	265	\$442,218	0.85	0.85	0.100
Manufacturing Biotech	117	886,993	12,700,364	115	872,971	12,490,160	433	\$267,258	1.49	1.27	0.029
Manufacturing Light Industrial	1,503	10,711,400	136,100,031	1,436	10,308,318	130,304,531	12,381	\$3,787,575	1.18	1.11	0.038
Office - Large	3,089	22,822,612	243,138,640	3,064	22,677,700	241,938,029	15,663	\$15,813,993	0.98	0.94	0.085
Office - Small	1,307	9,245,397	77,362,451	1,141	8,290,503	69,069,021	3,530	\$6,724,348	0.45	0.45	0.123
Other Agricultural	761	6,159,071	75,331,552	717	5,800,104	69,917,128	8,268	\$670,749	3.29	1.43	0.013
Other Commercial	6,545	43,253,056	483,112,669	6,168	40,570,751	455,657,964	69,037	\$24,750,813	1.34	1.38	0.073
Other Industrial	1,331	12,282,124	107,437,393	1,303	12,114,788	105,494,529	14,607	\$4,067,129	1.44	1.47	0.052
Residential	5,184	42,493,448	259,305,013	4,622	35,176,780	212,495,643	57,449	\$10,438,949	1.92	1.31	0.069
Residential - Mobile Home	18	16,050	97,191	18	15,953	96,220	5	\$21,889	0.68	0.50	0.297
Residential - Multi-Family	6,180	12,279,872	84,757,554	6,180	12,279,527	84,752,910	3,779	\$16,724,089	0.35	0.29	0.260
Residential - Single-Family	23,004	46,959,401	616,413,325	22,462	42,928,366	558,101,690	66,205	\$45,221,008	1.34	1.14	0.115
Restaurant - Fast-Food	50	291,206	2,288,391	46	267,369	2,118,413	105	\$149,835	0.64	0.62	0.087
Restaurant - Sit-Down	230	1,320,290	10,894,728	229	1,312,113	10,775,561	482	\$1,257,750	0.55	0.55	0.148
Retail - Big Box	314	2,433,026	32,507,338	313	2,425,885	32,428,787	1,264	\$1,480,644	1.45	1.93	0.061
Retail - Large	338	2,148,752	19,362,774	321	2,053,784	18,261,139	1,714	\$1,579,248	0.71	0.66	0.108
Retail - Small	1,924	12,821,759	102,917,454	1,846	12,346,476	99,525,120	5,767	\$11,691,193	0.48	0.47	0.149
Storage - Conditioned											
Storage - Unconditioned	149	1,324,767	10,430,277	143	1,284,581	10,147,667	492	\$1,235,580	0.42	0.41	0.151
Warehouse - Refrigerated	260	1,740,646	27,520,199	260	1,740,646	27,520,199	7,260	\$677,324	3.82	2.30	0.035
EE Subtotal	73,771	392,566,747	4,655,518,964	69,637	357,099,449	4,195,601,868	579,000	\$214,265,865	1.39	1.22	0.070
Low Income	1,476	5,168,622	74,037,380	1,221	4,840,187	70,252,772	9,668	\$8,809,352	0.66	0.67	0.175
EE and Low Income Subtotal	75,246	397,735,370	4,729,556,343	70,858	361,939,635	4,265,854,640	588,668	\$223,075,217	1.37	1.20	0.072
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Electrification	2,795	20,390,042	287,950,321	2,711	19,762,496	277,951,058	11,789	\$23,917,348	0.13	0.13	0.115
Transmission and Distribution	0	4,062,875	8,148,494	0	4,062,875	8,148,494	1,886	\$137,656	2.74	2.74	0.034
C&S T&D and Electrification Subtotal	35,966	249,379,235	3,263,454,878	35,882	248,751,689	3,253,455,615	133,739	\$42,283,874	5.11	4.23	0.018
Utility Total	111,213	647,114,605	7,993,011,222	106,740	610,691,324	7,519,310,255	722,407	\$265,359,091	1.96	1.71	0.049

Table 9 compares the actual savings in 2022 to the POU's adopted annual targets for each utility. In total, the actual energy savings were approximately 22% below forecasted levels for 2022.

TABLE 9. Forecast vs Actual for Installation Year 2022 ^{5 6}

Utility	Gross/Net	EE Forecast (MWh)	EE Actual (MWh)	EE %
Alameda	Net	1,251	728	58.2%
Anaheim	Gross	17,825	6,529	36.6%
Azusa	Net	1,721	2,846	165.3%
Banning	Net	202		0.0%
Biggs	Net	5	-	0.0%
Burbank	Gross	8,837	7,280	82.4%
Colton	Net	13,548	2,598	19.2%
Glendale	Net	16,957	11,281	66.5%
Gridley	Net	90	251	279.2%
Healdsburg	Net	355	178	50.1%
IPUC	Net	228	625	274.2%
Imperial	Net	12,450	15,616	125.4%
Lassen	Net	182	518	284.8%
Lodi	Net	860	2,023	235.2%
Lompoc	Gross	217	97	44.6%
Los Angeles	Gross	221,837	150,942	68.0%
Merced	Net	2,037	790	38.8%
Modesto	Net	6,113	1,643	26.9%
Moreno Valley	Net	791	2,056	259.9%
Palo Alto	Net	4,300	909	21.1%
Pasadena	Net	12,741	10,589	83.1%
Pittsburg	Net	77	5	6.6%
Plumas-Sierra	Net	59	639	1083.7%
Port of Oakland	Gross	53	-	0.0%
Rancho Cucamonga	Gross	1,630	7	0.4%
Redding	Net	1,358	4,369	321.8%
Riverside	Net	21,383	9,719	45.4%
Roseville	Net	11,070	13,575	122.6%
Sacramento	Gross	100,000	96,051	96.1%
San Francisco	Net	2,875	5,376	187.0%
Shasta Lake	Net	518	241	46.5%
Silicon Valley Power	Net	11,584	19,711	170.2%
Truckee Donner	Net	490	64	13.0%
Turlock	Net	26,385	4,802	18.2%
Ukiah	Net	403	60	14.8%
Vernon	Net	16,538	3,479	21.0%
Victorville	Net	328	235	71.6%
Total		517,302	375,831	72.7%

⁵ To be consistent with EE savings reported in Table 3, Annual targets exclude codes and standards savings.

⁶ Not all Small, Non-IRP POU's are included in this list because they either did not develop forecasts in 2022, or did not have any energy savings in 2022.

POLICY CONSIDERATIONS

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

California is a leader in advancing EE 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, EE programs have saved California consumers in excess of \$100 billion.⁷ POU communities have played a key role in supporting the State's accomplishments and look forward to a continuing partnership with all stakeholders as California pursues its clean energy agenda.

The Pandemic and Electricity Demand

COVID-19 resulted in the shutdown of whole segments of California's economy and caused Californians to work at home through 2021. In 2022 the pandemic continued to have an impact on California's electricity demand and the State's economy as a whole. While more Californians returned to working out of the home in 2022, comparing the data in this report with those of previous years demonstrates the clear impact the pandemic has had on EE performance. On balance, electricity demand in California looks to be approximately 4.5% lower on a year-to-date level. Electricity sales declined in 2019 and 2020 from pre-pandemic 2018 levels. While actual 2022 electricity sales information is not available as of the date of this report, 2021 sales were higher than 2020 levels, but remained below their pre-pandemic level.⁸ As a result of these changes in electricity demand, as this report demonstrates, California's EE programs show greater than 2021 levels, but remained below pre-pandemic levels. While reduced C&I energy demand understandably limits the production one can expect from C&I EE programs, the impact of the health crisis can also be seen in residential EE programs. For example, programs requiring direct interaction, such as DI, had to be suspended through 2021 due to state and local health restrictions. While some utilities renewed their DI programs, many continued to look for alternative means of reducing GHG emissions. While we cannot know the full social, environmental, and economic cost of the pandemic, the information presented in this report demonstrates the pandemic's impact on EE. It remains to be seen how enduring the impact of COVID-19 will be on California's EE program performance.

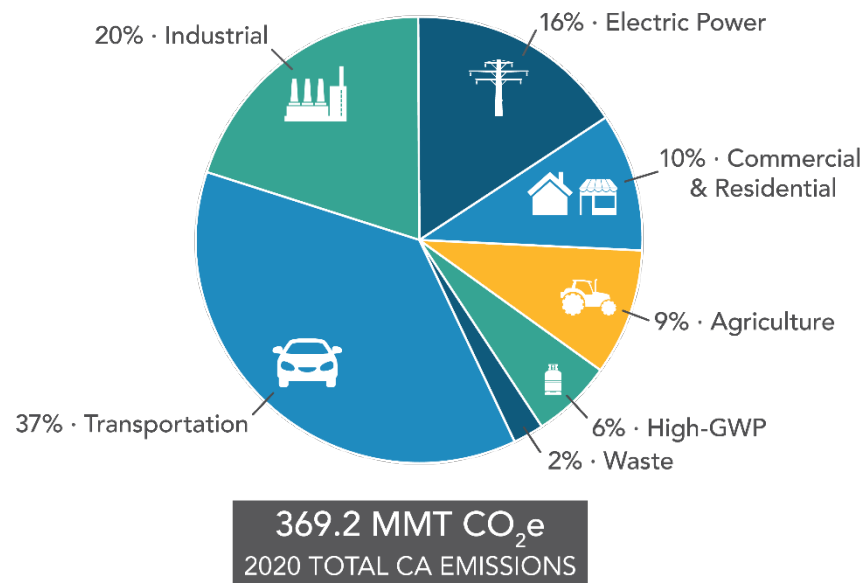
⁷ Energy Commission, September 2018, EE Tracking Progress, Available at: https://www.energy.ca.gov/sites/default/files/2019-12/Greenhouse_Gas_Emissions_Reductions_ada.pdf

⁸ Energy Commission Electricity Consumption by Entity. Available at: <http://www.ecdms.energy.ca.gov/elecbyutil.aspx>.

EE and Carbon Reduction

California's SB 100 (De León, 2018) regulation establishes California's goal that retail electricity will be GHG emission free by 2045.⁹ EE remains the first resource in the State's loading order and will maintain its important role in reducing GHG emissions. But as the GHG content of POU loads continues to decline, it is reasonable to expect that GHG emission reductions from EE will continue to diminish. As displayed in Figure 1 below, electric power is responsible for 16% of Scoping Plan GHG emissions.¹⁰

Figure 1. California's 2020 GHG Emissions by Scoping Plan Category



The Value of the EE Doubling Goal

As part of the State's carbon reduction goals, California enacted SB 350 (De León, 2015), which directed the Energy Commission to establish statewide targets for the cumulative doubling of EE by 2030.¹¹ These targets take into consideration increases in EE savings from utility programs, Codes & Standards (C&S), financing, behavioral programs, market transformation, and improvements in the agriculture and industry sectors. In establishing a statewide target, SB

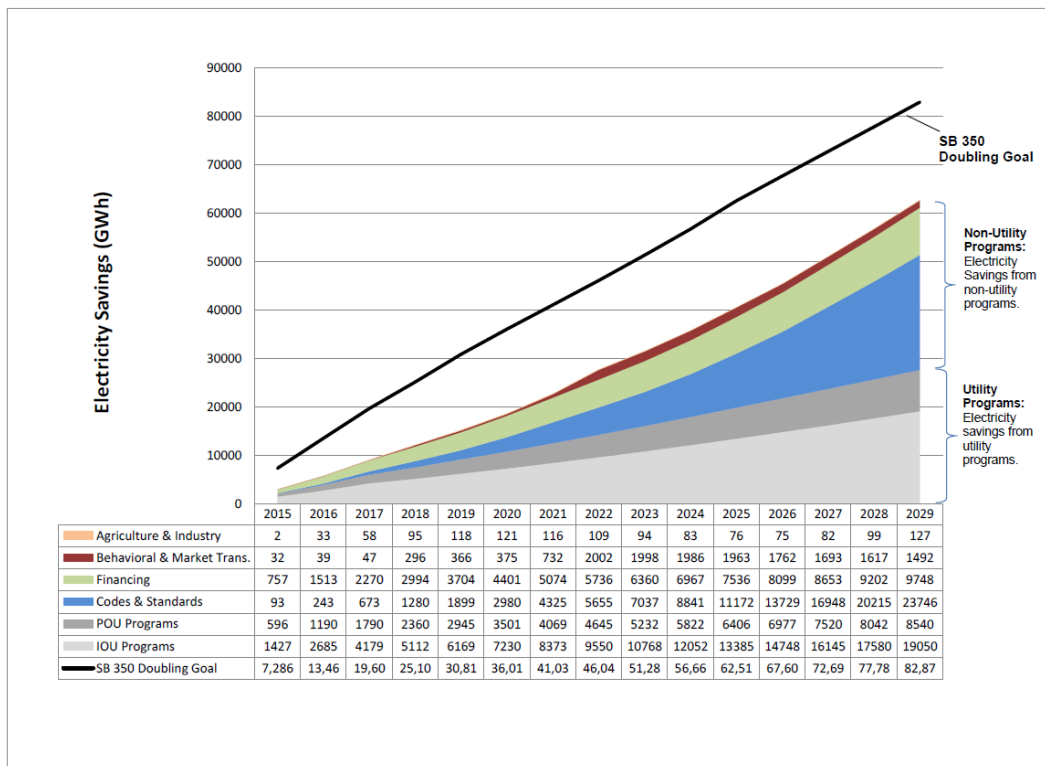
⁹ Cal. Pub. Util. Code § 399.15(b)(2)(B).

¹⁰ See <https://ww2.arb.ca.gov/ghg-inventory-graphs>.

¹¹ Cal. Pub. Util. Code § 454.55(b)(1).

350 directed the Energy Commission to rely on both the forecast for additional achievable EE in the *California Energy Demand Updated Forecast, 2014-2025*, and the POU's EE targets.¹² The POU's own forecasts of all potentially achievable cost-effective electricity efficiency savings from their respective customers were used by the Energy Commission to forecast the cumulative energy savings potential from POU's EE programs. This report reflects current EE potential forecast, based on a 2021 forecast posted on the CMUA website.¹³ The Energy Commission incorporated the POU's adopted annual EE targets into the statewide cumulative target by combining the POU's 1st year savings as the annual targets for 2015-2030 and used that as the aggregate "cumulative savings" target for POU's, as shown below in Figure 2.

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



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

POU cumulative savings through 2022 were calculated using this same methodology, as presented in **Figure 2**, above, which shows that to date POU's have exceeded the State's forecast for their collective, cumulative EE savings by more than 14 GWh.

POU's will continue to work together to determine how best to calculate the cost-effectiveness of EE portfolios and the resulting savings for their communities. The need for consistent

¹² POU's are required to update their annual EE targets every four years, per Cal. Pub. Util. Code § 9505 (b). The 2021 update is forthcoming.

¹³ See <https://www.cmua.org/files/CMUA%202020%20EE%20Potential%20Forecast.pdf>.

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 EE program is ultimately dependent on the actions of the customer.

To that end, there is a concern that the methodology used by the Energy Commission to forecast POU contributions towards the State's EE doubling goals may not properly recognize cumulative savings, nor give sufficient attribution to utilities' EE programs. Specifically, using only the first-year savings from EE 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 EE 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 (CFL) once the LED no longer works.¹⁴ 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 has ended. Recognizing that these paradigm changes are real, the lifetime cumulative savings from EE programs currently utilized by the Energy Commission 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 EE programs have achieved and will continue to provide.

The Challenges of Attribution

As noted above, the *Senate Bill 350: Doubling EE Savings by 2030* report recognizes the key areas where future EE savings are likely to come from, including EE savings from utility programs, C&S, financing, behavioral programs, market transformation, and improvements in the agriculture and industry sectors.¹⁵ 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 EE program savings continuing to increase, utilities have received less attribution for these increases.

¹⁴ 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>.

¹⁵ Energy Commission, October 2017, *Senate Bill 350: Doubling EE Savings by 2030*.

EE improvements are one of the most cost-effective ways to reduce energy consumption.¹⁶ However, as California’s POU’s continue to reduce the GHG emissions from their portfolios, it is unclear whether EE improvements will be the most cost-effective way to reduce GHG emissions. Further, POU’s EE savings are likely to decrease over time due to future codes and standards. As building codes continue to become increasingly more stringent, including the move towards net-zero (or near-net-zero) buildings, utilities cannot claim savings from any EE improvements incorporated into building codes.

Regardless of how EE attribution is addressed, it is important for policymakers, utilities, environmental groups, and EE advocates to work together to introduce new strategies for reductions in energy use that go above and beyond C&S – but remain cost-effective for the utilities and their customers. POU programs must continuously evolve in order to find new technologies, encourage 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 EE strategies from kilowatt-hours (kWh) saved to GHG emissions reduced. Consistent with California policy, many POU’s 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.

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

Cost-effectiveness metrics must begin to account for the future carbon content of the electricity being saved by EE measures, as well as the carbon content of the additional electricity needed due to building electrification and transportation electrification (TE).

Cost-effectiveness metrics must begin to account for the future carbon content of the electricity being saved by EE measures as well as the carbon content of the additional electricity needed due to building and transportation electrification.

POU’s continue to evaluate how best to calculate the benefits of various EE and demand reduction measures to meet both state and local GHG emission goals. To that end, the POU’s

¹⁶ Gillingham, Kenneth, and James H. Stock. 2018. "The Cost of Reducing Greenhouse Gas Emissions." *Journal of Economic Perspectives*, 32 (4): 53-72.

CET/RP was developed to model the impacts of EE programs and GHG reductions on electric utility operations on an hourly basis. In addition, utilities are continuing to expand their resource planning platforms and analytical tools to optimize utility operations.

While building electrification and decarbonization measures can be expected to increase electricity demand, they can both deliver GHG emissions reductions. These efforts will require a shift in many paradigms, strategies, and operational practices for utilities, policymakers, and other stakeholders. For example, as the grid integrates higher percentages of renewables, the hours of energy use (or savings) will be a critical consideration when developing EE 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. Both peak load reduction measures and load shifting measures have 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.¹⁷ 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.¹⁸ 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 for 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”.¹⁹ These joint agency proceedings, in which the POUs are participating, have begun to reevaluate the methodologies that the regulatory agencies have used 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.

More work is needed to address the obstacles faced by electrification. Fuel substitution in buildings is only part of the picture for electrification – changing from gasoline or diesel to

¹⁷ Building Decarbonization Coalition, February 2019, *A Roadmap to Decarbonize California Buildings*, Available: <http://www.buildingdecarb.org/resources/a-roadmap-to-decarbonize-californias-buildings>

¹⁸ 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

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

electricity in the transportation sector is defined as “fuel switching” and is not captured in fuel substitution policies. Moving California’s transportation sector to zero-emission vehicles will prompt considerable increases in electricity demand. The Advanced Clean Cars II regulation and the proposed Advanced Clean Fleets regulation will each fundamentally transform California’s transportation sector and place considerable demands on the ability of the State’s electric utilities to maintain safe, affordable, and reliable electricity service. Building electrification can complement related efforts to electrify the transportation sector, as both are essential to meeting the State’s GHG emission reduction goals. However, because building electrification and TE will increase electric load, policymakers, utilities, and other stakeholders must recognize that this can also complicate the ability to track success with California’s goal to reduce energy use. 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 EE policies, markets, and technologies evolve, POU will continue to develop innovative programs tailored to the changing needs of their respective communities; the POU look forward to working with the Energy Commission to frame effective policies to that end.

Diversity, Equity, and Inclusion

As referenced below, many POU service territories include a significant share of low-income, and/or Disadvantaged Communities (DACs). Diversity, Equity, and Inclusion (DEI) is a stated goal for many of California’s POU. This is manifest in planning and/or implementing programs that incorporate equity components to help ensure inclusion. POU programs focused on DEI include, but are not limited to:

- Home improvement programs for income-qualified customers to provide little to no-cost weatherization and appliance upgrades.
- Bill assistance and rate discount programs that target underrepresented communities.
- EV Rideshare programs for low-income and DAC members who may not otherwise be able to access an EV.
- Mobile resource centers that deliver information directly to DACs about program options and benefits.
- Specifically identifying locations in DACs to install public EV charging infrastructure and providing greater incentives for commercial customers installing EV charging infrastructure in DACs.
- Lowering the purchase price of E-Bikes and EVs for low-income customers through vouchers.
- Training members of DACs in urban forestry to support Shade Tree programs.
- Public school education programs that inform students about environmental sustainability and clean energy opportunities.

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 EE program and develop EE targets, in accordance with Public Utilities Code.²⁰

EE Cost-Effectiveness Tool and Reporting Platform

Energy Platforms, LLC developed a cloud-based EE CET/RP to improve POU's 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 EE 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 EE resource programs: Total Resource Cost (TRC), Program Administrator Cost (PAC), Ratepayer Impact (RIM), and Participant Cost Test, as developed by the CPUC in the 1980s and codified in the California Standard Practice Manual.²¹

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

- 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 POU's 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.

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. The TRM was completed in 2014, updated in 2016 and 2017, and another update is planned for 2023. 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 EE measures and projects in a very clear and open format. POUs use energy savings estimates to report program accomplishments and measure progress towards program goals. EE measures are documented and classified as either unit energy savings 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 EE programs.

Public power is actively involved in the California Technical Forum's (CalTF) statewide electronic TRM (eTRM). NCPA, SCPPA, SMUD, and LADWP are members of the CalTF Policy Advisory Committee, which consists of statewide EE stakeholders who advise on the organization's vision, mission, guiding principles, and affirm the annual Work Plan. In addition, POU staff

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

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.²³

Evaluation, Measurement & Verification

California 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 EE savings and the reduction in energy demand achieved by its EE.²⁴

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 EE, 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 EE efforts.²⁵

²³ For more information on the CalTF, visit: <http://www.caltf.org/>.

²⁴ Cal. Pub. Util. Code § 9505(d).

²⁵ See: <https://www.cmua.org/emv-reports>.

SOURCES OF FUNDING

This section provides an overview of the POU's sources of funding for its investments in EE and demand reduction programs, as required by Public Utilities Code.²⁶ The POU's collectively spent \$288 million in FY 2020, from a combination of Public Goods Charge (PGC) funds, Cap-and-Trade (C&T) allowances, and General Fund monies.

Public Goods Charge

The PGC is a “non-bypassable”, usage-based, charge on local distribution services, collected by POU's, in accordance with Public Utilities Code.²⁷ The PGC is available to fund investments in the following:

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

Cap-and-Trade Allowances

The California C&T program allows utilities to use proceeds from the sale of freely allocated allowances to invest in EE 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 C&T 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.²⁸

General Fund

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

²⁶ Cal. Pub. Util. Code § 9505(a)(3).

²⁷ *Id.* § 385.

²⁸ California Code of Regulations (CCR), Title 17, § 95801.

Appendix A – POU Narratives

Appendix A consists of detailed narratives of each POU’s EE programs, as well as general descriptions of the utilities, presented in alphabetic order.

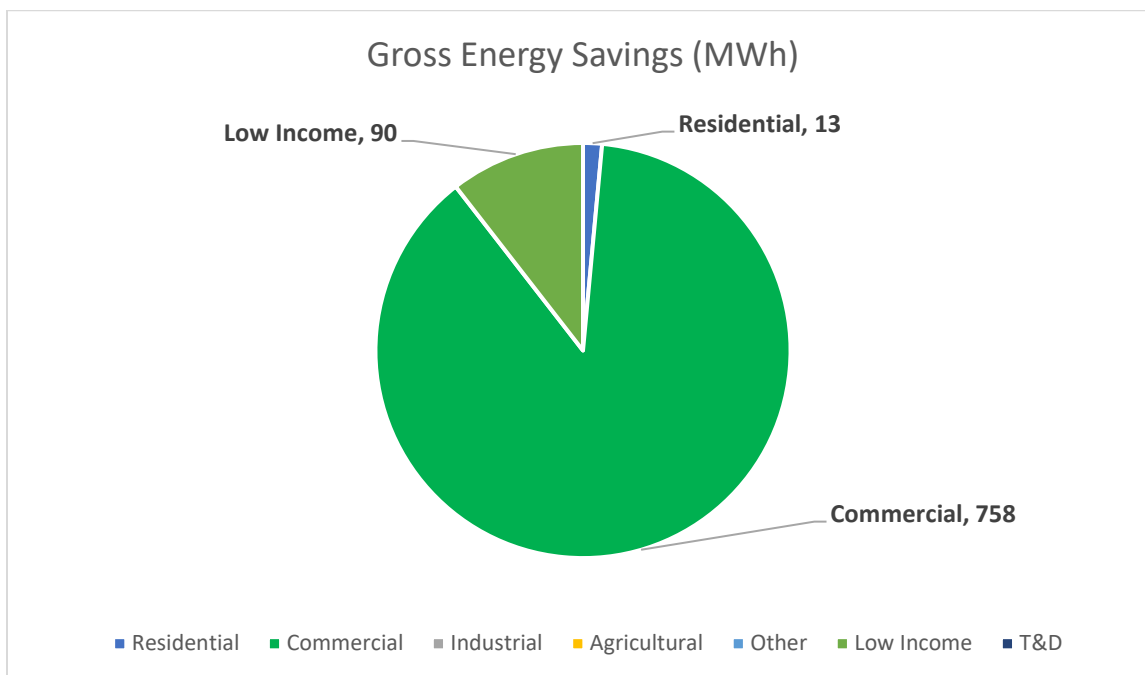
TABLE 10. Annual EE Program Summary

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	89	770,388	11,114,924	85	727,988	10,501,664	\$563,798
Anaheim	1,445	6,528,637	95,026,154	1,445	6,528,637	95,026,154	\$2,472,626
Azusa	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	\$661,054
Banning	31	110,294	1,488,966	21	60,700	840,457	\$140,532
Biggs	-	-	-	-	-	-	\$12,782
Burbank	1,678	7,279,669	114,349,328	1,677	7,278,395	114,328,944	\$1,907,947
Colton	474	2,627,787	16,958,054	469	2,598,370	16,546,706	\$534,475
Corona	-	-	-	-	-	-	\$0
Glendale	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	\$3,162,930
Gridley	29	265,737	3,732,090	26	251,284	3,521,377	\$97,916
Healdsburg	35	210,851	2,798,583	30	177,954	2,355,388	\$147,745
Imperial	6,420	16,308,841	228,147,602	6,292	15,615,519	214,099,698	\$6,971,966
IPUC	165	781,580	11,161,168	132	625,264	8,928,934	\$109,535
Lassen	78	642,446	8,259,954	63	518,343	6,653,924	\$273,784
Lodi	291	2,209,880	30,298,947	236	2,022,984	27,564,581	\$601,827
Lompoc	8	96,873	1,230,306	6	70,015	893,155	\$109,671
Los Angeles	36,714	150,941,980	1,620,767,694	36,714	150,941,980	1,620,767,694	\$157,989,347
Merced	130	989,645	10,905,517	103	790,176	8,702,838	\$222,801
Modesto	301	2,124,169	28,584,730	212	1,642,540	22,109,125	\$1,200,612
Moreno Valley	309	2,284,907	23,711,905	278	2,055,880	21,333,728	\$526,087
Palo Alto	150	1,135,867	18,735,542	120	908,693	14,988,434	\$890,568
Pasadena	2,044	10,643,248	46,147,017	2,018	10,588,984	45,548,611	\$2,518,103
Pittsburg	1	6,392	58,649	1	5,048	46,206	\$14,580
Plumas-Sierra	88	678,017	10,953,818	70	639,393	10,321,429	\$121,273
Port of Oakland	-	-	-	-	-	-	\$12,984
Rancho Cucamonga	2	7,048	112,768	2	7,048	112,768	\$32,634
Redding	827	5,267,198	51,350,286	673	4,369,456	42,120,748	\$2,559,038
Riverside	2,510	10,387,956	160,402,582	2,294	9,718,532	142,139,699	\$3,423,265
Roseville	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	\$2,926,167
Sacramento	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	\$13,213,024
San Francisco	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	\$2,094,894
Shasta Lake	335	295,239	3,759,668	121	241,068	2,981,486	\$244,286
Silicon Valley Power	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	\$4,677,441
Truckee Donner	13	98,765	1,399,164	8	63,552	893,038	\$1,652,838
Turlock	600	4,847,788	76,838,272	561	4,630,428	73,650,968	\$1,379,620
Ukiah	16	77,745	1,037,149	12	59,558	785,586	\$66,610
Vernon	690	3,479,377	46,865,844	690	3,479,377	46,865,844	\$712,204
Victorville	40	293,471	4,695,536	32	234,777	3,756,429	\$18,900
EE and Low Income Subtotal	75,246	397,735,370	4,729,556,343	70,858	361,939,635	4,265,854,640	\$223,075,217

ALAMEDA MUNICIPAL POWER

Alameda at a Glance

- Climate Zone: 3
- Customers: 36,283
- Total annual retail sales: 326,708 MWh
- Annual Retail Revenue: \$60,993,707
- Annual EE expenditures for reporting year: \$912,940
- Gross annual savings from reporting year portfolio: 861 MWh



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 little residential air conditioning.

AMP has committed to spending its C&T and renewable energy credit (REC) funds to reduce greenhouse gas emissions in its service area.

Major Program and Portfolio Changes

FY 2022 savings included non-residential programs, a marketplace and rebate portal, and direct-install program for income-qualified residential customers.

Program and Portfolio Highlights

In September 2021, AMP made a new rebate portal and an e-Commerce online marketplace available to all AMP customers. The marketplace offered instant rebates for LED lighting, thermostats, and other EE measures. For customers' convenience, AMP also offered online rebate submissions through the same marketplace portal for residential customers to apply for downstream rebates.

Commercial, Industrial & Agricultural Programs

- **Energy Plus Program:** The Energy Plus Program, which started in January 2016, is a non-residential direct-install lighting, refrigeration, and heating, ventilation, and air conditioning (HVAC) program. This program is also available to local municipal customers doing EE upgrades. In FY 2022, five customers participated in lighting and refrigeration upgrades with low co-pay amounts, due to AMP's rebates. This program ended December 31, 2021.
- **Non-Residential Self-Install Program:** This program, like Energy Plus, offers non-residential customers rebates for EE upgrades such as lighting, HVAC, and refrigeration. In FY 2022, four customers participated in lighting upgrades with low co-payment amounts, due to AMP's rebates. AMP has maintained this program as an umbrella commercial rebate program since Energy Plus ended to provide continuing support for commercial customers' EE needs. This program will remain open in FY 2023.
- **Commercial Kitchen Rebate Program:** This program was introduced in the second half of FY 2021, targeting the growing restaurant and food service industry in the City of Alameda. The program offers rebates for EE such as solid doors for commercial refrigerators and freezers, glass doors for commercial refrigerators and freezers, commercial ice makers, and other energy efficient commercial kitchen equipment. In FY 2022, there were no participants in the program. In FY 2022, AMP supplemented this program with no-cost in-person commercial kitchen audits, and free in-person or virtual webinars.

Residential Programs

- **Residential Online Rebates – Lighting and Appliances:** Alamedans have been able to participate in residential EE rebates using a simple web application since March 2016. In the first quarter (Q1) of FY 2022 AMP approved 31 applications. Rebates were available for LED bulbs, LED fixtures, LED decorative string lights, electric clothes dryers, washing machines, heat pump water heaters, and electric vehicle (EV) chargers. Starting in the second quarter (Q2) of FY 2022, AMP launched a new rebate portal and an e-commerce online marketplace. The marketplace was a resource for customers to research,

purchase, and compare energy efficient products for their homes or small businesses. In addition, the new marketplace offered downstream rebates for customers. The marketplace remained open until February 2023.

- Energy Assistance Program (EAP) Plus – In October 2019, AMP launched a residential direct-install program, called EAP Plus, targeting income-qualified residents living in single and multi-family homes. Eligible customers received no-cost EE upgrades, including LED bulbs, LED fixtures, refrigerators, advanced power strips, low-flow shower heads and various weatherization measures. In FY 2022, the program served 60 customers. The program will remain open in FY 2023.

Complementary Programs

- EV Programs: AMP offers two incentive programs to encourage EV adoption. The first is an EV rate discount, which the utility offered the EV rate discount from 1998 through the end of FY 2021. Beginning in FY 2022 AMP introduced an EV Time-of-Use (TOU) rate plan to replace the EV rate discount. 595 customers enrolled in AMP’s EV TOU rate plan in FY 2022.
- EV Charger Rebate Electric Vehicle Rebates: AMP offers a rebate up to \$800 for residential customers who install Level 2 (240 volt) chargers in their homes. For commercial customers, the rebate amount is up to \$33,000. During FY 2022, 216 residential customers participated in the program installing Level 2 chargers. AMP also launched a new Used EV rebate program that encouraged customers to purchase a used EV. The rebate amount was \$1,500 for participating customers, up to \$2,000 for income qualified customers. In FY 2022, 58 customers participated in the Used EV program.
- Low-Income Programs: AMP continues to provide financial assistance to Alameda's low-income families through the Energy Assistance through Supportive Efforts (EASE) and EAP programs. A maximum amount of \$200 is available per household within a three-year period through the EASE program. In FY 2022, EASE, an emergency relief program, helped 103 households receive a total of \$20,043.70 in electric-bill assistance. EAP provides a 25% monthly discount on the residential customer’s electric bill. A total of \$163,061.10 was allocated to 947 Alameda households in FY 2022. These programs are funded through the public purpose component of AMP's energy charge.
- Heat Pump HVAC Rebate: AMP developed a new Heat Pump HVAC rebate for residential and non-residential customers, launching in FY 2023. Additionally, AMP plans to launch webinars for EV charging, EV ownership, and residential and non-residential electrification.

EM&V Studies

AMP completes an EM&V study every other year with a focus on the two previous years. The most recent EM&V report for FYs 2020 and 2021 was performed by ADM Associates. The EM&V report focused on impact and process evaluation for Energy Plus and EAP Plus. The study is

available on the CMUA website. AMP plans to complete the next study in FY 2024 that will cover non-residential DI and residential downstream for FY 2020 and FY 2021 with a projected \$60,000 budget.

Major Differences or Diversions from California's 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 2019 EM&V report. The energy savings figures for the residential refrigerator/freezer, LED string lights, washing machines, and heat pump water heaters were from the TRM 2017 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 DI program, Energy Plus, used a combination of the TRM 2017 and full pre- and post-calculations.

TABLE 1. AMP EE Program Results by End Use

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)
Appliance & Plug Loads	0	568	6,816	0	176	2,113	1	\$1,072	0.18	0.18	0.683
HVAC - Cooling	0	393	6,288	0	314	5,030	2	\$7,331	0.24	0.24	2.078
Lighting - Indoor	89	360,255	5,764,084	85	341,982	5,471,719	1,755	\$259,832	1.88	0.82	0.068
Lighting - Outdoor	0	400,035	5,200,456	0	380,033	4,940,433	2,149	\$247,676	2.26	2.02	0.068
Miscellaneous	0	6,129	104,193	0	3,677	62,516	19	\$30,257	0.19	0.21	0.701
Service & Domestic Hot Water	0	3,008	33,088	0	1,805	19,853	8	\$17,630	0.21	0.20	1.181
EE Subtotal	89	770,388	11,114,924	85	727,988	10,501,664	3,932	\$563,798	1.88	1.14	0.075
Appliance & Plug Loads	7	18,530	140,454	4	12,250	91,831	31	\$53,454	0.20	0.20	0.766
Building Envelope	0	193	4,057	0	54	1,136	1	\$2,166	0.17	0.17	2.946
Lighting - Indoor	352	68,325	1,093,197	300	57,107	913,718	325	\$279,113	0.34	0.34	0.435
Lighting - Outdoor	0	2,616	41,856	0	2,616	41,856	15	\$12,994	0.34	0.34	0.443
Service & Domestic Hot Water	0	782	8,602	0	469	5,161	2	\$1,415	0.33	0.33	0.365
Low-Income Subtotal	360	90,446	1,288,166	304	72,497	1,053,702	373	\$349,142	0.32	0.32	0.469
EE and Low Income Subtotal	449	860,834	12,403,090	389	800,485	11,555,367	4,306	\$912,940	1.28	0.92	0.110
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	449	860,834	12,403,090	389	800,485	11,555,367	4,306	\$912,940	1.28	0.92	0.110

TABLE 2. AMP EE 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)
Commercial	89	757,690	10,922,939	85	719,806	10,376,792	3,891	\$491,877	2.12	1.21	0.066
Residential	0	12,698	191,985	0	8,183	124,872	42	\$71,922	0.21	0.21	0.817
EE Subtotal	89	770,388	11,114,924	85	727,988	10,501,664	3,932	\$563,798	1.88	1.14	0.075
Residential	360	90,446	1,288,166	304	72,497	1,053,702	373	\$349,142	0.32	0.32	0.469
Low-Income Subtotal	360	90,446	1,288,166	304	72,497	1,053,702	373	\$349,142	0.32	0.32	0.469
EE and Low Income Subtotal	449	860,834	12,403,090	389	800,485	11,555,367	4,306	\$912,940	1.28	0.92	0.110
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	449	860,834	12,403,090	389	800,485	11,555,367	4,306	\$912,940	1.28	0.92	0.110

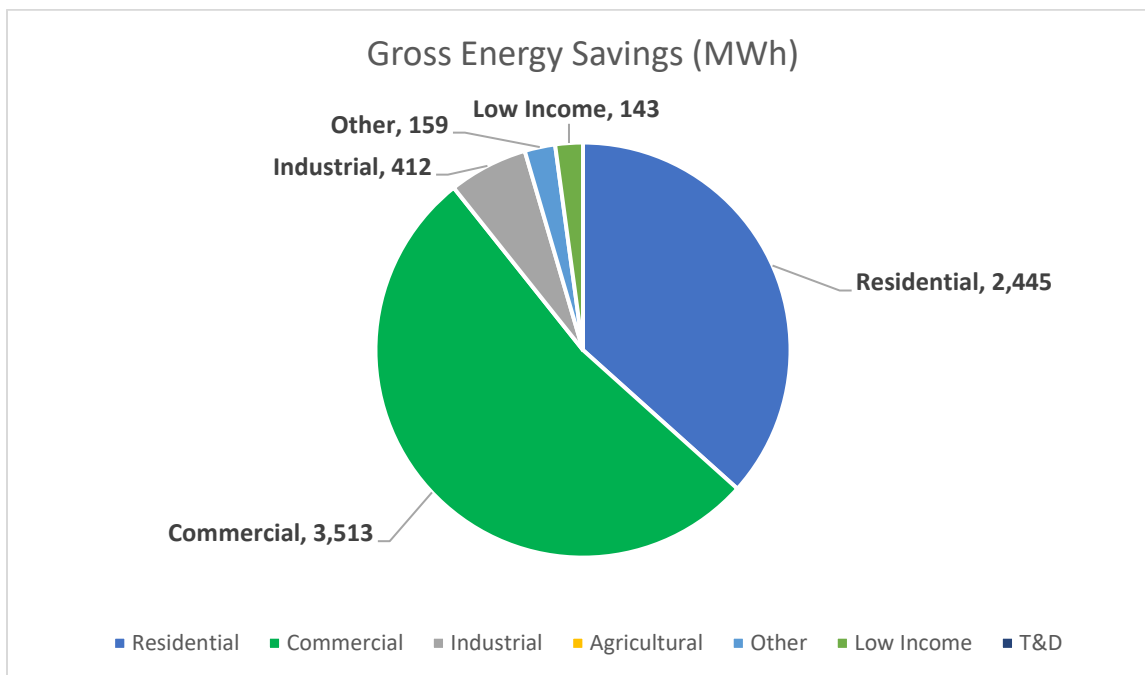
TABLE 3. AMP EE Program Results by Building Type

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	89	757,690	10,922,939	85	719,806	10,376,792	3,891	\$491,877	2.12	1.21	0.066
Residential	0	12,698	191,985	0	8,183	124,872	42	\$71,922	0.21	0.21	0.817
EE Subtotal	89	770,388	11,114,924	85	727,988	10,501,664	3,932	\$563,798	1.88	1.14	0.075
All	0	10,472	62,832	0	7,330	43,982	15	\$13,103	0.39	0.39	0.390
Residential	360	78,342	1,203,982	304	64,102	995,633	354	\$310,150	0.34	0.34	0.443
Residential - Multi-Family	0	782	8,602	0	469	5,161	2	\$1,415	0.33	0.33	0.365
Residential - Single-Family	0	850	12,750	0	595	8,925	3	\$24,474	0.04	0.04	3.850
Low-Income Subtotal	360	90,446	1,288,166	304	72,497	1,053,702	373	\$349,142	0.32	0.32	0.469
EE and Low Income Subtotal	449	860,834	12,403,090	389	800,485	11,555,367	4,306	\$912,940	1.28	0.92	0.110
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	449	860,834	12,403,090	389	800,485	11,555,367	4,306	\$912,940	1.28	0.92	0.110

ANAHEIM PUBLIC UTILITIES

Anaheim at a Glance

- Climate Zone: 8
- Customers: 122,514
- Total annual retail sales: 2,682,356 MWh
- Annual Retail Revenue: \$371,681,000
- Annual EE expenditures for reporting year: \$2,761,879
- Gross annual savings from reporting year portfolio: 6,672 MWh



Anaheim Overview

In FY 2022, residual pandemic-related challenges continued to affect residential and commercial customer participation in conservation programs. Challenged by statewide restrictions and supply chain shortages, businesses and residents deferred EE improvement projects, resulting in a decrease in annual energy savings. Anaheim Public Utilities' (APU) ability to design and adjust programs quickly to meet the needs of customers in FY 2022 resulted in new safety protocols and pilot programs to support changing customer needs.

Major Program and Portfolio Changes

The pandemic's challenges persisted into FY 2022, and significantly affected residential and commercial DI programs, resulting in a decrease in customer participation levels, as well as energy savings.

During this time, customer sentiment changed to reflect a growing need for emergency bill assistance services, and APU shifted resources to expand programs that helped customers facing financial hardship due to the pandemic.

APU prioritized safeguarding the public's health, and upheld safety protocols to avoid person-to-person contact and minimize the risk of virus transmission during FY 2022. APU's commitment to the safety of employees, customers, and community members, lead to newly implemented safety practices. These new practices, such as social distancing, personal protective equipment, and virtual presentations of energy assessment findings, allowed in-person programs to thoughtfully open towards the end of fiscal year 2021. The new safety practices provided customers with the flexibility to participate in APU's programs including the Small Business DI, Energy Savings Assistance Program (Weatherization), and Home Utility Check-Up, in a modified manner. Although customer sentiment during this time reflected a hesitation to engage with in-person activities, APU provided customers with access to modified services that allowed them the benefits of the programs, while being considerate of evolving public health policies, and changing consumer sentiments.

APU contracts with third-party vendors to implement a variety of energy and water efficiency programs including residential energy and water conservation services, commercial conservation programs, and school education initiatives. The third-party vendors facilitate robust marketing and outreach activities with the goal of increasing program participation, and thus increasing energy and water savings. Furthermore, residential programs including Home Utility Check-Up, Dusk-to-Dawn Lighting, and Weatherization, were redesigned to enable a synergistic participation amongst these three programs simultaneously. The efficient approach enhances program marketing potential, customer awareness of program offerings, and aims to increase program participation. Most significantly, the cross-coordination of program deliverables streamlines the enrollment process and allows participating customers to receive the services and efficiency benefits of each of these programs with ease.

Program and Portfolio Highlights

Residential lighting enhancement programs and initiatives maintained a valuable benefit to customers, and a key driver in contributing to APU's EE portfolio. At no-cost to program participants, APU offers high-efficiency LED lighting fixture replacement through the Dusk-to-Dawn Program, with free installation available for income-qualified customers. Through the LED Welcome Kit initiative, new customers that move into the city and establish a new electric utility account are directly mailed four LED bulbs, along with a welcome brochure with city information and resources. Additionally, APU hosts an annual Holiday Light Exchange event that provides customers with the opportunity to exchange outdated and inefficient holiday light

strands for new energy efficient LED light strands. Collectively, the aforementioned residential lighting programs have contributed to over 1.78 MWh savings in FY 2022 alone.

Educating customers about the resources and programs available to them is the forefront of APU's marketing approach. In addition to traditional program marketing mechanisms such as the customer service call-center phone line, utility webpages, bill inserts, social media, community event outreach, and program flyer distribution to city facilities, APU makes a concerted effort to bring resources directly to the neighborhood.

Launched as a pilot project in FY 2022, APU collaborated with the Anaheim Community Services Department to support the Mobile Family Resource Center initiative.²⁹ Through the Mobile Family Resource Center initiative, various city departments and non-profit organizations work collectively to travel to neighborhoods throughout Anaheim and provide essential services and information to low income and disadvantaged residential and multifamily customers. APU piloted a new initiative to provide customer service outreach in the community, in which customer services representatives equipped with laptops and internet access, helped enroll customers in bill assistance programs, directly at community events. This unique service allowed customers to learn more about their utility account and apply for various bill assistance programs. In FY 2022, the Mobile Family Resource Center made over 3,700 significant contacts with residents through 64 events held at 20 Anaheim neighborhoods. In addition to providing utility support through bill assistance and program enrollment, the pilot project distributed 776 food and/or produce boxes to families, administered 162 COVID-19 vaccinations, and helped 138 families become qualified to receive up to \$500 in emergency financial assistance to help pay for food, transportation, groceries, medical, and utility expenses, among others. APU continues to support the Mobile Family Resource Center initiative, which has proven to be a valuable on-the-spot resource fair for low income and DACs.

In addition to the community-based Mobile Family Resource Center initiative, APU hosted seven Pop-Up Lighting Distribution Events during FY 2022. These Lighting Distribution Events provided an on-the-spot enrollment into the Dusk-to-Dawn Program, with both high-efficiency lighting fixtures and LED bulbs distributed to the community on site. Collectively, a total of 436 lighting fixtures were distributed at these events, resulting in an annual energy savings of over 54,000 kWh. In total, APU participated in over 45 community events in FY 2022.

As the pandemic has predisposed many residents, multifamily dwellings, and businesses, APU actively coordinates with local organizations to help customers get access to available utility-bill relief funding and bill payment resources. Additionally, APU provides assistance options, including bill deferrals, payment plans, income-qualified discounts, and fee waivers, to help keep customers current with their utility bills. APU also provides eligible customers with the necessary documentation to seek third-party assistance.

²⁹ See <https://anaheimcf.org/anaheim-community-impact-grant/mobile-family-resource-center/>.

School education programs are a vital component to APU's engaged efforts in the community. APU recently contracted with Inside the Outdoors, a non-profit organization, to provide on-site educational programs and off-site field trips to elementary, intermediate, and high school students throughout Anaheim.³⁰ Educational topics include EE, water conservation, EVs, GHG curtailment, and renewable resources. The non-profit also teaches students how to perform in-home energy and water efficiency assessments. Additionally, school gardens are also constructed/rehabilitated at two school sites per year, and students attend field trips to various nature centers and outdoor venues. These field trip opportunities encourage interactive learning experiences with natural systems and embed Next Generation Science Standards education into the field trip activities.³¹ Students at all levels are taught how they can be leaders in their communities by incorporating sustainability into their personal lifestyles. APU also sponsors the annual Sustainable Schools Award, a program that recognizes two local schools for their sustainability improvements in their campus and curriculums. Additionally, APU sponsors and supports student mentorship programs and career exploration opportunities within the utility industry.

Commercial, Industrial & Agricultural Programs

In FY 2022, APU faced residual challenges from the pandemic, as did the business community. Affected by statewide restrictions, labor shortages, and supply chain disruptions, C&I EE program participation remained stagnant, as business customers found it difficult to spend upfront capital costs on new efficiency projects. APU remains committed to supporting the changing needs of business customers and encouraging their participation in EE and demand reduction programs.

APU offers commercial businesses over 15 commercial EE programs and rebates. The incentives vary according to the measure implemented, based on kW reduction or kWh annual savings. Program methods remain consistent with California SB 1037 (Kehoe, 2005), and are designed to facilitate significant impacts with energy savings results. A unique program is the Customized Energy Incentives Program, which allows customers to target their most significant energy load concerns using on-site equipment, and customized incentive solutions. This measure captures before and after energy use of efficiency recommendations with thorough documentation and analysis. Additional commercial efficiency programs include the following:

- Comprehensive Energy Assessments: In alignment with the American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), APU provides customized on-site analysis and recommendations to help businesses with energy-efficient goals.
- Customized Energy Incentives Program: Tailored for projects such as high-efficient air conditioning units, energy management systems (EMS), and other innovative high-efficiency technology.

³⁰ See <https://ocde.us/ito/Pages/default.aspx>.

³¹ See <https://www.cde.ca.gov/pd/ca/sc/ngsstandards.asp>.

- Heat Pump Incentives Program: Encourages the installation of high-efficiency heat pumps (HP), which can save on electricity consumption.
- Lighting Incentives: Provides incentives to improve EE for various LED lighting applications, contributing to appropriate lighting levels and energy savings.
- New Construction: Customers receive design assistance and incentives for new construction and facility expansions that exceed Title 24 standards.
- Small Business Energy & Water DI Program: Provides small business customers with energy and water consumption analysis and implementation measures focusing on LED lighting upgrades, smart thermostats, air conditioning, and refrigeration tune-ups.
- Small and Medium Business assessments: Customized on-site assessments and recommendations designed to improve operating EE and help business customers reduce costs.
- Energy Star® Air Purifier Rebate: Provides prescribed rebates for using Energy Star® Air Purifiers.
- Energy Star® Uninterruptible Power Supply Rebate: A prescribed rebate for Energy Star® Uninterruptible Power Supplies in response to potential outages that will assist companies in preserving computer productivity.
- Dusk-to-Dawn Lighting: Commercial customers can receive free high-efficiency LED fixtures with photo sensors, which include wall packs and pole-mountable parking lot lights.
- Energy & Water Incentives for Multi-family Housing projects: Provides financial incentives for new construction and rehabilitation of multi-family dwellings to promote sustainability for interior and exterior measures to decrease tenant utility costs and lower GHG emissions.
- Tree Power: Provides complimentary shade trees and incentives for residential and commercial customers. Shade trees, when properly placed, can help reduce air conditioning costs.

Residential Programs

APU is committed to providing customers with the resources they need to achieve their energy reduction and water conservation goals. With over 60 measure incentives and direct-installation services available through the residential Home Incentives Program, Home Utility Check-Up Program, and income-qualified direct-installation Weatherization Program, coupled with emerging electrification programs and demand response initiatives, Anaheim Public Utilities continues to develop innovative resources to support energy and water use efficiency and promote sustainability for the community at large.

As pandemic induced financial hardship persists for many households, APU offers a number of resources to assist with bill payment. Some of these payment assistance options include bill deferrals, payment plans, income-qualified program discounts, emergency payment assistance

support, medical allowances, and service fee waivers. Further, we provide resources and needed documentation for third-party assistance options.

Below is an overview of APU's residential programs and resources:

- Weatherization Program: Inter-utility partnership with Southern California Gas Company that assists income-qualified renters and homeowners in making their homes more water and energy efficient. Program offers no-cost home repairs and replacement of inefficient appliances, consisting of ENERGY STAR® certified ceiling fans and room air conditioners, plug load occupancy sensors in smart power strips, LED lamps, duct sealing and testing, A/C tune-ups with refrigerant recharge, high-efficient toilets, and additional electric and gas saving measures.
- Home Utility Check-Up Program: No cost home assessment of electric (plug loads) and water use, customized assessment report with efficiency recommendations, outdoor water assessment component with irrigation scheduling and controller programming, direct-installation of LEDs, low-flow shower heads, aerators, toilet leak/dye tab test, and toilet flapper replacement as needed.
- Dusk-to-Dawn Lighting Program: Residential customers can receive up to two free high-efficiency LED fixtures with photo sensors. Program participants can pick-up lights from program contractor's office in Anaheim or receive during Home Utility Check-Up and Weatherization Program services.
- Dusk-to-Dawn Lighting Program Income-Qualified Assistance: In addition to receiving up to two free outdoor security lights, income-qualified residents may also have the light installed by one of Anaheim's approved and licensed electrical contractors free of charge.
- Home Incentives Program: Provides rebates for the purchase and installation of high efficiency ENERGY STAR® rated appliances and high-efficiency conservation measures.
- Air Conditioner (AC) Tune-Up Program: Provides up to a \$100 incentive to residential customers who have a licensed HVAC contractor perform an AC tune up, with an enhanced incentive of up to \$150 for income-qualified customers.
- Refrigerator & Freezer Recycling Program: Provides a \$50 incentive to customers who recycle an old, operational refrigerator or freezer. Appliance collection is available at no cost to the customer.
- Uninterruptible Power Supply Rebate Program: Provides a \$50 incentive for standard equipment and \$200 incentive for medical device uninterruptible power supply systems that meet ENERGY STAR® certification requirements.
- Electric Portable Power Station Rebate Program: Provides a \$50 incentive for standard equipment and \$200 incentive for medical device associated electric portable power stations. Incentive eligible for battery powered electric portable power station devices, with a minimum 100W AC output.

- Tree Power Program: Provides up to 6 complimentary shade trees, along with an option for a \$20 incentive per shade tree for residential customers.
- myPower Savings Program: As a demand response program, participating residential customers earn event participation rewards of \$1.00 for every kWh of energy reduced during event hours (up to \$100 in bill credits per fiscal year). Additionally, instant enrollment bill credits are provided for participants with central A/C units, pool pumps, wall A/C units, and/or EV chargers.
- LED Distribution Program (Welcome Kits): New residential electric utility customers are direct-mailed LED Welcome Kits, which include four LED bulbs and a welcome brochure with city information and resources.
- Utility Discount Program: Provides a 10% reduction on the electric and/or water portions of utility bills to seniors, military veterans, or long-term disabled customers at or below 80% of the Orange County median income.
- Community Solar Discount Program: Income-qualified customers are eligible to receive a \$20 monthly discount on the electric portion of their utility bill for a 12-month period.
- Emergency Assistance Program: Provides up to \$350 electric and/or water utility payment assistance for income-qualified customers experiencing financial hardship.

Complementary Programs

- Multi-Family and Affordable Housing New Construction/Retrofit Program: Incentives for developers installing high-efficiency energy and water measures in their developments for affordable housing projects in the community.
- Commercial & Residential Water Savings Resulting from Equipment Rebates: Businesses and residents are eligible for rebates by installing or retrofitting with qualifying water-saving devices through the "SoCal Water\$mart" Program in partnership with the Metropolitan Water District of Southern California. Water savings result from the application of measures such as:
 - Rotating Sprinkler Nozzles
 - Weather-Based Irrigation Controllers
 - Soil Moisture Sensor Systems
 - Turf Replacement
 - High-Efficiency Clothes Washers
 - Premium High-Efficiency Toilets
 - Rain Barrels & Cisterns
- LED Street Lighting Retrofit Initiative: Anaheim is currently in the process of converting its city streetlights from high pressure sodium (HPS) to LED lights. To date, a total of 18,602 out of 22,353 streetlights have been upgraded to LEDs. In FY 2022, a total of 1,950 streetlights were converted to LED, resulting in over 411,000 annual kWh savings and nearly 100 kW peak demand savings.

- School Education Programs: Public and Private school students in Anaheim engage 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 assessments.
- Water Conservation Student Poster Contest: Anaheim Public Utilities continues to hold an annual “Water is Life” Poster Contest, whereby 1st through 8th graders are invited to submit artwork associated with water conservation, giving students the opportunity to help raise water awareness through the art they create. At the culmination of the contest, winning artwork is printed on Anaheim Public Utilities branded water bottle labels and an artist recognition is held at a City Council meeting.
- Holiday Light Exchange Program: Provides free LED holiday light strands to residents who turn in old incandescent holiday light strands.
- Water Smart Landscaping Workshops: Partnership with OC Master Gardeners Speakers Bureau to provide free gardening and landscaping workshops on various topics at venues throughout Anaheim.
- EV Shopper Guide: Browse and compare new and used electric vehicle models available within Anaheim, cost of ownership, fuel savings, and applicable incentives. This web page resource was created in partnership with Zappy Ride.
- Public Access EV Charger Rebate Program: Anaheim Public Utilities offers EV charging station rebates to commercial, schools and municipal who install a Level 2 or higher plug-in EV chargers at locations accessible to patrons, multi-family residents, commuters, and visitors. Under this program, Anaheim Public Utilities will reimburse customers for out-of-pocket expenses up to \$5,000 per charging station for public access locations, or \$10,000 for school, affordable housing, or publicly accessible DC fast plug-in locations (maximum of 10 charging stations), and up to an additional \$1,500 for City plan check fees. In addition to the rebate, City permit application fees for the EV charger are paid for.
- EV Fleet Charger & Infrastructure Rebate Program: The program provides rebates to commercial customers and schools to electrify their vehicle fleet. Under this program, customers receive \$5,000 per charging station and up to an additional \$45,000 per site location for associated EV charger infrastructure upgrades. Schools receive \$10,000 per EV charger and up to \$95,000 per site for associated infrastructure upgrades. All program participants with an associated sub-meter installation may receive up to a \$5,000 rebate. In addition, Anaheim will pay the applicable City permit fees, reimburse City plan check fees up to \$1,500 and electric service connection fees up to \$2,000.
- EV Ride Share Pilot Program: Anaheim Public Utilities EV Ride Share Pilot Program provides rebates to offset the costs of electric vehicles for residents who live in multi-family affordable housing developments and residential multi-family properties in DACs who may not otherwise have the opportunity to access EVs. Providing access to EV ride sharing transportation is a clean and sustainable way for residents to get to doctor’s

appointments, grocery stores, and run errands at no cost. EV ride-sharing leases, metering, and fuel are qualified rebate expenses under the program, which will be offered for a 3-year term.

- **Personal Use EV Charger Rebate Program:** This program offers individual use Electric Vehicle Charging Station Rebates to residential and commercial customers who install a Level 2 or higher plug-in electric vehicle (EV) charger at their facility. In this program, Anaheim will reimburse up to \$1,500 for any Level 2 EV charger or up to \$3,000 for a networked charger (up to 2 per customer). In addition to the rebate, Anaheim will waive the City's permit fees for the installation of the EV chargers.

EM&V Studies

Under SCPPA and CMUA EE Services Resolution No. 2021-105, Anaheim contributed to the development of tools and services that calculate and report the cost-effectiveness of EE and demand response programs.

Major Differences or Diversions from California POU TRM for Energy Savings

None.

TABLE 1. APU EE Program Results by End Use

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
All	384	1,246,549	26,177,519	384	1,246,549	26,177,519	9,350	\$104,354	23.37	96.27	0.006
Appliance & Plug Loads	19	156,813	1,379,449	19	156,813	1,379,449	467	\$110,773	1.37	2.37	0.108
Building Envelope	45	35,832	732,734	45	35,832	732,734	280	\$55,483	2.82	3.83	0.116
HVAC - Cooling	107	213,963	3,249,342	107	213,963	3,249,342	1,221	\$710,850	0.97	1.23	0.325
HVAC - Heat Pump	19	41,191	494,292	19	41,191	494,292	146	\$2,524	20.00	96.27	0.007
Lighting - Indoor	447	3,115,340	43,621,075	447	3,115,340	43,621,075	14,744	\$573,995	7.38	9.66	0.018
Lighting - Outdoor	0	383,991	6,061,724	0	383,991	6,061,724	2,550	\$236,327	2.58	2.58	0.055
Miscellaneous	423	1,173,824	11,684,281	423	1,173,824	11,684,281	3,627	\$675,099	1.58	1.63	0.078
Service & Domestic Hot Water	0	2,400	38,400	0	2,400	38,400	13	\$1,708	2.04	3.83	0.063
Water Pumping / Irrigation	0	158,734	1,587,340	0	158,734	1,587,340	493	\$1,513	96.27	96.27	0.001
EE Subtotal	1,445	6,528,637	95,026,154	1,445	6,528,637	95,026,154	32,890	\$2,472,626	3.86	4.73	0.037
Appliance & Plug Loads	1	6,201	74,412	1	6,201	74,412	25	\$8,332	1.00	1.00	0.151
HVAC - Cooling	82	91,485	936,284	82	91,485	936,284	351	\$213,359	1.00	1.00	0.304
Miscellaneous	9	45,808	694,025	9	45,808	694,025	241	\$67,562	1.00	1.00	0.138
Low-Income Subtotal	92	143,494	1,704,721	92	143,494	1,704,721	617	\$289,253	1.00	1.00	0.232
EE and Low Income Subtotal	1,537	6,672,131	96,730,875	1,537	6,672,131	96,730,875	33,507	\$2,761,879	3.56	4.26	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,537	6,672,131	96,730,875	1,537	6,672,131	96,730,875	33,507	\$2,761,879	3.56	4.26	0.041

TABLE 2. APU EE Program Results by Sector

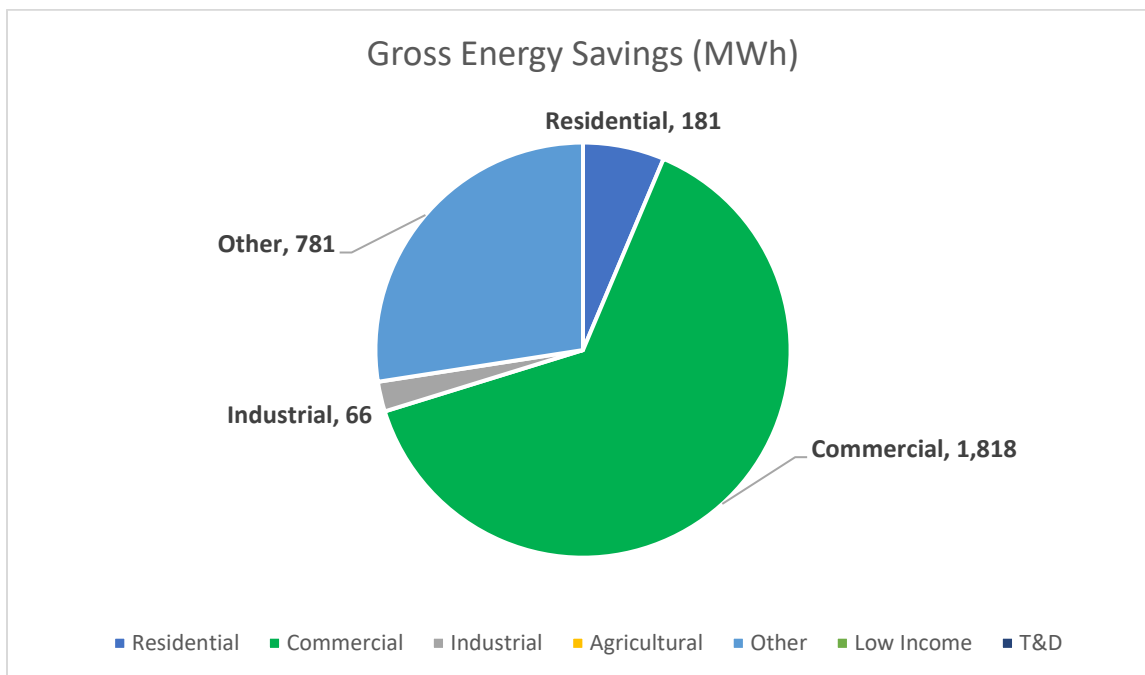
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Commercial	792	3,512,945	50,075,976	792	3,512,945	50,075,976	15,832	\$1,063,667	4.31	5.41	0.030
Industrial	99	411,938	8,650,688	99	411,938	8,650,688	3,893	\$9,018	96.27	96.27	0.002
Other	0	158,734	1,587,340	0	158,734	1,587,340	493	\$1,513	96.27	96.27	0.001
Residential	554	2,445,020	34,712,151	554	2,445,020	34,712,151	12,672	\$1,398,428	2.82	3.40	0.058
EE Subtotal	1,445	6,528,637	95,026,154	1,445	6,528,637	95,026,154	32,890	\$2,472,626	3.86	4.73	0.037
Residential	92	143,494	1,704,721	92	143,494	1,704,721	617	\$289,253	1.00	1.00	0.232
Low-Income Subtotal	92	143,494	1,704,721	92	143,494	1,704,721	617	\$289,253	1.00	1.00	0.232
EE and Low Income Subtotal	1,537	6,672,131	96,730,875	1,537	6,672,131	96,730,875	33,507	\$2,761,879	3.56	4.26	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,537	6,672,131	96,730,875	1,537	6,672,131	96,730,875	33,507	\$2,761,879	3.56	4.26	0.041

TABLE 3. APU EE 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	403	1,590,059	30,068,630	403	1,590,059	30,068,630	10,769	\$293,578	9.59	13.24	0.015
Other Commercial	488	2,575,955	31,563,726	488	2,575,955	31,563,726	10,036	\$831,928	3.50	4.19	0.036
Residential	554	2,249,527	31,580,526	554	2,249,527	31,580,526	11,426	\$1,275,455	2.85	3.49	0.058
Residential - Single-Family	0	113,097	1,813,273	0	113,097	1,813,273	658	\$71,665	2.58	2.60	0.056
EE Subtotal	1,445	6,528,637	95,026,154	1,445	6,528,637	95,026,154	32,890	\$2,472,626	3.86	4.73	0.037
Residential	92	143,494	1,704,721	92	143,494	1,704,721	617	\$289,253	1.00	1.00	0.232
Low-Income Subtotal	92	143,494	1,704,721	92	143,494	1,704,721	617	\$289,253	1.00	1.00	0.232
EE and Low Income Subtotal	1,537	6,672,131	96,730,875	1,537	6,672,131	96,730,875	33,507	\$2,761,879	3.56	4.26	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,537	6,672,131	96,730,875	1,537	6,672,131	96,730,875	33,507	\$2,761,879	3.56	4.26	0.041

Azusa at a Glance

- Climate Zone: 9
- Customers: 17,098
- Total annual retail sales: 237,344 MWh
- Annual Retail Revenue: \$38,467,556
- Annual EE expenditures for reporting year: \$661,054
- Gross annual savings from reporting year portfolio: 2,846 MWh



Azusa Overview

Since inception of its EE programs, Azusa Light & Water has expended over \$16 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

The onset of the COVID pandemic began reducing the amount of participation in the residential rebate programs and business related EE measure implementation. In addition, the number of

Azusa Pacific University students residing in Azusa was dramatically reduced, resulting in hundreds fewer residential customers.

Program and Portfolio Highlights

The DI 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.

Due to the COVID pandemic, the joint Library Awareness and LED Lamp Distribution Program was scaled back until the pandemic subsides.

The In-Class Education Program was converted from in-class to on-line in order to accommodate the pandemic related on-line learning curriculum.

Commercial, Industrial & Agricultural Programs

- Business Partnership Program: Retrofit existing buildings and factories with high efficiency lighting, air conditioning and process equipment.
- Free Energy Audits: Provide suggestions on the most energy efficient equipment and more cost-effective methods of operations.
- New Business Retrofit Program: Encourage the use of the most energy efficient equipment in the design and construction of new buildings and factories.
- Small Business Audit/Retrofit Program: Provide free utility audit, free LED retrofit, free packaged AC 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.
- The Proctor Engineering HVAC Tune-Up and Retrofit Program: Provides free HVAC tune-ups and HVAC equipment replacement recommendations.

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

- The Public Facilities Program: Essentially the same as the current C&I programs; therefore, they are included in the same category for funding and savings.
- City Schools "Tinker" Program: Provides an interactive 5th grade conservation education program to all 5th 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 (RD&D): Azusa Light & Water has, jointly with SCPPA, is an active member of the APPA DEED Program.

EM&V Studies

Azusa Light & Water contracted with Lincus Energy to complete a study of the various EE programs and associated savings. The Lincus study is available on the CMUA website and the Azusa light & Water website.³² Azusa Light & Water will continue to make EM&V reports available to the Energy Commission 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 work papers and custom savings analysis along with vendor calculations when applicable.

³² See https://www.ci.azusa.ca.us/DocumentCenter/View/26058/Azusa-EMV-Study-v1_2?bidId=.

TABLE 1. Azuza Light & Water EE Program Results by End Use

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	88	372,444	4,861,686	88	372,444	4,861,686	1,511	\$41,073	10.86	22.60	0.012
Building Envelope	919	1,884,471	30,006,826	919	1,884,471	30,006,826	9,120	\$493,695	5.78	22.60	0.023
Miscellaneous	271	589,329	6,079,090	271	589,329	6,079,090	1,909	\$126,286	4.41	22.60	0.028
EE Subtotal	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
EE and Low Income Subtotal	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023

TABLE 2. Azuza Light & Water EE 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)
Commercial	901	1,818,106	28,944,986	901	1,818,106	28,944,986	8,778	\$459,373	6.00	22.60	0.023
Industrial	18	66,365	1,061,840	18	66,365	1,061,840	342	\$34,322	2.85	22.60	0.046
Other	292	781,101	9,435,427	292	781,101	9,435,427	2,916	\$102,188	8.43	22.60	0.015
Residential	67	180,672	1,505,349	67	180,672	1,505,349	504	\$65,171	2.18	22.60	0.061
EE Subtotal	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
EE and Low Income Subtotal	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023

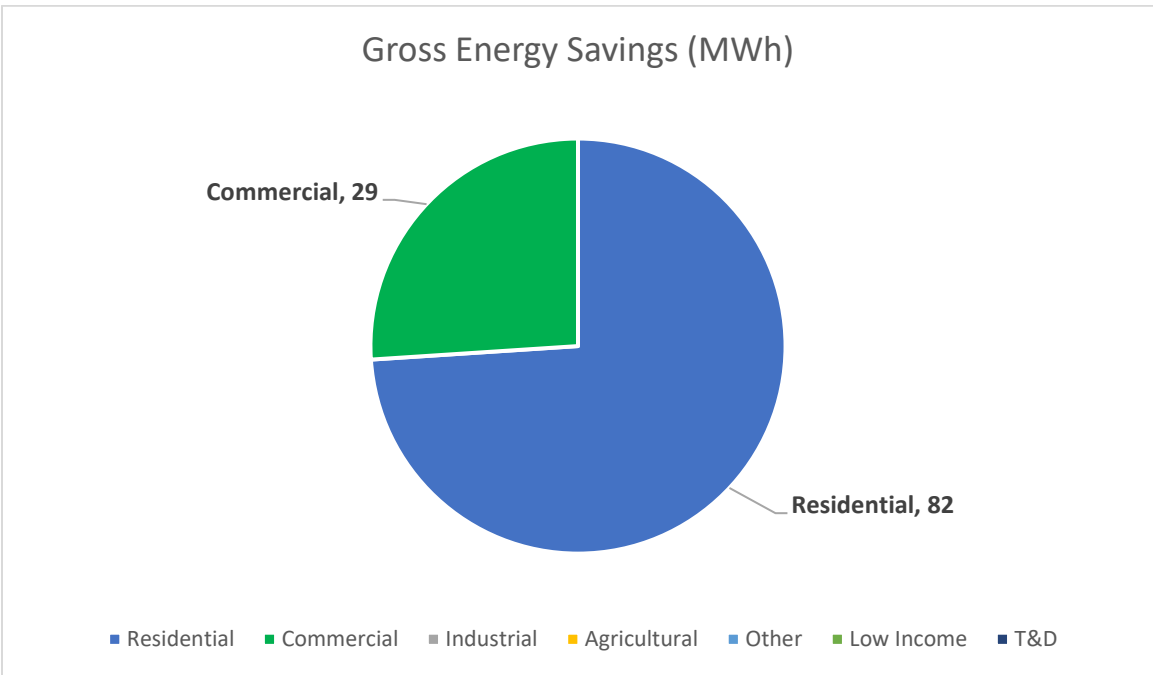
TABLE 3. Azuza Light & Water EE Program Results by Building Type

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	1,155	2,506,681	37,044,707	1,155	2,506,681	37,044,707	11,263	\$486,612	7.16	22.60	0.018
Other Commercial	38	92,526	1,335,706	38	92,526	1,335,706	431	\$74,949	1.79	22.60	0.074
Other Industrial	18	66,365	1,061,840	18	66,365	1,061,840	342	\$34,322	2.85	22.60	0.046
Residential	67	180,672	1,505,349	67	180,672	1,505,349	504	\$65,171	2.18	22.60	0.061
EE Subtotal	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
EE and Low Income Subtotal	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,278	2,846,244	40,947,602	1,278	2,846,244	40,947,602	12,540	\$661,054	5.84	22.60	0.023

CITY OF BANNING ELECTRIC UTILITY

City of Banning Electric Utility at a Glance

- Climate Zone: 15
- Customers: 13,155
- Total annual retail sales: 148,242 MWh
- Annual Retail Revenue: \$27,090,650
- Annual EE expenditures for reporting year: \$140,532
- Gross annual savings from reporting year portfolio: 110 MWh



City of Banning Electric Utility Overview

During FY 2022, Banning spent \$136,542 on EE programs, which have resulted in 514,966 kWh of energy savings. The City of Banning is deemed an economically disadvantaged area. As such, 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 used to provide low-income assistance through a monthly utility bill credit.

The new master-planned community Atwell broke ground during 2020. To-date, approximately 724 homes have been built. Each new home has 2.8 kW of roof-top solar, totaling 2.1 MW of new roof-top solar and adheres to 2019 Title 24 Construction Standards. This buzz around this

new community on Banning's west side of town earned City of Banning the title of "Fastest Growing City in California" by the Sacramento Bee.

Major Program and Portfolio Changes

One of Banning's main goals for FY 21/22 was to increase participation in the residential air conditioner rebate with the focus on 18.0 SEER or greater. Increased incentives made higher SEER units more affordable and attractive to customers. A goal for commercial customers was to increase participation in 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 (BEEF) program. Unfortunately, with the Covid pandemic participation in the BEEF program was almost non-existent, and overall residential and commercial program participation drastically decreased. Banning adopted 2019 Title 24 Construction Standards.

During the pandemic, Banning Electric Utility felt the call to step up community outreach and education. We wanted to let our customers know we are here behind the scenes working for them to provide safe, reliable power. A collaboration began with our Chamber of Commerce to be a presence at local, outdoor Market Nights two Fridays a month. While this collaboration did not always focus on EE, opportunities for outreach and education occurred, such as special events to promote Public Power Week and Lineman Appreciation Day. This focus on community involvement has led to the creation of our new Community, Outreach, Relations and Education (CORE) Team. Our CORE Team actively partners with other City of Banning departments and local organizations to focus on our community engagement and social equity.

One successful program created through a partnership with our Parks and Recreation Department is the new "Keep Your Kool...At the Pool" program. During the summer of 2022, City of Banning Electric Utility sponsored Friday-night swim sessions and "Dive-In Movies" at the Repplier Aquatic Center. The goal of this program was to shave peak load by enticing residents leave their homes to come cool off in the community pool rather than stay home and use their air conditioners. Most of these events were at capacity and over a period of 10 Friday evenings, kWh savings equaled that of three residential customers' usage for an entire month. We are currently in the planning stages for summer of 2023 and look forward to increased peak load reduction.

Banning Electric Utility was proud to partner with the Arbor Day Foundation for our 2nd annual Energy-Saving Tree Event in Spring of 2022. Customers accessed the Arbor Day Foundation website and reserved up to two trees per household in a Banning Electric portal. A day was scheduled for customers to pick up their reserved trees with planting and care instructions given to ensure successful growth of the trees. Some environmental impacts from our 2022 tree event are: 337,895 pounds carbon sequestered, 605 pounds air pollution removed, 494,237 gallons storm water filtered and \$58,145 cumulative community benefits over a 20-

year span. We hope this will continue to be an annual event for years to come, and we already have a waitlist for the 2023 Energy-Saving Tree event.

Banning Electric Utility was also instrumental in the development of a second location for a pallet-home community for the homeless. Entitled “Ramsey Village,” this small community for the homeless consisted of portable, energy-efficient, two-person bungalows with heat, air conditioning, and wall-mounted, fold-up beds.

Program and Portfolio Highlights

- Renewable Portfolio Standard: In 2021, the City of Banning’s energy portfolio was 54% renewable. Steps have been taken to increase our renewable portfolio, which will increase this percentage in the coming years.
- Solar Energy: Banning has met its California SB 1 (Murray, 2006), requirements by providing \$2.4 million in rebates for the installation of solar PV systems in its service territory. The rebates, coupled with Title 24 Construction Standards, have helped install approximately 4.0 MW of customer-owned solar PV capacity in the city. Banning previously met the NEM Cap of 2.3 MW in 2018.

Commercial, Industrial & Agricultural Programs

- BEEF: Complementary Energy Audit coupled with monetary incentives for commercial customers to install EE 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, or refrigeration. Customized rebate programs have also been adopted when business-specific energy-efficiency measures are implemented, and kWh and peak demand reduction is demonstrated.
- New Construction: Monetary incentives for new construction projects that exceed the EE above California’s Title 24 standards.

Residential Programs

- AC: Monetary incentives to replace an existing central air conditioning unit with a new high-efficiency unit.
- AC Tune Ups: Monetary incentives for getting air conditioning units tuned up.
- EnergyStar® Appliances: Monetary incentives for purchasing products that meet the Energy Star®” criteria.
- EnergyStar® Refrigerator: A monetary incentive for replacing an old inefficient refrigerator with a new energy efficient unit.
- Recycle: Rebates offered to remove and recycle operating old and inefficient refrigerators and freezers.
- Energy Weatherization: Monetary incentives to replace inefficient materials with products that will improve the EE 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.
- Smart Thermostat: Rebates offered for installation of a programmable, WIFI-enabled thermostat.

Complementary Programs

- Low Income Assistance: An electric utility discount for qualified customers. As mentioned above, the majority of Public Benefits funds are spent providing low-income assistance. Currently, we have 1,200 customers on our Low-Income Assistance program with a budget of \$400,000 during this fiscal year.
- Medical Discount Program: An electric utility discount for qualified customers. This program has approximately 800 customers with a budget of \$140,000 during this fiscal year.
- Meter-Data Evaluation: With the height of the pandemic still being a great concern during FY 2022, we temporarily suspended in-home Energy Audits in exchange for meter data review. We may not be able to physically point out items within a customer’s home yet can discuss behavior and pinpoint exact periods of high consumption. With the majority of Energy Audit requests coming from our senior community, we believe this is the best course of action to keep our customers and staff safe and healthy.
- Software Updates: Addition of customer portals through SATEC and Milsoft products.

^{33,34}

EM&V 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.

Major Differences or Diversions from California POU TRM for Energy Savings

None.

³³ See <https://www.satec-global.com/>.

³⁴ See <https://www.milsoft.com/>.

TABLE 1. Banning EE Program Results by End Use

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)
Appliance & Plug Loads	2	9,985	100,066	2	9,485	95,063	35	\$46,516	0.24	2.14	0.667
Building Envelope	5	8,949	187,924	4	7,069	148,439	56	\$2,656	11.19	10.54	0.028
HVAC - Cooling	16	32,663	390,680	14	27,957	345,488	128	\$85,959	0.82	1.32	0.352
Lighting - Indoor	8	55,898	779,496	2	14,677	234,835	85	\$5,402	4.32	0.73	0.033
Lighting - Outdoor	0	2,800	30,800	0	1,512	16,632	6	\$0		0.32	0.000
EE Subtotal	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
EE and Low Income Subtotal	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239

TABLE 2. Banning EE Program Results by Sector

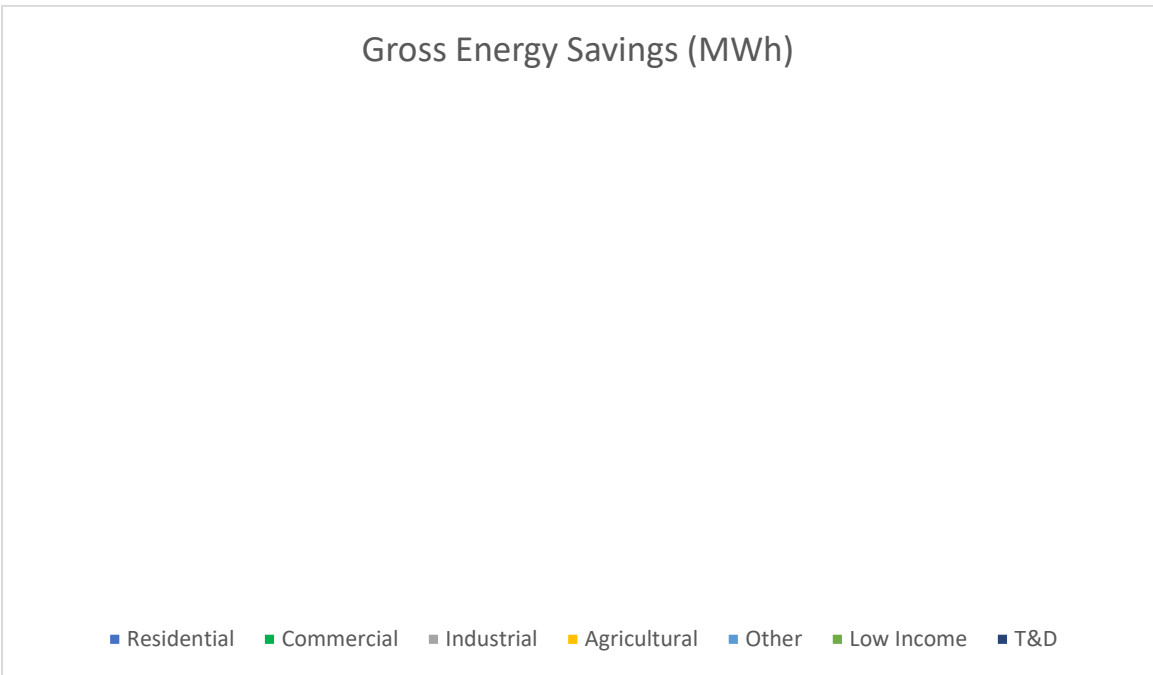
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Commercial	5	28,718	344,616	0	0	0	0	\$4,420			0.000
Residential	26	81,576	1,144,350	21	60,700	840,457	309	\$136,112	1.00	1.45	0.232
EE Subtotal	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
EE and Low Income Subtotal	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239

TABLE 2. Banning EE 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	10	42,722	429,810	5	11,978	72,977	26	\$8,586	1.41	1.59	0.154
Residential	20	64,222	1,008,896	16	45,540	719,733	267	\$89,896	1.32	1.36	0.181
Residential - Single-Family	1	3,351	50,260	1	3,183	47,747	16	\$42,050	0.13	1.72	1.237
EE Subtotal	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
EE and Low Income Subtotal	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	31	110,294	1,488,966	21	60,700	840,457	309	\$140,532	0.97	1.39	0.239

City of Biggs at a Glance

- Climate Zone: 11
- Customers: 689
- Total annual retail sales: 8,172 MWh
- Annual Retail Revenue: \$1,208,737
- Annual EE expenditures for reporting year: \$12,782
- Gross annual savings from reporting year portfolio: 0 MWh



City of 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 has had a recent low income housing development built within the community. This housing development has energy efficient windows, etc. as well as on-site solar generation installed.

Major Program and Portfolio Changes

There have been no major changes in programs offered.

Program and Portfolio Highlights

Commercial, Industrial & 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 & Optimization Program provides generous incentives for businesses and educational facilities to update aging HVAC units or tune-up units that don't need replacement.

Residential Programs

Limited complimentary EE 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 & weatherization measures.

Complementary Programs

Low-Income Programs: Biggs works with Community Action Agency of Butte County to provide Home Energy Assistance Program (HEAP) grants to income-qualified household within our service territory.³⁵ 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 Assembly Bill (AB) 2021 (Levine, 2006), Biggs hired a third-party contractor to formulate an EM&V plan. In 2008, 2009 & 2010, Biggs contracted with Navigant Consulting to perform EE Program Evaluation studies of all programs the city offers. Those studies can be found on the NCPA website and our city website.³⁶ With the understanding that all programs need not be evaluated every year, Biggs moved to evaluation of all programs, in three year blocks.

Major Differences or Diversions from California POU TRM for Energy Savings

None.

³⁵ See <https://www.buttecaa.com/>.

³⁶ See <https://www.ncpa.com/about/ncpa-members/city-of-biggs/>.

TABLE 1. Biggs EE Program Results by End Use

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)
HVAC - Cooling	0	0	0	0	0	0	0	\$12,782			0.000
EE Subtotal	0	0	0	0	0	0	0	\$12,782			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$12,782			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$12,782			0.000

TABLE 2. Biggs EE 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)
Commercial	0	0	0	0	0	0	0	\$12,782			0.000
EE Subtotal	0	0	0	0	0	0	0	\$12,782			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$12,782			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$12,782			0.000

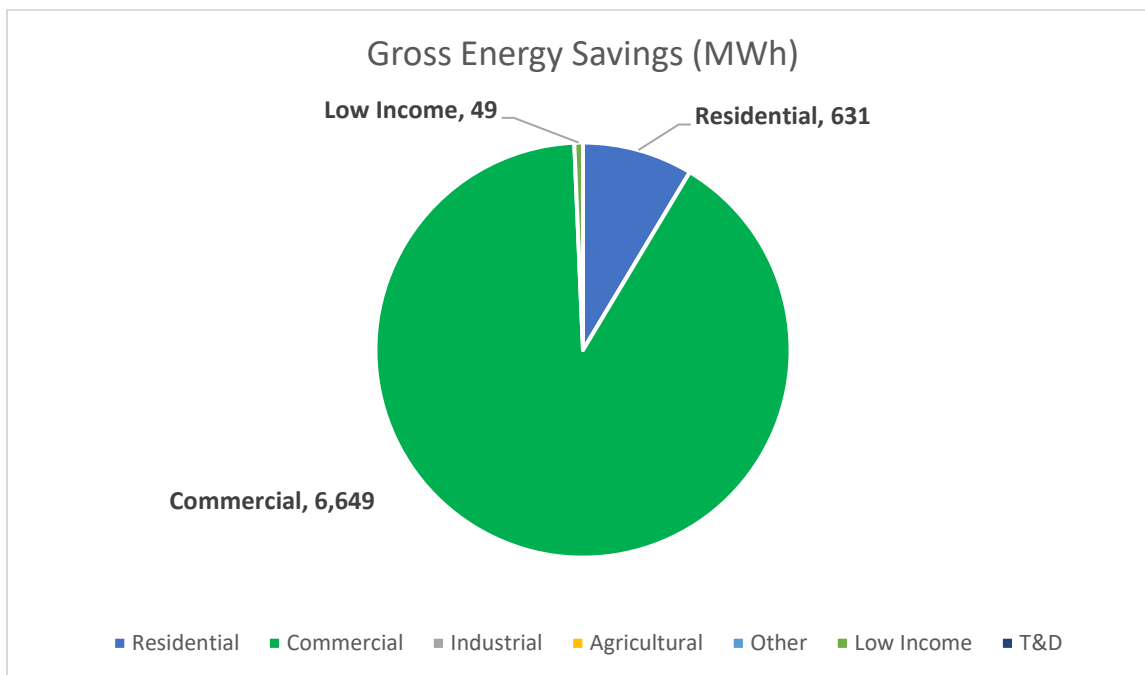
TABLE 3. Biggs EE Program Results by Building Type

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)
Grocery	0	0	0	0	0	0	0	\$12,782			0.000
EE Subtotal	0	0	0	0	0	0	0	\$12,782			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$12,782			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$12,782			0.000

BURBANK WATER & POWER

Burbank Water & Power at a Glance

- Climate Zone: 9
- Customers: 53,252
- Total annual retail sales: 978,966 MWh
- Annual Retail Revenue: \$154,304,000
- Annual EE expenditures for reporting year: \$2,014,683
- Gross annual savings from reporting year portfolio: 7,329 MWh



Burbank Water & Power Overview

Burbank Water & Power (BWP) provides essential utility services to its residential and business customers.

There are 6,962 business customers in Burbank. Burbank is known as the "Media Capital of the World" and is home to The Walt Disney Company, Warner Bros Studios, The Burbank Studios, Nickelodeon, Cartoon Network, ABC Studios, Netflix, and KCET. There are also numerous small media businesses in the city. Burbank is also home to unique shopping and dining neighborhoods like Downtown Burbank and Magnolia Park. You can also visit the powerhouse Empire Center, the Burbank Town Center, and one of the largest IKEAs in North America.

Burbank also has a vibrant residential community, with 46,290 single-family and multi-family homes.

BWP also offers a fiber optic networking service to its business customers. BWP's EE portfolio reflects its organizational mission to provide sustainable, affordable, and reliable service to all city residents and businesses.

The Burbank City Council adopted the utility's IRP in December 2018, which directs BWP to reduce GHG emissions by beneficial electrification and renewable energy integration.

BWP plays a key role in facilitating the adoption of TE through education and programs development that help customers overcome barriers to TE adoption. In FY 2022, BWP continued implementing a Used EV Rebate Program, Residential EV Charger Rebate Program, and Commercial EV Charger Rebate Program. BWP is also committed to making public charging easy. Burbank has 73 EV charging ports at 17 sites.

BWP also implements the Green Choice Program, which allows residential customers to offset 100 percent of their non-renewable electricity by paying an additional 1.8 cents per kWh in addition to the standard residential electric rate.

Major Program and Portfolio Changes

Due to the COVID-19 pandemic and state and local stay-home orders, BWP temporarily suspended residential and commercial EE programs that provided onsite visits in March 2020. Even though changes in state and local COVID-19 orders allowed services to be performed again for efficiency programs requiring home or onsite visits in June of 2021, energy savings resulting from residential and commercial programs continued to remain lower than expected in fiscal year FY 2022.

Due to the economic impact of the COVID-19 pandemic, BWP customers have accrued significant utility outstanding balances. In FY 2022, BWP continued to be focused on assisting customers and reducing economic impacts by implementing the COVID-19 Job Loss Bill Credit Program and the Low-Income Residential Assistance Program in response to the pandemic.

Program and Portfolio Highlights

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

In September 2021, BWP re-launched BWP's Home Improvement Program (HIP) with its new and refreshed program offerings.

The Home Improvement Program (HIP) is one of the most popular residential programs. It offers energy-water surveys, energy-water measures installation, and home weatherization services to all Burbank single-family and multi-family customers. The HIP services are provided at no cost to BWP customers, and all of the energy-water efficiency measures are installed in descending order of their cost-effectiveness.

Furthermore, in FY 2022, BWP launched the Behavioral Demand Response Program (BDR) to engage residential customers during the summer 2021 season via the existing OPower Home Energy Management platform to achieve measurable peak demand savings. As a result, three peak events were scheduled during the summer of 2021, resulting in 0.956 MW of cumulative peak demand savings.

Commercial, Industrial & Agricultural Programs

Expenditures for commercial, industrial, and institutional programs were \$497,916, delivering 1.47 MW of peak-load reduction and 6,649 MWh in annual energy savings.

Business Rebates: Burbank businesses that retire their inefficient equipment and install new energy-efficient products are awarded rebates.

Business Bucks Program: The program offers an EE survey and retrofits to small and mid-sized businesses.

LED Street Lighting Project: The program is designed to retrofit the City of Burbank's inefficient HPS streetlight systems with energy-efficient LEDs.

Residential Programs

Expenditures for residential programs were \$792,134, with the delivery of 0.22 MW of peak-load reduction and 677 MWh in annual energy savings.

- **AC Replace Before It Breaks Program:** The program provides HVAC replacement incentives to residential customers to help them save energy by ensuring that their air conditioning system is operating at the optimal level.
- **Home Rewards Rebates Program:** BWP provides rebates for purchasing and installing ENERGY STAR® rated appliances and high-efficiency measures.
- **Livingwise® Program:** The program provides energy and water education services, materials, and conservation kits to sixth-grade students attending public school in Burbank.
- **OPower Web Portal:** The portal offers residential customers web access to view their electric usage information in hourly, daily, weekly, and monthly intervals and helps them better understand their energy use and reduce their electricity consumption.
- **HIP:** The program offers energy-water surveys, energy-water measures installation, and home weatherization services to all Burbank single-family and multi-family customers.

- Shade Tree 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.

Complementary Programs

- Lifeline Program: Offers a reduced electric rate and an exemption from the monthly Customer Service Charge for income-qualified customers.
- Life Support Program: Offers qualified customers an exemption from the utility user tax.
- Project Share Program: Offers income-qualified customers a one-time yearly stipend towards their electric utility bill.
- Refrigerator Exchange Program: BWP offers income-qualified and Lifeline-approved customers a program to replace an old inefficient refrigerator with a new ENERGY STAR® certified refrigerator at no cost.
- Charging Station Rebates: Residential and commercial customers who install a Level 2 EV charger or DC Fast Charger are eligible for a rebate from BWP. Residential customers can get a reimbursement for up to \$1,500 per charging station for their home, and commercial customers can get a rebate for up to \$15,000 per charging station for their business.
- Used EV Rebates: The program offers residential customers a \$1,000 rebate towards a used EV purchase to support the adoption of EVs. The program is designed for customers who prefer pre-owned EVs or have income constraints to acquire a new EV.

EM&V Studies

BWP is committed to providing cost-effective, ongoing EM&V efforts for its EE 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 verifier to perform quality inspections for 100% of AC Replace Before It Breaks participants.

Major Differences or Diversions from CA POU TRM for Energy Savings

Most energy savings values used to evaluate BWP's program performance were obtained from the TRM developed for California's POU's 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.

TABLE 1. BWP EE Program Results by End Use

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	1,107	5,137,585	77,063,775	1,107	5,137,585	77,063,775	25,125	\$772,748	14.54	2.74	0.013
Appliance & Plug Loads	2	61,731	761,514	2	61,731	761,514	254	\$33,456	2.28	1.98	0.060
Building Envelope	44	37,690	771,860	44	37,690	771,860	1,157	\$22,099	16.55	8.00	0.044
HVAC - Cooling	65	121,461	2,105,899	64	120,187	2,085,515	822	\$213,711	2.07	2.14	0.151
Lighting - Outdoor	355	1,481,000	31,101,000	355	1,481,000	31,101,000	13,769	\$348,147	14.79	7.73	0.017
Miscellaneous	105	440,201	2,545,280	105	440,201	2,545,280	867	\$517,786	0.51	1.99	0.258
EE Subtotal	1,678	7,279,669	114,349,328	1,677	7,278,395	114,328,944	41,995	\$1,907,947	9.19	3.38	0.023
Appliance & Plug Loads	10	49,280	246,400	10	49,280	246,400	98	\$65,598	0.48	0.49	0.290
Low-Income Subtotal	10	49,280	246,400	10	49,280	246,400	98	\$65,598	0.48	0.49	0.290
EE and Low Income Subtotal	1,688	7,328,949	114,595,728	1,687	7,327,675	114,575,344	42,093	\$1,973,545	8.90	3.35	0.024
C&S	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
C&S Subtotal	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
C&S, T&D and Electrification Subtotal	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
Utility Total	2,081	9,016,976	124,723,890	2,080	9,015,702	124,703,506	45,251	\$2,014,683	9.24	3.52	0.022

TABLE 2. BWP EE 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)
Commercial	1,470	6,649,114	108,439,536	1,470	6,649,114	108,439,536	38,988	\$1,135,937	14.46	3.44	0.015
Residential	209	630,555	5,909,792	208	629,281	5,889,408	3,007	\$772,010	1.43	2.72	0.182
EE Subtotal	1,678	7,279,669	114,349,328	1,677	7,278,395	114,328,944	41,995	\$1,907,947	9.19	3.38	0.023
Residential	10	49,280	246,400	10	49,280	246,400	98	\$65,598	0.48	0.49	0.290
Low-Income Subtotal	10	49,280	246,400	10	49,280	246,400	98	\$65,598	0.48	0.49	0.290
EE and Low Income Subtotal	1,688	7,328,949	114,595,728	1,687	7,327,675	114,575,344	42,093	\$1,973,545	8.90	3.35	0.024
Other	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
C&S Subtotal	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
C&S, T&D and Electrification Subtotal	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
Utility Total	2,081	9,016,976	124,723,890	2,080	9,015,702	124,703,506	45,251	\$2,014,683	9.24	3.52	0.022

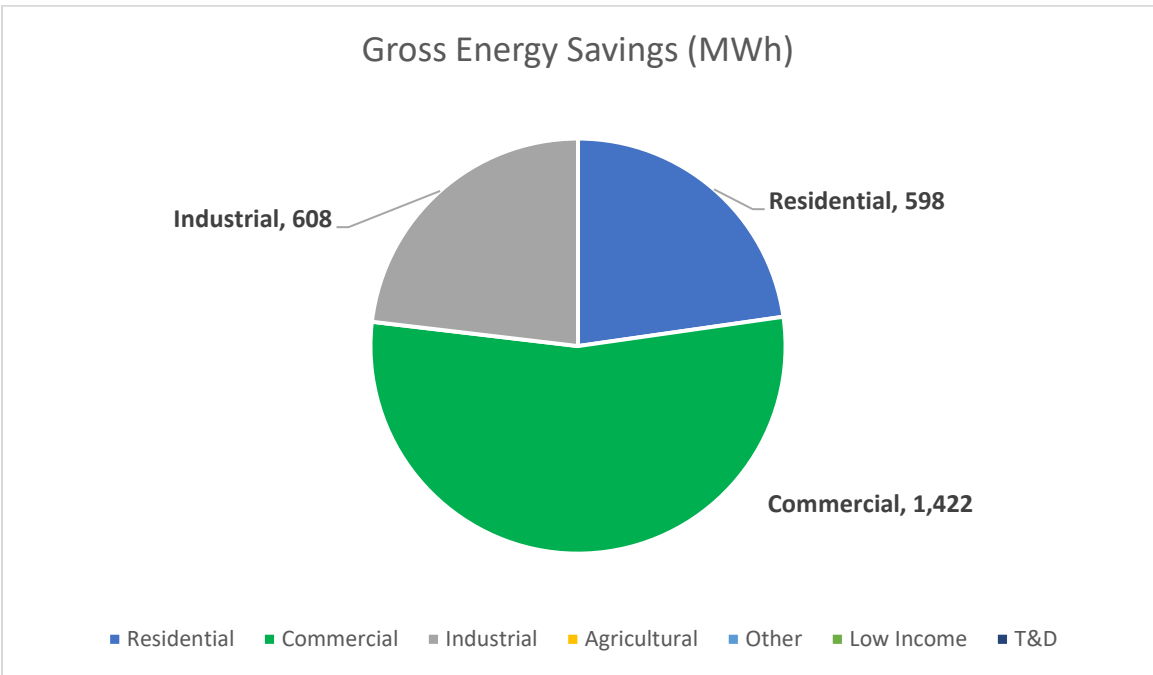
TABLE 3. BWP EE Program Results by Building Type

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	1,470	6,649,114	108,439,536	1,470	6,649,114	108,439,536	38,988	\$1,135,937	14.46	3.44	0.015
Residential	204	563,310	5,063,009	203	562,036	5,042,625	2,614	\$735,505	1.36	2.81	0.202
Residential - Single-Family	5	67,245	846,783	5	67,245	846,783	393	\$36,505	2.80	2.08	0.059
EE Subtotal	1,678	7,279,669	114,349,328	1,677	7,278,395	114,328,944	41,995	\$1,907,947	9.19	3.38	0.023
Residential	10	49,280	246,400	10	49,280	246,400	98	\$65,598	0.48	0.49	0.290
Low-Income Subtotal	10	49,280	246,400	10	49,280	246,400	98	\$65,598	0.48	0.49	0.290
EE and Low Income Subtotal	1,688	7,328,949	114,595,728	1,687	7,327,675	114,575,344	42,093	\$1,973,545	8.90	3.35	0.024
All	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
C&S Subtotal	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
C&S, T&D and Electrification Subtotal	393	1,688,027	10,128,162	393	1,688,027	10,128,162	3,158	\$41,138	25.74	25.74	0.005
Utility Total	2,081	9,016,976	124,723,890	2,080	9,015,702	124,703,506	45,251	\$2,014,683	9.24	3.52	0.022

COLTON ELECTRIC UTILITY

Colton Electric Utility at a Glance

- Climate Zone: 10
- Customers: 20,329
- Total annual retail sales: 353,743 MWh
- Annual Retail Revenue: \$58,223,471
- Annual EE expenditures for reporting year: \$534,475
- Gross annual savings from reporting year portfolio: 2,628 MWh



Colton Electric Utility Overview

Colton Electric Utility (CEU) continues to be committed to provide cost-effective EE and conservation programs for residents and businesses in the Colton Electric Service territory. CEU continues to investigate new strategies to engage residents and businesses to participate in EE by expanding its participation base to a new generation of online users and users that have continued to work from home. CEU continues to focus on EE rebates, direct installation programs, inter-utility partnerships with Southern California Gas Company (SoCalGas), programs to better serve the low income, and education and outreach.

Major Program and Portfolio Changes

CEU continues to prepare more online services for a changing customer class of computer literate customers. The division continued to focus on online platforms to better serve customers with EE. With the launch of CEU's online audit platform, CEU continues its focus on marketing rebates for EE that continues to be available via electronic formats.

CEU continues to seek innovative ways to increase kWh savings and included water savings from well upgrades and water conservation efforts. CEU used 2013 as the baseline for these savings and included the 2022 savings in the report.

Program and Portfolio Highlights

CEU sunset the COVID-19 Assistance Program when State funds for assistance was distributed through the utilities service territory in San Bernardino County. The program was administered through the Community Action Partnership which assists customers who have been impacted by COVID-19 to have all utility bills including mortgage payments paid for. All Colton residents suffering from the impacts are now referred to this program.

CEU continues to offer low-income assistance programs that helps customers continuously throughout the year.

Commercial, Industrial & Agricultural Programs

- EE Rebates Non-Residential: Commercial and industrial customers participating in lighting and equipment upgrades and custom measures were rebated \$0.10 per kWh saved on the projected first year's savings.
- Municipal DI: This program provided direct installation of EE measures throughout City owned facilities.
- Commercial DI: Small business customers with less than 20 kW participated in an energy audit and DI of EE measures up to \$5,000 per business.
- The C&I Energy Rebate Program provides rebates to C&I customers that install new EE 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: C&I buildings can benefit from substantial rebates given for improving lighting and equipment by increasing EE and lowering consumption. CED offer \$.10 per kWh saved on the projected first year of savings.
- Online Energy Review for TOU accounts: SATEC is an online energy review CEU used to provide its TOU customers with their interval data. Since this platform did not provide customer-interfacing access, Colton will retire this program and will investigate other options.
- 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 DI opportunities depending on audit recommendations. CEU is

offering \$1,000 of DI 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.

- Multifamily EE DI Program: apartment complexes throughout CEU territory can apply to have common area EE upgrades in lighting, thermostats, and AC tune-ups.

Residential Programs

- EE Upgrade Rebates: CEU offers varying rebates on a number of home EE improvements. Currently CEU 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.
- AC Upgrade and Replacement Program: This program offers up to \$150 per ton rebate to replace a Seasonal EE Ratio (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: CEU'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 WebShop.
- Refrigerator Replacement Program (Appliance Recycling Centers of America (ARCA): CEU provides a new ENERGY STAR® refrigerator to replace an existing inefficient refrigerator for 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 CEU can recycle.
- Residential Energy Audit: CEU 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 DI 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 DI measured recommendations.
- Residential WebShop: CEU residents can now purchase LED light bulbs, smart power strips, holiday lights and smart thermostats from the comfort of their own home. CEU provides up to \$50.00 per FY to buy down the cost of these items and provides free

shipping. The customer can order directly from CEU's website and the items are shipped directly to the customer's home.

- Residential Weatherization Rebates: CEU 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 barriers 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: CEU 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 five trees in a lifetime.
- Arbor Day Foundation Tree Program: CEU residents are offered shade trees to plant on their property that would reduce their energy bill by providing shade to their home. Residents go online to use an interactive geographical information system map that illustrates where the highest energy savings is for their home depending on where they plant the tree. Residents preregister online and the trees are picked up at the City's annual Earth Day Event.

Complementary Programs

- Low-Income Programs: Income qualified applicants were provided with a Tier 1 allotment increase of 139 kWh. This brings the Tier 1 allotment from 250 kWh to 389 kWh each month for 12 consecutive months from the date of approval.
- Low-Income Community Solar: Customers who qualify for our low income assistance program and also have low energy use, may qualify for our new Low Income Community Solar Program. Participants receive a monthly credit towards their bill using solar energy provided by the City's Community Solar System.
- Renewable Energy Programs: This reporting year Public Benefit Funds did not fund any renewable energy programs. The Electric Utility enterprise fund funded the planning and construction of a community solar project.
- Low-Income Programs: Income qualified applicants were provided with a Tier 1 allotment increase of 139 kWh. This brings the Tier 1 allotment from 250 kWh to 389 kWh each month for 12 consecutive months from the date of approval.
- Low-Income Community Solar: Customers who qualify for our low income assistance program and also have low energy use, may qualify for our new Low Income Community Solar Program. Participants receive a monthly credit towards their bill using solar energy provided by the City's Community Solar System.

- Renewable Energy Programs: This reporting year Public Benefit Funds did not fund any renewable energy programs. The Electric Utility enterprise fund funded the planning and construction of a community solar project.
- Energy Saving Tree Program: Residents can sign up for the Community Canopy program. This is a program that combines trees with an interactive web experience to help homeowners & communities save energy and money by strategically planting trees to maximize their environmental benefits.
- Tinker Program: The Tinker Program provides over 500 EE and water conservation kits to 6th grade Colton Unified School District students. As part of the program students and parents will install resource efficiency measures 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 EE Program: in partnership with SoCalGas, CEU 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 DI.
- Low-Income Programs: Income qualified applicants were provided with 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 has funded the planning and construction of a community solar project in the past.
- RD&D: CEU participated in an emerging technology demonstration of a solar powered, ductless mini-split air conditioning systems in a commercial setting. CEU 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.
- EVs: CEU 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. CEU also installed seven Level II chargers for fleet and one fast charger. CEU continues to work on facilitating the state incentives to expand fleet electric vehicles with participation in the Low Carbon Fuel Standard (LCFS) and developing rebate programs to incentivize customers to participate.
- Energy Storage: CEU participates in an energy storage working group through SCPPA. Energy storage is being renewed for future participation. CEU has purchased 8 Ice Bear thermal energy storage units for installation in 2018 as part of a trial project.

- Digital Monthly Newsletter on EE: residential and commercial customers receive a monthly newsletter that provides current information on EE and energy education. It is emailed in a digital print format but also includes video clips on EE. CEU also posts the articles from the newsletter to CEU's social media platforms.

EM&V Studies

CEU contracts with Alternative Energy Services Consulting (AESC) annually to complete CEU programs studies of the residential and commercial program and associated savings. Current studies are available on the CEU website.³⁷ CEU 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.

³⁷ www.ci.colton.ca.us/DocumentCenter/View/3225.

TABLE 1. CEU EE Program Results by End Use

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	49	382,986	4,313,799	49	382,986	4,313,799	1,453	\$59,593	7.00	2.49	0.019
Appliance & Plug Loads	6	44,515	642,259	3	22,818	325,289	112	\$30,579	1.22	0.48	0.128
Building Envelope	18	52,402	1,099,026	18	52,203	1,095,860	407	\$39,102	5.49	3.06	0.055
HVAC - Cooling	36	63,571	973,215	34	57,556	906,116	339	\$87,032	2.15	2.54	0.142
Lighting - Indoor	117	619,255	6,386,793	116	617,748	6,362,681	1,947	\$248,872	2.38	2.30	0.053
Miscellaneous	9	68,094	749,031	9	68,094	749,031	846	\$41,480	3.55	6.99	0.074
Water Pumping / Irrigation	239	1,396,965	2,793,930	239	1,396,965	2,793,930	557	\$27,818	5.71	5.71	0.020
EE Subtotal	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
EE and Low Income Subtotal	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047

TABLE 2. CEU EE 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)
Commercial	261	1,422,405	3,204,673	261	1,422,341	3,203,646	703	\$167,030	1.36	1.64	0.100
Industrial	115	607,777	6,135,408	115	607,777	6,135,408	1,869	\$144,051	3.96	3.66	0.031
Residential	98	597,605	7,617,972	93	568,252	7,207,652	3,088	\$223,394	4.28	2.38	0.043
EE Subtotal	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
EE and Low Income Subtotal	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047

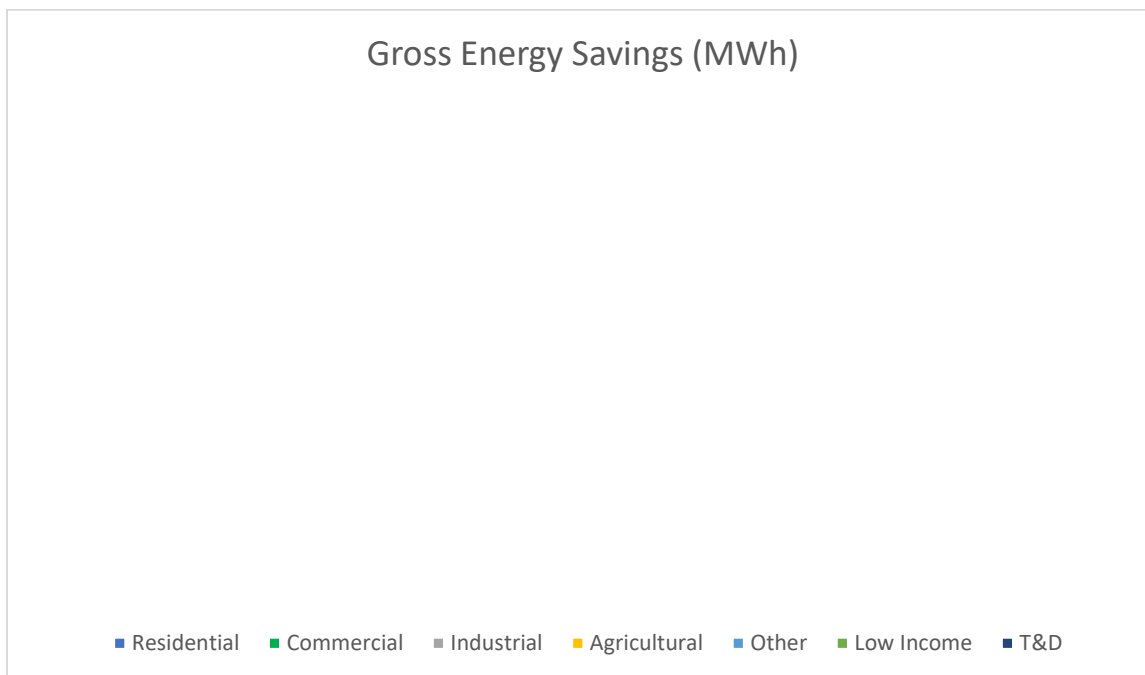
TABLE 3. CEU EE Program Results by Building Type

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	21	27,664	356,004	21	23,404	294,564	109	\$14,310	4.23	0.88	0.065
Education - Primary School	0	185	2,960	0	157	2,516	1	\$24,411	0.01	0.09	13.832
Education - Secondary School	16	64,913	1,103,521	16	64,913	1,103,521	303	\$14,019	5.83	7.99	0.018
Lodging - Hotel	0	801	12,816	0	801	12,816	3	\$1,173	1.33	2.21	0.130
Manufacturing Light Industrial	95	521,991	4,697,919	95	521,991	4,697,919	1,457	\$105,688	4.34	4.34	0.029
Office - Large	1	7,822	195,550	1	7,822	195,550	67	\$97,291	0.19	0.19	0.803
Other Agricultural	239	1,396,965	2,793,930	239	1,396,965	2,793,930	557	\$27,818	5.71	5.71	0.020
Other Commercial	0	243	3,888	0	207	3,305	1	\$6,591	0.05	0.27	2.843
Residential	3	21,977	336,042	1	7,982	122,778	45	\$22,934	0.66	1.11	0.256
Residential - Single-Family	94	564,353	7,121,455	91	553,255	6,985,839	3,008	\$195,898	4.74	2.84	0.039
Retail - Large	4	20,873	333,968	4	20,873	333,968	108	\$24,344	1.26	0.77	0.104
EE Subtotal	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
EE and Low Income Subtotal	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	474	2,627,787	16,958,054	469	2,598,370	16,546,706	5,660	\$534,475	3.28	2.52	0.047

CORONA DEPARTMENT OF WATER & POWER

Corona Department of Water & Power at a Glance

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



Corona Department of Water & Power Overview

Corona Department of Water & Power (DWP) began serving electric customers in 2001 with unbundled generation services to existing investor-owned utility customers and bundled service to customers continuing to build new facilities located in the designated service territory. The peak demand was 27.4 megawatts (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 provide less EE upgrade opportunities. DWP continued to offer customers the same EE programs.

Major Program and Portfolio Changes

DWP continued to offer customers the same EE programs.

Program and Portfolio Highlights

DWP serves municipal facilities that can be interrupted as scheduled.

No EE incentive payments were disbursed to customers.

Commercial, Industrial & Agricultural Programs

On-site energy audits that analyze customer usage and demand to develop recommendations designed to improve EE and reduce load requirements. Rebates are available for EE 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, EE, conservation, or research and development.

Residential Programs

On-site energy audits that analyze customer usage and demand to develop recommendations designed to improve EE and reduce load requirements. Rebates are available for EE upgrades identified in these audits. Verification services to ensure appropriate installation of recommended measures are also provided.

- Offer EE kits that include low flow showerheads, low flow faucet aerators, and energy conservation tips brochure.
- Rebates are available for installing Energy Star® washing machines.
- Incentives are available to improve EE for lighting applications, which reduce energy usage by a specified amount.
- Incentives are available for installing 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 DWP's net metering tariff schedule.
- DWP has installed 350 kW of photovoltaic systems.
- DWP installed eight electric charging vehicle stations.
- DWP's energy storage goal is to procure cost-effective energy storage applications equal to one percent (1%) of its peak load during calendar year 2020, with installations occurring no later than the end of calendar years 2021. No specific cost-effective energy storage application has been identified to date.

EM&V Studies

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

Major Differences or Diversions from California POU TRM for Energy Savings

None.

TABLE 1. Corona EE Program Results by End Use

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)
Lighting - Indoor	0	0	0	0	0	0	0	\$0			0.000
EE Subtotal	0	0	0	0	0	0	0	\$0			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$0			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$0			0.000

TABLE 2. Corona EE 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)
Commercial	0	0	0	0	0	0	0	\$0			0.000
EE Subtotal	0	0	0	0	0	0	0	\$0			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$0			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$0			0.000

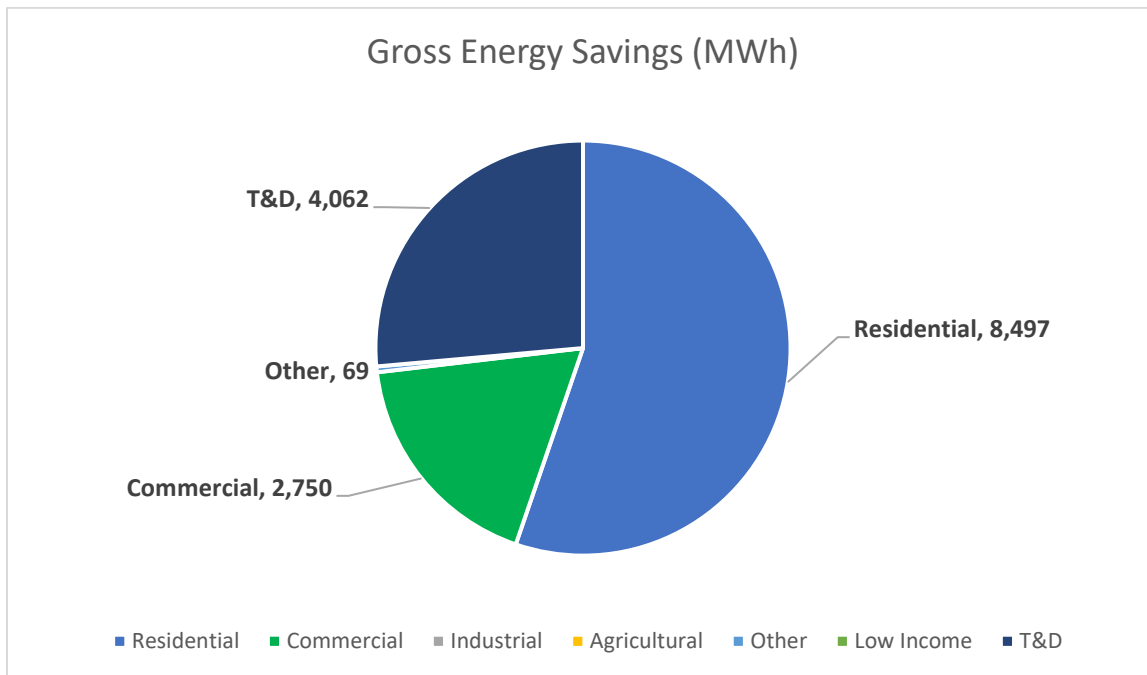
TABLE 3. Corona EE Program Results by Building Type

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)
Retail - Big Box	0	0	0	0	0	0	0	\$0			0.000
EE Subtotal	0	0	0	0	0	0	0	\$0			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$0			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$0			0.000

GLENDALE WATER & POWER

Glendale Water & Power at a Glance

- Climate Zone: 9
- Customers: 90,283
- Total annual retail sales: 985,525 MWh
- Annual Retail Revenue: \$201,959,000
- Annual EE expenditures for reporting year: \$3,300,536
- Gross annual savings from reporting year portfolio: 15,378 MWh



Glendale Water & Power Overview

Glendale Water & Power (GWP) is a municipal utility that serves the citizens and community of Glendale, California including over 34,000 water customers and 90,000 electric customers. The city of Glendale is located in Climate Zone 9 with a population of 203,000 in 31 square miles. GWP continues to help residents and businesses become wise stewards of the planet's natural resources and to wisely manage energy costs at home and at work through GWP's Residential Water and EE Programs, Business Programs and Community Programs.

For FY 2022 reporting year, GWP's EE programs and transmission and distribution programs produced a total Net Annual Energy Savings of 15,343 MWh and reduced peak demand by 1.5 MW. With a modernized utility system, GWP will continue to invest significant resources in conservation and EE programs for commercial, industrial, and residential customers. Increasing customer engagement through various innovative programs will enable Glendale customers to be stewards in conservation by giving them the tools to empower them.

Glendale is fully supportive of ensuring a clean energy future for its citizens. On August 16, 2022, the Glendale City Council adopted Resolution No. 22-125. This resolution intends for the City of Glendale to achieve 100% clean, renewable, or non-carbon emitting energy excluding renewable biofuels not already permitted or approved, by no later than 2035. The resolution also intends for the City of Glendale to adopt policies and practices designed to reach a goal of having at least 10% of GWP customers adopt solar and energy storage systems by 2027, and develop additional demand management measures, with a minimum total peak dispatchable and peak-load-reducing capacity of 100 MW. Subsequently, in August 2022, GWP hired a consultant to review its current low-income, EE, renewable energy, and RD&D program portfolio with the purpose of analyzing the potential for increased EE, load management, and distributed energy resources to augment the GWP power system. GWP is working towards implementing some of the recommendations and best practices and utilizing the findings of this report as a roadmap to assist in the improvement of our program portfolio in the upcoming years.

GWP supports the City's clean energy future and is committed to developing policies and programs to realize such. We continue to invest significant resources in conservation and EE programs for commercial, industrial, and residential customers. Glendale has been and will continue its commitment to transitioning to a low-carbon future through reliable, affordable, and sustainable clean energy projects, establishing GWP as a clean energy leader.

Major Program and Portfolio Changes

In FY 2022 GWP experienced increased participation in multiple EE programs which resulted in higher kWh savings. During this reporting year, GWP was able to reopen customer programs that were closed during the pandemic. The reopening of the Smart Home Energy and Water Saving Upgrade program along with the launch of the new Business Energy Upgrade program yielded a higher kW and kWh savings for our overall portfolio. GWP expected a higher kW energy savings from our new Demand Response (DR) Peak Savings Program but reported lower kW energy savings. We concluded that the capacity of the DR program is expected to ramp up over the next two-and-a-half-year term as additional customers enroll in this new program.

Program and Portfolio Highlights

GWP's new Business Energy Upgrade program, Home Energy Reports, Business Energy Solutions (BES) Program and the Smart Home Energy and Water Saving Upgrade Program continued to produce the most energy savings. The Home Energy Reports had the greatest

impact on residential customers. The Home Energy Reports program also reached the majority of customers and provided constant communication and engagement. GWP also launched the Weekly Energy Updates to engage and educate customers with personalized insights and programs marketing via email. GWP's Business Energy Solutions (BES) 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 EE projects. The BES program guidelines were changed by increasing the total incentive cap to \$100,000 per fiscal year and also increasing the incentive per project to 40% of eligible project cost.

Commercial, Industrial & Agricultural Programs

Becoming EE partners with our C&I customers has always been one of Glendale's priorities.

- 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 \$100,000 (increased from \$50,000 in FY 2022) 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 40% (increased from 20% in FY 2022) 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.
- Peak Savings Program: Launched in April of 2021 and implemented by Franklin Energy. This program provides commercial DR. By 2024, the program is expected to offer up to 4 MW of DR capacity from commercial customers during up to 15 peak load events per year. At the end of FY 2022, a total of 0.545 MW was under control, representing 13% of the four year commercial program goal. The capacity of the program is expected to ramp up over the next two-and-a-half-year term as additional customers enroll.
- Business Energy Upgrade Program: A seven-year Commercial DI EE Program that will deliver up to 8.3 MW and 36,500 MWh of EE improvements in commercial buildings by the end of the program term, with an expected average 12.5-year life for the installed EE measures. At the end of FY 2022, a total of 1,423 MWh energy savings were delivered.

Residential Programs

- Home Energy Reports: Provides print and email reports annually to 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. The home energy report includes their Smart Grid data and access to the website where they can review their energy usage. The

addition of interval electric usage data has given customers the ability to view their usage in monthly, weekly, daily or hourly intervals.

- **High Bill Alerts:** These alerts are designed to analyze Automated Metering Infrastructure (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.
- **Weekly Energy Updates:** A weekly email report sent to customers to inform them of their energy usage patterns, trends, and projected energy usage or costs.
- **Smart Home Energy and Water Savings Rebates:** Provides incentives to promote the purchase of approved energy and water saving appliances and devices. GWP began to offer rebates for various all-electric home appliances for customers to electrify their home. To facilitate and expedite the application process, GWP offers an easy-to-use web portal for residents to submit their rebate applications online.
- **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.
- **In-Home Display/Thermostat Program:** GWP partnered with CEIVA Energy, LLC to provide a unique In-Home Display (IHD) solution for residential customers. The CEIVA IHD is a digital picture frame that integrates customer's personal photographs with meaningful and useful historical water usage information and near real time electric consumption information. The CEIVA IHD works as a home gateway that simultaneously communicates with GWP's electric digital meters as well as the customer's existing home networks via Wi-Fi or Ethernet. In addition to providing interval energy and water consumption usage information, GWP has the ability to enhance outreach by pushing the EE program, conservation, and event messages directly to the IHD. This program was modified and it now integrated the installation of smart thermostats.
- **Smart Home Energy and Water Saving Upgrade Program:** The Smart Home Energy and Water Saving Upgrades program evaluates the efficiency of customer homes, installs low-cost energy and water saving devices, and makes recommendations regarding additional energy and water measures customers can implement. The program inspects a number of energy and water saving measures, including lighting, HVAC systems, attic insulation, temperature setting for home environment and appliances, and water flow rates at all sinks, showers, and toilets. Additionally, the program installs several measures at no cost to the customer, including LED lights, low flow shower heads, faucet aerators, toilet displacement devices and toilet flappers.
- **Online Marketplace:** An online marketplace that allows Glendale residents to obtain program eligible energy and water saving products easily and quickly without having to visit a retail store nor the need to fill out incentive or rebate applications.

Complementary Programs

Low Income Programs: In FY 2022, 49% of the annual Public Benefit Charge (PBC) expenditure went towards funding the low-income programs described below:

- Glendale Care: This program offers all eligible low-income customers a discount of \$17.50 on their electric bills, which is an increase from the previous discount of \$15.00.
- 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.
- Helping Hand: This program provides bill payment and deposit assistance for low-income customers who are experiencing a temporary financial emergency and having trouble paying for their utility services providing up to \$150 towards a bill payment or deposit.
- Guardian: This program provides bill discounts for households with special electrically powered medical equipment needs.

TE: GWP continues to respond to the growing EV demand by investing in EV infrastructure and customer programs.

- EV Infrastructure: GWP will significantly increase its public charging network to make EV charging more accessible and accommodate a greater number of electric vehicles on the road. GWP plans to install at least 30 new publicly accessible EV chargers per year.
- EV Level II Charger Rebate: This program offers rebates of up to \$599 for residential customers, and up to \$3,000 per charger for commercial or multi-family building customers who install a new Level 2 EV charging station. Rebates are for out-of-pocket expenses for the purchase of EV chargers, installation, and permit fees. Commercial or multi-family building customers can also receive an additional \$3,000 rebate per charger if their chargers meet one of the following criteria: Installed charger is a DC fast charger, installed chargers are publicly accessible, chargers are installed at an educational institution, chargers are installed in a DAC, chargers are installed in an income qualified housing structure.
- Bring Your Own Charger Program: Provides a monthly incentive of \$8 to EV drivers who set their vehicles to charge during off-peak hours, helping to reduce peak load. This program uses AMI data to verify charging times, making the program available to any electric vehicle and any EV charger. Similar programs require vehicle and charger telematics, which limits the types of EVs and EV chargers that can participate in the program. Over 450 customers are currently enrolled in this program.
- EV Customer Awareness Website: GWP launched its EV customer awareness website which provides customers with information on new and used Electric vehicles, incentives, home charging options, EV dealers, and a public charging station map.

- Electric Bookmobile: Sponsored the purchase of an electric bookmobile for the City's Library Arts and Culture department by providing \$100,000 towards the purchase.
- EV Autonomous Renewable Charge (EV ARC) Station: GWP purchased a standalone, transportable, solar-powered EV charger that can charge electric vehicles completely off-grid. The EV ARC station can also be used as a power source during emergencies where other electricity sources are unavailable. The EV ARC station is currently located at a public parking lot and available to the community.

RD&D:

- 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 AMI by using the data generated by smart meters to reduce power costs by increasing the efficiency of GWP's distribution system. During FY 2022, the program produced energy savings of 4,062 MWh.

EM&V Studies

GWP plans to initiate EM&V analysis of EE programs in FY 2024 in support of AB 2021 (Wicks, 2022). For FY 2024 Glendale has budgeted \$50,000 to its EE budget to conduct EM&V studies through the use of a third-party contractor. GWP will select EE 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 EE 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 compliance.
- Energy assessments and installations for Glendale's Business Energy Upgrade 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, work papers and third-party EE verification.

TABLE 1. GWP EE Program Results by End Use

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)
Appliance & Plug Loads	1	48,292	600,914	1	30,604	385,470	139	\$46,119	0.87	0.84	0.163
Building Envelope	4	6,431	102,311	1	1,801	28,647	10	\$3,750	1.43	0.93	0.191
HVAC - Cooling	1,055	1,142,666	16,281,759	1,053	1,138,006	16,208,886	5,225	\$1,367,184	1.93	0.82	0.118
Lighting - Indoor	92	421,974	5,133,096	92	413,992	5,005,385	1,557	\$85,858	7.67	2.08	0.023
Lighting - Outdoor	0	69,051	1,450,071	0	69,051	1,450,071	653	\$16,308	10.65	10.65	0.017
Miscellaneous	358	9,627,130	40,662,314	358	9,627,130	40,662,314	11,938	\$1,643,161	2.21	2.21	0.059
Service & Domestic Hot Water	0	800	8,800	0	480	5,280	2	\$551	0.85	0.55	0.139
EE Subtotal	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
EE and Low Income Subtotal	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
All	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
T&D Subtotal	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
C&S, T&D and Electrification Subtotal	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
Utility Total	1,510	15,378,344	72,363,265	1,504	15,343,064	71,870,054	21,402	\$3,300,536	2.28	1.40	0.068

TABLE 2. GWP EE 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)
Commercial	460	2,750,418	33,199,428	460	2,750,418	33,199,428	10,243	\$868,658	4.59	1.38	0.035
Other	777	69,051	1,450,071	777	69,051	1,450,071	653	\$917,575	0.37	0.37	0.978
Residential	273	8,496,875	29,589,766	267	8,461,595	29,096,555	8,628	\$1,376,697	2.05	1.99	0.073
EE Subtotal	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
EE and Low Income Subtotal	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
Residential	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
T&D Subtotal	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
C&S, T&D and Electrification Subtotal	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
Utility Total	1,510	15,378,344	72,363,265	1,504	15,343,064	71,870,054	21,402	\$3,300,536	2.28	1.40	0.068

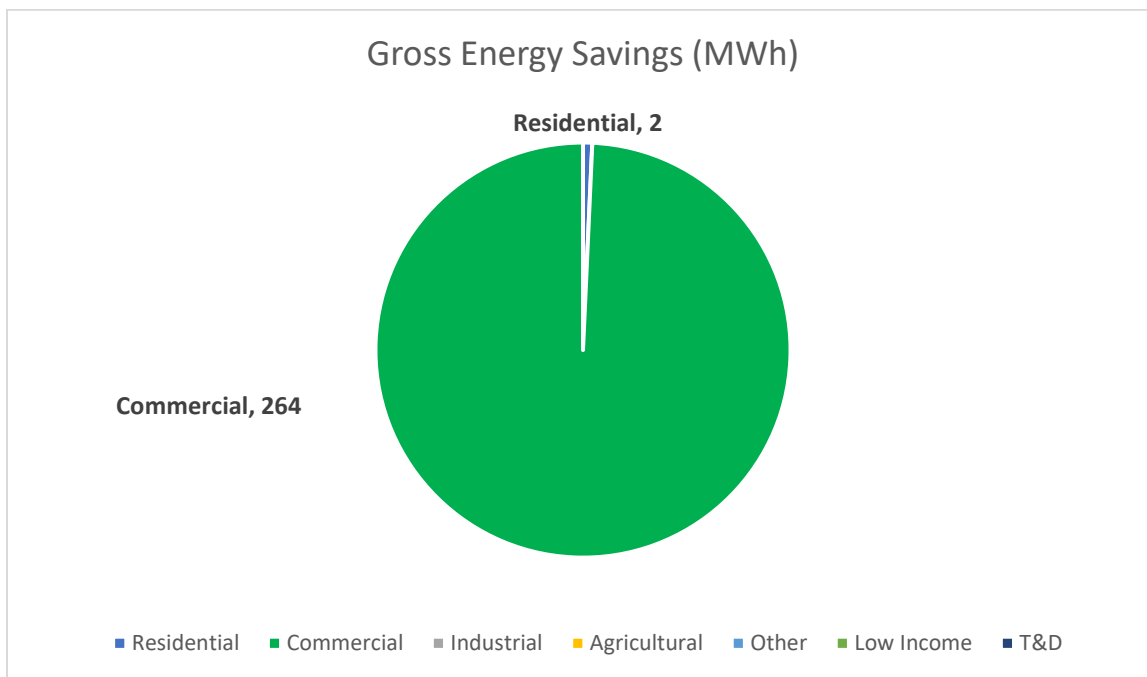
TABLE 3. GWP EE Program Results by Building Type

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	996	1,496,004	17,146,554	996	1,494,579	17,130,881	5,518	\$1,510,102	1.42	1.43	0.119
Office - Large	241	1,327,027	17,542,127	241	1,327,027	17,542,127	5,388	\$279,986	7.79	0.95	0.022
Residential	268	8,452,518	29,031,568	265	8,433,956	28,743,475	8,504	\$1,337,855	2.08	2.02	0.072
Residential - Single-Family	5	40,795	519,016	2	25,502	329,571	113	\$34,987	1.08	1.10	0.146
EE Subtotal	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
EE and Low Income Subtotal	1,510	11,316,344	64,239,265	1,504	11,281,064	63,746,054	19,524	\$3,162,930	2.26	1.37	0.071
All	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
T&D Subtotal	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
C&S, T&D and Electrification Subtotal	0	4,062,000	8,124,000	0	4,062,000	8,124,000	1,878	\$137,606	2.72	2.72	0.034
Utility Total	1,510	15,378,344	72,363,265	1,504	15,343,064	71,870,054	21,402	\$3,300,536	2.28	1.40	0.068

GRIDLEY MUNICIPAL UTILITY

Gridley Municipal Utility at a Glance

- Climate Zone: 11
- Customers: 2,893
- Total annual retail sales: 31,607 MWh
- Annual Retail Revenue: \$704,893
- Annual EE expenditures for reporting year: \$97,916
- Gross annual savings from reporting year portfolio: 266 MWh



Gridley Municipal Utility Overview

Gridley is a neighborhood community with agricultural roots and an historic downtown. It's 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 and C&I 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 2022. GMU has offered a comprehensive menu of EE rebate programs for many years. Both customers and local contractors find value in maintaining a consistent program.

Program activity for FY 2022 has increased from last year. Program activity tends to fluctuate from year to year. In FY 2022, GMU achieved 279% of the annual EE target and 95% of the EE targets for net kWh over the last three years.

Program and Portfolio Highlights

The commercial program is typically responsible for a large percentage of the energy savings. In FY 2022 the commercial program contributed 99% of the net annual energy savings. GMU is pleased to be able to support local businesses with the program and hopes to continue to see increased participation in the future.

Commercial, Industrial & Agricultural Programs

GMU manages a comprehensive EE incentive program for commercial customers focusing on EE 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. EE 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 EE 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 efficient 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

GMU offers rebates to residential customers for the installation of various EE measures, such as lighting, HVAC, appliances, and weatherization. On-site energy audits are provided by energy specialists. EE 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.

EM&V Studies

Information on GMU's EM&V is available on the CMUA website.³⁸

Major Differences or Diversions from California POU TRM for Energy Savings

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

³⁸ See <https://www.cmua.org/emv-reports>.

TABLE 1. GMU EE Program Results by End Use

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)
Appliance & Plug Loads	0	259	3,891	0	182	2,724	1	\$7,724	0.04	0.04	3.982
Building Envelope	2	1,644	34,530	0	460	9,668	14	\$7,326	0.49	0.51	1.171
Lighting - Indoor	27	261,497	3,660,961	26	248,422	3,477,912	1,121	\$82,115	4.00	10.12	0.033
Lighting - Outdoor	0	2,336	32,708	0	2,219	31,073	14	\$749	4.15	2.59	0.033
EE Subtotal	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
EE and Low Income Subtotal	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038

TABLE 2. GMU Program Results by Sector

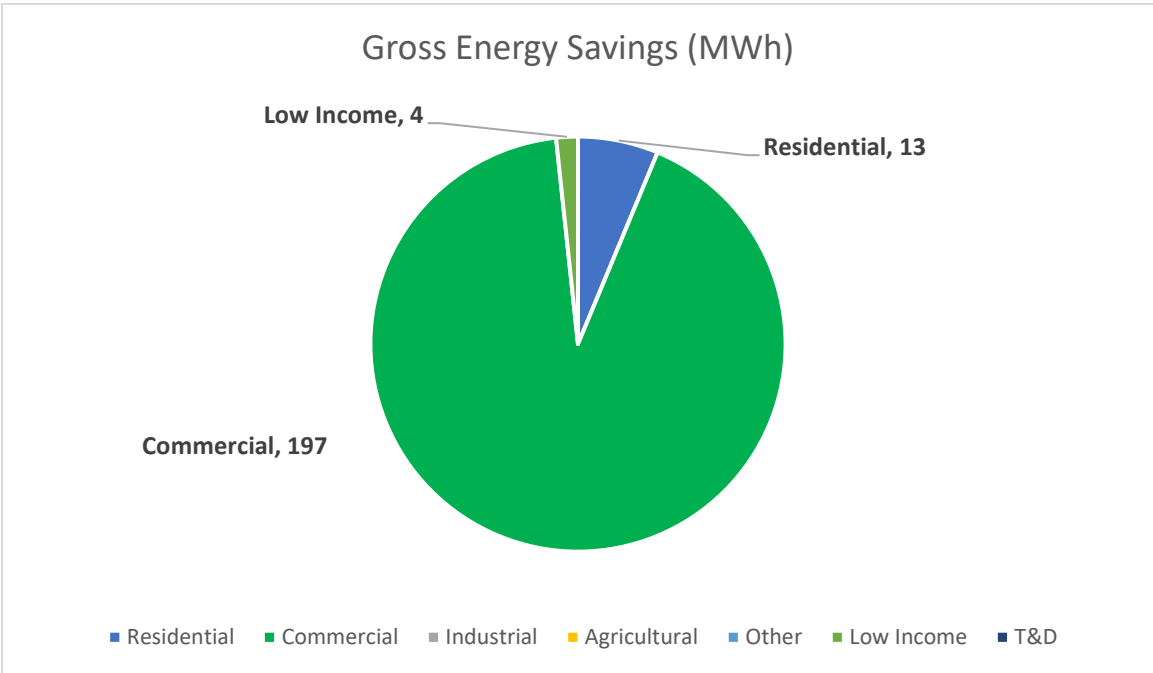
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Commercial	27	263,833	3,693,668	26	250,642	3,508,985	1,135	\$82,865	4.00	9.85	0.033
Residential	2	1,904	38,421	0	642	12,392	15	\$15,051	0.26	0.27	1.836
EE Subtotal	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
EE and Low Income Subtotal	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038

TABLE 3. GMU EE 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	27	263,833	3,693,668	26	250,642	3,508,985	1,135	\$82,865	4.00	9.85	0.033
Residential	2	1,644	34,530	0	460	9,668	14	\$7,326	0.49	0.51	1.171
Residential - Single-Family	0	259	3,891	0	182	2,724	1	\$7,724	0.04	0.04	3.982
EE Subtotal	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
EE and Low Income Subtotal	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	29	265,737	3,732,090	26	251,284	3,521,377	1,150	\$97,916	3.42	6.93	0.038

City of Healdsburg at a Glance

- Climate Zone: 2
- Customers: 6,052
- Total annual retail sales: 73,932 MWh
- Annual Retail Revenue: \$12,150,276
- Annual EE expenditures for reporting year: \$204,556
- Gross annual savings from reporting year portfolio: 214 MWh



City of Healdsburg Overview

The City of Healdsburg’s Electric Department (Electric Department) manages a comprehensive EE and greenhouse gas reduction program for residential and commercial customers by incentivizing energy conservation as well as peak load reduction. For residential customers, rebates help to drive installations of a variety of EE measures. The Electric Department offers residential rebates in the following areas: appliances, HVAC, weatherization, and pool pumps. Commercial rebates are predominantly for site specific lighting upgrades. For commercial customers, rebates can also be developed as custom programs to allow the greatest 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

Changes implemented during the pandemic to benefit income-qualified customers continued in 2022. The Electric Department maintained an increase in the allowable income for eligibility in the CARE program, a discount of 25% for all families at or below 80% of Sonoma County's area median income. Additionally, the Electric Department funded the installation of water efficiency devices within income restricted multifamily housing to reduce hot water use and reduce water heating costs.

During 2022, the Electric Department is undergoing a rebate program review with a consultant to evaluate current rebates, efficiency requirements, and new rebates. Rebate updates based on the review are expected in 2023.

Program and Portfolio Highlights

In 2022, customer interest in EE rebates continued. There was also increased interest in electrification to reduce greenhouse gas emissions, and the City of Healdsburg passed its Electrification Reach Code update to require electric space and water heating in new construction.

Commercial, Industrial & Agricultural Programs

The Electric Department 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 the Electric Department.
- **Commercial HVAC Rebates:** The Electric Department offers commercial customers a variety of HVAC rebates. Custom rebates are performance based and provide greater financial incentives to projects that reduce system peak demand.
- **Custom EE Programs:** The Electric Department will consider custom EE programs for site-specific consumption. The Electric Department requires that its 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 Electric Department retains the sole right to approve or deny custom projects.

Residential Programs

The Electric Department offers the following residential programs:

- **Residential Heat Pump Rebates:** The Electric Department offers tiered rebates for residential and small business customers who install high performance heat pumps. The

tiered rebate levels are designed to incentivize higher SEER ratings. The Electric Department also offers a rebate for AC and heat pump tune-ups.

- **Weatherization and Building Envelope Rebates:** The Electric Department provides financial incentives for homeowners who invest in home weatherization such as ceiling insulation, wall insulation, and window replacement projects.
- **Appliances and Device Rebates:** The Electric Department offers incentives for high-performance clothes washers to encourage EE and water conservation. The Electric Department also provides rebates for variable speed pool pumps and ENERGY STAR® wi-fi enabled smart thermostats.

Complementary Programs

The Electric Department offers the following complementary programs:

- **Low-Income Programs:** The Electric Department actively supports a low-income discount for income-qualified customers. Currently, this discount supports approximately 510 families, or about 8% of the Electric Department's residential customers. Income qualified customers receive 25% off their electric bill through this program.
- **EVs:** The Electric Department offers an EV Discount for residents that drive a battery electric vehicle and switch to the Time of Use rate. Additionally, the Electric Department maintains 12 public charging stations with discounted charging rates located at City Hall.
- **E-bikes:** The Electric Department offers an e-bike rebate for residents that purchase an e-bike to replace driving trips. This program provides various levels of rebates relative to customer income to help offset the cost of purchasing an e-bike.
- **Technical Consulting on all-electric construction:** The Electric Department implemented a Reach Code in 2019, which was updated in 2022, that requires electric space and water heating. To assist commercial customers in compliance, the Electric Department offers free technical consulting through Guttman & Blaevoet to support builders and contractors.
- **Green Rate:** The Electric Department offers a voluntary opt-in 100% renewable electricity rate for an additional \$0.018/kWh. Roughly 8% of the City of Healdsburg's electricity usage is attributed to customers enrolled in the Green Rate.
- **Renewable Energy Programs:** The Electric Department continues to see photovoltaic (PV) solar array installations in both residential and commercial sectors. At the end of 2022, the City had interconnected a total of 6.3 MW of solar capacity. This includes the Electric Department's 4.78 MW floating photovoltaic (FPV) system at the City of Healdsburg's Water Reclamation Facility. The system provides about 8% of the Electric Department's annual electric needs. In 2022, the system generated 6,207 MWh directly into the Electric Department's distribution system and offset roughly 2.9 MW of the Electric Department's peak coincident demand.

- Induction Cooktop Rental: To inform customers regarding electric cooktops, specifically induction cooktops, the Electric Department offers a free induction cooktop loaner for electric customers interested in cooking with electricity rather than natural gas. The loaner program includes pans compatible with induction cooktops.
- Water Conservation: The Electric Department offers multiple water conservation programs, such as lawn conversion, rain barrels, low-flow toilets, irrigation controllers, and more. During the multi-year drought significantly impacting Healdsburg, the Electric Department has increased promotion of these rebates and customers have responded with an approximately 30% reduction in water consumption. Water conservation can help reduce the amount of electricity needed for treating and conveying water.

EM&V Studies

EM&V studies previously completed by the Electric Department is available on the CMUA website.³⁹

Major Differences or Diversions from California POU TRM for Energy Savings

The Electric Department relies on the CMUA TRM for savings calculations. Savings for the Commercial Lighting Program are calculated based on the actual equipment replaced and installed. Savings for the Custom Water Control Devices are calculated based on water flow rates before and after installation.

³⁹ *Ibid.*

TABLE 1. Healdsburg EE Program Results by End Use

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)
Appliance & Plug Loads	0	288	4,320	0	89	1,339	0	\$457	0.33	0.27	0.479
Building Envelope	5	4,687	98,418	4	3,287	69,022	58	\$27,110	0.56	0.18	0.607
HVAC - Cooling	1	7,291	115,415	0	5,839	92,369	39	\$45,235	0.37	0.44	0.698
HVAC - Heating	0	1,180	14,157	0	944	11,326	17	\$4,300	0.56	0.45	0.511
Lighting - Indoor	29	197,406	2,566,273	25	167,795	2,181,332	662	\$70,643	2.52	1.48	0.044
EE Subtotal	35	210,851	2,798,583	30	177,954	2,355,388	777	\$147,745	1.44	0.84	0.086
Appliance & Plug Loads	0	2,758	39,706	0	1,889	27,337	10	\$14,849	0.21	0.29	0.758
Building Envelope	0	869	18,250	0	243	5,110	13	\$21,613	0.11	0.12	6.534
Service & Domestic Hot Water	0	0	0	0	0	0	61	\$20,348	0.37	0.37	0.000
Low-Income Subtotal	0	3,627	57,956	0	2,132	32,447	84	\$56,811	0.23	0.25	2.482
EE and Low Income Subtotal	35	214,478	2,856,539	30	180,086	2,387,835	861	\$204,556	1.10	0.74	0.118
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	35	214,478	2,856,539	30	180,086	2,387,835	861	\$204,556	1.10	0.74	0.118

TABLE 2. Healdsburg EE 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)
Commercial	29	197,406	2,566,273	25	167,795	2,181,332	662	\$70,643	2.52	1.48	0.044
Residential	6	13,445	232,310	5	10,159	174,056	115	\$77,102	0.45	0.26	0.649
EE Subtotal	35	210,851	2,798,583	30	177,954	2,355,388	777	\$147,745	1.44	0.84	0.086
Residential	0	3,627	57,956	0	2,132	32,447	84	\$56,811	0.23	0.25	2.482
Low-Income Subtotal	0	3,627	57,956	0	2,132	32,447	84	\$56,811	0.23	0.25	2.482
EE and Low Income Subtotal	35	214,478	2,856,539	30	180,086	2,387,835	861	\$204,556	1.10	0.74	0.118
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	35	214,478	2,856,539	30	180,086	2,387,835	861	\$204,556	1.10	0.74	0.118

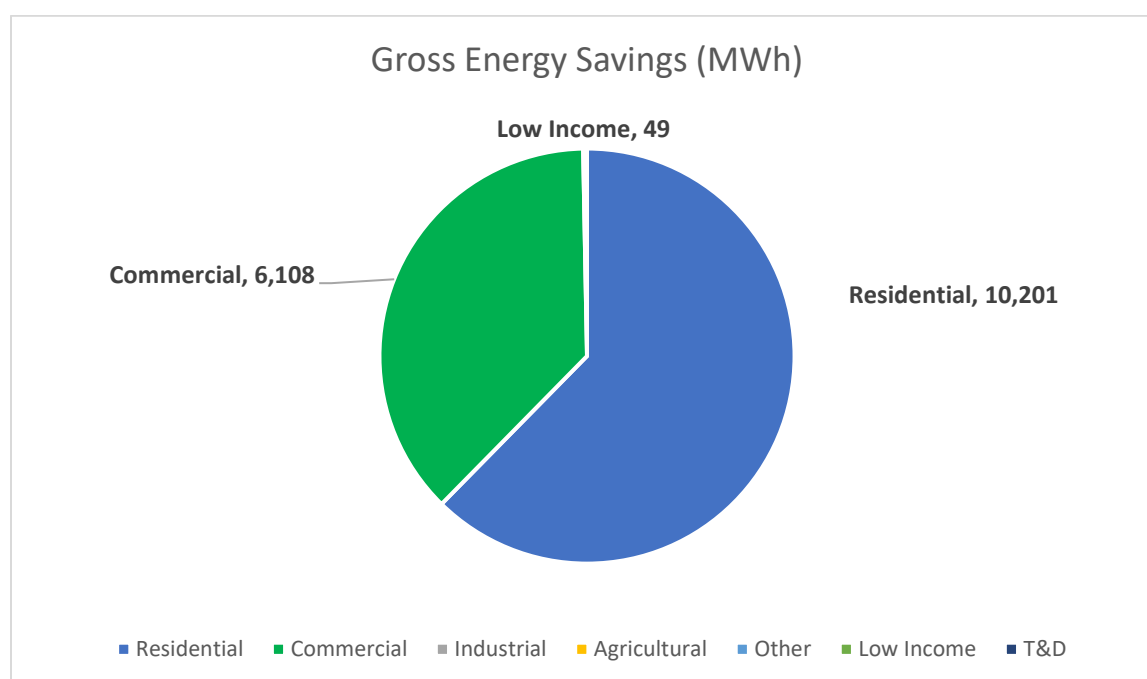
TABLE 3. Healdsburg EE Program Results by Building Type

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	29	197,406	2,566,273	25	167,795	2,181,332	662	\$70,643	2.52	1.48	0.044
Residential	0	1,180	14,157	0	944	11,326	17	\$4,300	0.56	0.45	0.511
Residential - Single-Family	6	12,265	218,153	5	9,215	162,731	98	\$72,802	0.44	0.25	0.659
EE Subtotal	35	210,851	2,798,583	30	177,954	2,355,388	777	\$147,745	1.44	0.84	0.086
Residential - Multi-Family	0	3,627	57,956	0	2,132	32,447	84	\$56,811	0.23	0.25	2.482
Low-Income Subtotal	0	3,627	57,956	0	2,132	32,447	84	\$56,811	0.23	0.25	2.482
EE and Low Income Subtotal	35	214,478	2,856,539	30	180,086	2,387,835	861	\$204,556	1.10	0.74	0.118
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	35	214,478	2,856,539	30	180,086	2,387,835	861	\$204,556	1.10	0.74	0.118

IMPERIAL IRRIGATION DISTRICT

Imperial Irrigation District at a Glance

- Climate Zone: 15
- Customers: 159,822
- Total annual retail sales: 3,515,689 MWh
- Annual Retail Revenue: \$516,535,188
- Annual EE expenditures for reporting year: \$7,138,931
- Gross annual savings from reporting year portfolio: 16,358 MWh



Imperial Irrigation District Overview

As the sixth largest utility in California, Imperial Irrigation District (IID) controls more than 1,200 megawatts of energy derived from a diverse resource portfolio that includes its own generation, and long- and short-term power purchases. IID's Energy Department provides electric power to more than 158,000 customers in the Imperial Valley and parts of Riverside and San Diego counties.

As a consumer-owned utility, IID works to meet our customers' demands efficiently and effectively 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 EE programs are a key factor in the utility's overall goal. These programs provide a positive impact on utility costs 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. The Covid pandemic placed a restraint on expected customer participation and thus budget levels were tempered for the year 2021, with the expectation of adding new programs in year 2022. However, IID did continue with newly introduced programs from 2020, such as:

- Rebates for Next-Generation Thermostats
- Keep Your Cool Program
- Online Energy Assessments

Due to impacts related to the COVID-19 pandemic, all programs requiring on-site interactions with customers were temporarily suspended to avoid potential spread of the virus and help ensure the safety of our customers, employees, and contractors. This suspension resulted in lower program participation and impacted reportable energy savings.

Furthermore, the state of California's expected doubling of utilities' EE savings over the next few years has proven to be an interesting, yet demanding task. Some of the challenges include:

- Most cost-effective programs have been in place for years and this leads us closer to market saturation.
- Budgets for programs are reduced in order to fund other utility projects or matters.
- The pandemic's impact on customer's disposable income has diminished their ability to participate in EE programs.

Program and Portfolio Highlights

IID strives to provide an EE 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. The addition of Next-Generation Thermostats to the Energy Rewards prescriptive rebate program was widely popular with the customer base all while supplying a healthy dose of savings to both the customer and to IID's reporting.

Commercial, Industrial & Agricultural 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 EE by offering financial incentives to commercial customers who install EE equipment. The larger commercial customers that participate generally have their own EE specialists they've consulted with for their upgrades and have identified the details of their project prior to applying for the rebate. However, for all other commercial customers that may not have access to an EE specialist, IID offers technical expertise to assist them in identifying the EE 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.
- **Keep Your Cool Program:** This program offers commercial account customers DIIrefrigeration measures, which fall into three categories: measures that reduce air leakage from cooled spaces, higher efficiency equipment and equipment controls. Some of the measures included are motors, controllers, LED fixtures, door gaskets, and anti-sweat heat controllers.

Residential 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.
- **Residential Audits:** Customers may obtain a digital version of a home energy assessment by answering a few questions regarding their home energy use. The online link is accessible via the IID website. This tool provides customers with plenty of energy saving tips and identifies residential energy consumption 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 or freezers rather than using them as a secondary, usually located either in uninsulated garages or outdoors. Through this program, a customer's refrigerator or freezer will be picked up and recycled, in addition to providing 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 brand new refrigerator to replace their older models, at no cost to the 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 2021 year totaled over \$4.49M, with an average enrollment of 11,361 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:** This is an assistance program that reduces the electric rate for a defined quantity of electricity used to operate medical equipment by a household that has a full-time resident who requires specific medically necessary electric equipment to sustain life or prevent deterioration of a person’s medical condition.

Energy Storage:

IID’s first ever battery energy storage system went online in November 2016. The project is a 30-megawatt, 20-megawatt-hour lithium-ion battery storage system that will increase reliability across the IID grid by providing the ability to balance power and integrate solar while providing spinning reserve and black start power restoration capabilities. IID anticipates its customers will benefit from reduced operating costs throughout the lifetime of the project, providing 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 the successor program to Net Energy Metering (NEM) and 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 of IID's qualified, low-income customers. The program utilizes a 23-year term power purchase agreement with Citizens Energy Corporation for 30 megawatts 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.

Codes and Standards

Through IID's participation with SCPA, IID accounts for codes and standards (C&S) savings which are drawn from the statewide allocation of energy savings credits attributed to codes and standards. The codes and standards savings claimed by IID are pro-rated based on the district's percent share of statewide load.

EM&V Studies

IID has historically conducted EM&V studies on a two-year program cycle. The latest report covering program years 2014 and 2015 summarized the evaluation effort led by ADM Associates Inc. and included the Energy Rewards prescriptive rebates, Weatherization, Quality AC Maintenance, Customer Energy Solutions and New Construction EE 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. Given cost considerations and the consistency of IID's portfolio offering, IID has transitioned to a five-year program cycle. Efforts to commission a study to evaluate programs that generated the highest energy savings over the evaluation period is currently underway.

Major Differences or Diversions from California POU TRM for Energy Savings

IID utilized a combination of savings from the TRM (Energy Rewards, Refrigerator Recycling and Replacement) & publications (Keep Your Cool), and modeled savings (Custom Energy Solutions Program) when applicable. Prescriptive rebate programs such as Energy Rewards and Refrigerator Recycling used deemed savings values from the TRM for measures such as HVACs, refrigerators, pool pumps, etc., since the individual efficiency measure's performance characteristics and use conditions were well known and consistent. The direct-install Keep Your Cool program draws savings for motors and respective accessories to LED-related items from

TRM, PGE documents and ORNL publications. For the CESP program on the other hand, custom savings were calculated (for categories such as lighting, refrigeration, process loads, and HVAC) considering the properties of existing equipment, replacement equipment and future use.

TABLE 1. IID EE Program Results by End Use

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
Appliance & Plug Loads	722	3,226,861	32,299,091	721	3,221,392	32,271,948	12,084	\$592,436	6.79	25.05	0.023
Building Envelope	2,131	1,855,346	31,219,897	2,124	1,781,758	30,042,492	9,782	\$944,407	3.95	4.60	0.047
Commercial Refrigeration	0	1,808,495	37,978,395	0	1,537,221	32,281,636	11,006	\$257,748	11.28	24.90	0.013
HVAC - Cooling	1,501	3,208,143	61,766,150	1,445	3,147,286	60,488,150	22,150	\$2,113,754	5.24	29.41	0.054
Lighting - Indoor	25	224,824	3,597,189	24	213,583	3,417,330	1,079	\$81,857	3.86	3.86	0.035
Lighting - Outdoor	369	1,593,484	33,463,161	306	1,322,592	27,774,424	12,481	\$182,725	14.35	26.27	0.011
Miscellaneous	1,672	3,788,337	15,153,348	1,672	3,788,337	15,153,348	4,654	\$2,653,950	0.50	0.50	0.245
Water Pumping / Irrigation	0	603,351	12,670,371	0	603,351	12,670,371	4,243	\$145,088	7.96	31.65	0.018
EE Subtotal	6,420	16,308,841	228,147,602	6,292	15,615,519	214,099,698	77,479	\$6,971,966	3.89	6.26	0.048
Appliance & Plug Loads	10	48,664	729,960	7	34,065	510,972	186	\$69,133	0.88	0.88	0.186
Low-Income Subtotal	10	48,664	729,960	7	34,065	510,972	186	\$69,133	0.88	0.88	0.186
EE and Low Income Subtotal	6,430	16,357,505	228,877,562	6,299	15,649,584	214,610,670	77,665	\$7,041,100	3.86	6.17	0.049
C&S	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$36,044	102.89	102.89	0.001
C&S Subtotal	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$36,044	102.89	102.89	0.001
All	0	0	0	0	0	0	0	\$61,787			0.000
Electrification Subtotal	0	0	0	0	0	0	0	\$61,787			0.000
C&S, T&D and Electrification Subtotal	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$97,831	37.91	37.91	0.004
Utility Total	6,430	43,690,505	256,210,562	6,299	42,982,584	241,943,670	88,957	\$7,138,931	4.33	6.86	0.042

TABLE 2. IID EE 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)
Commercial	907	6,107,625	119,777,222	780	5,419,772	105,756,461	37,764	\$1,376,648	7.17	10.31	0.020
Other	0	0	0	0	0	0	0	\$195,000			0.000
Residential	5,513	10,201,216	108,370,380	5,512	10,195,747	108,343,238	39,714	\$5,400,319	3.20	5.42	0.071
EE Subtotal	6,420	16,308,841	228,147,602	6,292	15,615,519	214,099,698	77,479	\$6,971,966	3.89	6.26	0.048
Residential	10	48,664	729,960	7	34,065	510,972	186	\$69,133	0.88	0.88	0.186
Low-Income Subtotal	10	48,664	729,960	7	34,065	510,972	186	\$69,133	0.88	0.88	0.186
EE and Low Income Subtotal	6,430	16,357,505	228,877,562	6,299	15,649,584	214,610,670	77,665	\$7,041,100	3.86	6.17	0.049
Residential	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$36,044	102.89	102.89	0.001
C&S Subtotal	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$36,044	102.89	102.89	0.001
Other	0	0	0	0	0	0	0	\$61,787			0.000
Electrification Subtotal	0	0	0	0	0	0	0	\$61,787			0.000
C&S, T&D and Electrification Subtotal	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$97,831	37.91	37.91	0.004
Utility Total	6,430	43,690,505	256,210,562	6,299	42,982,584	241,943,670	88,957	\$7,138,931	4.33	6.86	0.042

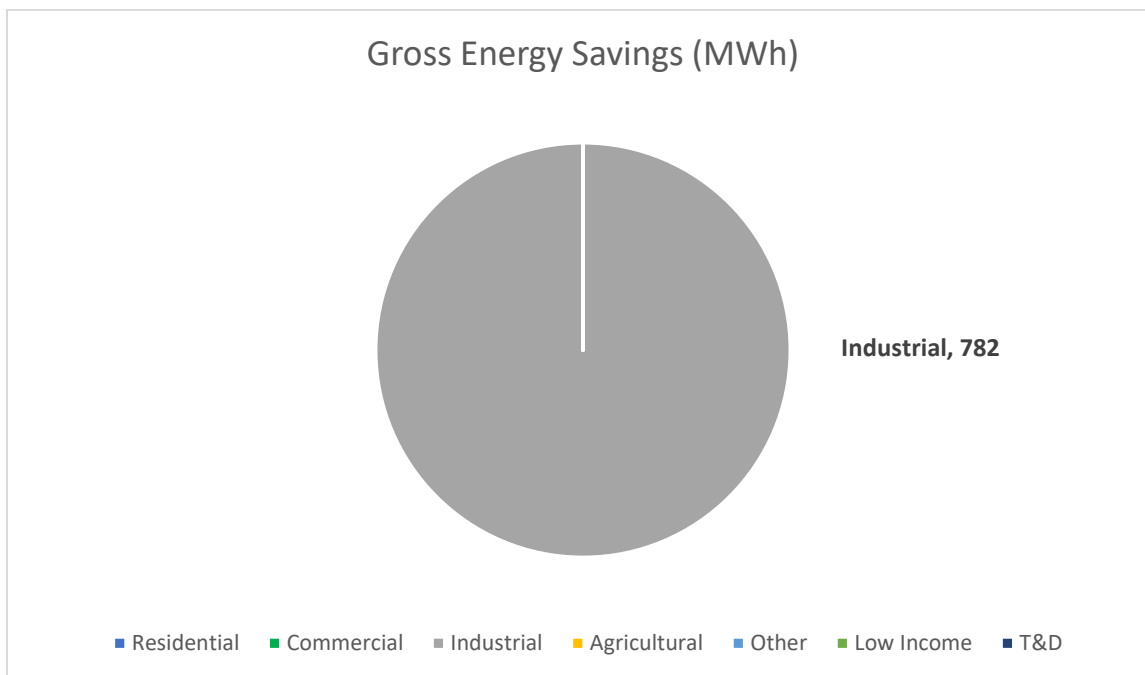
TABLE 3. IID EE Program Results by Building Type

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	741	4,411,044	92,631,926	623	3,808,020	79,968,429	29,928	\$923,769	7.98	14.59	0.019
Other Commercial	166	1,696,581	27,145,296	158	1,611,752	25,788,032	7,836	\$647,879	3.86	3.86	0.037
Residential	0	24,461	366,915	0	24,461	366,915	125	\$9,815	4.20	30.59	0.039
Residential - Single-Family	5,513	10,176,755	108,003,465	5,512	10,171,286	107,976,323	39,589	\$5,390,504	3.20	5.41	0.071
EE Subtotal	6,420	16,308,841	228,147,602	6,292	15,615,519	214,099,698	77,479	\$6,971,966	3.89	6.26	0.048
Residential	10	48,664	729,960	7	34,065	510,972	186	\$69,133	0.88	0.88	0.186
Low-Income Subtotal	10	48,664	729,960	7	34,065	510,972	186	\$69,133	0.88	0.88	0.186
EE and Low Income Subtotal	6,430	16,357,505	228,877,562	6,299	15,649,584	214,610,670	77,665	\$7,041,100	3.86	6.17	0.049
All	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$36,044	102.89	102.89	0.001
C&S Subtotal	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$36,044	102.89	102.89	0.001
All	0	0	0	0	0	0	0	\$61,787			0.000
Electrification Subtotal	0	0	0	0	0	0	0	\$61,787			0.000
C&S, T&D and Electrification Subtotal	0	27,333,000	27,333,000	0	27,333,000	27,333,000	11,293	\$97,831	37.91	37.91	0.004
Utility Total	6,430	43,690,505	256,210,562	6,299	42,982,584	241,943,670	88,957	\$7,138,931	4.33	6.86	0.042

INDUSTRY PUBLIC UTILITIES COMMISSION

Industry Public Utilities Commission at a Glance

- Climate Zone: 9
- Customers: 109
- Total annual retail sales: 39,300 MWh
- Annual Retail Revenue: \$4,501,000
- Annual EE expenditures for reporting year: \$109,535
- Gross annual savings from reporting year portfolio: 782 MWh



Industry Public Utilities Commission Overview

Industry Public Utilities Commission (IPUC) began serving electric customers in 2002. The peak demand was 8.4 megawatts. 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 provide fewer EE upgrade opportunities.

Major Program and Portfolio Changes

The IPUC EE Program provides incentives in four program categories: Large General Service Program; General Service Program; Domestic Service Program; and IPUC EE 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 EE 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 & Agricultural Programs

On-site energy survey, at no cost to the customer, that analyze usage and demand to develop recommendations designed to improve EE and reduce load requirements. Incentives are available for the installation of specified energy measures.

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

Incentives are available to improve EE 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/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 lesser 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, analyzes 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 PV Solar Installations: Industry Metrolink 1,600 kW PV-1 Solar project

EM&V Studies

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

Major Differences or Diversions from California POU TRM for Energy Savings

None.

TABLE 1. IPUC EE Program Results by End Use

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	0	0	0	0	0	0	0	\$66,375			0.000
Lighting - Indoor	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$43,160	20.80	2.51	0.006
EE Subtotal	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
EE and Low Income Subtotal	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016

TABLE 2. IPUC EE 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)
Industrial	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
EE Subtotal	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
EE and Low Income Subtotal	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016

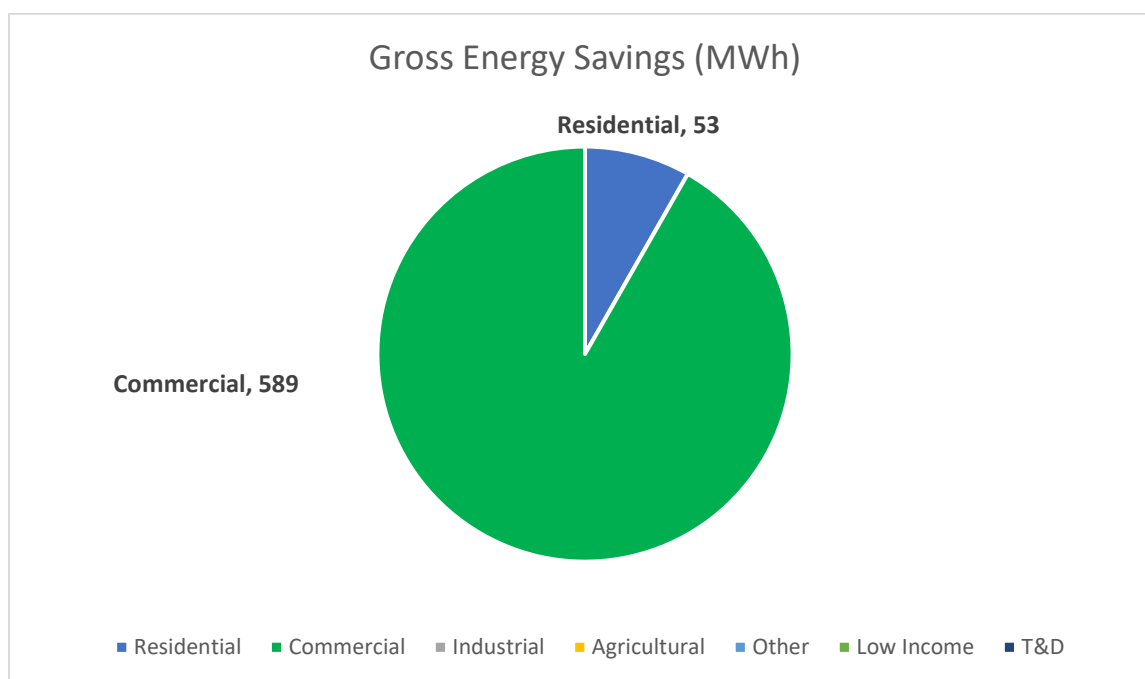
TABLE 3. IPUC EE Program Results by Building Type

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	0	0	0	0	0	0	0	\$66,375			0.000
Manufacturing Light Industrial	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$43,160	20.80	2.51	0.006
EE Subtotal	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
EE and Low Income Subtotal	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	165	781,580	11,161,168	132	625,264	8,928,934	2,933	\$109,535	8.19	2.48	0.016

LASSEN MUNICIPAL UTILITY DISTRICT

Lassen Municipal Utility District at a Glance

- Climate Zone: 16
- Customers: 10,000
- Total annual retail sales: 159,708 MWh
- Annual Retail Revenue: \$22,936,520
- Annual EE expenditures for reporting year: \$273,784
- Gross annual savings from reporting year portfolio: 642 MWh



Lassen Municipal Utility District Overview

The Lassen Municipal Utility District (LMUD) remains committed to helping customers manage their energy use through energy education and a comprehensive offering of EE incentives. For residential customers, rebates are offered for the installation of various EE 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 DI 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 EE rebate programs to our residential, commercial, and agricultural customers. There were no major changes to the program in FY 2022. We find that the customers and local contractors value consistency in program offerings.

Program and Portfolio Highlights

LMUD continued the Residential DI Program in FY 2022. LMUD also launched a commercial lighting program that offers fixtures at no cost to customers. This program has helped remove some of the barriers faced by businesses in need of lighting upgrades. This program delivered 28% of the gross annual energy savings. LMUD achieved 120% of the target net annual kWh savings for the last five years.

Commercial, Industrial & Agricultural Programs

LMUD manages a comprehensive EE incentive program for C&I and agricultural customers.

- Non-Res Lighting Program: LMUD offers rebates to business owners who invest in the installation of energy efficient lighting upgrades.
- 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 EE improvements at their sites.

Residential Programs

LMUD manages a comprehensive EE 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.

Complementary Programs

- Low-Income Programs: LMUD offers two low-income programs. WEAR, Winter Energy Assistance Rate, offers rate assistance, November through April. 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. LMUD also works with Lassen Economic Development Corporation to identify customers who qualify for state and federal Low-Income Home Energy Assistance Programs (LIHEAP).
- Renewable Energy Programs: LMUD offers customers a customer generation rate that pays customers for excess generation. Our NEM limit of 5% total peak load of 25 MW 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 \$0.055 per exported kWh.
- EVs: LMUD offers customers rebates on EV charging stations. Publicly accessible and residential are based on a first come, first served basis.

EM&V Studies

Previous EM&V reports are available on the CMUA website.

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.

TABLE 1. LMUD EE Program Results by End Use

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)
Appliance & Plug Loads	1	11,924	142,350	1	8,497	99,976	33	\$26,260	0.45	0.45	0.354
HVAC - Cooling	2	940	13,998	2	752	11,199	5	\$13,428	0.15	0.02	1.692
Lighting - Indoor	71	497,801	6,431,203	57	401,254	5,178,050	1,669	\$132,705	3.59	2.10	0.035
Lighting - Outdoor	0	112,018	1,454,995	0	89,568	1,163,721	506	\$97,253	1.45	1.44	0.114
Service & Domestic Hot Water	4	19,764	217,408	4	18,271	200,978	65	\$4,139	4.89	4.60	0.027
EE Subtotal	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
EE and Low Income Subtotal	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056

TABLE 2. LMUD EE Program Results by Sector

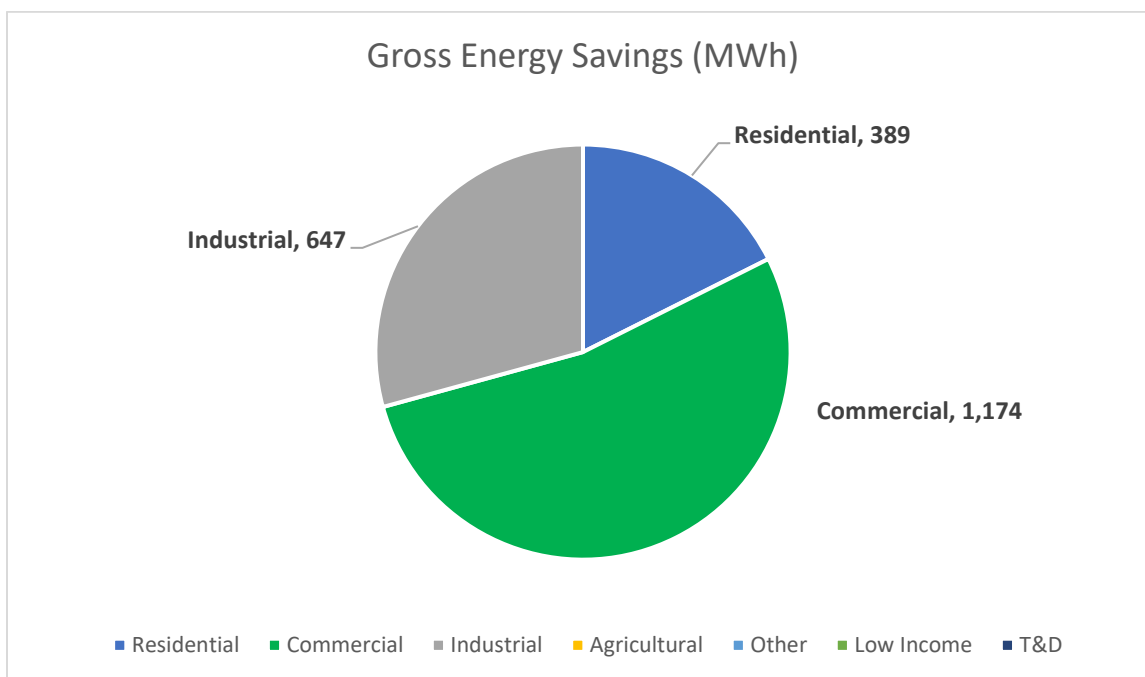
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Commercial	71	589,420	7,662,458	57	471,536	6,129,966	2,100	\$202,894	2.93	2.00	0.045
Residential	8	53,026	597,496	7	46,807	523,957	179	\$70,891	0.82	0.38	0.181
EE Subtotal	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
EE and Low Income Subtotal	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056

TABLE 3. LMUD EE 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	71	590,060	7,668,620	57	471,910	6,133,600	2,101	\$206,626	2.87	1.97	0.046
Residential	7	50,266	560,409	7	44,932	498,502	170	\$55,565	0.99	0.40	0.149
Residential - Single-Family	0	2,120	30,925	0	1,501	21,821	7	\$11,594	0.23	0.23	0.743
EE Subtotal	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
EE and Low Income Subtotal	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	78	642,446	8,259,954	63	518,343	6,653,924	2,278	\$273,784	2.38	1.45	0.056

Lodi Electric Utility at a Glance

- Climate Zone: 12
- Customers: 27,747
- Total annual retail sales: 450,539 MWh
- Annual Retail Revenue: \$78,437,312
- Annual EE expenditures for reporting year: \$601,827
- Gross annual savings from reporting year portfolio: 2,210 MWh



Lodi Electric Utility Overview

Lodi Electric Utility (LEU) utilizes the EE program to engage with residential customers, bring value to local businesses and through its commercial EE programming, expand the business relationship with key accounts. The EE 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. In 2022, with a median household income of \$66,596 and nearly half (46.6%) of the housing in the city renter-occupied, many LEU customers would not have the ability or financial means to make

significant EE 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 LEU meet their EE goals.

Major Program and Portfolio Changes

In FY 2022, LEU continued to offer a comprehensive selection of programs for 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. In FY 2022, Lodi achieved 127% of net annual energy savings targets.

LEU continued its 2021 partnership with Tree Lodi, a non-profit community-based organization dedicated to the planting, maintenance, and preservation of trees to plan and implement the LEU's first pilot Shade Tree Program. An integral component of the program will be the measurement of GHG emissions reductions of surviving trees following a two-year period of pilot implementation.

Program and Portfolio Highlights

LEU continued to offer the Residential DI and Snapshot Audit program that it started in FY 2016. This program offers installation of LEDs, advanced power strips, thermostatic shower valves, shower heads, and aerators in customer homes at no cost. The intent is to provide a program for residential customers that do not traditionally participate in EE rebate programs. While open to all residential customers, the program specifically targets multi-family and low-income properties, as they are not likely to benefit from traditional EE programs.

The Non-Residential Rebate Program continues to provide a large portion of energy savings achieved, accounting for 55% of annual net savings for FY 2022. Through key accounts management, the utility maintains a proactive and positive relationship with LEU's largest energy consumers. These relationships are vital to Lodi's overall economic development strategy and through them our large commercial and industrial customers have been effectively encouraged to engage and make investments in EE.

Commercial, Industrial & Agricultural Programs

LEU manages a comprehensive EE incentive program for commercial and industrial customers focusing on EE 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. EE 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 efficient lighting upgrades.

- Non-Res HVAC: LEU 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: LEU 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, LEU 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 LEU over a 24-month period. The amounts due are invoiced on the customer's monthly utility bill.
- Keep Your Cool: This program provides direct installation of energy savings measures for restaurants, convenience stores, or other facilities with commercial refrigeration. The program offers upgraded equipment such as energy efficient motors, motor controls, anti-sweat heater controls, door closers and case lighting to help reduce energy use. This program is a popular energy savings program for commercial and industrial customers in Lodi, particularly retail food distributors.

Residential Programs

For residential customers, rebates are offered for the installation of various EE 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 DI: 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 payment assistance grants to very low-income customers in need of assistance paying their electric utility account. In 2022, CARE Package assistance payments were increased from \$110 to \$150. Eligible participants may apply for up to \$150 in a six month period.
- Lodi SHARE Discount Rate: LEU provides a rate discount of 30% for qualifying residential customers on their electric utility monthly billing statement; over \$476,540K was budgeted in FY22 for this rate discount from the Lodi Public Benefits Program fund.
- Renewable Energy Programs: LEU offers an Energy Purchase rate tariff for customers interested in installing solar. In addition, LEU funds a portion of its eligible power supply costs from the Public Benefits Program fund each year, totaling a little over \$120K in FY 2022.
- EVs: LEU offers rebates for residential and commercial EV chargers and in April 2022, added rebates for the purchase of new and used zero emission vehicles including both standard and income-qualifying rebates. Efforts also continued throughout the City in FY 2022 to replace public EV charging stations with the help of the California Electric Vehicle Infrastructure Project and LCFS funding.
- EE and Conservation Curriculum: LEU has successfully implemented a middle school educational curriculum designed to teach students about how to use energy responsibly. Energy education efforts include a science-based EE curriculum designed to demonstrate how small changes in energy use can make a big impact on overall energy consumption. Beginning in September 2021 to June 2022, educational program highlights included lessons delivered through an in-person and on-line platform to 544 students across 10 Lodi middle schools. This content was followed with hands-on activities to enhance learning retention. During the implementation period, teachers, students, and parents were given access to the on-line Web App. During the final lesson, students completed exercises that required measuring current home energy use, retrofitting home energy use devices with high efficiency devices from take-home kits. As part of the program, students were given the opportunity to participate in three competitions: the Student Challenge, Video Contest, and Photo Contest.

EM&V Studies

Previously completed EM&V reports are available for review on the NCPA website.⁴⁰

⁴⁰ See www.ncpa.com/policy/reports/emv/.

Major Differences or Diversions from California POU TRM for Energy Savings

LEU relies 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.

TABLE 1. LEU EE Program Results by End Use

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)
Appliance & Plug Loads	7	67,428	613,780	6	47,169	397,098	133	\$82,963	0.52	0.52	0.277
Building Envelope	60	66,607	1,383,949	22	23,934	498,467	509	\$72,273	1.90	0.37	0.224
HVAC - Cooling	20	41,605	378,782	17	34,356	310,419	125	\$43,002	2.11	1.51	0.179
Lighting - Indoor	200	1,256,999	17,833,145	190	1,193,612	16,932,881	5,503	\$279,382	5.66	3.07	0.023
Lighting - Outdoor	0	754,618	9,840,445	0	716,887	9,348,422	4,048	\$121,720	7.61	5.65	0.018
Service & Domestic Hot Water	4	22,622	248,847	1	7,027	77,294	32	\$2,487	3.12	2.67	0.043
EE Subtotal	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
EE and Low Income Subtotal	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030

TABLE 2. LEU EE 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)
Commercial	80	1,174,430	15,136,652	76	1,113,564	14,365,035	5,606	\$185,644	7.49	5.37	0.018
Industrial	96	646,655	10,346,474	91	614,322	9,829,150	3,200	\$97,568	9.35	3.03	0.014
Residential	115	388,796	4,815,821	69	295,098	3,370,396	1,544	\$318,615	1.52	0.76	0.128
EE Subtotal	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
EE and Low Income Subtotal	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030

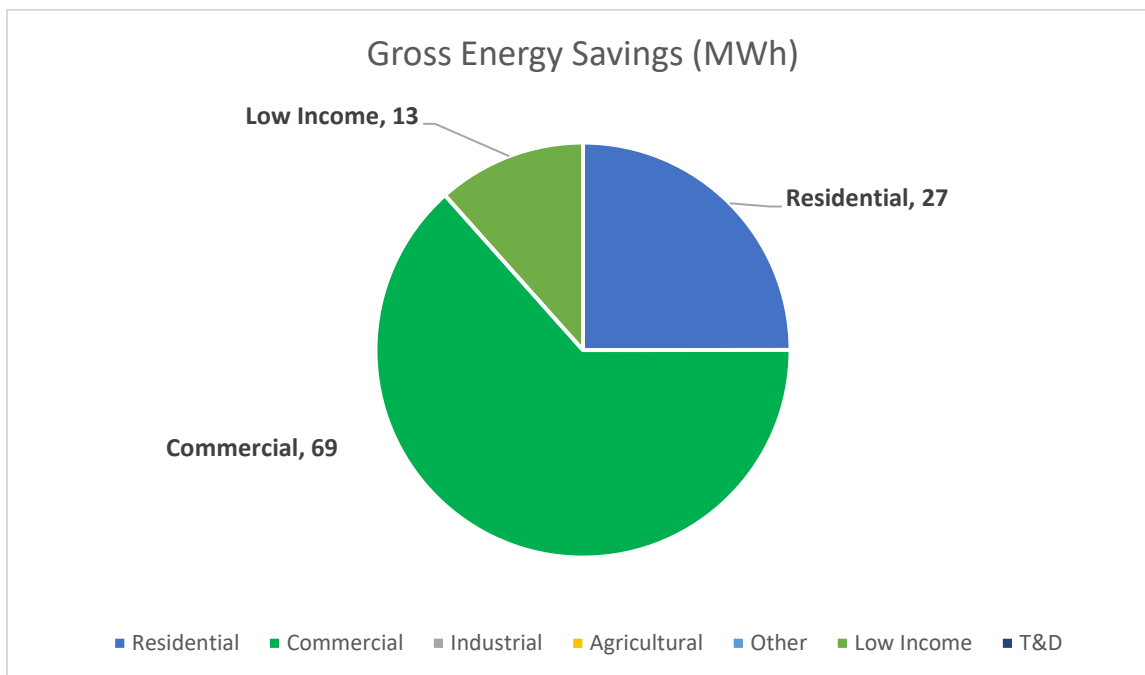
TABLE 3. LEU EE Program Results by Building Type

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	174	1,823,202	25,594,460	163	1,717,248	24,152,008	8,793	\$283,841	8.09	4.10	0.016
Assembly	4	14,520	84,243	4	12,342	71,606	23	\$1,065	7.46	4.60	0.017
Other Commercial	2	6,925	63,610	2	5,886	54,069	17	\$2,982	1.85	3.32	0.071
Residential	104	332,137	4,189,742	63	267,404	3,068,057	1,405	\$261,941	1.69	1.06	0.116
Residential - Single-Family	7	33,096	366,892	5	20,103	218,841	111	\$51,997	0.67	0.16	0.318
EE Subtotal	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
EE and Low Income Subtotal	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	291	2,209,880	30,298,947	236	2,022,984	27,564,581	10,349	\$601,827	4.63	2.33	0.030

LOMPOC ELECTRIC UTILITY

Lompoc Electric Utility at a Glance

- Climate Zone(s): 5
- Customers: 15,195
- Total annual retail sales (MWh): 112,610
- Annual Retail Revenue: \$19,191,527
- Annual EE expenditures for reporting year: \$132,271
- Gross annual savings from reporting year portfolio (MWh): 110



Lompoc Electric Utility Overview

Established in 1923, the City of Lompoc's Electric Utility serves electricity to over 15,000 customers in the Central Coast region of California. Lompoc offers a variety of programs to assist all customer classes by economizing their monthly electricity costs through EE and conservation practices. The local climate, customer base and community demographics largely influence Lompoc's strategy to offer effective energy-saving programs to its customers.

In FY 2022, a majority of the Lompoc's energy savings were achieved through its commercial lighting retrofit program, since there is little need for air conditioning in Lompoc's coastal climate and most buildings are heated by gas. Residential customers accounted for 90% of Lompoc's customer base in FY 2022, with an average residential electricity use of 328 kWh per

month. Only 11% of the retail customer connections are commercial and demand customers; however, these customer classes hold the majority of energy savings opportunities within Lompoc's electricity service territory.

The demographics of the Lompoc community also have an impact on the participation rate of EE programs. The average median household income in Lompoc is \$60,234 with 19.4% of the population living in poverty.⁴¹ Many residential customers have limited funds or little incentive to make EE improvements to their homes. During FY 2022, numerous small, local businesses within Lompoc's service territory were continuing to recover and resume normal business after the COVID-19 pandemic, leaving little room for owner-led investment in EE upgrades during this time. To assist its customers, Lompoc continued to offer generous rebate and income-qualifying programs for customers.

Major Program and Portfolio Changes

In FY 2022, Lompoc began seeking new ways to help its customers reduce energy use while continuing to offer its usual EE and conservation programs. As an element of distributed energy resources research, Lompoc purchased two EV ARC stations in FY 2022 using a \$100,000 grant provided by the Santa Barbara County Air Pollution Control District's Clean Air Grants Program, which covered a majority of the project cost. The EV ARC systems are grid-independent, self-contained EV charging systems that include a solar generation system, battery storage, and an EV charger designed to generate and store clean electricity, then deliver that electricity to electric and hybrid vehicles at any given time of the day. Lompoc opted to offer the use of the EV ARC stations to the public at no cost to station users. This project reduced local energy demand created by EV charging and helped Lompoc better understand its customer base's current and future electrification needs by inducing local conversation about transportation electrification. These were the first publicly accessible EV chargers Lompoc installed in its service territory.

Lompoc also began its LED Lightbulb Replacement and LED Holiday Light Exchange programs in FY 2022. Customers of all classes were able to bring their old, inefficient lightbulbs or holiday light strings into City Hall and replace them with new, efficient light bulbs or holiday lights. Lompoc offered the new equipment, as well as the disposal of hazardous and electronic waste, at no cost to utility customers as both programs were funded with public benefit resources. These programs assisted customers with old, inefficient lighting equipment to replace it without having to incur an upfront purchase cost and lessened the increase in electric utility bills during the holiday season.

Program and Portfolio Highlights

Lompoc noticed increased participation in its Commercial Lighting Rebate Program from C&I, and institutional customers this year and hopes to continue increasing participation in the

⁴¹ See <https://www.census.gov/quickfacts/lompoccitycalifornia>.

program in future years. This program is designed to support commercial, industrial and institutional customers optimize their energy usage by incentivizing the removal and replacement of old, inefficient light fixtures with more efficient LED fixtures. This program provided 63% of Lompoc’s annual energy savings in FY 2022.

Commercial, Industrial & Agricultural Programs

Lompoc offers a number of rebate programs for commercial, industrial and agricultural customers, including rebates for lighting, HVAC, and other energy-efficient equipment upgrades. These customer classes may also apply for rebates on custom energy-saving projects. Lompoc currently classifies industrial and agricultural customers as commercial customers; therefore, there are no specific programs for these sectors.

Residential Programs

Lompoc offers several rebate opportunities for residential customers such as the Energy Star® Appliance Rebate Program, the LED Lighting Replacement Program, and the Holiday Light Replacement Program. While each residential rebate program provided a small percentage of Lompoc’s overall energy savings, these programs provide all customers a chance to participate in Lompoc’s EE program. It should be noted that clothes washer rebates administered through the Energy Star® Appliance Rebate Program is partly funded from the PBC, sharing program costs with the City of Lompoc’s Water Conservation Fund. Lompoc provides both water and electricity services to its customers, among other services.

To help encourage low-income residential customer participation in EE upgrades, Lompoc continued to offer its Income-Qualified Energy Star® Refrigerator Replacement and Recycle Program in FY 2022. Success of this program can be attributed to an established pre-approval process for participating customers, as well as city staff working with one small, locally owned appliance dealer who handles the delivery and installation of new energy-efficient refrigerators. The appliance dealer also handles refrigerator-recycling processes for participating customers. This program expedites the process for low-income customers to participate in the EE program and assists Lompoc to ensure that old, inefficient appliances are recycled properly at the city landfill. Residential customers must meet low-income guidelines established by the Department of Housing and Urban Development (HUD) to participate. Participating customers also pay a portion of the cost back to Lompoc over a year.

Complementary Programs

In addition to the portfolio programs, Lompoc also offers rate assistance, customer energy use auditing, and has been closely evaluating the feasibility of offering EV charging services. Lompoc provides financial assistance with electricity charges for customers who have a household income level below the HUD Low Income Limits Calculation for the local area.

The Customer Energy Audit Program continues to be highly successful in meeting customers’ needs. Using Lompoc’s automatic meter reading capabilities, staff is able to view daily and

hourly electric use data. Customers are provided with 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 EE upgrades. Audits are also offered over-the-phone and via email to further assist customers who are unable to visit City Hall during business hours. Customers may also borrow a watt meter to measure the energy use of appliances and electronics used at home.

EM&V Studies

Previously completed EM&V reports are available for review on the CMUA website.⁴²

Major Differences or Diversions from CA POU TRM for Energy Savings

The City of Lompoc used the CMUA Savings Estimation TRM as the primary source for calculating and reporting annual EE program performance during FY 2022.

⁴² See <https://www.cmua.org/emv-reports>.

TABLE 1. LOMPOC EE Program Results by End Use

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)
Appliance & Plug Loads	1	17,504	198,631	1	9,087	101,164	40	\$82,865	0.15	0.15	1.120
Lighting - Indoor	7	31,198	426,277	6	23,164	312,313	97	\$14,452	1.94	1.47	0.064
Lighting - Outdoor	0	48,171	605,398	0	37,763	479,677	207	\$12,354	4.26	1.58	0.035
EE Subtotal	8	96,873	1,230,306	6	70,015	893,155	345	\$109,671	0.85	0.71	0.168
Appliance & Plug Loads	2	12,694	110,016	1	8,886	77,011	26	\$22,600	0.39	0.53	0.398
Low-Income Subtotal	2	12,694	110,016	1	8,886	77,011	26	\$22,600	0.39	0.53	0.398
EE and Low Income Subtotal	10	109,567	1,340,322	8	78,900	970,166	370	\$132,271	0.77	0.69	0.186
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	10	109,567	1,340,322	8	78,900	970,166	370	\$132,271	0.77	0.69	0.186

TABLE 2. LOMPOC EE 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)
Commercial	7	69,493	903,409	5	55,594	722,727	280	\$14,606	5.04	2.07	0.028
Residential	2	27,380	326,897	1	14,420	170,427	65	\$95,065	0.20	0.20	0.772
EE Subtotal	8	96,873	1,230,306	6	70,015	893,155	345	\$109,671	0.85	0.71	0.168
Residential	2	12,694	110,016	1	8,886	77,011	26	\$22,600	0.39	0.53	0.398
Low-Income Subtotal	2	12,694	110,016	1	8,886	77,011	26	\$22,600	0.39	0.53	0.398
EE and Low Income Subtotal	10	109,567	1,340,322	8	78,900	970,166	370	\$132,271	0.77	0.69	0.186
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	10	109,567	1,340,322	8	78,900	970,166	370	\$132,271	0.77	0.69	0.186

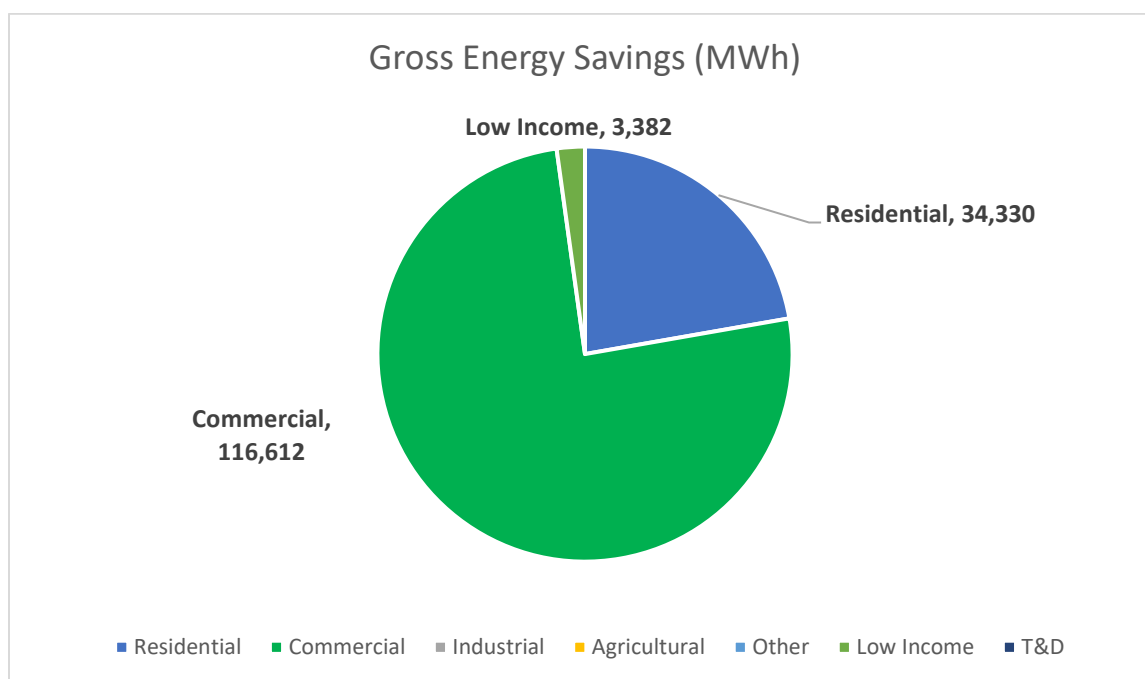
TABLE 3. LOMPOC EE Program Results by Building Type

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	8	77,376	954,839	6	60,527	754,667	291	\$31,203	2.47	1.40	0.056
Residential	1	14,866	205,996	0	6,246	89,858	38	\$46,739	0.23	0.23	0.727
Residential - Single-Family	0	4,631	69,471	0	3,242	48,630	16	\$31,729	0.17	0.18	0.916
EE Subtotal	8	96,873	1,230,306	6	70,015	893,155	345	\$109,671	0.85	0.71	0.168
All	2	8,932	53,592	1	6,252	37,514	12	\$11,069	0.38	0.51	0.386
Residential - Single-Family	0	3,762	56,424	0	2,633	39,497	13	\$11,531	0.40	0.55	0.410
Low-Income Subtotal	2	12,694	110,016	1	8,886	77,011	26	\$22,600	0.39	0.53	0.398
EE and Low Income Subtotal	10	109,567	1,340,322	8	78,900	970,166	370	\$132,271	0.77	0.69	0.186
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	10	109,567	1,340,322	8	78,900	970,166	370	\$132,271	0.77	0.69	0.186

LOS ANGELES DEPARTMENT OF WATER & POWER

Los Angeles Department of Water & Power at a Glance

- Climate Zones: 6, 8, 9
- Customers: 1,565,000
- Total annual retail sales: 21,255,000,000 MWh
- Annual Retail Revenue: \$4,268,478,000
- Annual EE expenditures for reporting year: \$181,895,085
- Gross annual savings from reporting year portfolio: 154,324 MWh



Los Angeles Department of Water & Power Overview

The Los Angeles Department of Water and Power (LADWP) was established in 1902 to deliver water to the City of Los Angeles and distribute 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: 6, 8, 9, and 16. LADWP registered a peak demand of 4,868 MW on September 9, 2021.

Major Program and Portfolio Changes

Most programs that were temporarily suspended for health and safety of customers during the COVID-19 pandemic continued full operation in 2021. The programs that returned to full

operation were HVAC Optimization Program, Refrigerator Exchange Program, Refrigerator Turn-In & Recycle, LAUSD DI Program and the Commercial DI Program.

The Home Energy Improvement Program (HEIP) remained suspended throughout FY 2022. The Residential Lighting Efficiency Program (RLEP) did not return to normal Direct-to-Door distribution in FY 2022, but customers participating in the Refrigerator Exchange Program are provided two LED bulbs at the time the new refrigerator is delivered.

The Comprehensive Affordable Multifamily Retrofits (CAMR) was launched in May 2022 to assist L.A.'s low income, multifamily property owners. CAMR offers multifamily property owners free property assessments to identify efficiency opportunities to help owners and their residents to save energy and reduce costs. In addition, qualified property owners will receive aid with work scope development and the contractor procurement process.

Due to the COVID-19 pandemic, supply chain and computer chip manufacturing shortages has severely limited participation in the Refrigerator Exchange Program since the 4th quarter of FY 2022 due to lack of inventory.

Program and Portfolio Highlights

- HVAC Optimization Program: The HVAC Optimization Program (ACOPT) was shut down for the majority of the FY 2021 due to the COVID-19 pandemic and reopened at the beginning of FY 2022. An increased rebate was added in the second quarter of the fiscal year to encourage customers replacing their old, inefficient HVAC systems to make the fuel conversion from natural gas heating to a high efficiency, all-electric option.
- City Plants: The Tree Ambassador sub-program trains local members of DACs in urban forestry and how to recruit nearby participation. New marketing campaigns were implemented successfully using a variety of outreach methods. More integrated cross-promotion has begun with the Turf Replacement program and related Water Conservation offerings.
- HEIP: While the program was suspended the entire fiscal year, it expanded program terms and conditions to focus on multi-family properties, while creating a dedicated Multi-family HEIP application for eligible properties.
- Refrigerator Turn in & Recycle Program: In an effort to increase customer awareness and participation in the program, LADWP continued to offer the increased incentive of \$60 per refrigerator/freezer recycled.
- Program Outreach & Community Partnerships Program: The program expanded its focus beyond efficiency programs to topics such as financial assistance, community solar, water quality, and electric vehicles. Began utilizing online signatures, digital program documents, and virtual meetings resulting in time, cost, and GHG savings. Short notice adjustments to scopes of work allowed support of LADWP CARES grants. Overall funding was increased with an added emphasis on financial assistance programs in all grant phases.

- Savings by Design / Zero by Design: On January 1, 2021, Savings by Design (SBD) transitioned to Zero By Design (ZBD) without the SoCalGas partnership. The program provides greater flexibility to customers and offers streamlined incentive payment options which had created challenges under SBD. The ZBD program offers two tracks:
 - Express – Select prescriptive measures using deemed savings.
 - Custom – Whole building projects using energy modeling for savings.
- Prescriptive Measures which use deemed savings include Water Cooled Chiller Centrifugal w/ Conventional Variable Speed Drive, Water Cooled Chiller Variable Speed Screw, Variable Speed Drive for a Central Plant System Condenser Water Pump, Air Cooled Constant Speed Screw Chiller, and Cogged V-Belt for HVAC Fan Motors.
- External Studies: LADWP has contributed to several research studies as it relates to Building Electrification, including the following:
 - NBI’s Building Electrification Technology Roadmap (BETR).⁴³
 - E3’s Residential Building Electrification in California.⁴⁴

LADWP is also partnered with The National Renewable Energy Lab (NREL) to develop a technology prioritization process as LADWP ramps up its Emerging Technologies efforts. This effort incorporates many of the tools and methods used in LADWP’s 100% Renewable study effort (LA100).⁴⁵

The set of tools and methods allows LADWP to assess potential impacts as it relates to its building stock for a given technology. This effort will have multiple use cases to empower LADWP to provide more accurate potential studies and develop a pipeline of new technology assessments to determine the appropriate intervention required to get maximum benefits. The goal is to quantify achievable contributions towards goals set by state and local energy policies for the lowest cost.

Commercial, Industrial & Agricultural Programs

- City Plants: The City Plants (CP) Program provides free shade trees for residents and property owners in Los Angeles to promote tree planting to improve the city's tree canopy, air quality, stormwater retention, and, importantly, building EE. 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 can provide free shade trees for residents and property owners and information on where to plant the trees for maximum EE benefits. City Plants currently focuses on delivering trees to residential and commercial

⁴³ See <https://newbuildings.org/resource/building-electrification-technology-roadmap/>.

⁴⁴ See <https://www.ethree.com/e3-quantifies-the-consumer-and-emissions-impacts-of-electrifying-california-homes/>.

⁴⁵ See <https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-cleanenergyfuture/a-p-renewableenergystudy>.

customers and planting trees on residential parkways, commercial parkways, and other city property (Res Cooling, Res Shell, Commercial Shell).

- C&S: The Codes, Standards & 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 Los Angeles 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 concerning water and energy use. The principal audience includes the Los Angeles City Department of Building and Safety, Los Angeles City Planning, Los Angeles City Department of Public Works, and the Los Angeles City Council, which 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 EE and water conservation regulations and standards, and industry groups that conduct research and develop industry-specific standards. (Non-Res Process)
- Commercial DI: The Commercial DI Program is a free DI 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. The CDI program is available to qualifying businesses whose average monthly electrical demand is 250 kW or less. (Non-Res Lighting)
- Commercial Lighting Incentive Program: The Commercial Lighting Incentive Program (CLIP) offers customers incentives to install newly purchased and installed energy-efficient lighting and controls. CLIP currently provides incentives to customers whose monthly electrical use is greater than 200 kW. CLIP's calculated savings approach allows customers to tailor their lighting efficiency upgrades to meet their lighting needs better, attain greater energy savings, and receive higher incentives. (Non-Res Lighting)
- Custom Performance Program (CPP): The Custom Performance Program (CPP) provides cash incentives for energy savings achieved through the implementation and installation of various EE measures and equipment that meet or exceed Title 24 or industry standards. Measures may include but are not limited to equipment controls, industrial process, retrocommissioning, chiller efficiency, and/or other innovative energy savings strategies.

CPP's Custom Express fast tracks smaller, less energy-intensive projects with deemed energy savings projections to help expedite application processing and get customers paid faster, while CPP's Custom Calculated conducts an in-depth energy savings analysis to custom calculate customers' individual efficiency projects' energy savings. By utilizing our customers' existing facility conditions as the baseline, CPP's Custom Calculated

maximized our customers' savings potential! (Non-Res Cooling, Non-Res Comprehensive, Non-Res Motors, Non-Res Lighting, Non-Res Refrigeration)

- Food Service: The Food Service Program (FSP) 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, dishwashers and handwrappers. (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 EE 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 results in a reduction in energy and water consumption and procurement expense for LADWP that would otherwise be borne by LADWP customers. (Non-Residential Lighting)
- Los Angeles Unified School District DI: The Los Angeles Unified School District (LAUSD) DI Program is designed to improve energy and water efficiency throughout LAUSD's facilities through upgrades in electric and water systems. This program provides EE design assistance, project management experience, and retrofitting installation, utilizing LADWP's Power Construction Maintenance (PCM) and Commercial DI program to assist LAUSD facilities reducing energy usage and corresponding utility expenses. (Non-Res Lighting)
- SBD and ZBD: The SBD Program was a California statewide non-residential new construction program, in which LADWP partnered with SoCalGas to offer a uniform, multi-faceted program designed to consistently serve the needs of the commercial building community. SBD encouraged 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. On January 1, 2021, SBD transitioned to ZBD without the SoCalGas partnership.

ZBD is LADWP's non-residential new construction incentive program. Launched on January 1, 2021, LADWP ZBD replaces the California-statewide SBD program that was held in partnership with SoCalGas. LADWP ZBD encourages energy-efficient building design and construction practices by 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 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 can 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 program added additional upstream market actors to expand its coverage of the Los Angeles market. The upstream program is designed to adapt to market changes. Therefore, LADWP will continue working with relevant industry players to enhance the program to include new beyond-code upstream incentives continually. (Commercial Cooling)

Residential Programs

- California Advanced Homes: The California Advanced Home Program (CAHP) is a statewide residential construction incentive program in which LADWP participated through a partnership with the Southern California Gas Company. CAHP incentivized builders and designers to create environmentally friendly, energy-efficient communities for potential home buyers. CAHP was available to single and multi-family residential new construction projects and helped builders prepare for future code changes by encouraging them to build homes that exceed code, ultimately driving new homes to Zero Net Energy (ZNE). The program partnership ended in December 2019. (Res Comprehensive)
- Consumer Rebate Program (CRP): The Consumer Rebate Program offers incentives to its residential customers to promote and advance comprehensive EE measures, including whole-house solutions, plug load efficiency, performance standards, and integration opportunities. 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: The Efficient Product Marketplace (EPM) offers customers the opportunity to research, locate, and purchase energy efficient products online. Residential customers can also apply for rebates on qualifying ENERGY STAR® products, including refrigerators, room air conditioners, LED lighting, and televisions. Rebates are also available for Wi-Fi enabled thermostats and advanced power strips. Customers have the option of purchasing qualified products from a third-party retailer and submitting a rebate application or purchasing select products directly through the online marketplace and having the rebate applied as an instant discount at the time of purchase. (Res Cooling, Res Lighting, Res Refrigeration)
- HEIP: The HEIP is a comprehensive DI whole-house retrofit program that offers residential customers a full suite of free products and services to improve the home's energy and water efficiency by upgrading/retrofitting the home's envelope and core systems. While not limited to low-income customers, in FY 2021, HEIP expanded to serve DACs and residential customers by including the multi-family segment. (Res Shell, Res Lighting)

- HVAC Optimization Program: The AC Optimization Program provides services by certified, professional HVAC technicians to analyze cooling systems and provide basic maintenance to maximize system efficiency. This service is offered to eligible residential and commercial LADWP customers at no cost. This program also offers a programmable, Wi-Fi enabled thermostat free of charge to residential customers. (Res Cooling)
- Refrigerator Exchange Program / Window AC: The Refrigerator Exchange Program (REP) 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 program's delivery and provide new, energy-saving ENERGY STAR® rated refrigerators for this customer segment to replace qualifying older, inefficient, but operational models. Additionally, customers can pair the REP with the Window Air Conditioner Recycling Program, which offers a \$25 rebate to residential customers to turn in their old window air conditioners. Eligible units must be fully operational and satisfy certain age and size requirements. (Res Refrigeration)
- Refrigerator Turn-In & Recycle: The Refrigerator Turn-in and Recycle Program offers a \$60 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 program's delivery. (Res Refrigeration)
- Residential Lighting Efficiency Program: The Residential Lighting Efficiency Program (RLEP) provides LED lamps to customers to reduce their home electrical use. The primary channel for distributing the LED lamps is by way of Direct-to-Door to residential customers within LADWP's service territory. Lamps are also distributed at community events and by community-based organizations. Alternative and additional distribution campaigns continue to be evaluated. (Res Lighting)

Complementary Programs

- Low-Income Programs: Refrigerator Exchange Program, Home Energy Improvement Program, Energy Savings Assistance Program and Commercial DI Program are key programs offered to the community, small business customers, hard to reach customers, low-income customers, and multi-unit dwellings.
- Emerging Technologies Program: The LADWP Emerging Technologies Program (ETP) is designed to accelerate the introduction of innovative energy and water-efficient technologies, applications, and analytical tools that are not yet widely adopted in California. By reducing both the performance uncertainties associated with new products and institutional barriers, this program's ultimate goal is to increase the

probability that promising energy and water efficiency technologies will be commercialized and adopted throughout Los Angeles.

As a non-resource program for LADWP and focused on promoting the development and implementation of new technologies in the LADWP community, ETP provides energy and water savings that are ultimately captured in LADWP's resource programs. In this way, ETP plays a vital role in positioning LADWP as a state and national leader in energy and water efficiency.

- **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 preserving and protecting 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.
- **Program Outreach & Community Partnerships Program:** The Program Outreach & Community Partnerships Program is an advocacy program that strives to improve customer awareness among LADWP's "hard-to-reach" customers of electric efficiency and water conservation programs through community-based activities organizations. This program offers grants to local non-profit organizations that are awarded through a competitive selection process to work in one of the fifteen Los Angeles City Council Districts, or, on an at-large basis, to improve community and customer awareness of LADWP's core EE and water conservation programs and free services customers can take to reduce energy and water use. The program has expanded to focus on other topics such as financial assistance, community solar, water quality, and electric vehicles.
- **RD&D:** LADWP is involved in various internal 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. Some of these studies are in collaboration with the Electric Power Research Institute
- **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 chargers at their business place. 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 cost to the installation process but will yield lower electricity costs for off-peak charging.

EM&V Studies

The total not to exceed budget for the round of EM&V over the 3-year contract period is \$4,895,135, which is equivalent to approximately 1% of the total portfolio budget annually.

This evaluation will review past (retrospective) impact savings from FY 2016 through FY 2020 while simultaneously reviewing impact savings as it occurs (concurrently), from FY 2021 through FY 2023. The process evaluation portion of the scope will only review the concurrent period. The new round of LADWP EM&V activities started Q3 of 2020 to capture impact evaluation for retrospective years. Both impact and process evaluation will be evaluated for concurrent years.

Like prior years, the current round of the EM&V contract will also have a contract term duration of three years. With comparable budgets as proportioned to the portfolio savings.

LADWP has opted to evaluate its programs and activities from a holistic standpoint, emphasizing the effects of EE programs. Beyond the core impact and process evaluation findings, the new EM&V efforts will build upon the preliminary Market Transformation (MT) evaluation plan reported in prior years. One of the MT evaluation results will be to quantify 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.

Retrospective Impact Evaluation Scope results and reports were delivered by June of 2021. With comprehensive final results and report provided by Oct of 2023.

LADWP will publish all past and future reports on the LADWP Website.⁴⁶

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, and simple engineering calculations in spreadsheet format. LADWP's Custom Performance Program and Commercial Lighting incentive Programs apply these methods, respectively. For DI and residential programs, deemed savings supported by a combination of the latest Technical Reference Manual and utility workpapers are used. Examples of programs using this approach include the Commercial DI, Consumer Rebate Program, the Food Service Program, Refrigerator Exchange, and Refrigerator Recycling Programs.

LADWP is currently transitioning towards leveraging the CalTF eTRM for its deemed savings references. Moving forward, all new additions and updates will be referring to the eTRM as the primary source.

⁴⁶ See

https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=OPLADWPCCB436019&RevisionSelectionMethod=LatestReleased.

For the current FY 2022 SB 1037 portfolio submission, all gross savings claims are Ex-Post EM&V verified and adjusted. Details of EM&V results, methodologies and overall findings can be found in the latest EM&V report as referenced in the EM&V studies section above.

TABLE 1. LADWP EE Program Results by End Use

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
Appliance & Plug Loads	416	2,172,062	19,003,796	416	2,172,062	19,003,796	877	\$950,445	1.18	1.13	0.065
Building Envelope	8,170	7,367,636	145,654,040	8,170	7,367,636	145,654,040	5,857	\$4,764,729	5.09	4.26	0.050
Commercial Refrigeration	15	127,511	1,912,671	15	127,511	1,912,671	71	\$68,010	1.71	0.96	0.050
Food Service	23	165,310	2,168,928	23	165,310	2,168,928	80	\$486,977	0.27	0.23	0.307
HVAC - Cooling	9,761	15,897,750	162,752,857	9,761	15,897,750	162,752,857	6,019	\$19,495,007	0.95	1.07	0.165
HVAC - Heat Pump	2,950	6,885,943	35,106,334	2,950	6,885,943	35,106,334	1,825	\$11,072,637	0.25	0.26	0.404
HVAC - Heating	0	-264,959	-3,983,109	0	-264,959	-3,983,109	-167	\$497,714	-0.21	-0.25	-0.182
Lighting - Indoor	9,421	75,048,847	696,344,018	9,421	75,048,847	696,344,018	29,376	\$84,725,663	0.51	0.55	0.157
Lighting - Outdoor	1,117	12,491,578	89,798,523	1,117	12,491,578	89,798,523	4,990	\$7,179,742	0.45	0.59	0.106
Process	1,330	10,890,937	157,756,501	1,330	10,890,937	157,756,501	5,442	\$4,968,877	1.91	1.86	0.044
Service & Domestic Hot Water	0	-15,888	-238,327	0	-15,888	-238,327	-8	\$404,567	-0.03	-0.03	-2.421
Water Pumping / Irrigation	2,285	14,709,249	205,744,161	2,285	14,709,249	205,744,161	7,775	\$5,484,765	2.49	3.55	0.037
Whole Building	1,226	5,466,004	108,747,301	1,226	5,466,004	108,747,301	4,221	\$17,890,214	0.44	0.29	0.249
EE Subtotal	36,714	150,941,980	1,620,767,694	36,714	150,941,980	1,620,767,694	66,358	\$157,989,347	0.79	0.79	0.132
Appliance & Plug Loads	544	2,841,247	40,549,256	544	2,841,247	40,549,256	1,622	\$4,223,722	0.61	0.61	0.144
Lighting - Indoor	14	102,365	333,252	14	102,365	333,252	15	\$18,108	0.71	0.71	0.070
Whole Building	100	437,988	8,830,002	100	437,988	8,830,002	344	\$1,523,089	0.42	0.28	0.261
Low-Income Subtotal	658	3,381,600	49,712,510	658	3,381,600	49,712,510	1,981	\$5,764,919	0.56	0.49	0.163
EE and Low Income Subtotal	37,371	154,323,580	1,670,480,204	37,371	154,323,580	1,670,480,204	68,339	\$163,754,266	0.78	0.78	0.133
All	226	1,819,619	23,806,682	226	1,819,619	23,806,682	869	\$122,922	11.44	0.75	0.007
Appliance & Plug Loads	6,824	40,821,061	615,717,668	6,824	40,821,061	615,717,668	23,003	\$3,401,980	11.42	7.73	0.008
Building Envelope	2,167	6,826,632	102,968,359	2,167	6,826,632	102,968,359	3,358	\$973,952	11.42	8.94	0.013
Commercial Refrigeration	586	5,036,272	75,963,768	586	5,036,272	75,963,768	2,864	\$375,084	11.42	7.45	0.007
Food Service	2	13,782	207,879	2	13,782	207,879	7	\$1,064	11.42	7.54	0.007
HVAC - Cooling	6,733	26,159,287	394,569,247	6,733	26,159,287	394,569,247	12,639	\$3,585,848	11.42	8.86	0.013
Lighting - Indoor	9,066	69,833,954	1,053,328,801	9,066	69,833,954	1,053,328,801	37,411	\$5,883,277	11.43	7.77	0.008
Miscellaneous	358	2,878,453	43,416,663	358	2,878,453	43,416,663	1,523	\$226,981	11.43	7.60	0.007
Process	5	43,555	656,955	5	43,555	656,955	23	\$3,435	11.43	7.60	0.007
Service & Domestic Hot Water	556	4,219,788	63,648,475	556	4,219,788	63,648,475	2,397	\$279,591	11.42	7.14	0.006
Whole Building	6,061	36,678,940	553,240,674	6,061	36,678,940	553,240,674	20,626	\$3,286,686	11.42	7.91	0.008
C&S Subtotal	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009

C&S, T&D and Electrification Subtotal	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009
Utility Total	69,954	348,654,922	4,598,005,375	69,954	348,654,922	4,598,005,375	173,058	\$181,895,085	1.84	1.75	0.055

TABLE 2. LADWP EE 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)
Commercial	14,717	116,611,598	1,230,804,259	14,717	116,611,598	1,230,804,259	49,574	\$106,911,406	0.74	0.79	0.116
Residential	21,997	34,330,382	389,963,436	21,997	34,330,382	389,963,436	16,784	\$51,077,940	0.88	0.79	0.188
EE Subtotal	36,714	150,941,980	1,620,767,694	36,714	150,941,980	1,620,767,694	66,358	\$157,989,347	0.79	0.79	0.132
Residential	658	3,381,600	49,712,510	658	3,381,600	49,712,510	1,981	\$5,764,919	0.56	0.49	0.163
Low-Income Subtotal	658	3,381,600	49,712,510	658	3,381,600	49,712,510	1,981	\$5,764,919	0.56	0.49	0.163
EE and Low Income Subtotal	37,371	154,323,580	1,670,480,204	37,371	154,323,580	1,670,480,204	68,339	\$163,754,266	0.78	0.78	0.133
Commercial	18,489	135,944,395	2,046,855,392	18,489	135,944,395	2,046,855,392	69,618	\$12,834,325	11.43	7.37	0.009
Residential	14,094	58,386,947	880,669,779	14,094	58,386,947	880,669,779	35,102	\$5,306,494	11.42	7.94	0.008
C&S Subtotal	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009
C&S, T&D and Electrification Subtotal	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009
Utility Total	69,954	348,654,922	4,598,005,375	69,954	348,654,922	4,598,005,375	173,058	\$181,895,085	1.84	1.75	0.055

TABLE 3. LADWP EE Program Results by Building Type

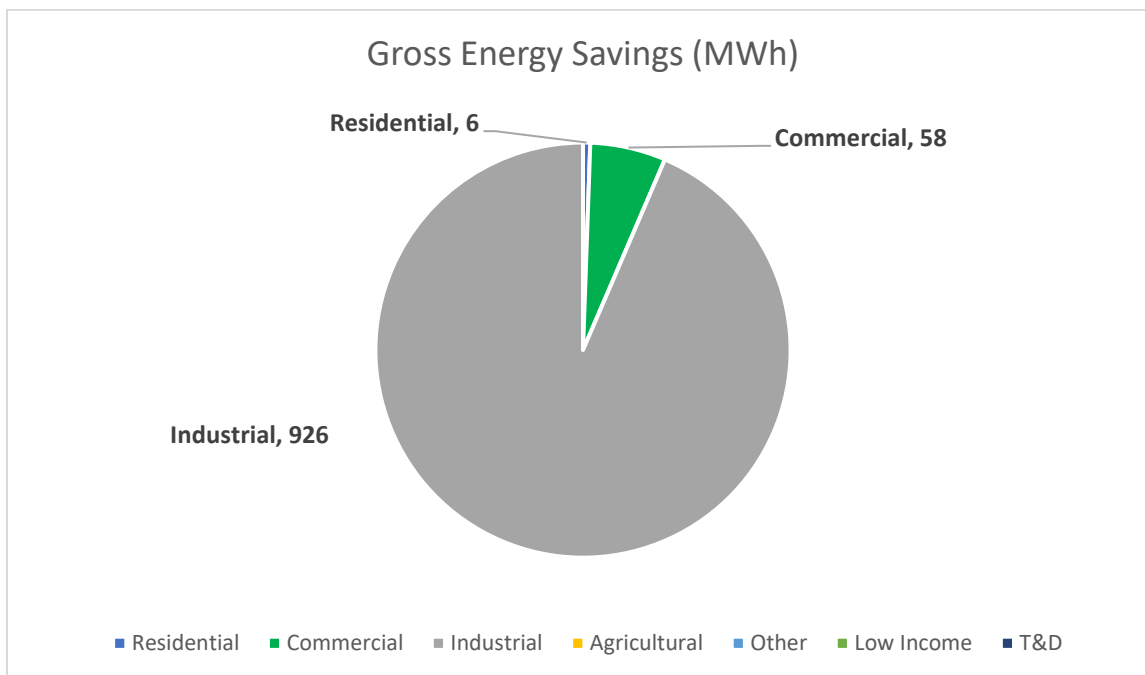
Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
All	1,541	11,392,174	171,501,804	1,541	11,392,174	171,501,804	6,228	\$3,976,958	2.86	8.19	0.033
Assembly	260	2,016,461	17,430,572	260	2,016,461	17,430,572	780	\$2,529,118	0.44	0.45	0.181
Education - Community College	104	677,209	9,243,157	104	677,209	9,243,157	329	\$1,274,950	0.54	0.89	0.193
Education - Primary School	308	3,740,742	53,953,797	308	3,740,742	53,953,797	1,758	\$13,591,133	0.27	0.27	0.348
Education - Secondary School	394	4,771,229	67,835,776	394	4,771,229	67,835,776	2,283	\$16,037,957	0.31	0.31	0.327
Education - University	746	6,438,787	70,645,119	746	6,438,787	70,645,119	2,971	\$3,497,188	1.30	1.82	0.065
Grocery	173	1,164,343	11,040,248	173	1,164,343	11,040,248	436	\$743,339	0.95	0.96	0.090
Health/Medical - Hospital	334	2,480,246	21,802,048	334	2,480,246	21,802,048	1,003	\$1,675,911	0.76	0.79	0.099
Health/Medical - Nursing Home	301	2,351,308	19,506,328	301	2,351,308	19,506,328	968	\$1,371,460	0.79	0.79	0.087
Lodging - Hotel	149	896,775	12,826,239	149	896,775	12,826,239	451	\$797,334	1.07	1.02	0.090
Lodging - Motel	118	704,193	5,829,360	118	704,193	5,829,360	265	\$442,218	0.85	0.85	0.100
Manufacturing Biotech	53	419,593	5,693,542	53	419,593	5,693,542	207	\$129,844	2.65	1.36	0.031
Manufacturing Light Industrial	383	2,994,044	24,229,643	383	2,994,044	24,229,643	1,214	\$2,805,858	0.49	0.49	0.142
Office - Large	2,438	20,075,881	208,877,836	2,438	20,075,881	208,877,836	8,602	\$14,953,399	0.87	0.96	0.093
Office - Small	626	5,257,733	47,658,066	626	5,257,733	47,658,066	2,006	\$5,836,434	0.49	0.49	0.162
Other Commercial	3,187	23,576,193	250,076,243	3,187	23,576,193	250,076,243	9,563	\$18,635,458	0.95	1.05	0.101
Other Industrial	989	10,045,366	73,235,103	989	10,045,366	73,235,103	3,809	\$3,482,996	0.88	1.44	0.062
Residential - Mobile Home	18	15,833	95,034	18	15,833	95,034	5	\$21,698	0.66	0.49	0.298
Residential - Multi-Family	5,985	10,809,070	62,721,025	5,985	10,809,070	62,721,025	3,025	\$16,401,125	0.35	0.34	0.343
Residential - Single-Family	16,096	24,046,667	334,503,860	16,096	24,046,667	334,503,860	13,975	\$33,147,380	1.21	0.98	0.144
Restaurant - Fast-Food	29	165,274	1,337,382	29	165,274	1,337,382	60	\$109,117	0.82	0.82	0.103
Restaurant - Sit-Down	225	1,279,406	10,298,892	225	1,279,406	10,298,892	466	\$1,233,271	0.56	0.56	0.151
Retail - Big Box	309	2,397,321	32,114,583	309	2,397,321	32,114,583	1,162	\$1,472,886	1.44	1.91	0.061
Retail - Large	242	1,622,638	13,042,082	242	1,622,638	13,042,082	608	\$1,363,893	0.62	0.62	0.127
Retail - Small	1,515	10,149,515	81,300,597	1,515	10,149,515	81,300,597	3,610	\$10,849,923	0.47	0.47	0.171
Storage - Unconditioned	122	1,123,837	9,017,227	122	1,123,837	9,017,227	417	\$1,167,918	0.43	0.43	0.162
Warehouse - Refrigerated	67	330,142	4,952,130	67	330,142	4,952,130	156	\$440,583	1.12	1.21	0.126
EE Subtotal	36,714	150,941,980	1,620,767,694	36,714	150,941,980	1,620,767,694	66,358	\$157,989,347	0.79	0.79	0.132
All	14	102,365	333,252	14	102,365	333,252	15	\$18,108	0.71	0.71	0.070
Residential - Multi-Family	249	1,299,835	18,563,920	249	1,299,835	18,563,920	742	\$2,096,519	0.57	0.55	0.156
Residential - Single-Family	395	1,979,400	30,815,338	395	1,979,400	30,815,338	1,224	\$3,650,292	0.56	0.47	0.168
Low-Income Subtotal	658	3,381,600	49,712,510	658	3,381,600	49,712,510	1,981	\$5,764,919	0.56	0.49	0.163
EE and Low Income Subtotal	37,371	154,323,580	1,670,480,204	37,371	154,323,580	1,670,480,204	68,339	\$163,754,266	0.78	0.78	0.133

All	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009
C&S Subtotal	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009
C&S, T&D and Electrification Subtotal	32,583	194,331,342	2,927,525,171	32,583	194,331,342	2,927,525,171	104,720	\$18,140,819	11.42	7.53	0.009
Utility Total	69,954	348,654,922	4,598,005,375	69,954	348,654,922	4,598,005,375	173,058	\$181,895,085	1.84	1.75	0.055

MERCED IRRIGATION DISTRICT

Merced Irrigation District at a Glance

- Climate Zone: 13
- Customers: 12,496
- Total annual retail sales: 535,680 MWh
- Annual Retail Revenue: \$80,660,822
- Annual EE expenditures for reporting year: \$222,801
- Gross annual savings from reporting year portfolio: 990 MWh



Merced Irrigation District Overview

For more than 75 years, the Merced Irrigation District (MeID) has been in the business of generating wholesale electrical power. MeID provides electric services to thousands of customers in Eastern Merced County including the cities of Livingston, Winton, Atwater, and Merced as well as Castle Airport and Aviation Development Center.

A large percentage of our EE 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 DI program for low-income customers.

Commercial, Industrial & Agricultural Programs

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

Residential Programs

MeID's current Residential Rebate Program encourages residential customers to purchase EnergyStar® labeled products and home appliances. Additionally, we 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 along with residential electric vehicle rebates.

Complementary Programs

Since 2000, MeID's Residential Energy Assistance Program (CARE) has provided discounts on monthly energy bills for Low-Income Families, along with the Medical Baseline Program.

EM&V Studies

MeID partnered with Modesto and Turlock in one evaluation effort for EM&V that was conducted by Anchor Blue. The three Irrigation Districts of Modesto, Turlock, and Merced are all located in California's central valley near one another.

TABLE 1. MeID EE Program Results by End Use

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	0	532	6,552	0	272	3,394	1	\$378	0.87	1.59	0.155
Appliance & Plug Loads	1	5,038	74,136	1	2,644	39,581	13	\$13,091	0.35	0.71	0.465
Lighting - Indoor	102	792,847	8,721,321	82	634,278	6,977,057	2,222	\$167,441	3.83	5.21	0.032
Lighting - Outdoor	26	191,228	2,103,508	21	152,982	1,682,806	726	\$41,892	3.90	5.23	0.033
EE Subtotal	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
EE and Low Income Subtotal	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034

TABLE 2. MeID EE 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)
Commercial	8	58,347	641,821	6	46,678	513,457	164	\$12,718	3.89	5.23	0.033
Industrial	120	925,728	10,183,008	96	740,582	8,146,406	2,784	\$196,615	3.84	5.21	0.032
Residential	1	5,570	80,688	1	2,915	42,975	14	\$13,468	0.37	0.74	0.440
EE Subtotal	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
EE and Low Income Subtotal	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034

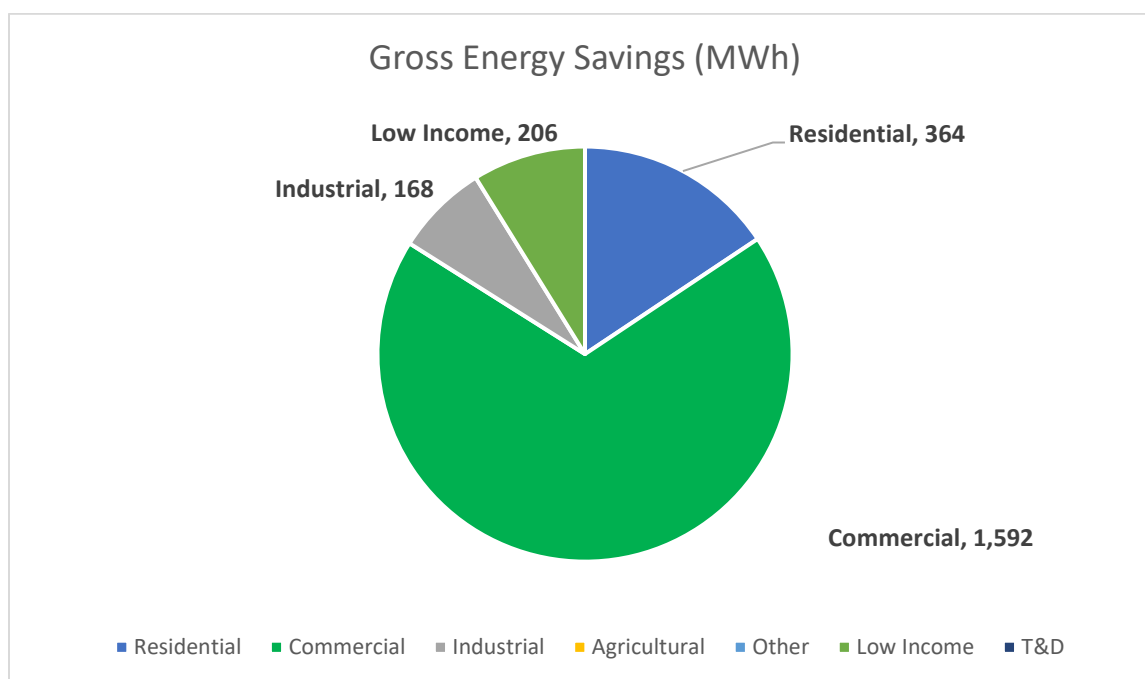
TABLE 3. MeID EE Program Results by Building Type

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)
Other Industrial	94	734,500	8,079,500	75	587,600	6,463,600	2,058	\$154,723	3.82	5.21	0.032
Residential - Single-Family	1	5,570	80,688	1	2,915	42,975	14	\$13,468	0.37	0.74	0.440
Retail - Big Box	5	35,705	392,755	4	28,564	314,204	102	\$7,759	3.88	5.23	0.033
Retail - Large	29	213,870	2,352,574	23	171,096	1,882,060	788	\$46,852	3.90	5.23	0.033
EE Subtotal	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
EE and Low Income Subtotal	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	130	989,645	10,905,517	103	790,176	8,702,838	2,963	\$222,801	3.63	5.03	0.034

MODESTO IRRIGATION DISTRICT

Modesto Irrigation District at a Glance

- Climate Zone: 12
- Customers: 132,213
- Total annual retail sales: 2,637,109 MWh
- Annual Retail Revenue: \$380,622,593
- Annual EE expenditures for reporting year: \$1,582,453
- Gross annual savings from reporting year portfolio: 2,330 MWh



Modesto Irrigation District 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 2022 annual retail electric sales by customer class are: 37.3% residential, 26.6% commercial, 30.8% industrial, 5.0% agricultural and pumping, 0.4% other. For 2022 load growth was -0.4% (based on Total System Input GWH)

MID has robust EE 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 EE 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

MID did not have any changes for 2022.

Program and Portfolio Highlights

MID continued to promote low to moderate income EE programs by providing staff presentations on EE to non-profit agencies and low-income advocacy groups in our area in 2022. Social media promotions have improved customer awareness of MID programs, especially due to the COVID restrictions.

Commercial, Industrial & Agricultural Programs

Programs offered are Business, Business Custom and Business New Construction.⁴⁷

Residential Programs

MID offers a variety of residential rebates.⁴⁸

Complementary Programs

- Energy Audits: MID energy specialists provide free virtual and on-site energy audits that include usage analysis, identification, and recommendation of energy conservation measures to reduce load and improve EE.
- CARES Program: Income qualifying households will receive a 60 percent reduction on their fixed monthly charge and a 23 percent discount on the first 850 kWh each billing cycle. The MID CARES discount is also applicable to group residences where low-income people are accommodated without a rental charge by a non-profit agency.
- Medical Life Support Rate: Customers who need electricity for life-sustaining devices or who have a condition that requires special heating or air conditioning may qualify for 50 percent off the first 500 kilowatt-hours used during each residential billing cycle.
- Weatherization – Our Weatherization program provides energy efficient measures to income qualified households to help reduce their energy consumption. Energy savings from the weatherization program are included in the results for the SB1037 report. However, MID continues to facilitate new partnerships with other organizations and

⁴⁷ See <https://www.mid.org/> for program details.

⁴⁸ *Ibid.*

agencies to increase its outreach and provide additional weatherization services to low-income customers.

- Good Neighbor Program – Each month, many MID customers seek emergency assistance to help pay their electric bills. With MID's Good Neighbor Program, customers can donate money to a designated fund for MID customers that seek assistance. MID works with the Salvation Army to ensure that 100% of the donations go only to those MID customers who are experiencing hardships.

EM&V Studies

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

For 2022, Power Services, Inc. (CMVP qualified) performed M&V on selected projects. Anchor Blue Consulting conducted M&V on the 2021 EE portfolio. MID will perform a review of the 2022 portfolio in 2023.

MID's annual budget for EM&V work is \$75,000 and completed studies are provided on the CMUA website.⁴⁹

Major Differences or Diversions from California POU TRM for Energy Savings

None.

⁴⁹ See <https://www.cmua.org/emv-reports>.

TABLE 1. MID EE Program Results by End Use

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
Appliance & Plug Loads	12	196,883	1,871,288	8	124,177	1,175,930	372	\$81,202	1.68	1.25	0.084
Building Envelope	56	56,800	948,896	31	31,643	527,542	250	\$72,789	2.37	0.82	0.196
Commercial Refrigeration	44	493,335	7,398,045	36	394,668	5,918,436	2,095	\$256,343	2.88	0.44	0.058
HVAC - Cooling	85	203,348	3,146,867	55	150,874	2,290,149	1,280	\$315,846	1.62	0.76	0.187
Lighting - Indoor	102	923,919	12,006,075	81	739,135	9,604,860	3,314	\$371,949	3.24	1.52	0.050
Lighting - Outdoor	0	239,204	3,106,756	0	191,363	2,485,405	1,167	\$95,767	3.24	2.09	0.050
Service & Domestic Hot Water	2	10,680	106,804	2	10,680	106,804	38	\$6,716	2.24	1.94	0.077
EE Subtotal	301	2,124,169	28,584,730	212	1,642,540	22,109,125	8,517	\$1,200,612	2.57	0.85	0.071
Appliance & Plug Loads	5	38,481	538,241	5	38,481	538,241	195	\$107,631	0.68	0.68	0.264
Building Envelope	3	8,611	78,081	3	8,611	78,081	31	\$24,511	0.66	0.66	0.390
HVAC - Cooling	5	34,189	172,357	5	34,189	172,357	89	\$61,245	0.68	0.68	0.397
Lighting - Indoor	13	99,325	1,588,295	13	99,325	1,588,295	598	\$165,574	1.39	1.39	0.143
Miscellaneous	0	10,172	116,486	0	10,172	116,486	43	\$13,482	1.04	1.04	0.150
Service & Domestic Hot Water	3	14,876	148,646	3	14,876	148,646	55	\$9,398	2.29	2.29	0.077
Low-Income Subtotal	29	205,654	2,642,106	29	205,654	2,642,106	1,012	\$381,840	1.04	1.04	0.191
EE and Low Income Subtotal	330	2,329,823	31,226,836	242	1,848,193	24,751,231	9,529	\$1,582,453	2.20	0.87	0.084
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	330	2,329,823	31,226,836	242	1,848,193	24,751,231	9,529	\$1,582,453	2.20	0.87	0.084

TABLE 2. MID EE 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)
Commercial	150	1,591,707	21,868,341	119	1,272,209	17,477,355	6,349	\$718,656	3.06	0.84	0.054
Industrial	4	168,072	2,184,050	3	134,458	1,747,240	603	\$61,700	3.17	1.67	0.046
Residential	147	364,390	4,532,340	91	235,873	2,884,531	1,565	\$420,256	1.66	0.77	0.190
EE Subtotal	301	2,124,169	28,584,730	212	1,642,540	22,109,125	8,517	\$1,200,612	2.57	0.85	0.071
Residential	29	205,654	2,642,106	29	205,654	2,642,106	1,012	\$381,840	1.04	1.04	0.191
Low-Income Subtotal	29	205,654	2,642,106	29	205,654	2,642,106	1,012	\$381,840	1.04	1.04	0.191
EE and Low Income Subtotal	330	2,329,823	31,226,836	242	1,848,193	24,751,231	9,529	\$1,582,453	2.20	0.87	0.084
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	330	2,329,823	31,226,836	242	1,848,193	24,751,231	9,529	\$1,582,453	2.20	0.87	0.084

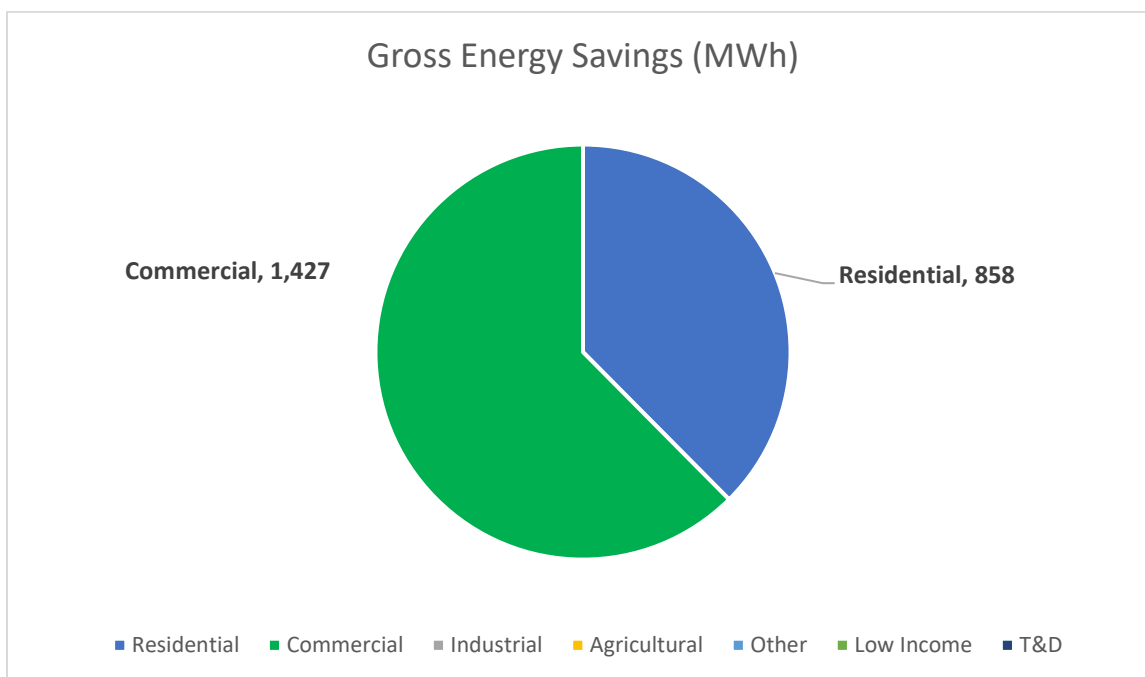
TABLE 3. MID EE Program Results by Building Type

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	158	1,781,437	24,156,582	125	1,421,827	19,297,529	6,980	\$795,278	3.03	0.88	0.054
Residential	67	85,458	1,408,807	42	55,777	895,756	417	\$216,466	1.20	0.52	0.335
Residential - Mobile Home	0	217	2,157	0	119	1,186	1	\$192	2.65	2.40	0.197
Residential - Single-Family	75	257,057	3,017,184	46	164,816	1,914,654	1,119	\$188,677	2.25	1.05	0.126
EE Subtotal	301	2,124,169	28,584,730	212	1,642,540	22,109,125	8,517	\$1,200,612	2.57	0.85	0.071
Residential	17	138,996	1,842,836	17	138,996	1,842,836	717	\$238,420	1.18	1.18	0.173
Residential - Mobile Home	0	1,230	16,908	0	1,230	16,908	6	\$3,386	0.68	0.68	0.263
Residential - Multi-Family	7	44,513	502,626	7	44,513	502,626	185	\$80,447	0.87	0.87	0.204
Residential - Single-Family	5	20,915	279,737	5	20,915	279,737	103	\$59,587	0.72	0.72	0.279
Low-Income Subtotal	29	205,654	2,642,106	29	205,654	2,642,106	1,012	\$381,840	1.04	1.04	0.191
EE and Low Income Subtotal	330	2,329,823	31,226,836	242	1,848,193	24,751,231	9,529	\$1,582,453	2.20	0.87	0.084
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	330	2,329,823	31,226,836	242	1,848,193	24,751,231	9,529	\$1,582,453	2.20	0.87	0.084

MORENO VALLEY ELECTRIC UTILITY

Moreno Valley Electric Utility at a Glance

- Climate Zone: 10
- Customers: 7,550
- Total annual retail sales: 218,054 MWh
- Annual Retail Revenue: \$42,910,258
- Annual EE expenditures for reporting year: \$526,087
- Gross annual savings from reporting year portfolio: 2,285 MWh



Moreno Valley Electric Utility 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 over 50 megawatts for FY 2022.

MVU continued to experience a decline in EE projects from its' largest customers as they recovered from the pandemic. The energy audit and DI program was instrumental in helping MVU make its energy savings goal this reporting year.

Major Program and Portfolio Changes

EE 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 DI program in order to ensure MVU can make the doubling of EE goals per Senate Bill 350.

Program and Portfolio Highlights

MVU's highly successful residential direct installation program continues to be the main source of energy savings for this reporting year. The commercial lighting program is still the most popular commercial EE program at MVU.

Commercial, Industrial & Agricultural Programs

- Lighting Retrofits: rebates are available to commercial customers for LED lighting retrofits, other energy efficient lighting replacements, and for LED or photo-luminescent exit signs.
- Commercial EE Program: this DI program provides small to medium-sized customers with an onsite energy audit and energy saving measures at no cost to the customer.
- Commercial 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 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 EE projects.

Residential Programs

- Residential Energy Audit & DI: MVU expanded this program to include customers who continue to be impacted by the effects of the pandemic, as well as very high energy use customers and participants in our Low Income Program. The program provides residential customers with a full in-home energy audit and specific recommendations for their home plus a fixed set of EE 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 23% or 35% discount on monthly energy charges; this year’s expenditure was over \$140,000.
- COVID-19 Assistance Program: this temporary program was created to provide relief to customers affected by the pandemic and provided over \$275,000 in bill assistance.
- Demand Response – MVU continues to maintain and operate 15 commercial Ice Bear units on both city and customer facilities.
- RD&D: Nothing new in this reporting period.
- EVs: MVU is experiencing increased interest and activity both for workplace charging and home charging. MVU installed additional EV charging stations at its Annex location across from City Hall.
- Energy Storage: Tesla Powerwalls and other battery types have been installed with solar at residential homes. In the future MVU expects greater interest and activity in solar plus battery installations as the electric rates have moved to time-of-use (TOU).
- Educational Program: MVU has contracted with Franklin Energy, formerly ResourceAction, in partnership with SoCalGas to provide teachers, students, and their families with a school-based EE program.

EM&V Studies

Engineering analysis programs such as DOE-2 are the basis for calculated energy savings and incentive calculations.⁵⁰ MVU requires both pre-inspections and post-inspections for all projects that result in a commercial rebate over \$5000. The utility uses AESC 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.

⁵⁰ See <https://www.doe2.com/> for more information.

- Commercial C&S: this reporting year MVU will not record its share of the energy savings that are attributable to the State’s Building Codes and Appliance Standards (Title-24) to the CEC.

Major Differences or Diversions from California POU TRM for Energy Savings

None

TABLE 1. MVU EE Program Results by End Use

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	115	856,780	9,424,580	104	771,102	8,482,122	2,925	\$438,850	1.91	1.91	0.069
Appliance & Plug Loads	0	1,614	22,195	0	917	12,989	4	\$701	2.13	1.68	0.075
Lighting - Indoor	193	1,426,513	14,265,130	174	1,283,862	12,838,617	4,441	\$86,536	16.08	16.08	0.008
EE Subtotal	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
EE and Low Income Subtotal	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031

TABLE 2. MVU EE 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)
Commercial	193	1,426,513	14,265,130	174	1,283,862	12,838,617	4,441	\$86,536	16.08	16.08	0.008
Residential	116	858,394	9,446,775	104	772,019	8,495,111	2,930	\$439,552	1.91	1.91	0.069
EE Subtotal	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
EE and Low Income Subtotal	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031

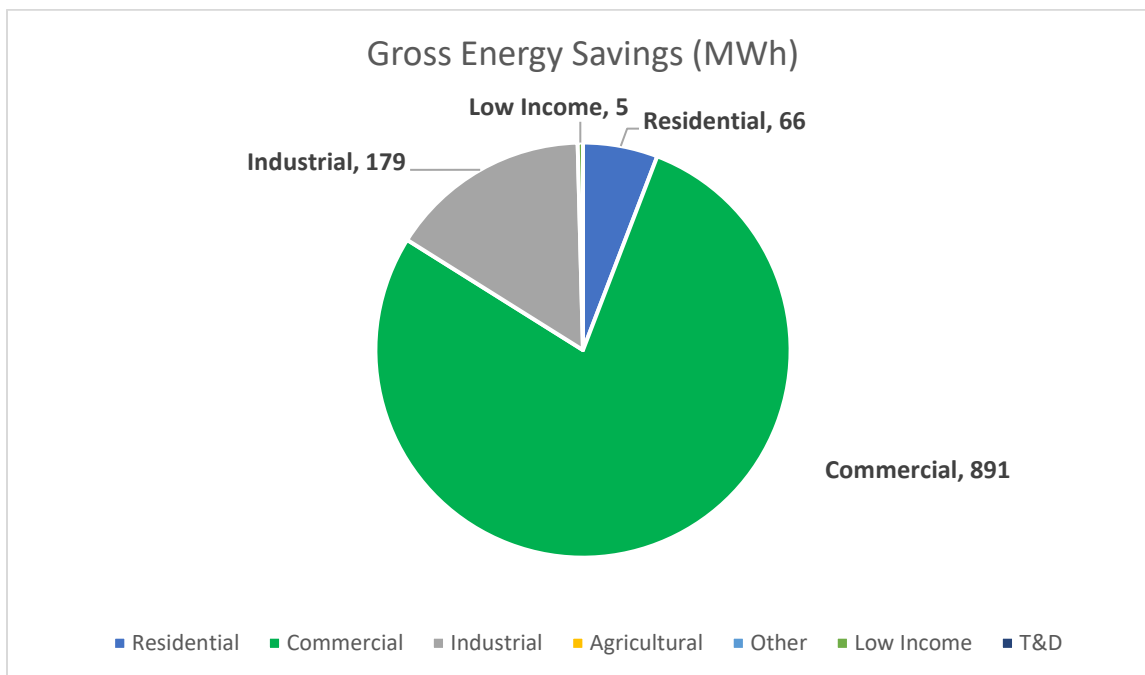
TABLE 3. MVU EE Program Results by Building Type

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	0	116	1,276	0	70	766	0	\$50	1.75	2.74	0.087
Other Commercial	193	1,426,513	14,265,130	174	1,283,862	12,838,617	4,441	\$86,536	16.08	16.08	0.008
Residential	116	857,297	9,430,784	104	771,262	8,484,045	2,926	\$439,201	1.91	1.91	0.069
Residential - Single-Family	0	981	14,715	0	687	10,301	4	\$301	3.91	4.55	0.041
EE Subtotal	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
EE and Low Income Subtotal	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	309	2,284,907	23,711,905	278	2,055,880	21,333,728	7,371	\$526,087	4.24	4.24	0.031

CITY OF PALO ALTO UTILITIES

City of Palo Alto Utilities at a Glance

- Climate Zone: 4
- Customers: 29,867
- Total annual retail sales: 812,841 MWh
- Annual Retail Revenue: \$131,273,000
- Annual EE expenditures for reporting year: \$935,217
- Gross annual savings from reporting year portfolio: 1,141 MWh



City of Palo Alto Overview

The City of Palo Alto Utilities (CPAU) has implemented a variety of EE programs since the 1970s. In 1998, in response to California's landmark energy legislation AB 1890 (Brulte, 1996), 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 EE 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 EE 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, the Palo Alto City Council approved a Carbon Neutral Electric Resource Plan, committing CPAU to a carbon-neutral electric portfolio beginning in 2013. Since July 2017, CPAU has also maintained a carbon neutral natural gas portfolio by purchasing carbon offsets; this serves as a bridge strategy to meeting the City's greenhouse gas reduction goal. Palo Alto is committed to reducing fossil fuel use and helping residents and businesses to pursue electrification opportunities in the building and transportation sectors.

In May 2022, the Palo Alto City Council approved a set of annual electric EE goals for 2022-2031. The EE goal for FY 2022 is set at 0.5% of forecast electric load, increasing to 0.75% in FY 2026 when the conservation voltage reduction program can be implemented. The gradual ramp-up of these goals reflect staff's anticipation that EE savings levels will take time to recover following the economic downturn. These EE goals are based on the results of an EE potential model that considers planned program offerings, expenditures, market saturation of energy efficient technologies, load forecast, and a planned conservation voltage reduction program following the city-wide deployment of AMI.

For FY 2022, CPAU fell short of its electricity savings targets, achieving 0.14% versus its goal of 0.50%. Various factors contributed to below-target achievements. Very few large commercial EE projects, which make up the bulk of CPAU's savings, were initiated during the COVID-19 pandemic period of 2020 and 2021; therefore, very few projects were completed during FY 2022 to contribute to the CPAU energy savings portfolio. Savings from CPAU's primary large commercial customer program – the Commercial and Industrial EE Program (CIEEP) – dropped by roughly a factor of eight compared to FY 2021. During FY 2022, CPAU was also transitioning vendors for its largest commercial savings program, which likely contributed to the reduced project savings.

Major Program and Portfolio Changes

In FY 2022 CPAU continued efforts on building-electrification activities and supporting installation of EV charging equipment while also implementing two new programs focused on commercial building electrification and efficiency. The Business Energy Advisor (BEA) program launched near the end of FY 2022, and therefore did not yet have any energy savings to report in FY 2022. The Refrigerator Recycling Program concluded in December 2021 because the grant provider was changing the program format and did not approve a contract term extension. CPAU, for the sixth year, continued to claim savings associated with Palo Alto's energy reach code requirements as part of the City's Green Building Ordinance.

Program and Portfolio Highlights

The CIEEP is the flagship of CPAU's commercial portfolio. With an engineering firm 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. As discussed in the overview section, several factors led to a lower volume of high-savings commercial EE projects, but the CIEEP still accounted for 56% of CPAU's program savings, excluding Green Building Ordinance, in FY 2022. The Small and Medium Business (SMB) program also started to ramp up in FY 2022, generating around 80 MWh of savings compared to less than 10 MWh in FY 2021.

Commercial, Industrial & Agricultural Programs

- Commercial Advantage Program (CAP): Incentives are offered to commercial customers for investments in efficiency, lighting, motors, HVAC, and custom projects that target gas, peak demand, and energy reductions. In FY 2022, the CAP program resulted in net annual electric savings of 160,096 kWh. In FY 2022 CAP was renamed the Business Customer Rebate program and will appear as such on CPAU's FY 2023 report.
- CIEEP: This program provides Key Account customers with an engineering consulting firm to evaluate and implement EE projects. In FY 2022, the CIEEP program produced net annual electric savings of 362,182 kWh.
- Small and Medium Business (SMB) program: This program focuses on EE savings from the small and medium commercial sector and targets energy management systems and air filter replacements to help businesses recovering from COVID-19. The new SMB program was launched in FY 2021 and saw a strong uptake that continued through FY 2022. In FY 2022, the SMB program produced net annual electric savings of 81,029 kWh. In FY 2022 the SMB program was renamed to the Business Advantage Program (BAP) and will appear as such on CPAU's FY 2023 report.
- BEA program: This program sends trained energy professionals to evaluate business equipment such as lighting, HVAC systems, hot water systems, refrigeration and more. Their customized assessments pinpoint exactly where businesses can benefit from efficiency by identifying electric, gas and water use equipment that is ready for upgrades and/or retrofits. Energy Advisors review assessment reports with customers and explain where they can reduce energy or water use. This program was launched in late FY 2022 and did not yield any savings to report for FY 2022.

Residential Programs

- Multifamily Plus: This program provides no-cost, direct installation of EE measures to multifamily residences with four or more units including hospices, care centers, rehab facilities and select small and medium commercial properties. These properties are typically very difficult to engage and unlikely to institute EE measures on their own. In FY 2022, the Multifamily Plus program resulted in net annual electric savings of 1,725 kWh.
- Home Efficiency Genie: The Home Efficiency Genie is CPAU's flagship residential program. Launched in June 2015, residents can call the program's Efficiency Advisor 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 topics such as improving the quality of a home's building envelope, installation of rooftop solar and battery storage, EV charging, 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 2022, the Home Efficiency Genie program resulted in net annual electric savings of 5,332 kWh.

- REAP: This program provides weatherization and equipment replacement services to low-income residents and those with certain medical conditions, at no cost to the residents. This program has an equal focus on efficiency and comfort. As a program serving income and medically qualified residents, it is not meant to be cost-effective, and neither costs nor savings are included in CPAU's calculation of EE portfolio cost effectiveness. In FY 2022, the Residential Energy Assistance Program resulted in net annual electric savings of 4,675 kWh.
- Refrigerator Recycling Program: This program provides customers the opportunity to recycle refrigerators and freezers. This program was originally planned using grant funding from the Bay Area Air Quality Management District (BAAQMD). The program was successful, resulting in the recycling of 101 refrigerator and freezer units in FY 2022, and 447 units cumulatively from August 2019 through December 2021. Palo Alto was recognized for the program by the Environmental Protection Agency (EPA) through its Responsible Appliance Disposal with a Nationally recognized Champion Award.⁵¹ The Refrigerator Recycling Program concluded in December 2021 because BAAQMD was changing the program format and did not approve a contract term extension. In FY 2022, the Refrigerator Recycling program produced net annual electric savings of 31,456 kWh.

Complementary Programs

- C&S: Green Building Ordinance: Since 2008, as part of the Green Building Ordinance the City of Palo Alto has enforced energy reach codes that are more stringent than the state's Title 24 building energy standards. The energy reach code requirements apply to both new residential and commercial buildings. In FY 2022, 494,047 kWh of savings were attributable to the city's Green Building Ordinance. As of January 2023, the City of Palo Alto requires that all new construction projects be all-electric, with no local energy reach code requirements.
- Community Resource Education Programs: CPAU offers free EE advice and energy education programs to the community. Activities include residential energy workshops

⁵¹ See <https://www.epa.gov/rad/>.

on topics such as the SunShares solar group-buy program and tabling at neighborhood association events, local fairs, and various special events throughout the city.

- **Low-Income Program: Rate Assistance Program:** 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 EE, renewable energy, and safety.
- **Customer-Side Renewable Energy: The PV Partners Program:** This program provided rebates for installations of rooftop solar, including 5-year performance-based incentive payments to customers who installed solar PV systems greater than 30 kW and up to 1,000 kW. 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 since 2015. 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 2022 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.

EM&V Studies

In FY 2022, CPAU did not undertake independent evaluation, measurement, and verification for any of its programs.

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 TRM DEER. All savings data claimed by CPAU was vetted by staff and relies on conservative assumptions.

TABLE 1. CPAU EE Program Results by End Use

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
Appliance & Plug Loads	8	35,348	388,830	6	28,279	311,064	94	\$150,019	0.18	0.20	0.616
BROs	11	81,029	1,701,610	8	64,823	1,361,288	550	\$267,916	0.46	0.46	0.281
Building Envelope	0	425	8,925	0	340	7,140	18	\$7,163	0.31	0.31	1.432
C&S	65	494,047	10,374,986	52	395,238	8,299,989	2,675	\$158,661	4.33	4.33	0.027
HVAC - Cooling	8	48,600	1,020,600	7	38,880	816,480	230	\$42,442	1.51	1.45	0.074
Lighting - Indoor	59	476,389	5,240,279	47	381,111	4,192,223	1,259	\$259,563	1.34	0.71	0.079
Lighting - Outdoor	0	28	312	0	23	250	0	\$1,016	0.02	0.02	5.196
Water Pumping / Irrigation	0	0	0	0	0	0	1	\$3,789	0.04	0.04	0.000
EE Subtotal	150	1,135,867	18,735,542	120	908,693	14,988,434	4,828	\$890,568	1.41	1.13	0.082
Appliance & Plug Loads	0	120	1,320	0	96	1,056	0	\$591	0.16	0.16	0.715
Building Envelope	0	797	16,737	0	638	13,389	37	\$25,334	0.18	0.18	2.701
Lighting - Indoor	0	3,641	40,053	0	2,913	32,043	11	\$15,117	0.18	0.18	0.603
Lighting - Outdoor	0	117	1,287	0	94	1,030	0	\$596	0.15	0.15	0.740
Miscellaneous	0	0	0	0	0	0	0	\$900			0.000
Service & Domestic Hot Water	0	0	0	0	0	0	0	\$213	0.21	0.21	0.000
Water Pumping / Irrigation	0	0	0	0	0	0	3	\$1,898	0.20	0.20	0.000
Low-Income Subtotal	1	4,675	59,397	0	3,740	47,517	53	\$44,649	0.18	0.18	1.237
EE and Low Income Subtotal	151	1,140,542	18,794,939	121	912,433	15,035,951	4,880	\$935,217	1.35	1.10	0.086
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	151	1,140,542	18,794,939	121	912,433	15,035,951	4,880	\$935,217	1.35	1.10	0.086

TABLE 2. CPAU EE 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)
Commercial	119	890,563	15,753,481	95	712,450	12,602,785	3,988	\$575,695	1.81	1.40	0.064
Industrial	20	178,844	1,967,284	16	143,075	1,573,827	471	\$98,766	1.31	0.81	0.080
Residential	12	66,460	1,014,777	9	53,168	811,822	370	\$216,107	0.37	0.40	0.363
EE Subtotal	150	1,135,867	18,735,542	120	908,693	14,988,434	4,828	\$890,568	1.41	1.13	0.082
Residential	1	4,675	59,397	0	3,740	47,517	53	\$44,649	0.18	0.18	1.237
Low-Income Subtotal	1	4,675	59,397	0	3,740	47,517	53	\$44,649	0.18	0.18	1.237
EE and Low Income Subtotal	151	1,140,542	18,794,939	121	912,433	15,035,951	4,880	\$935,217	1.35	1.10	0.086
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	151	1,140,542	18,794,939	121	912,433	15,035,951	4,880	\$935,217	1.35	1.10	0.086

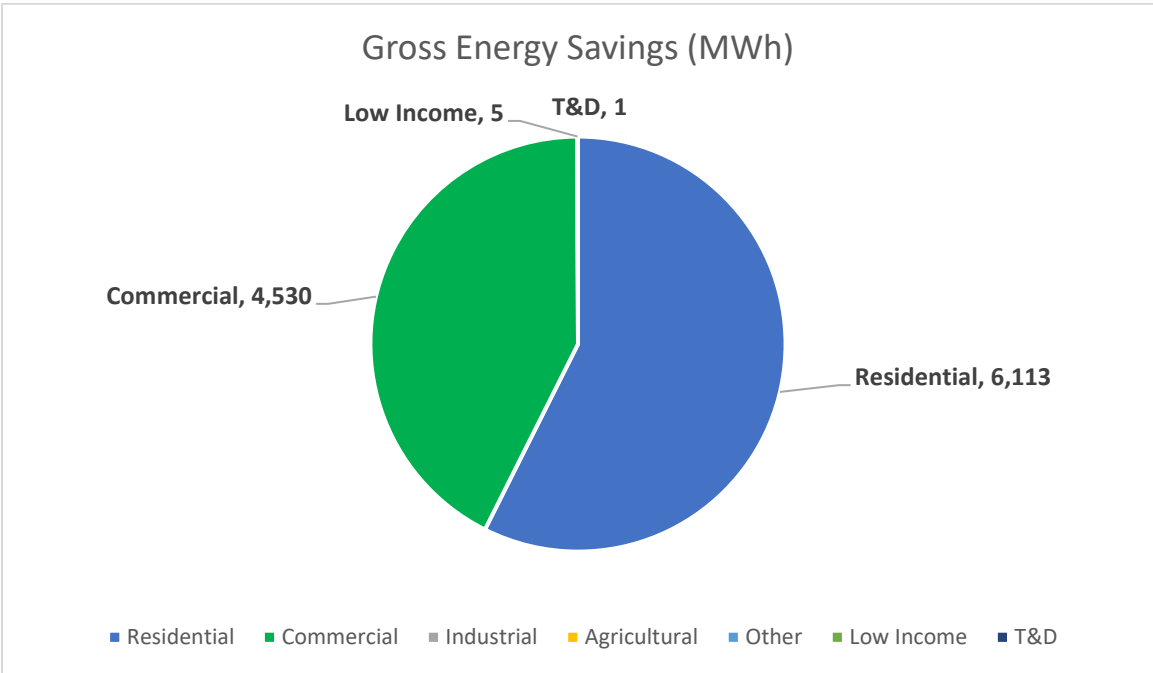
TABLE 3. CPAU EE Program Results by Building Type

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)
Education - University	26	183,338	2,502,718	21	146,670	2,002,174	587	\$117,677	1.38	0.78	0.078
Grocery	21	160,096	1,761,056	17	128,077	1,408,845	423	\$51,515	2.27	0.93	0.047
Health/Medical - Hospital	20	178,844	1,967,284	16	143,075	1,573,827	471	\$98,766	1.31	0.81	0.080
Other Commercial	72	547,129	11,489,707	57	437,703	9,191,766	2,978	\$406,503	1.87	1.87	0.063
Residential	4	27,947	586,888	3	22,358	469,511	248	\$20,074	2.43	2.43	0.061
Residential - Multi-Family	0	1,725	23,221	0	1,380	18,576	22	\$10,989	0.29	0.29	0.788
Residential - Single-Family	8	36,788	404,668	6	29,430	323,734	100	\$185,043	0.15	0.16	0.730
EE Subtotal	150	1,135,867	18,735,542	120	908,693	14,988,434	4,828	\$890,568	1.41	1.13	0.082
Residential - Multi-Family	0	981	10,892	0	784	8,714	6	\$5,664	0.18	0.18	0.833
Residential - Single-Family	0	3,695	48,505	0	2,956	38,804	47	\$38,984	0.17	0.17	1.331
Low-Income Subtotal	1	4,675	59,397	0	3,740	47,517	53	\$44,649	0.18	0.18	1.237
EE and Low Income Subtotal	151	1,140,542	18,794,939	121	912,433	15,035,951	4,880	\$935,217	1.35	1.10	0.086
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	151	1,140,542	18,794,939	121	912,433	15,035,951	4,880	\$935,217	1.35	1.10	0.086

PASADENA WATER AND POWER

Pasadena Water and Power at a Glance

- Climate Zone: 9
- Customers: 67,910
- Total annual retail sales: 972,244 MWh
- Annual Retail Revenue: \$190,124,487
- Annual EE expenditures for reporting year: \$2,546,550
- Gross annual savings from reporting year portfolio: 10,650 MWh



Pasadena Water and Power Overview

The City of Pasadena, located in climate zone 9, 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 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 recent years, there has been an increase in new multifamily properties; a sector that will continue to see growth with infill and higher-density development.

Pasadena Water and Power's (PWP) EE 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 EE and demand reduction goals set forth by its City Council since 2007.

The EE and demand reduction goals starting in FY 2022 called for 11,720 MWh of annual energy savings (about 1.2 % of retail sales/year). PWP's long standing EE programs, combined with new building codes and standards, independent efficiency improvements and customer investments in clean, local distributed generation have resulted in a steady decline in retail energy sales since FY 2008, and are expected to maintain a consistently flat energy load projections in the near future.

In FY 2022, PWP's EE programs expenditures totaled \$2.13 million, which is roughly 1.1% of retail revenue. PWP funds procurement of all EE programs through its PBC revenues, with current PBC revenue rate at \$0.00685 per kWh.

As a whole, EE programs and other related expenses represented approximately 74% of Pasadena's PBC expenditures in FY 2022. The transportation and building electrification incentives represented 12%, and income-qualified rate assistance accounted for 14%.

Major Program and Portfolio Changes

PWP has continued to develop and implement various conservation and sustainability programs for all of its customers, while meeting annual EE goals adopted by the City Council and supporting GHG emissions reduction goals outlined in the City's Climate Action Plan.

PWP has kept its focus on DI programs and continues to use these programs to serve low/moderate income and elderly residential customers, plus various small commercial customers; with a focus on businesses in DACs.

In FY 2021, PWP completed its EE potential forecast analysis with the CMUA third party consultant for FY 2022 through FY 2031, which provides an outlook for the next 10 years and meets the state's legislative requirements. In addition, PWP also obtained City Council approval on the utility's new EE and demand reduction goals for FY 2022 through FY 2031.

Program and Portfolio Highlights

In summary, energy savings for FY 2022 are broken down into five separate categories. Commercial EE programs contributed 3,909 MWh, Residential EE programs contributed 6,126 MWh, C&S contributed 1,574 MWh, Water-Energy transfer (embedded energy savings from water conservation efforts) contributed 621 MWh and Transmission and Distribution (T&D) upgrades contributed roughly 0.9 MWh. In total, PWP's EE programs produced 12,231 MWh of energy savings for FY 2022.

PWP has three EE programs that account for roughly 80% of its annual savings for FY 2022, programs with the greatest impact are as follows:

The Water Energy DI Program (WeDIP) provides customers with no-cost DI services to select small and medium commercial customers, measures include LED Lighting and commonly found refrigeration measures. In total, WeDIP contributed 3,858 MWh (32%) 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 5,568 MWh (46%) 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 DI services. Measures include lighting, HVAC Tune-up, weatherization, high efficiency toilets, smart thermostats and smart irrigation systems. The HIP contributed 227 MWh (2%) towards the annual energy savings.

Commercial, Industrial & Agricultural Programs

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

- The Customized Incentive and Business Rebate programs provides incentives to any commercial electric customer to help offset the upfront costs of efficiency upgrades and capital improvement projects that generates above code energy savings.
- The no-cost WeDIP 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, efficient kitchen equipment and low-flow toilet replacements.

Residential Programs

PWP has seven residential offerings that also fall into three distinct categories, rebates, DI, 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 that include wall and ceiling insulation.
- 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 SoCalGas that provides no cost DI services to 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 and 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 HIP provides no cost DI 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. In particular, this involves 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 Rate Assistance Programs: PWP has offered electric rate assistance programs to eligible low-income customers for several decades. The Electric Utility Assistance Program became effective in 2006 and provides monthly assistance to customers between the ages of 18-61 that meet the established income guidelines. The CARES and CARES Plus program provides additional assistance for low-income seniors (ages 62 and up), plus customers with a permanent disability that meets the established income guidelines. Assisting Pasadena People with Limited Emergencies (Project APPLE) provides a one-time utility bill payment assistance program that provides eligible income qualified customers who are at risk of power shut off, up to \$200 per year. Project APPLE is primarily funded by PBC revenues, with additional funding provided via donations from PWP customers. PWP also offers added services to eligible low-income

customers which include bonus rebates on qualifying efficiency products offered through the Home Energy Rebates program, no-cost direct installation of energy and water efficiency services, and much more.

- PWP offers a Green Power Program, where customers can opt to pay a premium on their electricity bill for clean, renewable power. This program is open to both residential and commercial customers.

RD&D: While there were no RD&D projects in FY 2022, PWP continues to seek out a variety of new opportunities that align with current utility objectives.

- TE: PWP continues to encourage the private sector to build additional EV charging sites for public and private fleet use through a robust incentive program offering rebates of up to \$50,000 per commercial electric 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. 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 \$1,500 for a new or used EV and up to \$600 for a new Wi-Fi enabled Level 2 EV charger.
- FY 2022 was another strong year for commercial EV charger rebates, providing \$322,000 in incentives for 69 new Level 2 charging ports. On the residential side, the utility provided \$116,500 in rebates for 386 EVs and 99 residential Level 2 EV chargers applications.

EM&V Studies

PWP spent approximately \$30,288.25 on EM&V efforts for various EE programs to justify program design, expenditures and verify results:

- Residential Rebate Program: Utility staff requested and verified proof of installation documentation on residential energy-efficient equipment purchases and installations that were selected for inspection.
- Residential DI Program: Program implementer performed quality assurance inspections on a percentage of sub-contract direct installations.
- Commercial Rebate Programs: For custom projects, utility staff or third party engineering consultants conducted inspections on all installations. For non-custom projects participating in the deemed rebate program, utility staff conduct a percentage of inspections after installations are complete.

Major Differences or Diversions from California POU TRM for Energy Savings

PWP relies on the latest version of the CMUA TRM or CalTF eTRM data, supplemented by best available technical information from independent engineering analysis or approved California utility work papers, when e-TRM measures are not available. For commercial programs, as discussed above, PWP may rely on independent engineering analysis conducted by PWP's third-

party engineering consultant and/or an online rebate estimator with industry accepted models and simulations. Customized commercial efficiency offerings like the CIP provide commercial electric customers with the ability to participate with any proven technology that can produce above code energy savings, provided it meets the existing program requirements at the time.

TABLE 1. PWP EE Program Results by End Use

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
All	55	227,190	1,814,686	55	227,190	1,814,686	706	\$655,235	0.53	0.53	0.432
Appliance & Plug Loads	25	99,412	906,560	16	62,452	531,915	203	\$63,784	1.67	1.66	0.150
BROs	1,346	5,568,050	8,366,024	1,346	5,568,050	8,366,024	3,422	\$431,810	7.02	7.02	0.055
Building Envelope	37	45,738	878,134	31	39,554	768,509	325	\$46,303	5.75	5.75	0.092
Commercial Refrigeration	2	20,089	204,239	2	20,089	204,239	75	\$3,772	6.53	6.53	0.023
HVAC - Cooling	23	28,703	242,078	15	20,574	172,667	69	\$64,168	1.24	1.24	0.468
HVAC - Heat Pump	12	15,749	235,422	9	12,757	190,696	76	\$19,088	3.57	3.57	0.139
Lighting - Indoor	449	3,862,071	30,789,434	449	3,862,071	30,789,434	10,473	\$1,092,414	3.47	3.47	0.042
Miscellaneous	95	776,246	2,710,441	95	776,246	2,710,441	2,150	\$91,029	6.14	6.14	0.040
Whole Building	0	0	0	0	0	0	0	\$50,500			0.000
EE Subtotal	2,044	10,643,248	46,147,017	2,018	10,588,984	45,548,611	17,501	\$2,518,103	3.29	3.29	0.065
All	1	5,484	60,234	1	5,484	60,234	23	\$12,418	0.87	0.87	0.263
Low-Income Subtotal	1	5,484	60,234	1	5,484	60,234	23	\$12,418	0.87	0.87	0.263
EE and Low Income Subtotal	2,045	10,648,731	46,207,251	2,019	10,594,467	45,608,845	17,523	\$2,530,521	3.27	3.27	0.065
C&S	195	1,573,949	2,369,730	195	1,573,949	2,369,730	894	\$10,870	46.40	46.40	0.005
C&S Subtotal	195	1,573,949	2,369,730	195	1,573,949	2,369,730	894	\$10,870	46.40	46.40	0.005
Appliance & Plug Loads	0	0	0	0	0	0	0	\$2,710			0.000
Service & Domestic Hot Water	0	0	0	0	0	0	0	\$2,400			0.000
Electrification Subtotal	0	0	0	0	0	0	0	\$5,110			0.000
Transmission & Distribution	0	875	24,494	0	875	24,494	8	\$50	46.40	46.40	0.004
T&D Subtotal	0	875	24,494	0	875	24,494	8	\$50	46.40	46.40	0.004
C&S, T&D and Electrification Subtotal	195	1,574,824	2,394,224	195	1,574,824	2,394,224	902	\$16,030	31.61	31.88	0.007
Utility Total	2,241	12,223,555	48,601,475	2,214	12,169,291	48,003,069	18,426	\$2,546,550	3.45	3.45	0.062

TABLE 2. PWP EE 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)
Commercial	527	4,530,018	32,276,411	527	4,530,018	32,276,411	11,000	\$1,245,602	3.25	3.25	0.046
Residential	1,517	6,113,230	13,870,606	1,490	6,058,966	13,272,200	6,501	\$1,272,501	3.32	3.32	0.108
EE Subtotal	2,044	10,643,248	46,147,017	2,018	10,588,984	45,548,611	17,501	\$2,518,103	3.29	3.29	0.065
Residential	1	5,484	60,234	1	5,484	60,234	23	\$12,418	0.87	0.87	0.263
Low-Income Subtotal	1	5,484	60,234	1	5,484	60,234	23	\$12,418	0.87	0.87	0.263
EE and Low Income Subtotal	2,045	10,648,731	46,207,251	2,019	10,594,467	45,608,845	17,523	\$2,530,521	3.27	3.27	0.065
Commercial	195	1,573,949	2,369,730	195	1,573,949	2,369,730	894	\$10,870	46.40	46.40	0.005
C&S Subtotal	195	1,573,949	2,369,730	195	1,573,949	2,369,730	894	\$10,870	46.40	46.40	0.005
Residential	0	0	0	0	0	0	0	\$5,110			0.000
Electrification Subtotal	0	0	0	0	0	0	0	\$5,110			0.000
Commercial	0	875	24,494	0	875	24,494	8	\$50	46.40	46.40	0.004
T&D Subtotal	0	875	24,494	0	875	24,494	8	\$50	46.40	46.40	0.004
C&S, T&D and Electrification Subtotal	195	1,574,824	2,394,224	195	1,574,824	2,394,224	902	\$16,030	31.61	31.88	0.007
Utility Total	2,241	12,223,555	48,601,475	2,214	12,169,291	48,003,069	18,426	\$2,546,550	3.45	3.45	0.062

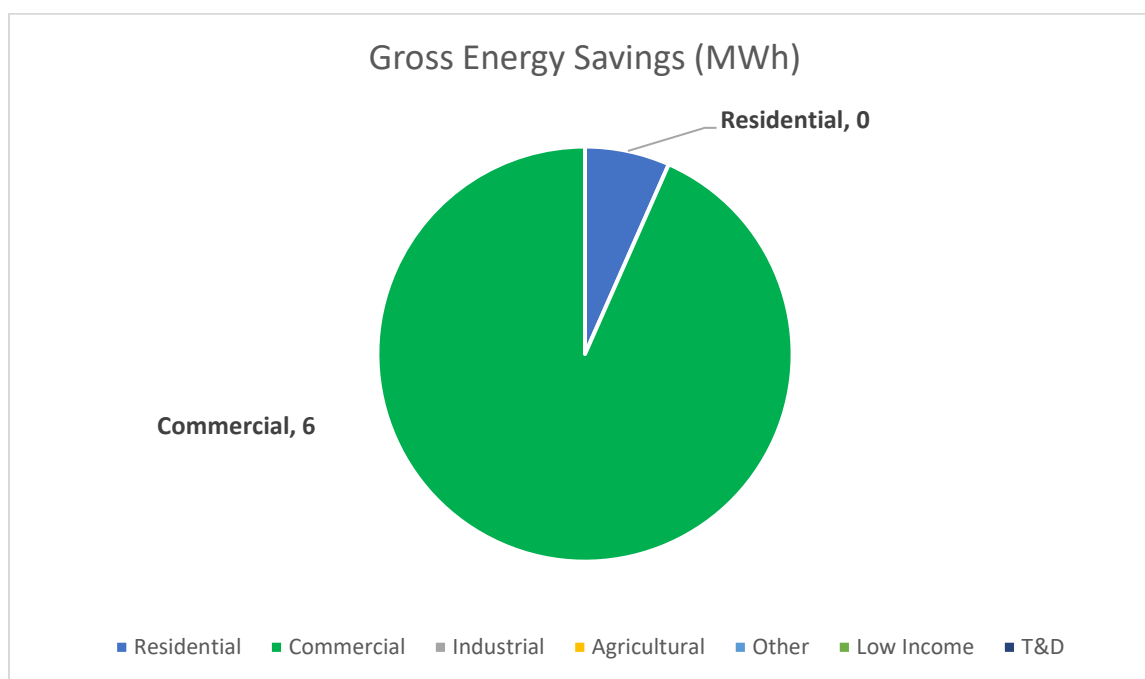
TABLE 3. PWP EE Program Results by Building Type

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	536	4,563,659	32,442,823	533	4,553,567	32,392,900	11,046	\$1,252,190	3.25	3.25	0.046
Residential	1,493	6,023,180	13,028,155	1,477	6,006,151	12,807,062	6,326	\$1,231,573	3.36	3.36	0.108
Residential - Single-Family	15	56,409	676,039	8	29,266	348,650	129	\$34,340	1.94	1.91	0.129
EE Subtotal	2,044	10,643,248	46,147,017	2,018	10,588,984	45,548,611	17,501	\$2,518,103	3.29	3.29	0.065
Residential	1	5,484	60,234	1	5,484	60,234	23	\$12,418	0.87	0.87	0.263
Low-Income Subtotal	1	5,484	60,234	1	5,484	60,234	23	\$12,418	0.87	0.87	0.263
EE and Low Income Subtotal	2,045	10,648,731	46,207,251	2,019	10,594,467	45,608,845	17,523	\$2,530,521	3.27	3.27	0.065
All	195	1,573,949	2,369,730	195	1,573,949	2,369,730	894	\$10,870	46.40	46.40	0.005
C&S Subtotal	195	1,573,949	2,369,730	195	1,573,949	2,369,730	894	\$10,870	46.40	46.40	0.005
Residential	0	0	0	0	0	0	0	\$5,110			0.000
Electrification Subtotal	0	0	0	0	0	0	0	\$5,110			0.000
All	0	875	24,494	0	875	24,494	8	\$50	46.40	46.40	0.004
T&D Subtotal	0	875	24,494	0	875	24,494	8	\$50	46.40	46.40	0.004
C&S, T&D and Electrification Subtotal	195	1,574,824	2,394,224	195	1,574,824	2,394,224	902	\$16,030	31.61	31.88	0.007
Utility Total	2,241	12,223,555	48,601,475	2,214	12,169,291	48,003,069	18,426	\$2,546,550	3.45	3.45	0.062

PITTSBURG POWER COMPANY - ISLAND ENERGY

Pittsburg Power Company – Island Energy at a Glance

- Climate Zone: 3
- Customers: 580
- Total annual retail sales: 21,678 MWh
- Annual Retail Revenue: \$4,972,834
- Annual EE expenditures for reporting year: \$14,580
- Gross annual savings from reporting year portfolio: 6 MWh



Pittsburg Power Company – Island Energy Overview

Island Energy is committed to helping its customers to achieve EE by incentivizing EE programs. Island Energy will continue to work with its customers to understand their load profile, design EE programs that fit business needs and to engage more resources to promote EE on Mare Island.

Major Program and Portfolio Changes

- Commercial Lighting Program: Lighting Redesign, Overhaul or Retrofit Projects for Commercial Buildings. Incentive is based on one-for-one replacement or calculated based on expected annual energy Savings.

- Residential Home Energy Audit: Free On-Site Energy Advisory Service to Residential Customers
- Residential Retail Lighting: Free CFL Light Bulbs & LED Lights to Residential Customers
- Residential Appliance Efficiency: Rebates for Energy Star Qualified Clothes Washers, Dishwashers, Air Conditioners and Refrigerators.
- LED Street & Parking Lights: Rebates for Street and parking LED Lights
- EV Charging Station: Rebate for electric vehicle charging station at residential premises.

The rebate programs for Commercial Motors and Process Improvement and Compressed Air System have been discontinued.

Program and Portfolio Highlights

- Continue to provide EE & renewable energy incentive programs that are comparable to those offered by other utilities in surrounding communities.
- Continue to work with customers on energy audits, efficiency improvements and new renewable technologies on Mare Island.
- Work with the new master developer on leasing space for utility owned solar.
- Invest in other distributed energy generation.

Commercial, Industrial & Agricultural Programs

- Commercial Lighting Retrofit Program
- Building Exterior and Parking Lot Lightings

Residential Programs

- Residential Free Energy Audit Program
- Residential Efficient Lighting Program
- Appliance Efficiency Program
- Smart Thermostats

EM&V Studies

Evaluation of each EE application is based on the engineering grade report on energy savings provided by customers. Measurement is based on AMR data reads every month, compared with usage before EE measure installations.

Major Differences or Diversions from California POU TRM for Energy Savings

None.

TABLE 1. Island Energy EE Program Results by End Use

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)
Appliance & Plug Loads	0	423	4,954	0	272	3,249	1	\$3,786	0.11	0.11	1.483
Lighting - Indoor	1	5,969	53,695	1	4,775	42,956	15	\$10,794	0.39	0.41	0.301
EE Subtotal	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
EE and Low Income Subtotal	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380

TABLE 2. Island Energy EE 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)
Commercial	1	5,969	53,695	1	4,775	42,956	15	\$10,794	0.39	0.41	0.301
Residential	0	423	4,954	0	272	3,249	1	\$3,786	0.11	0.11	1.483
EE Subtotal	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
EE and Low Income Subtotal	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380

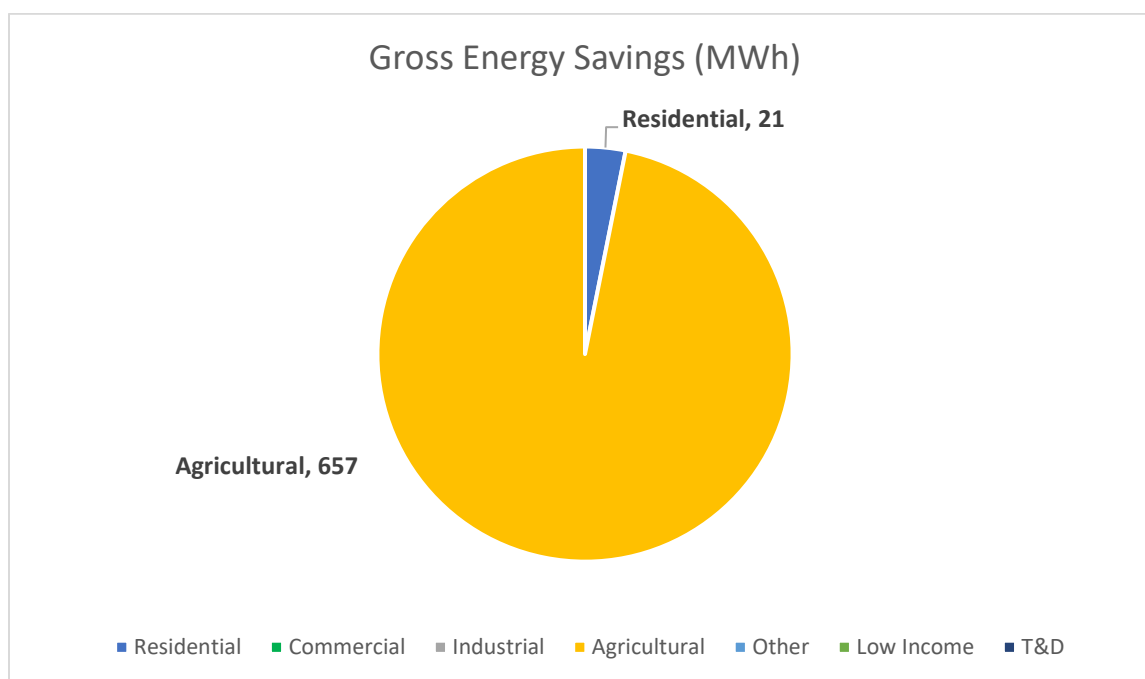
TABLE 3. Island Energy EE Program Results by Building Type

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	0	58	579	0	35	348	0	\$461	0.10	0.10	1.619
Assembly	1	5,969	53,695	1	4,775	42,956	15	\$10,794	0.39	0.41	0.301
Residential	0	244	2,682	0	141	1,548	1	\$1,863	0.11	0.10	1.499
Residential - Single-Family	0	121	1,693	0	97	1,354	0	\$1,463	0.12	0.12	1.426
EE Subtotal	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
EE and Low Income Subtotal	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1	6,392	58,649	1	5,048	46,206	16	\$14,580	0.32	0.33	0.380

PLUMAS-SIERRA RURAL ELECTRIC COOPERATIVE

Plumas-Sierra Rural Electric Cooperative at a Glance

- Climate Zone: 16
- Customers: 8,176
- Total annual retail sales: 153,794 MWh
- Annual Retail Revenue: \$27,267,249
- Annual EE expenditures for reporting year: \$121,273
- Gross annual savings from reporting year portfolio: 678 MWh



Plumas-Sierra Rural Electric Cooperative Overview

The Plumas-Sierra Rural Electric Cooperative (PSREC) is a member-owned, not-for-profit utility located in the eastern Sierras of Northern California. PSREC provides electricity to more than 8,100 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 six 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 EE programs is to help members understand and control their energy use.

Major Program and Portfolio Changes

There were no major changes to the PSREC programs or portfolios in 2022.

Program and Portfolio Highlights

The majority of the energy savings for the 2022 program was provided by upgrades to irrigation equipment in the agricultural sector.

Commercial, Industrial & Agricultural Programs

PSREC provides free energy audits to businesses to assist with energy conservation and troubleshooting high energy consumption. This program has been successful in assisting business owners in making decisions in efficiency upgrades and conservation.

PSREC offers rebates for commercial and industrial members who perform efficiency upgrades including lighting 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 Resistance Values (R-Value), 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 EE and conservation information, as well as kilowatt meters, to interested members to help them reduce their bill, understand their energy consumption, and make their home more efficient. This program has successfully addressed high bill concerns by empowering members to use information such as our 'Do-It-Yourself Energy Audit' to learn more about their home and how they use energy.
- Efficiency Education - Energy Audits: PSREC provides free comprehensive energy audits to assist members with energy conservation and troubleshooting high energy consumption in their home. This program has been successful in educating members about efficiency and conservation and assisting in reduction of energy use, especially in low-income homes.

Complementary Programs

- Low Income Winter Rate Assistance Program: Income-qualified members can apply for a discounted rate during the heating season. In conjunction, a home energy audit is offered, and efficiency information is provided to assist members with energy conservation.
- NEM Program: PSREC offers NEM for members who install renewable energy generation systems.
- Community Shared Solar: PSREC offers solar energy shares 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 EE and renewable energy resources to members through a book lending library and resource center in our office lobby.
- EV Rebate: PSREC offers a \$500 rebate for the purchase of an EV.
- RD&D: PSREC is researching EV charging infrastructure and other program options to encourage the adoption of electric vehicles in its service area.

EM&V Studies

PSREC EM&V reports can be found on CMUA website.⁵² PSREC performs a yearly internal review to evaluate program effectiveness and improvement areas. PSREC has committed to seeking third party evaluation of its programs every five years, depending upon budget.

⁵² See <https://www.cmua.org/emv-reports>.

Major Differences or Diversions from California POU TRM for Energy Savings

PSREC uses the CMUA TRM and the eTRM as the primary sources for the majority of reported energy savings. Savings for the commercial lighting program are custom calculations based on the specific equipment replaced.

TABLE 1. PSREC EE Program Results by End Use

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)
Appliance & Plug Loads	0	5,244	59,350	0	2,862	31,885	11	\$17,966	0.21	0.21	0.769
Building Envelope	85	13,674	344,220	68	10,782	273,649	127	\$37,006	1.28	0.33	0.225
HVAC - Cooling	2	2,231	41,255	2	1,784	33,004	14	\$13,860	0.43	0.24	0.626
Lighting - Indoor	0	7	42	0	4	23	0	\$20	0.12	0.09	1.153
Service & Domestic Hot Water	0	165	1,815	0	99	1,089	0	\$551	0.20	0.22	0.673
Water Pumping / Irrigation	0	656,696	10,507,136	0	623,861	9,981,779	3,263	\$51,869	17.58	8.54	0.007
EE Subtotal	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
EE and Low Income Subtotal	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017

TABLE 2. PSREC EE Program Results by Sector

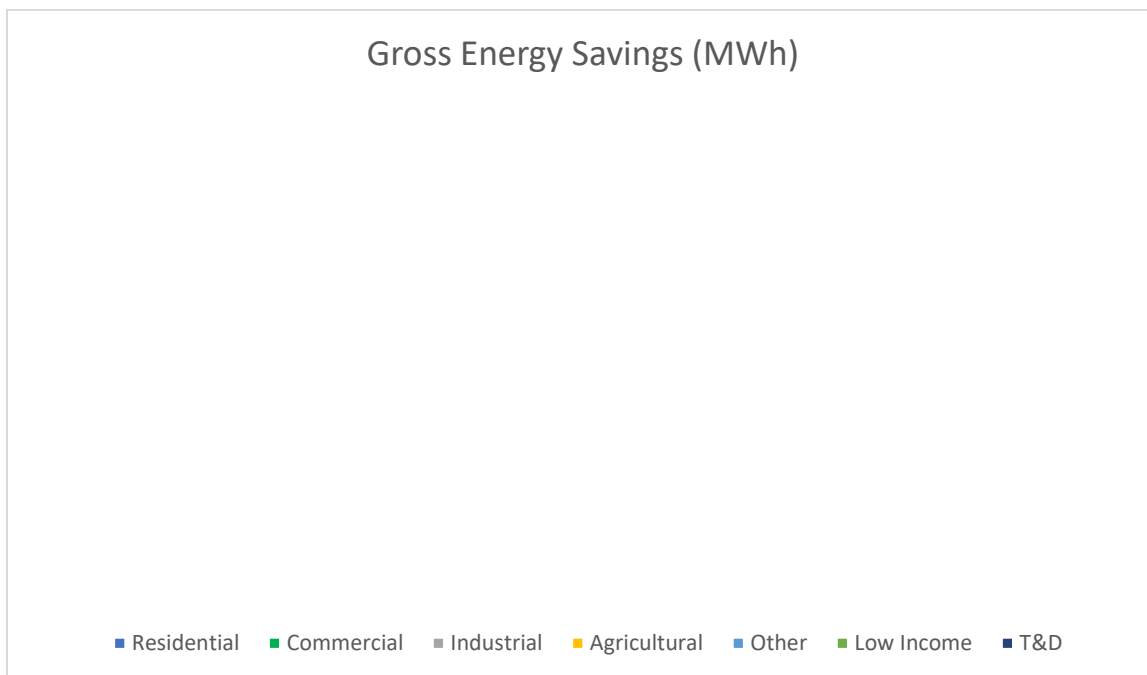
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Agricultural	0	656,696	10,507,136	0	623,861	9,981,779	3,263	\$51,869	17.58	8.54	0.007
Residential	88	21,321	446,682	70	15,531	339,650	152	\$69,403	0.82	0.31	0.329
EE Subtotal	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
EE and Low Income Subtotal	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017

TABLE 3. PSREC EE 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	0	1,703	12,538	0	1,145	8,259	3	\$4,687	0.20	0.21	0.747
Other Agricultural	0	656,696	10,507,136	0	623,861	9,981,779	3,263	\$51,869	17.58	8.54	0.007
Residential	88	17,889	409,420	70	13,304	315,478	144	\$55,292	0.98	0.31	0.286
Residential - Single-Family	0	1,729	24,724	0	1,083	15,912	5	\$9,424	0.20	0.21	0.829
EE Subtotal	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
EE and Low Income Subtotal	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	88	678,017	10,953,818	70	639,393	10,321,429	3,415	\$121,273	7.99	3.30	0.017

Port of Oakland at a Glance

- Climate Zone: 3
- Customers: 167
- Total annual retail sales: 119,987,000 MWh
- Annual Retail Revenue: \$27,520,300
- Annual EE expenditures for reporting year: \$12,984
- Gross annual savings from reporting year portfolio: 0 MWh



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

Although no customers completed projects in FY 2022, the Port offered incentives for EE projects.

Program and Portfolio Highlights

In FY 2022, Port provided incentives for EE projects at a refrigerated warehouse facility.

Commercial, Industrial & Agricultural Programs

- Energy Audits: The Port provides Energy Audits that focus on five major energy saving retrofit/improvement projects that will result in load reduction and more efficient use of energy.
- Energy Saving Measures Exceeding Title 24 Standards: Port will provide a rebate for any new facility constructed within the Port by its electricity customers that exceed the Title 24 standards in energy saving measures. Eligible facilities 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 EE equipment/improvements by our commercial customers.
- Lighting Retrofit: A program providing rebates for the installation of EE lighting upgrades.

Residential Programs

The Port does not have any residential customers.

Complementary Programs

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

EM&V Studies

The Port's EM&V studies are posted on the CMUA website.

Major Differences or Diversions from California POU TRM for Energy Savings

Reported savings are custom calculations based on actual equipment replaced and installed.

TABLE 1. Port of Oakland EE Program Results by End Use

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)
Lighting - Indoor	0	0	0	0	0	0	0	\$12,984			0.000
EE Subtotal	0	0	0	0	0	0	0	\$12,984			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$12,984			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$12,984			0.000

TABLE 2. Port of Oakland EE 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)
Commercial	0	0	0	0	0	0	0	\$12,984			0.000
EE Subtotal	0	0	0	0	0	0	0	\$12,984			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$12,984			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$12,984			0.000

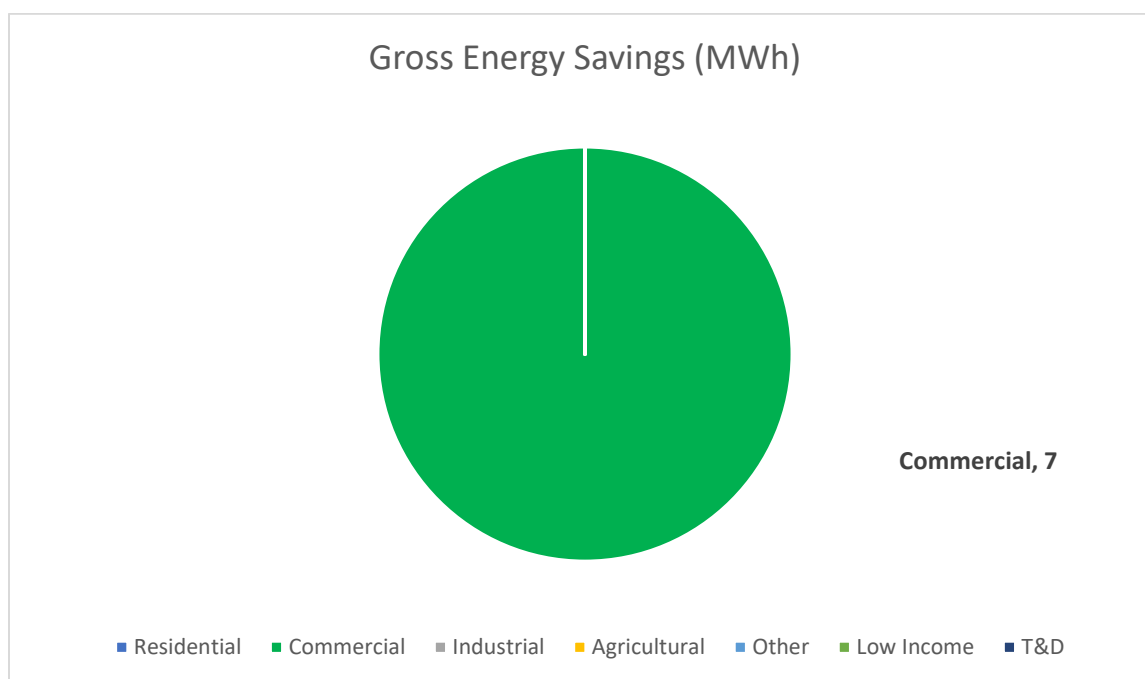
TABLE 3. Port of Oakland EE Program Results by Building Type

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	0	0	0	0	0	0	0	\$12,984			0.000
EE Subtotal	0	0	0	0	0	0	0	\$12,984			0.000
EE and Low Income Subtotal	0	0	0	0	0	0	0	\$12,984			0.000
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	0	0	0	0	0	0	0	\$12,984			0.000

RANCHO CUCAMONGA MUNICIPAL UTILITY

Rancho Cucamonga Municipal Utility at a Glance

- Climate Zone: 10
- Customers: 2,503
- Total annual retail sales: 99,763 MWh
- Annual Retail Revenue: \$12,503,161
- Annual EE expenditures for reporting year: \$32,634
- Gross annual savings from reporting year portfolio: 7 MWh



Rancho Cucamonga Municipal Utility Overview

The Rancho Cucamonga Municipal Utility (RCMU) began providing electric service in 2004 to primarily commercial customers. Since then, RCMU has grown and expanded to residential and industrial customers and new developments. Interest and participation in EE programs continues to be challenging due to the existing customer base and new 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 2022.

Program and Portfolio Highlights

In previous years, the greatest participation in EE programs has been attained by the commercial EE rebate program. Replacing inefficient lamp fixtures with LEDs continues to be the trend for EE rebates. Programs and EE practices are promoted online, and free energy audits are continuing to be offered to educate customers on energy savings and potential upgrades on existing equipment.

Commercial, Industrial & Agricultural Programs

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

Residential Programs

During this reporting period, the RCMU residential customer base expanded from primarily leasing multi-family tenants to include single family owned residences. With the growth coming from new developments that meet or exceed Title 24, there is the continued challenge to find interest for EE improvements among the residential customers. The homes are built with LED lighting fixtures, energy efficient appliances and many include solar PV systems.

To date, there have not been any residential requests or interest for EE programs. The existing programs are being reviewed as staff is exploring offering rebates for energy efficient equipment and innovative ways to tailor the programs to increase participation.

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 EE and reduce energy use are provided.
- Low Income: The program is intended to assist customers with their bills and is funded by the RCMU Public Benefit Fund. The household size and gross income requirements will be based off the San Bernardino County Income Limits and Documentation system.
- Medical Support Assistance Program: The program will assist eligible residential customers where a full-time resident of the household regularly requires the use of essential medical support equipment. An application with supporting documentation from the patient’s doctor is required to receive the credit each month.

- New Development Incentive: This incentive is for new development that is built to exceed a minimum of 15% above Title 24 Code. The incentive payment is based off the final Title 24 report created by a Certified Energy Plans Examiner and verified by a third-party certified Home Energy Rating Systems Rater.
- EV Charger Rebate Program: The program provides an incentive of up to \$5,000 per Level 2 or DC Fast charging station to RCMU commercial customers who install a workplace or public EV charger. An incentive of up to \$500 for residential customers who install a Level 2 charger is also offered.

EM&V Studies

Major Differences or Diversions from California POU TRM for Energy Savings

None.

TABLE 1. RCMU EE Program Results by End Use

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)
Lighting - Outdoor	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
EE Subtotal	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
EE and Low Income Subtotal	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407

TABLE 2. RCMU EE 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)
Commercial	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
EE Subtotal	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
EE and Low Income Subtotal	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407

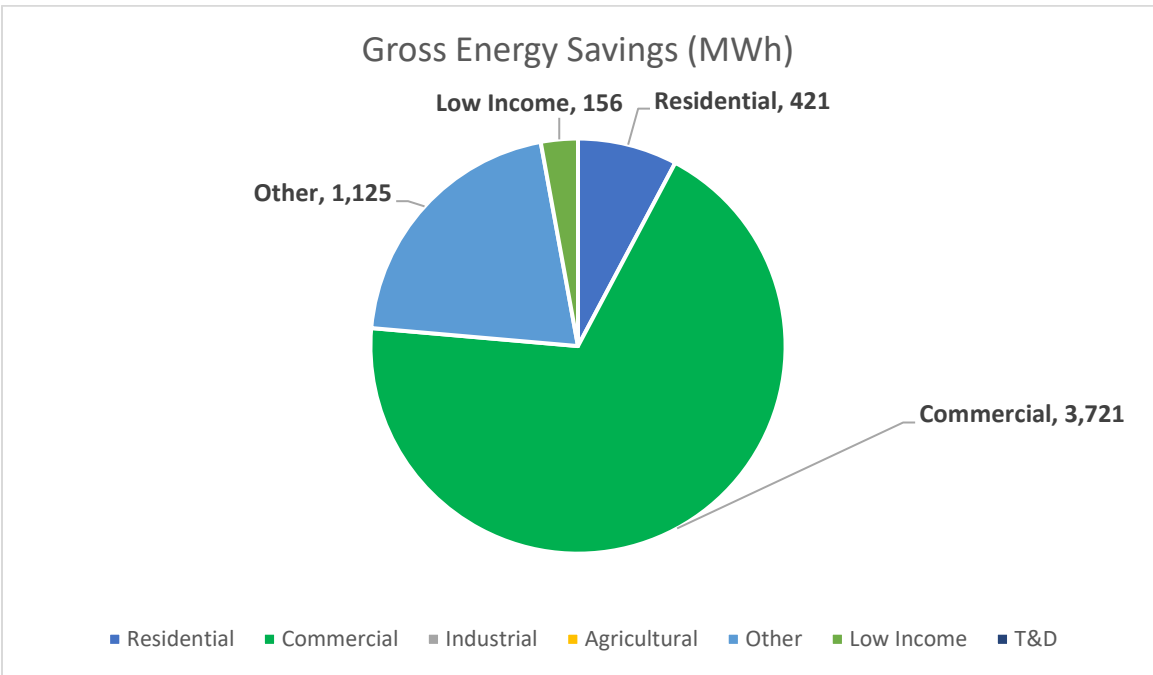
TABLE 3. RCMU EE Program Results by Building Type

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)
Other Commercial	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
EE Subtotal	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
EE and Low Income Subtotal	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	2	7,048	112,768	2	7,048	112,768	53	\$32,634	0.52	0.53	0.407

REDDING ELECTRIC UTILITY

Redding Electric Utility at a Glance

- Climate Zone: 11
- Customers: 44,511
- Total annual retail sales: 738,493 MWh
- Annual Retail Revenue: \$121,256,164
- Annual EE expenditures for reporting year: \$2,829,388
- Gross annual savings from reporting year portfolio: 5,423 MWh



Redding Electric Utility Overview

Redding Electric Utility’s (REU) total sales in FY 2022 were 738,493 MWh, reflecting a 2.5% decrease compared to FY 2021. REU attributes the reduction in retail sales due to lower impacts from the reduced economic activity from the COVID-19 pandemic, supply chain issues, and inflation. Redding continuously develops electric sales forecasts, especially as the utility expects to see sustained increases in sales attributed to economic growth and increased building and transportation electrification.

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.

REU has committed much of its C&T auction proceeds to efforts that reduce greenhouse gas emissions, combat poverty, and achieve reliable energy savings. However, Redding does not expect additional funding from C&T auction proceeds and is scheduled to ramp down greenhouse gas-funded programs over the next few years.

Major Program and Portfolio Changes

REU continuously evaluates and makes changes to the public benefits programs to maximize the benefits to the community and maintain compliance with State and Federal Regulations.

In September 2021, Redding’s City Council approved Redding’s Demand-Side Management- (DSM) IRP report. The DSM-IRP report concluded that EE measures were not cost-effective for ratepayers due to REU’s low avoided costs and the impact of lost revenue for providing programs that inherently reduce load (i.e., EE). In contrast, electrification programs are cost-effective for all ratepayers (both participants and non-participants), provide a positive revenue source to help sustain PBC funding, and are a cost-effective way to save carbon. As a result, Redding City Council approved terminating all EE rebate programs paid through Public Benefits, replacing them with a new suite of building electrification programs beginning in FY 2023. The approved DSM-IRP report is available on the City of Redding’s website.⁵³

In order to process all outstanding rebates by the end of FY 2022, Redding ended several EE programs effective May 1st, 2022, including:

- Public Benefits
 - Residential EE Deemed Rebates
 - Commercial EE Deemed Rebates
 - Commercial Lighting Rebates
 - Commercial Custom Rebates
- C&T Auction Proceeds
 - Shade Trees
 - Low-Income EE + Electrification

REU has two remaining EE savings programs, including the EE Economic Recovery Plan (EEE-RP) for upgrades to City facilities and the LED Streetlight replacement project. These programs are funded by C&T auction proceeds.

Program and Portfolio Highlights

For the commercial sector in FY 2022, Redding’s Commercial Lighting rebate program accounted for 59% of total annual energy savings, an increase from FY 2021 levels by 140.16% or an additional 1.95 million net kWh. REU anticipated this result due to the large influx of

⁵³ See

(http://reddingcityca.iqm2.com/Citizens/Detail_LegiFile.aspx?Frame=&MeetingID=3604&MediaPosition=&ID=7641&CssClass).

rebates submitted due to the Lighting program ending in May 2022. REU's LED streetlight replacement program accounted for 24.98% of annual energy savings, or 1.13 million kWh (net). On the residential side, the Residential EE Deemed rebates program accounted for 5.69% of total annual energy savings for the year, or 0.133 million net kWh.

Commercial, Industrial & Agricultural Programs

- HVAC: Deemed rebates for air conditioning, heat pump equipment, and Wi-Fi-enabled thermostats. Custom rebates are 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, 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 are calculated using a custom calculator to determine savings based on existing equipment, retrofit equipment, and hours of operation.
- City Facilities EE: Funding from C&T auction proceeds provide updates to City of Redding facilities, including LED streetlight replacement, lighting retrofits, and upgrades to energy-efficient equipment.

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 the installation of dual pane windows, drill and fill wall insulation, and ceiling insulation.

Complementary Programs

- Low-Income Programs: Low-income assistance spending (through the CARES Program and Residential Energy Discount) continues to be the second-largest area of our Public Benefits Program expenditures. During FY 2022, rate discounts represented about \$1.76 million, and assistance programs represented about \$0.60 million paid with public benefits funds. Low-income programs have been most beneficial to a significant portion of our customer base that has limited situational and/or financial means to participate in other EE programs.
- EV and Charging Infrastructure: REU offers TE incentives for chargers and vehicle purchases for residential and commercial ratepayers through C&T auction proceeds and

the LCFS funding. As part of the DSM-IRP implementation, the TE program was also re-evaluated for new program offerings beginning FY 2023.

- Residential Education: REU 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: REU 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.

EM&V Studies

The results of Redding EM&V reports are available on CMUA's website.⁵⁴

In addition to these activities, rebate processing includes technical reviews 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 EE programs, REU uses the standard measures as constructed within the ESP reporting tool. For REU's unique programs (Low Income EE + Electrification, Streetlights, City EE), REU used the custom measure feature in ESP to represent the energy and demand impacts of those programs. REU utilizes a custom calculation for Commercial Lighting, lighting retrofit projects in the REU EE programs, and the Low Income Electrification measures.

⁵⁴ See <https://www.cmua.org/emv-reports>.

TABLE 1. REU EE Program Results by End Use

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)
Appliance & Plug Loads	1	21,430	251,354	1	12,663	147,883	43	\$8,666	0.93	0.64	0.071
Building Envelope	18	88,874	1,866,360	7	26,553	557,615	306	\$60,781	0.70	0.29	0.137
Commercial Refrigeration	11	106,461	1,491,767	7	63,876	895,060	290	\$12,964	3.72	2.09	0.018
HVAC - Cooling	109	443,174	5,296,294	89	331,998	3,818,340	1,625	\$530,376	0.45	0.60	0.165
Lighting - Indoor	591	2,344,260	18,673,036	473	1,875,408	14,938,429	4,940	\$418,338	2.08	2.09	0.033
Lighting - Outdoor	97	2,253,114	23,662,740	97	2,053,026	21,698,181	9,460	\$1,521,520	0.80	1.83	0.084
Service & Domestic Hot Water	0	9,885	108,735	0	5,931	65,241	21	\$6,392	0.53	0.46	0.118
EE Subtotal	827	5,267,198	51,350,286	673	4,369,456	42,120,748	16,685	\$2,559,038	0.95	1.46	0.072
Appliance & Plug Loads	0	8,818	132,270	0	7,495	112,430	38	\$38,497	0.16	0.16	0.416
Building Envelope	0	18,687	392,423	0	15,884	333,560	138	\$67,878	0.29	0.29	0.256
HVAC - Cooling	0	16,451	144,852	0	13,983	123,124	50	\$30,521	0.23	0.23	0.302
HVAC - Heat Pump	0	27,002	567,045	0	22,952	481,989	196	\$63,761	0.44	0.44	0.167
Lighting - Indoor	0	70,117	1,121,872	0	59,599	953,591	335	\$51,437	1.02	1.02	0.066
Miscellaneous	0	0	0	0	0	0	0	\$2,185	0.00	0.00	5,142,235.311
Service & Domestic Hot Water	0	15,042	171,512	0	12,786	145,785	51	\$16,071	0.50	0.50	0.133
Low-Income Subtotal	0	156,117	2,529,974	0	132,699	2,150,478	808	\$270,351	0.45	0.45	0.155
EE and Low Income Subtotal	827	5,423,315	53,880,260	673	4,502,155	44,271,226	17,494	\$2,829,388	0.90	1.32	0.076
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	827	5,423,315	53,880,260	673	4,502,155	44,271,226	17,494	\$2,829,388	0.90	1.32	0.076

TABLE 2. REU EE 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)
Commercial	736	3,721,336	32,569,876	608	2,988,489	26,106,985	9,657	\$1,675,669	0.90	1.84	0.075
Other	0	1,124,647	12,371,117	0	1,124,647	12,371,117	5,345	\$317,369	2.17	2.17	0.031
Residential	91	421,215	6,409,293	65	256,319	3,642,646	1,684	\$566,000	0.42	0.44	0.188
EE Subtotal	827	5,267,198	51,350,286	673	4,369,456	42,120,748	16,685	\$2,559,038	0.95	1.46	0.072
Residential	0	156,117	2,529,974	0	132,699	2,150,478	808	\$270,351	0.45	0.45	0.155
Low-Income Subtotal	0	156,117	2,529,974	0	132,699	2,150,478	808	\$270,351	0.45	0.45	0.155
EE and Low Income Subtotal	827	5,423,315	53,880,260	673	4,502,155	44,271,226	17,494	\$2,829,388	0.90	1.32	0.076
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	827	5,423,315	53,880,260	673	4,502,155	44,271,226	17,494	\$2,829,388	0.90	1.32	0.076

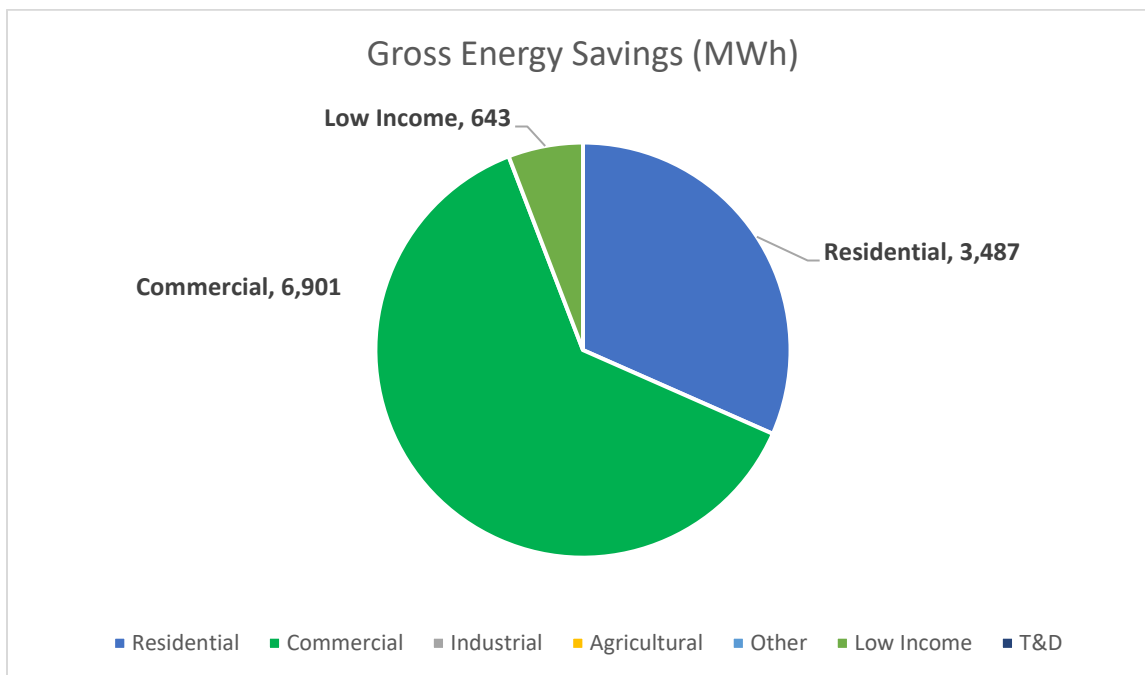
TABLE 3. REU EE Program Results by Building Type

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	0	1,126,721	12,398,079	0	1,125,891	12,387,294	5,350	\$317,698	2.17	2.17	0.031
Grocery	10	95,739	1,352,381	6	57,443	811,428	262	\$11,431	3.82	2.09	0.017
Other Commercial	726	3,623,523	31,190,533	602	2,929,802	25,279,380	9,390	\$1,663,909	0.88	1.83	0.077
Residential	83	206,963	2,882,055	61	145,630	1,906,663	861	\$414,229	0.29	0.40	0.261
Residential - Single-Family	8	214,252	3,527,238	4	110,690	1,735,984	822	\$151,771	0.76	0.49	0.107
EE Subtotal	827	5,267,198	51,350,286	673	4,369,456	42,120,748	16,685	\$2,559,038	0.95	1.46	0.072
Residential	0	935	10,284	0	795	8,741	4	\$30,648	0.02	0.02	4.209
Residential - Single-Family	0	155,182	2,519,690	0	131,905	2,141,737	805	\$239,703	0.50	0.50	0.138
Low-Income Subtotal	0	156,117	2,529,974	0	132,699	2,150,478	808	\$270,351	0.45	0.45	0.155
EE and Low Income Subtotal	827	5,423,315	53,880,260	673	4,502,155	44,271,226	17,494	\$2,829,388	0.90	1.32	0.076
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	827	5,423,315	53,880,260	673	4,502,155	44,271,226	17,494	\$2,829,388	0.90	1.32	0.076

RIVERSIDE PUBLIC UTILITIES

Riverside Public Utilities at a Glance

- Climate Zone: 10
- Customers: 112,014
- Total annual retail sales: 2,143,518 MWh
- Annual Retail Revenue: \$337,876,146
- Annual EE expenditures for reporting year: \$3,806,254
- Gross annual savings from reporting year portfolio: 11,031 MWh



Riverside Public Utilities Overview

In FY 2022, Riverside Public Utilities (RPU) met 50% of the kWh savings goal of 1% of retail sales as adopted by the Board of Public Utilities in 2021.

FY 2022 posed a challenge for reaching the savings target due to the world-wide pandemic. RPU staff was able to create some low income programs to assist customers with their utility bills to ease some of the financial burden on them.

Major Program and Portfolio Changes

RPU continues to enhance and expand its EE program portfolio for the benefit of its customers and the Riverside community. Staff continues to review the program portfolio and offers recommendations on incentive level adjustments for consideration.

RPU is experiencing leveled participation in EE rebate and incentive programs. Overall program participation has remained flat over the past 10 years. This flattening demand for EE programs is likely due to a combination of market saturation, customer perception that solar generation is of higher value than EE, and overall weak consumer confidence.

During FY 2022, the RPU team continued to focus on revamping low-income programs to be most beneficial to rate payers. RPU reintroduced the Energy Savings Assistance Program (ESAP) in early 2022.

Program and Portfolio Highlights

RPU had over 37,000 participations in all programs. RPU did not operate our DI programs this reporting year but will resume in the next reporting year.

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 EE savings.

Commercial, Industrial & Agricultural Programs

- Air Conditioning Incentives: Rebates for replacement of energy inefficient AC units (Non-Res Cooling).
- Energy Star® Appliances: Rebates for purchase of Energy Star®-rated refrigerators, dishwashers, commercial clothes washers, solid door refrigerator/freezers, ceiling fans and televisions (Non Res-Lighting, Non Res-Cooling, and Non-Res Refrigeration).
- Lighting Incentive: Rebates for kWh savings on installation of more energy efficient lighting and controls (Non-Res Lighting).
- Tree Power: Rebates for purchase and planting of up to 5 qualifying shade trees per year (Non-Res Cooling).
- Weatherization: Rebates for installation of insulation, window film and cool roofs (Non-Res Shell).
- Performance Based Incentive: Rebates for customers who can demonstrate a kWh savings based on custom energy-efficiency measures (Non-Res Comprehensive).
- Commercial Food Service Program: Program specifically targeting commercial food service customers such as restaurants, hospitality providers, institutional, medical/hospital customers, schools, and government customers. The program is offered in conjunction with SoCalGas and provides customers with a comprehensive facility audit offering recommendations on specific EE measures, estimated return on investment, and applicable utility incentives.

- Key Account EE 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 EE plan including a priority list of recommended EE 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 EE projects from concept to completion (Non-Res Comprehensive).
- Custom Energy Technology Grants: Grants awarded for research, development, and demonstration of EE 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 EE, 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 in FY 2022).
- Thermal Energy Storage Incentive: Feasibility study and incentives available for use of thermal energy storage based on program guidelines (none claimed in FY 2022).

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).
- 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 EE measures in common areas (Res Lighting). While we did not have this program in place this reporting year, we will resume in the next reporting year.
- 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

- SHARE: This low-income assistance program credits up to \$250 toward electric deposit or bill payment assistance for qualified low-income applicants annually. The program assisted 2,467 customers during FY21/22. RPU has a facility in a low income area of the city in an effort to make the program more accessible to our low income customers.
- ESAP: In partnership with SoCalGas, ESAP is designed to help lower monthly bills to income-qualified renters and homeowners, making homes more energy efficient through professional no-cost energy-saving home improvements by RPU's authorized contractor Synergy. There were 529 qualified ESAP participants in FY 2022.
- Emergency Recovery Assistance Program (ERAP): RPU established the ERAP in response to the COVID-19 pandemic to assist residential electric customers that have experienced reduced income due to loss of employment or reduced hours as a result of COVID-19. ERAP assisted 529 residential electric customers with a one-time \$400 credit towards their utility bill.
- 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 11 MW 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.

EM&V Studies

RPU is committed to providing cost-effective, ongoing EM&V efforts for its EE 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. Due to the COVID-19 pandemic, the number of inspections have reduced.

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.

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.

The refrigerator recycling program administered by ARCA assures full inspection when the contractor picks up old appliances.

TABLE 1. RPU EE Program Results by End Use

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	2	3,194	35,138	2	3,194	35,138	11	\$921	3.64	12.86	0.035
Appliance & Plug Loads	250	826,217	5,631,685	244	816,069	5,508,479	1,993	\$256,576	2.56	11.22	0.058
Building Envelope	193	233,588	4,709,206	179	215,950	4,349,849	1,624	\$139,449	6.13	12.11	0.049
Commercial Refrigeration	0	2,121	27,573	0	2,121	27,573	9	\$806	3.29	12.86	0.040
HVAC - Cooling	2,059	3,568,143	82,508,816	1,864	2,926,914	64,731,180	23,009	\$1,747,411	6.09	11.15	0.043
Lighting - Indoor	5	1,347,266	14,819,925	5	1,347,266	14,819,925	4,660	\$279,896	5.22	12.86	0.025
Miscellaneous	1	3,949,591	43,419,076	1	3,949,280	43,417,522	13,833	\$690,760	6.08	12.84	0.021
Service & Domestic Hot Water	0	1,956	22,584	0	1,858	21,455	7	\$598	3.18	11.16	0.037
Water Pumping / Irrigation	0	49,269	689,768	0	49,269	689,768	234	\$203,231	0.33	12.86	0.408
Whole Building	0	406,610	8,538,810	0	406,610	8,538,810	2,859	\$103,616	7.81	12.86	0.019
EE Subtotal	2,510	10,387,956	160,402,582	2,294	9,718,532	142,139,699	48,240	\$3,423,265	5.46	11.74	0.035
Appliance & Plug Loads	0	128	512	0	128	512	0	\$114	0.46	12.86	0.310
HVAC - Cooling	0	177,682	2,730,667	0	177,682	2,730,667	1,020	\$223,159	2.47	6.68	0.117
Lighting - Indoor	0	465,370	7,445,920	0	465,370	7,445,920	2,701	\$159,716	4.62	11.95	0.031
Low-Income Subtotal	0	643,180	10,177,099	0	643,180	10,177,099	3,721	\$382,989	3.36	8.94	0.054
EE and Low Income Subtotal	2,510	11,031,136	170,579,681	2,294	10,361,712	152,316,798	51,962	\$3,806,254	5.25	11.51	0.036
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	2,510	11,031,136	170,579,681	2,294	10,361,712	152,316,798	51,962	\$3,806,254	5.25	11.51	0.036

TABLE 2. RPU EE 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)
Commercial	1,029	6,900,671	85,901,221	1,029	6,900,458	85,897,277	27,140	\$1,440,788	5.78	12.84	0.023
Residential	1,481	3,487,284	74,501,362	1,266	2,818,074	56,242,423	21,100	\$1,982,478	5.24	10.98	0.057
EE Subtotal	2,510	10,387,956	160,402,582	2,294	9,718,532	142,139,699	48,240	\$3,423,265	5.46	11.74	0.035
Residential	0	643,180	10,177,099	0	643,180	10,177,099	3,721	\$382,989	3.36	8.94	0.054
Low-Income Subtotal	0	643,180	10,177,099	0	643,180	10,177,099	3,721	\$382,989	3.36	8.94	0.054
EE and Low Income Subtotal	2,510	11,031,136	170,579,681	2,294	10,361,712	152,316,798	51,962	\$3,806,254	5.25	11.51	0.036
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	2,510	11,031,136	170,579,681	2,294	10,361,712	152,316,798	51,962	\$3,806,254	5.25	11.51	0.036

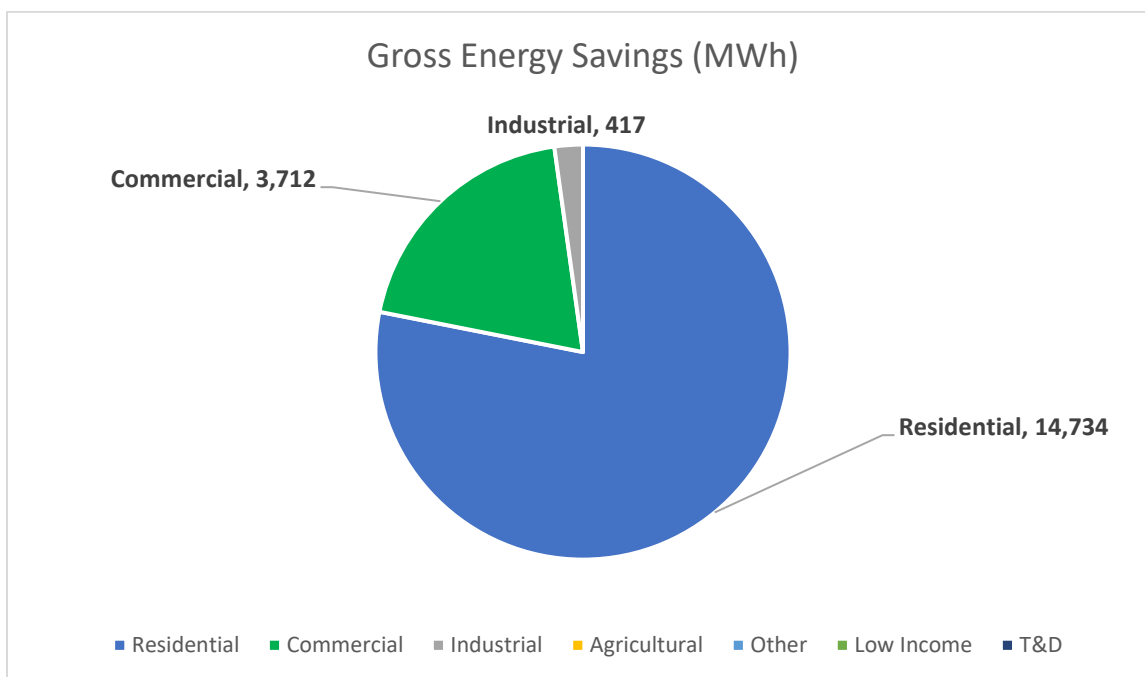
TABLE 3. RPU EE Program Results by Building Type

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	1,600	8,983,608	144,218,459	1,428	8,358,603	126,720,589	42,545	\$2,397,555	6.72	11.85	0.028
Residential	910	1,404,348	16,184,124	866	1,359,929	15,419,110	5,695	\$1,025,711	2.54	11.08	0.093
EE Subtotal	2,510	10,387,956	160,402,582	2,294	9,718,532	142,139,699	48,240	\$3,423,265	5.46	11.74	0.035
Residential	0	643,180	10,177,099	0	643,180	10,177,099	3,721	\$382,989	3.36	8.94	0.054
Low-Income Subtotal	0	643,180	10,177,099	0	643,180	10,177,099	3,721	\$382,989	3.36	8.94	0.054
EE and Low Income Subtotal	2,510	11,031,136	170,579,681	2,294	10,361,712	152,316,798	51,962	\$3,806,254	5.25	11.51	0.036
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	2,510	11,031,136	170,579,681	2,294	10,361,712	152,316,798	51,962	\$3,806,254	5.25	11.51	0.036

ROSEVILLE ELECTRIC UTILITY

Roseville Electric Utility at a Glance

- Climate Zone: 11
- Customers: 66,220
- Total annual retail sales: 1,149,163 MWh
- Annual Retail Revenue: \$166,249,238
- Annual EE expenditures for reporting year: \$3,300,263
- Gross annual savings from reporting year portfolio: 18,863 MWh



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 59,000 residential accounts and 7,000 commercial accounts.

In 2022 Roseville issued 1,468 residential single family, 363 multifamily and 41 commercial building construction permits.

Industrial vacancy rate is 3.7% and office vacancy rate is 12.9%.

The median household income in Roseville is \$97,097 and 43% of residents over 25 have a bachelor's degree or higher. Interest in rooftop solar and electric vehicles is high.

Major Program and Portfolio Changes

As part of pandemic era relief, Roseville Electric Utility has focused, for a second year, on ways that Roseville Electric could support the recovery efforts of our community. Low income rate assistance programs continued at their enhanced levels to support those in need. Qualifications remained at their adjusted level of 200% of the federal poverty level.

Roseville Electric Utility has also continued to support the recovery of the local business community through its "Reopen Energy Smart" program, focused on small and medium businesses. This program has included a variety of enhanced rebates aimed at covering most, if not all, upgrade costs. LED lighting, smart thermostats, and cooking appliances were included in these rebates.

Roseville Electric Utility continues to offer residential new construction rebates for mixed fuel and all-electric homes.

In October 2021 Roseville Electric Utility launched a residential retrofit electrification program which included incentives for heat pump HVACs, heat pump water heaters, heat pump dryers, induction cooktops and assistance for panel upgrades. Interest in rebates for Heat Pump Water Heaters and Heat Pump HVACs was especially high as we saw participation increase throughout the year.

Program and Portfolio Highlights

Residential Home Energy Reports continue to be the most cost-effective program generating the greatest amount of energy savings for the Roseville Electric Utility residential program portfolio.

Roseville Electric Utility continues to maintain a broad portfolio of EE rebate offerings including 26 options for residential measures and 76 options for commercial measures. Roseville also includes a custom rebate option allowing commercial customers to take advantage of rebate opportunities outside of our prescriptive portfolio.

Commercial, Industrial & Agricultural Programs

- **Commercial LED and Other Lighting:** Roseville Electric Utility 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:** This program provides rebates to commercial restaurants to install energy efficient electric food service equipment.

- Commercial HVAC: This program includes package and split system retrofits, smart thermostats, and HVAC tune ups.
- Commercial Custom: Customer driven rebate option targets projects that reduce peak loads and energy consumption and offers unlimited EE technology opportunities for the large and key account customers.

Residential Programs

- Low-Income Rate Assistance: Roseville Electric Utility assisted approximately 2,100 customers in rate reduction for their utility bills in FY 22. Additionally, Roseville works with local agencies and supports the local LIHEAP program.
- During this period, Roseville Electric Utility also applied for and received funding from the 2021 California Arrearage Payment Program (CAPP) to assist with the impacts of delinquent accounts resulting from the pandemic. These funds significantly reduced the number of accounts in arrearage.
- Residential Windows: Under this program, 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: This program offers a rebate to customers installing a permanently fixed 2,000 cubic feet per minute (or greater) whole house fan.
- Residential Home Energy Reports: This industry-recognized, contractor-managed EE behavior program provided education, feedback, and tips to residential customers.
- Residential HVAC: This program provides rebates to customers for installing higher efficiency systems upon retrofit, performing annual HVAC tune-ups, and installing smart thermostats.
- Residential Shade Tree: This is a rebate program designed to incentivize and educate customers to plant drought-tolerant shade trees to keep their home cool. A local urban forester recommends trees. EE savings for the trees was obtained from an EM&V performed in 2010.
- Residential Pool Pump: A rebate program designed to incentivize customers to upgrade from a single speed to a variable speed pool pump.
- Residential New Construction: Mixed fuel and all-electric home programs offering incentives to builders designed to be consistent with new construction programs from neighboring utilities. Savings estimates are obtained from HERS energy reports and reviewed by the third-party administrator.
- Residential Sunscreens: Rebate program designed to incent customers to install permanent sunscreens on their windows to reduce air conditioner runtime.
- Residential Retrofit Electrification: Roseville Electric Utility promoted switching from gas to all electric appliances with rebates for heat pump HVACs, heat pump water heaters, heat pump dryers, induction cooktops and assistance with panel upgrades.

Complementary Programs

EV Program: In FY 2022, residential customers purchasing new and used electric vehicles and motorcycles were eligible for incentives for vehicles, plug in chargers and panel replacements. An increased rebate was also available for income qualified customers as part of our EV equity program.

In addition to rebates for residential vehicles and chargers, funding was used to assist commercial customers with Level 2 chargers for workplace charging and fleet charging. Rebates were also available for fleet vehicles and increased incentives were available for non-profit customers. Commercial customers were also able to request a free EV site assessment.

Additionally, funding was used to promote EV adoption through outreach and education.

Roseville Electric Utility is working with Plug in America to educate and incentivize Roseville dealers.⁵⁵

In FY 2023, Roseville will add rebates for infrastructure upgrades for all commercial customers and DC fast charging for multifamily and non-profits. Roseville will also increase the focus on equity and commercial charging projects.

In FY 2023, an update to the independent assessment of the potential impact of EVs to the City of Roseville Electric grid will be completed for Roseville Electric Utility and it will provide recommendations for a strategic approach to address the electrification of the transportation industry. Roseville staff will use this report and other industry research to identify opportunities for improvements and expansion of our existing EV program.

Community Solar:

Roseville Electric Utility 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 Roseville Electric Utility's Renewable Portfolio Standard (RPS) requirements. The objective is to test an option for customers who rent or otherwise choose not to install solar on their own homes.

City of Roseville Utility Exploration Center:

Roseville Electric Utility continues to support and promote EE and conservation education at 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.

EM&V Studies

Roseville Electric Utility suspended EM&V activity during the pandemic years to reduce the required customer contact and plans to return to its regular EM&V activity in 2023. Roseville

⁵⁵ See <https://pluginamerica.org/>.

Electric Utility prioritizes the programs to review 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 and M&V reports are published on the CMUA website.⁵⁶

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 Utility's avoided costs are entered into the SB 1037 reporting model. All modeling is performed using these costs.

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

⁵⁶ See <https://www.cmua.org/emv-reports>.

TABLE 1. Roseville Electric Utility EE Program Results by End Use

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	91	293,083	3,516,996	82	263,775	3,165,296	1,014	\$129,107	1.30	2.48	0.054
Appliance & Plug Loads	5	91,937	1,009,306	3	55,184	605,755	202	\$35,772	0.95	0.61	0.078
BROs	0	13,211,553	26,423,106	0	8,719,625	17,439,250	3,676	\$459,392	1.26	1.26	0.053
Building Envelope	238	510,154	10,492,397	49	184,566	3,814,054	1,618	\$303,590	0.87	0.51	0.120
Commercial Refrigeration	0	1,617	21,021	0	970	12,613	4	\$2,714	0.24	0.19	0.289
HVAC - Cooling	378	1,334,998	13,033,342	359	1,233,759	12,232,708	4,738	\$848,950	0.94	1.03	0.096
HVAC - Heat Pump	0	900	14,400	0	900	14,400	6	\$1,735	0.57	0.17	0.169
Lighting - Indoor	462	2,017,027	24,229,248	416	1,813,080	21,770,426	6,977	\$587,833	1.96	1.72	0.036
Lighting - Outdoor	251	981,373	11,776,476	226	883,236	10,598,828	4,590	\$353,164	1.60	2.70	0.044
Miscellaneous	50	417,334	8,764,015	50	417,334	8,764,015	2,847	\$201,413	2.31	0.90	0.035
Process	0	1,807	19,877	0	1,084	11,926	4	\$1,655	0.38	0.69	0.182
Service & Domestic Hot Water	0	1,175	18,800	0	1,175	18,800	6	\$842	1.20	0.29	0.063
EE Subtotal	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
EE and Low Income Subtotal	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
Appliance & Plug Loads	0	6,860	109,760	0	5,488	87,808	31	\$6,308	0.82	0.59	0.101
HVAC - Heat Pump	0	153,276	2,452,416	0	153,276	2,452,416	1,052	\$176,571	0.95	0.93	0.101
Service & Domestic Hot Water	0	189,501	3,032,016	0	189,501	3,032,016	1,060	\$191,217	0.84	1.63	0.088
Electrification Subtotal	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
C&S, T&D and Electrification Subtotal	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
Utility Total	1,475	19,212,594	104,913,175	1,185	13,922,953	84,020,313	27,828	\$3,300,263	1.32	1.22	0.058

TABLE 2. Roseville Electric Utility EE 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)
Commercial	1,166	3,711,911	44,177,834	1,069	3,360,799	40,086,696	13,928	\$1,272,788	1.68	1.80	0.042
Industrial	50	417,334	8,764,015	50	417,334	8,764,015	2,847	\$201,413	2.31	0.90	0.035
Residential	259	14,733,712	46,377,134	66	9,796,555	29,597,362	8,909	\$1,451,966	0.99	0.90	0.084
EE Subtotal	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
EE and Low Income Subtotal	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
Residential	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
Electrification Subtotal	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
C&S, T&D and Electrification Subtotal	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
Utility Total	1,475	19,212,594	104,913,175	1,185	13,922,953	84,020,313	27,828	\$3,300,263	1.32	1.22	0.058

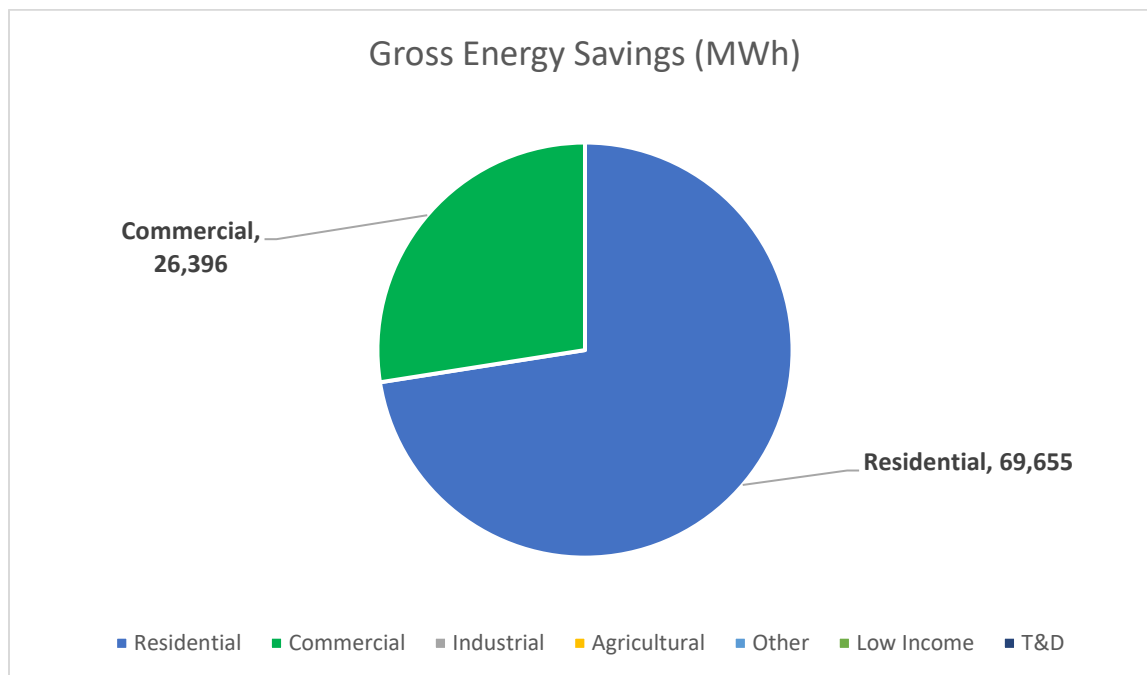
TABLE 3. Roseville Electric Utility EE Program Results by Building Type

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	702	2,477,087	28,366,570	631	2,228,351	25,517,643	8,138	\$754,111	1.79	1.79	0.039
Office - Large	205	224,787	3,596,597	205	224,787	3,596,597	1,092	\$117,243	1.72	1.01	0.046
Other Commercial	259	1,010,037	12,214,668	233	907,661	10,972,456	4,699	\$401,435	1.46	2.50	0.049
Other Industrial	50	417,334	8,764,015	50	417,334	8,764,015	2,847	\$201,413	2.31	0.90	0.035
Residential	24	13,819,237	36,446,581	14	9,147,783	24,032,937	6,534	\$920,812	1.14	0.98	0.069
Residential - Single-Family	235	914,475	9,930,553	52	648,773	5,564,425	2,375	\$531,154	0.72	0.75	0.134
EE Subtotal	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
EE and Low Income Subtotal	1,475	18,862,957	99,318,983	1,185	13,574,688	78,448,073	25,684	\$2,926,167	1.38	1.22	0.055
Residential - Single-Family	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
Electrification Subtotal	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
C&S, T&D and Electrification Subtotal	0	349,637	5,594,192	0	348,265	5,572,240	2,144	\$374,095	0.89	1.16	0.094
Utility Total	1,475	19,212,594	104,913,175	1,185	13,922,953	84,020,313	27,828	\$3,300,263	1.32	1.22	0.058

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Sacramento Municipal Utility District at a Glance

- Climate Zone: 12
- Customers: 647,502
- Total annual retail sales: 10,453,026 MWh
- Annual Retail Revenue: \$1,565,104,629
- Annual EE expenditures for reporting year: \$36,132,093
- Gross annual savings from reporting year portfolio: 96,051 MWh



Sacramento Municipal Utility District Overview

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

In July of 2020, the SMUD Board of Directors (Board) declared a climate emergency and set a goal of delivering carbon neutral electricity by 2030.

Diversity, Equity, Inclusion, and Belonging is a stated goal in SMUD culture. Many of our programs have included equity components to help ensure inclusion. In addition, the SMUD Board issued funding for a new Sustainable Communities Equity program offerings to ensure access to decarbonization offerings.

Due to the SMUD Board declaration, SMUD will need to develop load management or load flexibility programs to meet 10% to 20% of SMUD's peak load.

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.

EE, 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.

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 conflict with complex rates and carbon reduction efforts.

Major Program and Portfolio Changes

SMUD continued long-term reduction in the overall EE budget, with an ensuing reduction in the energy and peak savings achieved in prior years. This was both a planned reduction as SMUD's focus shifted towards its 2030 Zero Carbon plan goals and a decrease in commercial program activity resulting from economic conditions. Major program changes include the following:

Launched two new rates products in support of SMUD's 2030 Zero Carbon Plan: the Solar and Storage Rate to support battery storage adoption, and Critical Peak Pricing (CPP) to support a load flexibility product.

Initiated a new My Energy OptimizerSM (MEO) thermostat program for Summer 2022. This includes a standard demand response product, as well as a CPP product.

Developed a suite of MEO battery storage incentives. This includes a Starter product for rate arbitrage, a Partner product as a summer CPP offering, and a Partner+ product as an all-year dispatchable resource.

The Advanced Homes program conducted delivery coordination with the statewide California TECH program, which provided incentives for heat pump water and space heating conversions.

The Greenergy program launched five new individual options for residential customers which focuses on carbon savings in addition to renewable energy to provide consistency and alignment with our Integrated Resource Plan and 2030 Clean Energy Vision. The new options include: Greenergy Standard (200kWh of customers usage offset with renewable energy), Greenergy CA Renewable (100% of customers usage is offset with CA based renewable energy) and Greenergy Local (100% of customers usage is offset with local Sacramento region renewable energy), Greenergy Neighbor (customers can donate in blocks of 200 kWh of

renewable power to customers who would like to participate but cannot afford to do so; and Climate Advocate

Successfully launched the contractor driven phase of Charge@Home, allowing customers to access the SMUD Contractor Network and choose from a variety of contractors to install an EV charging circuit and administrate the Charge@Home rebate.

The Smart Homes program re-designed offerings to emphasize adoption of central hot water system conversions.

Program and Portfolio Highlights

On July 17, 2020, the SMUD Board adopted a climate emergency declaration. The SMUD Board adopted a climate emergency declaration that commits to working toward an ambitious goal of delivering carbon neutral electricity by 2030. The declaration recognizes the immediate risks to our community and demands bold action to achieve results.

As SMUD charts the process to decarbonize our electricity supply, we recognize there is a need to help our customers decarbonize their lives also through EE, building electrification and transportation electrification. Building and transportation electrification will both place strain on the distribution grid and force a larger carbon free electricity supply. Managing the load and grid in 2030 will encourage SMUD to operate the supply and grid differently.

Due to these expected changes, SMUD is changing many of its existing programs and developing new programs to prepare SMUD and its customers to this new future. As we move forward, this will encourage more bundling of programs and care to develop programs that aid us to a carbon free future.

For 2022, SMUD spent \$36.2 million for residential and commercial EE programs, compared to a budget of \$29.6 million. All expenditures are PGC funded. These programs delivered 14 MW of peak-load reduction and 96 GWh of annual energy savings.

Commercial, Industrial & Agricultural Programs

Expenditures for C&I EE retrofit programs for existing buildings and facilities were \$11.8 million, with delivery of 27.9 GWh in annual energy savings.

- Customized EE 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 assists customer in hiring a contractor to complete the project.
- Integrated Design Solutions: Provides incentives to builders and their design teams to design new commercial and industrial buildings energy efficient than required by Title 24 (or typical new construction in the case of Title 24-exempt buildings and processes).
- Multifamily Retrofit: Provides incentives to apartment owners and managers to complete energy retrofits.
- Smart Homes: Provides incentives to builders and their design teams to design efficient all electric homes and apartments.

Residential Programs

Expenditures for residential EE programs for existing homes were \$20.3 million and achieved 17.2 GWh in annual energy savings.

- Advanced Homes: Provides rebates for qualifying (Energy Star®, Consortium for EE, and/or other high-efficiency levels) efficiency improvements, which include mini split heat pump, heat pump space heaters and heat pump water heaters.
- Low Income Decarbonization: DI weatherization program supporting the adoption of heat pump water and space heating.
- Home Energy Reports: Emailed energy reports to support more energy efficient usage within a home.
- Retail Partnership Program is an upstream program that works with big box retailers to pay retailer incentives for all the EE items they sell in their stores.
- Appliance Efficiency Program: Included in this program are induction cooking rebates, Refrigerator/Freezer Recycling, SHIFT, and the Retail Partnership Program.
- Induction Cooking Rebates provides incentives for both electric replacement and gas conversions.
- Refrigerator/Freezer Recycling provides incentives to recyclers and partners to complete environmental recycling of old refrigerators and freezers.
- SHIFT is an upstream program that works with big box retailers to pay retailer incentives to shift adoption away from high volume non-Energy Star® models.

Complementary Programs

Information/Education Programs

- Expenditures for Information and Education programs were \$0.2M in 2021 and achieved 0.0 MW of peak-load reduction and 0.0 GWh in annual energy savings.

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 AC Load Management cycling program within a three-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.
- **Behavioral DR:** In 2021, SMUD piloted a Behavioral DR program. This program ran from July through September and ten events were called. Results were more promising than expected. The program used gamification and ranked similar houses against each other during the event. This ranking was then shared with the customers so they could take action to score better during the next event. This was a one-year pilot and based upon the results, SMUD will determine if it uses this type of DR in the future.

Other Complimentary 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 EE, demand response and other technologies in an aligned vision. The program is designed to complement SMUD's other portfolio programs (EE, DR, EV, etc.) to support SMUD's future load requirements. The resulting home design from those builders that participate will be an innovative use of energy-efficient design technologies, integrated built-in DR capabilities, automated peak shifting strategies, and other "smart" connected options desired by homeowners. The All-Electric Smart Homes program focuses on increasing the opportunities for reducing carbon emissions in residential new construction.
- **Low-Income Programs:** SMUD provides a low-income rate subsidy, a medical assistance rate subsidy, and no-cost weatherization and electrification services to our low-income customers.

- EVs: In 2021, SMUD’s Drive Electric program continued to promote adoption of plug-in electric vehicles through special PEV rate offerings, participation in educational events, and educational offerings through the SMUD website.⁵⁷
- Energy Storage: SMUD is conducting field studies to examine customer scale storage applications, risks and benefits associated with thermal and battery storage. Additionally, SMUD is piloting an energy storage program, StorageShares, in order to fulfill AB 2514 (Skinner, 2012) requirements.
- Renewable Energy Programs: During 2021, SMUD worked closely with our community to develop a new Solar & Storage rate for our customers. This rate was planned to go live in 2022 as we closed out the NEM 1 solar rate. This new Solar & Storage rate has now joined our voluntary green pricing programs including SolarShares, which supports expansion of distributed PV; and commercial and residential REC purchase programs.
- C&S: SMUD continues to pursue the development and implementation of C&S (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 52 net GWh energy savings associated with the Statewide C&S Team for 2020.
- RD&D: 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, ET, climate change, distributed generation, EE, 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.

EM&V 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 2022. 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 EE 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 using third-party contractors, with management and oversight by SMUD’s Strategy division.

SMUD completed the following M&V activities in 2022:

⁵⁷ See <https://www.smud.org/PEV>.

- Energy Star® Retail Products Platform evaluation study
- My Energy Optimizer Partner Thermostat evaluation study

In 2022, M&V will be conducted for the following:

- Advanced Commercial Solutions – This includes Integrated Design Solutions, Commercial Customized Incentives, and Commercial Building Electrification
- My Energy Optimizer Partner+
- Peak Conserve (Next Generation ACLM)

Major Differences or Diversions from California POU TRM for Energy Savings

In order to determine energy savings, programs may rely on several sources: the 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 climate zone 12 and SMUD customers.

TABLE 1. SMUD EE Program Results by End Use

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)
Appliance & Plug Loads	788	4,591,281	55,225,563	547	3,186,226	38,522,606	1,364	\$1,011,147	0.31	0.04	0.034
C&S	5,396	51,000,000	764,219,537	4,317	40,800,000	611,375,630	20,154	\$1,939,632	2.59	2.59	0.004
Commercial Refrigeration	9	74,934	1,123,405	7	59,948	898,724	30	\$42,030	0.17	0.20	0.063
Food Service	2	10,879	130,432	1	8,703	104,345	4	\$6,602	0.13	0.05	0.080
HVAC - Cooling	628	2,692,956	29,803,290	506	2,141,688	23,510,738	925	\$3,321,367	0.09	0.12	0.179
HVAC - Heating	0	7,156,163	107,210,764	0	4,293,698	64,326,458	2,082	\$1,559,396	0.20	0.11	0.033
Lighting - Indoor	1,131	7,089,761	49,532,795	905	5,671,809	39,626,236	2,656	\$1,660,617	0.20	0.14	0.048
Miscellaneous	394	3,000,000	41,974,972	276	2,100,000	29,382,480	1,055	\$342,557	0.69	0.69	0.015
Service & Domestic Hot Water	382	2,396,167	17,265,484	303	1,883,510	13,478,144	851	\$782,201	0.15	0.21	0.067
Whole Building	2,509	18,039,184	270,392,455	2,409	17,312,806	259,504,001	8,643	\$2,547,474	0.83	0.34	0.013
EE Subtotal	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
EE and Low Income Subtotal	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
Appliance & Plug Loads	6	33,308	332,778	6	33,308	332,778	15	\$372,211	0.01	0.01	1.367
HVAC - Heat Pump	2,020	12,287,814	158,229,016	1,984	12,069,838	155,802,648	5,562	\$12,116,177	0.14	0.12	0.101
Miscellaneous	0	0	0	0	0	0	0	\$476,000			0.000
Service & Domestic Hot Water	334	3,926,797	49,660,931	325	3,860,120	48,661,051	1,824	\$4,238,815	0.09	0.14	0.112
Whole Building	434	3,648,007	72,064,223	395	3,353,360	66,199,087	1,663	\$5,715,866	0.09	0.10	0.127
Electrification Subtotal	2,794	19,895,925	280,286,947	2,710	19,316,626	270,995,564	9,064	\$22,919,069	0.11	0.11	0.113
C&S, T&D and Electrification Subtotal	2,794	19,895,925	280,286,947	2,710	19,316,626	270,995,564	9,064	\$22,919,069	0.11	0.11	0.113
Utility Total	14,034	115,947,250	1,617,165,644	11,980	96,775,014	1,351,724,927	46,829	\$36,132,093	0.31	0.24	0.036

TABLE 2. SMUD EE 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)
Commercial	3,918	26,396,062	321,064,749	3,465	23,541,579	293,199,782	11,484	\$4,848,588	0.50	0.42	0.022
Residential	7,321	69,655,264	1,015,813,947	5,806	53,916,809	787,529,581	26,281	\$8,364,437	0.76	0.33	0.014
EE Subtotal	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
EE and Low Income Subtotal	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
Commercial	76	521,025	7,810,819	65	445,775	6,682,584	223	\$1,840,650	0.03	0.04	0.370
Residential	2,719	19,374,900	272,476,129	2,645	18,870,851	264,312,980	8,841	\$21,078,418	0.12	0.12	0.106
Electrification Subtotal	2,794	19,895,925	280,286,947	2,710	19,316,626	270,995,564	9,064	\$22,919,069	0.11	0.11	0.113
C&S, T&D and Electrification Subtotal	2,794	19,895,925	280,286,947	2,710	19,316,626	270,995,564	9,064	\$22,919,069	0.11	0.11	0.113
Utility Total	14,034	115,947,250	1,617,165,644	11,980	96,775,014	1,351,724,927	46,829	\$36,132,093	0.31	0.24	0.036

TABLE 3. SMUD EE Program Results by Building Type

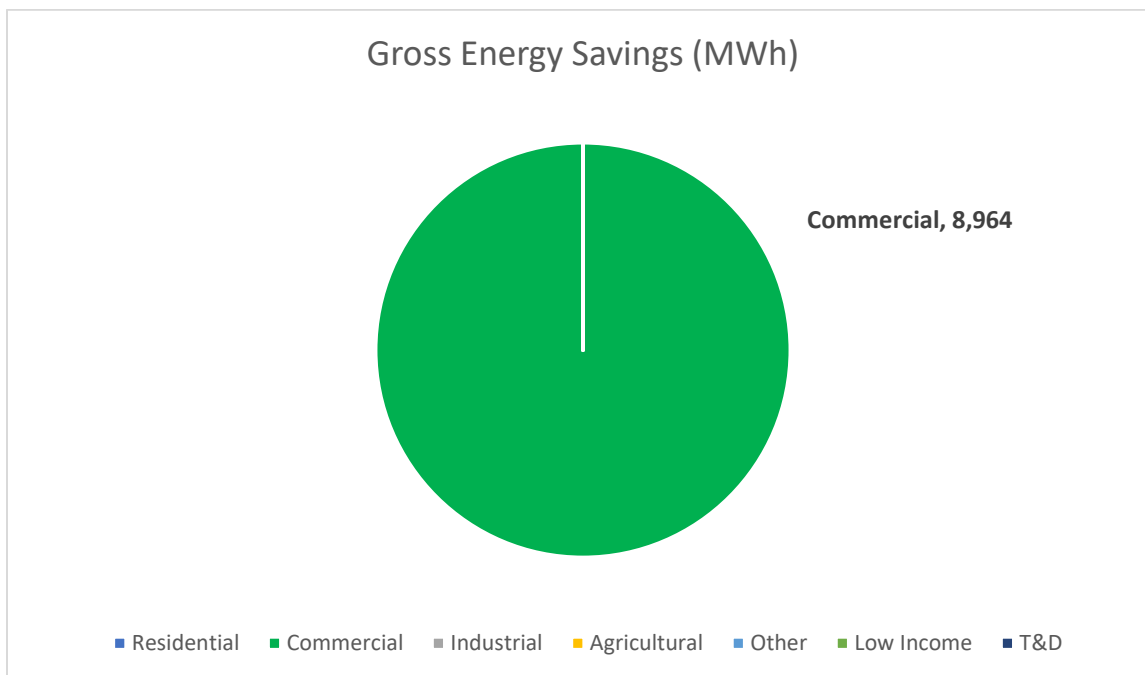
Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
All	5,396	51,000,000	764,219,537	4,317	40,800,000	611,375,630	20,154	\$1,939,632	2.59	2.59	0.004
Assembly	38	270,954	1,986,613	30	218,572	1,616,401	101	\$53,605	0.26	0.18	0.039
Education - Primary School	80	510,452	3,582,980	64	408,361	2,866,384	185	\$136,840	0.17	0.06	0.055
Education - Secondary School	51	322,257	4,830,757	51	322,257	4,830,757	161	\$69,663	0.55	0.45	0.019
Education - University	19	94,500	661,057	15	75,600	528,845	35	\$19,346	0.22	0.19	0.042
Grocery	93	745,471	9,861,572	86	688,403	9,268,832	340	\$149,312	0.50	0.37	0.021
Health/Medical - Hospital	530	3,799,740	56,957,546	514	3,685,748	55,248,819	1,839	\$333,082	1.36	1.65	0.008
Manufacturing Biotech	64	467,400	7,006,823	62	453,378	6,796,618	226	\$137,414	0.40	0.91	0.027
Manufacturing Light Industrial	776	5,577,572	82,631,893	750	5,389,500	80,007,733	2,685	\$694,616	0.94	1.28	0.012
Office - Large	204	1,187,095	12,926,530	179	1,042,182	11,725,918	514	\$366,074	0.27	0.32	0.040
Office - Small	673	3,969,592	29,415,233	507	3,014,698	21,121,803	1,431	\$884,785	0.21	0.20	0.048
Other Agricultural	496	3,623,690	54,322,965	451	3,297,558	49,433,898	1,645	\$498,271	0.80	0.41	0.014
Other Commercial	378	2,749,261	32,722,403	339	2,464,570	30,152,970	1,197	\$437,298	0.56	0.28	0.019
Residential	1,108	6,904,272	86,131,935	771	4,804,584	60,149,720	2,217	\$1,183,708	0.43	0.07	0.026
Residential - Multi-Family	195	1,469,077	22,013,308	195	1,469,077	22,013,308	732	\$311,975	0.59	0.05	0.019
Residential - Single-Family	622	10,281,914	143,449,167	523	6,843,147	93,990,923	3,178	\$4,929,121	0.13	0.10	0.069
Restaurant - Fast-Food	21	125,931	951,008	17	102,094	781,031	45	\$40,718	0.17	0.15	0.062
Restaurant - Sit-Down	5	40,884	595,836	4	32,707	476,669	16	\$24,479	0.16	0.17	0.069
Retail - Large	59	268,687	3,271,206	48	216,493	2,640,086	96	\$140,274	0.20	0.12	0.069
Retail - Small	405	2,441,645	17,927,278	326	1,968,714	14,572,576	891	\$795,148	0.16	0.22	0.064
Storage - Unconditioned	27	200,930	1,413,050	22	160,744	1,130,440	75	\$67,662	0.14	0.10	0.069
EE Subtotal	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
EE and Low Income Subtotal	11,240	96,051,325	1,336,878,697	9,271	77,458,388	1,080,729,363	37,765	\$13,213,024	0.66	0.35	0.016
Assembly	46	333,383	4,999,403	37	266,707	3,999,522	134	\$803,921	0.04	0.05	0.270
Education - Secondary School	19	116,689	1,749,208	18	116,322	1,743,713	58	\$615,799	0.02	0.03	0.475
Manufacturing Light Industrial	3	21,400	320,783	2	17,120	256,626	9	\$89,610	0.02	0.04	0.470
Office - Large	5	26,298	393,646	5	26,298	393,646	13	\$105,672	0.03	0.06	0.361
Other Agricultural	0	3,620	54,268	0	3,620	54,268	2	\$166,161	0.00	0.06	4.117
Residential - Multi-Family	247	2,134,097	35,818,650	209	1,844,097	30,023,166	897	\$2,051,829	0.11	0.12	0.096
Residential - Single-Family	2,471	17,240,803	236,657,479	2,436	17,026,754	234,289,814	7,944	\$19,026,589	0.12	0.12	0.107
Restaurant - Fast-Food	3	19,635	293,511	3	15,708	234,809	7	\$59,486	0.04	0.05	0.340
Electrification Subtotal	2,794	19,895,925	280,286,947	2,710	19,316,626	270,995,564	9,064	\$22,919,069	0.11	0.11	0.113

C&S, T&D and Electrification Subtotal	2,794	19,895,925	280,286,947	2,710	19,316,626	270,995,564	9,064	\$22,919,069	0.11	0.11	0.113
Utility Total	14,034	115,947,250	1,617,165,644	11,980	96,775,014	1,351,724,927	46,829	\$36,132,093	0.31	0.24	0.036

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

San Francisco Public Utilities Commission at a Glance

- Climate Zone: 3
- Customers: 5,347
- Total annual retail sales: 886,417 MWh
- Annual Retail Revenue: \$140,614,060
- Annual EE expenditures for reporting year: \$2,094,894
- Gross annual savings from reporting year portfolio: 8,964 MWh



San Francisco Public Utilities Commission Overview

Hetch Hetchy Power manages a portfolio of electric generation, which includes the San Francisco Public Utilities Commission's (SFPUC) Hetch Hetchy Water and Power System, which generates an average of 1.6 million MWh of clean hydroelectric power each year, 28 municipal solar photovoltaic installations (8.5 MW), and 2 biogas cogeneration facilities (3.1 MW). Hetch Hetchy Power has made a commitment to EE as its highest priority resource.

Historically, Hetch Hetchy Power's EE programs have mainly targeted its municipal customers, and most of its programs have been provided at no charge to these civic agencies. Hetch Hetchy Power also now offers programs for its growing residential and commercial customer sectors.

Major Program and Portfolio Changes

This year's energy savings are primarily derived from a DI project at San Francisco City Hall, custom new design and construction savings incentivized through the Blueprint for Savings program, and data center retrofit savings incentivized through the Upgrade for Savings program.

Program and Portfolio Highlights

EE has been an essential component of Hetch Hetchy Power's resource portfolio for more than a decade. In the current reporting period, FY 2022, completed EE projects and programs are estimated to save 5,376 net MWh of electricity per year, at a utility cost of \$2.0 million. Hetch Hetchy Power's EE projects and programs also achieve significant natural gas savings each year, which are accounted for separately from this report.

Program highlights for FY 2022 include:

- Interior dome lighting retrofit at City Hall
- Energy efficient HVAC, lighting, and people-mover designs implemented at the Transbay Terminal and incentivized through the Blueprint for Savings Program
- Energy efficient uninterruptible power supply retrofits for a large data center incentivized through the Upgrade for Savings Program

Commercial, Industrial & Agricultural Programs

Hetch Hetchy Power's EE programs are generally tailored to each 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 EE 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.
- 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 2022, Power Enterprise released its tenth annual report benchmarking the energy performance of San Francisco's municipal buildings.

- Upgrade for Savings: Hetch Hetchy Power offers customized cash incentives and technical support to help customers make significant upgrades to energy-efficient equipment, systems, and operational practices.
- Blueprint for Savings: This new construction EE program offers design assistance and cash payments to building owners and design teams planning to build highly energy efficient buildings 50,000 square feet or larger.

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 EE activities for this new residential use are limited as these new units are being built to the latest code and EE standards. New programs are under development to serve these customers.

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: This 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.

EM&V Studies

Historically, most of the EE retrofit projects funded by Hetch Hetchy Power have included an individual M&V study following the International Performance Measurement and Verification Protocol. 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 EE 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.

TABLE 1. SFPUC EE Program Results by End Use

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)
HVAC - Cooling	288	2,522,000	25,220,000	144	1,261,000	12,610,000	4,267	\$155,966	7.56	0.67	0.015
Lighting - Indoor	23	152,662	2,289,930	23	152,662	2,289,930	783	\$717,004	0.30	0.30	0.418
Miscellaneous	1,076	6,289,350	132,076,350	678	3,962,291	83,208,101	26,880	\$1,221,924	6.03	6.03	0.023
EE Subtotal	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
EE and Low Income Subtotal	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032

TABLE 2. SFPUC EE Program Results by Sector

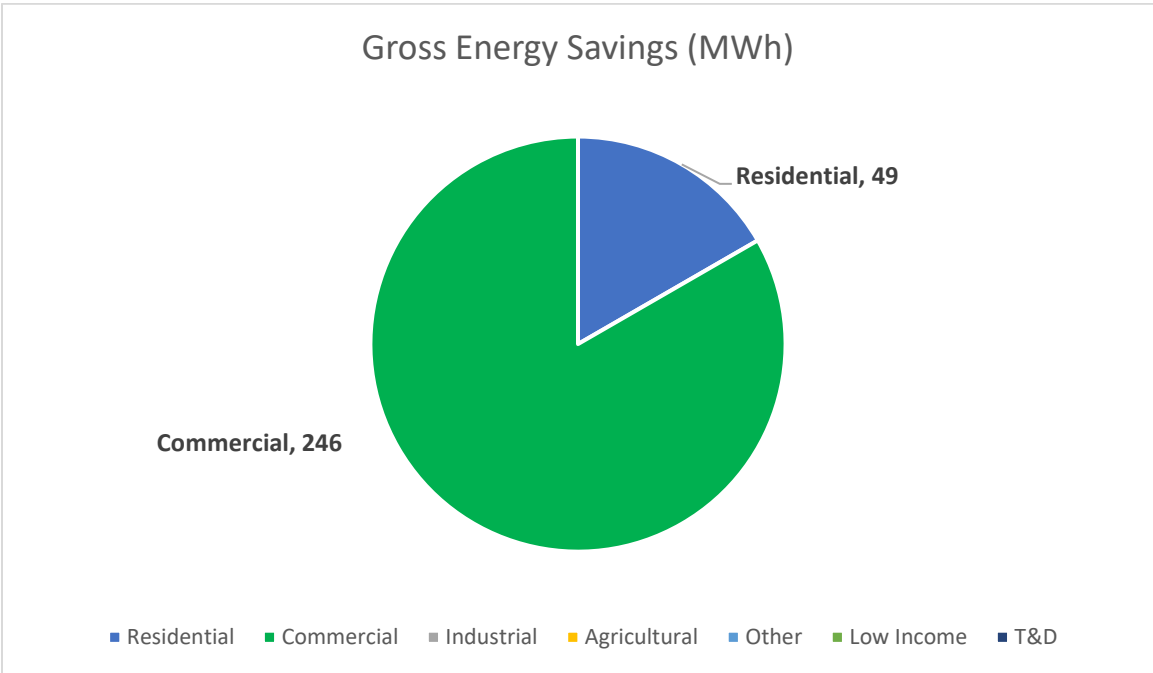
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Commercial	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
EE Subtotal	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
EE and Low Income Subtotal	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032

TABLE 3. SFPUCC EE 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	1,076	6,289,350	132,076,350	678	3,962,291	83,208,101	26,880	\$1,221,924	6.03	6.03	0.023
Other Commercial	311	2,674,662	27,509,930	167	1,413,662	14,899,930	5,050	\$872,970	1.60	0.56	0.072
EE Subtotal	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
EE and Low Income Subtotal	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	1,387	8,964,012	159,586,280	845	5,375,953	98,108,031	31,930	\$2,094,894	4.18	2.36	0.032

City of Shasta Lake at a Glance

- Climate Zone: 11
- Customers: 4,608
- Total annual retail sales: 214,652 MWh
- Annual Retail Revenue: \$25,638,225
- Annual EE expenditures for reporting year: \$244,286
- Gross annual savings from reporting year portfolio: 295 MWh



City of Shasta Lake Overview

The City of Shasta Lake (CSL) is located in Shasta County north of Redding. CSL invests its PBC funds to promote positive community impacts by promoting electricity-saving measures. CSL utilizes a comprehensive set of traditional rebate programs available to all customers under retrofit projects.

Major Program and Portfolio Changes

Reportable savings tend to fluctuate dramatically from year to year. In the last five years, CSL has achieved 113% of net kWh savings targets.

Program and Portfolio Highlights

The Commercial Lighting DI Program provided 37% of the gross annual savings in FY 2022. The program provides lighting fixtures to commercial customers at no cost if the customer agrees to pay for the installation of the fixtures.

Commercial, Industrial & Agricultural Programs

CSL manages a comprehensive EE incentive program for commercial customers focusing on EE 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. EE measures are recommended, and additional visits are completed upon request.

- C&I Lighting Program: CSL offers rebates to business owners who invest in the installation of EE 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 efficient 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 EE incentive program for residential customers. Rebates are offered for the installation of various EE measures, such as lighting, HVAC, appliances, and weatherization. On-site energy audits are provided by CSL energy specialists. EE 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 CSL.
- Research, Development, and Demonstration: Focuses on LED lighting in various applications, community solar charging station(s) and latest HVAC applications in City owned facilities.
- EV: Support of local business in conversion of combustion engine vehicles to electric vehicles.

EM&V Studies

EM&V reports for CSL are posted on the CMUA website.⁵⁸

Major Differences or Diversions from CA POU TRM for Energy Savings

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

⁵⁸ *Ibid.*

TABLE 1. CSL EE Program Results by End Use

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)
Appliance & Plug Loads	1	12,694	103,084	1	10,542	79,378	26	\$27,198	0.29	0.29	0.456
Building Envelope	286	15,000	313,494	81	4,931	103,136	106	\$31,050	0.96	0.88	0.465
HVAC - Cooling	3	7,310	117,986	2	5,778	92,911	38	\$36,049	0.68	0.67	0.555
HVAC - Heat Pump	1	718	11,493	1	431	6,896	3	\$3,876	0.44	0.42	0.801
Lighting - Indoor	38	176,693	2,179,701	32	150,113	1,838,651	592	\$104,393	1.66	1.58	0.077
Lighting - Outdoor	1	62,039	805,279	0	49,586	643,950	280	\$36,398	1.76	1.72	0.077
Service & Domestic Hot Water	5	20,785	228,631	4	19,688	216,564	70	\$5,322	3.65	3.66	0.033
EE Subtotal	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
EE and Low Income Subtotal	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112

TABLE 2. CSL EE Program Results by Sector

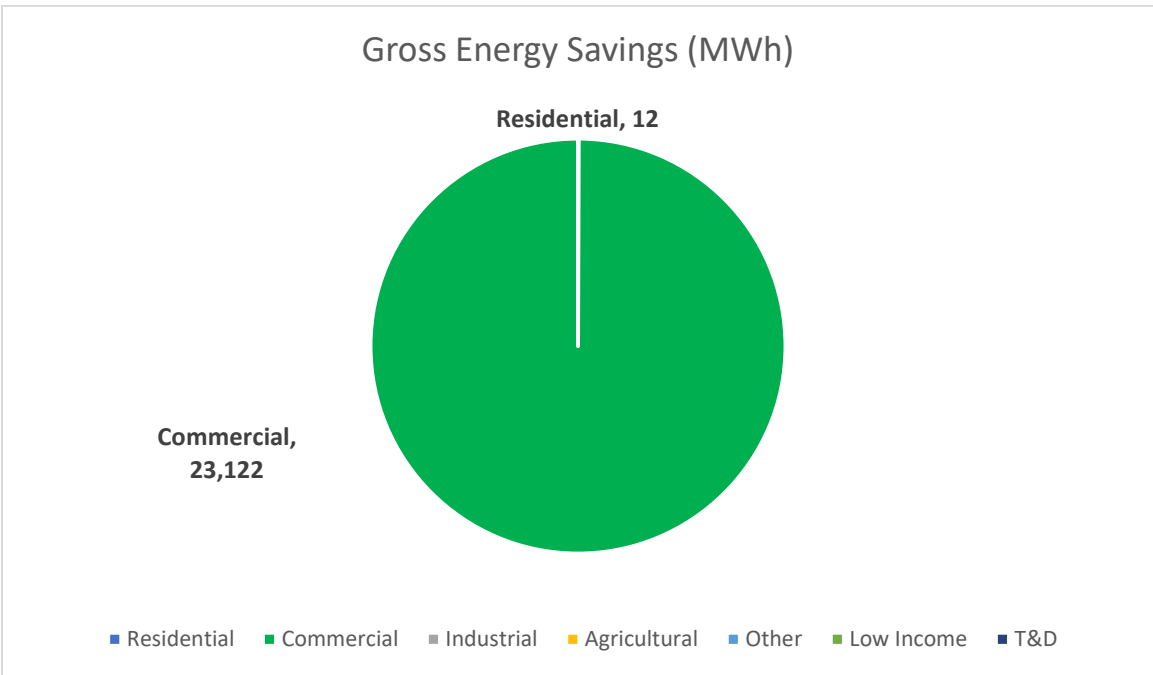
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Commercial	39	246,010	3,017,450	33	207,144	2,521,225	884	\$148,917	1.62	1.56	0.080
Residential	295	49,229	742,218	88	33,924	460,260	231	\$95,369	0.84	0.81	0.290
EE Subtotal	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
EE and Low Income Subtotal	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112

TABLE 3. CSL EE 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	39	238,134	2,972,802	32	199,407	2,476,369	870	\$139,837	1.70	1.63	0.077
Residential	19	50,023	666,626	10	37,510	435,675	223	\$80,910	0.92	0.95	0.256
Residential - Single-Family	276	7,083	120,240	79	4,152	69,441	22	\$23,539	0.41	0.32	0.497
EE Subtotal	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
EE and Low Income Subtotal	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	335	295,239	3,759,668	121	241,068	2,981,486	1,115	\$244,286	1.31	1.27	0.112

Silicon Valley Power at a Glance

- Climate Zone: 4
- Customers: 57,557
- Total annual retail sales: 4,028,518 MWh
- Annual Retail Revenue: \$487,946,907
- Annual EE expenditures for reporting year: \$4,702,062
- Gross annual savings from reporting year portfolio: 23,134 MWh



Silicon Valley Power Overview

Silicon Valley Power (SVP) is unique in its mix of customers. While 85% of the customers are residential, 94% of the utility retail sales are to commercial, industrial, and municipal customers. Over 75% of our electric load is attributable to our largest “Key” Customers and more than half 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 most of our annual energy savings. 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 2022, SVP made the following changes to its program portfolio:

- Ended the ENERGY STAR® Ceiling Fan Rebate - The program ended due to lack of savings that can now be claimed through this measure, as it was primarily lighting savings through the fan's lighting kit.
- End the Attic Insulation rebate. As building codes have become more stringent, the requirements for high levels of attic insulation when doing a remodel project are now required. Energy savings cannot be claimed when energy code requirements are triggered by a project and the savings for a stand-alone attic insulation project have dropped significantly where the amount of savings no longer justifies paying an incentive.
- End the ENERGY STAR® Room Air Cleaner mail in rebate. This program was replaced by an instant rebate through the online SVP Marketplace where customers can purchase energy efficient products. The marketplace includes instant rebates on equipment such as ENERGY STAR® room air cleaners and electric yard care equipment. Manufacturer rebates are also provided for a variety of products including smart thermostats and various types of LED light bulbs. The Marketplace launched in April 2022, simplifying the process for the customers, and reducing the staff time involved in validating qualifying products on rebate applications.
- Add a Commercial Prescriptive Variable Frequency Drive (VFD) Air Compressor Rebate. Adding VFD to air compressors have historically been rebated through our Customer Directed Rebate program. The Investor Owned Utilities have developed a prescriptive incentive of \$75 per horsepower (HP) for VFDs on compressors between 5 HP and 24 HP. Compressors larger than 24 HP are required to have a VFD by code and are not eligible. We recommend adding a prescriptive rebate that matches the \$75 per HP offered by the IOUs.
- Add a Building Optimization Pilot Program. The existing Building Controls program does not incentivize customers to optimize their existing controls strategies unless equipment is being added or upgraded with the controls system. This pilot program allows SVP to offer a performance-based incentive to customers to optimize their building controls strategies and recover up to 100% of the cost of external labor for implementing the new strategies. The performance incentive would be \$0.03 per kWh per year and the customer would receive three payments over two years, with the first payment made upon project completion and the following two payments made annually. This is in line with the other EE performance incentive programs offered by SVP, but the duration is shorter, as the persistency of savings from optimizing controls strategies tends to be two years. The program will be run as a pilot program for two years and if successful, may be rolled into our standard program offering.

- Reduce the amount of the prescriptive rebate for certain commercial food service equipment to align with lower equipment costs and lower energy claimable energy savings. The reduction in claimable energy savings varies from 9% to 76%, with most measures having a reduction in claimable energy savings of 60% or more. The reduction in the price differential ranges from 47% to 95%. A combination of these two factors results in the need for lower EE rebates.

Program and Portfolio Highlights

In FY 2022, SVP customers completed a total of 19 custom incentive projects under the Customer Directed Rebate and Data Center Rebate programs. These projects contributed almost 20 million kWh in gross energy savings to the program's overall goal.

The Customer Directed Rebate and Data Center Rebate programs were developed years ago in recognition of the unique customer base served by SVP. The programs provide unique opportunities for energy-efficiency projects that may not otherwise fit into the utility's standard rebate and customer assistance offerings. Any EE project that decreases energy consumption at a facility in Santa Clara not already covered under one of our other rebate programs 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 achieved, as data centers do not always build out as planned and occupancy can vary. The performance incentive component has been 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 has been carried into other program design.

SVP launched its EE Grant for Small Businesses in FY 2021 to help small businesses impacted by the pandemic. This program carried over into the first half of FY 2022. Between the Nonprofit EE Grant Program and the Small Business EE Grant Program, 41 grant projects were completed with savings of almost 383,000 kWh annually. These projects will help small businesses and nonprofit organizations lower their ongoing operating costs. The grant programs were also effective in helping to keep contractors working during the pandemic when customers were less willing to invest in their facilities due to the uncertainty of the future of their business, thereby ensuring the utility has the contractor workforce to support our EE programs as things began to return toward normal.

Commercial, Industrial & Agricultural Programs

- Emerging Technologies Grant: The program provides grants to encourage businesses to develop new energy-related technologies. The incentive is paid in two installments. 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 EE 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 EE 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 EE 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 six 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 six payments made over five years, capped at 65% of total project cost. 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' EE 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.
- **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 information technology 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.
- **Customer Directed Rebate:** This program provides incentives based on actual energy saved for EE measures that do not fall into SVP's standard business rebate programs.
- **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 to determine the amount of the rebate.
- **EE Grant Program for NonProfit Organizations:** Organizations registered as a 501c3 are eligible for a grant up to \$25,000 to fund EE upgrades in their facilities. The grant requires a 20% matching funds contribution through cash, other grant funding, donations, or some other documented means.
- **EE Grant for Small Businesses impacted by COVID-19 mandates:** This program provides a grant of up to \$10,000 per eligible small business to improve the EE of its facilities to lower ongoing operating costs. Businesses who were required to shut down due to the County Health Order issued in March 2020 were not required to pay a copay. Businesses who were allowed to remain open paid 10% of the project cost. The program's intent was to assist businesses by lowering their overall operating costs and to keep contractors working and avoid layoffs so that we had the project support that we need for our EE programs once businesses opened up again.
- **Commercial Electrification Rebates:** SVP offers commercial electrification rebates including a custom rebate for conversion to heat recovery chillers, a custom rebate for heat pump pool heaters, a rebate for heat pump air conditioners, bonus incentives for electrification of food service equipment and a rebate for installation of heat pump water heaters. The heat pump air conditioner rebate program also offers an incentive to help cover the cost of infrastructure improvements needed to accommodate the new equipment.

Residential Programs

- **Residential Pool Pump Rebate:** This program provides a \$100 rebate to residential customers for installing a new variable speed pool pump with a qualifying controller.
- **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 EE and solar electric generation systems to residents.
- 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.
- SVP Marketplace: Online marketplace where customers can purchase energy efficient products. The marketplace includes instant rebates on equipment such as ENERGY STAR® room air cleaners and electric yard care equipment. Manufacturer rebates are also provided for a variety of products including smart thermostats and various types of LED light bulbs.

Complementary Programs

- Residential Pool Pump Rebate: This program provides a \$100 rebate to residential customers for installing a new variable speed pool pump with a qualifying controller.
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- SVP Marketplace: Online marketplace where customers can purchase energy efficient products. The marketplace includes instant rebates on equipment such as ENERGY STAR® room air cleaners and electric yard care equipment. Manufacturer rebates are also provided for a variety of products including smart thermostats and various types of LED light bulbs.

EM&V Studies

SVP regularly conducts EM&V studies of its rebate programs. The most current study will kick off in February 2023 and will be available in the fall. All past EM&V studies conducted on behalf of SVP can be found on the CMUA website.⁵⁹

Major Differences or Diversions from California POU TRM for Energy Savings

SVP uses the California eTRM for the majority of its energy savings and uses the California POU TRM for measures not included in the eTRM. 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 on the SVP website.⁶⁰

⁵⁹ *Ibid.*

⁶⁰ See <https://www.siliconvalleypower.com/businesses/rebates>.

TABLE 1. SVP EE Program Results by End Use

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)
Appliance & Plug Loads	1	6,230	62,791	1	5,296	53,373	9	\$21,716	0.30	0.26	0.536
Food Service	0	3,995	51,935	0	3,396	44,145	8	\$21,666	0.21	0.18	0.670
HVAC - Cooling	806	19,831,805	307,382,138	685	16,857,034	261,274,817	49,383	\$2,784,982	9.91	2.80	0.015
Lighting - Indoor	558	2,932,862	14,664,310	475	2,492,933	12,464,664	2,329	\$1,514,693	0.83	0.60	0.132
Lighting - Outdoor	0	324,770	974,310	0	324,770	974,310	184	\$319,493	0.34	0.34	0.342
Process	3	28,391	454,256	3	24,132	386,118	74	\$7,109	5.98	0.28	0.026
Service & Domestic Hot Water	0	6,016	66,176	0	3,610	39,706	7	\$7,783	0.54	0.44	0.261
EE Subtotal	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
EE and Low Income Subtotal	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
Appliance & Plug Loads	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
Electrification Subtotal	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
C&S, T&D and Electrification Subtotal	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
Utility Total	1,369	23,145,970	323,786,827	1,164	19,721,286	275,348,406	52,015	\$4,702,062	6.18	2.33	0.024

TABLE 2. SVP EE 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)
Commercial	1,368	23,121,823	323,526,949	1,163	19,702,265	275,144,053	51,979	\$4,540,204	6.39	2.36	0.023
Residential	1	12,246	128,967	1	8,905	93,078	17	\$137,237	0.08	0.07	1.951
EE Subtotal	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
EE and Low Income Subtotal	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
Residential	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
Electrification Subtotal	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
C&S, T&D and Electrification Subtotal	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
Utility Total	1,369	23,145,970	323,786,827	1,164	19,721,286	275,348,406	52,015	\$4,702,062	6.18	2.33	0.024

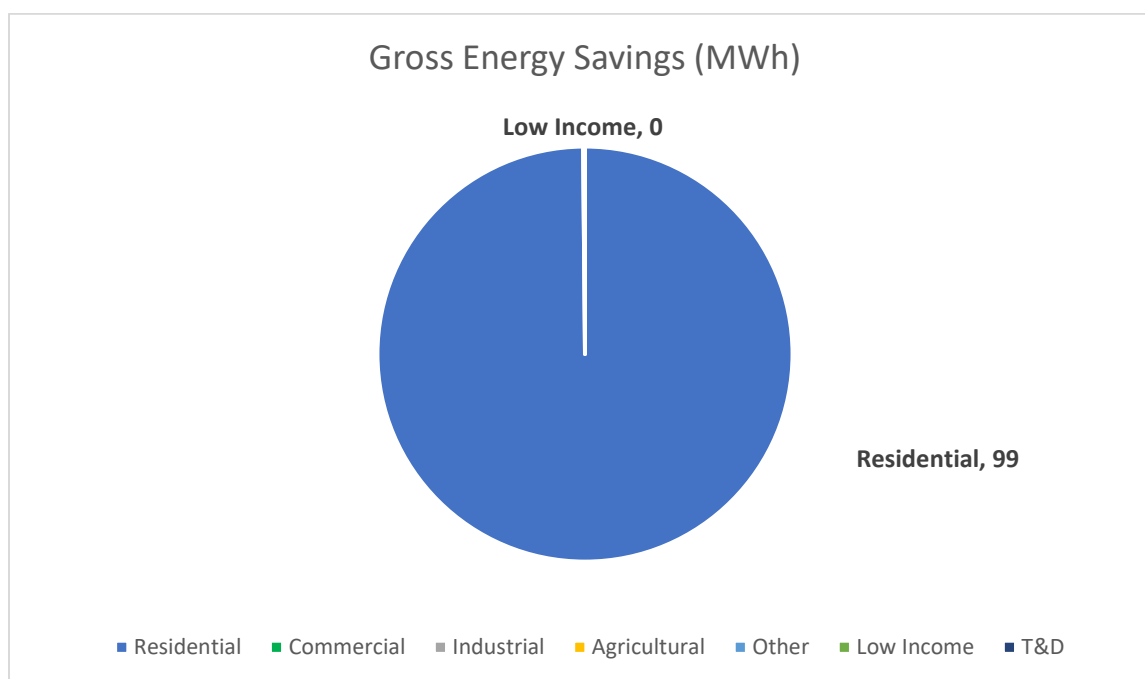
TABLE 3. SVP EE Program Results by Building Type

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	1,369	23,128,053	323,589,740	1,164	19,707,561	275,197,426	51,988	\$4,561,921	6.36	2.35	0.023
Residential	0	6,016	66,176	0	3,610	39,706	7	\$115,521	0.04	0.04	3.870
EE Subtotal	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
EE and Low Income Subtotal	1,369	23,134,069	323,655,916	1,164	19,711,170	275,237,131	51,995	\$4,677,441	6.21	2.33	0.024
Residential	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
Electrification Subtotal	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
C&S, T&D and Electrification Subtotal	0	11,901	130,911	0	10,116	111,274	19	\$24,621	0.55	0.53	0.294
Utility Total	1,369	23,145,970	323,786,827	1,164	19,721,286	275,348,406	52,015	\$4,702,062	6.18	2.33	0.024

TRUCKEE DONNER PUBLIC UTILITY DISTRICT

Truckee Donner Public Utility District at a Glance

- Climate Zone: 16
- Customers: 14,602
- Total annual retail sales: 167,154 MWh
- Annual Retail Revenue: \$31,136,246
- Annual EE expenditures for reporting year: \$2,693,193
- Gross annual savings from reporting year portfolio: 99 MWh



Truckee Donner Public Utility District Overview

The Truckee Donner Public Utility 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 four 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. TDPUD has been successful in transitioning towards renewable energy sources, far exceeding our RPS requirements, keeping rates stable, and investing in accessible, cost-effective, EE programs.

Major Program and Portfolio Changes

This year marks the first full program year during which TDPUD programs maintained a heavier focus on beneficial electrification. No significant changes have been made in 2022 following our portfolio revisions in 2021. Some minor changes included:

2021 was the last year we offered rebates on LED holiday lights.

Restructured the EV charger rebate to encourage purchase of Energy Star® rated smart chargers.

Our local trade ally running the refrigerated recycling program retired mid-year 2021 and no other vendor locally is interested in picking up the work. Therefore, The TDPUD was not able to offer any appliance recycling programming for 2022.

TDPUD has piloted a remote energy audit offering for our residential customers in which District staff engage customers via a virtual face-to-face interview and tour of the customer's home. The platform being used by The District enables direct interaction and data collection. The audits conclude with a detailed audit report and energy conservation and decarbonization recommendations.

Program and Portfolio Highlights

TDPUD's Residential Energy Survey has historically been a very popular program with customers. In 2022 the TDPUD piloted an updated version of this program which leverages interactive video conferencing software to facilitate face-to-face interaction and remote data collection. This proved convenient for both the customer and the TDPUD staff executing the energy audit on many levels. In 2023 the TDPUD is looking into how it can expand this pilot into a full program offering for its customers. In addition to the residential energy survey pilot, TDPUD also started offering commercial customers complimentary energy audits on an ad hoc basis (upon request). TDPUD does not currently have the resources to expand this commercial energy survey "mini pilot". However; it will continue offering this complementary service while exploring how to expand it into a full program.

The 2023 program year was the first full year offering for TDPUD's new electrification focused measure offerings (namely heat pumps for space heating and induction cooktops as TDPUD has offered rebates for EV charging and heat pump water heaters in the past). Traditional programs, such as residential appliances and water efficient toilets, continued to perform well – though TDPUD anticipates some changes to these traditional offerings following a technology saturation and electrification potential study which is currently underway. Last year it was noted that TDPUD's ability to offer programming was restricted during the COVID-19 pandemic due to safety concerns. Furthermore, uncertainties in the tourism sector (driven by COVID and wildfires) limited the engagement of our commercial customers. In 2022 TDPUD saw some

'recovery' on those fronts with several ad hoc commercial energy audit requests and the completion of a large custom commercial project which had stalled during the COVID pandemic.

Commercial, Industrial & Agricultural Programs

- Commercial Custom Rebate (Non-Res Process): Provides incentives to commercial electric customers for replacing inefficient plant equipment with high efficiency equipment. Customers receive a rebate proportional to the projected first year energy savings.
- Commercial Energy Survey: TDPUD provides ad hoc energy surveys to commercial customers upon request, and subject to staff resources. These energy surveys provide customers with analysis of their energy use patterns and an on-site review of their facilities and equipment. The complimentary survey delivers a set of no-capitol, low-capital, and high-capitol recommendations for business owners to follow up on.

Residential Programs

- 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 EE (CEE). Rebates range from \$75 to \$125. Induction cook-tops and Energy Star® air purifiers were added to these offerings in 2022 with reasonable uptake.
- Heat Pump Water Heater (Res Electric Water Heater): Provides a \$750 rebate for electric water heaters with a UEF > 2.85, and \$1,000 for gas to electric conversions.
- 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. The 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.
- EV Charger Rebates: In 2021 TDPUD added an EV charger rebate for our residential customers. This rebate paid \$500 for any new EV charger installed at a customer's home with proof of an EV registered at the address.
- Heat Pumps (Space Heating): Heat pumps replace existing gas furnaces or older, inefficient heat pumps as the main source of heat for the customer. Rebates are tiered based on the efficiency of the unit(s) being installed and scale with the size of the system (in Tons). Rebates span from \$250 per Ton for an 8.5 heating seasonal

performance factor (HSPF) system replacing a pre-existing heat pump to \$800 per Ton for a 10 HSPF unit replacing a gas furnace.

Complementary Programs

- Residential Energy Survey: RES (Res comprehensive): Provides free residential energy surveys and free energy and water-saving measures energy efficient LED bulbs, low-flow shower heads, faucet aerators, weather stripping, and pipe insulation at the time of survey. Customers are also informed about TDPUD conservation programs and good EE habits that they may benefit from and provided with associated literature.
- Commercial Energy Survey: The District provides ad hoc energy surveys to commercial customers upon request, and is subject to staff resources. These energy surveys provide customers with analysis of their energy use patterns and an on-site review of their facilities and equipment. The complimentary survey delivers a set of no-capitol, low-capital, and high-capitol recommendations for business owners to follow up on.
- Payment Assistance Program Income-Qualified (Res Comprehensive): Provides an annual 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 two-times their highest energy charge in the past 12-months upon completion of the required Residential Energy Survey (RES). The requirement of the RES was suspended during the COVID-19 crisis and all participants will be offered the RES when re-instated.
- 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.⁶¹
- School Conservation Education (Res Comprehensive): 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.
- Renewable Energy Generation: The District helps buy down the cost of additional renewable generation components within its energy portfolio. This increases our renewables within our RPS while maintaining low rates for our customers.

EM&V Studies

EM&V is currently underway for the 2022 and (concurrent) for the 2023 program years. Results will be made public via TDPUD's website upon completion for each program year.

Major Differences or Diversions from California POU TRM for Energy Savings

Energy savings were predominantly derived from the CA eTRM and in some cases were obtained from the CMUA TRM or from the Pacific Northwest Regional Technical Forum (RTF).

⁶¹ See www.tdpud.org.

One notable exception is found in the embedded energy value applied to our water-energy nexus measures. The embedded energy content for water-energy nexus measures was derived by our EM&V consultant in 2014 using actual water pumping data provided by the TDPUD.

TABLE 1. TDPUD EE Program Results by End Use

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	1,145	24,041	0	321	6,731	5	\$509,359	0.00	0.00	116.899
Appliance & Plug Loads	1	7,221	92,320	0	3,768	48,338	24	\$230,569	0.03	0.05	6.516
Lighting - Indoor	9	77,039	1,232,624	6	50,075	801,206	285	\$259,450	0.36	0.33	0.462
Process	1	13,360	50,180	1	9,388	36,762	10	\$653,459	0.04	0.10	30.017
EE Subtotal	13	98,765	1,399,164	8	63,552	893,038	325	\$1,652,838	0.08	0.12	2.651
All	0	142	854	0	142	854	0	\$720,592	0.00	0.00	1,103.917
Low-Income Subtotal	0	142	854	0	142	854	0	\$720,592	0.00	0.00	1,103.917
EE and Low Income Subtotal	13	98,907	1,400,018	8	63,695	893,891	326	\$2,373,429	0.05	0.11	3.803
Appliance & Plug Loads	0	262	3,142	0	144	1,728	1	\$2,706	0.10	0.15	2.109
HVAC - Heating	0	119,584	1,809,636	0	77,729	1,176,263	513	\$317,057	0.52	0.59	0.381
Electrification Subtotal	0	119,846	1,812,777	0	77,873	1,177,991	514	\$319,763	0.52	0.58	0.384
C&S, T&D and Electrification Subtotal	0	119,846	1,812,777	0	77,873	1,177,991	514	\$319,763	0.52	0.58	0.384
Utility Total	13	218,753	3,212,795	8	141,568	2,071,882	840	\$2,693,193	0.11	0.20	1.848

TABLE 2. TDPUD EE 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)
Residential	13	98,765	1,399,164	8	63,552	893,038	325	\$1,652,838	0.08	0.12	2.651
EE Subtotal	13	98,765	1,399,164	8	63,552	893,038	325	\$1,652,838	0.08	0.12	2.651
Residential	0	142	854	0	142	854	0	\$720,592	0.00	0.00	1,103.917
Low-Income Subtotal	0	142	854	0	142	854	0	\$720,592	0.00	0.00	1,103.917
EE and Low Income Subtotal	13	98,907	1,400,018	8	63,695	893,891	326	\$2,373,429	0.05	0.11	3.803
Residential	0	119,846	1,812,777	0	77,873	1,177,991	514	\$319,763	0.52	0.58	0.384
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Utility Total	13	218,753	3,212,795	8	141,568	2,071,882	840	\$2,693,193	0.11	0.20	1.848

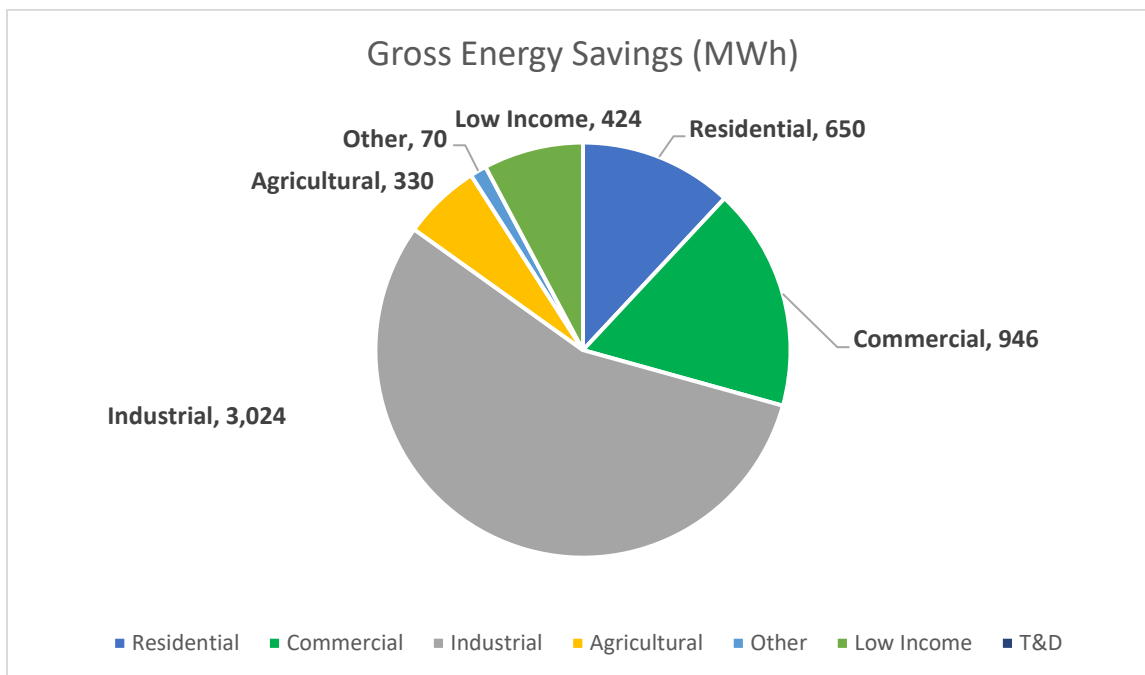
TABLE 3. TDPUD EE Program Results by Building Type

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	13	98,765	1,399,164	8	63,552	893,038	325	\$1,600,167	0.08	0.12	2.566
Residential	0	0	0	0	0	0	0	\$52,671			0.000
EE Subtotal	13	98,765	1,399,164	8	63,552	893,038	325	\$1,652,838	0.08	0.12	2.651
All	0	142	854	0	142	854	0	\$702,332	0.00	0.00	1,075.944
Residential	0	0	0	0	0	0	0	\$18,259			0.000
Low-Income Subtotal	0	142	854	0	142	854	0	\$720,592	0.00	0.00	1,103.917
EE and Low Income Subtotal	13	98,907	1,400,018	8	63,695	893,891	326	\$2,373,429	0.05	0.11	3.803
All	0	119,846	1,812,777	0	77,873	1,177,991	514	\$319,763	0.52	0.58	0.384
Electrification Subtotal	0	119,846	1,812,777	0	77,873	1,177,991	514	\$319,763	0.52	0.58	0.384
C&S, T&D and Electrification Subtotal	0	119,846	1,812,777	0	77,873	1,177,991	514	\$319,763	0.52	0.58	0.384
Utility Total	13	218,753	3,212,795	8	141,568	2,071,882	840	\$2,693,193	0.11	0.20	1.848

TURLOCK IRRIGATION DISTRICT

Turlock Irrigation District at a Glance

- Climate Zone: 12
- Customers: 94,399
- Total annual retail sales: 2,252,542 MWh
- Annual Retail Revenue: \$313,566,231
- Annual EE expenditures for reporting year: \$1,986,851
- Gross annual savings from reporting year portfolio: 5,443 MWh



Turlock Irrigation District Overview

Turlock Irrigation District (TID) continues to help customers achieve energy savings through the implementation and promotion of a variety of EE programs for all rate classes. Many programs provide rebate opportunities to encourage customers to conserve energy. A significant portion of the EE measures adopted by our customers were implemented within C&I 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

TID launched the Multi-Family DI program. TID hired a weatherization contractor to focus on our low income multi-family complexes. We offered no-cost weatherization measures to 268 households.

TID also rolled out our “Powering Our Communities” grant, giving local non-profits the opportunity to apply for funding to help lower the cost for their EE projects.

Program and Portfolio Highlights

TID’s Custom rebate accounted for 64% of the total program savings in 2022. This was driven by lighting projects completed by our large industrial customers.

Commercial, Industrial & Agricultural Programs

- Commercial LED rebate programs: TID offers our non-residential customers a lighting rebate that is paid based on kWh savings.
- Dairy Fan VFD rebate program: TID offers our dairy customers a rebate for installing VFDs on cooling fans in their freestall and milk barns.
- TID’s multi-year project to retrofit over 5,000 dusk to dawn lights to LED has saved over 3.2 million kWh over the last 3 years.

Residential Programs

TID offers many rebates for Heating & Cooling, Appliances and General Improvements.

During 2022, TID developed a point-of-sale discount for customers purchasing Energy Star® LED holiday lights. We collaborated with our local hardware store to offer a direct discount at the register to encourage the sale of Energy Star® LED holiday lights. We found this program to be successful.

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 of \$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 2022 EM&V is available on the CMUA website.⁶²

Major Differences or Diversions from CA POU TRM for Energy Savings

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.

⁶² See <https://www.cmua.org/emv-reports>.

TABLE 1. TID EE Program Results by End Use

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
Appliance & Plug Loads	12	140,374	1,398,690	8	82,550	795,938	272	\$53,574	1.74	1.22	0.090
Building Envelope	8	19,489	378,449	2	5,457	105,966	70	\$6,837	3.99	2.88	0.098
Commercial Refrigeration	4	200,997	3,215,947	4	198,645	3,178,315	1,058	\$40,558	7.16	0.90	0.018
HVAC - Cooling	91	471,357	7,679,658	76	383,534	6,249,965	2,246	\$240,198	5.08	1.31	0.060
Lighting - Indoor	478	2,890,955	46,174,810	469	2,849,592	45,521,106	15,164	\$509,222	8.53	0.73	0.016
Lighting - Outdoor	0	912,281	14,596,496	0	912,281	14,596,496	6,406	\$453,685	3.23	4.51	0.044
Process	0	323,652	5,178,435	0	323,652	5,178,435	1,710	\$64,763	7.41	1.61	0.018
Service & Domestic Hot Water	7	25,566	281,225	4	15,340	168,735	55	\$11,575	1.31	1.52	0.091
Water Pumping / Irrigation	16	9,799	156,782	16	9,799	156,782	51	\$1,499	10.80	0.47	0.014
Whole Building	27	24,937	523,669	23	21,196	445,118	218	\$13,441	4.38	4.38	0.047
EE Subtotal	642	5,019,406	79,584,160	602	4,802,046	76,396,856	27,250	\$1,395,351	5.74	1.01	0.026
All	5	12,466	149,587	1	3,490	41,884	17	\$17,350	0.51	0.70	0.558
Appliance & Plug Loads	1	9,093	136,397	0	6,365	95,478	32	\$22,490	0.50	0.50	0.331
Building Envelope	82	172,500	1,701,520	23	48,300	476,425	190	\$157,236	0.65	0.40	0.436
HVAC - Cooling	115	112,652	987,182	34	42,100	345,418	136	\$79,219	0.95	1.21	0.300
Lighting - Indoor	108	113,062	1,702,085	58	55,494	857,976	305	\$97,491	0.87	0.93	0.161
Lighting - Outdoor	3	1,734	27,742	1	936	14,981	5	\$3,423	0.43	0.48	0.326
Miscellaneous	0	1,836	11,015	0	514	3,084	1	\$759	0.38	0.38	0.322
Service & Domestic Hot Water	0	224	2,459	0	134	1,475	0	\$656	0.20	0.43	0.591
Low-Income Subtotal	314	423,566	4,717,987	119	157,334	1,836,721	687	\$378,623	0.75	0.63	0.282
EE and Low Income Subtotal	956	5,442,972	84,302,147	721	4,959,380	78,233,577	27,937	\$1,773,974	4.68	0.99	0.032
Appliance & Plug Loads	0	2,671	35,913	0	2,206	29,365	14	\$25,455	0.16	0.25	1.193
HVAC - Cooling	0	4,534	28,762	0	3,627	23,009	12	\$29,794	0.20	0.16	1.706
HVAC - Heat Pump	1	2,329	25,619	1	1,863	20,495	11	\$124,236	0.04	0.02	8.064
Service & Domestic Hot Water	0	3,200	35,200	0	1,920	21,120	9	\$33,392	0.07	0.08	2.103
Electrification Subtotal	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
C&S, T&D and Electrification Subtotal	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
Utility Total	957	5,455,705	84,427,640	722	4,968,996	78,327,567	27,983	\$1,986,851	4.18	0.95	0.036

TABLE 2. TID EE Program Results by Sector

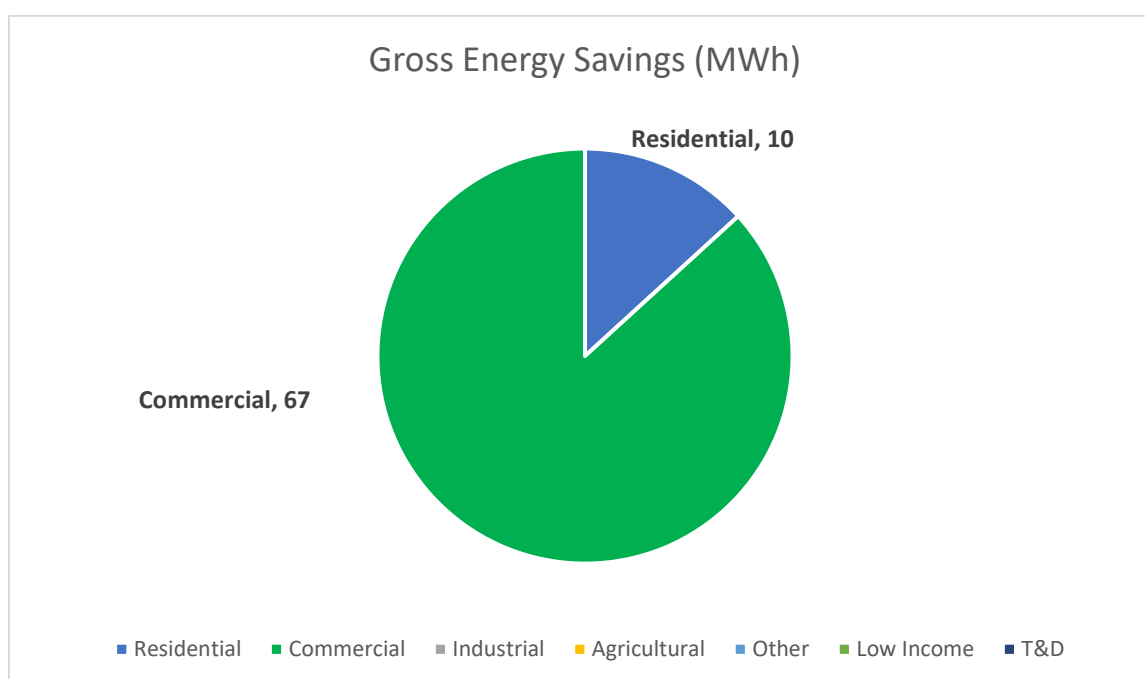
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle GHG Reductions (Tons)	Total Utility Cost	PAC	TRC	Utility (\$/kWh)
Agricultural	68	329,686	5,274,974	68	329,686	5,274,974	2,298	\$54,427	9.79	3.75	0.015
Commercial	74	945,611	15,121,501	74	945,197	15,119,017	6,065	\$458,931	3.29	4.93	0.043
Industrial	389	3,024,070	48,385,114	379	3,001,282	48,020,518	15,837	\$542,022	8.50	1.77	0.016
Other	10	69,745	1,115,922	10	69,745	1,115,922	327	\$11,086	8.40	0.02	0.014
Residential	101	650,294	9,686,649	70	456,136	6,866,425	2,723	\$328,885	3.84	2.99	0.073
EE Subtotal	642	5,019,406	79,584,160	602	4,802,046	76,396,856	27,250	\$1,395,351	5.74	1.01	0.026
Residential	314	423,566	4,717,987	119	157,334	1,836,721	687	\$378,623	0.75	0.63	0.282
Low-Income Subtotal	314	423,566	4,717,987	119	157,334	1,836,721	687	\$378,623	0.75	0.63	0.282
EE and Low Income Subtotal	956	5,442,972	84,302,147	721	4,959,380	78,233,577	27,937	\$1,773,974	4.68	0.99	0.032
Residential	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
Electrification Subtotal	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
C&S, T&D and Electrification Subtotal	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
Utility Total	957	5,455,705	84,427,640	722	4,968,996	78,327,567	27,983	\$1,986,851	4.18	0.95	0.036

TABLE 3. TID EE 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	21	47,000	275,260	13	32,618	190,992	63	\$28,112	0.76	0.71	0.193
Education - Primary School	10	69,745	1,115,922	10	69,745	1,115,922	327	\$11,086	8.40	0.02	0.014
Office - Small	8	18,072	289,152	8	18,072	289,152	93	\$3,087	8.86	2.50	0.015
Other Agricultural	68	653,338	10,453,409	68	653,338	10,453,409	4,007	\$119,190	8.50	2.30	0.016
Other Commercial	74	319,217	5,099,197	74	318,803	5,096,713	1,666	\$53,791	9.30	2.78	0.015
Other Industrial	180	1,018,558	16,296,935	171	998,123	15,969,971	5,551	\$191,185	8.54	1.35	0.017
Residential	43	1,112,583	17,835,449	29	971,873	15,584,883	6,620	\$658,994	3.22	4.63	0.062
Residential - Single-Family	37	117,105	1,598,244	29	78,038	1,112,854	439	\$46,919	2.84	2.19	0.060
Retail - Large	4	22,684	362,944	4	22,684	362,944	113	\$3,832	9.24	1.46	0.015
Retail - Small	4	230,599	3,689,579	4	228,247	3,651,947	1,266	\$45,607	7.40	1.00	0.018
Warehouse - Refrigerated	193	1,410,504	22,568,069	193	1,410,504	22,568,069	7,104	\$233,549	8.97	2.94	0.015
EE Subtotal	642	5,019,406	79,584,160	602	4,802,046	76,396,856	27,250	\$1,395,351	5.74	1.01	0.026
Residential	116	155,702	2,175,805	63	80,845	1,109,965	401	\$216,302	0.65	0.42	0.274
Residential - Multi-Family	198	264,918	2,512,497	55	74,177	703,499	277	\$148,718	0.93	1.28	0.278
Residential - Single-Family	0	2,946	29,685	0	2,312	23,257	9	\$13,603	0.40	1.00	0.771
Low-Income Subtotal	314	423,566	4,717,987	119	157,334	1,836,721	687	\$378,623	0.75	0.63	0.282
EE and Low Income Subtotal	956	5,442,972	84,302,147	721	4,959,380	78,233,577	27,937	\$1,773,974	4.68	0.99	0.032
Residential	0	7,734	63,962	0	5,547	44,129	21	\$63,186	0.13	0.13	1.895
Residential - Single-Family	1	5,000	61,532	1	4,069	49,860	25	\$149,691	0.06	0.03	4.073
Electrification Subtotal	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
C&S, T&D and Electrification Subtotal	1	12,734	125,494	1	9,616	93,989	47	\$212,877	0.08	0.05	3.037
Utility Total	957	5,455,705	84,427,640	722	4,968,996	78,327,567	27,983	\$1,986,851	4.18	0.95	0.036

City of Ukiah at a Glance

- Climate Zone: 3
- Customers: 8,353
- Total annual retail sales: 110,731 MWh
- Annual Retail Revenue: \$16,561,784
- Annual EE expenditures for reporting year: \$66,610
- Gross annual savings from reporting year portfolio: 78 MWh



City of Ukiah Overview

The City of Ukiah is located in Mendocino County on highway 101 approximately 100 miles north of San Francisco. Ukiah is committed to helping customers manage energy use through energy education and a comprehensive menu of EE incentives. Ukiah also provides funding to assist income-qualified customers.

Major Program and Portfolio Changes

There were no major program changes in FY 2022. Ukiah started a Low-Income DI program in FY 2023 and is considering a Commercial Lighting DI program.

Program and Portfolio Highlights

The Commercial Lighting Program delivered the greatest percentage of savings in FY22, accounting for 91% of the total savings. Ukiah achieved 89% of the target energy savings for the past five reporting years.

Commercial, Industrial & Agricultural Programs

Ukiah provides comprehensive EE incentive program offerings for commercial and industrial customers focusing on EE 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. EE measures are recommended, and additional visits are completed upon request.

- Non-Res Lighting: Ukiah offers rebates to business owners who invest in the installation of energy efficient lighting upgrades. There is a prevalence of inefficient lighting throughout the city instead of more efficient fluorescent or LED fixtures.
- Non-Res HVAC: Ukiah 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: Ukiah offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Non-Res Custom: Ukiah 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

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

- Residential Lighting: Ukiah offers rebates to homeowners who install ENERGY STAR® qualified LED lamps/bulbs, ceiling fans and LED holiday lights.
- Residential HVAC: Ukiah 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: Ukiah offers rebates to homeowners who purchase new ENERGY STAR® qualified products, including clothes washers, dishwashers, pool pumps,

refrigerators and advanced power strips. Rebates are also available for refrigerator and freezer recycling.

- Residential Weatherization: Ukiah 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: Ukiah offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

- Low-Income Programs: Ukiah offers a low-income bill assistance program to eligible customers.
- Renewable Energy Program: Ukiah offers NEM agreements to customers wishing to install Solar PV.
- EVs: In addition to the eight Tesla Fast Charging stations, Ukiah has installed four Level 2 chargers in the downtown area and is reviewing additional locations throughout the city of Ukiah. Ukiah 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.

EM&V Studies

EM&V information for Ukiah can be found at the CMUA website.⁶³

Major Differences or Diversions from California POU TRM for Energy Savings

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

⁶³ *Ibid.*

TABLE 1. Ukiah EE Program Results by End Use

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)
Appliance & Plug Loads	0	2,416	32,043	0	1,170	16,189	5	\$13,078	0.14	0.14	1.118
Building Envelope	0	2,802	58,846	0	785	16,477	45	\$13,177	0.62	0.61	1.236
HVAC - Cooling	0	3,107	49,706	0	2,485	39,765	17	\$16,634	0.66	0.69	0.596
Lighting - Indoor	14	56,856	739,124	11	45,485	591,300	190	\$11,864	4.48	1.35	0.027
Lighting - Outdoor	2	11,061	140,885	1	8,731	111,930	49	\$10,520	1.15	0.30	0.128
Service & Domestic Hot Water	0	1,504	16,544	0	902	9,926	3	\$1,338	0.68	0.57	0.179
EE Subtotal	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
EE and Low Income Subtotal	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116

TABLE 2. Ukiah EE 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)
Commercial	14	67,463	877,015	11	53,970	701,612	238	\$14,200	4.59	0.91	0.028
Residential	2	10,283	160,134	1	5,588	83,974	71	\$52,410	0.42	0.42	0.889
EE Subtotal	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
EE and Low Income Subtotal	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116

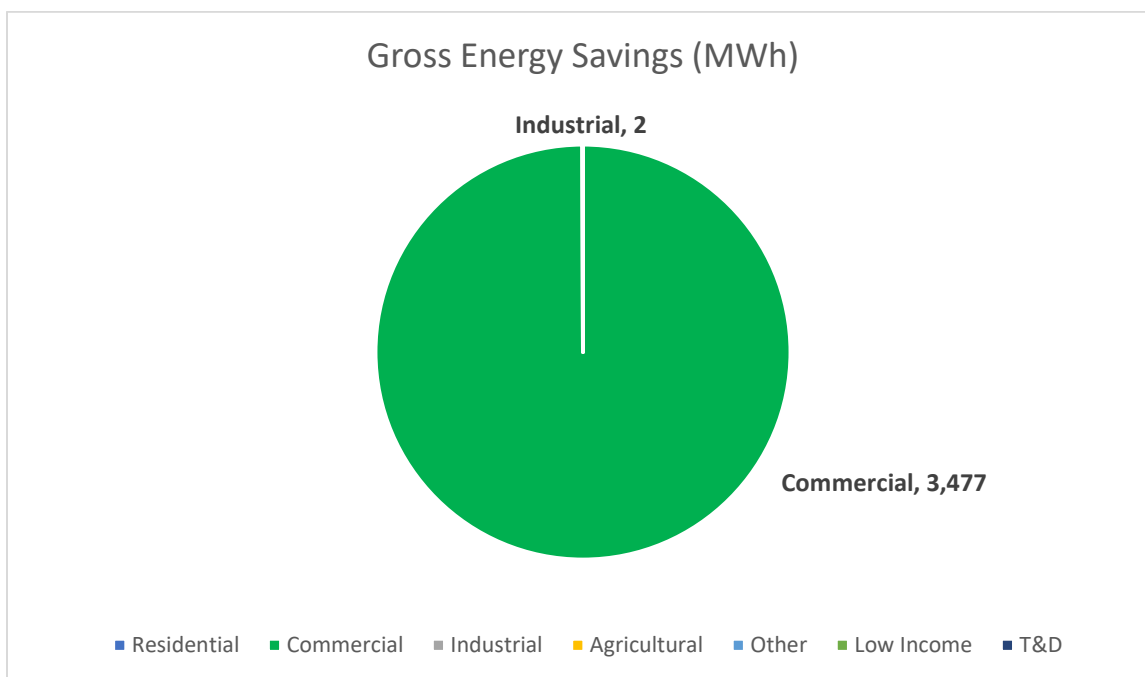
TABLE 3. Ukiah EE Program Results by Building Type

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	16	57,341	742,324	12	45,750	593,066	190	\$19,256	2.77	1.14	0.044
Other Commercial	0	10,607	137,891	0	8,486	110,313	48	\$2,337	5.12	0.37	0.029
Residential	0	8,514	136,206	0	4,527	69,866	60	\$34,268	0.57	0.57	0.701
Residential - Single-Family	0	1,284	20,728	0	795	12,341	10	\$10,750	0.22	0.22	1.236
EE Subtotal	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
EE and Low Income Subtotal	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	16	77,745	1,037,149	12	59,558	785,586	309	\$66,610	1.31	0.70	0.116

VERNON PUBLIC UTILITIES

Vernon Public Utilities at a Glance

- Climate Zone: 9
- Customers: 1,927
- Total annual retail sales: 1,169,139 MWh
- Annual Retail Revenue: \$176,231,792
- Annual EE expenditures for reporting year: \$712,204
- Gross annual savings from reporting year portfolio: 3,479 MWh



Vernon Overview

Vernon Public Utilities (VPU), in climate zone 8, has implemented some of the recommendations of the comprehensive IRP. The IRP recommendations have guided VPU's decision making in the procurement of resources and delivery of EE services. VPU has identified action plans to implement new EE measures throughout its city-owned facilities. This particular action item is currently being implemented. VPU also has a goal by implementing the following EE action plans in cooperation with other Vernon city departments:

- Continue existing EE programs and educate customers on more efficient uses of electricity;
- Perform EE upgrades at all city-owned facilities as needed; and

- Purchase energy efficient transformers, capacitors, and other distribution equipment when appropriate.

VPU recently developed an Electrification Strategic Plan that outlines the areas VPU will focus on to help advance electrification adoption, while taking into consideration Vernon 's unique customer base.

Major Program and Portfolio Changes

VPU has not made any major changes in their programs but the 2021/22 fiscal year has continue to point to the business community that energy saving can be achieved by looking into great detail to the operation process side of the their respectable businesses. The City of Vernon business community continues to explore smart efficient ways to be resourceful. By focusing on more projects like compressors, heat conversion, and refrigeration controls and not always relying on the lighting aspect of savings. As our customers get smarter and more efficient to increase their bottom line, VPU 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 C&I 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.

VPU recently developed an Electrification Strategic Plan that outlines the development of an incentive program for residential customers for the purchase or lease of a new or used electric vehicle, and a separate incentive for the installation of a Level 2 charger at the place of residence. In addition, VPU has made efforts to install EV chargers for public access at city-owned properties at no cost to the drive. A total of 23 Level 2 chargers were recently installed at Vernon City Hall, with plans to add more chargers at future locations. VPU is also working to partner with Tesla to explore the possibility of installing DC fast chargers for public access. Those are the chargers that can provide approximately 80% charge in 15-30 minutes. Strategically, VPU plans to place the public charging station at a key location in the city that are easy to access and would help extend the electric range for EV commuters coming in and out of Los Angeles. This supports EV drivers within the Vernon community, and to minimize traffic impact as much as possible. Recognizing that Vernon's customer base is primarily commercial and industrial, a handful of customers have already invested in electric midsize trucks. VPU's Customer Relations team will be working closely to support onsite EV charging, pilot testing new technologies, and to coordinate in the cobranding of these electrification partnerships. VPU envisions a significant increase with on-site EV charging in the coming years as businesses will work towards meeting the legislative requirements, like Executive Order N-79-20, which requires midsize to large trucks to be zero admissions by 2045.⁶⁴ As a result of this anticipated

⁶⁴ See <https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf>.

increase in charging, VPU's electric engineering team is assessing our transmission and distribution system to ensure its properly sized.

Program and Portfolio Highlights

This year again highlights have been in the refrigeration controls sector. VPU's customer base consists of commercial and industrial type buildings. VPU had one particular company, MJ Global Enterprise upgraded their existing refrigeration controls system hardware and software to take full advantage of energy savings. An M&V report was to provide detailed analysis of the project. Our lighting program continues to be popular among our business community, although COVID has slowed many of the capital projects caused by uncertainties of the pandemic.

Commercial, Industrial & Agricultural Programs

VPU 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 EE. Customers must fund at least 25 percent of total project cost. Projects are only eligible if they do not qualify for any of the other programs.
- Energy Education & Demonstration Workshops: Provide customers with an array of information resources to encourage EE measures through EE 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.
- TOU Rate Programs: All customers with loads exceeding 100 kilowatts demand are eligible to receive time-of-use rate; enabling them to reduce their energy cost through time management of their energy usage.

This year highlights have been spread out to the lighting sector. Since VPU's customer base is many long-standing buildings, we had wide range of small to large companies convert to LED's.

Residential Programs

VPU Electrification Strategic Plan that outlines the development of an incentive program for residential customers for the purchase or lease of a new or used electric vehicle, and a separate incentive for the installation of a Level 2 charger at the place of residence.

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.

TE

VPU is working to incentivize transportation electrification through investments in electric vehicle charging infrastructure. The presence and convenience of EV charging stations will motivate public purchases of electric vehicles, having a direct impact on local air quality conditions. The City of Vernon lacks open space (parks, libraries etc.) requiring greater participation from Vernon businesses for siting and installation of EV charging stations. VPU intends to develop a plan to increase EVs to city fleet and reach out to our customer base to:

To install and maintain EV charging stations at customer facilities;

Evaluate increasing the number of City-owned electric vehicles; and

Coordinate with local air quality agencies on available programs and initiatives.

DR and Energy Storage

DR is one of the ways customers can save money 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 demand response 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.

EM&V Studies

VPU 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 Vernon is essentially a small C&I city, VPPU can provide smart and efficient reports to our customers proving their worth. An EM&V comprehensive study was conducted for two of our key customers, Choice Foods, to evaluate their refrigeration control systems and strategize how to optimize their controls to help reduce the energy when their operations are slow and no air is required and Kal Plastics which was replacing two of their plastic thermoforming machines which were smaller and more efficient with enhanced software controls.

Major Differences or Diversions from California POU TRM for Energy Savings

TABLE 1. VPU EE Program Results by End Use

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)
Commercial Refrigeration	43	542,742	8,683,872	43	542,742	8,683,872	2,857	\$119,353	6.24	5.96	0.020
HVAC - Cooling	0	1,905	30,480	0	1,905	30,480	7	\$1,912	1.54	0.81	0.089
Lighting - Indoor	647	2,934,730	38,151,492	647	2,934,730	38,151,492	11,625	\$590,939	5.90	4.63	0.021
EE Subtotal	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
EE and Low Income Subtotal	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021

TABLE 2. VPU EE 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)
Commercial	690	3,477,472	46,835,364	690	3,477,472	46,835,364	14,482	\$710,292	5.96	4.82	0.021
Industrial	0	1,905	30,480	0	1,905	30,480	7	\$1,912	1.54	0.81	0.089
EE Subtotal	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
EE and Low Income Subtotal	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021

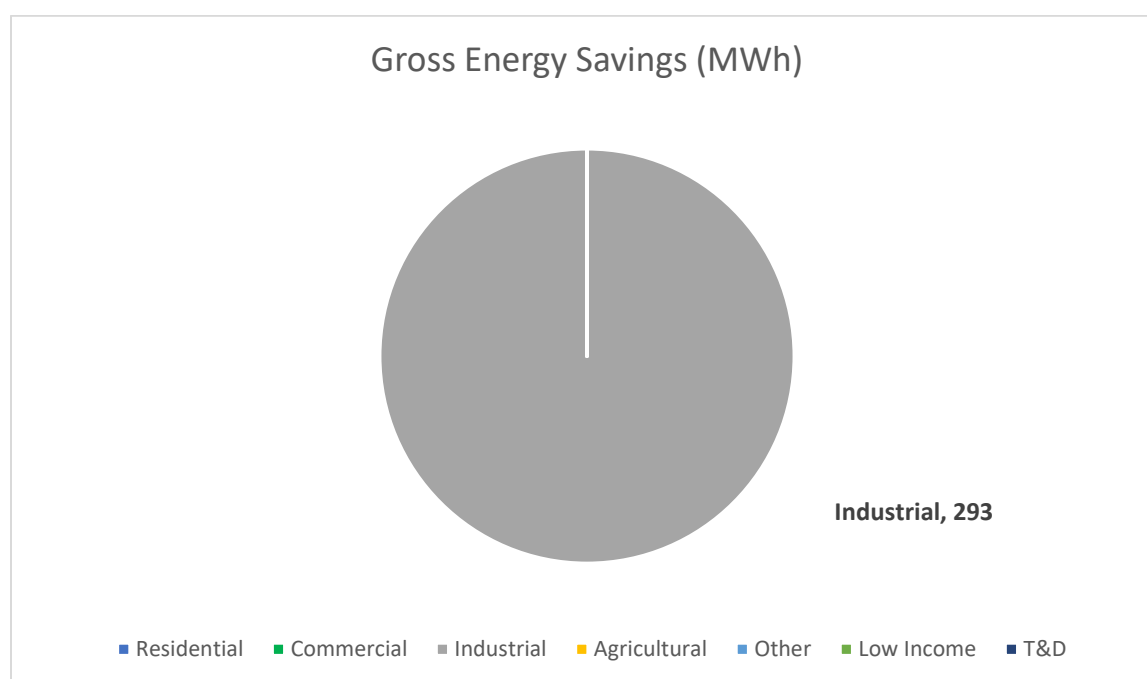
TABLE 3. VPU EE Program Results by Building Type

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)
Manufacturing Light Industrial	43	542,742	8,683,872	43	542,742	8,683,872	2,857	\$119,353	6.24	5.96	0.020
Other Commercial	647	2,936,635	38,181,972	647	2,936,635	38,181,972	11,632	\$592,851	5.88	4.62	0.021
EE Subtotal	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
EE and Low Income Subtotal	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	690	3,479,377	46,865,844	690	3,479,377	46,865,844	14,488	\$712,204	5.94	4.81	0.021

VICTORVILLE MUNICIPAL UTILITY SERVICES

Victorville Municipal Utility Services at a Glance

- Climate Zone: 14
- Customers: 68
- Total annual retail sales: 96,485 MWh
- Annual Retail Revenue: \$11,291
- Annual EE expenditures for reporting year: \$18,900
- Gross annual savings from reporting year portfolio: 293 MWh



Victorville Municipal Utility Services 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. VMUS's 2022 peak demand was 16.9 megawatts (1.8% more than last year) and the load factor was 70.4%. Customers reside in climate zone 14 and all customers' facilities are less than fifteen years old and meet the applicable Title 24 requirements. The recent age of these facilities provide fewer EE upgrade opportunities. VMUS continued to offer customers the same EE programs.

Major Program and Portfolio Changes

VMUS continued to offer customers the same EE programs.

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

Program and Portfolio Highlights

\$25,000 in EE incentive payments was disbursed for industrial LED lighting installation.

TOU 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 EE improvements are a priority in the VMUS' integrated resource plan.

VMUS serves municipal facilities that can be interrupted as scheduled.

Customers are served through 12 kV underground facilities with larger gauge ASCR conductors to improve system reliability and reduce system losses.

VMUS evaluates circuit load performance to optimize performance and reduce system losses.

VMUS purchases and installs energy efficient transformers to reduce system losses.

Commercial, Industrial & Agricultural Programs

VMUS continued to offer customers the same EE programs.

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.

EM&V Studies

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

Major Differences or Diversions from California POU TRM for Energy Savings

None

TABLE 1. VMUS EE Program Results by End Use

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)
Lighting - Indoor	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE Subtotal	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE and Low Income Subtotal	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007

TABLE 2. VMUS EE 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)
Industrial	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE Subtotal	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE and Low Income Subtotal	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007

TABLE 3. VMUS EE 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)
Manufacturing Light Industrial	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE Subtotal	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
EE and Low Income Subtotal	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	\$0			0.000
Utility Total	40	293,471	4,695,536	32	234,777	3,756,429	1,236	\$18,900	17.71	3.18	0.007

Appendix B – Calculation Reference

Energy Platforms, LLC

Revision History

Document Version	Date	Author	Changes
0.1	3/28/2019	L. Bovitz	Initial Draft
1.0	4/26/2019	L. Bovitz	Finalize version 1.0
1.1	3/1/2021	L. Bovitz	Updates for Reporting Year 2021

— Lori Bovitz

Last Updated: 3-1-2021

Version: 1.01

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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 the 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.

Applied Measure Editor

Ductless mini-split air conditioner, 15 SEER (after 1/1/15) Change Measure Details

Unit Type	Tons	Type	Energy Efficiency	Load Shapes	
Number of Units	3	End Use	HVAC - Cooling	Electricity	Residential_SINGLEFAMIL
Variable Overhead		Building Type	Residential	Gas	Flat Load Shape - Gas
Cost per Unit	\$0.00	Climate Zone	15	Water	Flat Load Shape - Water
Incentives Paid by Utility	\$450.00	Is Latest Version	Yes	Retail Rates	
Incentives Received by Customer	\$450.00	Is Retired	No	Electricity	
Is Low Income	<input type="checkbox"/>			Gas	
Exclude from Cost Allocation	<input type="checkbox"/>			Water	
NTG Percentage	80 %				
NTG Percentage Override					
Measure Application Type	Replace on Burn	Calculation Data			
Delivery Type	Any	Cost (MeasureCost - BaseCaseCost)	\$252.00		
Measure Life	15	Baseline 1 (Code)			
		Electric Savings (kWh)	106		
		Peak Electric Savings (kW)	0.055		
		Gas Savings (Therms)	0		
		Water Savings (CCF)	0		
		Years (EUL)	15		

Save Cancel

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

Measure Editor

Name: Details

End Use: <input type="text" value="Appliance & Plug Loads"/>	Effective Useful Life: <input type="text" value="11"/>
Climate Zone: <input type="text" value="All"/>	Remaining Useful Life: <input type="text" value="0"/>
Building Type: <input type="text" value="Residential"/>	Sector: <input type="text" value="Residential"/>
Normalized Unit: <input type="text" value="Clothes washer"/>	Measure Type: <input type="text" value="Energy Efficiency"/>
Gross Savings Installation Adjustment: <input type="text" value="100"/> %	Version Notes: <input type="text" value="Historical Import 1/22/2019 2:19:22 PM"/>
Net To Gross Percentage: <input type="text" value="31"/> %	

Base Case Cost: <input type="text" value="\$0.00"/>	Measure Cost: <input type="text" value="\$195.00"/>
---	---

Code Baseline	Existing Baseline
Electric Savings (kWh): <input type="text" value="184"/>	Electric Savings (kWh): <input type="text" value="0"/>
Peak Load Savings (kW): <input type="text" value="0"/>	Peak Load Savings (kW): <input type="text" value="0"/>
Gas Savings (Therms): <input type="text" value="4.9"/>	Gas Savings (Therms): <input type="text" value="0"/>
Water Savings (CCF): <input type="text" value="0"/>	Water Savings (CCF): <input type="text" value="0"/>

Save Cancel

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.

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	1 st Baseline	2 nd Baseline	1 st Baseline Costs	2 nd Baseline Costs	1 st Baseline Years	2 nd 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
	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.

Total Cost Column

The Total Cost Column for Programs is a total of the Incremental Costs for each Applied Measure in the Program. The Increment Costs are calculated based on the Baseline Costs for the Applied Measure as described in the table above. This cost is a per unit cost and is not multiplied by the Number of Units.

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.

The screenshot shows the 'Measure Editor' interface for a measure named '1/15HP-1/20HP Electronically Commutated Motor'. The interface includes several input fields and dropdown menus. A red box highlights the 'Gross Savings Installation Adjustment' field (set to 100%) and the 'Net To Gross Percentage' field (set to 60%). Other fields include 'End Use' (Commercial Refrigeration), 'Climate Zone' (15), 'Building Type' (All), 'Effective Useful Life' (15), 'Remaining Useful Life' (15), 'Sector' (Commercial), 'Measure Type' (Energy Efficiency), 'Base Case Cost' (\$0.00), and 'Measure Cost' (\$0.00). There are also sections for 'Code Baseline' and 'Existing Baseline' with values for Electric Savings (kWh), Peak Load Savings (kW), Gas Savings (Therms), and Water Savings (CCF).

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:

$$\text{Adjusted Gross Savings} = \text{Gross Savings} * \text{GSIA}$$

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:

$$\text{Net Savings} = \text{Adjusted Gross Savings} * \text{Net to Gross Percentage}$$

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.

$$\text{Annual Savings (unit)} * 8760 \text{ Fraction (unit)} = \text{Hourly Savings (unit)}$$

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

$$\text{Hourly Savings (unit)} * \text{Retail Rate (\$/unit)} = \text{Hourly Benefits (\$)}$$

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.

$$\text{Annual Savings (unit)} * 8760 \text{ Fraction (unit)} = \text{Hourly Savings (unit)}$$

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

$$\text{Hourly Savings}(\text{unit}) * \text{Avoided Cost Rate}(\$/\text{unit}) = \text{Hourly Benefit} (\$)$$

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.

The screenshot shows the 'Applied Measure Editor' for an 'ENERGY STAR ceiling fan'. The interface is divided into several sections:

- General Information:** Unit Type (Unit), Number of Units (140), Variable Overhead Cost per Unit (\$0.00), Incentives Paid by Utility (\$35.00), Incentives Received by Customer (\$35.00).
- Details:** Type (Energy Efficiency), End Use (HVAC - Cooling), Building Type (Residential - Multi-Fa), Climate Zone (8), Is Latest Version (Yes), Is Retired (No).
- Load Shapes:** Electricity (Residential_MULTIFAMILY), Gas (Flat Load Shape - Gas), Water (Flat Load Shape - Water).
- Retail Rates:** Electricity, Gas, Water (all empty).
- Calculation Data:** Cost (MeasureCost - BaseCaseCost) (\$0.00), Baseline 1 (Code) (151), Electric Savings (kWh) (0.138), Peak Electric Savings (kW) (0), Gas Savings (Therms) (0), Water Savings (CCF) (0), Years (EUL) (10).
- Other Settings:** Exclude from Cost Allocation (checkbox, highlighted in red), NTG Percentage (100%), NTG Percentage Override (100%), Measure Application Type (Replace on Burn), Delivery Type (Any), Measure Life (10).

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

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

LOW-INCOME

Low income Applied Measures results are separate from the main Portfolio results. So are Transmission & Distribution and Codes & Standards Applied Measures.

There is a setting in the Applied Measure, "Is Low Income." Select that option to consider that Applied Measure as Low Income, even if its underlying Measure is not of type Low Income.

Applied Measure Editor

ENERGY STAR ceiling fan **Change Measure** **Details**

Unit Type: Unit
 Number of Units: 140
 Variable Overhead: \$0.00
 Cost per Unit: \$35.00
 Incentives Paid by Utility: \$35.00
 Incentives Received by Customer: \$35.00
 Is Low Income:
 Exclude from Cost Allocation:

Type: Energy Efficiency
 End Use: HVAC - Cooling
 Building Type: Residential - Multi-Fa
 Climate Zone: 8
 Is Latest Version: Yes
 Is Retired: No

Load Shapes
 Electricity: Residential_MULTIFAMILY
 Gas: Flat Load Shape - Gas
 Water: Flat Load Shape - Water

Retail Rates
 Electricity:
 Gas:
 Water:

NTG Percentage: 100 %
 NTG Percentage Override: 100 %
 Measure Application Type: Replace on Burn
 Delivery Type: Any
 Measure Life: 10

Calculation Data
 Cost (MeasureCost - BaseCaseCost): \$0.00
 Baseline 1 (Code)
 Electric Savings (kWh): 151
 Peak Electric Savings (kW): 0.138
 Gas Savings (Therms): 0
 Water Savings (CCF): 0
 Years (EUL): 10

Save Cancel

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)



Note:

Participant Test and Ratepayer Impact Measure Test are only run if a Retail Rate is selected for the Applied Measure.

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

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

Element Type	General	Participant	TRC	Societal	RIM	PA
RLa_RevenuLossAlternative					Cost	
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.

EIA-861 REPORT CALCULATIONS

ESP can generate a Microsoft Excel workbook with the data calculated and formatted for inclusion in an Energy Information Administration (EIA) 861 report. The EIA-861 generates using the data entered in the Portfolio used to download the report.

The rules for selection and calculation of these numbers are based on the EIA-861 instructions document “861 2017 instructions.pdf”.⁶⁵

The related section in the document is “SCHEDULE 6, PART A: Energy Efficiency Programs” beginning on page 13.

The EIA-861 data workbook includes the data for each of four energy sectors, plus totals. The four sectors are:

- Residential
- Commercial
- Industrial
- Transportation

Each section includes the following data:

- Reporting Year Incremental Annual Savings
 - Energy Savings (MWh)
 - Peak Demand Savings (MW)
- Incremental Life Cycle Savings
 - Energy Savings (MWh)
 - Peak Demand Savings (MW)
- Reporting Year Incremental Costs
 - Customer Incentives
 - All other costs
- Incremental Life Cycle Costs
 - Customer Incentives
 - All other costs
- Weighted Average Life for Portfolio

⁶⁵ See <https://www.eia.gov/electricity/data/eia861/zip/f8612017.zip>.

SECTOR MAPPING

ESP includes sectors that are not part of the EIA-861 report. ESP combines those sectors into one of the four EIA-861 sectors, according to the following:

ESP Sector	EIA-861 Sector
Residential	Residential
Commercial	Commercial
Industrial	Industrial
Agricultural	Industrial
Other	Commercial

REPORTED MEASURE TYPES

The EIA-861 results include energy savings from all measure types except:

- Codes & Standards
- Transmission & Distribution

REPORTING YEAR INCREMENTAL ANNUAL SAVINGS

Reporting Year Energy Savings

To calculate the Reporting Year Energy Savings:

1. Add up first year gross annual kWh savings for all Measures in the sector.
2. Convert to Megawatt hours (MWh).

Reporting Year Peak Demand Savings

To calculate the Reporting Year Peak Demand Savings:

1. Add up gross coincident peak kW savings for all Measures in the sector.
2. Convert to MWh.

INCREMENTAL LIFE CYCLE SAVINGS

Life Cycle Energy Savings

To calculate Life Cycle Energy Savings:

1. Calculate the life cycle energy savings by adding up the annual energy savings for the lifetime of the Measure.

- a. For dual-baseline Measure, the annual value changes from the first baseline to the second baseline at the end of the remaining useful life.
2. Add up the gross life cycle kWh savings for all Measures in the sector.
3. Convert to MWh.

Life Cycle Peak Demand Savings

To calculate Life Cycle Peak Demand Savings:

1. Determine the maximum annual peak demand savings during the lifetime of the Measure.
2. Add up the Gross Lifecycle Peak kW savings for all Measures in the sector.
3. Convert to MWh.

REPORTING YEAR INCREMENTAL COSTS

Reporting year customer incentives include the total of all first-year incentives paid by the utility for Measures in the sector.

Reporting year “All Other Costs” are the total of other (non-incentive) first-year utility costs for Measures in the sector. These include the following:

- Variable Measure Costs
- Allocated Overhead Costs from Portfolio, Program, and Sector

INCREMENTAL LIFE CYCLE COSTS

Life cycle customer incentives include all incentives paid by the utility over the life of each Measure in the sector. All incentives in ESP are first-year incentives, so the life cycle incentives should be the same as Reporting Year incentives.

Lifecycle “All Other Costs” are the total of other (non-incentive) utility costs over the life of each Measure in the sector. In practice, variable Measure costs and allocated overhead in ESP are incurred in the first year, so the lifecycle costs should be the same as the Reporting Year costs.

WEIGHTED AVERAGE LIFE FOR PORTFOLIO

Average life of all measures included in EIA-861 calculations, weighted by their total lifecycle electrical savings:

$$\text{Weighted Average Life} = \frac{\sum \text{Gross Life Cycle kWh Savings} \times \text{Measure Life}}{\sum \text{Gross Life Cycle kWh Savings}}$$

To calculate weighted average life:



Note:

Applying CEC Measure Decay for a Portfolio will affect this calculation

1. Multiply Gross Life Cycle kWh Savings by Measure Life.
2. Add up the result of step 1.
3. Add up Gross Life Cycle kWh Savings.
4. Divide the results of step 2 by the results of step 3.

CALCULATION DETAILS REFERENCE

The interim calculations used to calculate the cost benefit tests are available by reviewing the Calculations Details. The Calculations Details file is available from the Results Viewer.

FILE FORMAT

Comma Separated Value format (.csv)

ACCESSING THE CSV FILE

Access the CSV file by clicking the **Get Calculations Details** button in the Results Viewer. The following steps describe how to view the details.

1. In the Portfolio, click **Show Results**.
2. In the Results Viewer, click **Get Calculation Details**.

The screenshot shows the 'Results' viewer interface. At the top, there is a 'Select a Presentation:' dropdown menu set to 'Programs', with 'Get Results CSV' and 'Print Results' buttons. Below this is a table titled 'Resource Savings Summary' with the following data:

Name	Units Installed	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 Gas Savings (Therms)	Net Lifecycle GHG Reductions (Tons)	Net Lifecycle Combined Energy Savings (MMBtu)
Residential	178	3,770	44,163	469,731	2,586	31,149	336,677	0	136	1,14
Commercial Direct Install	4	178,720	2,204,576	31,886,989	169,784	2,094,348	30,292,639	0	11,510	103,28
Non-Residential	4	43,107	232,793	2,802,428	34,486	186,235	2,241,942	0	908	7,64
Subtotal	186	225,597	2,481,533	35,159,147	206,856	2,311,731	32,871,259	0	12,555	112,00
Low-Income										
Codes & Standards										

Below the table, there are three buttons: 'Get Calculation Details' (highlighted with a red box), 'Get EIA Results', and 'Get Results Report'. A 'Close' button is located at the bottom right of the interface.

3. The results download in CSV format and open in Windows Explorer.
4. Open the downloaded file "<Portfolio Name> - Calculation Details.csv".

ELEMENTS

The fundamental piece of the Cost/Benefit calculations is the Element. Each Element produces a list of annual dollar values, one for each year in the analysis. The Element accepts inputs from the Measure, Applied Measure, and hourly resource data to develop the list of values. Those values are used to calculate the Cost/Benefit results.

Each Element has an ElementType that corresponds to the variables defined in the Cost/Benefit formulas. Each ElementType is assigned as either a Cost or a Benefit depending on the test being calculated. Some elements can be a cost for some tests and benefit for other tests. The Cost/Benefit calculator understands which types are required for each test and if an element should be a cost or a benefit.

Each of the Elements used to calculate values for each Measure in a Portfolio are listed in the Calculations Details with the list of values.

COLUMN DESCRIPTIONS

Two sheets are available in the Calculation Details CSV file:

- Portfolio
- Applied Measure Elements

The following provides details on contents of each sheet.

	A	B	C	D	E
1	M_MeasureName	M_VersionNumber	M_NormalizedUnit	AM_NumberOfUnits	AM_VariableOverhead
2	ENERGY STAR clothes w		1 Clothes washer	9	
3	ENERGY STAR clothes w		1 Clothes washer	9	
4	ENERGY STAR clothes w		1 Clothes washer	9	
5	ENERGY STAR clothes w		1 Clothes washer	9	
6	ENERGY STAR clothes w		1 Clothes washer	9	
7	ENERGY STAR clothes w		1 Clothes washer	9	
8	ENERGY STAR clothes w		1 Clothes washer	9	

Portfolio Sheet

Field	Description
Organization	Organization name
PortfolioName	Name of the Portfolio Defined in the Portfolio Editor

PortfolioId	Unique identifier for the Portfolio
InstallationYear	Installation year of the Applied Measures in the Portfolio
TestLengthYears	Number of years included in the results
DiscountRateFraction	Net Present Value (NPV) discount rate used for cost/benefit calculation Formatted as a decimal. For example, a discount rate of 4.5% is formatted as 0.045 Defined in the Portfolio Editor
BaseYear	Beginning year used for the calculation Typically, the same as the installation year.

Applied Measure Elements Sheet

Column	Description
M_MeasureName	Name of the Measure the Element applies
M_VersionNumber	Version number of the Measure
M_NormalizedUnit	Units set in the Measure Defined in the Measure
AM_NumberOfUnits	Number of units Defined in the Applied Measure Editor
AM_VariableOverheadCostPerUnit	Variable Overhead Cost per Unit Defined in the Applied Measure Editor
AM_IncentivesPaidByUtilityPerUnit	Incentives Paid by the Utility per Unit Defined in the Applied Measure Editor
AM_IncentivesReceivedByCustomerPerUnit	Incentives Received by the Customer per Unit Defined in the Applied Measure Editor
AM_IsLowIncome	Indicates if measure is categorized as Low Income Defined in the Applied Measure Editor
AM_ExcludeFromCostAllocation	Indicates if Portfolio and Program Overhead Costs should be allocated to this measure. If this option is selected, the overhead costs are not allocated to this measure. Defined in the Applied Measure Editor
M_NTGFraction	Net to Gross Percentage Defined in the Measure Editor Indicated as decimal fraction. For example, 95% is 0.95
AM_NTGFractionOverride	Net to Gross percentage override value Defined in the Applied Measure Editor Value only appears if entered in the Applied Measure Editor Indicated as decimal fraction. For example, 95% is 0.95

Column	Description
AMMeasureApplicationType	Measure Application Type as selected in the Applied Measure Editor Selection determines if Measure is dual baseline and how the baseline values are used for the calculations
AM_DeliveryType	Delivery Type as selected in the Applied Measure Editor Selection determines if Measure is dual baseline and how the baseline values are used for the calculations
M_EffectiveUsefulLife	Effective Useful Life Defined in Measure Editor Number of years to use the first baseline savings
M_RemainingUsefulLife	Remaining Useful Life Defined in Measure Editor Number of years to use the second baseline savings
AM_RemainingUsefulLifeOverride	Remaining Useful Life Override Defined in Applied Measure Editor
M_MeasureType	Measure Type Defined in the Measure Editor
M_Sector	Sector Defined in the Measure Editor
M_EndUse	End Use Defined in the Measure Editor
M_BuildingType	Building Type Defined in the Measure Editor
M_ClimateZone	Climate Zone defined for the organization
AM_ElectricLoadShapeName	Electric Load Shape Defined in Applied Measure Editor Either set by default or selected in the Applied Measure Editor
AM_ElectricLoadShapeVersionNumber	Version number of the selected Load Shape
M_GSIA	Gross Savings Installation Adjustment Defined in Measure Editor
M_BaseCaseCost	Base Case Cost Defined in Measure Editor
M_MeasureCost	Measure Cost Defined in Measure Editor
M_CodeBaselineSavingskWh	Code Baseline > Electric Savings Defined in Measure Editor
M_CodeBaselinePeakSavingskW	Code Baseline > Peak Load Savings Defined in Measure Editor

Column	Description
M_CodeBaselineGasSavingsTherms	Code Baseline > Gas Savings Defined in Measure Editor
M_CodeBaselineWaterSavingsCCF	Code Baseline > Water Savings Defined in Measure Editor
M_ExistingBaselineSavingskWh	Existing Baseline > Electric Savings Defined in Measure Editor
M_ExistingBaselinePeakSavingskW	Existing Baseline > Peak Load Savings Defined in Measure Editor
M_ExistingBaselineGasSavingsTherms	Existing Baseline > Gas Savings Defined in Measure Editor
M_ExistingBaselineWaterSavingsCCF	Existing Baseline > Water Savings Defined in Measure Editor
ElementSavingsUnitsType	Units for calculated savings
ElementBaseline1Savings	Total savings for element for first Baseline. First baseline is dependent on selection of Measure Application Data and Delivery Type See Dual Baseline Savings, Cost, and Measure Life for more details
ElementBaseline2Savings	Total savings for element for first Baseline. First baseline is dependent on selection of Measure Application Data and Delivery Type See Dual Baseline Savings, Cost, and Measure Life for more details
ElementBaseline1YearCount	Number of years using the first Baseline savings
ElementBaseline2YearCount	Number of years using the second Baseline savings value Value only provided if dual baseline measure
ElementRateScheduleName	Retail Rate selected for Measure
ElementRateScheduleVersionNumber	Version number of Retail Rate
DE_AnnualizedDollarsPerUnit__<Year>	
ElementDescription	Element Name
ElementType	Type of Element
ElementValue__<Year>	Value of the Element for the year indicated in column header Number of columns with values depends on total lifetime of the measure
ElementNPV__<Year>	Net Present Value of the Element for the year indicated in column header Number of columns with values depends on total lifetime of the measure
ElementTestUsage_PAC	Indicates if the element was used as Benefit or Cost for the PAC Test. Blank if Element is not used in calculation for PAC test

Column	Description
ElementTestUsage_TRC	Indicates if the element was used as Benefit or Cost for the TRC Test. Blank if Element is not used in calculation for TRC test
ElementTestUsage_PCT	Indicates if the element was used as Benefit or Cost for the PCT test Blank if Element is not used in calculation for PCT test
ElementTestUsage_RIM	Indicates if element was used as Benefit or Bost for the RIM test Blank if RIM test is not run or the Element is not used in the calculation of the RIM test

ADDITIONAL HELP

If you have additional questions, contact technical support at the following:

Support Team	Contact Information
CMUA	Policy questions Request accounts
ESP	Technical software assistance Email: esportfolios.support@energyplatforms.com Phone: 866-258-6913 Phone answered 8 a.m. to 5 p.m. Central Time (6 a.m. to 3 p.m. Pacific Time)