ENERGY EFFICIENCY

in California's Public Power Sector

16th Edition – 2022

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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 16th edition report presents the latest results from POUs' wide range of EE programs.

During the Fiscal Year (FY) 2021 reporting cycle, POUs expended **$159 million** on EE programs for their communities, including low-income customers, resulting in **254 Gigawatt hours (GWh)** of net annual energy savings and reducing peak demand by **82 Megawatts (MW)**. Since the enactment of Senate Bill (SB) 1037 (Kehoe, 2005), public power has spent nearly **$2.5 billion** on EE and demand reduction, achieving over **97,235 GWh** in net lifecycle energy savings.

2021

POUs expended **$159 million** on energy efficiency programs

Resulting in over **254 GWh** of annual energy savings*

Since 2006, nearly **$2.5 billion** invested in Energy efficiency

Achieving over **2,857GWh** 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 2021, keeping EE program yields 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. For example, programs requiring direct interaction, such as Direct Install, had to be suspended due to state and local health restrictions. As indicated in the utility narratives, some of California's POUs began to return to programs that require direct interaction while other POUs have indicated that they intend to return to these programs in 2022. 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 POUs are evaluating new methods to cost-effectively reduce both energy use and Greenhouse Gas (GHG) emissions. 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 POUs are required to report the following information to customers and the Energy Commission:[1]

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

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

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

The POUs 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.

> "First place goes to California, which sets the pace in saving energy on multiple fronts with adoption of net-zero energy building codes, stringent vehicle emissions standards, and industry-leading appliance standards."
>
> **ACEEE 2020 State EE Scorecard**

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

PROGRAM RESULTS

This section provides an overview of the EE program results for public power in California during FY 2021. Most POUs manage and implement EE programs on a fiscal year basis; for POUs that operate on a calendar year basis, their respective report results for FY 2021 are equal to that of Calendar Year 2021.[2]

In summary, during the 2021 reporting cycle, POUs collectively spent **$159** million on EE programs, resulting in **254 GWh** of net annual energy savings, with **2,851 GWh** of net lifecycle energy savings and reduced peak demand by **82 MW**.

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
Total	**1,597,673**	**8,275,485**	**97,234,831**	**$2,498,654,404**

As shown in **Table 1**, public power has collectively spent **$2.5 billion** on EE programs, resulting in **97,235 GWh** in net lifecycle energy savings since 2006 and avoided the development of **1,598 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 before the beginning of the pandemic, providing further evidence of the impact COVID-19 has had on the State's energy economy.

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

California's POUs 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, POUs' cumulative first year savings from FY 2015 through FY 2021 equals **4,293 GWh,** as presented in **Table 2** below. In spite of the effects of the pandemic, these cumulative savings remain **224 GWh** above the target cumulative goals for California POUs.[3] The Policy Consideration section discusses in further detail the importance of POUs' 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 (GWh) per Installation Year							Cumulative Savings	CEC Cumulative Savings Target
2015	2016	2017	2018	2019	2020	2021		
644.7	771.6	861.9	638.7	646.3	475.6	254.3	4,293.1	4,069.0

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

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

TABLE 3. California POU Cumulative Lifecycle Savings Comparison

Cumulative Savings (GWh) Per Installation Year							Cumulative Savings
2015	2016	2017	2018	2019	2020	2021	
7,836.6	10,253.6	11,991.6	8,267.5	7,312.3	5,221.8	2,850.9	53,734.3

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

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

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

Net Cumulative Savings (GWh) Per Installation Year							Cumulative Savings
2015	2016	2017	2018	2019	2020	2021	
1,172.0	1,645.7	2,225.1	2,774.9	3,289.0	3,649.6	3,818.0	18,574.3

Table 5 below provides a comprehensive summary of the EE savings for all POUs' respective EE Portfolios in FY 2021. The 16 largest utilities subject to Integrated Resource Plan (IRP) requirements account for the majority of savings within the public power community. As in past years, the two largest POUs, Los Angeles Department of Water & Power (LADWP) and Sacramento Municipal Utility District (SMUD), accounted for roughly two-thirds of the total POU savings during the 2021 reporting cycle. Taken as a group, the 16 IRP POUs produced 97% of the total savings. The remainder of the savings were realized by 32 smaller and mid-sized POUs 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	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080
Anaheim	1,872	10,417,460	119,962,912	1,872	10,417,460	119,962,912	44,594	$2,506,333	5.10	11.66	0.027
Azusa	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
Banning	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
Biggs	-	-	-	-	-	-	-	$12,782			0.000
Burbank	1,244	4,899,355	56,880,385	1,244	4,899,355	56,880,385	20,206	$2,032,144	2.99	1.40	0.045
Colton	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
Corona	-	-	-	-	-	-	-	$0			0.000
Glendale	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
Gridley	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
Healdsburg	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290
Imperial	4,033	8,702,773	138,859,393	3,628	7,985,740	127,915,498	48,912	$2,876,532	6.28	11.46	0.032
IPUC	-	-	-	-	-	-	-	$0			0.000
Lassen	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
Lodi	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
Lompoc	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066
Los Angeles	19,898	113,949,160	1,299,806,260	19,898	113,949,160	1,299,806,260	58,964	$93,784,254	1.12	1.29	0.100
Merced	-	232,687	2,358,976	-	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
Modesto	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027
Moreno Valley	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
Needles											
Palo Alto	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031
Pasadena	2,107	9,953,397	34,519,833	2,084	9,912,060	34,059,756	12,932	$2,402,483	2.83	2.82	0.082
Pittsburg											
Plumas-Sierra	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
Port of Oakland	-	-	-	-	-	-	-	$12,984			0.000
Rancho Cucamonga	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
Redding	661	3,918,970	40,214,520	548	3,205,967	32,413,691	13,943	$3,273,319	0.45	0.53	0.112
Riverside	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
Roseville	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
Sacramento	12,694	45,015,931	558,483,793	8,885	34,816,108	452,474,365	21,063	$24,930,574	0.16	0.12	0.072
San Francisco	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
Shasta Lake	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
Silicon Valley Power	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
Trinity											
Truckee Donner	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
Turlock	280	5,056,369	75,046,256	255	4,852,751	72,322,737	28,364	$1,232,039	6.50	1.97	0.023
Ukiah	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
Vernon	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
Victorville	-	-	-	-	-	-	-	$0			0.000
EE and Low Income Subtotal	**87,872**	**275,779,000**	**3,094,107,373**	**81,596**	**254,310,333**	**2,850,853,984**	**489,998**	**$158,527,378**	**1.51**	**1.43**	**0.075**

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 (**37%**) 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	1,340	12,091,957	151,495,385	1,226	11,118,724	138,133,896	48,935	4,305,215	3.57	3.20	0.040
Appliance & Plug Loads	2,189	11,064,992	100,051,283	1,324	6,620,599	68,773,861	9,040	$5,498,967	0.67	0.41	0.102
BROs	1,555	11,925,780	15,356,764	1,555	10,092,294	13,499,718	5,721	996,565	3.53	3.51	0.077
Building Envelope	8,224	16,077,459	299,500,847	7,785	15,516,742	289,355,284	35,415	$36,369,057	1.32	1.11	0.198
Codes & Standards											
Commercial Refrigeration	442	3,780,607	46,596,263	429	3,600,161	44,596,982	7,620	$1,152,312	2.62	1.33	0.035
Food Service	49	332,554	4,168,749	45	310,176	3,879,177	253	793,718	0.20	0.21	0.276
HVAC - Cooling	48,726	36,679,050	555,906,013	45,982	31,937,264	476,405,546	106,446	$20,073,893	2.88	2.60	0.059
HVAC - Heat Pump	1,140	1,504,666	21,835,234	711	940,487	13,397,683	604	512,545	0.51	0.27	0.051
HVAC - Heating	30	222,589	3,403,843	25	186,331	2,859,973	1,896	$91,663	3.88	0.68	0.040
Lighting - Indoor	10,183	67,064,802	638,827,424	9,307	64,830,537	614,123,557	121,956	34,297,205	1.43	1.59	0.070
Lighting - Outdoor	1,491	26,823,299	280,162,730	1,386	25,144,962	257,556,815	72,785	$15,730,455	1.11	1.53	0.079
Miscellaneous	776	14,184,071	60,406,834	762	14,040,364	59,778,621	16,287	3,235,601	1.66	1.30	0.067
Process	1,821	13,444,467	189,037,360	1,749	13,180,847	185,103,839	21,581	$4,520,857	2.77	2.70	0.034
Service & Domestic Hot Water	42	449,746	3,844,748	32	325,456	2,718,199	658	234,970	0.69	0.74	0.102
Transmission & Distribution	171	1,538,820	17,564,749	171	1,538,820	17,564,749	788	$406,865	2.11	0.79	0.031
Water Pumping / Irrigation	2,321	14,837,303	174,146,218	2,318	14,805,647	173,683,358	10,269	936,077	11.04	10.52	0.008
Whole Building	4,561	35,913,155	454,947,146	4,090	32,398,822	414,234,171	21,370	$9,784,247	0.86	0.49	0.031
EE Subtotal	**85,061**	**267,935,318**	**3,017,251,590**	**78,896**	**246,588,234**	**2,775,665,430**	**481,624**	**$138,940,211**	**1.70**	**1.52**	**0.067**
Low Income	2,811	7,843,681	76,855,783	2,699	7,722,099	75,188,553	8,374	$19,587,167	0.19	0.30	0.337
EE and Low Income Subtotal	**87,872**	**275,779,000**	**3,094,107,373**	**81,596**	**254,310,333**	**2,850,853,984**	**489,998**	**$158,527,378**	**1.51**	**1.43**	**0.075**
Codes and Standards	37,415	269,424,835	3,790,047,621	37,415	269,424,835	3,790,047,621	163,480	$15,356,422	10.77	10.77	0.006
Electrification	8,773	17,769,202	243,684,522	8,768	17,728,602	243,075,891	10,652	$11,143,210	0.20	0.28	0.060
Transmission and Distribution	27	4,383,612	5,743,511	27	4,383,612	5,743,511	2,740	$362,857	1.29	1.29	0.066
C&S T&D and Electrification Subtotal	**46,215**	**291,577,649**	**4,039,475,655**	**46,210**	**291,537,049**	**4,038,867,023**	**176,872**	**$26,862,489**	**6.26**	**7.06**	**0.009**
Utility Total	**134,087**	**567,356,649**	**7,133,583,028**	**127,806**	**545,847,382**	**6,889,721,007**	**666,870**	**$185,389,867**	**2.20**	**2.13**	**0.037**

Table 7 presents the statewide EE program results by sector. As has historically been the case, the C&I sectors account for the majority of California POUs' annual energy savings (72%), while residential programs resulted in 27% 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	14	2,087,842	31,257,749	14	2,086,644	31,251,761	11,055	$298,654	10.99	3.01	0.013
Commercial	26,122	183,433,106	2,074,052,704	24,466	175,632,070	1,977,906,482	292,155	$78,285,030	1.61	1.60	0.052
Industrial	981	10,047,060	126,960,194	873	8,238,026	102,170,745	41,542	$1,529,319	7.62	1.86	0.020
Other	68	1,207,362	11,766,210	68	1,207,362	11,766,210	5,163	$309,792	4.21	4.17	0.035
Residential	57,876	71,159,948	773,214,733	53,475	59,424,132	652,570,233	131,710	$58,517,416	1.61	1.36	0.129
EE Subtotal	**85,061**	**267,935,318**	**3,017,251,590**	**78,896**	**246,588,234**	**2,775,665,430**	**481,624**	**$138,940,211**	**1.70**	**1.52**	**0.067**
Low Income	2,811	7,843,681	76,855,783	2,699	7,722,099	75,188,553	8,374	$19,587,167	0.19	0.30	0.337
EE and Low Income Subtotal	**87,872**	**275,779,000**	**3,094,107,373**	**81,596**	**254,310,333**	**2,850,853,984**	**489,998**	**$158,527,378**	**1.51**	**1.43**	**0.075**
Codes and Standards	37,415	269,424,835	3,790,047,621	37,415	269,424,835	3,790,047,621	163,480	$15,356,422	10.77	10.77	0.006
Electrification	8,773	17,769,202	243,684,522	8,768	17,728,602	243,075,891	10,652	$11,143,210	0.20	0.28	0.060
Transmission and Distribution	27	4,383,612	5,743,511	27	4,383,612	5,743,511	2,740	$362,857	1.29	1.29	0.066
C&S T&D and Electrification Subtotal	**46,215**	**291,577,649**	**4,039,475,655**	**46,210**	**291,537,049**	**4,038,867,023**	**176,872**	**$26,862,489**	**6.26**	**7.06**	**0.009**
Utility Total	**134,087**	**567,356,649**	**7,133,583,028**	**127,806**	**545,847,382**	**6,889,721,007**	**666,870**	**$185,389,867**	**2.20**	**2.13**	**0.037**

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

TABLE 8. 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	9,375	59,016,780	746,287,510	8,189	54,361,432	685,242,943	190,074	$16,691,758	3.79	2.19	0.032
Assembly	270	3,657,798	31,221,676	268	3,641,511	31,107,139	1,911	$5,695,465	0.23	0.42	0.230
Education - Community College	93	657,975	9,032,009	93	657,975	9,032,009	388	$225,546	2.34	0.98	0.036
Education - Primary School	852	7,814,353	92,847,201	852	7,807,018	92,737,244	5,842	$10,442,541	0.47	0.74	0.154
Education - Relocatable Classroom											
Education - Secondary School	1,350	11,710,129	116,237,522	1,350	11,707,591	116,199,479	5,174	$4,515,781	1.43	2.37	0.050
Education - University	1,052	7,271,262	62,597,372	1,052	7,271,262	62,597,372	3,095	$3,700,030	1.02	1.17	0.075
Grocery	1,086	7,995,835	98,869,281	959	7,037,275	86,244,194	5,725	$3,629,616	0.51	0.28	0.055
Health/Medical - Hospital	1,285	9,034,692	109,580,617	1,284	9,024,184	109,425,539	5,054	$2,709,315	2.18	2.79	0.034
Health/Medical - Nursing Home	35	337,519	2,246,970	35	326,805	2,139,828	249	$207,882	0.63	0.84	0.116
Lodging - Hotel	182	1,294,031	8,562,766	181	1,291,709	8,528,024	459	$605,171	0.83	1.00	0.086
Lodging - Motel	1	3,224	42,124	1	2,637	34,561	5	$1,658	1.15	1.21	0.062
Manufacturing Biotech	19	160,454	2,402,818	18	155,495	2,328,992	98	$36,302	0.50	0.30	0.021
Manufacturing Light Industrial	896	7,317,213	96,923,605	827	6,724,319	87,849,843	11,727	$1,671,495	2.46	2.39	0.025
Office - Large	2,922	21,933,514	237,417,508	2,893	21,640,540	234,091,519	20,744	$9,126,357	1.41	1.27	0.052
Office - Small	81	910,185	12,256,153	73	807,364	10,928,345	1,455	$462,675	0.85	0.46	0.055
Other Agricultural	1,177	10,898,512	116,685,490	1,122	10,425,530	109,606,963	16,755	$1,322,453	3.45	1.96	0.016
Other Commercial	4,724	30,798,954	353,634,847	4,523	29,476,780	341,547,051	69,206	$14,095,352	1.83	2.35	0.054
Other Industrial	631	6,428,433	56,194,479	626	6,395,168	55,715,674	7,296	$2,363,693	1.10	1.03	0.054
Residential	10,207	41,824,762	317,714,673	8,033	33,297,859	239,159,186	81,626	$12,032,032	2.82	2.24	0.068
Residential - Multi-Family	627	3,072,480	35,412,321	595	2,881,484	33,872,746	2,286	$2,742,494	1.00	1.02	0.112
Residential - Single-Family	47,101	27,142,096	425,543,533	44,905	24,036,065	384,391,249	47,492	$43,737,991	1.32	1.12	0.171
Restaurant - Fast-Food	3	15,209	426,398	3	16,185	401,238	11	$19,971	0.18	0.12	0.071
Restaurant - Sit-Down	17	99,572	1,176,428	14	81,148	954,562	48	$34,808	0.30	0.27	0.047
Retail - Big Box	59	349,257	2,981,366	59	349,257	2,981,366	136	$171,869	1.18	1.85	0.075
Retail - Large	554	3,918,234	40,048,228	506	3,081,786	29,098,499	2,628	$1,143,243	1.29	1.04	0.050
Retail - Small	116	679,281	5,158,959	96	559,551	4,273,398	364	$290,003	0.34	0.32	0.080
Storage - Conditioned	63	555,477	4,222,281	63	551,817	4,173,382	201	$252,083	0.61	0.85	0.074
Storage - Unconditioned	15	186,626	1,337,246	12	152,523	1,098,841	86	$50,849	0.30	0.44	0.054
Warehouse - Refrigerated	269	2,851,461	30,190,210	266	2,825,964	29,904,245	1,489	$961,781	1.22	1.78	0.043
EE Subtotal	**85,061**	**267,935,318**	**3,017,251,590**	**78,896**	**246,588,234**	**2,775,665,430**	**481,624**	**$138,940,211**	**1.70**	**1.52**	**0.067**
Low Income	2,811	7,843,681	76,855,783	2,699	7,722,099	75,188,553	8,374	$19,587,167	0.19	0.30	0.337
EE and Low Income Subtotal	**87,872**	**275,779,000**	**3,094,107,373**	**81,596**	**254,310,333**	**2,850,853,984**	**489,998**	**$158,527,378**	**1.51**	**1.43**	**0.075**
Codes and Standards	37,415	269,424,835	3,790,047,621	37,415	269,424,835	3,790,047,621	163,480	$15,356,422	10.77	10.77	0.006
Electrification	8,773	17,769,202	243,684,522	8,768	17,728,602	243,075,891	10,652	$11,143,210	0.20	0.28	0.060
Transmission and Distribution	27	4,383,612	5,743,511	27	4,383,612	5,743,511	2,740	$362,857	1.29	1.29	0.066
C&S T&D and Electrification Subtotal	46,215	291,577,649	4,039,475,655	46,210	291,537,049	4,038,867,023	176,872	$26,862,489	6.26	7.06	0.009
Utility Total	**134,087**	**567,356,649**	**7,133,583,028**	**127,806**	**545,847,382**	**6,889,721,007**	**666,870**	**$185,389,867**	**2.20**	**2.13**	**0.037**

Table 9 compares the actual savings in 2021 to the POUs' adopted annual targets for each utility. In total, the actual energy savings were approximately 73% below forecasted levels for 2021.

TABLE 9. Forecast vs Actual for Installation Year 2021 [4] [5]

Utility	Gross/Net	EE Forecast (MWh)	EE Actual (MWh)	EE %
Alameda	Net	823	1,163	141
Anaheim	Gross	19,089	10,148	53
Azusa	Net	1,705	2,318	136
Banning	Net	445	476	107
Biggs	Net	8	-	-
Burbank	Gross	12,052	4,899	41
Colton	Net	10,681	4,036	38
Glendale	Net	25,337	9,792	39
Gridley	Net	420	2	0
Healdsburg	Net	466	55	12
Imperial	Net	66,469	7,937	12
Lassen	Net	1,381	335	24
Lodi	Net	1,496	825	55
Lompoc	Gross	963	388	40
Los Angeles	Gross	227,718	111,252	49
Merced	Net	5,607	183	3
Modesto	Net	42,318	10,710	25
Moreno Valley	Net	3,028	1,235	41
Needles	Net	87		
Palo Alto	Gross	7,757	4,405	57
Pasadena	Net	35,875	9,879	28
Plumas-Sierra	Net	593	19	3
Port of Oakland	Gross	2,076	-	-
Rancho Cucamonga	Gross	1,242	472	38
Redding	Net	3,858	2,998	78
Riverside	Net	19,451	9,662	50
Roseville	Gross	18,707	10,184	54
Sacramento	Gross	405,921	41,005	10
San Francisco	Net	2,657	612	23
Shasta Lake	Net	2,130	65	3
Silicon Valley Power	Net	14,928	6,985	47
Trinity	Net	25		
Truckee Donner	Gross	2,694	99	4
Turlock	Net	21,357	4,821	23
Ukiah	Net	1,844	59	3
Vernon	Net	12,797	3,039	24
Victorville	Net	685	-	-
Total		**974,689**	**260,060**	**27**

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

[5] Not all Small, Non-IRP POUs are included in this list because they either did not exist when the 2017 forecasts were developed, did not develop forecasts in 2017, or did not have any energy savings in 2021.

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.[6] POU communities have played a key role in supporting the State's accomplishments and look forward to a continuing partnership with all stakeholders, as the state pursues its clean energy agenda.

The Pandemic and Electricity Demand

COVID-19 resulted in the shutdown of whole segments of California's economy and caused Californians to spend much of 2021 working at home. In 2021 the pandemic continued to have an unprecedented impact on California's electricity demand and the State's economy as a whole. Comparing the data in this Draft Report with those of previous years demonstrates the clear impact the pandemic has had on EE performance.

Similar to 2020, in 2021 residential demand increased, particularly in the summer months, while Commercial and Industrial (C&I) demand has decreased by even more.[7] On balance, electricity demand in California looks to be approximately 4.5% lower on a year-to-date level. As a result of these changes in electricity demand, as this report demonstrates, California's EE programs show lower than expected results for 2021. 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 Direct Install, had to be suspended due to state and local health restrictions. 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.

[6] 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

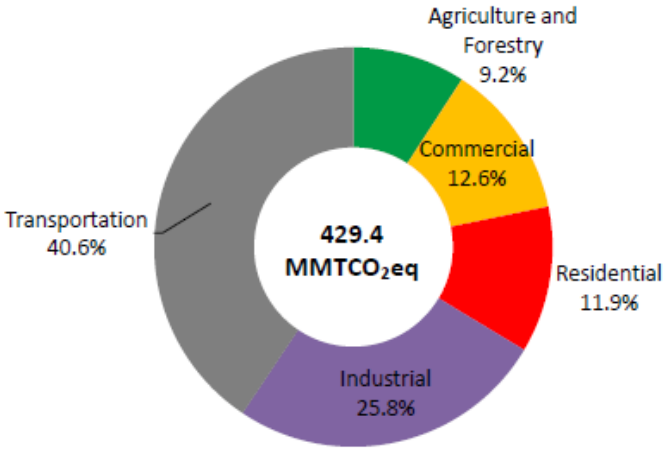
[7] California Energy Commission Energy Insights, Available at: https://www.energy.ca.gov/news/2020-05/energy-commission-releases-new-data-how-covid-19-impacting-energy-sector

EE and Carbon Reduction

California's SB 100 (De León, 2018) regulation establishes the State's goal that retail electricity will be GHG emission free by 2045.[8] As California's electric utilities continue to reduce their GHG emissions, the net reduction in GHG emissions from EE improvements will also decline.

Until the time that the majority or all of California's generation is emission free, EE will remain the first resource in the State's loading order and will maintain its important role in reducing GHG emissions. As displayed in Figure 1 below, energy use in residential and existing commercial buildings has collectively accounted for nearly one quarter of statewide GHG emissions.[9] To meet the State's GHG emission reduction goals, California must clearly focus on programs that reduce energy consumption in existing buildings and new construction.

Figure 1. California's 2016 GHG Emissions by End Use



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.[10] These targets take into consideration increases in EE savings from utility programs, codes and standards, financing, behavioral programs, market transformation, and improvements in the agriculture and industry sectors. In establishing a statewide target, SB 350 directed the Energy Commission to rely on both the forecast for additional achievable EE in the *California Energy Demand Updated Forecast, 2014-2025*, and the POUs' EE targets. [11]

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[8] Cal. Pub. Util. Code § 399.15(b)(2)(B).

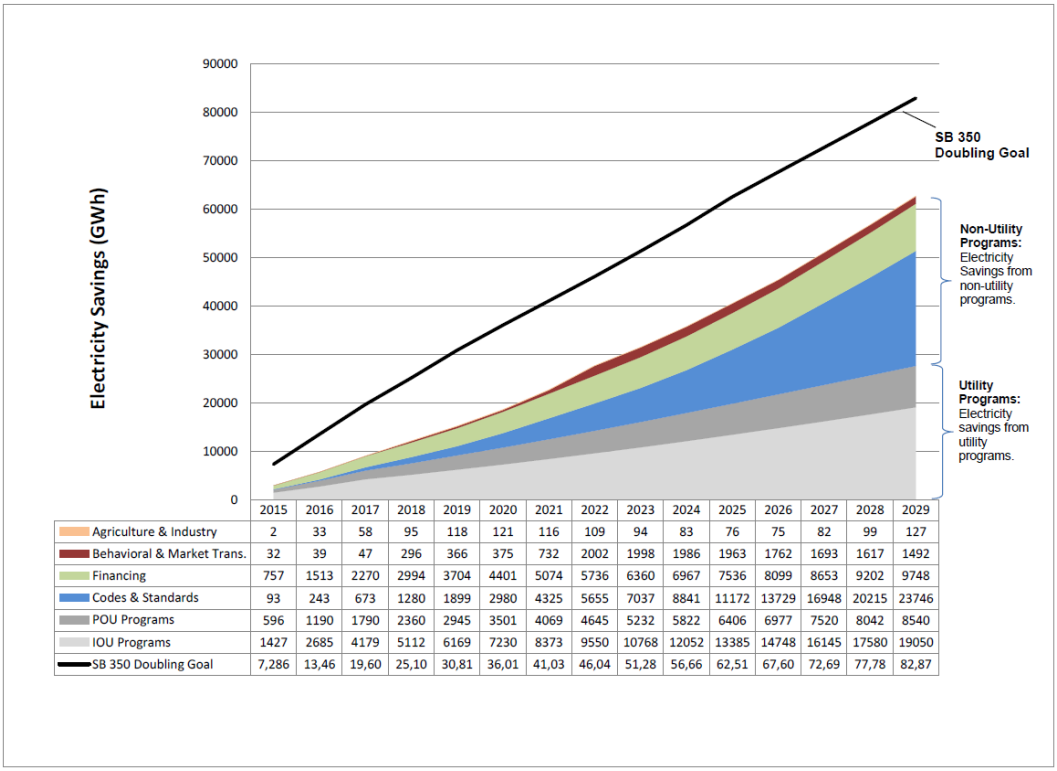
[9] See Figure 6, Energy Commission, September 2018, EE Tracking Progress, Available: https://www.energy.ca.gov/sites/default/files/2019-12/Greenhouse_Gas_Emissions_Reductions_ada.pdf

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

[11] POUs are required to update their annual EE targets every four years, per Cal. Pub. Util. Code § 9505 (b). The 2021 update is forthcoming.

The POUs' 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 POUs' EE programs.[12] The Energy Commission incorporated the POUs' adopted annual EE targets into the statewide cumulative target by combining the POUs' 1st year savings as the annual targets for 2015-2030 and used that as the aggregate "cumulative savings" target for POUs, as shown below in Figure 2.

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



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

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

POU cumulative savings through 2021 were calculated using this same methodology, as presented in **Figure 2**, above, which shows that to date POUs have exceeded the State's forecast for their collective, cumulative EE savings by more than 224 GWh.

POUs 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 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.

[12] POUs have contracted with GDS Associates, Inc. to produce the 2021 update to the POUs' EE potential forecast.

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.[13] 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, codes and standards, financing, behavioral programs, market transformation, and improvements in the agriculture and industry sectors.[14] All of these programs are expected to continue generating considerable energy savings for consumers, but the traditional methodology for attributing savings to utilities may need to be revisited - despite EE program savings continuing to increase, utilities have received less attribution for these increases.

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

EE improvements are one of the most cost-effective ways to reduce energy consumption and GHG emissions.[15] However, POUs' EE savings are likely to decrease over time due to future

[13] 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.
[14] Energy Commission, October 2017, *Senate Bill 350: Doubling EE Savings by 2030.*
[15] Gillingham, Kenneth, and James H. Stock. 2018. "The Cost of Reducing Greenhouse Gas Emissions." *Journal of Economic Perspectives*, 32 (4): 53-72.

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 codes and standards – but remain cost-effective for the utilities and their customers. POU programs must continuously evolve in order to find new technologies, incent customers to re-engage in new programs, and convince new customers to participate in efficiency improvement programs.

Embracing Opportunities to Use Energy More Efficiently

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

POUs 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 POUs' 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.

Building electrification and decarbonization measures can deliver both energy savings and 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.[16] Recently, a partnership of LADWP, SMUD, and Southern California Edison commissioned a study to assess the energy savings, GHG savings, and the overall economics of electrification for California customers.[17] This study found that all-electric new construction could result in savings of $130-$540 per year relative to a gas-fueled home over the life of the equipment. In addition, there are potential savings to developers who do not have to lay gas lines if constructing all-electric buildings.

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

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

However, more work is needed to address the obstacles faced by electrification. For example, fuel substitution in buildings is only part of the picture for electrification – changing from gasoline or diesel to electricity in the transportation sector is defined as "fuel switching" and is not captured in fuel substitution policies. Building electrification can complement related efforts to electrify the transportation sector, as both are essential to meeting the State's GHG emission reduction goals. However, building electrification and TE will increase electric load and therefore

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

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

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

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

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, POUs will continue to develop innovative programs tailored to the changing needs of their respective communities; the POUs look forward to working with the Energy Commission to frame effective policies to that end.

RESOURCES AND TOOLS

This section provides an overview of the technical resources, analytical tools, methodologies, and input assumptions used or developed by public power to evaluate its 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 POUs' tracking and evaluation of program performance and to support the development of reports in compliance with state and federal reporting requirements. This tool built upon the functionality of the complex spreadsheets used in prior reporting years to calculate the cost-effectiveness of 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 (PCT), as developed by the CPUC in the 1980s and codified in the California Standard Practice Manual.[21]

Using this tool, POUs can analyze individual efficiency measures or full programs to determine the potential savings and cost-effectiveness before implementation. POUs are able to create unique programs and measures for their utility -- and may choose to share them with other POUs collaboratively. The model also allows each POU to be able to specify many key inputs including, but not limited to, 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 POUs to manage reference libraries of measures, avoided costs, load shapes, and GHG emissions, allowing useful tracking and comparative scenario analyses for integrated planning purposes. Energy Platforms, LLC continues to update and improve the CET/RP to improve reporting functionality.

Technical Reference Manual

[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.

Recognizing that the Database for Energy Efficient Resources (DEER) was not a viable resource for public power to continue to use, POUs contracted for the development of a technical reference manual (TRM) modeled after the Northwest Regional Technical Forum resource in 2013.[22] Public power retained Energy & Resource Solutions (ERS) to develop the TRM to be used by utilities across the State's different building climate zones. ERS completed the TRM in 2014 and performed updates in 2016 and 2017. The TRM has replaced DEER as the basis for which most POUs calculate the energy savings of their programs. Deviations from the TRM for individual utilities are noted in ***Appendix A.***

The TRM provides the methods, formulas, and default assumptions used for estimating energy savings and peak demand impacts from EE measures and projects in a very clear and open format. POUs use the energy savings estimates to report program accomplishments and measure progress towards program goals. EE measures are documented and classified as either unit energy savings (UES) measures, semi-custom measures, or custom measures. The TRM includes both nonresidential and residential measures, and presents each measure type in separate sections, grouped by technology type.

The TRM includes the main manual as well as supporting spreadsheets. The TRM also includes spreadsheets that provide detailed and transparent measure calculations and, for semi-custom measures, energy savings calculators for estimating energy savings for project-specific measures. As needed, each section also contains supplementary tables and charts to provide additional measure details. Measures with multiple savings values (savings by size, building use, varying levels of efficiency, etc.) will have both savings and cost data listed in a supplementary table. The last section of the TRM provides the custom measure protocol, which outlines a process for estimating and documenting custom measure savings.

The TRM includes energy savings calculators, which are Excel spreadsheet-based engineering models for estimating semi-custom measures per the described methodology. They provide a consistent, transparent, and user-friendly approach for estimating project-specific energy savings. The TRM provides a much higher degree of transparency for public power, policymakers, and interested stakeholders regarding the energy savings estimates underpinning public power's EE programs.

Public power is actively involved in the California Technical Forum's (CalTF) newly created statewide electronic TRM, or 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 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.

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

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

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 POUs' sources of funding for its investments in EE and demand reduction programs, as required by Public Utilities Code.[26] The POUs collectively spent $288 million in FY 2020, from a combination of Public Goods Charge funds, Cap-and-Trade allowances, and General Fund monies.

Public Goods Charge

The Public Goods Charge (PGC) is a "non-bypassable", usage-based, charge on local distribution services, collected by POUs, in accordance with Public Utilities Code.[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 Cap-and-Trade 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 Cap-and-Trade auctions, but the level of available revenues are expected to increase over time as minimum auction prices have escalation factors that are applied once a year.[28]

General Fund

POUs 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 disadvantaged communities (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.

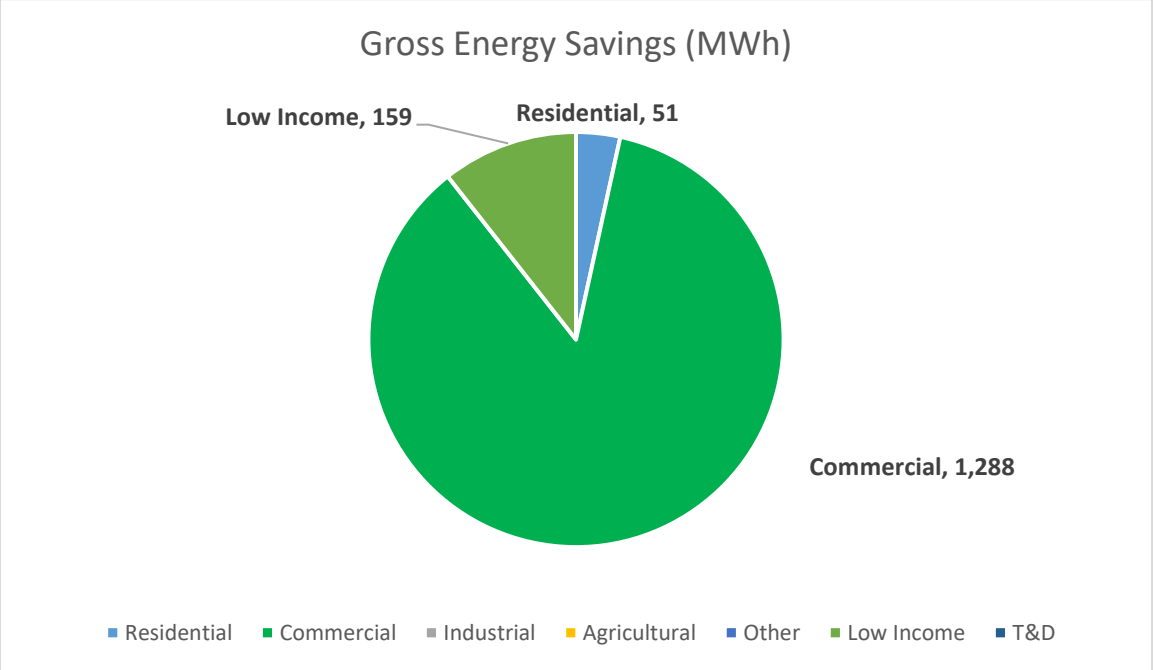
TABLE 10. Annual EE Program Summary

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	779	1,498,098	18,865,441	656	1,292,660	16,381,028	$1,023,586
Anaheim	1,872	10,417,460	119,962,912	1,872	10,417,460	119,962,912	$2,506,333
Azusa	603	2,391,582	24,196,684	598	2,318,223	23,833,258	$1,326,261
Banning	34,361	514,966	9,721,156	33,742	476,074	9,182,580	$160,431
Biggs	-	-	-	-	-	-	$12,782
Burbank	1,244	4,899,355	56,880,385	1,244	4,899,355	56,880,385	$2,032,144
Colton	669	4,599,296	29,419,548	658	4,035,866	21,051,138	$351,558
Corona	-	-	-	-	-	-	$0
Glendale	308	9,821,344	33,502,545	306	9,792,158	33,142,520	$1,373,543
Gridley	1	3,572	47,119	1	1,874	24,929	$45,606
Healdsburg	27	84,418	1,156,550	21	65,358	891,645	$196,287
Imperial	4,033	8,702,773	138,859,393	3,628	7,985,740	127,915,498	$2,876,532
IPUC	-	-	-	-	-	-	$0
Lassen	36	395,988	4,481,367	31	335,474	3,771,448	$124,093
Lodi	196	942,213	10,831,773	136	825,439	9,038,246	$443,192
Lompoc	57	401,901	3,529,874	53	369,901	3,222,741	$178,759
Los Angeles	19,898	113,949,160	1,299,806,260	19,898	113,949,160	1,299,806,260	$93,784,254
Merced	-	232,687	2,358,976	-	183,025	1,844,151	$286,134
Modesto	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	$2,943,644
Moreno Valley	69	1,373,102	13,738,065	62	1,235,132	12,356,055	$445,607
Needles							
Palo Alto	555	4,404,709	69,636,578	472	3,744,007	59,191,181	$1,425,857
Pasadena	2,107	9,953,397	34,519,833	2,084	9,912,060	34,059,756	$2,402,483
Pittsburg							
Plumas-Sierra	45	24,827	327,973	44	18,916	268,823	$104,628
Port of Oakland	-	-	-	-	-	-	$12,984
Rancho Cucamonga	67	472,362	7,557,792	67	472,362	7,557,792	$74,933
Redding	661	3,918,970	40,214,520	548	3,205,967	32,413,691	$3,273,319
Riverside	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	$2,951,320
Roseville	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	$5,536,239
Sacramento	12,694	45,015,931	558,483,793	8,885	34,816,108	452,474,365	$24,930,574
San Francisco	84	611,954	9,179,310	84	611,954	9,179,310	$833,807
Shasta Lake	23	94,330	1,277,438	11	64,961	834,532	$152,637
Silicon Valley Power	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	$4,734,082
Trinity							
Truckee Donner	15	98,782	973,792	11	71,224	706,216	$258,070
Turlock	280	5,056,369	75,046,256	255	4,852,751	72,322,737	$1,232,039
Ukiah	14	77,407	959,250	10	59,381	727,978	$68,245
Vernon	544	3,038,998	38,249,660	544	3,038,998	38,249,660	$425,415
Victorville	-	-	-	-	-	-	$0
EE and Low Income Subtotal	**87,872**	**275,779,000**	**3,094,107,373**	**81,596**	**254,310,333**	**2,850,853,984**	**$158,527,378**

ALAMEDA MUNICIPAL POWER

Alameda at a Glance

- Climate Zone: 3
- Customers: 36,192
- Total annual retail sales: 333,933 MWh
- Annual Retail Revenue: $62,241,908
- Annual EE expenditures for reporting year: $1,023,586
- Gross annual savings from reporting year portfolio: 1,498 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 cap-and-trade and renewable energy credit (REC) funds to reduce greenhouse gas emissions in its service area.

Major Program and Portfolio Changes

AMP's FY 2021 EE savings included the continuation of a successful non-residential direct-install program, a residential online rebate portal and direct-install program for income-qualified residential customers. AMP also launched a Commercial Kitchen Equipment Rebate in FY 2021.

Program and Portfolio Highlights

AMP's non-residential direct-install program, Energy Plus, provided more than 60% of total savings. The program, which provides both lighting and refrigeration upgrades, is particularly attractive to small businesses that are eager to benefit from the energy savings, but do not have in-house expertise in energy-saving technologies and installations. The Energy Plus rebates can cover up to 90% of the upgrade cost for small businesses and 80% for all other non-residential customers.

Commercial, Industrial & Agricultural Programs

Energy Plus Program: The Energy Plus Program, which started in January 2016, is a non-residential direct-install lighting, refrigeration, heating, ventilation, and air conditioning (HVAC) program. In FY 2021, four customers participated in lighting and refrigeration upgrades with low co-pay amounts, due to AMP's rebates. This program was suspended during the final quarter of FY 2020 due to the COVID-19 pandemic, which affected the continuation of projects in the pipeline and decelerated the installation process of project implementation. 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 2021, six customers participated in lighting upgrades with low co-pay amounts, due to AMP's rebates. AMP maintains this program as a means of offering customers a do-it-yourself option for EE upgrades. This is a common pathway for chain retailers who are trying to manage incentivized upgrades across various locations. This program will remain open in FY 2022.

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 EE rebates for items such as solid doors for commercial refrigerators and freezers, glass doors for commercial refrigerator and freezers, commercial ice makers, and other EE commercial kitchen equipment. In FY 2021, there were no participants in the program. In FY 2022, AMP plans to supplement 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 FY 2021 AMP approved 195 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. In the beginning of FY 2022, AMP will launch a new rebate portal and an e-Commerce online marketplace. This will be a resource for customers to research, purchase, and compare energy efficient products for their homes or small businesses. In addition, the new marketplace will be offering downstream rebates for customers.

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 2021, the program served 140 customers. The program will remain open in FY 2022.

Complementary Programs

- EV Programs: AMP offers two incentive programs to encourage EV adoption. The first is in the form of an EV rate discount, which the utility has offered since 1998. In FY 2021, 138 customers signed up for the discount, bringing the total number of program participants to 1,036. The EV rate discount was discontinued at the end of FY 2021, in the beginning of FY 2022 an EV Time-of-Use (TOU) rate plan will be introduced to replace the EV rate discount. In February 2018, AMP launched its second incentive program in the form of rebates for purchasing level 2 chargers for residential and non-residential customers. During FY 2021, 113 residential customers and 15 non-residential customers had installed EV level 2 chargers. AMP also launched a new Used EV rebate program that incentivized customers to purchase a used EV. The rebate amount was for $1,000 and if income qualified the rebate amount was $1,500. In FY 2021, 50 customers participated in the Used EV program. For FY 2021, AMP also offered an additional cash back incentive for customers who participated in both the level 2 charger and used EV program. This was an additional $500 and $1,000 for income qualified customers.

- 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. In FY 2021, EASE, an emergency relief program, helped 181 households receive a total of $24,697.43 in electric-bill assistance. A maximum amount of $200 is available per household within a three-year period through the EASE program. EAP provides a 25% monthly discount on the participating customer's electric bill. A total of $164,138.36 was allocated to 1,074 Alameda households in FY 2021. These programs are funded through the public purpose component of AMP's energy charge.

- Renewable Energy Programs: Alameda Green, AMP's voluntary green power program, provides customers with the option to choose 100% renewable energy at an additional cost of $0.020 per kilo-watt hour (kWh). As of the end of FY 2021, there were 3,174 customers enrolled in Alameda Green. In September 2021, AMP earned two national rankings for green utility programs from the U.S. Department of Energy's National Renewable Energy Laboratory (NREL). AMP's Alameda Green program made NREL's "Top 10" lists for its high participation rate and green power sales rate.

- Research, Development, and Demonstration (RDD): AMP is developing a new Heat Pump HVAC rebate for residential and non-residential customers. Additionally, AMP plans to launch webinars for EV charging, EV ownership, and residential and non-residential electrification.

- Energy Storage: AMP does not have any onsite storage. AMP evaluated energy storage in 2017 pursuant to California Assembly Bill (AB) 2514. The evaluation concluded that while some costs of energy storage system have decreased, energy storage for the utility was not cost effective at this time. However, AMP continues to evaluate the potential for this technology.

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 FY 2019 was performed by the CADMUS Group. AMP plans to complete the next study in FY 2022 that will cover Energy Plus and EAP Plus for FY 2020 and FY 2021 with a projected $50,000 budget.

Major Differences or Diversions from California POU TRM for Energy Savings

With a goal of getting the most accurate energy savings, AMP staff used a variety of sources. For the residential lighting energy savings, AMP used historical AMP customer program data, buoyed by a high realization rate in the FY 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 EnergyStar® report.

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

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	3,124	34,364	0	968	10,653	3	$3,341	0.31	0.30	0.387
Commercial Refrigeration	23	133,856	2,007,840	22	127,163	1,907,448	690	$72,912	2.48	1.55	0.051
Lighting - Indoor	133	685,025	8,529,632	109	562,394	7,039,310	2,482	$276,598	2.40	1.81	0.050
Lighting - Outdoor	1	480,017	5,759,156	0	450,422	5,404,491	2,571	$253,725	2.50	1.74	0.059
Miscellaneous	0	7,138	114,208	0	4,283	68,525	22	$19,176	0.34	0.39	0.381
Service & Domestic Hot Water	0	30,080	300,800	0	18,048	180,480	80	$87,645	0.41	0.39	0.587
EE Subtotal	157	1,339,240	16,746,000	132	1,163,278	14,610,907	5,848	$713,397	2.13	1.59	0.062
Appliance & Plug Loads	20	33,198	234,324	12	21,246	148,084	58	$54,821	0.36	0.36	0.425
Building Envelope	0	91	1,822	0	26	510	0	$2,077	0.08	0.08	5.991
Lighting - Indoor	603	125,303	1,879,545	512	107,865	1,617,969	624	$252,773	0.69	0.69	0.209
Lighting - Outdoor	0	218	3,270	0	218	3,270	1	$486	0.72	0.72	0.198
Service & Domestic Hot Water	0	48	480	0	29	288	0	$33	0.86	0.86	0.137
Low-Income Subtotal	623	158,858	2,119,441	524	129,383	1,770,122	683	$310,189	0.63	0.63	0.231
EE and Low Income Subtotal	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080

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	156	1,287,818	16,131,925	131	1,130,607	14,211,485	5,689	$574,026	2.55	1.79	0.052
Residential	1	51,423	614,075	0	32,671	399,421	159	$139,371	0.42	0.41	0.446
EE Subtotal	157	1,339,240	16,746,000	132	1,163,278	14,610,907	5,848	$713,397	2.13	1.59	0.062
Residential	623	158,858	2,119,441	524	129,383	1,770,122	683	$310,189	0.63	0.63	0.231
Low-Income Subtotal	623	158,858	2,119,441	524	129,383	1,770,122	683	$310,189	0.63	0.63	0.231
EE and Low Income Subtotal	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080

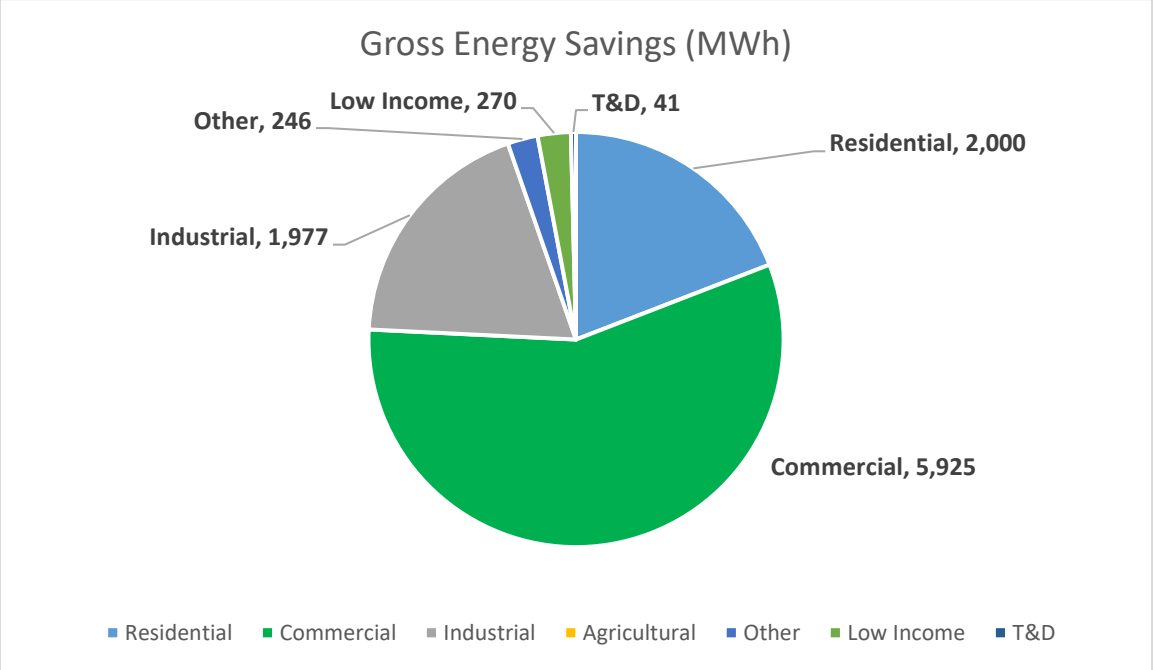
TABLE 3. AMP EE Program Results by Building Type

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	133	1,154,112	14,124,838	110	1,003,525	12,304,444	4,999	$501,319	2.56	1.83	0.052
Grocery	23	133,856	2,007,840	22	127,163	1,907,448	690	$72,912	2.48	1.55	0.051
Residential	0	51,272	613,322	0	32,590	399,015	159	$139,166	0.42	0.41	0.445
EE Subtotal	157	1,339,240	16,746,000	132	1,163,278	14,610,907	5,848	$713,397	2.13	1.59	0.062
All	0	12,320	61,600	0	8,624	43,120	18	$5,608	1.05	1.05	0.142
Residential	623	145,540	2,044,061	524	120,065	1,717,404	662	$278,189	0.67	0.67	0.215
Residential - Multi-Family	0	48	480	0	29	288	0	$33	0.86	0.86	0.137
Residential - Single-Family	0	950	13,300	0	665	9,310	3	$26,359	0.04	0.04	3.710
Low-Income Subtotal	623	158,858	2,119,441	524	129,383	1,770,122	683	$310,189	0.63	0.63	0.231
EE and Low Income Subtotal	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	779	1,498,098	18,865,441	656	1,292,660	16,381,028	6,531	$1,023,586	1.68	1.35	0.080

ANAHEIM PUBLIC UTILITIES

Anaheim at a Glance

- Climate Zone: 8
- Customers: 121,526
- Total annual retail sales: 2,652,150 MWh
- Annual Retail Revenue: $328,440,000
- Annual EE expenditures for reporting year: $2,506,424
- Gross annual savings from reporting year portfolio: 10,458 MWh



Anaheim Overview

Due to the global pandemic, Anaheim Public Utilities (APU) saw major shifts in programs, with many residential and commercial direct install (DI) programs placed on hold in order to develop new safety protocols to avoid person-to-person contact and an increased risk of transmission. APU's three most popular programs; the Small Business Direct Install Program, the Home Utility Checkup, and the Energy Savings Assistance Program (Weatherization) all paused before the end of FY 2020 in response to the state of emergency and began to reopen in FY 2021 with new safety protocols under the Center for Disease Control (CDC) guidelines that included social distancing, along with the use of face masks and gloves.

Major Program and Portfolio Changes

Due to the global pandemic, APU saw major shifts in programs, with many residential and commercial DI programs placed on hold in order to develop new safety protocols to avoid person-to-person contact and an increased risk of transmission. APU's three most popular

programs; the Small Business DI Program, the Home Utility Checkup, and the (Weatherization) programs all paused before the end of FY 2020 in response to the state of emergency and began to reopen in FY 2021 with new protocols. All programs reopened in FY 2021 under the CDC guidelines that include proper social distancing, wearing face masks and gloves.

Program and Portfolio Highlights

Although lower than in previous years, APU's Lighting Incentive Program still achieved over three million kWh savings in FY 2021 during the COVID-19 pandemic. Businesses are able to maximize the benefits of LED lighting technology with increased energy savings and reduced maintenance costs.

APU's Customized Energy Incentives Program provides customers the flexibility to target their greatest demand using on site equipment and incentives designed to specifically meet their needs. By documenting energy use before and after equipment upgrades at their facilities, APU customers can replace the greatest energy end users at their businesses through performance-based incentives. This can be a great alternative to selecting a one size fits all prescriptive menu of measures with pre-established incentives. Customers who need assistance in identifying their business's highest energy use can also reach out to APU for a comprehensive energy assessment or design review. Commercial customers who participated in the Customized EE Incentives Program saved upwards of 1.24 million kWh in energy savings through process efficiency improvements this fiscal year.

APU introduced the COVID-19 Emergency Assistance Program in June 2020 to help customers impacted by the pandemic with bill pay assistance, and the program continued to operate through FY 2021. This program offers $250 and $100 towards their electric and water portions of their bill, respectively. Although APU was not administering shut-offs during the pandemic, we encouraged customers that may need financial help to participate to reduce their balances. During the pandemic, APU also transitioned current in-classroom education program offerings to virtual distance learning labs for teachers and students and is currently phasing in in-person program offerings. Additionally, APU continues to operate a Sustainable Schools award in which schools apply for an award for their sustainable practices for an opportunity to win 30 EnergyStar® laptops for their students to use at school or up to two water bottle filling stations.

Commercial, Industrial & Agricultural Programs

- Comprehensive Energy Assessments: Customized on-site audits and recommendations designed to improve energy operating efficiency and help customers reduce costs.
- Customized Energy Incentives Program: Customized financial incentives for installation of high-efficiency air conditioning, motor controls and other production related equipment.
- Heat Pump Incentives Program: Encourage installation of high-efficiency heat pumps.
- Lighting Incentives: Provides incentives to improve EE for a variety of LED lighting applications.
- New Construction: Customers receive design assistance and incentives for new construction and facility expansions that install energy-efficient equipment that exceed Title 24.

- Operations Program: Produces energy savings by taking large transformers offline that are not serving customers' loads.
- Small Business Energy Direct Install Program: Provides small business customers with energy use evaluations, retrofit funding and installation assistance; focusing on LED lighting upgrades, smart thermostats, air conditioning and refrigeration tune-ups.
- Small/Medium Business Audits: Customized on-site audits and recommendations designed to improve operating EE and help small business customers reduce costs.
- EnergyStar® Air Purifier Rebate: a new program for FY 2021, which provides prescribed rebates for the use of EnergyStar® Air Purifiers.
- EnergyStar® Uninterruptible Power Supply Rebate: A prescribed rebate for EnergyStar® Uninterruptible Power Supplies in response to potential outages that will assist companies in preserving computer productivity.

Residential Programs

- Dusk-to-Dawn Lighting: Residents can receive outdoor LED security lights for existing installation (income-qualified) at no cost.
- 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 conservation audits.
- Holiday Lights Exchange: Provides LED holiday lights to residents who turn in old incandescent holiday lights.
- Home Incentives: Rebates for purchase and installation of high efficiency ENERGY STAR® certified appliances and high-efficiency conservation measures. This program includes appliance and battery storage rebates, air purifier rebates, and AC-Tune ups.
- Home Utility Check-Up Audits: A customized in-home energy and water use audit.
- Home Utility Check-Up Equipment and LED Direct Install: Customers receive free installation of up to five LED's and water saving devices during the Home Utility Check-Up audit.
- Refrigerator Recycling Program: Provides a rebate to customers who recycle an old operational refrigerator or freezer.
- TreePower: Provides complimentary shade trees and other incentives for residential and commercial customers. Shade trees when properly placed can help reduce air conditioning costs.
- Weatherization Program: Inter-Utility partnership with Southern California Gas Company (SoCal Gas). The income-qualified direct installation program provides plug load occupancy sensors, up to 10 LED bulbs, duct sealing, refrigerant charge testing and EnergyStar® certified room air conditioners. Program includes thermal and water saving measures as well.
- Welcome Kit LED Distribution: Distribution of four 8.5 watt 800 lumen bulbs to new utility customers.

Complementary Programs

- Multi-Family and Affordable Housing New Construction/Retrofit Program: Incentives for developers who install high efficiency energy and water measures in their developments for affordable housing projects located throughout the community.

- Commercial & Residential Water Savings Resulting from Equipment Rebates: Businesses and residents are eligible for rebates by installing or retrofitting with qualifying water-saving devices through the "SoCal Water$mart" Program in partnership with Metropolitan Water District. Water savings result from the application of measures such as:
    - Rotating Nozzle Rebates
    - Smart Timer Rebates
    - Home Utility Checkup direct installs of water saving devices
- Transmission & Distribution (T&D): Increased efficiencies by upgrading electric infrastructure.
- LED Street lighting retrofits, Anaheim is currently in the process of converting its city streetlights to LED lights resulting in over 12 million kWh saved a year

EM&V Studies

As part of the Southern California Public Power Authority (SCPPA) APU participated in a refrigeration EM&V Study

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**	**Utility ($/kWh)**
All	513	1,946,719	32,007,157	513	1,946,719	32,007,157	10,702	$880,117	3.38	8.16	0.039
Appliance & Plug Loads	62	396,853	2,635,416	62	396,853	2,635,416	1,050	$97,885	3.29	3.29	0.043
Building Envelope	64	37,335	745,400	64	37,335	745,400	366	$78,332	2.18	2.18	0.155
HVAC - Cooling	128	292,829	4,449,241	128	292,829	4,449,241	1,833	$648,954	1.59	3.25	0.199
HVAC - Heat Pump	45	14,516	159,677	45	14,516	159,677	53	$123	142.57	142.57	0.001
Lighting - Indoor	178,306	4,494,061	53,840,137	178,306	4,494,061	53,840,137	19,166	$285,594	18.77	52.69	0.007
Lighting - Outdoor	0	878,013	15,537,730	0	878,013	15,537,730	7,372	$82,067	19.28	27.99	0.008
Miscellaneous	184	1,841,420	5,711,538	184	1,841,420	5,711,538	2,166	$82,992	7.13	16.12	0.015
Water Pumping / Irrigation	0	245,974	2,213,766	0	245,974	2,213,766	785	$1,545	142.57	142.57	0.001
EE Subtotal	179,303	10,147,720	117,300,063	179,303	10,147,720	117,300,063	43,492	$2,157,609	5.69	11.63	0.024
Appliance & Plug Loads	0	18,630	204,930	0	18,630	204,930	94	$12,441	2.11	12.56	0.075
HVAC - Cooling	162	182,952	1,510,831	162	182,952	1,510,831	651	$273,586	1.41	12.56	0.215
Lighting - Outdoor	0	1,505	22,575	0	1,505	22,575	9	$2,636	0.90	6.96	0.156
Miscellaneous	8	66,652	924,513	8	66,652	924,513	349	$60,061	1.55	12.56	0.085
Low-Income Subtotal	171	269,740	2,662,849	171	269,740	2,662,849	1,103	$348,725	1.46	12.51	0.161
EE and Low Income Subtotal	179,473	10,417,460	119,962,912	179,473	10,417,460	119,962,912	44,594	$2,506,333	5.10	11.66	0.027
Transmission & Distribution	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
T&D Subtotal	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
C&S, T&D and Electrification Subtotal	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
Utility Total	179,473	10,458,460	120,085,912	179,473	10,458,460	120,085,912	44,641	$2,506,424	5.10	11.67	0.027

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	1,114	5,924,691	73,425,915	1,114	5,924,691	73,425,915	25,211	$950,124	7.39	16.19	0.017
Industrial	155	1,976,779	16,415,584	155	1,976,779	16,415,584	7,403	$11,768	142.57	142.57	0.001
Other	0	245,974	2,213,766	0	245,974	2,213,766	785	$1,545	142.57	142.57	0.001
Residential	178,034	2,000,276	25,244,798	178,034	2,000,276	25,244,798	10,093	$1,194,173	2.80	5.51	0.062
EE Subtotal	179,303	10,147,720	117,300,063	179,303	10,147,720	117,300,063	43,492	$2,157,609	5.69	11.63	0.024
Residential	171	269,740	2,662,849	171	269,740	2,662,849	1,103	$348,725	1.46	12.51	0.161
Low-Income Subtotal	171	269,740	2,662,849	171	269,740	2,662,849	1,103	$348,725	1.46	12.51	0.161
EE and Low Income Subtotal	179,473	10,417,460	119,962,912	179,473	10,417,460	119,962,912	44,594	$2,506,333	5.10	11.66	0.027
Industrial	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
T&D Subtotal	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
C&S, T&D and Electrification Subtotal	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
Utility Total	179,473	10,458,460	120,085,912	179,473	10,458,460	120,085,912	44,641	$2,506,424	5.10	11.67	0.027

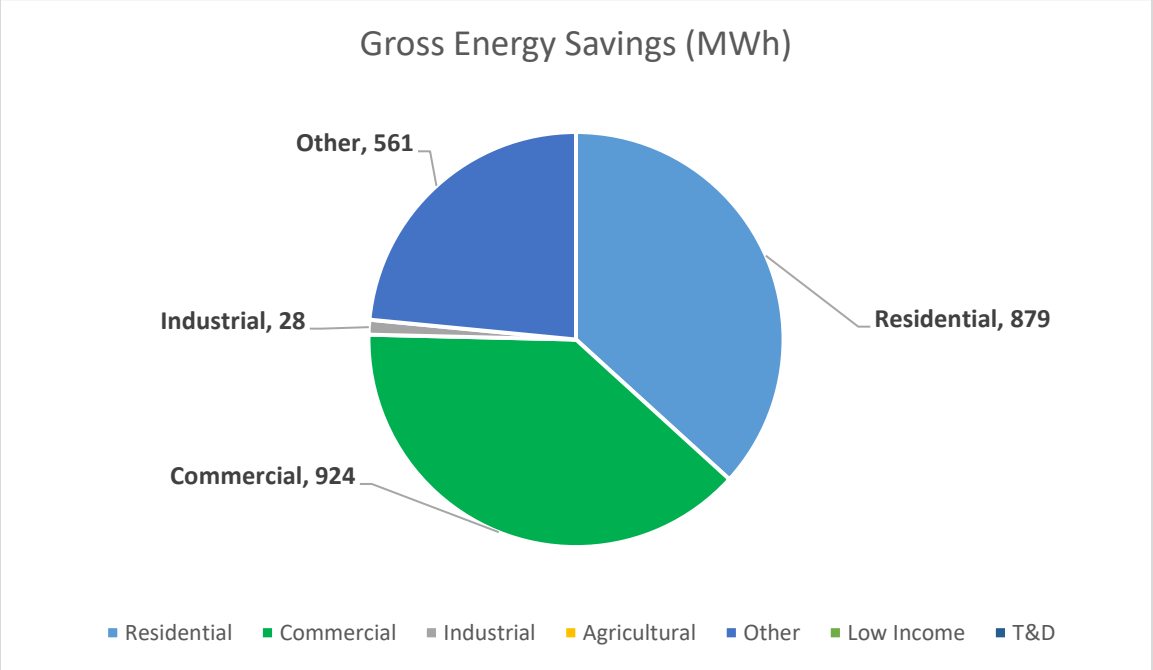
TABLE 3. APU Program Results by Building Type

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	1,269	7,804,116	90,854,135	1,269	7,804,116	90,854,135	32,955	$961,629	9.16	19.77	0.014
Other Commercial	0	337,208	1,179,766	0	337,208	1,179,766	435	$804	142.57	142.57	0.001
Residential	178,028	1,955,044	24,496,136	178,028	1,955,044	24,496,136	9,795	$1,131,361	2.89	5.93	0.061
Residential - Multi-Family	6	51,144	767,159	6	51,144	767,159	301	$63,309	1.27	1.40	0.110
Residential - Single-Family	0	208	2,868	0	208	2,868	5	$505	2.18	2.18	0.236
EE Subtotal	179,303	10,147,720	117,300,063	179,303	10,147,720	117,300,063	43,492	$2,157,609	5.69	11.63	0.024
Residential	102	194,240	1,907,849	102	194,240	1,907,849	782	$196,397	1.64	12.48	0.128
Residential - Multi-Family	69	75,500	755,000	69	75,500	755,000	320	$152,327	1.22	12.56	0.244
Low-Income Subtotal	171	269,740	2,662,849	171	269,740	2,662,849	1,103	$348,725	1.46	12.51	0.161
EE and Low Income Subtotal	179,473	10,417,460	119,962,912	179,473	10,417,460	119,962,912	44,594	$2,506,333	5.10	11.66	0.027
Other Industrial	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
T&D Subtotal	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
C&S, T&D and Electrification Subtotal	0	41,000	123,000	0	41,000	123,000	47	$91	142.57	142.57	0.001
Utility Total	179,473	10,458,460	120,085,912	179,473	10,458,460	120,085,912	44,641	$2,506,424	5.10	11.67	0.027

AZUSA LIGHT & WATER

Azusa at a Glance

- Climate Zone: 9
- Customers: 17,013
- Total annual retail sales: 241,467 MWh
- Annual Retail Revenue: $35,337,972
- Annual EE expenditures for reporting year: $1,349,209
- Gross annual savings from reporting year portfolio: 2,392 MWh



Azusa Overview

Since inception of the EE programs, Azusa Light & Water (ALW) has expended over $15 million toward providing energy conservation information to the Azusa community and rewarding businesses and residents for upgrading inefficient energy consuming equipment with more EE 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-19 pandemic began reducing the amount of participation in the residential rebate programs and business related EE measure implementation. In addition, there were fewer Azusa Pacific University students residing in Azusa, resulting in hundreds less 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 cases 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 CFL 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

- Public Facilities Program is essentially the same as the current commercial and industrial 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: Azusa Light & Water has, jointly with the SCPPA, is an active member of the American Public Power Association (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.[29] ALW 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, ALW uses a combination of figures from TRM, Energy and Environmental Economics (E3), utility work papers and custom savings analysis along with vendor calculations when applicable.

[29] http://www.ci.azusa.ca.us/DocumentCenter/View/26058

TABLE 1. ALW 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	17	36,628	659,304	14	29,302	527,443	198	$13,770	4.35	11.18	0.037
Building Envelope	423	727,652	10,899,761	422	726,413	10,862,579	3,577	$1,047,890	1.04	16.92	0.129
Miscellaneous	98	1,065,951	10,953,566	98	1,001,157	10,759,183	4,011	$255,101	4.25	17.34	0.030
Water Pumping / Irrigation	64	561,351	1,684,053	64	561,351	1,684,053	689	$9,500	18.38	18.38	0.006
EE Subtotal	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
EE and Low Income Subtotal	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
All	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
Codes & Standards Subtotal	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
C&S, T&D and Electrification Subtotal	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
Utility Total	695	2,821,055	28,491,414	690	2,747,696	28,127,988	9,977	$1,349,209	2.10	17.18	0.061

TABLE 2. ALW 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	493	923,510	12,596,641	493	923,510	12,596,641	4,174	$1,179,634	1.06	18.38	0.123
Industrial	9	27,552	413,280	9	27,552	413,280	146	$21,983	1.76	18.38	0.071
Other	64	561,351	1,684,053	64	561,351	1,684,053	689	$9,500	18.38	18.38	0.006
Residential	37	879,169	9,502,710	32	805,810	9,139,284	3,465	$115,145	8.27	15.21	0.017
EE Subtotal	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
EE and Low Income Subtotal	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
Other	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
Codes & Standards Subtotal	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
C&S, T&D and Electrification Subtotal	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
Utility Total	695	2,821,055	28,491,414	690	2,747,696	28,127,988	9,977	$1,349,209	2.10	17.18	0.061

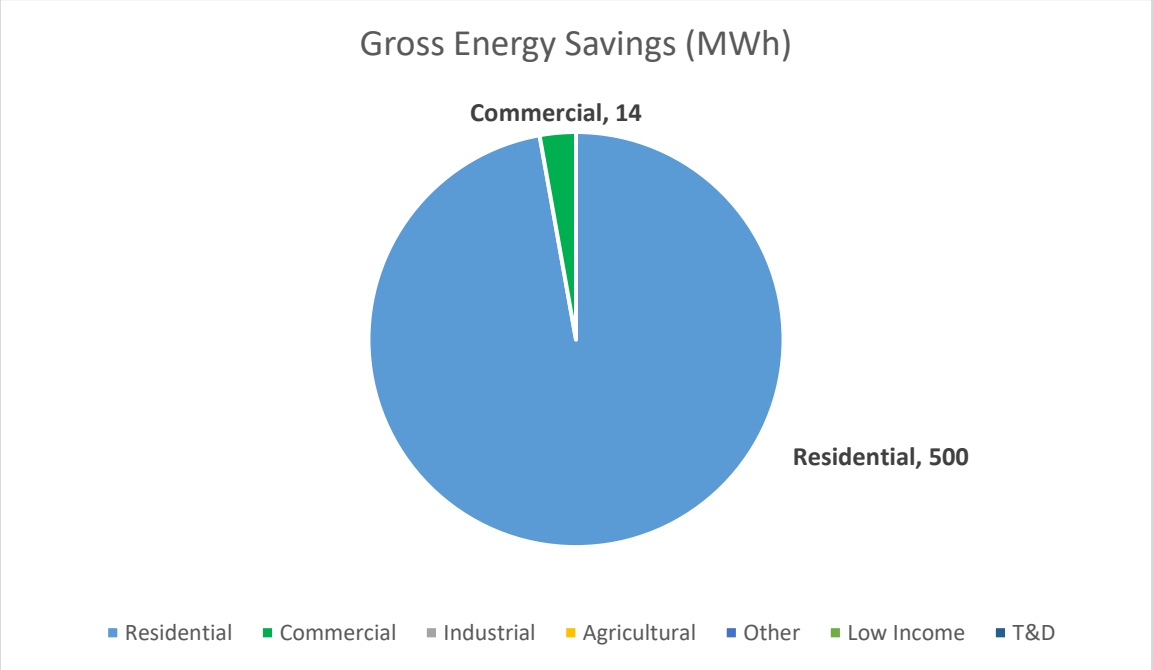
TABLE 3. ALW EE Program Results by Building Type

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	467	833,327	11,351,870	467	833,327	11,351,870	3,765	$1,046,383	1.07	18.38	0.121
Other Agricultural	64	561,351	1,684,053	64	561,351	1,684,053	689	$9,500	18.38	18.38	0.006
Other Commercial	26	90,183	1,244,771	26	90,183	1,244,771	409	$133,251	0.94	18.38	0.140
Other Industrial	9	27,552	413,280	9	27,552	413,280	146	$21,983	1.76	18.38	0.071
Residential	37	879,169	9,502,710	32	805,810	9,139,284	3,465	$115,145	8.27	15.21	0.017
EE Subtotal	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
EE and Low Income Subtotal	603	2,391,582	24,196,684	598	2,318,223	23,833,258	8,475	$1,326,261	1.82	16.98	0.072
All	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
Codes & Standards Subtotal	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
C&S, T&D and Electrification Subtotal	92	429,473	4,294,730	92	429,473	4,294,730	1,501	$22,948	18.38	18.38	0.006
Utility Total	695	2,821,055	28,491,414	690	2,747,696	28,127,988	9,977	$1,349,209	2.10	17.18	0.061

BANNING ELECTRIC UTILITY

Banning at a Glance

- Climate Zone: 15
- Customers: 12,527
- Total annual retail sales: 139,802 MWh
- Annual Retail Revenue: $26,014,596
- Annual EE expenditures for reporting year: $160,431
- Gross annual savings from reporting year portfolio: 515 MWh



Banning Overview

During FY 2021, Banning spent $123,235 on EE programs, which have provided 528,146 kWh energy savings. It should be noted that the City of Banning is deemed an economically disadvantaged area with a significant portion of its population comprised of either low income residents or senior citizens living on fixed incomes. Due to the economic demographics of Banning's population, a significant portion of Public Benefits dollars are utilized to provide low-income assistance through a monthly utility bill credit.

The new master-planned community Atwell broke ground during FY 2021. Approximately 200 homes were built in this timeframe, each with 2.8 kilowatt (kW) of roof-top solar and adherence to 2019 Title 24 Construction Standards. The development of this new community on the west side of Banning 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 2021 was to increase participation in the residential air conditioner rebate with the focus on 18.0 Seasonal EE Ratio (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 increase awareness and overall participation of the Business EE Funds, or BEEF program. Unfortunately, with the Covid pandemic participation in the BEEF program was almost low, and overall residential and commercial program participation decreased. Banning adopted 2019 Title 24 Construction Standards.

During the pandemic in FY 2021, 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, affordable, and 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, the opportunity 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.

Banning Electric Utility was proud to partner with the Arbor Day Foundation for an Energy-Saving Tree Event in Spring of 2021. This was our first collaboration and a huge success. Customers accessed the Arbor Day Foundation website and reserved up to two trees per household in a Banning Electric portal. As a trial, 200 hundred trees were purchased for the event. Two days were scheduled for customers to pick up their reserved trees with planting and care instructions given to ensure successful growth of the trees. We hope this will continue to be an annual event for years to come.

Banning Electric Utility was also instrumental in the development of first pallet-home community for the homeless. Titled Ramsey Village, this small community for the homeless consists of portable, energy-efficient, two-person bungalows with heat, air conditioning, and wall-mounted, fold-up beds.

Program and Portfolio Highlights

Renewable Portfolio Standard (RPS). In 2020, the City of Banning's energy portfolio was 54% renewable.

Solar Energy. Banning has met its California Senate Bill (SB) 1 requirements by providing $2.4 million in rebates for the installation of solar photovoltaic systems in its service territory. The

rebates have helped install approximately 0.75 MW of customer-owned solar photovoltaic (PV) capacity in the city. Banning met the net energy metering (NEM) cap of 2.3 MW in 2018.

Commercial, Industrial & Agricultural Programs

Business EE Fund: Complementary Energy Audit coupled with monetary incentives for commercial customers to install EE upgrades and retrofits such as lighting, refrigeration, motors, AC tune-ups, etc.

• Commercial Programs: Monetary incentives for commercial customers to install more energy efficient equipment such as lighting, signage, and refrigeration. Customized rebate programs have also been adopted when business-specific EE 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

• Air Conditioner: Monetary incentives to replace an existing central air conditioning unit with a new high-efficiency unit.
• Air Conditioner Tune Ups: Monetary incentives for getting air conditioning units tuned up.
• EnergyStar® Appliances: Monetary incentives for purchasing products that meet the Energy Star® criteria.
• EnergyStar® Refrigerator: A monetary incentive for replacing an old inefficient refrigerator with a new energy efficient unit.
• Recycle: Rebates offered to remove and recycle operating old and inefficient refrigerators and freezers.
• Energy Weatherization: Monetary incentives to replace inefficient materials with products that will improve the 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 occurring during FY 2021, 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.

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. Banning Electric Utility will continue with its EM&V programs and practices.

Major Differences or Diversions from California POU TRM for Energy Savings

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	1	6,594	53,563	1	6,029	48,526	20	$2,246	2.77	3.09	0.056
Building Envelope	16	27,811	556,210	12	20,826	416,519	172	$9,925	8.68	8.58	0.035
HVAC - Cooling	33,718	436,107	8,516,469	33,717	433,030	8,482,258	3,389	$138,733	12.58	16.86	0.024
Lighting - Indoor	605	41,654	566,914	1	14,677	220,158	86	$9,478	2.38	0.63	0.058
Lighting - Outdoor	21	2,800	28,000	11	1,512	15,120	6	$50	31.81	0.31	0.004
EE Subtotal	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
EE and Low Income Subtotal	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025

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	603	14,474	159,214	0	0	0	0	$4,420			0.000
Residential	33,758	500,492	9,561,942	33,742	476,074	9,182,580	3,674	$156,011	11.94	12.23	0.025
EE Subtotal	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
EE and Low Income Subtotal	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025

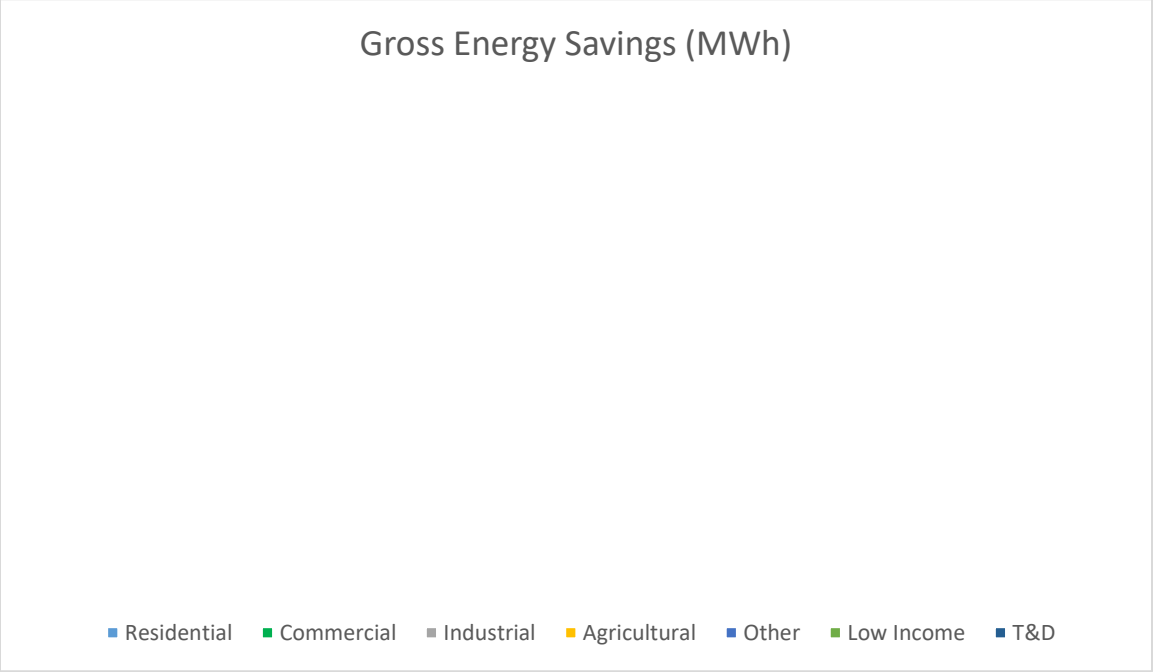
TABLE 3. Banning EE Program Results by Building Type

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	607	22,877	202,659	4	7,320	37,957	17	$6,989	1.00	1.05	0.202
Residential	51	85,595	1,403,666	35	62,599	1,033,459	420	$100,083	1.91	2.23	0.134
Residential - Single-Family	33,703	406,494	8,114,831	33,703	406,156	8,111,164	3,237	$53,359	31.18	25.93	0.010
EE Subtotal	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
EE and Low Income Subtotal	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	34,361	514,966	9,721,156	33,742	476,074	9,182,580	3,674	$160,431	11.61	11.89	0.025

BIGGS

Biggs at a Glance

- Climate Zone: 11
- Customers: 724
- Total annual retail sales: 16,464 MWh
- Annual Retail Revenue: $2,187,299
- Annual EE expenditures for reporting year: $12,782
- Gross annual savings from reporting year portfolio: 0 MWh



Biggs Overview

The City of Biggs is primarily a residential city with one large industrial custom. A significant portion of the City's population is either low-income or senior citizens living on fixed incomes. The City experienced a 1% load increase in FY 2021. This increased load occurred in the residential sector and Commercial sector with increases of 7% and 2% respectively. The industrial sector load decreased by 2%.

Customer focus continued to be on solar PV with little interest in EE measures. Our large industrial customer had a change of management in 2021, so we have again engaged with them to build a custom program of efficiency measures and rebates for future implementation.

Major Program and Portfolio Changes

There have been no major changes in programs offered.

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 Residential Weatherization Inc. (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. Complimentary on-site energy audits are performed by our partner, Efficiency Services Group, to resolve high usage complaints.

Evaluation, Measurement & Verification Studies

In 2007, in response to AB 2021, Biggs hired a third-party contractor to formulate an EM&V plan. In 2008, 2009 and 2010, Biggs contracted with Navigant Consulting to perform EE Program Evaluation studies of all programs the city offers. Those studies can be found on the NCPA website and our city website. With the understanding that all programs need not be evaluated every year, Biggs moved to evaluation of all programs in three year blocks. Biggs is currently working to find a consultant to perform multiple years' worth of EM&V reports and have budgeted $20,000 toward fulfilling our EM&V requirement.

Major Differences or Diversions from California POU TRM for Energy Savings

None.

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

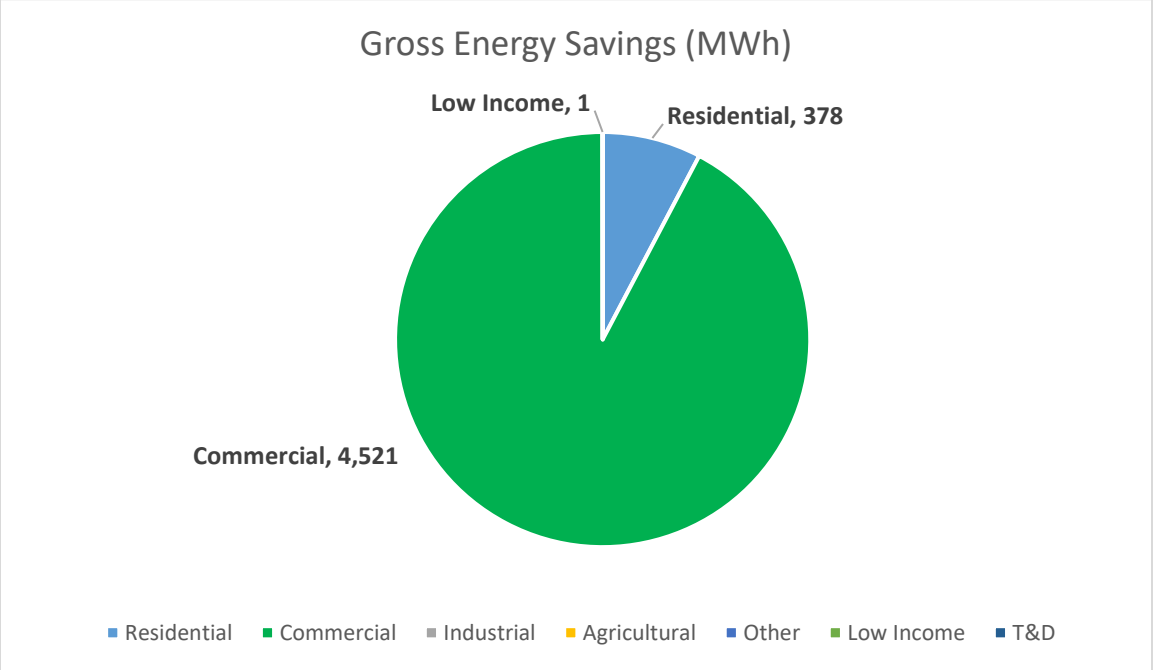
TABLE 3. Biggs EE Program Results by Building Type

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 at a Glance

- Climate Zone: 9
- Customers: 53,097
- Total annual retail sales: 962,319 MWh
- Annual Retail Revenue: $149,846,000
- Annual EE expenditures for reporting year: $2,306,130
- Gross annual savings from reporting year portfolio: 4,899 MWh



Burbank Overview

Burbank is known as the "Media Capital of the World." We are home to The Walt Disney Company, Warner Bros Studios, The Burbank Studios, Nickelodeon, Cartoon Network, ABC Studios, Netflix, and KCET. Numerous small media businesses also support these significant studios in our city by providing sound stages for music artists and a wide variety of other key services, from post-production to wardrobe and make-up, all of which are essential to the industry. 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 a housing mix of about 21,750 single-family homes that range from post-war bungalows to two-story homes. There are also about 22,500 multi-family homes, a figure that continues to increase with infill and high-density development.

Burbank Water & Power (BWP) provides essential utility services to its residential and business customers. 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 Integrated Resource Plan (IRP) in December 2018, which directs BWP to reduce greenhouse gas (GHG) emissions by beneficial electrification and renewable energy integration.

BWP plays a key role in facilitating the adoption of Transportation Electrification (TE) through education and programs development that help customers overcome barriers to TE adoption. In FY 2021 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, with plans to install hundreds more throughout the City of Burbank.

BWP also implements the Green Choice Program, which allows residential customers to offset 100% 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 beginning in March 2020. Changes in state and local COVID-19 orders allowed services to be performed again for EE requiring home or onsite visits. As a result, energy savings resulting from residential and commercial programs remained lower than expected in FY 2021. Suspended programs started resuming in June of 2021.

Due to the economic impact of the COVID-19 pandemic, BWP customers have accrued significant utility outstanding balances. In FY 2021, BWP focused on assisting customers and reducing economic impacts by developing and implementing the COVID-19 Job Loss Bill Credit Program and the Low-Income Residential Assistance Program in response to the pandemic.
Although there were lower than planned participation in efficiency programs, BWP played a role in helping residential customers afford essential electric service and ensure programs that did not require onsite visits to continue to operate.

Program and Portfolio Highlights

BWP manages a comprehensive portfolio of efficiency programs for residential and commercial customers focusing on energy efficiency, peak load reduction, and greenhouse gas savings.
The AC Replace Before It Breaks Program serves BWP's residential customers by offering incentives for replacing older operating HVAC systems with high-efficiency systems to support residential air conditioning demand reduction. BWP introduced the program in 2021, serving 95 customers in FY 2021.

The program offers a diagnostic test on the existing HVAC unit to determine the EE ratio and eligibility for early replacement. The program is facilitated by a program qualified HVAC contractor, who replaces the existing HVAC system with a new efficient HVAC system. After that, the program offers testing for a quality installation to confirm the system is operating at the manufacturer's maximum efficiency rating.

Commercial, Industrial & Agricultural Programs

Expenditures for commercial, industrial, and institutional programs were $463,976, with the delivery of 1.14 MW of peak-load reduction and 4,521 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.
- Upstream HVAC Program: The program provides rebates to the wholesale distributors to encourage stocking and promotion of high-efficiency HVAC equipment.
- LED Street Lighting Project: The program is designed to retrofit the City of Burbank's inefficient High-Pressure Sodium (HPS) streetlight systems with energy-efficient LEDs.

BWP offers two programs that fall into both residential and commercial categories, including:

- 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.

Residential Programs

Expenditures for residential programs were $234,151, with the delivery of 0.107 MW of peak-load reduction and 377 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.
- LED Distribution Program: BWP distributes LED light bulbs to residents at numerous events throughout the community, as well as through energy programs and surveys.
- 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 help them better understand their energy use and reduce their electricity consumption.

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.
- COVID-19 Job Loss Bill Credit Program: BWP offered financial assistance to customers who became unemployed due to the Covid-19 pandemic. Customers approved for the program received direct financial assistance in either $200 for residents of multi-unit dwellings or $300 for residents of single-family residences. In addition to this assistance, customers with outstanding balances were placed on payment arrangements to bring them current as a condition of participating in the program. In FY 2021, approximately 3,000 customers have received financial assistance through the program.
- Charging Station Rebates: Residential and commercial customers who install a Level 2 (240V) EV charger are eligible for a rebate from BWP. Residential customers can get a reimbursement for up to $500 per charging station for their home, and commercial customers can get a rebate for up to $2,000 per charging station for their business.
- Used EV Rebates: The program offers residential customers a $1,000 rebate towards a pre-owned 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.

Evaluation, Measurement & Verification 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.

Sources of Energy Savings

Most energy savings values used to evaluate BWP's program performance were obtained from the TRM developed for California's POUs by a third-party firm, Energy & Resource Solutions (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)**
Appliance & Plug Loads	3	76,384	861,784	3	76,384	861,784	327	$59,899	1.70	1.45	0.087
Building Envelope	70	200,721	2,418,541	70	200,721	2,418,541	882	$101,156	3.79	1.83	0.054
HVAC - Cooling	269	461,927	7,089,224	269	461,927	7,089,224	2,506	$473,709	2.19	1.57	0.093
Lighting - Indoor	787	3,406,915	37,476,149	787	3,406,915	37,476,149	12,727	$1,084,872	3.37	1.48	0.036
Lighting - Outdoor	84	365,818	4,389,816	84	365,818	4,389,816	2,118	$135,900	3.33	3.19	0.039
Miscellaneous	16	301,847	3,790,521	16	301,847	3,790,521	1,335	$131,478	2.80	0.51	0.045
Whole Building	16	85,127	851,270	16	85,127	851,270	310	$44,293	1.99	1.27	0.063
EE Subtotal	1,244	4,898,739	56,877,305	1,244	4,898,739	56,877,305	20,205	$2,031,308	3.00	1.40	0.045
Appliance & Plug Loads	0	616	3,080	0	616	3,080	1	$835	0.46	0.45	0.296
Low-Income Subtotal	0	616	3,080	0	616	3,080	1	$835	0.46	0.45	0.296
EE and Low Income Subtotal	1,244	4,899,355	56,880,385	1,244	4,899,355	56,880,385	20,206	$2,032,144	2.99	1.40	0.045
Codes & Standards	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
Codes & Standards Subtotal	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
C&S, T&D and Electrification Subtotal	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
Utility Total	1,665	6,863,353	66,700,375	1,665	6,863,353	66,700,375	24,307	$2,306,130	3.18	1.59	0.043

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	1,137	4,521,150	51,869,773	1,137	4,521,150	51,869,773	18,201	$1,582,889	3.23	1.32	0.038
Residential	107	377,589	5,007,532	107	377,589	5,007,532	2,005	$448,419	2.18	2.07	0.123
EE Subtotal	1,244	4,898,739	56,877,305	1,244	4,898,739	56,877,305	20,205	$2,031,308	3.00	1.40	0.045
Residential	0	616	3,080	0	616	3,080	1	$835	0.46	0.45	0.296
Low-Income Subtotal	0	616	3,080	0	616	3,080	1	$835	0.46	0.45	0.296
EE and Low Income Subtotal	1,244	4,899,355	56,880,385	1,244	4,899,355	56,880,385	20,206	$2,032,144	2.99	1.40	0.045
Other	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
Codes & Standards Subtotal	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
C&S, T&D and Electrification Subtotal	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
Utility Total	1,665	6,863,353	66,700,375	1,665	6,863,353	66,700,375	24,307	$2,306,130	3.18	1.59	0.043

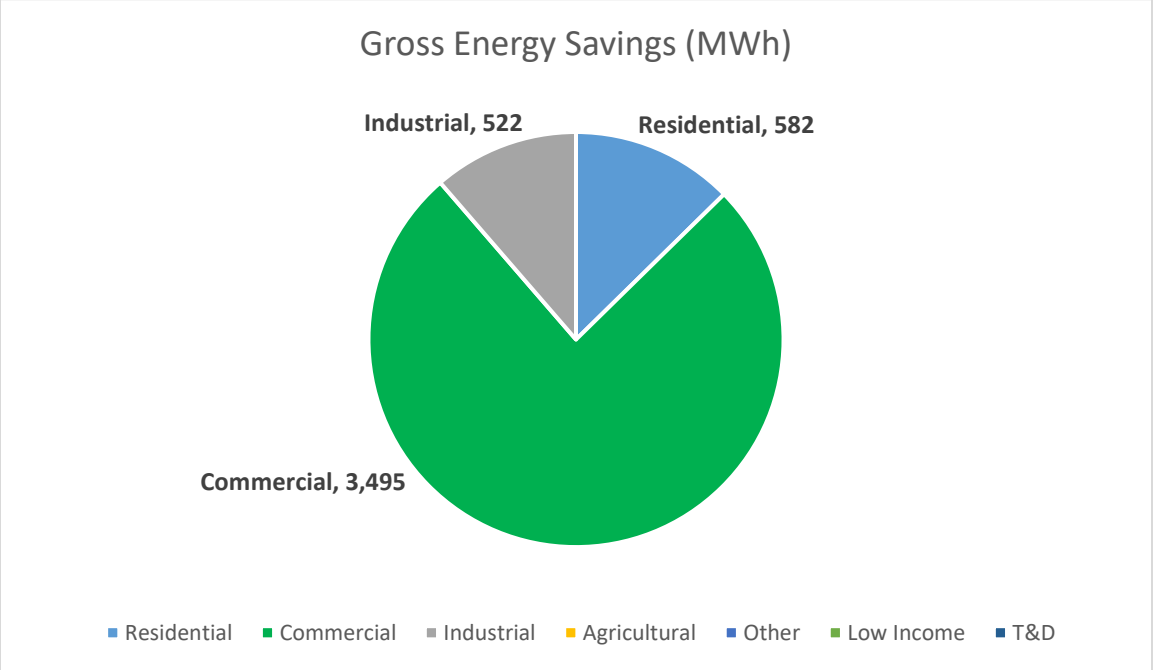
TABLE 3. BWP EE Program Results by Building Type

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	1,099	4,276,435	49,422,623	1,099	4,276,435	49,422,623	17,343	$1,491,625	3.25	1.33	0.038
Office - Large	23	159,588	1,595,880	23	159,588	1,595,880	548	$46,971	3.79	1.14	0.036
Other Commercial	16	85,127	851,270	16	85,127	851,270	310	$44,293	1.99	1.27	0.063
Residential	107	377,589	5,007,532	107	377,589	5,007,532	2,005	$448,419	2.18	2.07	0.123
EE Subtotal	1,244	4,898,739	56,877,305	1,244	4,898,739	56,877,305	20,205	$2,031,308	3.00	1.40	0.045
Residential	0	616	3,080	0	616	3,080	1	$835	0.46	0.45	0.296
Low-Income Subtotal	0	616	3,080	0	616	3,080	1	$835	0.46	0.45	0.296
EE and Low Income Subtotal	1,244	4,899,355	56,880,385	1,244	4,899,355	56,880,385	20,206	$2,032,144	2.99	1.40	0.045
All	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
Codes & Standards Subtotal	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
C&S, T&D and Electrification Subtotal	421	1,963,998	9,819,990	421	1,963,998	9,819,990	4,100	$273,987	4.56	4.56	0.030
Utility Total	1,665	6,863,353	66,700,375	1,665	6,863,353	66,700,375	24,307	$2,306,130	3.18	1.59	0.043

COLTON ELECTRIC DEPARTMENT

Colton at a Glance

- Climate Zone: 10
- Customers: 20,208
- Total annual retail sales: 351,541 MWh
- Annual Retail Revenue: $57,694,217
- Annual EE expenditures for reporting year: $351,558
- Gross annual savings from reporting year portfolio: 4,599 MWh



Colton Overview

Colton Electric Department (CED) continues to be committed to provide cost-effective EE and conservation programs for residents and businesses in the Colton Electric Service territory during this continued COVID-19 pandemic. CED 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. CED continues to focus on EE rebates, direct installation programs, inter-utility partnerships with SoCal Gas Company, programs to better serve the low income, and education and outreach.

Major Program and Portfolio Changes

The previous reporting year, the Energy Services Division began preparing 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 energy efficiency. As a result of this CED was prepared for the continued world pandemic of COVID-19. Having already launched an online

audit platform, the Energy Services Division continued its focus on marketing rebates for EE that continues to be available via electronic format. With so many students and families off and on in quarantine EE continues to be a priority to reduce energy consumption.
With a continued pandemic the Energy Services Division sought out other ways to increase kWh savings and included water savings from well upgrades and water conservation efforts. CED used 2013 as the baseline for these savings and included the 2021 savings in the report.

Program and Portfolio Highlights

As the World Wide Pandemic continues the Energy Services Division sunset the COVID-19 Assistance Program when State funds for assistance was distributed through 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.
CED 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 direct install of EE measures up to $5,000 per business.
- The Commercial/Industrial Energy Rebate Program provides rebates to commercial/industrial 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: Commercial and industrial 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: Shamir Advanced Technological Engineering Company (SATEC) is an online energy review CED used to provide its TOU customers their interval data. Since this platform did not provide customer-interfacing access, Colton will be retiring 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 direct install opportunities depending on audit recommendations. CED is offering $1,000 of direct install measured recommendations. This is a program to assist small businesses who are concerned with their energy consumption and want to learn how they can minimize their usage, shift their load, and save on energy costs.

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

Residential Programs

EE Upgrade Rebates: CED offers varying rebates on a number of home EE improvements. Currently CED offers rebates on: Occupancy sensors, EnergyStar® ceiling fans, box fans, pool pumps, solar attic fans, whole house fans, room ACs, evaporative coolers, solar tube lights, EnergyStar® clothes washer, EnergyStar® dishwasher and EnergyStar® 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 five tons in size. The program requires the customer to select their own licensed AC contractor that will replace filters, checks refrigerant levels, and adjusts the AC unit to minimize seasonal air conditioning costs.
- Air Conditioner Upgrade and Replacement Program: This program offers up to $150 per ton rebate to replace a SEER 11 or lower AC system with a SEER 16 or higher AC system. Upgrading AC systems will significantly lower residential customer's energy costs.
- Online Energy Audit: Colton Electric Utility's new online energy assessment tool assists customers find ways to save energy and money. The MyEnergyXpert is easy to use and designed to be completed in just a few minutes. This assessment tool provides an easy to follow improvement plan. Residents will also be connected to rebates available through the online platform that also links to the webshop.
- Refrigerator Replacement Program (ARCA): CED will provide a new ENERGYSTAR® refrigerator to replace an existing inefficient refrigerator to qualified customers for the low cost of $240. The customer is charged $20 a month for 12 consecutive months. To qualify for the new refrigerator, customers must have an older, inefficient refrigerator that CED can recycle.
- Residential Energy Audit: CED residential customers with energy usage of over 10,000 kWh annually can qualify to participate in a residential energy audit. Participants can be eligible for additional direct install opportunities depending on audit recommendations. For customers who previously participated in an energy audit in the past two years with over 10,000 kWh of usage they can participate in up to $500 of direct install measured recommendations.
- Residential WebShop: CED residents can now purchase LED light bulbs, smart power strips, holiday lights and smart thermostats from the comfort of their own home. CED provides up to $50.00 per FY to buy down the cost of these items and provides free shipping. The customer can order directly from CED's website and the items are shipped directly to the customer's home.
- Residential Weatherization Rebates: CED offers residential customers rebates for installing replacement windows and insulation in their homes. Windows must meet EnergyStar® approval with a thermal transmittance factor (U-Factor) less than 0.35 and solar heat gain coefficient (SHGC) less than 0.30 at a rebate amount of $4.00 per sq. ft. Insulation may be added to the attic, and/or exterior walls. Rebates will also be provided for radiant barrier installed within the attic space. Insulation and radiant barrier must meet the following thermal resistance values (R-Values):

Attic Insulation - Minimum R-30 Rebate is $0.40 per sq. ft.

Radiant Barrier - Minimum R-19 Rebate is $0.30 per sq. ft.
Exterior Walls - Minimum R-13 Rebate is $0.20 per sq. ft.

- Treebate: CED residents are offered up to $50.00 a tree to plant an approved tree on their property that would reduce their energy bill by providing shade to their home. Each resident may receive up to five trees in their lifetime.
- Arbor Day Foundation Tree Program: CED 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 geographic information system (GIS) 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 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 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 measure in their homes. Students and parents learn how to measure pre-existing devices to calculate saving that is generated by their efficiency upgrade. The goal of the program is to change customer behavior and experience energy savings from their actions.

- Low Income Mobile Home EE Program: in partnership with SoCal Gas Company CED offers mobile home building envelope and lighting retrofits to qualifying customers at the same time as SCGC. SCGC provides gas and water saving efficiency measure direct installation. Low-Income Programs: Income qualified applicants were provided a Tier 1 allotment increase of 139 kWh. This brings the Tier 1 allotment from 250 kWh to 389 kWh each month for 12 consecutive months from the date of approval.
- Low-Income Community Solar: Customers who qualify for our low income assistance program and also have low energy use, may qualify for our new Low Income Community Solar Program. Participants receive a monthly dollar 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.
- Research, Development, and Demonstration: CED participated in an emerging technology demonstration of a solar powered, ductless mini-split air conditioning systems in a commercial setting. CED placed the unit on the City of Colton Water Department outdoor water pumping house. The results of the study are available online at www.coltononline.com.
- Electric Vehicles: CED continues to grow its EV program. The utility currently has 17 level II public chargers available, an EV rate which adds 250 kWh to residential 2nd Tier of energy, and an EV charger rebate of $500 for level II chargers. CED also installed 7 Level II chargers for fleet and 1 fast charger. CED continues to work on facilitating the state incentives to expand fleet electric vehicles with participation in low carbon fuel standard (LCFS) and developing rebate programs to incentivize customers to participate.
- Energy Storage: Colton Electric Utility participates in an energy storage working group through SCPPA. Energy storage is being renewed for future participation. CED purchased eight Ice Bear thermal energy storage units for installation in 2018 as part of trial project.
- Digital Monthly Newsletter on Energy Efficiency: residential and commercial customers receive a monthly newsletter that provides current information on EE and energy education. It is emailed in a digital print format but also includes video clips on EE. We also post the articles from the newsletter to CEDs social media platforms.

EM&V Studies

CED contracts with Alternative Energy Services Consulting (AESC) annually to complete CED programs studies of the residential and commercial program and associated savings. Current studies are available on the CED website.[30] CED 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 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.

[30] (www.ci.colton.ca.us/DocumentCenter/View/3225)

TABLE 1. CED 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	58	382,986	3,829,860	58	382,986	3,829,860	1,565	$46,609	11.75	1.58	0.015
Appliance & Plug Loads	7	53,964	756,148	4	26,273	357,828	133	$14,956	2.85	0.44	0.055
Building Envelope	0	3	30	0	1	8	0	$451	0.03	0.04	64.958
HVAC - Cooling	32	92,156	1,096,997	27	78,424	957,001	381	$55,233	3.32	1.76	0.076
Lighting - Indoor	79	390,213	8,486,141	79	390,199	8,485,934	2,604	$71,129	9.52	3.49	0.013
Lighting - Outdoor	5	826,457	12,396,855	2	304,466	4,566,990	2,181	$157,782	2.89	2.71	0.046
Water Pumping / Irrigation	488	2,853,517	2,853,517	488	2,853,517	2,853,517	1,174	$5,399	57.52	57.52	0.002
EE Subtotal	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
EE and Low Income Subtotal	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022

TABLE 2. CED 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	569	3,495,415	15,394,024	569	3,495,415	15,394,024	5,739	$120,888	11.49	5.49	0.011
Industrial	3	521,991	7,829,865	0	0	0	0	$82,762			0.000
Residential	97	581,890	6,195,658	89	540,451	5,657,114	2,300	$147,908	5.59	1.43	0.032
EE Subtotal	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
EE and Low Income Subtotal	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022

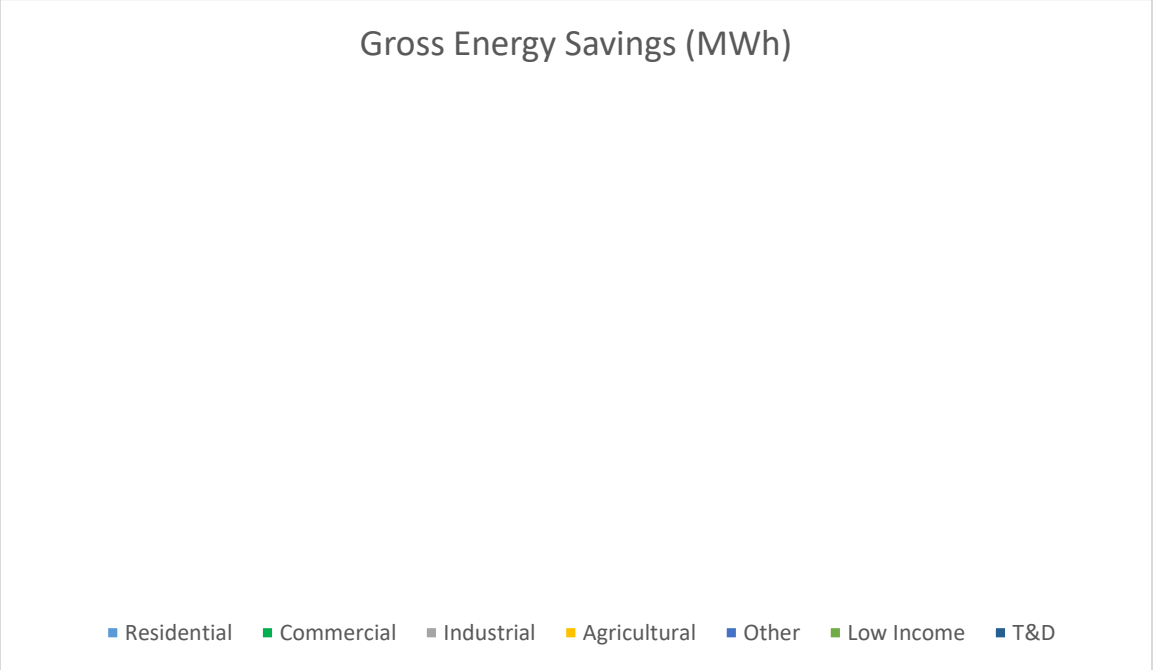
TABLE 3. CED EE Program Results by Building Type

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	31,191	372,422	7	26,126	301,877	106	$6,550	5.01	0.39	0.027
Education - Primary School	63	263,096	6,577,400	63	263,096	6,577,400	1,902	$34,883	14.14	57.52	0.009
Health/Medical - Hospital	3	20,873	313,095	3	20,873	313,095	111	$2,606	11.45	57.52	0.011
Office - Large	7	35,841	896,025	7	35,841	896,025	307	$1,407	57.52	0.53	0.003
Other Agricultural	488	2,853,517	2,853,517	488	2,853,517	2,853,517	1,174	$5,399	57.52	57.52	0.002
Other Commercial	2	304,466	4,566,990	2	304,466	4,566,990	2,181	$75,020	6.07	5.32	0.022
Residential	5	29,670	441,110	2	10,898	160,332	61	$21,447	1.05	1.12	0.178
Residential - Single-Family	91	538,650	5,569,123	86	521,048	5,381,902	2,196	$121,484	6.51	1.67	0.028
Retail - Large	3	521,991	7,829,865	0	0	0	0	$82,762			0.000
EE Subtotal	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
EE and Low Income Subtotal	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	669	4,599,296	29,419,548	658	4,035,866	21,051,138	8,039	$351,558	6.31	2.42	0.022

CORONA

Corona 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 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, which reduce energy usage by a specified amount.
- Incentives are available to install cost effective HVAC units that reduce annual energy usage or load requirements by a specified amount.
- Incentives are available to install cost effective refrigeration equipment that reduces annual energy usage or load requirements by a specified amount.
- Incentives are available to install cost effective motors, pumps, and equipment that reduce annual energy usage by a specified amount.
- Incentives are available for the direct funding of projects on the utility-side of the meter that provide benefits to customers in terms of improved safety, system integrity, energy efficiency, conservation, or research and development.

Residential Programs

- On-site energy audits that analyze customer usage and demand to develop recommendations designed to improve 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 to install Energy Star® washing machines.
- Incentives are available to improve EE for lighting applications, which reduce energy usage by a specified amount.
- Incentives are available to install cost-effective HVAC units that reduce annual energy usage or load requirements by a specified amount.
- Incentives are available to install pool pumps, which reduce energy usage by a specified amount.
- Incentives are available to install whole house fans, which reduce energy usage by a specified amount.

Complementary Programs

Eight customers are billed on 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.

TABLE 1. Colton 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. Colton 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

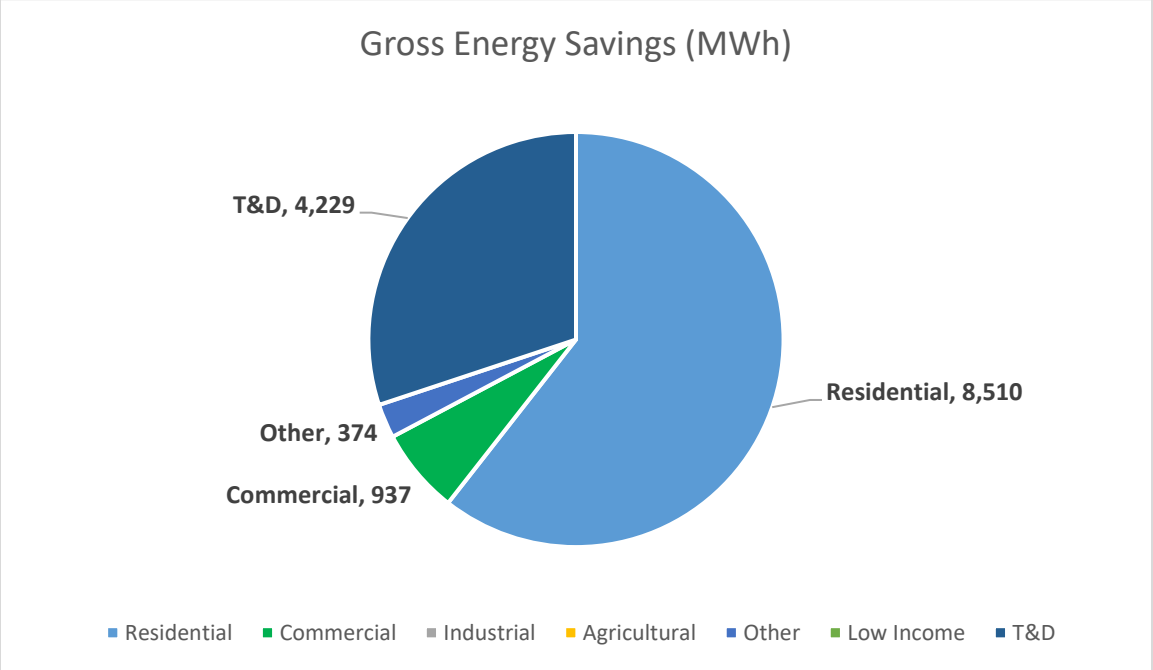
TABLE 3. Colton EE Program Results by Building Type

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 at a Glance

- Climate Zone: 9
- Customers: 90,079
- Total annual retail sales: 978,251 MWh
- Annual Retail Revenue: $194,482,000
- Annual EE expenditures for reporting year: $1,524,781
- Gross annual savings from reporting year portfolio: 14,051 MWh



Glendale Overview

With a heritage that spans a century, Glendale Water & Power (GWP) is a municipal utility that serves the citizens and community of Glendale, California including over 34,379 water customers and 90,079 electric customers. Glendale is located in Climate Zone 9 with a population of 203,834 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 the current FY 2021 reporting year, GWP's EE programs produced a total Net Annual Energy Savings of 14,021 MWh and reduced peak demand by 0.30 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.

In 2019 the City of Glendale issued a Request for Proposals for Local and Regional Renewable, Low-Carbon, and Zero Carbon Resource Options to Serve the City of Glendale to potentially offset capacity being planned for repowering at our Local Grayson Power Plant. In October 2020, the Glendale City Council approved agreements with contractors for a four-year Commercial and Residential Electric Demand Response Program, which launched in FY 2021, and a seven-year Commercial DI EE Program which launched in FY 2022. The Glendale City Council also authorized the City Manager to negotiate a contract for a residential Virtual Power Plant, with the contract to be presented to City Council for approval prior to execution. These project options will ideally incorporate sound alternatives that further GWP's efforts to meet state clean energy mandates, which are environmentally sustainable, and ensure reliable, efficient, and cost-effective power provision to our customers now and into the future.

A key part of our diversified power supply is an ongoing commitment to energy efficiency. We continue to invest significant resources in conservation and EE programs for commercial, industrial, and residential customers. EE remains the most cost-effective way to accommodate future energy needs, and projects in partnership with industrial customers are slated to surpass any previous savings in GWP's EE portfolio. 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 2021, GWP continued to experience declining participation in multiple EE programs resulting in lower kWh savings for this reporting year. Some EE programs continued to be closed as a result of the onset of the COVID-19 pandemic and reopened towards the beginning of the calendar year in 2021. The temporary closure of some or our programs impacted participation in multiple customer programs. The Business Energy Solutions Program, Tree Power Program, Livingwise Educational Program, and the closure of the Business Energy Savings Upgrade Program resulted in lower customer participation and therefore yielded lower kW and kWh savings for our overall portfolio.

Program and Portfolio Highlights

GWP's Home Energy Reports, Business Energy Solutions 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. This program also reached the majority of customers and provided constant communication and engagement. In FY 2022, GWP is planning to launch Weekly Energy Updates to engage and educate customers with personalized insights and programs marketing. GWP's Business Energy Solutions Program is a CMUA award winning program that is designed to allow GWP large business customers the flexibility to define their own needs and develop their own EE projects. The Smart Home Energy and Water Saving Upgrade Program also performed well this reporting year considering that it

was reopened towards the end of this reporting year due to program suspension during the pandemic.

Commercial, Industrial & Agricultural Programs

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

• Business Energy Solutions (BES) is a CMUA award winning program that provides incentives for medium and large businesses to complete pre-approved energy saving retrofit projects. Qualified customers can receive up to $50,000 in incentives per fiscal year. Projects must be cost-effective from the customer's perspective based on the value of total estimated energy savings over the life of the installed measures. Incentives for approved retrofit projects are limited to 20% of eligible project cost or 100% of the incremental costs necessary to bring a remodeling and/or new construction project above the minimum Title 24 energy standard. In no case will an incentive exceed the value saved energy over the life of the measures assuming $0.06 per kWh saved. In FY 2022 the annual incentive cap for customers was increased to $100,000 at 40% of overall project cost.

• Smart Business Energy Saving Upgrades is a CMUA award winning program that launched in 2002 and provided small business customers with comprehensive no-cost energy surveys, customized written reports, energy education, and directly installs as much as $2,000 worth of cost-effective energy conservation measures. The program was closed all of FY 2021 due to COVID-19. When all programs were reopened in February of 2021, a decision was made not to reopen this program in anticipation of the upcoming Business Energy Upgrade Program.

• Peak Savings Program launched in April of 2021 and implemented by Franklin Energy. This program will provide commercial demand response. By year four, the program will offer up to four MW of demand response capacity from commercial customers during up to 15 peak load events per year.

• Business Energy Upgrade Program, launched in FY 2022, will provide EE upgrades to all commercial businesses in GWP's service territory. The program will be implemented over a seven year term with the EE savings of the installed EE measures expected to last an average of 12.5 years. EE savings are expected to reach 36,500 MWh by year seven of the program.

Residential Programs

• Home Energy Reports – Provides six print reports annually to 50,000 residential customers on their energy use. Reports also include action steps for each household to help them reduce their electricity consumption. Currently, the program is integrating the existing two-month billing data and a wealth of external data sources to educate customers on how they can save energy. With the installation of digital meters throughout Glendale's service territory, customers are mailed a home energy report that includes their Smart Grid data and access to the website where they can review their energy usage. A total of approximately 450,000 Home Energy Reports are sent annually to Glendale residents.

• OPOWER Web Portal - Provides all residential electric customers with web-access to electric usage information from their digital meters. The software analytics engine enables the coupling of

insightful messaging with specific, targeted action steps for each household to help the customer reduce their electricity consumption. The addition of interval electric usage data has given customers the ability to view their usage in monthly, weekly, daily, or hourly intervals. Access to granular information coupled with the analytic engine will provide customers with greater insight into their usage and provide more in-depth ways for them to save energy and money.

• Smart Home Energy and Water Savings Rebates - Provides incentives to promote the purchase of approved energy and water saving appliances and devices. In FY 2022 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.

• In-School Energy and Water Conservation Education Program - Provides energy and water conservation education materials for Glendale public and private school students. These materials support 10 hours of intensive energy education as well as in-home installation of energy saving devices including LED light bulbs. This program was not available for this reporting period as a result of students working remotely due to COVID-19.

• 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 EE program, conservation, and event messages directly to the IHD. This program was modified and it now integrated the installation of smart thermostats.

• High Bill Alerts - GWP partnered with Opower to offer High Bill Alerts to all GWP customers that sign up for the service. High Bill 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.

• 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 a number of measures at no cost to the customer, including LED lights, low flow shower heads, faucet aerators, toilet displacement devices and toilet flappers.

Complementary Programs

Low-Income Programs:
In FY 2021, 63% of the annual Public Benefit Charge (PBC) expenditure went towards funding the below low income programs.
• GWP Cares Bill Relief – Program design for Low-Income (Residential and Business) customers. This program provided one-time bill relief of $60 to $150 to low-income residential and business customers experiencing hardship as a result of the adverse economic impacts caused by the COVID-19 pandemic. On December 15, 2020, City Council approved an update to the program. The update significantly increased the bill relief amounts to between $90 and $3,250. A total of 16,000 eligible residential and commercial customers received assistance, totaling $1.9 million in bill relief assistance. This program is now closed.
• 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. Modified the program income guidelines and enrollment process to provide immediate assistance for those customers financially affected by COVID-19 pandemic. Additionally, the eligibility guidelines and enrollment process for the Helping Hand Program were streamlined to reduce the administrative burden so that applications can be processed quickly and efficiently.
• Glendale Care - This program offers all eligible low-income customers a discount of $15 on their electric bills. Starting July 2020, the income eligibility guidelines were increased to 250% of federal poverty guidelines issued annually by the U.S. Department of Health and Human Services and published in the U.S. Federal Registrar.
• 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.
• Guardian - This program provides bill discounts for households with special electrically powered medical equipment needs.
Renewable Energy Programs:
Glendale has always been in the forefront of clean energy commitment and program implementation. In 2002, years before the California Solar Initiative (SB-1), Glendale started a very generous solar incentive program, targeting both residential and commercial customers. The program continued well beyond the SB-1 mandate of 10 years and ended in the summer of 2021. One of the several programs in Glendale's Clean Energy portfolio is the upcoming deployment of a Virtual Power Plant (VPP) to eligible single-family and multifamily residential rooftop solar and battery energy storage systems within Glendale territory. The VPP would potentially provide dispatchable capacity over a two-hour period to help GWP manage existing and emerging load conditions on its grid. Glendale is also in the process of working with a consultant to prepare and issue an RFP, in order to procure a Residential Energy Storage Program and a Commercial Solar + Energy Storage Program. Below is the list of our current programs:
• Smart Home Solar Solutions Program – provided capacity based incentives to residential and small commercial customers to promote the installation of grid-connected solar PV systems in Glendale. The program lasted for almost 20 years, launching in 2002 and ending in 2021. As of

2021, the City had 1,930 interconnected residential solar systems, with the total capacity of 11.2 MW. Of these systems, 1,444 were incentivized, with a total capacity of 8.7 MW.
• Business Energy Solutions Program – provided performance based incentives to commercial customers for five years after the installation of grid-connected solar PV system in Glendale. The program lasted for about 12 years, launching in 2006 and ending in 2018. As of 2021, the City had 109 interconnected commercial solar systems, with the total capacity of 10.4 MW. Of these systems, 69 were incentivized, with a total capacity of 3.4 MW.
• Energy Storage Installation Program – launched in 2018 to encourage the installation of Energy Storage units at residential and commercial sites. Energy Storage applications are accepted via PowerClerk. Thus far, approximately 106 Energy Storage units have been installed, with a total capacity of 508 kW.
• Solar School House - In partnership with The Rahus Institute, the Solar School House program provides Glendale Unified School District and/or local private schools an array of photovoltaic training and activities for educators, and the tools to implement a K-12 solar education program.
Transportation Electrification:
GWP continues to respond to growing EV demand. Below are programs and services that GWP has implemented and plans to launch in FY 2022:
• 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 60 new publicly accessible EV chargers through June 2023.
• 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 (240 Volt) 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 direct current (DC) fast charger, installed chargers are publicly accessible, chargers are installed at an educational institution, chargers are installed in a disadvantaged community, chargers are installed in an income qualified housing structure.
• Bring Your Own Charger Program – In FY 2022 GWP will launch this program to provide 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.
• EV Customer Awareness Website – In FY 2022 GWP will launch 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 – In FY 2022 GWP will sponsor the purchase of an electric bookmobile for the City's Library Arts and Culture department by providing up to $100,000 towards the purchase.
• EV Arc – GWP purchased a standalone, transportable, solar-powered EV charger that can charge electric vehicles completely off-grid. The EV Arc can also be used as power source during emergencies where other electricity sources are unavailable.

Research, Development, and Demonstration:

• 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 American National Standards Institute (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 the FY 2021, the program produced energy savings of 4,229 MWh.

Evaluation, Measurement & Verification Studies

Glendale Water & Power plans to initiate EM&V analysis of energy efficient programs in FY 2023 in support of AB 2021. For FY 2023 GWP has budgeted $50,000 to its EE budget to conduct EM&V studies that will be conducted 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 program 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	60,360	729,553	1	35,971	443,676	186	$55,784	0.85	0.77	0.160
Building Envelope	2	5,195	83,520	1	1,455	23,386	9	$3,368	1.15	0.76	0.201
HVAC - Cooling	85	419,008	5,867,862	84	417,950	5,853,848	2,005	$167,099	5.10	2.02	0.038
Lighting - Indoor	83	584,564	6,430,204	83	584,564	6,430,204	2,218	$68,452	10.93	3.53	0.013
Lighting - Outdoor	0	373,567	7,471,340	0	373,567	7,471,340	3,549	$294,656	2.95	2.95	0.058
Miscellaneous	137	8,378,651	12,920,066	137	8,378,651	12,920,066	5,314	$784,182	1.59	1.59	0.065
EE Subtotal	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
EE and Low Income Subtotal	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
All	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
T&D Subtotal	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
C&S, T&D and Electrification Subtotal	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
Utility Total	308	14,050,564	37,731,765	306	14,021,378	37,371,740	15,357	$1,524,781	2.72	2.15	0.049

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	137	937,440	11,549,542	137	937,440	11,549,542	3,922	$148,394	9.27	2.53	0.016
Other	0	373,567	7,471,340	0	373,567	7,471,340	3,549	$294,656	2.95	2.95	0.058
Residential	171	8,510,337	14,481,663	169	8,481,151	14,121,638	5,810	$930,493	1.64	1.62	0.072
EE Subtotal	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
EE and Low Income Subtotal	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
Residential	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
T&D Subtotal	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
C&S, T&D and Electrification Subtotal	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
Utility Total	308	14,050,564	37,731,765	306	14,021,378	37,371,740	15,357	$1,524,781	2.72	2.15	0.049

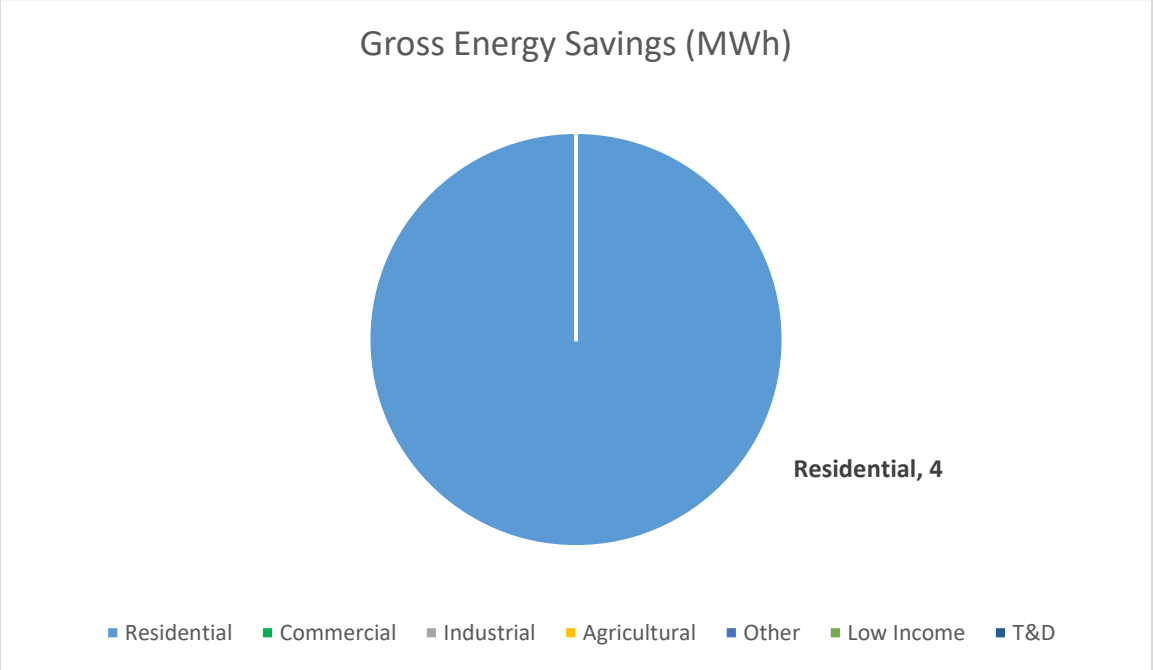
TABLE 3. GWP EE Program Results by Building Type

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	0	377,507	7,510,740	0	375,931	7,494,980	3,563	$299,919	2.91	2.92	0.059
Office - Large	137	937,440	11,549,542	137	937,440	11,549,542	3,922	$148,394	9.27	2.53	0.016
Residential	167	8,457,177	13,836,411	167	8,446,720	13,697,929	5,645	$883,734	1.67	1.65	0.070
Residential - Single-Family	4	49,221	605,852	2	32,067	400,070	151	$41,496	1.06	1.01	0.133
EE Subtotal	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
EE and Low Income Subtotal	308	9,821,344	33,502,545	306	9,792,158	33,142,520	13,281	$1,373,543	2.74	2.12	0.051
All	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
T&D Subtotal	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
C&S, T&D and Electrification Subtotal	0	4,229,220	4,229,220	0	4,229,220	4,229,220	2,077	$151,238	2.48	2.48	0.036
Utility Total	308	14,050,564	37,731,765	306	14,021,378	37,371,740	15,357	$1,524,781	2.72	2.15	0.049

GRIDLEY MUNICIPAL UTILITY

Gridley at a Glance

- Climate Zone: 11
- Customers: 2,900
- Total annual retail sales: 30,418 MWh
- Annual Retail Revenue: $711,920
- Annual EE expenditures for reporting year: $45,606
- Gross annual savings from reporting year portfolio: 4 MWh



Gridley 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, commercial and industrial customers. GMU's customer demographic has historically resulted in lower customer participation in programs that require capital investment by the customer.

Major Program and Portfolio Changes

There were no major program changes implemented in FY 2021. 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 2021 has decreased from last year. Program activity tends to fluctuate from year to year. GMU has achieved 115% of the EE targets for net kWh over the last eleven years.

Program and Portfolio Highlights

The commercial program is typically responsible for a large percentage of the energy savings. No commercial customers participated in the program in FY21. GMU is pleased to be able to support local businesses with the program and hopes 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 efficiency fluorescent or LED fixtures.
- Commercial HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.
- Commercial Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
- Commercial Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Commercial Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Commercial Custom Program: GMU offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.

Residential Programs

Rebates are offered to residential customers for the installation of various 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 ENERGYSTAR® 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 at https://www.cmua.org/.

Major Differences or Diversions from California POU TRM for Energy Savings

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

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	1,512	17,511	0	877	10,327	4	$27,455	0.05	0.05	3.350
Building Envelope	1	1,251	17,470	0	350	4,892	2	$10,204	0.13	0.13	2.806
HVAC - Cooling	0	809	12,139	0	647	9,711	4	$7,948	0.34	0.34	1.094
EE Subtotal	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
EE and Low Income Subtotal	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388

TABLE 2. GMU 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	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
EE Subtotal	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
EE and Low Income Subtotal	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388

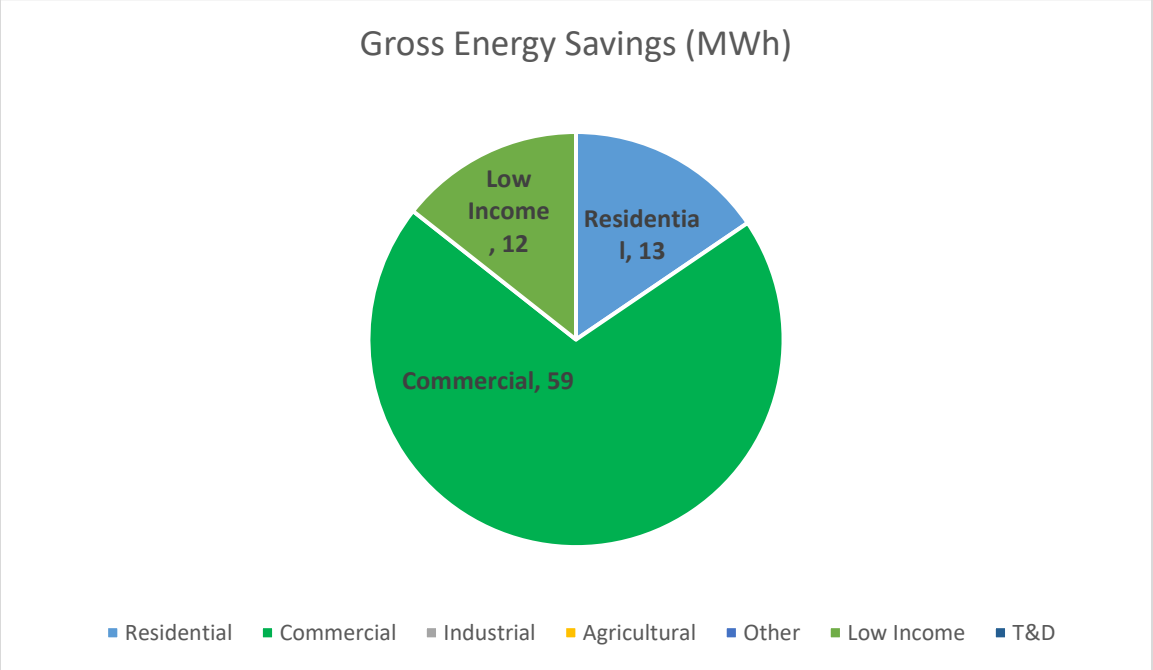
TABLE 3. GMU EE Program Results by Building Type

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	0	35	383	0	21	230	0	$644	0.04	0.05	3.462
Residential	0	1,589	25,183	0	874	13,457	6	$13,059	0.27	0.27	1.314
Residential - Single-Family	1	1,948	21,554	0	979	11,243	4	$31,903	0.05	0.05	3.556
EE Subtotal	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
EE and Low Income Subtotal	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	3,572	47,119	1	1,874	24,929	10	$45,606	0.12	0.12	2.388

HEALDSBURG

Healdsburg at a Glance

- Climate Zone: 2
- Customers: 6,064
- Total annual retail sales: 71,560 MWh
- Annual Retail Revenue: $11,711,789
- Annual EE expenditures for reporting year: $196,287
- Gross annual savings from reporting year portfolio: 84 MWh



Healdsburg Overview

The City of Healdsburg's 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. Residential rebates are offered in the following areas; appliances, heat, and cooling, weatherization, and pool pumps. For commercial customers, rebates are typically site-specific and developed as customer programs to allow the greatest program flexibility and variety of incentives to the end users. All custom commercial incentives must be accompanied with analysis demonstrating a benefit to cost ratio greater than one and acceptable to the end user.

Major Program and Portfolio Changes

Through 2021 and the continued pandemic, Healdsburg's Electric Department continued to concentrated funding and resources on income-qualified customers. 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.
In addition to direct financial relief, the Electric Department continued two CARE rebate programs: an incremental rebate for high efficiency appliances such as heat pump dryers and clothes washers and a direct install attic insulation program. Additionally, Healdsburg funded the direct installation of water efficiency within income restricted multifamily housing to lessen water use and reduce water heating costs.
Several residential rebates were retired at the end of calendar year 2020 to increase funding for CARE customers, reduce free ridership, and focus residential incentives on high efficiency items such as heat pump HVAC systems. Additionally, the Electric Department created a smart thermostat rebate for EnergyStar® Wi-Fi-enabled products. The goal of this restricting was to focus EE rebates on both the efficient use of electricity and a reduction in GHG emissions.

Program and Portfolio Highlights

The attic insulation direct install program was continued for a second year. It was implemented to serve qualified single-family homes that have less than 6 inches of insulation. So far, the program has improved insulation for 25,000 sq ft of attic space. As expected, participation increased as vaccinations became more widely administered, and therefore residents felt safer with contractors entering their homes.

Commercial, Industrial & Agricultural Programs

Healdsburg offers the following commercial programs:

- Commercial Lighting Rebates: This program engages local lighting and electrical contractors to promote and install energy efficient lighting upgrades through technical assistance and financial incentives available from Healdsburg's Electric Department.
- Commercial Refrigeration and HVAC Rebates: Healdsburg offers commercial customers a wide selection of refrigeration and HVAC rebates. In addition to the Keep Your Cool direct install program, custom rebates are performance based and provide greater financial incentives to projects that reduce system peak demand.
- Custom EE Programs: The Healdsburg Electric Department will consider custom EE programs for site-specific consumption. The Electric Department will require that the City's contractor review and endorse all custom programs. This review may result in a small cost adder to the proposed project but validates the benefit to cost ratio of the program. The Healdsburg Electric Department retains the sole right to approve or deny custom projects.
- Commercial Lighting Direct Install Program: this program offers new, energy-efficient fixtures at no cost to the commercial customer. The customer is responsible for installation of the fixtures, either using facility staff or electrical contractors.

Residential Programs

Healdsburg offers the following residential programs:

- Residential Heat Pump Rebates: Healdsburg offers tiered rebates for residential and small business customers who install high performance heat pumps. The tiered rebate levels are designed promote higher SEER ratings.

- Weatherization and Building Envelope Incentives: The City provides financial incentives for homeowners who invest in home weatherization such as ceiling and wall insulation, and window replacement projects.
- Appliances and Device Rebates: Healdsburg offers incentives for high-performance clothes washers to encourage EE and water conservation. Healdsburg also provides a rebate for EnergyStar® wi-fi enabled smart thermostats.

Complementary Programs

- Low-Income Programs: The City of Healdsburg actively supports a low-income discount for income-qualified customers. Currently, this discount supports approximately 550 families, or about 13% of Healdsburg's residential customers. Income qualified customers receive 25% off their electric bill through this program.
- Electric Vehicles: The City of Healdsburg offers an EV Discount for residents that drive a battery electric vehicle. Additionally, the city maintains 12 charging stations located at City Hall with a plan to expand the total number of public charging stations throughout Healdsburg.
- Green Rate: The Healdsburg Electric Department offers a voluntary opt-in 100% renewable electricity rate for $0.018 per kWh additional. Approximately 8% of Healdsburg's energy usage is attributed to customers enrolled in the Green Rate.
- Technical Consulting on all-electric construction: Healdsburg implemented a reach code in 2019 that requires efficient electric space and water heating. To assist customers in compliance, the city offers free technical consulting through Guttman & Blaevoet to support builders and contractors.
- Renewable Energy Programs: The City continues to see PV solar array installations in both residential and commercial sectors. At the end of 2021, the City had interconnected a total of 6.019 MW of solar capacity.

Electrification Educational Programs: Each of the programs listed below is intended to help educate Healdsburg electric customers regarding the electrification of both the transportation and building sectors. Funding for these programs is gained through the state's Cap & Trade program which helps to reduced GHG emissions within the community.

- eBike: To help educate City electric customers on electric transportation options Healdsburg launched an eBike incentive program. This program provides various levels of rebates relative to a customer income to help off-set the cost of purchasing an eBike.
- Smart Thermostat for Gas Heated Homes: To less the use of natural gas to heat homes, the City of Healdsburg has initiated a Smart Thermostat program for homes with natural gas heating. The intent of the program is to reduce the amount of natural gas burnt but also helps to reduce the amount of time the central heat's fan is operating (EE savings).
- Induction Cooktop Rental: To inform customers regarding electric cooktops and specifically induction cooktops, Healdsburg offers a free induction cooktop loaner for electric customers interested in cooking with electricity rather than natural gas. The loaner program has been popular and includes pans compatible with induction cooktops.

EM&V Studies

EM&V previously completed by the city is available at www.cmua.org.

Major Differences or Diversions from California POU TRM for Energy Savings

The city relies on the CMUA TRM for savings calculations. Savings for the Commercial Lighting Program are calculated based on the actual equipment replaced and installed.

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	1	3,163	33,445	0	1,371	14,277	5	$1,668	1.03	0.76	0.143
Building Envelope	5	5,179	103,589	2	2,425	48,500	92	$15,344	1.05	0.69	0.465
HVAC - Cooling	4	4,710	66,290	4	3,768	53,032	36	$21,572	0.53	0.80	0.536
HVAC - Heat Pump	0	34	169	0	29	143	0	$163	0.15	0.04	1.237
Lighting - Indoor	1	4,911	58,928	1	3,929	47,142	17	$8,485	0.52	0.52	0.227
Lighting - Outdoor	5	54,287	651,445	4	43,522	522,268	249	$67,085	0.81	0.52	0.162
EE Subtotal	16	72,284	913,865	11	55,044	685,362	398	$114,317	0.77	0.57	0.213
Building Envelope	12	12,134	242,685	10	10,314	206,282	535	$81,969	1.02	1.08	0.585
Low-Income Subtotal	12	12,134	242,685	10	10,314	206,282	535	$81,969	1.02	1.08	0.585
EE and Low Income Subtotal	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290

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	6	59,198	710,373	5	47,451	569,410	265	$75,570	0.77	0.52	0.167
Residential	10	13,086	203,492	6	7,593	115,952	132	$38,748	0.76	0.72	0.455
EE Subtotal	16	72,284	913,865	11	55,044	685,362	398	$114,317	0.77	0.57	0.213
Residential	12	12,134	242,685	10	10,314	206,282	535	$81,969	1.02	1.08	0.585
Low-Income Subtotal	12	12,134	242,685	10	10,314	206,282	535	$81,969	1.02	1.08	0.585
EE and Low Income Subtotal	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290

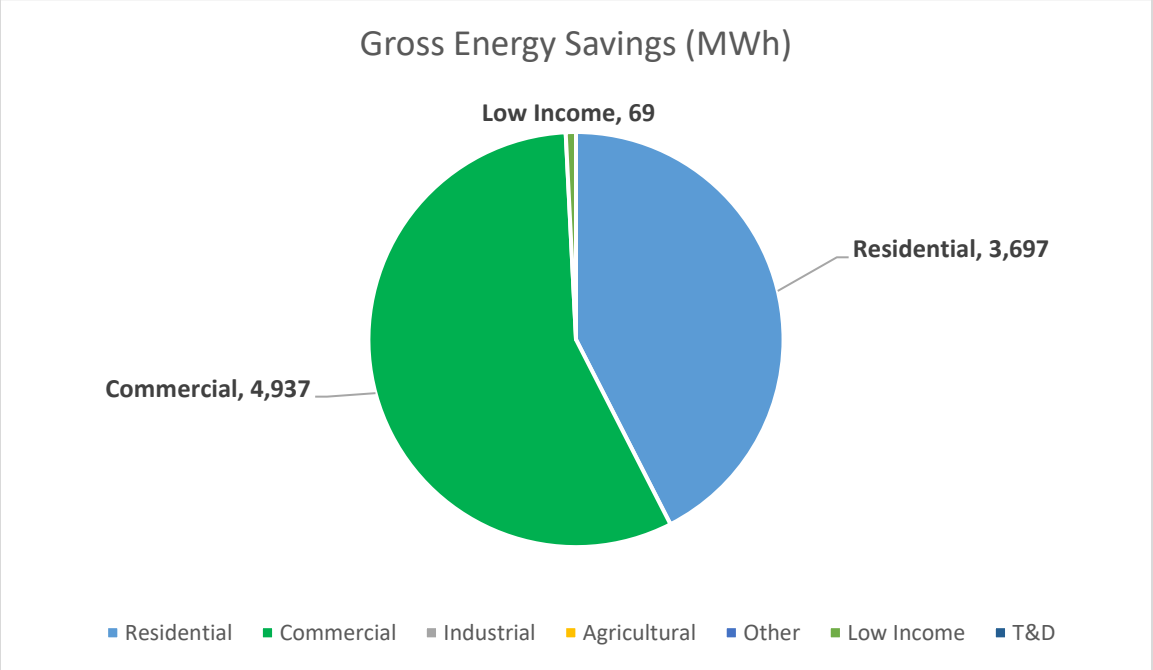
TABLE 3. Healdsburg EE Program Results by Building Type

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	6	59,198	710,373	5	47,451	569,410	265	$75,570	0.77	0.52	0.167
Residential	8	10,028	155,810	5	5,331	78,793	88	$31,744	0.64	0.79	0.541
Residential - Single-Family	2	3,058	47,682	2	2,262	37,160	44	$7,003	1.31	0.61	0.265
EE Subtotal	16	72,284	913,865	11	55,044	685,362	398	$114,317	0.77	0.57	0.213
Residential - Single-Family	12	12,134	242,685	10	10,314	206,282	535	$81,969	1.02	1.08	0.585
Low-Income Subtotal	12	12,134	242,685	10	10,314	206,282	535	$81,969	1.02	1.08	0.585
EE and Low Income Subtotal	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	27	84,418	1,156,550	21	65,358	891,645	933	$196,287	0.87	0.74	0.290

IMPERIAL IRRIGATION DISTRICT

Imperial 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: $2,907,797
- Gross annual savings from reporting year portfolio: 8,703 MWh



Imperial Overview

As the sixth largest utility in California, Imperial Irrigation District (IID) controls more than 1,200 MW 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 efficiently and effectively meet our customers' demands at the best possible rates, tying our area's low-cost of living directly with low-cost utilities. Our diverse resource portfolio provides our customers with some of the lowest cost rates in southern California which is critical given unemployment rates within the service territory are one of the highest in the nation.

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

Major Program and Portfolio Changes

The program portfolio and rebate levels remained consistent from the previous year. The COVID-19 pandemic placed a restraint on expected customer participation and thus budget levels were tempered for 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 at hand are 1) Most cost-effective programs have been in place for years and this leads us closer to market saturation, 2) budgets for programs are reduced in order to fund other utility projects or matters, 3) 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 energy-efficiency 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 direct installation refrigeration 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 customer.

Complementary Programs

Low-Income Programs

As many 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 experiencing a financial crisis and facing disconnection for nonpayment.

- Medical Equipment Energy Assistance Program (MEEUAP) – This is an assistance program that reduces the electric rate for a defined quantity of electricity used to operate medical equipment by a household that has a full-time resident who requires specific medically necessary electric equipment to sustain life or prevent deterioration of a person's medical condition.

Energy Storage:

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 a significant cost savings to ratepayers. The project is one of the largest of its kind in the western United States.

Renewable Energy Programs:

- Net Billing – The Net Billing Program is NEMs successor program and also compensates net-surplus customers in accordance with the Distributive Self-Generation Service Rate
- E-Green Solar Program - 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 are automatically enrolled onto the program.
- Green Energy Rate Program – Under the green energy rate, customers can designate the share of their energy consumption they wish to be provided by renewable energy sources. Customers can direct that up 100% of their energy needs be met with renewables through renewable energy or RECs.

Codes and Standards

Through IID's participation with SCPPA, IID accounts for codes and standards 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.

Evaluation, Measurement & Verification 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 off 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 CA 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**	**Utility ($/kWh)**
All	0	0	0	0	0	0	0	$0			0.000
Appliance & Plug Loads	81	418,070	4,004,068	68	354,767	3,438,771	1,325	$128,619	3.24	6.47	0.046
Building Envelope	1,773	2,863,402	44,916,030	1,561	2,686,818	42,011,814	14,335	$757,435	6.56	7.27	0.025
Commercial Refrigeration	2	16,330	326,600	2	13,881	277,610	100	$5,237	4.86	8.28	0.029
HVAC - Cooling	1,495	2,974,863	49,339,163	1,436	2,919,175	48,463,727	19,220	$1,316,886	7.14	25.42	0.039
Lighting - Indoor	13	211,624	3,174,360	12	201,043	3,015,642	1,030	$50,679	5.72	5.72	0.023
Lighting - Outdoor	263	1,053,268	21,065,360	218	874,212	17,484,249	8,292	$255,459	6.51	8.78	0.022
Miscellaneous	32	120,369	361,106	18	67,832	203,496	85	$55,116	0.41	0.41	0.284
Process	360	975,855	14,637,825	302	819,718	12,295,773	4,257	$300,015	3.92	7.71	0.034
EE Subtotal	4,019	8,633,781	137,824,513	3,618	7,937,446	127,191,082	48,645	$2,869,446	6.26	11.46	0.032
Appliance & Plug Loads	14	68,992	1,034,880	10	48,294	724,416	268	$7,086	11.83	11.83	0.013
Low-Income Subtotal	14	68,992	1,034,880	10	48,294	724,416	268	$7,086	11.83	11.83	0.013
EE and Low Income Subtotal	4,033	8,702,773	138,859,393	3,628	7,985,740	127,915,498	48,912	$2,876,532	6.28	11.46	0.032
Codes & Standards	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
Codes & Standards Subtotal	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
C&S, T&D and Electrification Subtotal	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
Utility Total	4,033	22,883,773	153,040,393	3,628	22,166,740	142,096,498	54,977	$2,907,797	6.84	12.39	0.028

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	1,124	4,937,208	80,462,558	971	4,431,458	71,811,568	26,325	$1,332,557	5.31	6.63	0.026
Residential	2,895	3,696,573	57,361,955	2,647	3,505,988	55,379,514	22,319	$1,536,889	7.09	21.78	0.040
EE Subtotal	4,019	8,633,781	137,824,513	3,618	7,937,446	127,191,082	48,645	$2,869,446	6.26	11.46	0.032
Residential	14	68,992	1,034,880	10	48,294	724,416	268	$7,086	11.83	11.83	0.013
Low-Income Subtotal	14	68,992	1,034,880	10	48,294	724,416	268	$7,086	11.83	11.83	0.013
EE and Low Income Subtotal	4,033	8,702,773	138,859,393	3,628	7,985,740	127,915,498	48,912	$2,876,532	6.28	11.46	0.032
Residential	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
Codes & Standards Subtotal	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
C&S, T&D and Electrification Subtotal	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
Utility Total	4,033	22,883,773	153,040,393	3,628	22,166,740	142,096,498	54,977	$2,907,797	6.84	12.39	0.028

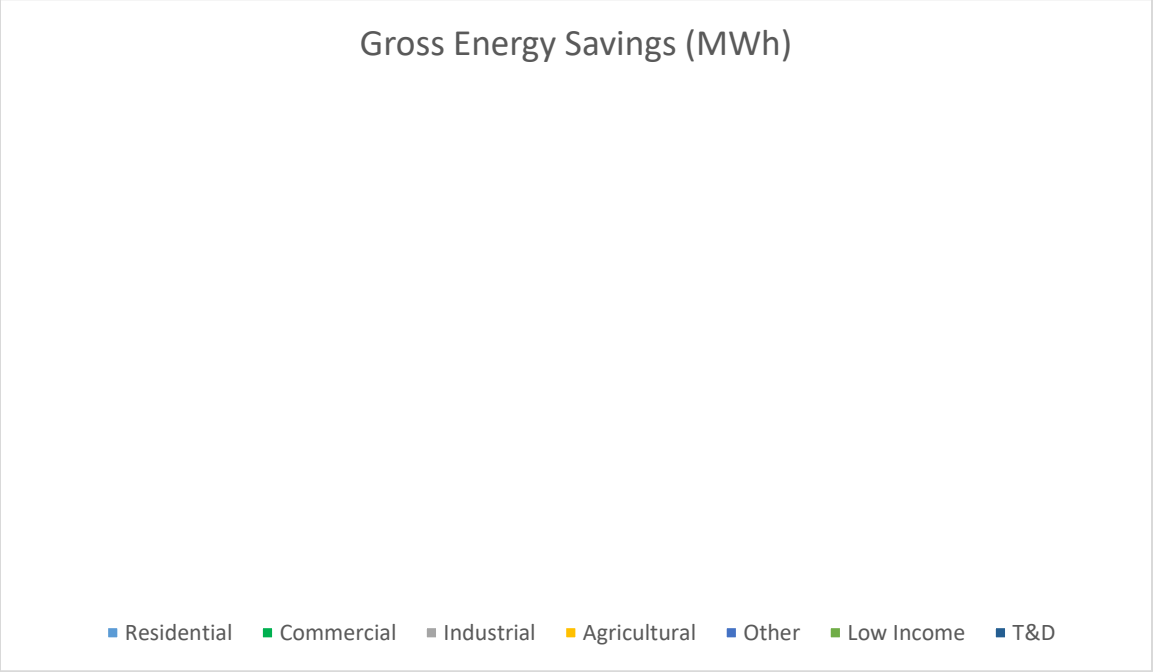
TABLE 3. IID EE Program Results by Building Type

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	880	2,279,861	40,602,353	739	1,906,979	33,944,373	13,902	$660,875	4.90	8.17	0.029
Other Commercial	244	2,657,347	39,860,205	232	2,524,480	37,867,195	12,423	$671,682	5.72	5.72	0.024
Residential	928	190,978	1,379,058	797	128,861	1,080,309	507	$99,873	1.65	2.62	0.119
Residential - Single-Family	1,967	3,505,596	55,982,897	1,850	3,377,127	54,299,205	21,812	$1,437,015	7.46	24.53	0.038
EE Subtotal	4,019	8,633,781	137,824,513	3,618	7,937,446	127,191,082	48,645	$2,869,446	6.26	11.46	0.032
Residential	14	68,992	1,034,880	10	48,294	724,416	268	$7,086	11.83	11.83	0.013
Low-Income Subtotal	14	68,992	1,034,880	10	48,294	724,416	268	$7,086	11.83	11.83	0.013
EE and Low Income Subtotal	4,033	8,702,773	138,859,393	3,628	7,985,740	127,915,498	48,912	$2,876,532	6.28	11.46	0.032
All	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
Codes & Standards Subtotal	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
C&S, T&D and Electrification Subtotal	0	14,181,000	14,181,000	0	14,181,000	14,181,000	6,064	$31,264	59.07	59.07	0.002
Utility Total	4,033	22,883,773	153,040,393	3,628	22,166,740	142,096,498	54,977	$2,907,797	6.84	12.39	0.028

INDUSTRY PUBLIC UTILITIES COMMISSION

IPUC 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: $0
- Gross annual savings from reporting year portfolio: 0 MWh



IPUC 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 less 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 has been completed for a Large General Service Customer.

Commercial, Industrial & Agricultural Programs

- On-site energy survey, at no cost to the customer, which 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, which 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 lessor of 25% of the cost difference between standard and upgraded new equipment and/or materials.
- Incentives are available for the direct funding of projects/activities on the utility side of the meter that have been approved by the IPUC Board.

Residential Programs

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

Complementary Programs

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

EM&V Studies

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

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	$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. 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	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

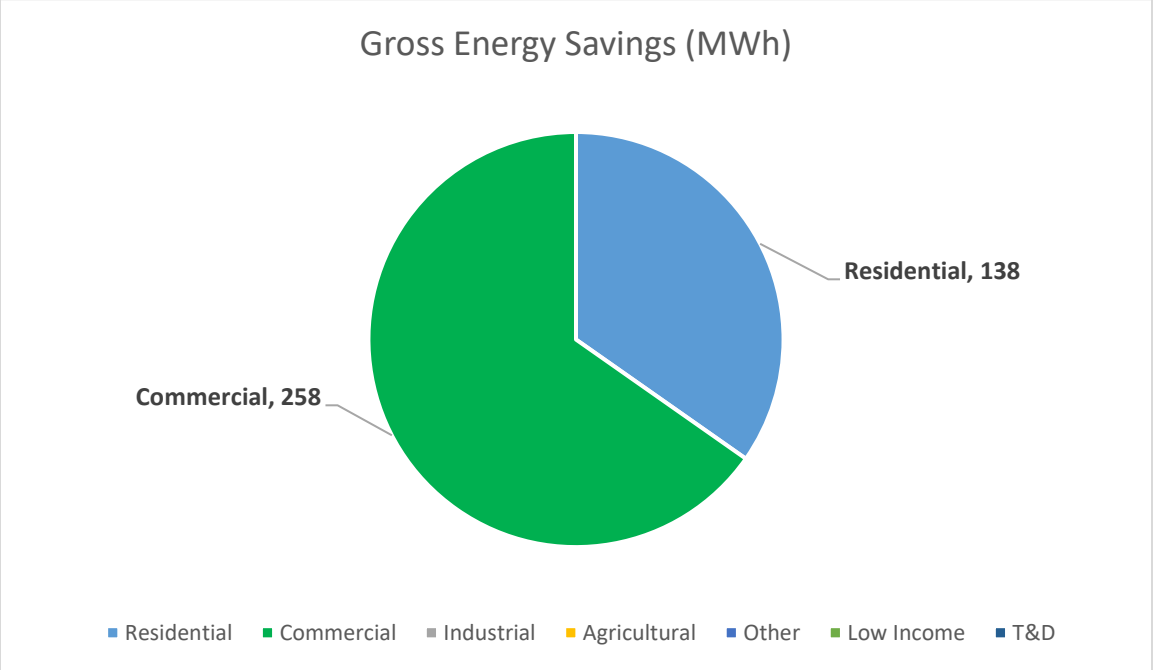
TABLE 3. IPUC EE Program Results by Building Type

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	$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

LASSEN MUNICIPAL UTILITY DISTRICT

Lassen at a Glance

- Climate Zone: 16
- Customers: 9,000
- Total annual retail sales: 147,241 MWh
- Annual Retail Revenue: $23,618,097
- Annual EE expenditures for reporting year: $124,093
- Gross annual savings from reporting year portfolio: 396 MWh



Lassen Overview

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 direct install programs at no cost to commercial and residential customers that provide energy saving and other benefits.

Major Program and Portfolio Changes

LMUD offers a comprehensive menu of EE rebate programs to our residential, commercial, and agricultural customers. There were no major changes to the program in FY 2021. We find that the customers and local contractors value consistency in program offerings.

Program and Portfolio Highlights

LMUD offered the Residential Direct Install Program in FY 2021. This program delivered 34% of the gross annual energy savings. LMUD achieved 119% of the target net annual kWh savings for FY 2021.

Commercial, Industrial & Agricultural Programs

LMUD manages a comprehensive EE incentive program for commercial, industrial, and agricultural customers.
Non-Res Lighting Program: LMUD 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 instead of more efficiency fluorescent or LED fixtures.
Non-Res HVAC: LMUD offers rebates to commercial customers for energy efficient HVAC upgrades.
Non-Res Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
Non-Res Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
Non-Res Electronics: LMUD offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
Non-Res Custom Program: LMUD offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.
Agricultural Custom Program: LMUD offers rebates to agricultural customers to make 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 ENERGYSTAR® 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. The EE Assistance Program (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 Program (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 0.045 per exported kilowatt hour.
- Electric Vehicles: LMUD offers customers rebates on EV charging stations. Publicly accessible and residential are based on a first come, first served basis.

EM&V Studies

LMUD is planning to complete EM&V in FY 2022 by working with several other utilities to gain economies of scale.

Major Differences or Diversions from California POU TRM for Energy Savings

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

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	2	12,137	126,140	2	10,495	107,846	41	$29,357	0.46	0.46	0.332
HVAC - Cooling	1	398	5,514	1	318	4,411	2	$4,383	0.19	0.15	1.308
Lighting - Indoor	26	156,539	1,699,106	22	138,378	1,491,195	567	$67,753	2.42	2.40	0.056
Lighting - Outdoor	0	190,730	2,288,760	0	152,584	1,831,008	871	$13,276	17.41	17.41	0.009
Service & Domestic Hot Water	7	36,185	361,846	7	33,699	336,988	124	$9,323	3.89	3.73	0.033
EE Subtotal	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
EE and Low Income Subtotal	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041

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	12	258,435	3,101,220	10	206,748	2,480,976	1,102	$24,316	12.07	12.07	0.012
Residential	24	137,553	1,380,147	21	128,726	1,290,472	502	$99,777	1.52	1.50	0.094
EE Subtotal	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
EE and Low Income Subtotal	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041

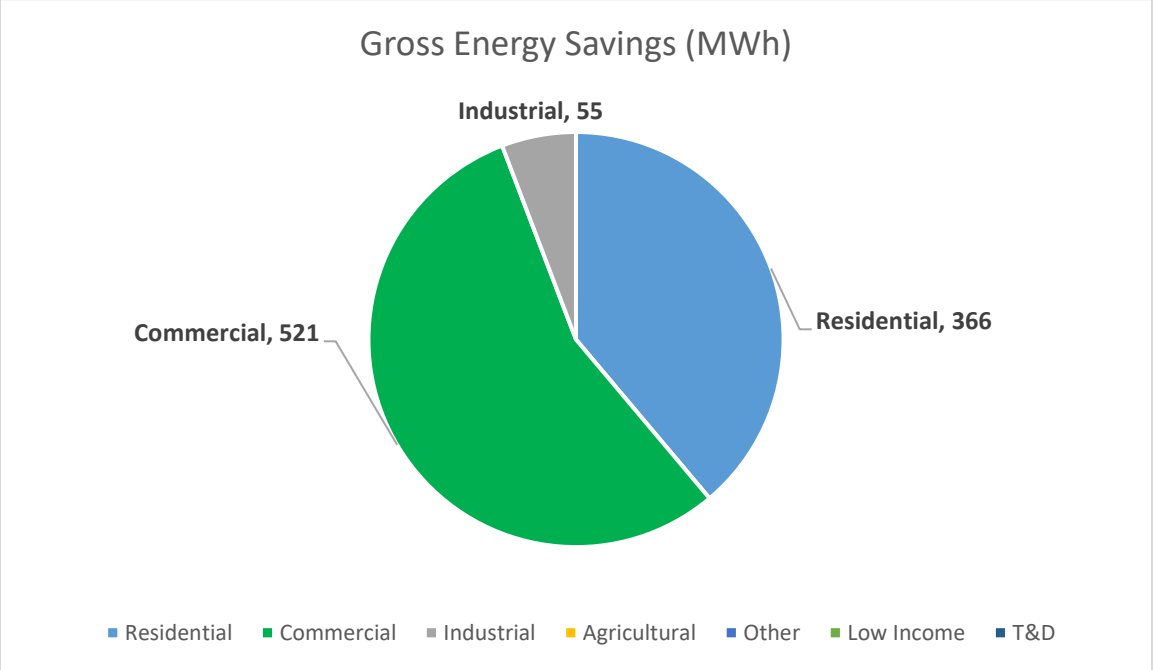
TABLE 3. LMUD EE Program Results by Building Type

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	14	259,053	3,105,472	11	207,096	2,483,411	1,103	$28,254	10.40	10.31	0.014
Residential	22	135,952	1,362,508	20	127,683	1,278,599	498	$85,079	1.77	1.74	0.081
Residential - Single-Family	0	983	13,387	0	696	9,438	3	$10,760	0.11	0.11	1.485
EE Subtotal	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
EE and Low Income Subtotal	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	36	395,988	4,481,367	31	335,474	3,771,448	1,604	$124,093	3.59	3.54	0.041

LODI ELECTRIC UTILITY

Lodi at a Glance

- Climate Zone: 12
- Customers: 27,485
- Total annual retail sales: 439,084 MWh
- Annual Retail Revenue: $74,197,234
- Annual EE expenditures for reporting year: $443,192
- Gross annual savings from reporting year portfolio: 942 MWh



Lodi 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 2021, with a median household income of $63,246 and nearly half (45.6%) 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 Lodi Electric Utility meet their EE goals.

Major Program and Portfolio Changes

In FY 2021, LEU continued to offer a comprehensive selection of programs for our commercial, industrial, and residential customers. There were no significant program changes. Reportable energy savings have decreased from last year due to a decrease in commercial and industrial projects. Over the past five years, Lodi has achieved 108% of net savings targets.

In 2021, LEU partnered with Tree Lodi, a non-profit community-based organization dedicated to the planting, maintenance, and preservation of trees to plan and implement the Utility's first pilot Shade Tree Program. Electric Utility staff worked closely with Tree Lodi to research other shade tree programs in the region to develop its scope of work, budget, and staffing plan. 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 Direct Install and Snapshot Audit program that it started in FY 2016. This program offered installation of LEDs, advanced power strips, thermostatic shower valves, shower heads, and aerators in customer homes at no cost. The intent was 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 targeted 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 40% of annual net savings for FY 2021. Through key accounts management, the utility maintains a proactive and positive relationship with Lodi's largest energy consumers. These relationships are vital to Lodi's overall economic development strategy and through them our large commercial and industrial customers have been effectively encouraged to engage and make investments in EE.

Commercial, Industrial & Agricultural Programs

LEU manages a comprehensive 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 EE lighting upgrades.

Non-Res HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.

Non-Res Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.

Non-Res Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.

Non-Res Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips
Non-Res Custom: LEU offers rebates to business owners based on site-specific equipment and usage. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the project. In addition, the Utility offers zero percent energy financing that allows commercial customers to install energy efficient improvements up to $150,000. The loan requirements are simple, easy to administer, and are paid back to the Utility over a 24-month period. The amounts due are invoiced on the customer's monthly utility bill.
In 2021, following an assessment of commercial customer needs and best practices across municipal energy providers, Lodi Electric Utility expanded its rebate program available to both commercial and industrial customers to provide additional funding opportunities associated with larger scale EE projects.
Keep Your Cool: LEU offered the KYC Commercial Refrigeration Program in FY 2021. 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.

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 ENERGYSTAR® qualified LED lamps and 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 ENERGYSTAR® qualified products, including clothes washers, dishwashers, pool pumps, refrigerators, and advanced power strips.
- Residential Weatherization: LEU offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments, solar attic fans, and air sealing.
- Residential Water Heater Rebate: LEU offers rebates to homeowners who purchase a new, energy efficient electric water heater.
- Residential Direct Install: Audits are performed on residential homes and advanced smart power strips, faucet aerators, thermostatic shower valves, and ENERGYSTAR® rated LEDs are installed at no cost to the customer. The Direct Install program paused temporarily during COVID-related shelter in place orders.

Complementary Programs

- Low-Income Programs:

o Lodi C.A.R.E. Package Program: Provides grants to very low-income customers in need of assistance paying their electric utility account.
o Lodi SHARE Discount Rate: LEU provides a rate discount of 30% for qualifying residential customers on their electric utility monthly billing statement; over $475K was budgeted in FY21 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. For FY 2021, this totaled over $140K.
- Electric Vehicles: LEU offers rebates for residential and commercial EV chargers and an effort is currently underway, with the help of the California Electric Vehicle Infrastructure Project (CalEVIP) and LCFS funding, to replace the City's first generation public EV charging stations.
- EE and Conservation Curriculum: Lodi Electric Utility 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 December 2020 through June 2021, educational program highlights included lessons delivered through an in-person and on-line platform. 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-based application. 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. The curriculum was delivered to 425 Lodi middle school students.

EM&V Studies

Previously completed EM&V reports are available for review at the NCPA website.[31]

Major Differences or Diversions from California POU TRM for Energy Savings

LEU relies heavily on the savings listed in the Technical Resource Manual. The Commercial Lighting and Commercial Custom programs use custom savings calculations based on actual pre- and post-equipment specifications.

[31] (www.ncpa.com/policy/reports/emv/)

TABLE 1. Lodi 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	9	101,221	772,231	7	74,450	525,671	204	$62,105	1.03	1.22	0.138
Building Envelope	80	97,290	1,912,997	27	31,568	622,164	693	$85,381	2.29	0.38	0.201
Commercial Refrigeration	28	187,669	1,520,797	26	177,745	1,438,264	546	$50,686	2.80	2.76	0.041
HVAC - Cooling	39	89,595	1,321,193	37	83,527	1,234,586	457	$62,807	2.85	1.66	0.068
HVAC - Heat Pump	0	92	1,016	0	74	813	0	$108	2.64	4.20	0.164
Lighting - Indoor	40	219,427	2,441,167	39	213,674	2,379,538	885	$119,099	2.02	13.78	0.062
Lighting - Outdoor	0	246,918	2,862,372	0	244,402	2,837,211	1,313	$63,005	4.65	18.89	0.028
EE Subtotal	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
EE and Low Income Subtotal	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061

TABLE 2. Lodi 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	61	521,368	5,579,513	59	508,727	5,456,229	2,246	$128,577	4.26	6.52	0.029
Industrial	27	54,600	819,000	27	54,600	819,000	293	$8,339	9.13	1.61	0.014
Residential	108	366,245	4,433,260	50	262,112	2,763,016	1,559	$306,275	1.60	0.79	0.139
EE Subtotal	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
EE and Low Income Subtotal	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061

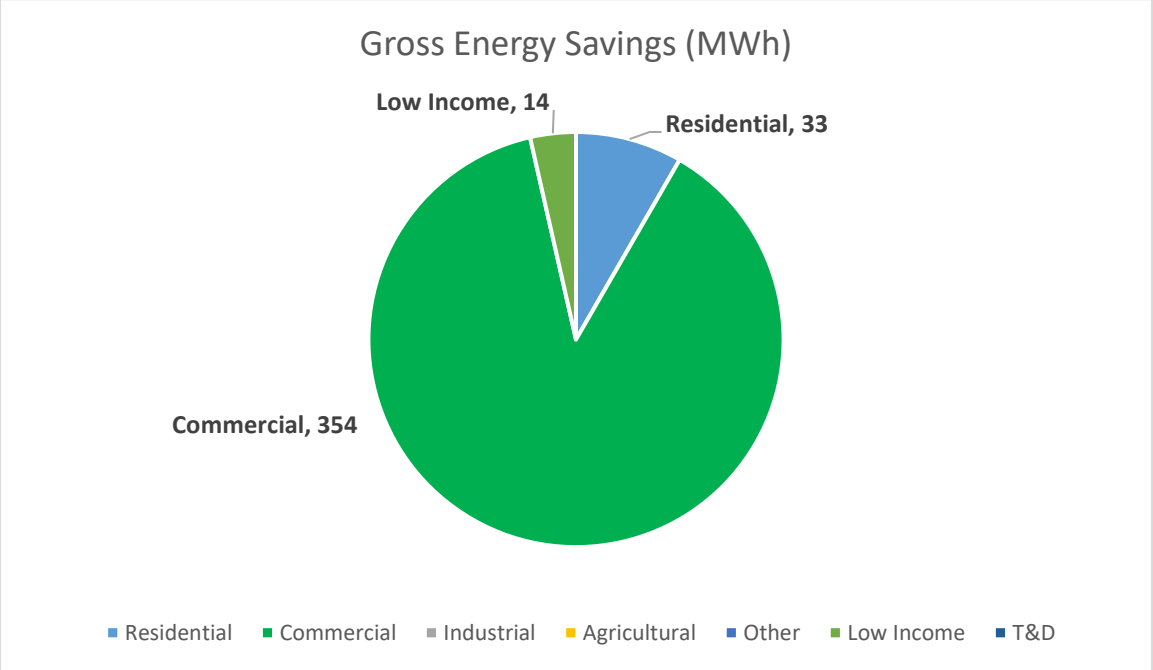
TABLE 3. Lodi EE Program Results by Building Type

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	83	559,886	6,147,141	82	549,150	6,056,488	2,471	$128,072	4.70	4.92	0.026
Grocery	0	1,193	17,888	0	1,014	15,204	5	$1,216	1.34	1.85	0.107
Office - Small	0	558	8,374	0	475	7,118	2	$453	1.60	1.29	0.085
Other Commercial	4	16,361	245,411	4	13,907	208,600	66	$10,126	2.06	2.14	0.065
Residential	100	315,142	3,949,264	46	231,244	2,466,929	1,439	$258,371	1.75	1.69	0.132
Residential - Single-Family	9	49,073	463,696	5	29,650	283,908	116	$44,954	0.83	0.10	0.194
EE Subtotal	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
EE and Low Income Subtotal	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	196	942,213	10,831,773	136	825,439	9,038,246	4,098	$443,192	2.51	1.48	0.061

LOMPOC

Lompoc at a Glance

- Climate Zone: 5
- Customers: 15,103
- Total annual retail sales: 117,631 MWh
- Annual Retail Revenue: $19,213,991
- Annual EE expenditures for reporting year: $178,759
- Gross annual savings from reporting year portfolio: 402 MWh



Lompoc Overview

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

In FY 2021, a majority of the LEU energy savings were achieved through commercial lighting and refrigeration retrofit programs, 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 the LEU's customer base in FY 2021, with an average residential electricity use of 334 kWh per month. Only 10% of the retail customer connections are commercial and demand customers; however, these customer classes hold the majority of energy savings opportunities within the LEU'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 $54,855 with 17.3% of the population living in poverty.[32] Many residential customers have limited funds or incentive to make EE improvements to their homes. Several small, local businesses were also affected by the COVID-19 pandemic during FY 2021, leaving little room for owner-led investment in EE upgrades during this time. To assist our customers, LEU continued to offer direct install and income-qualifying programs for customers.

Major Program and Portfolio Changes

In FY 2021, LEU continued to offer its customers EE and conservation programs identical to the prior year.

Program and Portfolio Highlights

LEU offered the Keep Your Cool Commercial Refrigeration Program to commercial market customers for a second consecutive year. The program is designed to support small, locally owned retail food stores by providing direct install upgrades to optimize refrigeration equipment. This program provided 88% of the LEU's annual energy savings in FY 2021.

Commercial, Industrial & Agricultural Programs

Lompoc offers a number of programs for commercial, industrial, and agricultural customers, including the Keep Your Cool Commercial Refrigeration Program and 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. The Keep Your Cool Commercial Refrigeration Program had the greatest participation rate among commercial programs. LEU staff worked with the owners and managers of twenty small, locally owned businesses to retrofit and/or upgrade refrigeration equipment in FY 2021.

Residential Programs

LEU offers several rebate opportunities for residential customers such as the EnergyStar® Appliance Rebate Program and LED Lighting Rebate Program. Both rebate programs provided a small percentage of the LEU's overall energy savings. Clothes washer rebates administered through the EnergyStar® Appliance Rebate Program is partly funded from Public Benefit charges, 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, LEU continued to offer the Income Qualifying EnergyStar® Refrigerator Replacement and Recycle Program in FY 2021. 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 oversees the delivery and installation of new energy-efficient refrigerators. The appliance dealer also oversees refrigerator-recycling processes for participating customers. This

[32] United States Census Bureau Quick Facts. (https://www.census.gov/quickfacts/fact/table/US/PST045221).

program expedites the process for low-income customers to participate in the EE program and assists LEU to ensure that old, inefficient appliances are recycled properly at the Lompoc 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 LEU over a year.

Complementary Programs

In addition to the portfolio programs, LEU also offers rate assistance, customer energy use auditing, and has been evaluating the feasibility of offering electric vehicle charging services. The City provides financial assistance towards electricity charges for customers who have a household income level below the Department of Housing and Urban Development (HUD) Low Income Limits Calculation for the local area.

The Customer Energy Audit Program continues to be highly successful in meeting customers' needs. Using the City's automatic meter reading capabilities, staff is able to view daily and hourly electric use data. Customers are provided reports of their electric use which can help them better understand their usage and implement staff suggestions to reduce energy use without making investments in EE upgrades. 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.[33]

Major Differences or Diversions from California POU TRM for Energy Savings

The City of Lompoc used the California Municipal Utilities Association Savings Estimation Technical Reference Manual as the primary source for calculating and reporting annual EE program performance during FY 2021.

[33] (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	0	9,017	98,057	0	4,072	44,061	23	$34,536	0.17	0.19	0.978
Commercial Refrigeration	50	354,129	2,997,369	48	336,422	2,847,501	1,074	$88,427	3.10	3.10	0.036
Lighting - Indoor	5	23,240	280,754	4	18,429	222,162	87	$15,532	1.56	1.81	0.088
Lighting - Outdoor	0	1,216	14,490	0	969	11,574	4	$698	1.64	2.03	0.076
EE Subtotal	55	387,601	3,390,670	52	359,891	3,125,297	1,189	$139,194	2.20	2.28	0.053
Appliance & Plug Loads	1	14,299	139,205	1	10,009	97,443	37	$39,565	0.30	0.37	0.507
Low-Income Subtotal	1	14,299	139,205	1	10,009	97,443	37	$39,565	0.30	0.37	0.507
EE and Low Income Subtotal	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066

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	50	354,129	2,997,369	48	336,422	2,847,501	1,074	$88,427	3.10	3.10	0.036
Residential	5	33,473	393,301	4	23,469	277,797	115	$50,766	0.62	0.69	0.230
EE Subtotal	55	387,601	3,390,670	52	359,891	3,125,297	1,189	$139,194	2.20	2.28	0.053
Residential	1	14,299	139,205	1	10,009	97,443	37	$39,565	0.30	0.37	0.507
Low-Income Subtotal	1	14,299	139,205	1	10,009	97,443	37	$39,565	0.30	0.37	0.507
EE and Low Income Subtotal	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066

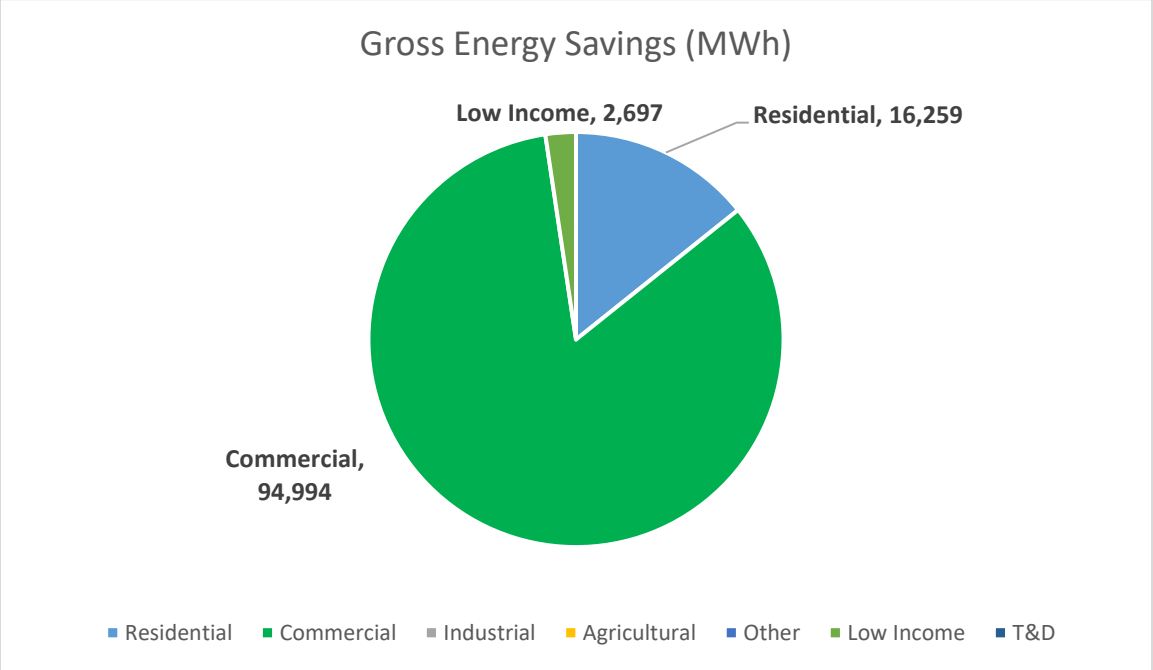
TABLE 3. Lompoc EE Program Results by Building Type

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	55	379,578	3,294,803	52	356,546	3,083,575	1,166	$106,343	2.82	2.91	0.041
Residential	0	6,322	72,046	0	2,154	25,047	16	$26,002	0.15	0.16	1.301
Residential - Single-Family	0	1,701	23,821	0	1,191	16,675	6	$6,849	0.26	0.28	0.538
EE Subtotal	55	387,601	3,390,670	52	359,891	3,125,297	1,189	$139,194	2.20	2.28	0.053
All	1	6,776	33,880	1	4,743	23,716	10	$7,956	0.39	0.54	0.366
Residential - Single-Family	0	7,523	105,325	0	5,266	73,727	27	$31,609	0.28	0.34	0.562
Low-Income Subtotal	1	14,299	139,205	1	10,009	97,443	37	$39,565	0.30	0.37	0.507
EE and Low Income Subtotal	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	57	401,901	3,529,874	53	369,901	3,222,741	1,225	$178,759	1.78	1.91	0.066

LOS ANGELES DEPARTMENT OF WATER & POWER

Los Angeles at a Glance

- Climate Zones: 6, 8, 9
- Customers: 1,500,000
- Total annual retail sales: 22,382,000 MWh
- Annual Retail Revenue: $4,200,000,000
- Annual EE expenditures for reporting year: $107,297,471
- Gross annual savings from reporting year portfolio: 113,949 MWh



Los Angeles Overview

The Los Angeles Department of Water and Power (LADWP) was established in 1902 to deliver water to the City of Los Angeles and 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: CZ6, CZ8, CZ9, and CZ16. A peak demand of 6,094 MW was registered on August 18, 2020.

Major Program and Portfolio Changes

As the situation around COVID-19 continues to evolve, to prioritize the health and safety of customers, employees, and contractors, effective March 2020, some programs were temporarily suspended, including the Home Energy Improvement Program, HVAC Optimization Program, Refrigerator Exchange Program, Refrigerator Turn-In & Recycle, Los Angeles Unified School District (LAUSD) Direct Install Program and the Commercial Direct Install Program.

The LAUSD Direct Install Program and the Commercial Direct Install Program had limited activity resume in vacant schools and select Recreation and Park facilities beginning Summer 2020.
The HVAC Optimization Program, Refrigerator Exchange Program, Refrigerator Turn-In & Recycle, and the Commercial Direct Install Program resumed full operation in June 2021.
The Home Energy Improvement Program (HEIP) remained suspended throughout FY 2021. The Residential Lighting Efficiency Program (RLEP), while a seasonal program, had no program offerings during FY 2021.

Program and Portfolio Highlights

Efficient Product Marketplace (EPM)
The online store feature was launched on the EPM site in August 2020, allowing customers to purchase select products directly through the website and receive their rebate in the form of an instant discount off the purchase price. Additionally, two informational only categories (safety & preparedness and solar) were added to the EPM website in Fall 2020.
Food Service Program
The Comprehensive Food Service Program (CFSP) agreement with SoCal Gas ended in December 2020 and the program was brought in-house to be fully administered by LADWP.
The program team initiated a targeted email marketing campaign to customers and collaborated with internal stakeholders and community business associations to promote the program. One promotional effort included a temporary boost of financial incentives for all measures for the period of January-March 2021 to increase program participation and awareness, assist customers during COVID-19, and to engage dealers that had been initially hesitant to participate.
In January 2021, the program performed a comparative analysis of shared measures with the Custom Performance Program. This resulted in the removal of measures from the Food Service Program, including auto closers, demand control ventilation, evaporator fan controllers, and others.
Custom Performance Program (CPP):
While COVID-19 restrictions prevented in-person verifications, the program team collaborated with engineering service providers to develop online verification methods to remotely document facility conditions. This allowed continued processing of customer applications with minimal disruption to the program process.
The program conducted a test pilot for specialty Film Set lighting and designed special parameters around the incentives for this efficiency equipment. Additionally, in response to vaccine storage needs, the program began incentivizing efficient ultra-low temperature freezers.
City Plants:
The Tree Ambassador sub-program trains local members of disadvantaged communities about 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.
Commercial Lighting Incentive Program:
The program worked with LADWP Field teams to develop virtual verifications which saved travel time to and from in-person verifications. In many cases, the virtual verifications have provided

flexibility and time savings in the program process and thus will be primarily utilized going forward. The program also converted in-person monthly workshops to monthly webinars.

LAUSD Direct Install

The program's new five-year Memoranda of Understanding (MOU) became effective in February 2021, no full activity on school sites under new MOU until April 2021. This new MOU provides that the cost of projects be shared between LADWP and LAUSD through incentive matching, of up to $12 million per year.

Consumer Rebate Program

The Attic Insulation Program was suspended for redesign in January 2021.

Home Energy Improvement Program

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.

HVAC Optimization Program

Participating program contractors are now required to be certified as Nest Pro installers, which increases the warranty available to customers on the installed thermostats. The program temporarily implemented a contactless commercial offering in April 2021.

Refrigerator Turn in & Recycle Program

In an effort to increase customer awareness and participation of the program, LADWP implemented a marketing pilot program at a national retailer and increased the incentive from $50 to $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:

1. Express – Select prescriptive measures using deemed savings
2. 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)

https://newbuildings.org/resource/building-electrification-technology-roadmap/

- E3's Residential Building Electrification in California

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

LADWP is also partnered with the 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).[34]

The set of tools and methods allows LADWP to assess potential impacts as it relates to it 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 energy efficiency. This program is operated by the City Plants team under the city's Board of Public Works and supported by LADWP.

Through this partnership, City Plants 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 customers and planting trees on residential parkways, commercial parkways, and other city property (Res Cooling, Res Shell, Commercial Shell).

Codes and Standards (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 LA Department of Building and Safety, legislative review, sponsorship of local ordinances, and participation in policy efforts with other City departments, state agencies and utilities. The goal of this program is to promote sustainability concerning water and energy use. The principal audience includes the LA City Department of Building and Safety, LA City Planning, LA City Department of Public Works, and the LA City Council, which 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 Direct Install:

The Commercial Direct Install Program is a free direct-install program that targets small, medium, and large business customers in the LADWP service territory. LADWP partners with Southern California Gas Company (SoCalGas) on this program to offer a tri-resource efficiency program

[34] (https://www.ladwp.com/ladwp/faces/ladwp/aboutus/a-power/a-p-cleanenergyfuture/a-p-renewableenergystudy)

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)

Energy Savings Assistance Program (ESAP):

The ESAP is a collaborative program with SoCal Gas that offers, free of charge, energy-efficient electric, water, and natural gas upgrades to income-qualified multi-family (MF) residential customers. The ESAP offers efficiency measures for the individual residential units. (Res Comprehensive).

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)

LAUSD Direct Install:

The Los Angeles Unified School District Direct Install 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 Direct Install (CDI) program to assist LAUSD facilities reducing energy usage and corresponding utility expenses. (Non-Res Lighting)

Savings by Design / Zero by Design:

The SBD Program was a California statewide non-residential new construction program, in which LADWP partnered with SoCal Gas 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 SoCal Gas. 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 Heating, Ventilation, and Air Conditioning (HVAC) Program is a market transformation-oriented program. This program offers incentives to upstream market actors who sell qualifying high-efficiency HVAC equipment. The logic that underscores this program's design is that a small number of upstream market actors 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) program provides customers an opportunity to research, locate, and purchase energy-efficient products from a single website. EPM is a convenient, one-stop web-based solution that provides a selection of popular energy-efficient brands available at numerous stores and online retailers, pricing and available rebate information on eligible products, and quick rebate turnaround. The program design simplifies shopping for a product and streamlines obtaining a rebate (Res Cooling, Res Lighting, Res Refrigeration).

Home Energy Improvement Program:

The Home Energy Improvement Program (HEIP) is a comprehensive direct install 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 disadvantaged communities and residential customers by including the multi-family segment (Res Shell, Res Lighting).

Home Energy Upgrade California:

The Home Energy Upgrade (HEU) Program is a collaborative effort in which LADWP partners with SoCal Gas to deliver a whole house residential retrofit EE program. The HEU Program offers incentives to homeowners who complete selected energy-saving home improvements on single-family residences or 2-4 unit buildings, such as townhouses, condominiums, etc. (Res Cooling, Res Comprehensive, Res Lighting, Res Water Heating, Res Shell).

HVAC Optimization Program:

LADWP's Air Conditioning Optimization Program (ACOPT) provides certified AC technicians services to analyze cooling systems and provide basic maintenance and efficiency services. This service is free for all eligible residential and commercial LADWP customers. It includes complimentary AC diagnostic and maintenance services and the installation of smart thermostats for eligible, Wi-Fi enabled residential customers. The program was redesigned in FY 17-18 to serve customers better and to include an incentive for early replacement of older AC units where warranted (Res Cooling).

Refrigerator Exchange / 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 Appliance Recycling Centers of America (ARCA), to administer the program's delivery and provide energy-efficient refrigerators for this customer segment to replace 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 a 3rd Party Contractor, 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 Direct Install 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.

Research, Development, and Demonstration:
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 (EPRI).
Electric Vehicles Electric Vehicle Charger Rebate Program:
LADWP introduced the Electric Vehicle Charger Rebate Program, "Charge Up L.A.!" to encourage the installation of convenient 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 additional 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 thru FY 2020 while simultaneously reviewing impact savings as it occurs (concurrently), from FY 2021 thru 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 EM&V contract will also have a contract term duration of 3 years. With comparable budgets as proportioned to the portfolio savings.
LADWP has opted to evaluate its programs and activities from a holistic standpoint, 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.[35]

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

[35](https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=OPLADWPCCB436019&RevisionSelectionMethod=LatestReleased)

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

LADWP is currently transitioning towards leveraging the California Technical Forum Electronic Technical Reference Manual (eTRM) for its deemed savings references. Moving forward, all new additions and updates will be referring to the eTRM as the primary source.

For the current FY 2021 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**	**Utility ($/kWh)**
Appliance & Plug Loads	430	2,274,691	23,170,965	430	2,274,691	23,170,965	1,207	$2,925,684	0.46	0.52	0.165
Building Envelope	5,112	11,219,325	221,206,894	5,112	11,219,325	221,206,894	9,911	$32,981,825	1.20	0.98	0.245
Commercial Refrigeration	276	2,083,873	27,299,035	276	2,083,873	27,299,035	1,218	$618,139	2.35	1.76	0.032
Food Service	26	194,012	2,443,038	26	194,012	2,443,038	106	$689,162	0.19	0.20	0.392
HVAC - Cooling	3,175	11,042,092	148,885,626	3,175	11,042,092	148,885,626	5,786	$7,403,298	1.89	2.22	0.071
HVAC - Heat Pump	19	75,819	524,737	19	75,819	524,737	25	$65,893	1.29	1.00	0.159
HVAC - Heating	0	-19,131	-221,957	0	-19,131	-221,957	-12	($2,430)	2.23	2.23	0.015
Lighting - Indoor	5,326	37,904,600	310,278,242	5,326	37,904,600	310,278,242	14,142	$27,425,229	0.67	1.21	0.111
Lighting - Outdoor	552	14,906,261	119,743,676	552	14,906,261	119,743,676	7,673	$10,103,270	0.44	0.92	0.106
Miscellaneous	181	1,375,644	18,992,627	181	1,375,644	18,992,627	778	$765,803	1.39	0.98	0.057
Process	1,270	9,894,837	135,241,308	1,270	9,894,837	135,241,308	5,482	$3,485,501	2.07	2.74	0.037
Service & Domestic Hot Water	-1	9,750	220,532	-1	9,750	220,532	9	$16,585	0.00	0.00	0.121
Transmission & Distribution	171	1,538,820	17,564,749	171	1,538,820	17,564,749	788	$406,865	2.11	0.79	0.031
Water Pumping / Irrigation	1,745	10,967,419	164,319,131	1,745	10,967,419	164,319,131	6,754	$851,946	11.04	10.95	0.008
Whole Building	1,146	7,784,143	91,643,087	1,146	7,784,143	91,643,087	4,209	$2,392,138	2.19	3.03	0.035
EE Subtotal	19,431	111,252,155	1,281,311,690	19,431	111,252,155	1,281,311,690	58,076	$90,128,907	1.14	1.32	0.098
Appliance & Plug Loads	42	219,399	996,921	42	219,399	996,921	49	$262,464	0.22	0.23	0.347
Building Envelope	151	330,134	6,571,709	151	330,134	6,571,709	294	$2,247,935	0.52	0.52	0.564
Food Service	30	105,988	1,483,408	30	105,988	1,483,408	69	$562,546	0.20	0.23	0.543
HVAC - Cooling	5	10,233	141,944	5	10,233	141,944	7	$13,412	2.07	2.18	0.135
HVAC - Heat Pump	5	26,601	370,937	5	26,601	370,937	19	$19,967	1.76	2.31	0.077
Lighting - Indoor	143	1,302,084	2,349,256	143	1,302,084	2,349,256	139	$174,684	0.61	0.62	0.084
Lighting - Outdoor	67	517,084	3,996,262	67	517,084	3,996,262	194	$236,082	0.87	0.97	0.082
Service & Domestic Hot Water	8	78,807	1,098,570	8	78,807	1,098,570	48	$43,705	1.03	1.33	0.057
Water Pumping / Irrigation	1	3,365	46,861	1	3,365	46,861	2	$1,958	1.53	2.31	0.060
Whole Building	17	103,309	1,438,702	17	103,309	1,438,702	67	$92,593	0.99	1.37	0.092
Low-Income Subtotal	468	2,697,005	18,494,570	468	2,697,005	18,494,570	889	$3,655,347	0.51	0.53	0.283
EE and Low Income Subtotal	19,898	113,949,160	1,299,806,260	19,898	113,949,160	1,299,806,260	58,964	$93,784,254	1.12	1.29	0.100
All	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
Codes & Standards Subtotal	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
C&S, T&D and Electrification Subtotal	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
Utility Total	46,395	309,968,254	4,234,642,685	46,395	309,968,254	4,234,642,685	175,460	$107,297,471	2.42	2.73	0.037

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	13,062	94,993,653	1,003,233,898	13,062	94,993,653	1,003,233,898	45,260	$51,033,475	1.14	1.83	0.069
Residential	6,368	16,258,502	278,077,792	6,368	16,258,502	278,077,792	12,815	$39,095,433	1.15	0.97	0.221
EE Subtotal	19,431	111,252,155	1,281,311,690	19,431	111,252,155	1,281,311,690	58,076	$90,128,907	1.14	1.32	0.098
Residential	468	2,697,005	18,494,570	468	2,697,005	18,494,570	889	$3,655,347	0.51	0.53	0.283
Low-Income Subtotal	468	2,697,005	18,494,570	468	2,697,005	18,494,570	889	$3,655,347	0.51	0.53	0.283
EE and Low Income Subtotal	19,898	113,949,160	1,299,806,260	19,898	113,949,160	1,299,806,260	58,964	$93,784,254	1.12	1.29	0.100
Commercial	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
Codes & Standards Subtotal	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
C&S, T&D and Electrification Subtotal	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
Utility Total	46,395	309,968,254	4,234,642,685	46,395	309,968,254	4,234,642,685	175,460	$107,297,471	2.42	2.73	0.037

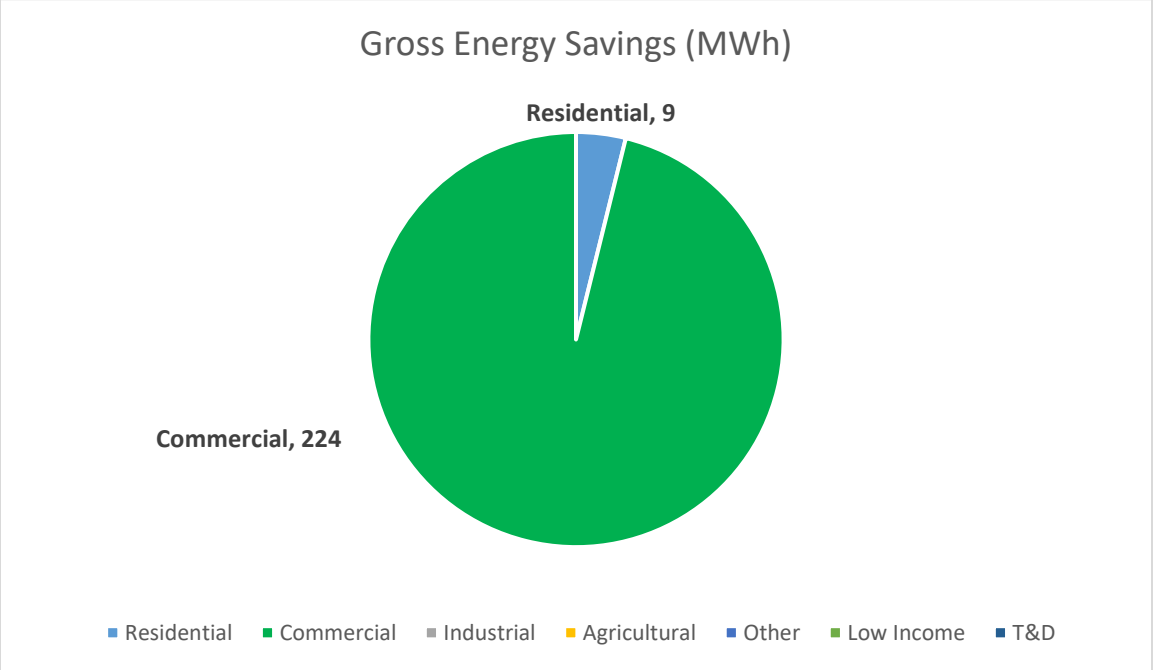
TABLE 3. LADWP EE Program Results by Building Type

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	1,729	10,886,426	162,741,038	1,729	10,886,426	162,741,038	6,691	$1,211,383	7.67	7.98	0.011
Assembly	260	3,576,362	30,648,990	260	3,576,362	30,648,990	1,874	$5,674,734	0.23	0.42	0.233
Education - Community College	93	657,975	9,032,009	93	657,975	9,032,009	388	$225,546	2.34	0.98	0.036
Education - Primary School	769	7,280,282	82,207,525	769	7,280,282	82,207,525	3,648	$10,355,192	0.42	1.97	0.170
Education - Secondary School	1,348	11,681,931	115,814,823	1,348	11,681,931	115,814,823	5,158	$4,401,432	1.47	2.49	0.049
Education - University	1,052	7,271,262	62,597,372	1,052	7,271,262	62,597,372	3,095	$3,700,030	1.02	1.17	0.075
Grocery	273	1,833,144	15,119,169	273	1,833,144	15,119,169	726	$1,434,651	0.64	0.65	0.122
Health/Medical - Hospital	1,243	8,708,996	104,710,453	1,243	8,708,996	104,710,453	4,757	$2,647,632	2.20	2.93	0.035
Health/Medical - Nursing Home	35	283,948	1,711,260	35	283,948	1,711,260	91	$145,268	0.62	0.93	0.100
Lodging - Hotel	178	1,282,419	8,389,057	178	1,282,419	8,389,057	454	$600,722	0.84	1.00	0.087
Manufacturing Light Industrial	207	1,716,724	11,755,233	207	1,716,724	11,755,233	604	$872,061	0.70	1.13	0.091
Office - Large	2,258	15,640,018	155,057,741	2,258	15,640,018	155,057,741	6,725	$7,388,566	1.21	1.49	0.064
Office - Small	13	56,370	530,303	13	56,370	530,303	24	$45,040	0.90	0.81	0.110
Other Commercial	2,647	14,129,799	167,978,844	2,647	14,129,799	167,978,844	6,892	$8,121,330	1.45	2.10	0.067
Other Industrial	245	4,707,103	29,262,075	245	4,707,103	29,262,075	1,888	$1,959,196	0.60	1.05	0.080
Residential - Multi-Family	449	2,053,038	26,774,577	449	2,053,038	26,774,577	1,250	$2,386,856	1.07	1.19	0.128
Residential - Single-Family	5,982	14,606,972	253,761,237	5,982	14,606,972	253,761,237	11,687	$36,930,709	1.15	0.96	0.231
Restaurant - Fast-Food	0	550	7,724	0	550	7,724	0	$159	2.67	0.74	0.030
Restaurant - Sit-Down	1	7,449	67,098	1	7,449	67,098	4	$11,961	0.27	0.38	0.226
Retail - Big Box	59	349,257	2,981,366	59	349,257	2,981,366	136	$171,869	1.18	1.85	0.075
Retail - Large	301	1,634,719	13,591,206	301	1,634,719	13,591,206	627	$579,962	1.63	2.16	0.054
Retail - Small	18	74,306	645,489	18	74,306	645,489	29	$129,655	0.39	0.60	0.253
Storage - Conditioned	55	454,533	2,739,445	55	454,533	2,739,445	139	$235,226	0.61	0.90	0.101
Storage - Unconditioned	2	16,112	145,221	2	16,112	145,221	7	$35,249	0.21	0.38	0.308
Warehouse - Refrigerated	213	2,342,461	23,042,434	213	2,342,461	23,042,434	1,181	$864,479	1.30	2.14	0.050
EE Subtotal	19,431	111,252,155	1,281,311,690	19,431	111,252,155	1,281,311,690	58,076	$90,128,907	1.14	1.32	0.098
Residential - Multi-Family	322	2,375,125	12,105,908	322	2,375,125	12,105,908	603	$1,489,167	0.49	0.55	0.165
Residential - Single-Family	145	321,879	6,388,662	145	321,879	6,388,662	286	$2,166,179	0.52	0.52	0.559
Low-Income Subtotal	468	2,697,005	18,494,570	468	2,697,005	18,494,570	889	$3,655,347	0.51	0.53	0.283
EE and Low Income Subtotal	19,898	113,949,160	1,299,806,260	19,898	113,949,160	1,299,806,260	58,964	$93,784,254	1.12	1.29	0.100
All	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
Codes & Standards Subtotal	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
C&S, T&D and Electrification Subtotal	26,497	196,019,094	2,934,836,426	26,497	196,019,094	2,934,836,426	116,496	$13,513,217	11.45	11.45	0.007
Utility Total	46,395	309,968,254	4,234,642,685	46,395	309,968,254	4,234,642,685	175,460	$107,297,471	2.42	2.73	0.037

MERCED IRRIGATION DISTRICT

Merced at a Glance

- Climate Zone: 13
- Customers: 12,000
- Total annual retail sales: 521,528 MWh
- Annual Retail Revenue: $69,548,000
- Annual EE expenditures for reporting year: $286,134
- Gross annual savings from reporting year portfolio: 233 MWh



Merced 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 of our residential customer base is made up of relatively new construction.

Major Program and Portfolio Changes

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

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

Program and Portfolio Highlights

Commercial, Industrial & Agricultural Programs

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

Residential Programs

Current Residential Customer Programs:
Residential Rebate Program: This program encourages residential customers to purchase EnergyStar® labeled products and home appliances. We also offer customers rebates for upgrading their HVAC systems, installing whole house fans, and installing ceiling fans.
We are currently evaluating and revising our programs. We are considering adding additional incentives for our low-income customers.

Complementary Programs

Since 2000, Merced Irrigation District's Residential Energy Assistance Program (CARE) has been providing a 20% discount on monthly energy bills for Low-Income Families, along with the Medical Baseline and Life-Support Program for those who depend on electrically powered medical equipment.

EM&V Studies

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

TABLE 1. Merced 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	7,289	87,986	0	3,591	45,049	18	$13,140	0.42	0.46	0.382
Building Envelope	0	1,701	34,020	0	476	9,526	4	$3,247	0.63	0.54	0.521
Lighting - Indoor	0	109,983	1,099,830	0	87,986	879,864	321	$129,470	0.65	0.69	0.181
Miscellaneous	0	113,714	1,137,140	0	90,971	909,712	321	$140,277	0.65	0.69	0.190
EE Subtotal	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
EE and Low Income Subtotal	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192

TABLE 2. Merced 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	223,697	2,236,970	0	178,958	1,789,576	642	$269,747	0.65	0.69	0.186
Residential	0	8,990	122,006	0	4,068	54,575	22	$16,387	0.46	0.48	0.403
EE Subtotal	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
EE and Low Income Subtotal	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192

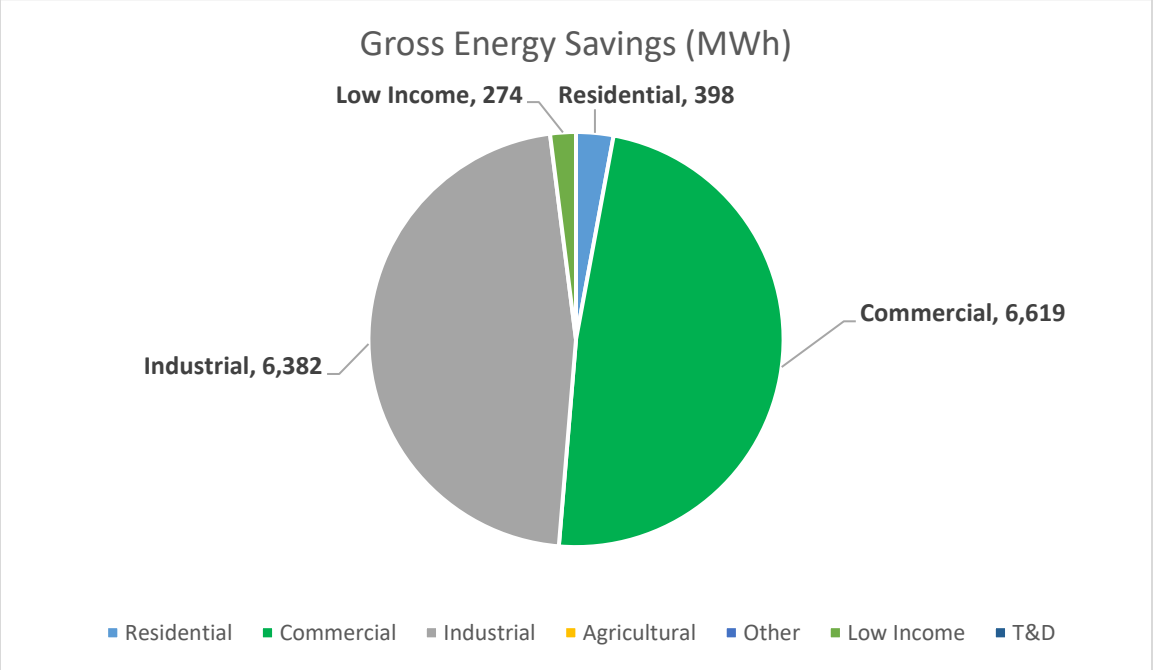
TABLE 3. Merced EE Program Results by Building Type

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	754	7,540	0	452	4,524	2	$1,772	0.31	0.44	0.483
Health/Medical - Nursing Home	0	53,571	535,710	0	42,857	428,568	158	$62,614	0.65	0.69	0.180
Office - Small	0	56,412	564,120	0	45,130	451,296	163	$66,856	0.65	0.69	0.183
Residential	0	5,381	74,500	0	1,617	22,074	10	$7,167	0.52	0.45	0.443
Residential - Single-Family	0	2,855	39,966	0	1,998	27,976	10	$7,448	0.44	0.52	0.359
Retail - Large	0	113,714	1,137,140	0	90,971	909,712	321	$140,277	0.65	0.69	0.190
EE Subtotal	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
EE and Low Income Subtotal	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	0	232,687	2,358,976	0	183,025	1,844,151	663	$286,134	0.64	0.67	0.192

MODESTO IRRIGATION DISTRICT

Modesto at a Glance

- Climate Zone: 12
- Customers: 131,535
- Total annual retail sales: 2,640,799 MWh
- Annual Retail Revenue: $381,593,605
- Annual EE expenditures for reporting year: $2,943,644
- Gross annual savings from reporting year portfolio: 13,673 MWh



Modesto Overview

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

MID's 2021 annual retail electric sales by customer class are: 37.7% residential, 26.2% commercial, 31.3% industrial, 4.5% agricultural and pumping, 0.4% other. Load growth in 2021 was 1.30% (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 2021.

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 2021. Social media promotions have improved the customer awareness of MID programs, especially due to the COVID-19 restrictions.

Commercial, Industrial & Agricultural Programs

Programs offered are MPower Business, Business Custom and Business New Construction. See MID website for program details.[36]

Residential Programs

Programs offered are MPower Home and Weatherization. See MID website for program details.

Complementary Programs

Low-Income Programs: MID's low income programs are comprised of weatherization, CARE rate discount and educational outreach. Energy savings from the weatherization program are included in the results for the SB1037 report. Customer demand for weatherization exceeds the annual amount budgeted and the rate discount alone represents a substantial portion of the total public benefits funding allocation. However, MID continues to facilitate new partnerships with other organizations and agencies to increase its outreach and provide additional weatherization services to low-income customers. In 2021 MID also initiated an on bill donation program partnering with the local Salvation Army.

New Energy Saving and Carbon Reduction Programs: MID didn't have any new programs for 2021.

Renewable Energy Programs: MID's renewable energy programs are conducted in accord with legislative and regulatory mandates, such as the Renewable Portfolio Standard (RPS) and the California Solar Initiative (CSI/SB1). To date, MID has procured enough renewable energy to satisfy the renewable energy trajectory that was established by the Energy Commission through 2026. MID continues to work toward meeting the remaining targets through 2030.

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

Electric Vehicles: MID has an EV Charger rebate program. Qualified Level 2 residential and commercial chargers receive a $500 rebate per unit. Demand for the program has been steady as the adoption of EV's are growing in the MID service territory. It is anticipated that MID will be using LCFS funding for chargers for public transit and for school buses in our service territory.

[36] (www.mid.org)

Energy Storage: In 2014, the MID board of directors adopted a policy determining that energy storage targets are not appropriate for MID, and subsequently adopted a policy update confirming the original determination that energy storage targets are not appropriate for MID. Although mandatory energy storage targets have not been adopted, the district's ongoing efforts to evaluate the benefits of energy storage have resulted in the inclusion of 10 MW of energy storage capacity with the most recent renewable energy procurement. MID is also currently soliciting proposals for new carbon-free resources, including for standalone and hybrid energy storage projects.

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 2021, Power Services, Inc., a certified measurement & verification professional (CMVP) qualified firm performed M&V on selected projects. Due to COVID-19 and safety issues Anchor Blue Consulting conducted M&V on the 2019 and 2020 EE portfolios. Review of the 2021 portfolio will be done in 2022.

MID's annual budget for EM&V work is $75,000 and completed studies can be found on the CMUA website.[37]

Major Differences or Diversions from California POU TRM for Energy Savings

None.

[37] (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**	**Utility ($/kWh)**
All	539	4,199,150	59,798,095	431	3,359,320	47,838,476	16,811	$767,337	7.68	2.96	0.021
Appliance & Plug Loads	30	171,990	1,638,096	23	106,960	1,014,707	383	$68,971	2.41	1.16	0.083
BROs	20	180,263	268,950	20	180,263	268,950	104	$4,542	10.24	10.24	0.018
Building Envelope	86	81,110	1,344,524	50	46,629	765,586	363	$63,293	4.17	1.14	0.117
Commercial Refrigeration	4	465,252	4,790,073	3	372,202	3,832,059	1,414	$92,679	4.15	2.39	0.030
HVAC - Cooling	215	167,063	2,335,109	172	137,355	1,908,582	1,296	$305,060	2.51	1.89	0.211
Lighting - Indoor	377	5,731,548	74,516,232	302	4,585,238	59,612,985	24,411	$961,520	7.40	0.97	0.021
Lighting - Outdoor	0	2,402,701	31,206,020	0	1,922,161	24,964,816	11,825	$396,791	7.34	1.39	0.021
EE Subtotal	1,272	13,399,077	175,897,100	1,001	10,710,127	140,206,162	56,608	$2,660,192	6.60	1.42	0.025
Appliance & Plug Loads	0	36,340	653,651	0	36,340	653,651	237	$70,612	1.05	1.05	0.154
Building Envelope	4	4,725	44,916	4	4,725	44,916	18	$8,390	1.49	1.49	0.227
HVAC - Cooling	6	34,220	188,783	6	34,220	188,783	99	$60,612	0.80	0.80	0.365
Lighting - Indoor	10	192,751	1,446,306	10	192,751	1,446,306	588	$135,377	1.29	1.29	0.110
Miscellaneous	0	5,892	75,174	0	5,892	75,174	28	$8,461	1.02	1.02	0.147
Low-Income Subtotal	20	273,928	2,408,831	20	273,928	2,408,831	970	$283,452	1.12	1.12	0.145
EE and Low Income Subtotal	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027

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	439	6,619,360	86,783,713	355	5,331,540	69,480,761	26,977	$1,138,065	7.18	1.06	0.021
Industrial	513	6,382,017	84,099,543	410	5,105,614	67,279,635	27,666	$1,109,876	7.41	2.07	0.021
Residential	320	397,700	5,013,843	236	272,973	3,445,767	1,965	$412,250	2.79	1.52	0.157
EE Subtotal	1,272	13,399,077	175,897,100	1,001	10,710,127	140,206,162	56,608	$2,660,192	6.60	1.42	0.025
Residential	20	273,928	2,408,831	20	273,928	2,408,831	970	$283,452	1.12	1.12	0.145
Low-Income Subtotal	20	273,928	2,408,831	20	273,928	2,408,831	970	$283,452	1.12	1.12	0.145
EE and Low Income Subtotal	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027

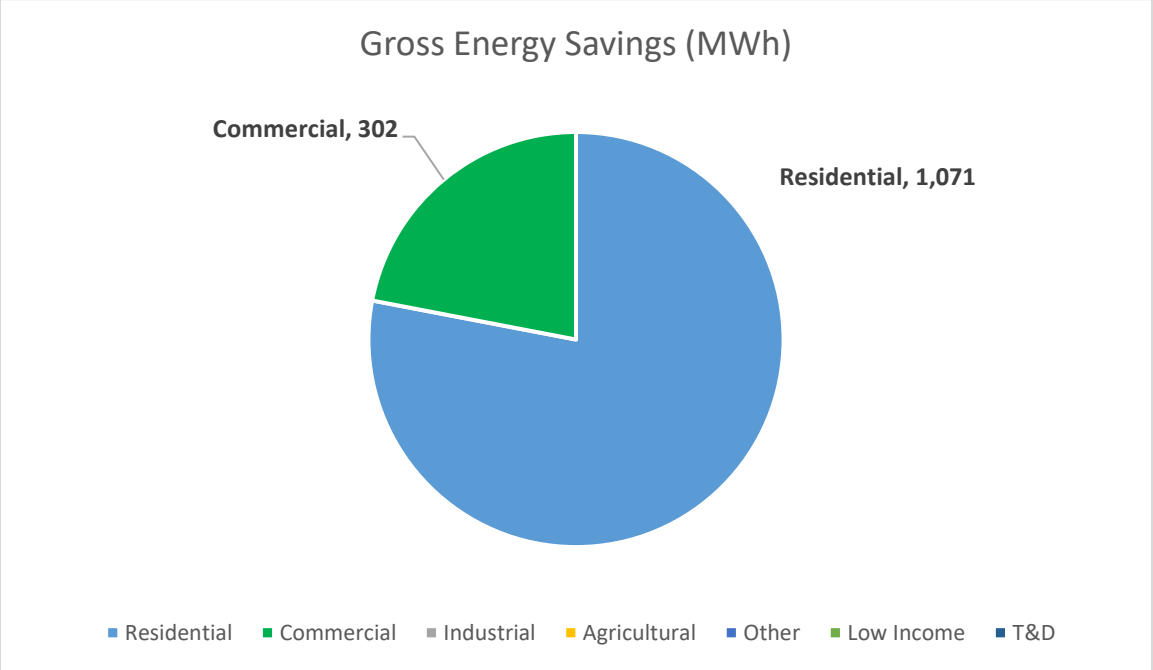
TABLE 3. MID EE Program Results by Building Type

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	741	11,056,374	143,960,485	592	8,843,209	115,159,026	47,072	$1,938,952	7.11	1.24	0.022
Manufacturing Light Industrial	195	1,783,644	26,747,441	156	1,426,915	21,397,953	7,493	$315,016	8.20	5.07	0.020
Office - Large	20	180,263	268,950	20	180,263	268,950	104	$4,542	10.24	10.24	0.018
Residential	222	121,113	1,772,456	179	97,266	1,422,462	686	$257,254	2.53	2.04	0.242
Residential - Multi-Family	2	1,830	18,175	1	1,007	9,996	5	$755	4.58	2.83	0.092
Residential - Single-Family	92	255,853	3,129,593	53	161,468	1,947,775	1,247	$143,673	3.38	1.13	0.096
EE Subtotal	1,272	13,399,077	175,897,100	1,001	10,710,127	140,206,162	56,608	$2,660,192	6.60	1.42	0.025
Residential	12	195,851	1,484,456	12	195,851	1,484,456	606	$147,284	1.26	1.26	0.117
Residential - Mobile Home	4	34,534	209,136	4	34,534	209,136	102	$56,227	0.79	0.79	0.316
Residential - Multi-Family	0	884	14,738	0	884	14,738	5	$2,033	1.00	1.00	0.193
Residential - Single-Family	4	42,659	700,501	4	42,659	700,501	256	$77,907	1.11	1.11	0.155
Low-Income Subtotal	20	273,928	2,408,831	20	273,928	2,408,831	970	$283,452	1.12	1.12	0.145
EE and Low Income Subtotal	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,292	13,673,005	178,305,930	1,021	10,984,055	142,614,993	57,578	$2,943,644	6.07	1.41	0.027

MORENO VALLEY ELECTRIC UTILITY

Moreno Valley at a Glance

- Climate Zone: 10
- Customers: 7,199
- Total annual retail sales: 208,573 MWh
- Annual Retail Revenue: $36,378,568
- Annual EE expenditures for reporting year: $445,607
- Gross annual savings from reporting year portfolio: 1,373 MWh



Moreno Valley Overview

Moreno Valley Electric Utility (MVU), municipally owned, began serving its first customers on February 6, 2004. These "first customers" are located in the Promontory Park subdivision built by Western Pacific Housing, located at Cactus Avenue and Moreno Beach Drive. Since then, MVU has witnessed significant load growth peaking at just over 53 megawatts.

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

Residential Programs

- Residential Energy Audit & Direct Install – this program targets very high energy use customers and participants in our Low Income Program. The program provides eligible residential customers with a full in-home energy audit and specific recommendations for their home plus a fixed set of EE upgrades, including the Nest thermostat, at no cost to the customer.
- EnergyStar® Appliance Rebates – customers who purchase EnergyStar® Qualified appliances can apply for a fixed rebate amount under this program.
- Weatherization – rebates are available for energy efficient windows, doors, attic insulation, and high SEER air conditioning and heat pumps.
- Building Electrification - MVU offers rebates for electric heat pump water heaters for those customers who want to remove their natural gas appliances.

Complementary Programs

- Low-Income Programs: MVU's Energy Bill Assistance Program provides income qualified residents with a 12% or 20% discount on monthly energy charges; this year's expenditures were over $145,000.
- COVID-19 Assistance Program: this temporary program was created to provide relief to customers affected by the pandemic and provided over $98,000 in bill assistance.

- Demand Response: MVU continues to maintain and operate 15 commercial Ice Bear units on both city and customer facilities.
- Research, Development, and Demonstration: Nothing new 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: A few 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 TOU.
- Educational Program: MVU has contracted with Franklin Energy, formerly ResourceAction, in partnership with the SoCal Gas to provide teachers, students, and their families a school-based EE program.

EM&V Studies

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

Sources of Energy Savings

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

- Commercial Codes & Standards – 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 Energy Commission.

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	0	1,068,938	10,689,380	0	962,044	9,620,442	3,726	$423,020	2.40	2.40	0.053
Appliance & Plug Loads	0	2,256	29,605	0	1,371	18,441	7	$825	2.67	2.44	0.058
Lighting - Indoor	69	301,908	3,019,080	62	271,717	2,717,172	962	$21,762	13.21	13.21	0.010
EE Subtotal	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
EE and Low Income Subtotal	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044

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	69	301,908	3,019,080	62	271,717	2,717,172	962	$21,762	13.21	13.21	0.010
Residential	0	1,071,194	10,718,985	0	963,415	9,638,883	3,733	$423,845	2.40	2.40	0.053
EE Subtotal	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
EE and Low Income Subtotal	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044

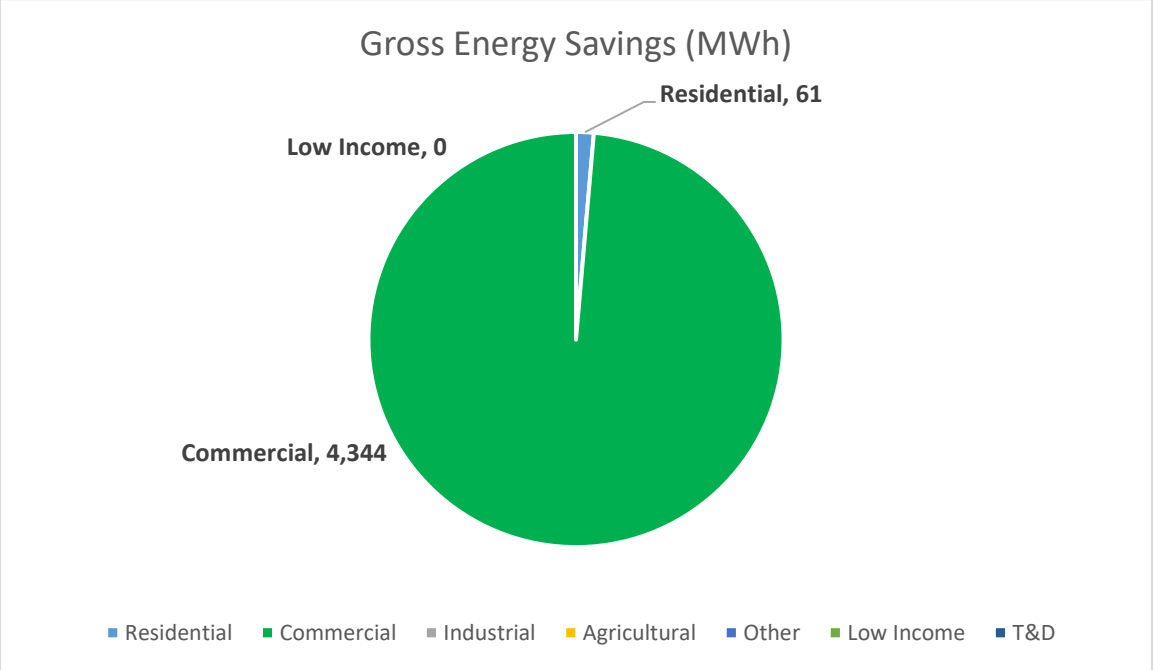
TABLE 3. MVU EE Program Results by Building Type

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	1,160	0	70	696	0	$70	1.22	2.12	0.122
Other Commercial	69	301,908	3,019,080	62	271,717	2,717,172	962	$21,762	13.21	13.21	0.010
Residential	0	1,069,443	10,694,935	0	962,201	9,622,164	3,726	$423,271	2.40	2.40	0.053
Residential - Single-Family	0	1,635	22,890	0	1,145	16,023	6	$504	3.78	4.39	0.041
EE Subtotal	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
EE and Low Income Subtotal	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	69	1,373,102	13,738,065	62	1,235,132	12,356,055	4,695	$445,607	2.93	2.93	0.044

PALO ALTO UTILITIES

Palo Alto at a Glance

- Climate Zone: 4
- Customers: 28,310
- Total annual retail sales: 813,884 MWh
- Annual Retail Revenue: $129,338,601
- Annual EE expenditures for reporting year: $1,425,857
- Gross annual savings from reporting year portfolio: 4,405 MWh



Palo Alto Overview

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), 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, Palo Alto City Council approved a Carbon Neutral Electric Resource Plan, committing CPAU to a carbon-neutral electric portfolio beginning in

2013. In FY 2021 CPAU continued purchasing carbon offsets for its complete natural gas portfolio and is currently supplying all customers with carbon neutral gas. Palo Alto continued investment into electrification and decarbonization by expanding services around electric vehicle charging and heat pump water heaters. FY 2021 is the fourth year the 2018-2027 reach goals have been in place. These reach goals are approximately 30% higher than a "business-as-usual" approach.

CPAU fell short of its electricity savings targets, achieving 0.54% versus its goal of 0.80%. Various factors contributed to below-target achievements. As an example, staff decided not to pursue launching Home Energy Reports for electricity because of the misalignment between the messaging of these reports and the community's interest in pursuing electrification of buildings and transportation as a means for reducing greenhouse gas emissions. In addition, the small and medium business program launched in April 2021 and only generated a small portion of electricity savings during this reporting year. Staff expects more savings from the SMB program in the coming fiscal year. Outside of these program-related impacts on savings, however, we also recognize in this fourth year of the 2018 - 2027 electricity efficiency goals that the savings targets are overly ambitious given the dynamics of the EE market. Savings achieved in this report are more closely aligned with the recent update of the electric efficiency goals, which takes effect in FY 2022.

Major Program and Portfolio Changes

In FY 2021 CPAU continued efforts on building-electrification activities and on supporting installation of EV charging equipment while also implementing a program to support small and medium businesses impacted by the pandemic. Two major RFPs were issued, covering both commercial and residential programs, and much effort was spent evaluating how best to help the community achieve its emissions reduction goals with these new programs. CPAU, for the fifth year, continued to claim savings associated with the development of Palo Alto's building reach code, the Green Building Ordinance.

Program and Portfolio Highlights

The Commercial and Industrial EE Program is the flagship of CPAU's commercial portfolio. With three engineering firms working closely with Key Accounts, this program yields the bulk of CPAU's energy savings. The consultants assist customers with audits, engineering studies, vendor selection, rebate processing and post-installation inspection, making the process as easy as possible for the customer. Over 80% percent of net savings reported are attributable to this program. CPAU applied this program design to the residential market with the Home Efficiency Genie as "Your Trusted Energy Advisor," and residential engagement has increased. CPAU began an EV Charger Rebate Program in late FY 2017 using funds from the sale Low Carbon Fuel Standard credits, and in FY 2021 staff worked with a variety of organizations to increase participation. During FY 2021 participation in CPAU's EV Technical Assistance Program (EVTAP) increased, with eight new customers who submitted Program Participation Agreements for a total of 43 sites enrolled in the program. The EVTAP program was designed to target installation of EV charging equipment at

nonprofits and multifamily properties, a sector identified to be significantly lacking in charging equipment. Since its launch, this program has been replicated by multiple agencies in the region.

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 2021, the CAP program resulted in net annual electric savings of 134,923 kWh.

Commercial and Industrial EE Program (CIEEP): This program offers Key Account customers the option of selecting one of three engineering consulting firms to evaluate and implement EE projects. In FY 2021, the CIEEP program produced net annual electric savings of 3,017,204 kWh. The 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 strong uptake. While only a handful of projects were completed before the end of FY 2021, staff expects even more savings from this program in FY 2022. In FY 2021, the SMB program produced net annual electric savings of 7,845 kWh.

Residential Programs

Multi-Family Plus: This program provides no-cost, direct installation of EE measures to multi-family residences with four or more units including hospices, care centers, rehab facilities and select small and medium commercial properties. These properties are typically very difficult to engage and unlikely to institute EE measures on their own. Most program activities were halted during the program year as a result of the pandemic; however, one project was completed. In FY 2021, the Multi-Family Plus program resulted in net annual electric savings of 2,465 kWh.

Home Efficiency Genie: The Home Efficiency Genie is CPAU's flagship residential program. Launched in June 2015, residents can call the 'Genie' to receive free utility bill reviews and phone consultations. This program has a high educational value for Palo Alto residents and offers personalized consultation services for all utilities-related questions, including topics such as 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 2021, the Home Efficiency Genie program did not conduct any in home assessments or perform any direct installation measures as a result of ongoing caution related to the pandemic.

Residential Energy Assistance Program (REAP): This program provides weatherization and equipment replacement services to low-income residents and those with certain medical conditions, with no cost to the residents. This program has an equal focus on efficiency and comfort, and

therefore is not meant to be cost-effective. Since this program serves only low-income residents, neither costs nor savings are included in CPAU's calculation of portfolio cost effectiveness. REAP, like the Home Efficiency Genie, also did not conduct any in-home assessments or energy improvement projects during the reporting year given caution related to the pandemic.
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. In FY 2021, the Refrigerator Recycling program produced net annual electric savings of 28,595 kWh.

Complementary Programs

Codes and Standards:
Green Building Ordinance: CPAU helped the City of Palo Alto develop a building reach code that is more stringent than the state's Title 24 standard. This ordinance applies to both residential and commercial buildings. In FY 2021, 650,525 kWh of savings were attributable to the building code. CPAU continues to choose not to participate in claiming savings from state-level codes and standards development.

Community Resource Education Programs:
CPAU offers free EE advice and energy education programs to the community. Activities include hosting Facility Manager Meetings for Key Account customers, residential energy workshops on topics such as the SunShares solar group-buy program and tabling at neighborhood association events, local fairs, and various special events throughout the Palo Alto. Events were all held virtually throughout FY 2021 due to the pandemic.

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

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

Customer-Side Renewable Energy:
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 2021 Bay Area SunShares solar group-buy program both in terms of the number of solar contracts signed and the number of kilowatts of rooftop solar capacity that will be installed through the program.

EM&V Studies

In FY 2021, CPAU did not undertake evaluation, measurement, and verification by any third parties 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 and 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**	**Utility ($/kWh)**
Appliance & Plug Loads	8	33,641	163,824	7	28,595	139,250	50	$29,031	0.46	0.46	0.223
BROs	3	25,423	182,489	3	21,610	155,116	96	$14,685	1.27	0.89	0.107
Building Envelope	49	26,975	250,600	41	22,929	213,010	298	$29,530	1.35	1.35	0.162
HVAC - Cooling	283	2,403,389	45,573,780	241	2,042,881	38,737,713	12,772	$869,374	3.74	1.61	0.030
HVAC - Heating	30	241,720	3,625,800	25	205,462	3,081,930	1,908	$94,093	3.84	0.68	0.038
Lighting - Indoor	104	962,144	13,179,260	88	817,822	11,202,371	4,071	$145,099	6.96	3.58	0.016
Lighting - Outdoor	5	107,275	1,609,125	4	91,184	1,367,756	640	$34,709	3.57	4.23	0.032
Miscellaneous	0	0	0	0	0	0	0	$69,270			0.000
Service & Domestic Hot Water	19	155,158	775,790	16	131,884	659,422	209	$26,715	2.16	2.54	0.043
Water Pumping / Irrigation	24	203,054	3,045,810	21	172,596	2,588,939	858	$63,529	3.51	2.26	0.031
Whole Building	30	245,900	1,229,500	26	209,015	1,045,075	475	$45,340	2.36	4.11	0.046
EE Subtotal	555	4,404,679	69,635,978	472	3,743,977	59,190,581	21,377	$1,421,374	3.66	1.65	0.031
Miscellaneous	0	30	600	0	30	600	0	$4,483	0.01	0.01	10.160
Low-Income Subtotal	0	30	600	0	30	600	0	$4,483	0.01	0.01	10.160
EE and Low Income Subtotal	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031

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	499	4,344,063	69,221,554	424	3,692,454	58,838,321	21,029	$1,293,543	3.98	1.70	0.029
Residential	56	60,616	414,424	48	51,524	352,260	348	$127,831	0.42	0.42	0.409
EE Subtotal	555	4,404,679	69,635,978	472	3,743,977	59,190,581	21,377	$1,421,374	3.66	1.65	0.031
Residential	0	30	600	0	30	600	0	$4,483	0.01	0.01	10.160
Low-Income Subtotal	0	30	600	0	30	600	0	$4,483	0.01	0.01	10.160
EE and Low Income Subtotal	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031

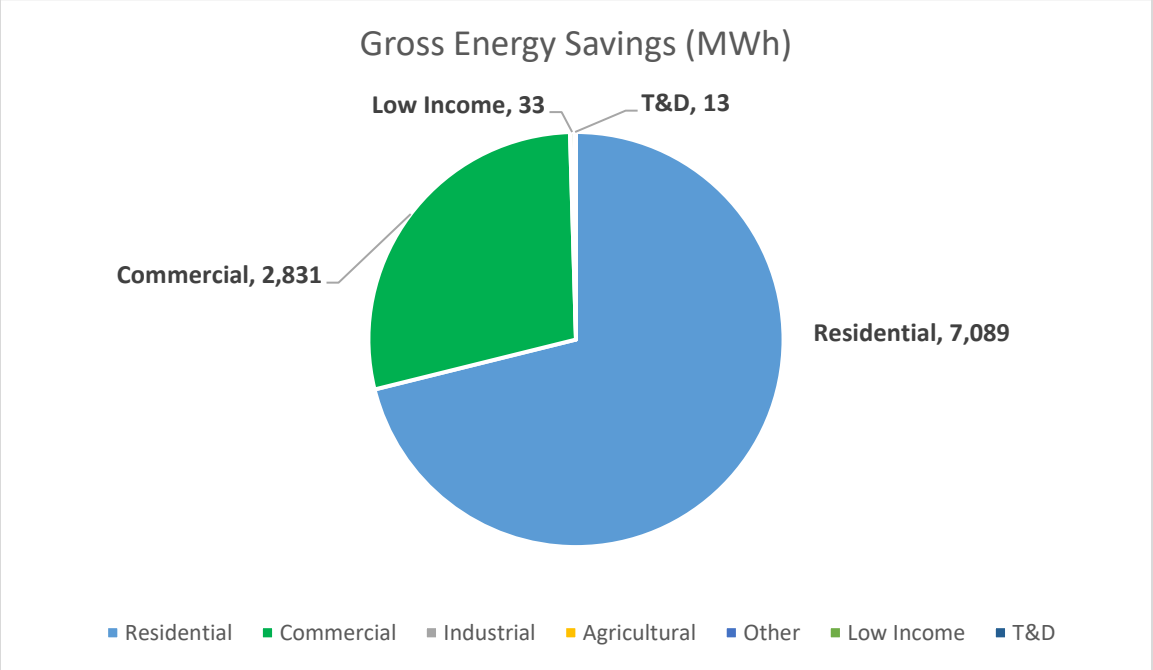
TABLE 3. CPAU EE Program Results by Building Type

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)**
All	348	2,955,339	53,345,130	296	2,512,038	45,343,361	15,194	$902,526	4.26	1.88	0.026
Office - Large	105	947,474	9,294,590	89	805,353	7,900,402	4,000	$254,051	3.24	1.08	0.039
Office - Small	21	228,967	3,434,505	17	194,622	2,919,329	941	$62,333	4.01	2.20	0.027
Other Commercial	24	203,054	3,045,810	21	172,596	2,588,939	858	$63,529	3.51	2.26	0.031
Residential	8	33,641	163,824	7	28,595	139,250	50	$98,301	0.14	0.14	0.754
Residential - Multi-Family	49	26,975	250,600	41	22,929	213,010	298	$29,530	1.35	1.35	0.162
Retail - Small	1	9,229	101,519	1	7,845	86,291	36	$11,104	0.77	4.04	0.152
EE Subtotal	555	4,404,679	69,635,978	472	3,743,977	59,190,581	21,377	$1,421,374	3.66	1.65	0.031
Residential	0	30	600	0	30	600	0	$4,483	0.01	0.01	10.160
Low-Income Subtotal	0	30	600	0	30	600	0	$4,483	0.01	0.01	10.160
EE and Low Income Subtotal	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	555	4,404,709	69,636,578	472	3,744,007	59,191,181	21,378	$1,425,857	3.65	1.65	0.031

PASADENA WATER & POWER

Pasadena at a Glance

- Climate Zone: 9
- Customers: 67,566
- Total annual retail sales: 942,266 MWh
- Annual Retail Revenue: $186,175,015
- Annual EE expenditures for reporting year: $2,417,947
- Gross annual savings from reporting year portfolio: 9,966 MWh



Pasadena 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 of are restaurants. At the same time, Pasadena has a vibrant residential community, with a diverse mix of single-family homes that ranges from craftsman homes to bungalows and two-story tract homes. In the recent years, there has been an increase in 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 latest update in 2021 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 2021, EE programs expenditures totaled $2.03 million, which is roughly 1.1% of retail revenue. PWP funds procurement of all EE programs through its Public Benefits Charge (PBC) revenues, with current PBC revenue rate at $0.00685 per kWh.
As a whole, energy-efficiency programs and other related expenses represented approximately 65% of Pasadena's PBC expenditures in FY 2021. The solar incentives represented 2%, transportation and building electrification incentives represented 15%, bill payment assistance accounted for 13% and RD&D accounted for 5%.

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.
1. PWP has kept its focus on direct-install 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 disadvantaged communities (DAC).
2. PWP successfully concluded all performance based incentives (PBI) for large solar installations, which are separate from standard solar rebates issued through the Pasadena Solar Initiative that ended on 12/31/2017.
3. PWP completed its EE potential forecast analysis with the CMUA's third party consultant, which provides an outlook for the next 10 years while also meeting the state's legislative requirements. In addition, PWP obtained City Council approval on the utility's new EE and demand reduction goals for FY 2022 to FY 2031.

Program and Portfolio Highlights

In summary, energy savings for FY 2021 are broken down into five separate categories. Commercial EE programs contributed 2,208 MWh, Residential EE programs contributed 7,128 MWh, Codes & Standards contributed 1,831 MWh, Water-Energy transfer (embedded energy savings from water conservation efforts) contributed 623 MWh and T&D upgrades contributed roughly 13 MWh. In total, PWP's EE programs produced 11,803 MWh of energy savings for FY 2021.
PWP has four EE programs that account for roughly 77% of its annual savings for FY 2021, programs with the greatest impact are as follows:
1. On the commercial side, the Business Rebate Program (BRP) provided customers with deemed incentives on various LED lighting and mechanical measures to encourage energy conservation and load reduction. In its second year of implementation, the Customized Incentive Program (CIP) contributed 463 MWh (4%) towards the annual energy savings.
2. The Water Energy Direct Install Program (WeDIP) provides customers with no-cost direct install services to select small/medium commercial customers, measures include LED Lighting and

commonly found refrigeration measures. In total, the WeDIP contributed 1,613 MWh (14%) towards the annual energy savings.
3. On the residential side, the Home Energy Report, a behavioral program that is available to all PWP residential electric customers, contributed 6,339 MWh (54%) 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.
4. Lastly, the home improvement program (HIP) provides residential electric customers with no cost direct install services. Measures include lighting, HVAC Tune-up, weatherization, high efficiency toilets, smart thermostats, and smart irrigation systems. The HIP contributed 536 MWh (4.5%) towards the annual energy savings.

Commercial, Industrial & Agricultural Programs

PWP's three commercial offerings fall into two distinct categories: rebates and direct-install programs.
1. The CIP and BRP provide incentives to any commercial electric customer to help offset the upfront costs of efficiency upgrades and capital improvement projects.
2. The no-cost direct install WeDIP program serves small businesses and includes a free evaluation to go with a customized report. Efficiency measures offered through the WeDIP include LED Lighting, refrigeration upgrades, aerators, and efficient kitchen equipment/low-flow toilet replacements.
3. The On-Demand Efficiency (ODE) program is a partnership with SoCal Gas that provides the direct installation of on-demand recirculation controls for central water heating systems in multifamily buildings, at no cost to qualifying PWP and SoCal Gas customers.

Residential Programs

PWP has seven residential offerings also fall into three distinct categories, rebates, direct-install and behavioral programs.
1. The Home Energy Rebate program provides rebates on the purchase of EnergyStar® certified appliances, qualifying variable speed pool pumps, efficient air conditioning/heat pump equipment and various building shell improvements (insulation, whole house ventilation fans, cool roofs, skylights, window film, shade trees, etc.).
2. The appliance-recycling program is a free service that encourages PWP electric customers to recycle their old functioning refrigerator/freezer and purchase a newer, more efficient model.
3. The Energy Savings Assistance Program (ESAP) is a partnership with SoCal Gas that provides no-cost direct install services to qualifying income qualified customers. As part of the program, eligible residential customers will receive various efficiency upgrades to help improve the comfort of their home while lowering energy/water consumption. Measures include attic insulation, AC Tune-up, LED light bulbs, smart power strips, smart thermostats, smart irrigation controllers, low-flow toilets and much more.
4. The Home Improvement program provides no cost direct install services to all residential electric customers. As part of the program, eligible residential customers will receive various efficiency

upgrades to help improve the comfort and efficiency of their home. Measures include attic insulation, duct sealing, AC Tune-up, smart thermostats, smart irrigation controllers and much more.
5. The income qualified refrigerator exchange program provides EnergyStar® certified refrigerators at no cost to eligible customers. Eligible participants must have a functioning refrigerator that can be swapped out with the new EnergyStar® certified model.
6. 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.
7. 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 at the Pasadena Unified School District (PUSD), scholarship for high school seniors, the Living wise green curriculum, and the Solar Cup through the Metropolitan Water District. On average, the utility is able to reach about 5,000 students each year. In particular, the green curriculum is available to all 2nd grade PUSD students and emphasizes ways to incorporate sustainability as part of their daily lifestyles.

Complementary Programs

1. Income Qualified Bill Assistance Programs: PWP has offered electric rate assistance programs to eligible low-income seniors or disabled customers for several decades. The current Electric Utility Assistance Program (EUAP) became effective in 2006 and provides monthly assistance to low income, seniors, and customers with qualifying medical equipment. The Assisting Pasadena People with Limited Emergencies (APPLE) project provides a one-time utility bill payment assistance program that provides eligible customers who need help paying their bills, up to $200 per year. Project APPLE primarily funded by PBC revenues, plus donations from PWP customers as well. In addition, PWP partners with other City departments that offers specific income-qualified services through the "Under One Roof" program to income qualified customers. Services include a limited number of exterior house paintings; wheel chair ramp installs and free turf replacement to drought tolerant landscapes and double the rebates on qualifying efficiency products offered through the Home Energy Rebates program.
2. PWP also offers a Green Power Program, where customers can opt to pay a premium (1.8 cents/kWh) on their electricity bill for clean, renewable power. This program is open to both residential and commercial customers.
3. RD&D: PWP has invested resources in a variety of different RD&D projects to align with industry trends and utility objectives. For FY 2021, RD&D funds were used to fund a portion of the utility's battery storage project for the Power Delivery section.
4. Transportation Electrification: PWP continues to encourage the private sector to build additional charging sites for public and private fleet use through a robust incentive program offering rebates of up to $50,000 per commercial 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 EV charger.
FY 2021 was a strong year for commercial EV charger rebates, providing $579,262.36 in incentives for 202 new level 2 charging ports. On the residential side, the utility provided $145,634 in rebates for the 328 residential EV and 75 residential EV chargers applications that were approved.

EM&V Studies

PWP spent roughly $44,646 on EM&V efforts for various EE programs to justify program design, expenditures and verify results:

1. Residential Rebate Program: Utility staff performed site verifications on a percentage of residential energy-efficient equipment purchases and installations
2.Residential Direct Install Program: Program implementer performed quality assurance inspections on a percentage of sub-contract direct installations.
3. Commercial Rebate Programs: For custom projects, utility staff or third party engineering consultant 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 California Technical Forum e-TRM 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**	**Utility ($/kWh)**
All	130	535,841	4,280,043	130	535,841	4,280,043	1,704	$1,067,071	0.73	0.73	0.298
Appliance & Plug Loads	17	67,190	665,455	11	42,920	424,726	165	$46,972	1.67	1.59	0.141
BROs	1,532	6,338,704	9,523,935	1,532	6,338,704	9,523,935	3,984	$440,063	7.32	7.32	0.049
Building Envelope	43	42,120	803,193	37	35,947	687,834	325	$34,866	8.37	8.02	0.077
Commercial Refrigeration	2	16,180	161,700	2	16,180	161,700	61	$1,723	10.70	10.70	0.013
HVAC - Cooling	47	159,677	1,855,417	38	150,252	1,773,386	606	$69,448	4.17	4.11	0.051
HVAC - Heat Pump	6	7,344	109,783	5	5,875	87,826	36	$8,926	3.52	3.24	0.141
Lighting - Indoor	240	2,059,454	15,089,900	240	2,059,454	15,089,900	5,284	$581,810	3.03	3.03	0.046
Miscellaneous	83	693,686	1,751,106	83	693,686	1,751,106	659	$50,733	5.49	5.49	0.033
Whole Building	0	0	0	0	0	0	0	$16,325			0.000
EE Subtotal	2,099	9,920,196	34,240,532	2,076	9,878,859	33,780,455	12,824	$2,317,937	2.91	2.91	0.080
All	3	12,902	141,723	3	12,902	141,723	55	$37,890	0.64	0.64	0.340
Appliance & Plug Loads	5	20,299	137,578	5	20,299	137,578	54	$46,656	0.58	0.58	0.410
Low-Income Subtotal	8	33,201	279,301	8	33,201	279,301	109	$84,546	0.61	0.61	0.376
EE and Low Income Subtotal	2,107	9,953,397	34,519,833	2,084	9,912,060	34,059,756	12,932	$2,402,483	2.83	2.82	0.082
Codes & Standards	227	1,831,270	2,757,151	227	1,831,270	2,757,151	1,066	$12,546	43.77	43.77	0.005
Codes & Standards Subtotal	227	1,831,270	2,757,151	227	1,831,270	2,757,151	1,066	$12,546	43.77	43.77	0.005
Appliance & Plug Loads	0	0	0	0	0	0	0	$2,140			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$2,140			0.000
Transmission & Distribution	1	12,873	386,101	1	12,873	386,101	133	$777	43.77	43.77	0.004
T&D Subtotal	1	12,873	386,101	1	12,873	386,101	133	$777	43.77	43.77	0.004
C&S, T&D and Electrification Subtotal	229	1,844,143	3,143,252	229	1,844,143	3,143,252	1,199	$15,464	37.71	37.72	0.006
Utility Total	2,336	11,797,540	37,663,085	2,313	11,756,203	37,203,008	14,131	$2,417,947	3.05	3.05	0.075

TABLE 2. PWP EE Program Results by Sector

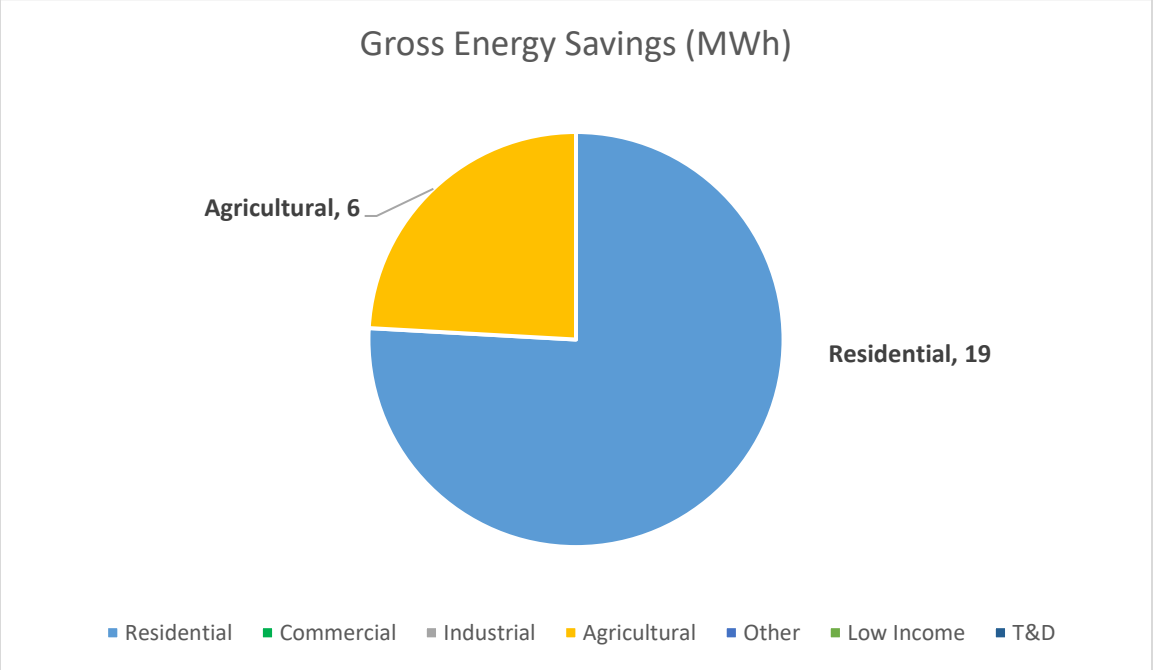
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	333	2,831,007	17,775,923	333	2,831,007	17,775,923	6,220	$666,596	3.23	3.23	0.045
Residential	1,766	7,089,189	16,464,609	1,742	7,047,852	16,004,532	6,603	$1,651,341	2.78	2.77	0.116
EE Subtotal	2,099	9,920,196	34,240,532	2,076	9,878,859	33,780,455	12,824	$2,317,937	2.91	2.91	0.080
Residential	8	33,201	279,301	8	33,201	279,301	109	$84,546	0.61	0.61	0.376
Low-Income Subtotal	8	33,201	279,301	8	33,201	279,301	109	$84,546	0.61	0.61	0.376
EE and Low Income Subtotal	2,107	9,953,397	34,519,833	2,084	9,912,060	34,059,756	12,932	$2,402,483	2.83	2.82	0.082
Commercial	227	1,831,270	2,757,151	227	1,831,270	2,757,151	1,066	$12,546	43.77	43.77	0.005
Codes & Standards Subtotal	227	1,831,270	2,757,151	227	1,831,270	2,757,151	1,066	$12,546	43.77	43.77	0.005
Residential	0	0	0	0	0	0	0	$2,140			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$2,140			0.000
Commercial	1	12,873	386,101	1	12,873	386,101	133	$777	43.77	43.77	0.004
T&D Subtotal	1	12,873	386,101	1	12,873	386,101	133	$777	43.77	43.77	0.004
C&S, T&D and Electrification Subtotal	229	1,844,143	3,143,252	229	1,844,143	3,143,252	1,199	$15,464	37.71	37.72	0.006
Utility Total	2,336	11,797,540	37,663,085	2,313	11,756,203	37,203,008	14,131	$2,417,947	3.05	3.05	0.075

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	338	2,849,239	17,866,103	336	2,843,769	17,839,049	6,246	$672,982	3.22	3.22	0.045
Residential	1,753	7,043,771	16,087,261	1,735	7,020,563	15,791,909	6,502	$1,625,298	2.80	2.79	0.116
Residential - Single-Family	8	27,185	287,167	4	14,527	149,497	76	$19,657	1.60	1.52	0.166
EE Subtotal	2,099	9,920,196	34,240,532	2,076	9,878,859	33,780,455	12,824	$2,317,937	2.91	2.91	0.080
Residential	8	33,201	279,301	8	33,201	279,301	109	$84,546	0.61	0.61	0.376
Low-Income Subtotal	8	33,201	279,301	8	33,201	279,301	109	$84,546	0.61	0.61	0.376
EE and Low Income Subtotal	2,107	9,953,397	34,519,833	2,084	9,912,060	34,059,756	12,932	$2,402,483	2.83	2.82	0.082
All	227	1,831,270	2,757,151	227	1,831,270	2,757,151	1,066	$12,546	43.77	43.77	0.005
Codes & Standards Subtotal	227	1,831,270	2,757,151	227	1,831,270	2,757,151	1,066	$12,546	43.77	43.77	0.005
Residential	0	0	0	0	0	0	0	$2,140			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$2,140			0.000
All	1	12,873	386,101	1	12,873	386,101	133	$777	43.77	43.77	0.004
T&D Subtotal	1	12,873	386,101	1	12,873	386,101	133	$777	43.77	43.77	0.004
C&S, T&D and Electrification Subtotal	229	1,844,143	3,143,252	229	1,844,143	3,143,252	1,199	$15,464	37.71	37.72	0.006
Utility Total	2,336	11,797,540	37,663,085	2,313	11,756,203	37,203,008	14,131	$2,417,947	3.05	3.05	0.075

Plumas-Sierra at a Glance

- Climate Zone: 16
- Customers: 8,179
- Total annual retail sales: 129,077 MWh
- Annual Retail Revenue: $26,018,552
- Annual EE expenditures for reporting year: $104,628
- Gross annual savings from reporting year portfolio: 25 MWh



Plumas-Sierra Overview

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 8,000 rural residents in portions of Plumas, Sierra and Lassen counties in California and part of Washoe County, Nevada.

PSREC'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

For 2021, there were no major changes to the PSREC programs or portfolios.

Program and Portfolio Highlights

HVAC upgrades continued to be a popular offering to our members in 2021. The program provided 32% of the achieved gross annual energy savings.

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 ENERGYSTAR® LED holiday light strands.
- Water Heater Sales and Rebates: Discounted sales of, and rebates for the purchase of high-efficiency electric water heaters, including heat pump water heaters.
- Weatherization Rebates: PSREC offers members rebates for upgrading windows and insulation in their homes. By retrofitting a home to above-code R-Values, and upgrading windows to double-pane high-performance windows, members not only realize the added comfort, but also gain increased home values. PSREC encourages members to invest in weatherization measures prior to, or in addition to, investing in a new heating source for energy conservation.
- Annual Member Meeting Efficiency Giveaways: PSREC provides members who attend the annual meeting with efficiency items such as LED lights, low-flow showerheads, faucet aerators, etc.
- Efficiency Education: PSREC provides 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.
- Net Metering Program: PSREC offers net-metering 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.
- Research, Development, and Demonstration: PSREC is researching electric vehicle charging infrastructure and other program options to encourage the adoption of electric vehicles in its service area.

EM&V Studies

PSREC EM&V reports can be found online at: http://www.ncpa.com/policy/reports/emv/. PSREC performs a yearly internal review to evaluate program effectiveness and improvement areas. PSREC has committed to seek third party evaluation of its programs every five years, dependent upon budget.

Major Differences or Diversions from California POU TRM for Energy Savings

PSREC uses the TRM as the source for the majority of reported energy savings. Some measures rely on savings from the Bonneville Power Administration's unite energy savings (UES) measure list.[38] Savings for the commercial lighting program are custom calculations based on the specific equipment replaced.

[38] (https://www.bpa.gov/energy-and-services/efficiency/interim-solution-2-0-files)

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	1	8,081	68,469	1	4,657	36,956	14	$21,128	0.22	0.23	0.684
Building Envelope	42	8,232	191,479	41	7,525	178,432	96	$58,030	0.56	0.40	0.514
HVAC - Cooling	2	1,905	31,039	2	1,524	24,831	11	$16,103	0.28	0.32	0.900
HVAC - Heat Pump	0	288	2,876	0	230	2,301	1	$1,219	0.31	0.57	0.641
Lighting - Indoor	0	168	2,520	0	91	1,361	1	$3,363	0.05	0.04	3.303
Service & Domestic Hot Water	0	165	1,650	0	99	990	0	$627	0.17	0.19	0.766
Water Pumping / Irrigation	0	5,988	29,940	0	4,790	23,952	9	$4,159	0.59	0.29	0.189
EE Subtotal	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
EE and Low Income Subtotal	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558

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	5,988	29,940	0	4,790	23,952	9	$4,159	0.59	0.29	0.189
Residential	45	18,839	298,033	44	14,126	244,871	124	$100,469	0.42	0.35	0.608
EE Subtotal	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
EE and Low Income Subtotal	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558

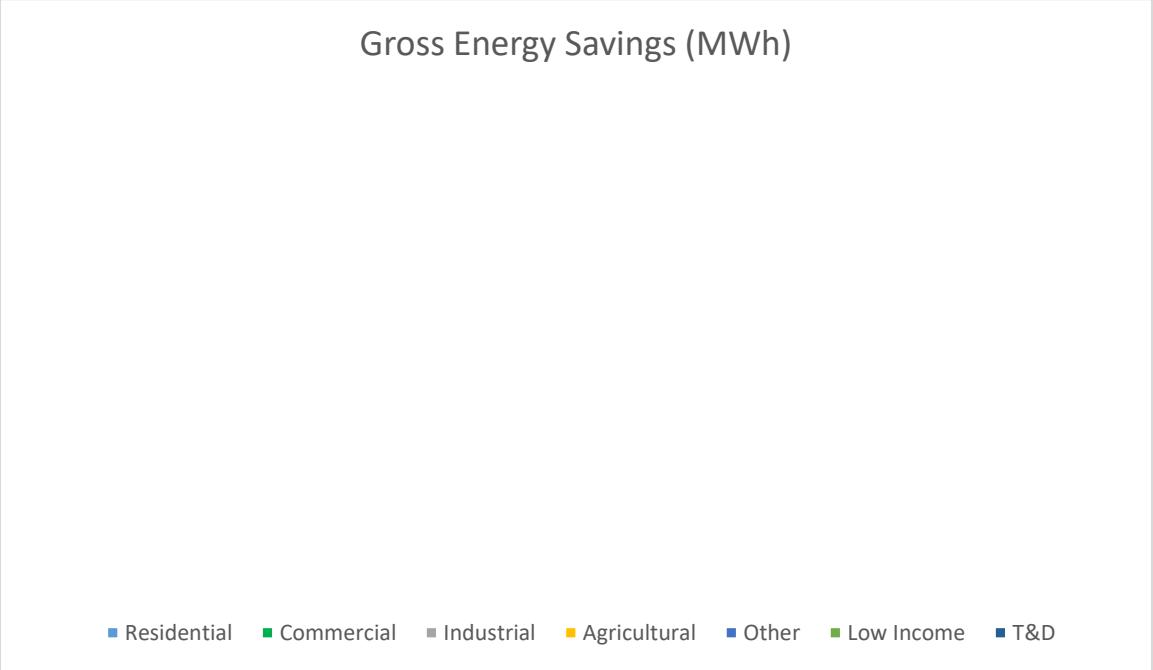
TABLE 3. PSREC EE Program Results by Building Type

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	1	4,294	22,920	1	2,977	15,754	6	$9,373	0.22	0.23	0.656
Other Agricultural	0	5,988	29,940	0	4,790	23,952	9	$4,159	0.59	0.29	0.189
Residential	44	12,584	250,543	43	9,789	212,062	111	$80,954	0.47	0.37	0.588
Residential - Single-Family	0	1,961	24,571	0	1,360	17,055	7	$10,142	0.23	0.25	0.761
EE Subtotal	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
EE and Low Income Subtotal	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	45	24,827	327,973	44	18,916	268,823	133	$104,628	0.43	0.34	0.558

PORT OF OAKLAND

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 2021, the Port offered incentives for EE projects.

Program and Portfolio Highlights

In FY 2020, the 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 facility must reduce energy usage by a minimum of 10% compared to the standard title 24 facility.
- Energy Saving Equipment Retrofits/Improvements Rebates: The Port has implemented a program that provides rebates and solid technical support for the installation of new 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

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

Major Differences or Diversions from California POU TRM for Energy Savings

Reported savings 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

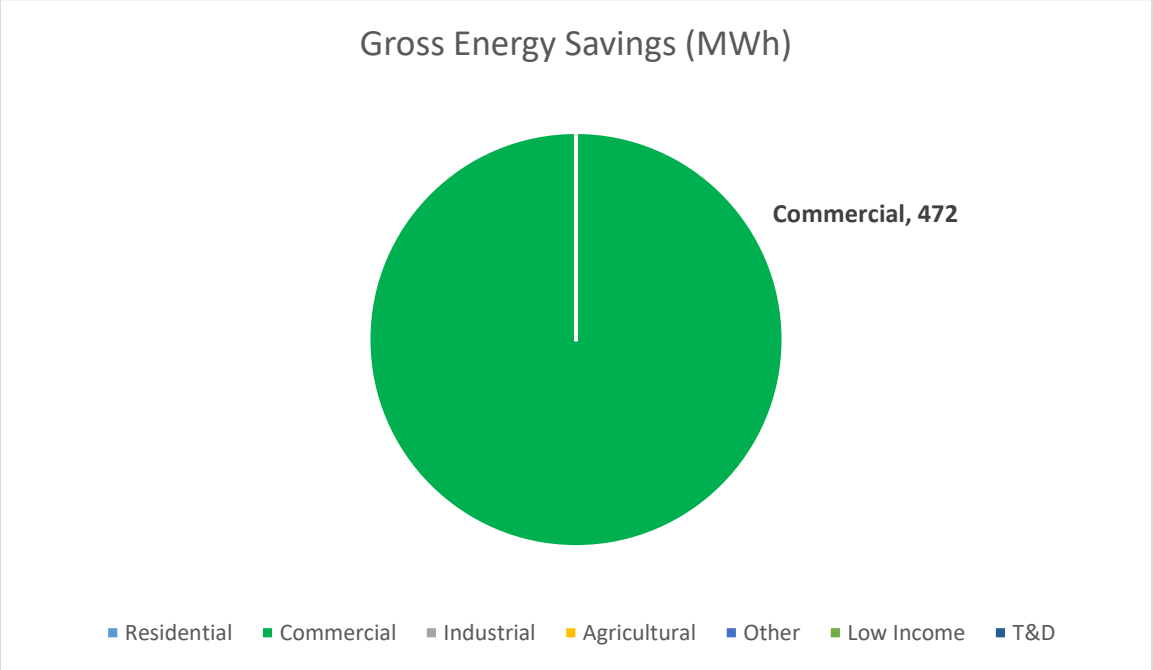
TABLE 3. Port of Oakland EE Program Results by Building Type

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 at a Glance

- Climate Zone: 10
- Customers: 2,126
- Total annual retail sales: 75,512 MWh
- Annual Retail Revenue: $10,724,000
- Annual EE expenditures for reporting year: $74,933
- Gross annual savings from reporting year portfolio: 472 MWh



Rancho Cucamonga Overview

The Rancho Cucamonga Municipal Utility (RCMU) began providing electric service in 2004 to primarily commercial customers. Over the past five years, RCMU has grown and expanded to residential and industrial customers from new developments. Interest and participation in EE programs continues to be a challenge, 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 2021.

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 being built with LED lighting fixtures, energy efficient appliances and many include solar PV systems.
To date, there has not been any residential requests or interest for EE programs. The existing programs are being reviewed and staff is looking for 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 bill 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 (CEPE) and verified by a third-party certified Home Energy Rating Systems (HERS) Rater.
- Electric Vehicle Commercial Charger Rebate Program: The program will provide an incentive of up to $5,000 per Level 2 (240-volt) or DC Fast charging station to RCMU commercial customers who install a workplace or public EV charger.

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 - Indoor	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
EE Subtotal	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
EE and Low Income Subtotal	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014

TABLE 2. RCMU EE Program Results by Sector

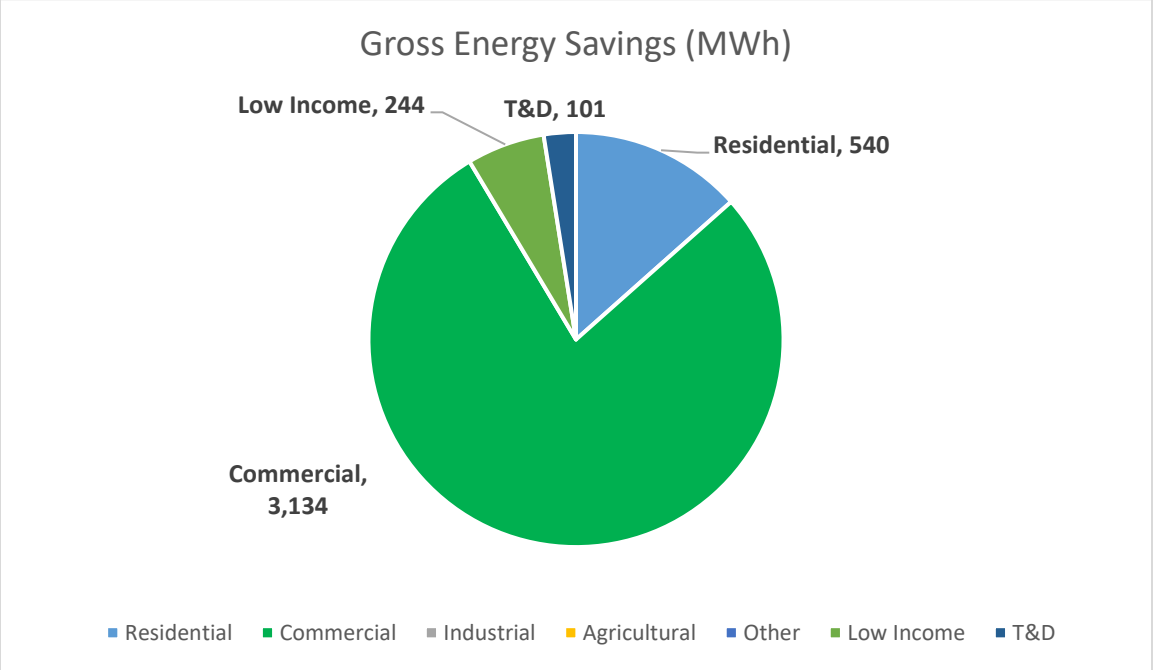
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
EE Subtotal	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
EE and Low Income Subtotal	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014

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)**
Manufacturing Light Industrial	42	283,122	4,529,952	42	283,122	4,529,952	1,542	$46,127	11.05	26.28	0.014
Retail - Large	25	189,240	3,027,840	25	189,240	3,027,840	1,011	$28,805	11.50	26.28	0.013
EE Subtotal	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
EE and Low Income Subtotal	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	67	472,362	7,557,792	67	472,362	7,557,792	2,552	$74,933	11.22	26.28	0.014

Redding at a Glance

- Climate Zone: 11
- Customers: 44,477
- Total annual retail sales: 757,129 MWh
- Annual Retail Revenue: $123,750,343
- Annual EE expenditures for reporting year: $3,484,069
- Gross annual savings from reporting year portfolio: 4,019 MWh



Redding Overview

Total sales for Redding Electric Utility (REU) in FY 2021 were 757,129 MWh – a 6.5 percent increase compared to FY 2020. The upward retail sales trend is a reversal of previous years where the utility saw decreases in total sales. REU attributes the rise in sales to increased economic activity due to the COVID-19 Pandemic – more ratepayers were working from home and several new commercial buildings opened for business. REU will continue to develop 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 our Cap and Trade auction proceeds to efforts that reduce greenhouse gas emissions, combat poverty, and achieve reliable energy savings. However, Redding does not expect additional funding from Cap and Trade 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 April 2020, as part of the economic response to the COVID-19 pandemic, Redding City Council approved a greenhouse gas-funded Economic EE Response Program to upgrade City facilities with energy-efficient equipment. Unlike large-scale projects, the local stimulus package creates smaller projects to give local contractors opportunities to participate and bid on individual jobs. The goal of the program was to quickly provide an economic benefit in jobs and business activity. In March 2021, Redding's City Council approved a reduction of the City's EE goals based on the results of the EE Market Potential Study. Redding attributes the EE goal adjustment to the utility's low avoided costs, high saturation in the Commercial Lighting program, and increased building codes and standards. The new goals were added to Redding's long-term planning efforts. As a result, Redding is considering transitioning from EE to electrification (building and transportation) programs effective FY 2023.

Program and Portfolio Highlights

In FY 2021, REU's total commercial sector lighting savings accounted for 45% of total energy savings. However, the Commercial Lighting program decreased from FY20 levels by 33.67% to 2.1 million kWh (net). Redding anticipated this result due to market saturation, fewer large-scale projects, and increased building codes & standards.
REU's Economic EE Response Program accounted for 26% of total energy savings, or nearly 810,000 kWh (net). With several EE projects under construction or in design, Redding anticipates the program will contribute a significant portion of total energy savings to its portfolio. The program will also lessen the impacts of the commercial sector's lighting savings reductions.

Commercial, Industrial & Agricultural Programs

HVAC – Deemed rebates for air conditioning, heat pump equipment, and Wi-Fi-enabled thermostats. Custom rebate calculated based on existing equipment, retrofit equipment, and hours of operation.
Food Service – Deemed rebates for ice machines, glass door refrigerators/freezers, solid door freezers, holding cabinets, and electric combination/convection ovens, steam cookers, fryers, griddles, and vending machine controllers.
Refrigeration – Deemed rebates for auto door closers, anti-sweat heater controls, and electronically commutated evaporator fans for walk-in coolers or display cases.
Lighting – Rebates for retrofit lighting projects are calculated using a custom calculator to determine savings based on existing equipment, retrofit equipment, and hours of operation.

Residential Programs

HVAC – Deemed rebates for air conditioning and/or heat pump equipment, Wi-Fi-enabled thermostats, and whole-house fans.
Water Heating – Deemed rebates for electric storage and heat pump water heaters.
Appliances – Deemed rebates for variable speed pool pumps, room air conditioners, refrigerators, and ceiling fans.
Building Shell – Deemed rebates for the installation of dual pane windows, drill and fill wall insulation, and ceiling insulation.

Complementary Programs

Shade Trees Program – Utility-funded program to provide Shade Trees for residential and commercial customers. This program ended in FY 2021.
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 2021, rate discounts represented about $1.7 million, and assistance programs represented about $2.1 million paid with public benefits funds. Low-income programs have been most beneficial to a significant portion of our customer base that has limited situational and/or financial means to participate in other EE programs.
Electric Vehicle (EV) and Charging Infrastructure – Redding offers Transportation Electrification incentives for chargers and vehicle purchases for residential and commercial ratepayers. Funding has also been approved for public level 3 fast charger installation and electrification of the City Fleet.
Residential Education – Redding offers a variety of in-home services through the Residential Energy Advisor program. This includes guiding customers through the rebate programs while educating them with energy-saving tips.
Commercial Education – Redding offers a variety of in-business services through the Commercial Energy Advisor program. This includes guiding customers through the rebate programs while educating them with energy-saving tips.
City EE – Funding from greenhouse gas provides updates to City of Redding facilities, including LED streetlight replacement, lighting retrofits, and upgrades to energy-efficient equipment.

EM&V Studies

The results of Redding EM&V reports are available on CMUA's website: https://www.cmua.org/emv-reports.
In addition to these activities, rebate processing includes technical 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 Energy Services Platform's (ESP) reporting tool. For REU's unique programs (Low Income Energy Efficiency, Streetlights, City Energy Efficiency), REU used the custom measure feature in ESP to represent the energy and demand impacts of those programs. REU utilizes a custom calculation for the Commercial Lighting and lighting retrofit projects in the City EE programs.

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)**
All	56	191,217	2,834,383	56	191,217	2,834,383	1,000	$533,268	0.23	0.41	0.215
Appliance & Plug Loads	1	18,056	193,472	0	10,672	113,824	43	$8,108	0.61	0.43	0.078
Building Envelope	40	101,512	2,030,232	16	32,989	659,771	443	$77,494	0.63	0.29	0.141
Commercial Refrigeration	11	106,461	1,385,306	7	63,876	831,184	295	$19,808	1.78	1.18	0.027
HVAC - Cooling	96	486,372	5,801,556	78	368,462	4,291,027	1,926	$460,584	0.43	0.48	0.122
Lighting - Indoor	338	1,223,484	9,549,552	271	978,787	7,639,642	2,794	$234,835	1.44	1.19	0.033
Lighting - Outdoor	120	1,471,082	14,158,696	120	1,306,426	12,613,053	6,073	$1,506,978	0.37	0.50	0.131
Service & Domestic Hot Water	0	76,527	765,270	0	45,916	459,162	167	$49,773	0.40	0.36	0.118
EE Subtotal	661	3,674,710	36,718,467	548	2,998,345	29,442,046	12,740	$2,890,848	0.46	0.56	0.109
Appliance & Plug Loads	0	11,550	150,252	0	9,818	127,714	47	$49,484	0.11	0.11	0.438
Building Envelope	0	22,584	450,166	0	19,196	382,641	168	$84,738	0.20	0.20	0.265
HVAC - Cooling	0	42,324	343,827	0	35,976	292,253	136	$81,320	0.15	0.15	0.301
HVAC - Heat Pump	0	23,572	471,432	0	20,036	400,717	173	$37,260	0.48	0.48	0.112
Lighting - Indoor	0	125,919	1,888,785	0	107,031	1,605,467	619	$110,983	0.64	0.64	0.079
Service & Domestic Hot Water	0	18,312	191,591	0	15,565	162,852	59	$18,685	0.38	0.38	0.126
Low-Income Subtotal	0	244,261	3,496,053	0	207,622	2,971,645	1,203	$382,471	0.34	0.34	0.148
EE and Low Income Subtotal	661	3,918,970	40,214,520	548	3,205,967	32,413,691	13,943	$3,273,319	0.45	0.53	0.112
Lighting - Outdoor	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
T&D Subtotal	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
C&S, T&D and Electrification Subtotal	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
Utility Total	686	4,019,489	41,219,710	573	3,306,486	33,418,881	14,426	$3,484,069	0.43	0.50	0.116

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	562	3,134,391	29,004,777	485	2,661,132	24,833,575	10,479	$2,342,853	0.47	0.62	0.104
Residential	99	540,318	7,713,690	63	337,213	4,608,470	2,261	$547,995	0.42	0.38	0.136
EE Subtotal	661	3,674,710	36,718,467	548	2,998,345	29,442,046	12,740	$2,890,848	0.46	0.56	0.109
Residential	0	244,261	3,496,053	0	207,622	2,971,645	1,203	$382,471	0.34	0.34	0.148
Low-Income Subtotal	0	244,261	3,496,053	0	207,622	2,971,645	1,203	$382,471	0.34	0.34	0.148
EE and Low Income Subtotal	661	3,918,970	40,214,520	548	3,205,967	32,413,691	13,943	$3,273,319	0.45	0.53	0.112
Other	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
T&D Subtotal	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
C&S, T&D and Electrification Subtotal	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
Utility Total	686	4,019,489	41,219,710	573	3,306,486	33,418,881	14,426	$3,484,069	0.43	0.50	0.116

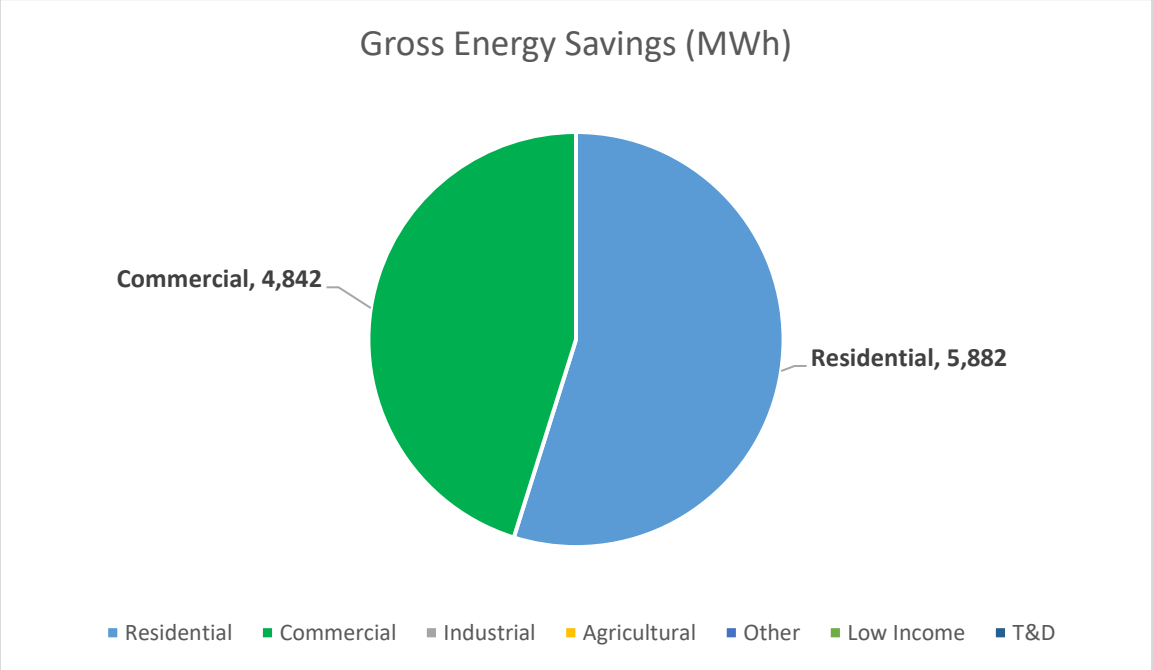
TABLE 3. REU EE Program Results by Building Type

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	56	159,421	2,385,091	56	158,591	2,375,136	838	$500,042	0.21	0.37	0.241
Grocery	10	95,739	1,256,642	6	57,443	753,985	266	$17,634	1.81	1.18	0.026
Other Commercial	497	2,879,232	25,363,044	423	2,445,098	21,704,455	9,375	$1,825,176	0.52	0.65	0.092
Residential	81	340,991	4,644,756	53	230,211	3,017,210	1,444	$377,893	0.39	0.41	0.144
Residential - Single-Family	18	199,327	3,068,934	10	107,003	1,591,260	817	$170,102	0.49	0.34	0.123
EE Subtotal	661	3,674,710	36,718,467	548	2,998,345	29,442,046	12,740	$2,890,848	0.46	0.56	0.109
Residential	0	3,272	32,721	0	2,781	27,813	13	$24,297	0.05	0.05	0.953
Residential - Single-Family	0	240,989	3,463,332	0	204,840	2,943,832	1,190	$358,174	0.36	0.36	0.140
Low-Income Subtotal	0	244,261	3,496,053	0	207,622	2,971,645	1,203	$382,471	0.34	0.34	0.148
EE and Low Income Subtotal	661	3,918,970	40,214,520	548	3,205,967	32,413,691	13,943	$3,273,319	0.45	0.53	0.112
All	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
T&D Subtotal	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
C&S, T&D and Electrification Subtotal	25	100,519	1,005,190	25	100,519	1,005,190	484	$210,750	0.21	0.21	0.229
Utility Total	686	4,019,489	41,219,710	573	3,306,486	33,418,881	14,426	$3,484,069	0.43	0.50	0.116

RIVERSIDE PUBLIC UTILITIES DEPARTMENT

Riverside at a Glance

- Climate Zone: 10
- Customers: 110,951
- Total annual retail sales: 2,113,574 MWh
- Annual Retail Revenue: $310,714,132
- Annual EE expenditures for reporting year: $2,951,320
- Gross annual savings from reporting year portfolio: 10,724 MWh



Riverside Overview

In FY 2021, Riverside Public Utilities (RPU) strived to achieve the kWh savings goal of 1% of retail sales as adopted by the Board of Public Utilities in 2021; however, this was impacted due to the world-wide pandemic, COVID-19.

The final quarter of FY 2021 posed a challenge for reaching the savings target. In response to this, RPU staff was able to create low-income programs to assist customers with their utility bills to ease some of the financial burden

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 energy efficiency, and overall weak consumer confidence.
The ESAP was reintroduced in early 2022.
During FY 2021, the RPU team continued to focus on revamping low-income programs to be most beneficial to rate payers.

Program and Portfolio Highlights

RPU did not operate direct install programs this reporting year 2021 but will resume in 2022. Although commercial customers only represent 10% of total utility, they are 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).
- EnergyStar® 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).
- Key Account EE Program (KEEP) – Program targeting RPU's largest Time of Use Customers. This customer segment includes the top 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 SCGC on this program. Customers are also offered additional technical and contracting assistance to bring large EE projects from concept to completion (Non-Res Comprehensive). While we did not have this program operational this year, we will resume in the next reporting year.
- 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 energy efficiency, renewable energy, energy storage, strategic energy research, and electric transportation (RD&D Program).

- Energy Management Systems – Rebates for the purchase and installation of energy management systems for monitoring and controlling facility energy load.
- New 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.

Residential Programs

- EnergyStar® 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).
- Air Conditioning Incentives – 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/Spa Pump – 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).

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. RPU has opened a facility in a low income area of the city in an effort to make the program more accessible to our low income customers.
- Research, Demonstration and Development (RD&D) – RPU continues to invest in RD&D programs through partnerships with both businesses and local higher education institutions. RPU has expended over $1,000,000 in public benefit funds over the last ten years through its Energy Innovation Grant Program (see description above) to support energy research at local institutions of higher learning. Additional RD&D funding is provided to local commercial customers under the Custom Energy Technology Grant Program (see description above). RPU also participates in SCPPA-directed RD&D efforts and will continue to explore future RD&D opportunities as they occur on a case-by-case basis.
- Demand Response – RPU continues to manage a highly successful voluntary (non NERC certified) demand response program. This program, known as Power Partners, was developed in partnership with RPU's largest commercial customers.
- 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.

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	0	3,638,104	36,381,038	0	3,628,158	36,281,579	12,904	$482,411	8.17	17.02	0.016
Appliance & Plug Loads	217	577,584	4,478,054	206	546,217	4,229,274	1,655	$260,303	2.01	12.00	0.073
Building Envelope	131	160,367	2,877,726	122	148,466	2,672,666	1,009	$87,687	5.27	14.91	0.047
HVAC - Cooling	2,774	5,086,649	113,296,655	2,428	4,078,927	85,039,017	33,953	$1,898,851	8.74	14.67	0.036
Lighting - Indoor	0	908,065	9,080,646	0	908,065	9,080,646	3,215	$157,796	6.09	17.12	0.021
Miscellaneous	1	7,770	31,080	1	6,993	27,972	12	$10,682	0.29	2.53	0.407
Service & Domestic Hot Water	0	2,660	26,600	0	2,527	25,270	9	$539	4.42	0.92	0.026
Whole Building	0	342,603	4,139,310	0	342,603	4,139,310	1,517	$53,051	7.81	17.12	0.017
EE Subtotal	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
EE and Low Income Subtotal	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030

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	59	4,842,211	49,602,139	57	4,841,057	49,585,278	17,576	$718,816	7.26	16.99	0.018
Residential	3,064	5,881,591	120,708,971	2,700	4,820,899	91,910,456	36,697	$2,232,504	7.92	14.56	0.038
EE Subtotal	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
EE and Low Income Subtotal	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030

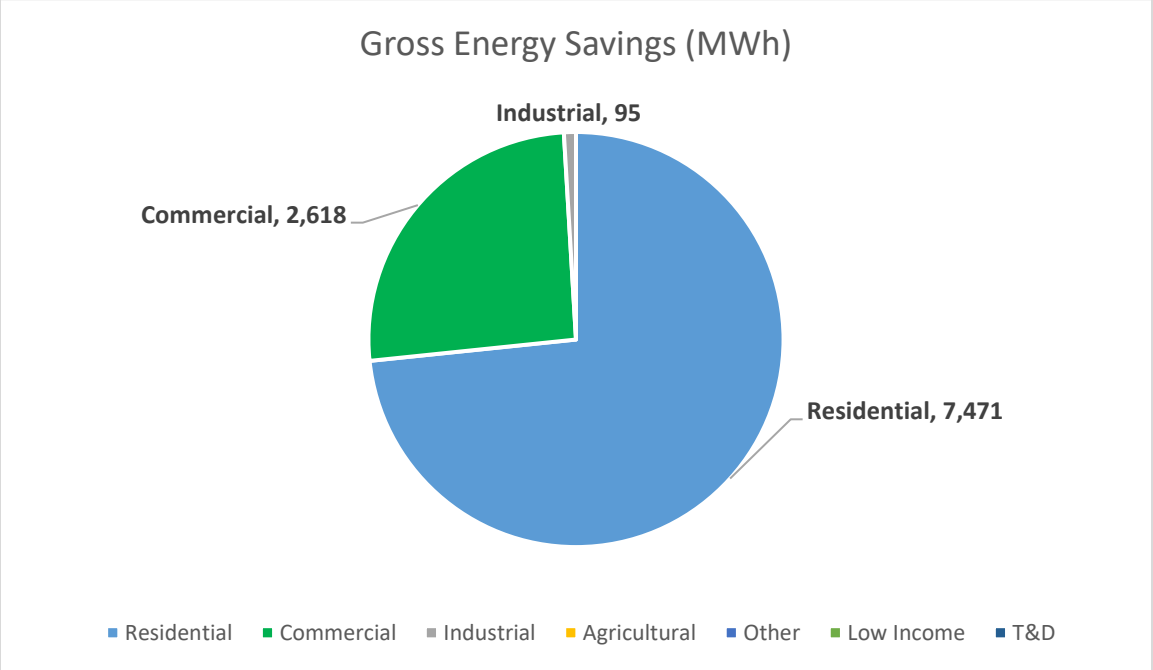
TABLE 3. RPU EE Program Results by Building Type

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	107	3,705,107	37,531,928	102	3,693,302	37,407,850	13,276	$554,781	7.31	16.79	0.018
Other Commercial	0	1,250,668	13,219,956	0	1,250,668	13,219,956	4,732	$210,847	6.52	17.12	0.020
Residential	3,017	5,768,027	119,559,226	2,655	4,717,986	90,867,928	36,266	$2,185,693	7.99	14.56	0.038
EE Subtotal	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
EE and Low Income Subtotal	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	3,123	10,723,802	170,311,110	2,757	9,661,956	141,495,734	54,273	$2,951,320	7.76	15.05	0.030

ROSEVILLE ELECTRIC DEPARTMENT

Roseville at a Glance

- Climate Zone: 11
- Customers: 64,598
- Total annual retail sales: 1,159,045 MWh
- Annual Retail Revenue: $162,656,977
- Annual EE expenditures for reporting year: $5,536,239
- Gross annual savings from reporting year portfolio: 10,184 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 57,300 residential customers and 6,900 commercial customers.

In 2021 Roseville issued 1,807 residential single family, 411 multifamily and 30 commercial building construction permits. Industrial vacancy rate is 3.2%, Office at 9.5 % and Retail at 6.0%.

The median household income in Roseville is $91,306 and 42% 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

In response to the impacts of the global pandemic, the Utility has continued focus on ways that Roseville Electric could support the recovery efforts of our community. Low income rate assistance programs were enhanced to offer relief to those who lost employment due to the pandemic. In addition, we modified our low income qualification requirements to increase the number of residents eligible.
The Utility supported the local business community as they struggled to recover from the economic impacts of the pandemic by offering a small and medium business focused program titled "Reopen Energy Smart." This program 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 continues to develop a building electrification pilot program. The first phase of the electrification efforts launched this fiscal year in the form of Residential New Construction incentives for All-Electric homes.

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 residential program portfolio.
Residential HVAC also saved customers 1,447,575 kWh or 14% of the total portfolio in FY 21.
Interior and exterior commercial LED lighting retrofits contributed an additional 1,421,207 kWh.
The EE savings achieved from the residential HER's, commercial lighting and residential HVAC programs contributed 8,250,172 kWh or 81% of the total portfolio savings.

Commercial, Industrial & Agricultural Programs

Commercial LED and Other Lighting: Offers business customers a wide variety of energy efficient LED interior and exterior LED lighting retrofits and control options for updating their facilities.
Commercial Food Service Equipment: Program provides rebates to commercial restaurants to install energy efficient electric food service equipment.
Commercial HVAC: Includes package and split system retrofits along with several measures to reduce heat gain in the facility, including shade trees, window film, VFD and VSM retrofits to existing HVAC supply and return fans.

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

Residential Programs

Low-Income Rate Assistance: In FY 2021, Roseville Electric assisted approximately 1,700 customers with a rate reduction to their utility bills. Roseville worked with local agencies and libraries to offer assistance workshops to low income residents.
Residential Windows: Program for retrofit Windows must be EnergyStar® rated with a U-value of .30 and an SHGC of .25 or less and bear the National Fenestration Rating Council label.
Residential Whole House Fan: Program offering a rebate to customers installing a permanently fixed 2000 cfm (or greater) whole house fan.

Residential Home Energy Reports: Industry-recognized, contractor-managed EE behavior program providing education, feedback, and tips to residential customers.
Residential HVAC: Provides rebates to customers installing higher efficiency systems upon retrofit, performing annual HVAC tune-ups, and installing Smart Thermostats.
Residential Shade Tree: Rebate program designed to incent and educate customers to plant drought-tolerant shade trees to keep their home cool. A local urban forester recommends trees. EE savings for the trees was obtained from an EM&V performed in 2010.
Residential Pool Pump: Rebate program designed to incent customers to upgrade from a single speed to a variable speed pool pump.
Residential New Construction: Programs offering incentives to builders to achieve greater savings than those required by building code have transitioned to a program modeled after the California Advanced Home Program. Savings estimates are obtained from HERS energy reports and reviewed by a third party consultant for this program.
Residential Sunscreens: Rebate program designed to incent customers to install permanent sunscreens on their windows to reduce air conditioner runtime.
All-Electric Homes – incentives are available for home builders who choose to build all electric homes with efficient heat pump and induction technology.

Complementary Programs

EV Program:
In FY 2021, residential customers purchasing new and used electric vehicles and motorcycles were eligible for incentives for both the vehicle and the plug in charger. In November, the new vehicle rebate was replaced by the Clean Fuel Reward program and Roseville decided to open a new rebate program for used electric vehicles. An increased rebate was also available for income qualified customers as part of our EV equity program.
This program is fully funded through the Low Carbon Fuel Program. In addition to rebates for residential vehicles and chargers, the 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 we also able to request a free EV site assessment.
Additionally, funding was used to promote electric vehicle adoption through outreach and education. Roseville Electric is working with Plug in America to educate and incentivize Roseville dealers.
In FY 2021, Roseville will add rebates for DC fast charging and residential panel upgrades. Roseville will also increase the focus on equity and commercial charging projects.
In 2018, an independent assessment of the potential impact of electric vehicles to the City of Roseville Electric grid was prepared for Roseville Electric Utility and provided recommendations for a strategic approach to address the electrification of the transportation industry. Roseville staff is using this report and other industry research to identify opportunities for improvements and expansion of our existing EV program. Roseville plans to update this assessment in 2022.
Community Solar:
Roseville introduced a 986 kW community solar project, Roseville Solective, to residential households in March 2019. A portion of the program was set aside for low-income customers. The

project is funded by the participants and the energy contributes to the Utility RPS requirements. 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 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 conducts third party EM&V or M&V on an annual basis. Selection of the programs to review is prioritized by the dollars spent and savings claimed for the program or when a provisional or custom measure is introduced to our customers.

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

All third party EM&V and M&V reports are published on California Municipal Utility Associations website under resources in the document library.

Recent Reports include:

- EM&V- Residential Home Energy Reports (2019)
- EM&V-Commercial Exterior Lighting (2017)
- EM&V- Residential HVAC, Pool Pump, Whole House Fan and Sunscreen (2016)
- M&V- Smart Thermostats (2018)
- M&V- HVAC Tune Ups (2018)

Major Differences or Diversions from California POU TRM for Energy Savings

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

Roseville Electric relies on the savings documented in the California Public Utilities TRM. If not available, the measure is entered to 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.

TABLE 1. Roseville 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	28	92,375	1,016,125	25	83,138	914,513	326	$91,611	0.56	0.77	0.122
Appliance & Plug Loads	8	147,442	1,461,546	5	88,679	878,426	332	$113,750	0.47	0.37	0.155
BROs	0	5,381,390	5,381,390	0	3,551,717	3,551,717	1,536	$537,275	0.43	0.43	0.151
Building Envelope	267	431,064	8,359,446	200	283,025	5,587,183	2,617	$870,827	0.47	0.53	0.223
Commercial Refrigeration	13	115,074	1,595,478	13	111,962	1,558,139	564	$134,664	0.63	0.74	0.111
Food Service	3	20,985	209,850	3	20,985	209,850	76	$23,101	0.51	0.80	0.132
HVAC - Cooling	173	1,611,817	8,826,330	161	1,337,021	7,529,708	3,809	$1,569,789	0.38	0.55	0.243
Lighting - Indoor	138	603,403	6,679,765	123	539,253	5,954,640	2,127	$509,278	0.66	0.77	0.104
Lighting - Outdoor	429	1,684,942	18,534,362	386	1,516,448	16,680,926	7,965	$1,566,581	0.60	0.78	0.114
Miscellaneous	10	95,132	1,902,640	10	95,132	1,902,640	656	$119,363	0.86	1.02	0.090
EE Subtotal	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
EE and Low Income Subtotal	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151

TABLE 2. Roseville 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	693	2,617,861	28,469,487	624	2,364,743	25,746,019	11,197	$2,447,281	0.59	0.77	0.116
Industrial	10	95,132	1,902,640	10	95,132	1,902,640	656	$119,363	0.86	1.02	0.090
Residential	366	7,470,631	23,594,806	292	5,167,486	17,119,083	8,155	$2,969,595	0.43	0.51	0.208
EE Subtotal	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
EE and Low Income Subtotal	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151

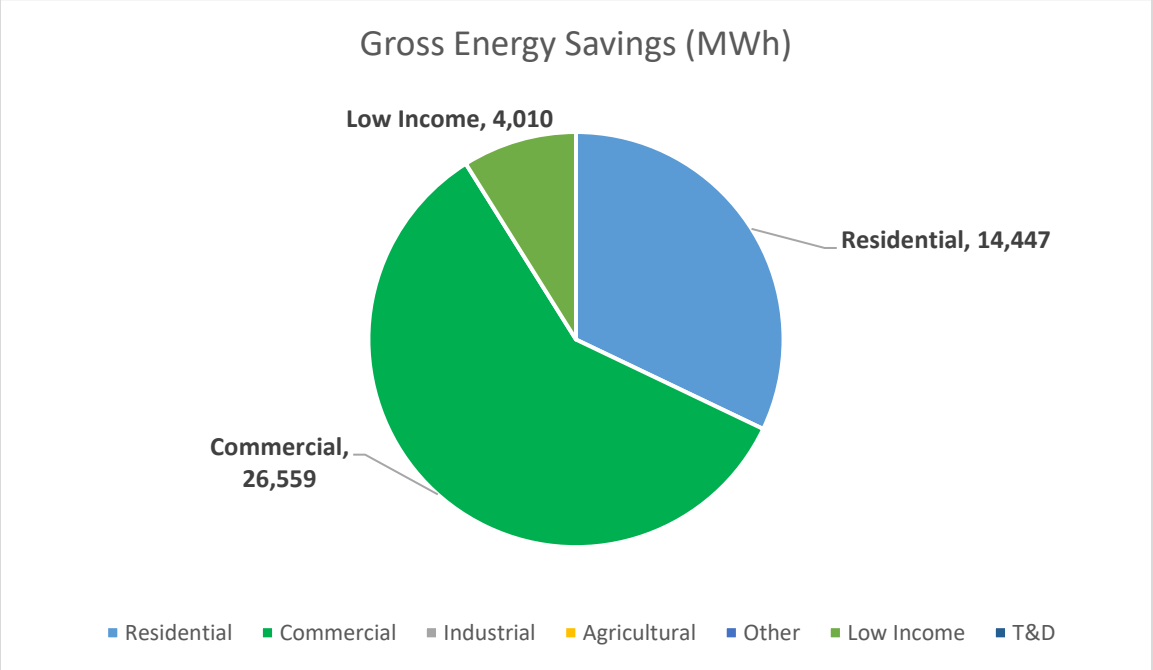
TABLE 3. Roseville EE Program Results by Building Type

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	244	799,924	8,098,238	219	719,696	7,281,395	2,599	$696,283	0.59	0.76	0.116
Grocery	12	107,295	1,502,130	12	107,295	1,502,130	544	$123,984	0.66	0.80	0.106
Other Commercial	437	1,710,642	18,869,119	393	1,537,751	16,962,494	8,055	$1,627,014	0.59	0.76	0.117
Other Industrial	10	95,132	1,902,640	10	95,132	1,902,640	656	$119,363	0.86	1.02	0.090
Residential	31	5,962,452	13,652,971	18	3,994,753	9,490,010	4,371	$1,574,540	0.43	0.48	0.194
Residential - Single-Family	335	1,508,179	9,941,835	274	1,172,732	7,629,073	3,784	$1,395,055	0.42	0.54	0.227
EE Subtotal	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
EE and Low Income Subtotal	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,069	10,183,623	53,966,932	926	7,627,360	44,767,742	20,008	$5,536,239	0.51	0.63	0.151

SACRAMENTO MUNICIPAL UTILITY DISTRICT

Sacramento at a Glance

- Climate Zone: 12
- Customers: 644,723
- Total annual retail sales (MWh): 10,415,276
- Annual Retail Revenue: $1,461,900,000
- Annual EE expenditures for reporting year: $37,459,268
- Gross annual savings from reporting year portfolio: 45,016 MWh



Sacramento Overview

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

- In July of 2020, the SMUD Board declared a climate emergency and set a goal of delivering carbon neutral electricity by 2030.
- Diversity, Equity, and Inclusion (DEI) is a stated goal in SMUD culture. Many of our programs have included equity components to help insure Inclusion.
- Due to the SMUD Governing Board declaration, SMUD will need to develop load management or load flexibility - programs to meet 10% to 20% of SMUD's peak load.
- In 2019, SMUD submitted an IRP to the Energy Commission and it was accepted. This was a 20-year plan, which included moves to a more carbon-free resource mix, building and transportation electrification and continuation of energy efficiency. SMUD intends to be net-carbon free by 2040.

- SMUD's future EE portfolio will be aligned with a net carbon free future. This transition has already started, with major changes expected in the next five years. For SMUD's residential and new construction programs, the focus has turned to building electrification with energy efficiency becoming a secondary impact.
- The increased emphasis on carbon reduction goals will also direct the utility industry to encourage the use of an increasingly renewable electric portfolio over natural gas.
- Natural gas is predominantly used in homes compared to businesses, so programs will more likely be focused on the residential sector.
- The expectations of residential and commercial customers are growing. Besides low-cost and reliable service, the expectation of the customer is now quality customer service and products that meet their business needs and personal lifestyles.
- There will be a continuation of more complex rate schedules that will mimic the cost and availability of renewable power and the intensities of carbon in the power mix.
- EE, building electrification, transportation electrification, solar and storage will continue to converge toward complete, integrated energy solutions, customized to meet the needs of the customer and the utility.
- Commercial customers' interest in Zero Net Energy (ZNE) solutions is growing.
- More and more customers prefer to access information and communicate via mobile devices.
- Consumers are becoming increasingly interconnected, fundamentally shifting channels of social interaction.
- Customers want clear and simple choices, which may be in conflict with complex rates and carbon reduction efforts.

Major Program and Portfolio Changes

There was a major reduction in the overall EE budget, with an ensuing reduction in the energy and peak savings achieved in 2021. This was a planned reduction as program movement has started from EE to building electrification. This movement is primarily due to SMUD's transition from an energy reduction metric to a carbon reduction metric. SMUD includes 52 GWh of energy savings associated with SMUD's work on Codes and Standards. Also, the following program changes were made to facilitate customer demand and to prepare for the future:
-The EE programs for residential and new construction programs transformed into building electrification programs, with EE as a secondary impact. SMUD no longer offers incentives for residential, efficient, gas-furnace, air-conditioning systems and focused only on heat pump HVAC systems.
- As part of SMUD's pandemic response, the building EE electrification program delivery teams worked diligently to quickly pivot and make necessary changes to continue to deliver the greatest value to our customers and community while supporting our carbon reduction goals in the most financially sustainable way. This meant connecting with stakeholders, coordinating with internal teams to make technical and programmatic updates, communicating with participating contractors and customers as needed and making sure staff in the SMUD Contact Center has the right information to answer customer questions. This effort required immense flexibility, as staff adapted product offerings based on financial availability and instituted new protocols to allow for more virtual customer communication options.

-As SMUD and their customers recovered from the pandemic, SMUD programs experienced supply chain issues. This was especially true with contractors tied to specific manufacturers. Most contractors were able to adjust their supply chains to continue servicing their customers and continued to participate in our programs.
- SMUD recommitted to residential new construction with a program dedicated to encouraging developers and builders to offer all electric homes. While these homes offer all the EE provided by Title 24, they also include heat pump space heaters, heat pump water heaters, induction cooktops and no natural gas service to the home. Other incentives are offered for prepping the homes for future electric vehicles and battery storage.
- Provided trusted advisory services through the Advanced Homes customer hotline by using real-time energy data to help customers understand their energy usage and identify opportunities to save energy and money. The Hotline advisors help customers understand the benefits of the heat pump HVAC systems and heat pump water heaters, select contractors, understand their bids, and operate their systems once installed.
- Advanced Commercial Solutions energy efficiency projects exceeded expectations despite the pandemic. The commercial building electrification programs released continued rebates for a suite of gas-to-electric conversions including heat pump water heaters, heat pump HVAC, cooking equipment and custom solutions.
- The Advanced Homes program continued its growth from 2020, with Heat Pump Space Heater rebate paid incentives for over 1,800 installations. The Heat Pump Water Heater rebate offering met installation goals, incenting nearly 1,000 installations by the end of the year. This resulted in more than 1,200 equivalent homes electrified in 2021.
- The Home Appliance program achieved noteworthy results for a number of product offerings. The Retail Products Platform, a mid-stream program that rewards retailers for stocking and selling greater numbers of energy-efficient appliances, added online sales and a new smart / connected thermostats product offering. For building electrification, over 130 gas-to-electric induction conversion projects were rebated by year-end.
- The Multifamily Program shifted its program model to electrification, providing bundled solutions to deliver holistic multifamily property upgrades: including energy efficiency, commercial electric vehicles and charging installations, tenant engagement opportunities, and low-income incentives. In 2021, of the 136 units participated in the program.
- The Smart Homes Program completed 328 all electric homes and 36 multi-family units.

Program and Portfolio Highlights

On July 17, 2020, the SMUD Board of Directors 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 strain 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 their existing programs and developing new programs to prepare SMUD and our 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.
SMUD spent $22.7 million in 2021 for residential and commercial EE programs, compared to a budget of $29.6 million. All expenditures are public-goods funded. These programs delivered 31.6 MW of peak-load reduction and 117.8 million kWh of annual energy savings.

Commercial, Industrial & Agricultural Programs

Expenditures for commercial/industrial EE retrofit programs for existing buildings and facilities were $9.3 million, with delivery of 31.3 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 10-30 percent more energy efficient than required by Title 24 (or typical new construction in the case of Title 24-exempt buildings and processes).

Residential Programs

Expenditures for residential EE programs for existing homes were $13.4 million and achieved 23.8 GWh in annual energy savings.

- Advanced Home: Provides rebates for qualifying (ENERGY STAR®, Consortium for Energy Efficiency, and/or other high-efficiency levels) efficiency improvements, which include mini split heat pump, heat pump space heaters and heat pump water heaters.
- Appliance Efficiency Program: Included in this program are Refrigerator/Freezer Recycling, Pool Pumps, and the Retail Partnership Program.
  - Refrigerator/Freezer Recycling provides incentives to recyclers to complete environmental recycling of old refrigerators and freezers.
  - Retail Partnership Program is an upstream program that works with big box retailers to pay retailer incentives for all the EE items they sell in their stores.

Complementary Programs

Information/Education Programs

Expenditures for Information and Education programs totaled $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 ACLM cycling program within a 3 minute time span, but the program has not been activated since 2000.
- Power Direct (Automated Demand Response 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 Demand Response: In 2021, SMUD piloted a Behavioral Demand Response 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 actions to score better during the next event. This was a one-year pilot and based upon the results, SMUD will make a determination if we will use 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.
- Electric Vehicles: 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 our website SMUD.org/PEV.
- 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 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 NEM1 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.
• Codes & Standards: SMUD continues to pursue the development and implementation of codes and standards (e.g., T24, T20, etc.) as the most cost-effective source of energy savings. SMUD participates in several working groups, drives code compliance through programs, assists with workforce training, conducts research, and develops data management systems to improve tracking and reporting. SMUD is claiming 52 net GWh energy savings associated with the Statewide Codes and Standards 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, electric transportation, climate change, distributed generation, energy efficiency, demand response, storage, and smart grid. These programs seek to track emerging technologies, demonstrate promising technologies, and prepare SMUD and our customers for widespread 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 2020. For methodological approaches needed to perform specific types of evaluations, SMUD will be guided by the CPUC's "California Evaluation Framework"[39] and "California Energy Efficiency Evaluation Protocols."[40]
SMUD is planning to allocate approximately one percent of its total energy-efficiency budget towards impact- and persistence-focused M&V studies. These studies will be conducted primarily through the use of third-party contractors, with management and oversight by SMUD's Business Planning Department.
SMUD completed the following M&V activities in 2021:
• Residential Retrofit Building Electrification, which included the Home Performance Program, Equipment Efficiency, and Multifamily Retrofit.
In 2022, M&V will be conducted for the following:
- Smart Homes Electrification and the Retail Products Platform.

Major Differences or Diversions from California POU TRM for Energy Savings

In order to determine energy savings, programs may rely on several sources: DEER, TRM, Energy Modeling Software, or specific studies conducted by utilities or recognized working groups. The

[39] TecMarket Works, June 2004. *The California Evaluation Framework*. (https://www.cpuc.ca.gov/-/media/cpuc-website/files/uploadedfiles/cpuc_public_website/content/utilities_and_industries/energy/energy_programs/demand_side_management/ee_and_energy_savings_assist/caevaluationframework.pdf)
[40] CPUC, April 2020. *Energy Efficiency Policy Manual*. (https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/e/6442465683-eepolicymanualrevised-march-20-2020-b.pdf)

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	1,270	6,283,945	55,380,752	466	2,306,664	28,570,198	1,288	$1,052,394	0.22	0.05	0.048
Food Service	19	108,971	1,412,829	16	87,177	1,130,263	52	$27,767	0.32	0.26	0.032
HVAC - Cooling	5,468	5,616,934	77,121,379	3,367	3,509,741	47,683,199	1,927	$1,868,039	0.31	0.18	0.052
HVAC - Heat Pump	1,070	1,406,574	21,036,977	642	843,944	12,622,186	488	$436,113	0.29	0.14	0.046
Service & Domestic Hot Water	14	133,692	1,336,971	8	80,215	802,182	47	$38,154	0.16	0.36	0.058
Whole Building	3,368	27,455,382	357,083,979	2,902	23,977,934	316,555,430	14,860	$7,233,100	0.35	0.17	0.030
EE Subtotal	11,210	41,005,498	513,372,886	7,401	30,805,675	407,363,458	18,662	$10,655,568	0.33	0.14	0.034
Appliance & Plug Loads	0	1,083	10,820	0	1,083	10,820	1	$29,514	0.00	0.01	3.333
HVAC - Heat Pump	1,019	1,339,806	17,358,853	1,019	1,339,806	17,358,853	774	$4,727,806	0.04	0.07	0.352
Service & Domestic Hot Water	37	359,856	4,678,028	37	359,856	4,678,028	215	$1,114,662	0.03	0.04	0.308
Whole Building	427	2,309,688	23,063,206	427	2,309,688	23,063,206	1,411	$8,403,023	0.02	0.05	0.445
Low-Income Subtotal	1,484	4,010,433	45,110,907	1,484	4,010,433	45,110,907	2,401	$14,275,006	0.03	0.06	0.397
EE and Low Income Subtotal	12,694	45,015,931	558,483,793	8,885	34,816,108	452,474,365	21,063	$24,930,574	0.16	0.12	0.072
All	10,178	55,000,000	824,158,324	10,178	55,000,000	824,158,324	34,252	$1,502,459	4.39	4.39	0.002
Codes & Standards Subtotal	10,178	55,000,000	824,158,324	10,178	55,000,000	824,158,324	34,252	$1,502,459	4.39	4.39	0.002
Appliance & Plug Loads	2	7,581	75,741	2	7,581	75,741	4	$217,981	0.00	0.00	3.516
Food Service	6	33,600	402,879	6	33,600	402,879	20	$6,456	0.50	0.35	0.020
HVAC - Heat Pump	7,976	10,490,382	135,877,832	7,976	10,490,382	135,877,832	6,058	$5,284,469	0.27	0.45	0.050
Miscellaneous	0	0	0	0	0	0	0	$237,000			0.000
Service & Domestic Hot Water	310	3,016,450	38,767,253	310	3,016,450	38,767,253	1,802	$1,709,194	0.17	0.24	0.057
Whole Building	477	4,203,381	68,382,740	472	4,162,781	67,774,109	2,648	$3,571,136	0.15	0.15	0.073
Electrification Subtotal	8,770	17,751,394	243,506,445	8,765	17,710,794	242,897,814	10,532	$11,026,236	0.20	0.28	0.060
C&S, T&D and Electrification Subtotal	18,948	72,751,394	1,067,664,770	18,943	72,710,794	1,067,056,139	44,784	$12,528,695	0.70	0.93	0.016
Utility Total	31,642	117,767,325	1,626,148,562	27,828	107,526,903	1,519,530,503	65,847	$37,459,268	0.34	0.31	0.033

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	3,177	26,558,513	346,989,206	2,792	23,496,922	311,308,510	14,552	$5,785,802	0.43	0.18	0.025
Residential	8,033	14,446,985	166,383,680	4,608	7,308,753	96,054,948	4,110	$4,869,766	0.20	0.10	0.067
EE Subtotal	11,210	41,005,498	513,372,886	7,401	30,805,675	407,363,458	18,662	$10,655,568	0.33	0.14	0.034
Residential	1,484	4,010,433	45,110,907	1,484	4,010,433	45,110,907	2,401	$14,275,006	0.03	0.06	0.397
Low-Income Subtotal	1,484	4,010,433	45,110,907	1,484	4,010,433	45,110,907	2,401	$14,275,006	0.03	0.06	0.397
EE and Low Income Subtotal	12,694	45,015,931	558,483,793	8,885	34,816,108	452,474,365	21,063	$24,930,574	0.16	0.12	0.072
Other	10,178	55,000,000	824,158,324	10,178	55,000,000	824,158,324	34,252	$1,502,459	4.39	4.39	0.002
Codes & Standards Subtotal	10,178	55,000,000	824,158,324	10,178	55,000,000	824,158,324	34,252	$1,502,459	4.39	4.39	0.002
Commercial	301	3,253,283	49,126,730	296	3,212,683	48,518,098	2,055	$1,409,639	0.27	0.27	0.039
Residential	8,469	14,498,111	194,379,716	8,469	14,498,111	194,379,716	8,477	$9,616,596	0.19	0.28	0.065
Electrification Subtotal	8,770	17,751,394	243,506,445	8,765	17,710,794	242,897,814	10,532	$11,026,236	0.20	0.28	0.060
C&S, T&D and Electrification Subtotal	18,948	72,751,394	1,067,664,770	18,943	72,710,794	1,067,056,139	44,784	$12,528,695	0.70	0.93	0.016
Utility Total	31,642	117,767,325	1,626,148,562	27,828	107,526,903	1,519,530,503	65,847	$37,459,268	0.34	0.31	0.033

TABLE 3. SMUD EE Program Results by Building Type

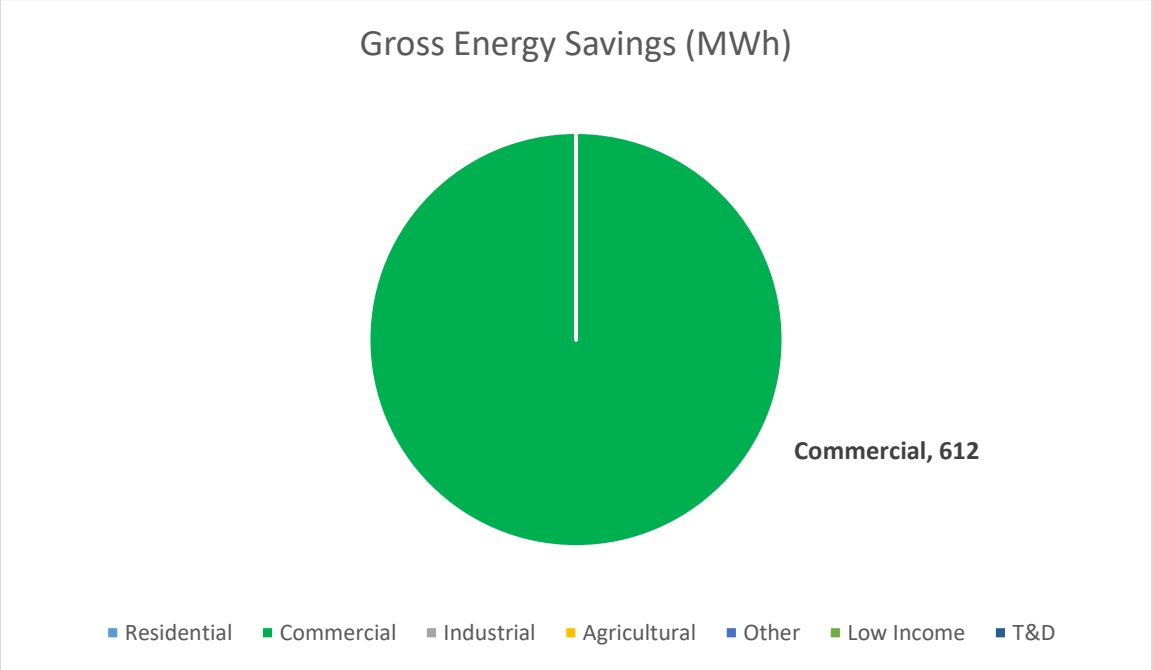
Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Assembly	10	81,436	572,685	8	65,149	458,148	37	$20,730	0.18	0.23	0.052
Education - Primary School	17	244,505	3,665,224	16	237,170	3,555,268	151	$48,375	0.57	0.01	0.018
Education - Secondary School	2	28,198	422,699	2	25,660	384,656	16	$114,349	0.03	0.02	0.400
Grocery	762	5,737,380	77,671,858	641	4,828,241	65,710,443	3,004	$1,931,567	0.27	0.12	0.039
Health/Medical - Hospital	39	304,823	4,557,069	38	294,315	4,401,991	186	$59,076	0.60	0.28	0.018
Lodging - Hotel	4	11,612	173,709	3	9,290	138,967	5	$4,449	0.33	0.39	0.043
Lodging - Motel	0	2,074	24,874	0	1,659	19,899	1	$378	0.42	0.35	0.024
Manufacturing Biotech	19	160,454	2,402,818	18	155,495	2,328,992	98	$36,302	0.50	0.30	0.021
Manufacturing Light Industrial	451	3,533,723	53,890,980	421	3,297,558	50,166,705	2,089	$438,291	0.91	0.62	0.012
Office - Large	289	3,420,936	49,575,471	275	3,270,082	47,643,670	2,102	$466,619	0.82	0.59	0.013
Office - Small	47	567,878	7,718,852	43	510,768	7,020,299	325	$287,992	0.20	0.09	0.054
Other Agricultural	611	5,242,041	78,583,766	556	4,770,257	71,511,227	3,011	$979,932	0.57	0.56	0.018
Other Commercial	306	2,625,222	19,151,958	246	2,110,920	15,482,606	1,201	$521,581	0.25	0.22	0.039
Other Industrial	109	853,130	12,788,294	106	827,536	12,404,645	523	$144,416	0.69	0.37	0.016
Residential	3,127	8,457,325	81,129,549	1,658	3,686,152	44,477,349	2,015	$1,495,983	0.27	0.06	0.044
Residential - Multi-Family	121	939,493	7,601,810	98	753,367	6,108,004	431	$262,044	0.19	0.12	0.051
Residential - Single-Family	4,880	5,861,091	83,327,188	2,928	3,517,973	50,009,489	2,031	$3,211,787	0.18	0.16	0.085
Restaurant - Fast-Food	3	14,659	418,674	3	15,635	393,514	11	$19,812	0.16	0.10	0.071
Restaurant - Sit-Down	16	92,123	1,109,329	13	73,698	887,463	44	$22,846	0.32	0.24	0.033
Retail - Large	226	1,458,570	14,462,177	181	1,166,856	11,569,741	669	$311,436	0.33	0.14	0.034
Retail - Small	96	588,367	4,301,266	77	470,694	3,441,013	263	$147,842	0.20	0.14	0.050
Storage - Conditioned	8	100,944	1,482,836	8	97,284	1,433,937	62	$16,857	0.66	0.49	0.016
Storage - Unconditioned	13	170,514	1,192,025	11	136,411	953,620	79	$15,600	0.51	0.52	0.019
Warehouse - Refrigerated	56	509,000	7,147,776	53	483,503	6,861,812	308	$97,302	0.56	0.41	0.019
EE Subtotal	11,210	41,005,498	513,372,886	7,401	30,805,675	407,363,458	18,662	$10,655,568	0.33	0.14	0.034
Residential - Single-Family	1,484	4,010,433	45,110,907	1,484	4,010,433	45,110,907	2,401	$14,275,006	0.03	0.06	0.397
Low-Income Subtotal	1,484	4,010,433	45,110,907	1,484	4,010,433	45,110,907	2,401	$14,275,006	0.03	0.06	0.397
EE and Low Income Subtotal	12,694	45,015,931	558,483,793	8,885	34,816,108	452,474,365	21,063	$24,930,574	0.16	0.12	0.072
All	10,178	55,000,000	824,158,324	10,178	55,000,000	824,158,324	34,252	$1,502,459	4.39	4.39	0.002
Codes & Standards Subtotal	10,178	55,000,000	824,158,324	10,178	55,000,000	824,158,324	34,252	$1,502,459	4.39	4.39	0.002
Assembly	24	202,998	3,043,156	19	162,398	2,434,525	102	$90,342	0.21	0.33	0.050
Education - Community College	0	1,406	21,064	0	1,406	21,064	1	$1,228	0.13	0.07	0.078
Education - Secondary School	39	575,885	9,125,939	39	575,885	9,125,939	367	$512,431	0.13	0.13	0.079

Office - Small	132	1,581,295	23,669,881	132	1,581,295	23,669,881	1,023	$505,414	0.38	0.36	0.029
Residential	2	7,581	75,741	2	7,581	75,741	4	$217,981	0.00	0.00	3.516
Residential - Multi-Family	120	1,017,440	14,446,647	120	1,017,440	14,446,647	635	$842,962	0.13	0.16	0.078
Residential - Single-Family	8,447	14,329,114	192,690,037	8,447	14,329,114	192,690,037	8,378	$8,846,871	0.21	0.31	0.060
Restaurant - Fast-Food	6	35,675	433,980	6	35,675	433,980	21	$9,008	0.39	0.29	0.026
Electrification Subtotal	8,770	17,751,394	243,506,445	8,765	17,710,794	242,897,814	10,532	$11,026,236	0.20	0.28	0.060
C&S, T&D and Electrification Subtotal	18,948	72,751,394	1,067,664,770	18,943	72,710,794	1,067,056,139	44,784	$12,528,695	0.70	0.93	0.016
Utility Total	31,642	117,767,325	1,626,148,562	27,828	107,526,903	1,519,530,503	65,847	$37,459,268	0.34	0.31	0.033

SAN FRANCISCO PUBLIC UTILITIES COMMISSION

San Francisco at a Glance

- Climate Zone: 3
- Customers: 5,347
- Total annual retail sales: 837,343 MWh
- Annual Retail Revenue: $119,692,592
- Annual EE expenditures for reporting year: $833,807
- Gross annual savings from reporting year portfolio: 612 MWh



San Francisco Overview

Hetch Hetchy Power manages a portfolio of electric generation, which includes the San Francisco Public Utility Commission's (SFPUC) Hetch Hetchy Water and Power system, which generates an average of 1.6 million MWh of clean hydroelectric power each year, 25 municipal solar photovoltaic installations (8.2 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 mainly have 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

Throughout much of FY 2021, the City and County of San Francisco was under shelter-in-place orders that prohibited all non-essential site work. This severely affected the ability of sites

throughout San Francisco to identify and complete EE projects, leading to a reduction in completed achieved energy savings when compared to previous years.
This year's energy savings are primarily derived from direct install projects at the 911 Emergency Call Center and Balboa Pool, as well as HVAC and controls projects 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 2020-21, completed EE projects and programs are estimated to save 612 MWh (net savings) of electricity per year, at a utility cost of $0.7 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 2021 include:

- Controls upgrades at the 911 Emergency Call Center
- Installation of an aquatic management system at Balboa Pool
- HVAC and equipment replacements for a large data center incentivized through the Upgrade for Savings Program
- HVAC controls modifications for computer/IT rooms and CO controls on the bus deck at the Salesforce Transit Center incentivized through the Upgrade for Savings Program.

Commercial, Industrial & Agricultural Programs

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

- General Fund Program: This program provides complete retrofit services and customized incentives to targeted municipal customers. The program focuses on City agencies that are funded primarily through local tax receipts, fees, and federal/state-funded programs. These customers are considered hard-to-reach (due to limited access to capital and engineering, as well as insufficient price signals).
- Civic Center Sustainability District: Through a partnership with the Clinton Global Initiative, this program demonstrates green, renewable and energy efficient technologies as a national model for sustainability in historic districts. For 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 19-20, Power Enterprise released its ninth 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.

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 is 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: The program provides incentive payments to San Francisco residents and businesses installing rooftop solar projects. The program includes a component for low income residents, which complements a statewide program administered by Grid Alternatives, a nonprofit organization.

EM&V Studies

Historically, the majority of EE retrofit projects funded by Hetch Hetchy Power have included an individual M&V study following the International Performance Measurement and Verification Protocol (IPMVP). These projects have included an M&V plan with a sampling plan, a logging plan, an approach to data recovery and analysis, and a written report.

Major Differences or Diversions from California POU TRM for Energy Savings

Hetch Hetchy Power's mostly direct-install 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	49	429,205	6,438,075	49	429,205	6,438,075	2,105	$82,381	7.31	0.64	0.017
Miscellaneous	35	182,749	2,741,235	35	182,749	2,741,235	929	$751,426	0.66	0.50	0.366
EE Subtotal	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
EE and Low Income Subtotal	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121

TABLE 2. SFPUC EE Program Results by Sector

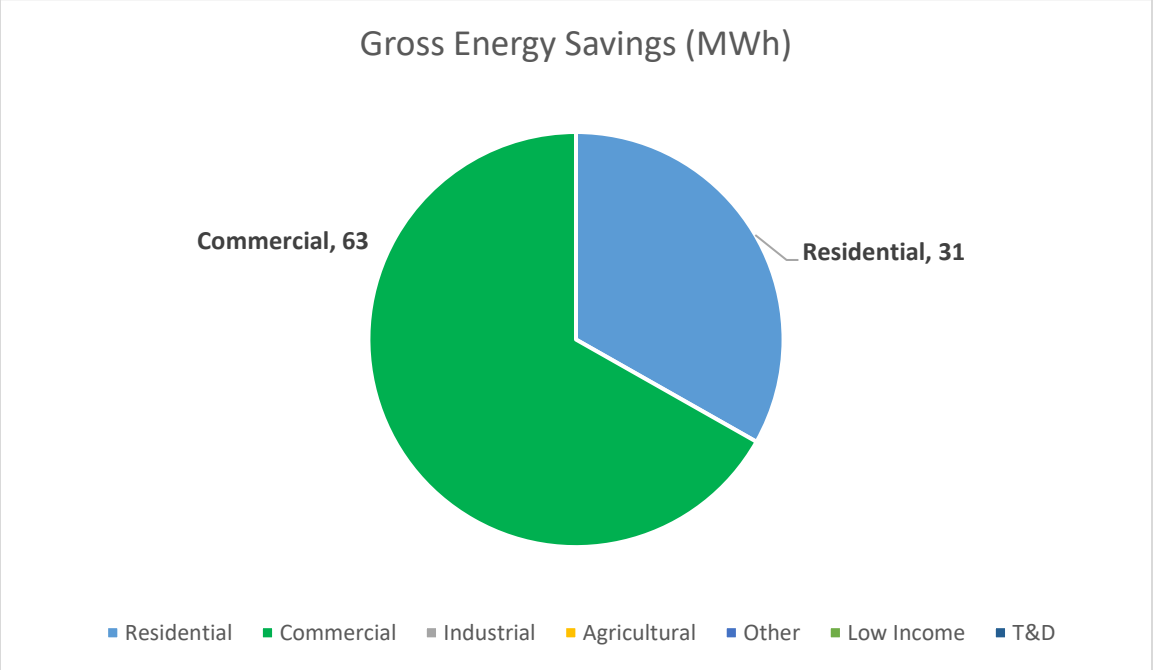
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
EE Subtotal	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
EE and Low Income Subtotal	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121

TABLE 3. SFPUC 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)**
Office - Large	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$815,807	1.35	0.57	0.119
Other Commercial	0	0	0	0	0	0	0	$18,000			0.000
EE Subtotal	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
EE and Low Income Subtotal	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	84	611,954	9,179,310	84	611,954	9,179,310	3,034	$833,807	1.32	0.57	0.121

Shasta Lake at a Glance

- Climate Zone: 11
- Customers: 4,602
- Total annual retail sales: 214,653 MWh
- Annual Retail Revenue: $22,847,516
- Annual EE expenditures for reporting year: $152,637
- Gross annual savings from reporting year portfolio: 94 MWh



Shasta Lake Overview

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

Major Program and Portfolio Changes

Reportable savings tend to fluctuate dramatically from year to year. In the last five years, CSL has achieved 128% of net kWh savings targets.

Program and Portfolio Highlights

The Commercial Lighting Direct Install Program provided 52% of the gross annual savings in FY 2021. 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.

- Commercial/Industrial 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 efficiency fluorescent or LED fixtures.
- Commercial HVAC: The City offers rebates to commercial customers for energy efficient HVAC upgrades.
- Commercial Refrigeration: Rebates are available to improve the efficiency of commercial refrigeration systems.
- Commercial Appliances: Rebates are available for energy efficient cooking equipment such as ovens, dishwashers, fryers, griddles, etc.
- Commercial Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.
- Commercial/Industrial Custom Program: CSL offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.

Residential Programs

CSL manages a comprehensive 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 and 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 ENERGYSTAR® 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 or 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 Shasta Lake
- Research, Development, and Demonstration: Focuses on LED lighting in various applications, community solar charging station(s) and latest HVAC applications in City owned facilities
- EVs: Support of local business in conversion of combustion engine vehicles to electric vehicles

EM&V Studies

The CSL is planning to complete EM&V in FY 2022 by working with several other utilities to gain economies of scale.

Major Differences or Diversions from California 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.

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	0	5,472	62,035	0	3,287	37,770	14	$17,286	0.25	0.26	0.573
Building Envelope	15	15,801	316,027	5	4,892	97,845	120	$25,534	1.25	1.18	0.384
Commercial Refrigeration	1	4,896	58,752	0	2,938	35,251	57	$8,745	0.98	0.48	0.312
HVAC - Cooling	2	7,292	111,111	2	5,755	87,312	38	$29,861	0.80	0.78	0.459
Lighting - Indoor	4	15,884	193,364	4	12,468	151,103	54	$22,535	0.67	0.62	0.188
Lighting - Outdoor	0	43,151	517,808	0	34,521	414,247	197	$45,789	0.93	0.87	0.139
Service & Domestic Hot Water	1	1,834	18,340	0	1,100	11,004	4	$2,887	0.37	0.35	0.317
EE Subtotal	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
EE and Low Income Subtotal	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236

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	5	63,010	756,125	4	49,429	593,149	305	$72,368	0.91	0.76	0.154
Residential	18	31,320	521,313	7	15,532	241,383	179	$80,269	0.77	0.75	0.455
EE Subtotal	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
EE and Low Income Subtotal	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236

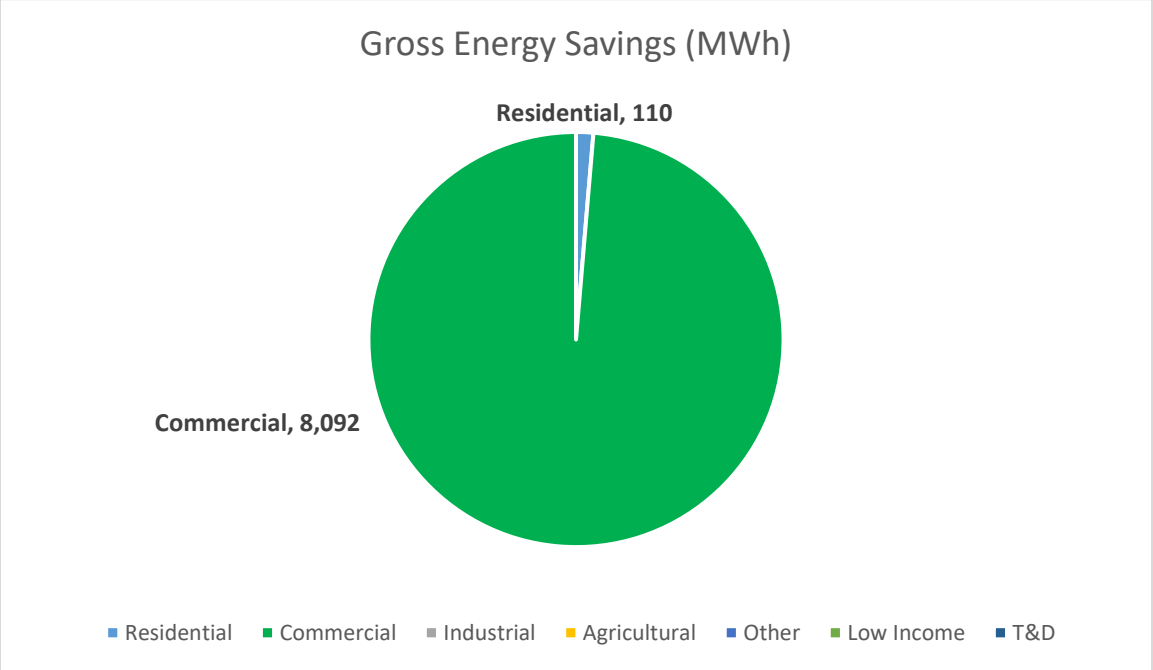
TABLE 3. CSL EE Program Results by Building Type

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	4	58,636	702,593	3	46,805	561,030	250	$65,288	0.88	0.82	0.147
Grocery	1	4,896	58,752	0	2,938	35,251	57	$8,745	0.98	0.48	0.312
Residential	16	24,518	428,030	6	11,274	182,978	159	$60,602	0.91	0.94	0.458
Residential - Single-Family	2	6,280	88,063	1	3,945	55,273	19	$18,002	0.37	0.29	0.435
EE Subtotal	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
EE and Low Income Subtotal	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	23	94,330	1,277,438	11	64,961	834,532	484	$152,637	0.84	0.75	0.236

SILICON VALLEY POWER

Silicon Valley Power at a Glance

- Climate Zone: 4
- Customers: 58,701
- Total annual retail sales: 3,593,748 MWh
- Annual Retail Revenue: $422,917,148
- Annual EE expenditures for reporting year: $4,734,082
- Gross annual savings from reporting year portfolio: 8,203 MWh



Silicon Valley Power Overview

Silicon Valley Power (SVP) is unique in its mix of customers. While 85% of the customers are residential, 93% 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 energy savings for the year. Combined with this unique customer mix and our mild climate, very little energy savings comes from the residential sector, as we do not have a high residential air conditioning load which often makes up a large percentage of energy portfolio savings in other climate zones.

During the pandemic, SVP saw a significant decline in new EE projects submitted, and many projects were delayed as businesses shut down. Since the majority of the utility's energy savings comes from business EE upgrades, this caused a significant decline in energy savings achieved in FY 2021.

Major Program and Portfolio Changes

In FY 2021, SVP made the following changes to its program portfolio:

• Ended the Residential Refrigerator Recycling Rebate Program - SVP offered customers a $50 rebate to recycle their old, working refrigerator or freezer through its program to ensure inefficient units are removed from the electric grid and recycled according to the EPA's Responsible Appliance Disposal (RAD) requirements. This program ended in 2021 when the grant funding under which the program was offered ended.

• Ended the ENERGYSTAR® Ceiling Fan Rebate - Residents who purchase ENERGYSTAR® qualified ceiling fans received a $35 rebate per ceiling fan. 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.

• Ended the Energy Efficient Water Systems Program - This program provided engineering support and analysis to large customer facilities with cooling towers, significant wastewater systems, and significant pumping loads to assist in implementing EE measures which will also likely result in water conservation. The program ended when the contract term expired, as there was little demand from customers to continue the program.

• Added a performance incentive to the 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. For projects where persistence of energy savings is more uncertain, SVP may now opt to pay a performance incentive for the measure through the Customer Directed Rebate instead of paying a lump sum.

• Added an 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 a co-pay of 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.

• Added commercial electrification rebates – SVP launched its first commercial electrification rebates in December 2020 with three measures. This includes a custom rebate for conversion to heat recovery chillers, a custom rebate for heat pump pool heaters, and a rebate for heat pump air conditioners. 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.

Program and Portfolio Highlights

In FY 2021, SVP customers completed a total of 26 custom incentive projects under the Customer Directed Rebate and Date Center Rebate programs. These projects contributed over 5.2 million kWh in gross energy savings to the program's overall goal.

The Customer Directed Rebate and Data Center Rebate programs were developed many years ago in recognition of the unique customer base served by SVP and provides unique opportunities for energy-efficiency projects that may not otherwise fit into the utility's standard rebate and customer assistance offerings. Any EE project that decreases energy consumption at a facility in

Santa Clara and is not already covered under a prescriptive rebate program may qualify. Customers must provide a measurement and verification plan that is approved by SVP before work can begin. Pre- and post-inspection and validation of energy consumption is required. Under the data center program, performance payments are made annually to ensure savings are actually achieved, as data centers do not always build out as planned and occupancy can vary. The performance incentive component has been very well-received by Silicon Valley Power's customers, as the rebate is paid to the facility's operating budget annually after the initial capital project is closed. This was a benefit to the customer that utility staff did not anticipate and has been carried into other program design.

SVP also launched its EE Grant for Small Businesses in FY 2021 to help small businesses impacted by the pandemic. Between the Nonprofit EE Grant Program and the Small Business EE Grant Program, 39 grant projects were completed with savings over 379,000 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 uncertainly 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.

In July 2020, SVP launched a pilot ENERGYSTAR® Room Air Cleaner rebate program. When the program was designed, it was targeted at customers who had respiratory issues or medical needs to utilize a room air cleaner. Participation levels were expected to be low. However, in August 2020, the Bay Area experienced an unprecedented lighting storm that sparked multiple fires on the foothills on both sides of the valley, contributing to poor air quality and smoke for weeks. The utility saw significant participation in the rebate program following this event, with 632 units rebated in fiscal year 2020-2021. This was more than ten times the anticipated program participation rate. Because this was triggered by the fires, SVP was concerned about the persistence of the energy savings over time, as the units may not be continually used, so it contracted to have EM&V of the program done by a third party. The results of this study showed that the majority of customers continue to use room air cleaners on a regular basis and the energy savings align with that in the California eTRM. This EM&V report is available on the California Municipal Utilities Association website.

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 provides assistance 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 6 months of program enrollment and HVAC measures within 12 months of enrollment in order to receive the additional incentive.

• Controls Program – This program is available for projects where at least 80% of the savings come from the control strategies. Incentives are paid on a performance basis with 6 payments made over 5 years, 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.

• Specialized Commercial and Industrial Operational Optimization Program - This program provides engineering support and analysis to large customer facilities to effectively engage these customers in taking a long-term view of developing energy savings strategies geared towards implementing measures that will continually optimize the operations of their facilities. The program also provides project management support to customers during the implementation phase to make the recommended EE improvements and data analytics support to assist with ongoing savings validation.

• Small Business Exterior Lighting Program – This program provides a free snapshot audit of exterior lighting efficiency opportunities. It then provides free LED exterior lights to eligible small businesses. The businesses are responsible for the installation cost and can use their own staff, the contractor of their choice, or one of the contractors working with the program provider.

• Data Center Efficiency Program – This program targets data centers with IT server load greater than 350 kW or cooling load greater than 100 tons. The incentive is paid as a performance incentive, where the customer will receive five annual payments based on actual measured energy savings, with the first payment made three months after project completion.

• 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. SVP offers a prescriptive rebate for three types of LED retrofits: LED integral troffers, LED high bay fixtures, and LED low bay fixtures. These three categories of lamp have the lowest program adoption rates and require a higher incentive than provided through the standard lighting rebate calculator to encourage adoption. The simplicity of a prescriptive rebate also makes this easier for contractors to sell.
• EE Grant Program for Non-Profit 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 a co-pay of 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 – Silicon Valley Power launched its first commercial electrification rebates in December 2020 with three measures. This includes a custom rebate for conversion to heat recovery chillers, a custom rebate for heat pump pool heaters, and a rebate for heat pump air conditioners. 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 installing a new variable speed pool pump with a qualifying controller.
• ENERGYSTAR® 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 Attic Insulation Rebate – This program pays $0.10/square foot for attic insulation of R-38 over conditioned space in single family homes or in multifamily homes where the attic space is completely separated from that of the other multifamily units. Eligible customers must have

electric heat either in the form of a heat pump or electric resistance heat and no more than R19 existing attic insulation.
• Residential Electric Dryer Rebate Program: This program provides a rebate of $100 for any ENERGYSTAR® -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.
• Refrigerator Recycling Rebate – This program provides free pickup of an old, inefficient refrigerator or freezer for responsible recycling. It also provides an incentive of $50 per unit (limit 2) to the customer.

Complementary Programs

• Financial Rate Assistance Program (FRAP) – This program provides a 25% discount on the electric portion of utility bills for income-qualified residential customers, up to the first 800 kWh of use per month.
• Low Income EV Charging Station Grant for Multi-family properties – Under its low income programs, SVP offers a grant of up to $1,000 per charging station for multi-family properties where a specified percentage of customers residing at the property qualify for SVP's low income programs. This is in addition to the rebate program the utility offers to all multifamily complexes in Santa Clara.
• Low Income Solar Grant Program - In 2020, SVP launched a program to install solar PV systems on the homes of low income residents that will offset nearly 100% of their annual energy consumption.
• Electric Vehicle Charging Infrastructure Rebate - funded through non-Public Benefits fund sources, this program provides a rebate up to $1,000 per residential electric vehicle charger installed at residences receiving electricity from Silicon Valley Power. Multifamily housing can receive a rebate up to $3,000 per Level 2 charger installed, and schools and non-profit organizations can receive up to $5,000 per Level 2 charging station installed.
• Low Income Electric Vehicle Rebate – this program provides a $1500 rebate to income qualified customers for the purchase of an all-electric vehicle ad a $1000 rebate for the purchase of a plug-in hybrid electric vehicle (PHEV).
• Electric Bicycle Rebate – This program provides a rebate of 10% of the purchase price of an electric bicycle, up to $300. Income-qualified customers can receive a bonus incentive of $200.
• Educational Outreach in Schools - in the 2019-2020 program year, SVP ramped up its outreach on EE and renewable energy education in the Santa Clara Unified School District. Working with the school district staff, we developed a curriculum for the after school program targeted at fourth graders. The program was piloted at two campuses and included educational lectures with hands on experiments the students could complete at home with their families and also within the classroom after school program. The culmination of the efforts were to be showcased at the annual STEAM Festival, which unfortunately was canceled in 2020 due to the COVID-19 stay at home order. In 2021, the STEAM Festival took on a virtual format with students uploading their projects in advance for review by virtual attendees at their leisure. SVP and the school district staff look forward to resuming the program and expanding it to more school campuses when students return to the classroom and after school programs full time.

EM&V Studies

Silicon Valley Power conducted an EM&V study of its Room Air Cleaner Rebate program. This report and all past EM&V studies conducted on behalf of Silicon Valley Power can be found on the California Municipal Utilities Association website.

Major Differences or Diversions from California POU TRM for Energy Savings

Silicon Valley Power uses the California Publicly Owned Utilities Technical Reference Manual (TRM) or the California eTRM for the majority of its energy savings. Where no savings value exists, Silicon Valley Power uses actual savings verified through metering or an approved measurement and verification plan. In the case of lighting projects, Silicon Valley Power uses a lighting calculator that utilizes actual operating hours. A copy of the calculator can be found at 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	16	110,034	627,501	12	83,910	475,505	87	$222,340	0.26	0.25	0.531
Building Envelope	0	151	1,510	0	42	423	0	$2,133	0.04	0.04	6.102
Food Service	1	8,586	103,032	1	8,002	96,025	19	$53,689	0.19	0.17	0.704
HVAC - Cooling	628	4,570,717	62,762,142	534	3,886,275	53,361,812	10,665	$2,357,867	2.37	1.34	0.058
Lighting - Indoor	405	2,436,911	12,184,555	347	2,088,580	10,442,901	1,946	$1,312,014	0.74	0.78	0.137
Lighting - Outdoor	0	371,171	1,484,684	0	315,495	1,261,981	246	$388,834	0.34	0.41	0.329
Process	91	705,049	10,575,735	78	603,069	9,046,034	1,835	$396,604	2.50	1.93	0.059
Service & Domestic Hot Water	0	0	0	0	0	0	0	$601			0.000
EE Subtotal	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
EE and Low Income Subtotal	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080

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	1,125	8,092,434	87,110,148	959	6,901,422	74,208,754	14,711	$4,509,007	1.71	1.22	0.077
Residential	17	110,185	629,011	12	83,952	475,927	87	$225,075	0.26	0.25	0.537
EE Subtotal	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
EE and Low Income Subtotal	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080

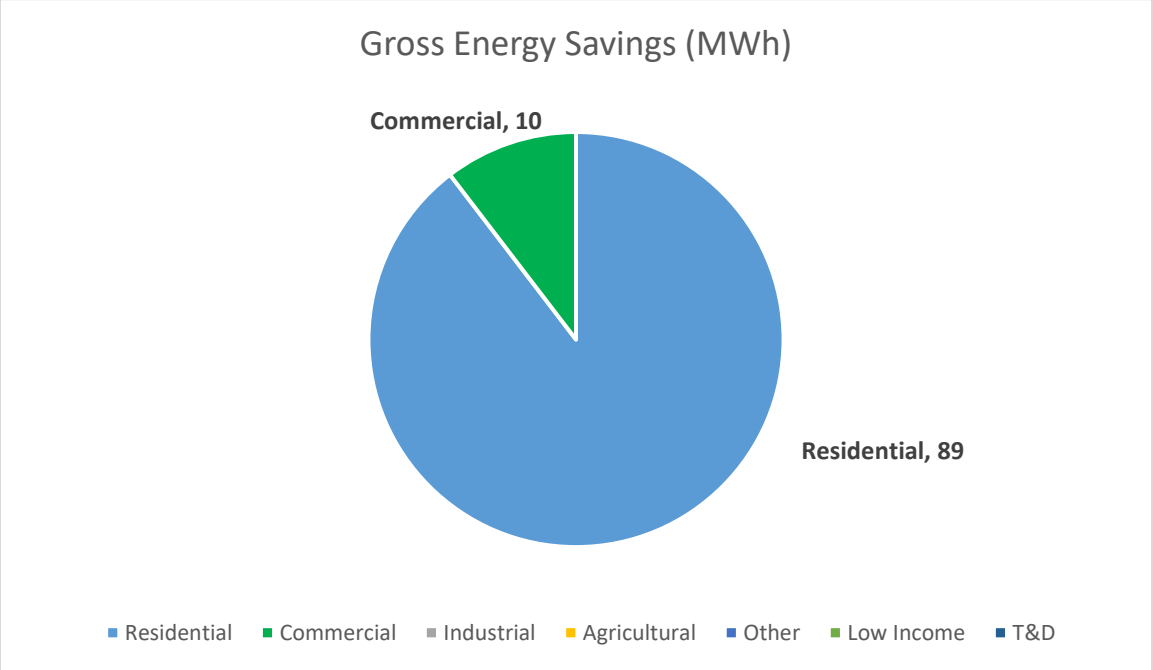
TABLE 3. SVP EE Program Results by Building Type

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	1,139	8,169,179	87,596,089	970	6,959,053	74,584,093	14,780	$4,696,406	1.65	1.19	0.080
Residential	0	0	0	0	0	0	0	$601			0.000
Residential - Single-Family	2	33,439	143,071	1	26,321	100,589	18	$37,075	0.33	0.30	0.415
EE Subtotal	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
EE and Low Income Subtotal	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1,142	8,202,619	87,739,159	971	6,985,374	74,684,682	14,798	$4,734,082	1.64	1.18	0.080

TRUCKEE DONNER PUBLIC UTILITY DISTRICT

Truckee Donner at a Glance

- Climate Zone: 16
- Customers: 14,355
- Total annual retail sales: 163,176 MWh
- Annual Retail Revenue: $27,927,720
- Annual EE expenditures for reporting year: $372,905
- Gross annual savings from reporting year portfolio: 99 MWh



Truckee Donner 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 4-year terms and operates on a calendar year budget. TDPUD is a transmission-dependent utility within NV Energy's control area and secures electric resources primarily through the Utah Associated Municipal Power System (UAMPS). TDPUD has been successful in the past in transitioning to renewable energy sources, keeping rates stable, and investing in accessible, cost-effective, EE programs.

Major Program and Portfolio Changes

Energy savings and program spending continued to be a challenge in 2021 due to impacts from the COVID-19 Pandemic. Furthermore, in 2021 the district began transitioning its programs to a heavier focus on electrification.

1) In line with our report last year, 2019 was the last year for our Residential lighting programs due to saturation, Codes & Standards, and diminishing returns. This has been a large part of our portfolio in previous years and has yet to be replaced.
2) In 2021 the TDPUD's program's saw additional focus placed on electrification measures. In many ways, 2021 has been a transitional year as the TDPUD re-designed its portfolio to align more with GHG objectives and identify measures which can replace the savings that lighting technologies were previously able to generate. The results of these changes were not reflected in 2021 but will manifest in significant changes to the portfolio in 2022 and onward.
3) Our low income program was expanded in 2020 to contribute to local COVID relief efforts. TDPUD's board was able to quickly respond to the COVID pandemic due to its Energy Savings Partners Home Energy Audit program (income qualified) which provides bill payment assistance for those who sign up for an energy audit. In 2021the Board maintained funding for this program including an annual credit twice the customers highest bill (up to $800).
4) Heat Pump Water Heater rebates were revised downward due to popularity. Rebates are now $750 for electric upgrades and $1,000 for gas to electric conversions.
5) This year marks the last year for our refrigerator recycling program as the local vendor offering those services is no longer able to provide this service.
6) The TDPUD began conversations with a third-party to implement a pilot behavioral program centered around customer bill comparison reports and enhanced behavioral awareness. While planning for this pilot started this year in 2021, the pilot itself will launch in 2022.

Program and Portfolio Highlights

TDPUD's ability to offer programing was restricted during the COVID-19 pandemic due to safety concerns. However, traditional programs – such as residential appliance and other rebates – continued to perform well. Much like 2020, local county policy made it difficult to directly interact with customers. Furthermore, uncertainties in the tourism sector (driven by COVID and wildfires) limited the engagement of our commercial customers.
TDPUD's Residential Energy Survey's has historically been very popular program with customers and local county policies allowed us to briefly re-engage with customers through this program towards the end of 2021. This program has since been suspended once more. However; we are in the process of implementing a virtual site-visit platform which will enable our staff to implement these surveys remotely. Implementation of the virtual Energy Surveys will be active in 2022 and the results (as well as the program details) discussed in next year's report.

Commercial, Industrial & Agricultural Programs

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

with reduced wattage T8 fluorescent or LED fixtures. Other lighting retrofits may qualify for a rebate equivalent to projected first year energy saving.
Commercial Custom Rebate (Non-Res Process): Provides incentives to commercial electric customers for replacing inefficient plant equipment with high efficiency equipment. Customers may receive a rebate equal to the projected first year energy savings.

Residential Programs

1) Residential Appliance Rebate (Appliance): Provides increasing incentives to customers to purchase more energy efficient appliances (clothes washers, dishwashers, and refrigerators) as identified by EnergyStar® and the Consortium for EE (CEE). Rebates range from $75 to $125.
2) Refrigerator Recycle (Res Refrigeration): Promotes the recycling of older, working refrigerators and freezers by providing customers with free pick-up and a $30 rebate. This program was retired in mid-2021 as the local trade ally retired and there are no other local companies available.
3) 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.
4) LED Holiday Light Program (Res Lighting): Provides a $5/$10 rebate for 100/300 LED light strands, respectively.
5) 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.
6) Thermally Efficient Windows Rebate (Res Shell): Provides an incentive of $5 per square foot of window to replace qualifying single-pane windows. Primary heating source must be a permanent electric space heating system.
7) 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.
8) EV Charger Rebates: In 2021 the 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.

Complementary Programs

1) 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.
2) 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 has been suspended during the COVID-19 crisis and all participants will be offered the RES when re-instated.

3) Patricia S. Sutton Conservation Garden (Not Evaluated): Promotes water-efficient landscaping by demonstrating, at the TDPUD's headquarters, native and drought tolerant plants, hardscaping/mulching techniques, and efficient irrigation. Plant lists, design, and materials used in the project are all available via a web-based resource at www.tdpud.org.
4) School Conservation Education (Res Lighting): Promotes energy and water conservation through an innovative series of programs designed to both educate students and deliver, for free, energy and water savings measures. 2021 handouts were suspended due to COVID-19.
5) 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

Due to the transitional nature of this program year, it was determined that EM&V represented limited utility in providing feedback for future program performance. EM&V will be leveraged again starting next year to help inform the updated portfolio design.

Major Differences or Diversions from California POU TRM for Energy Savings

Energy savings were predominately derived from the California eTRM and in some cases were pulled from the CMUA TRM. As a notable exception; the embedded energy value applied to our water-energy nexus measures was derived by our EM&V consultant in 2014 using actual water pumping data provided by 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)**
Appliance & Plug Loads	11	66,778	555,792	7	43,405	361,265	159	$141,790	0.34	0.24	0.496
Building Envelope	0	196	3,920	0	127	2,548	8	$5,525	0.22	0.19	3.191
Lighting - Indoor	1	10,265	184,770	1	6,672	120,100	41	$38,513	0.29	0.29	0.454
Process	3	21,544	229,310	3	21,019	222,303	84	$72,242	2.71	2.59	0.400
EE Subtotal	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
EE and Low Income Subtotal	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
Appliance & Plug Loads	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
Electrification Subtotal	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
C&S, T&D and Electrification Subtotal	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
Utility Total	18	116,590	1,151,869	14	89,031	884,293	413	$372,905	0.76	0.67	0.533

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)**
Commercial	1	10,265	184,770	1	6,672	120,100	41	$38,513	0.29	0.29	0.454
Residential	14	88,517	789,022	10	64,551	586,115	251	$219,557	1.11	0.86	0.469
EE Subtotal	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
EE and Low Income Subtotal	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
Residential	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
Electrification Subtotal	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
C&S, T&D and Electrification Subtotal	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
Utility Total	18	116,590	1,151,869	14	89,031	884,293	413	$372,905	0.76	0.67	0.533

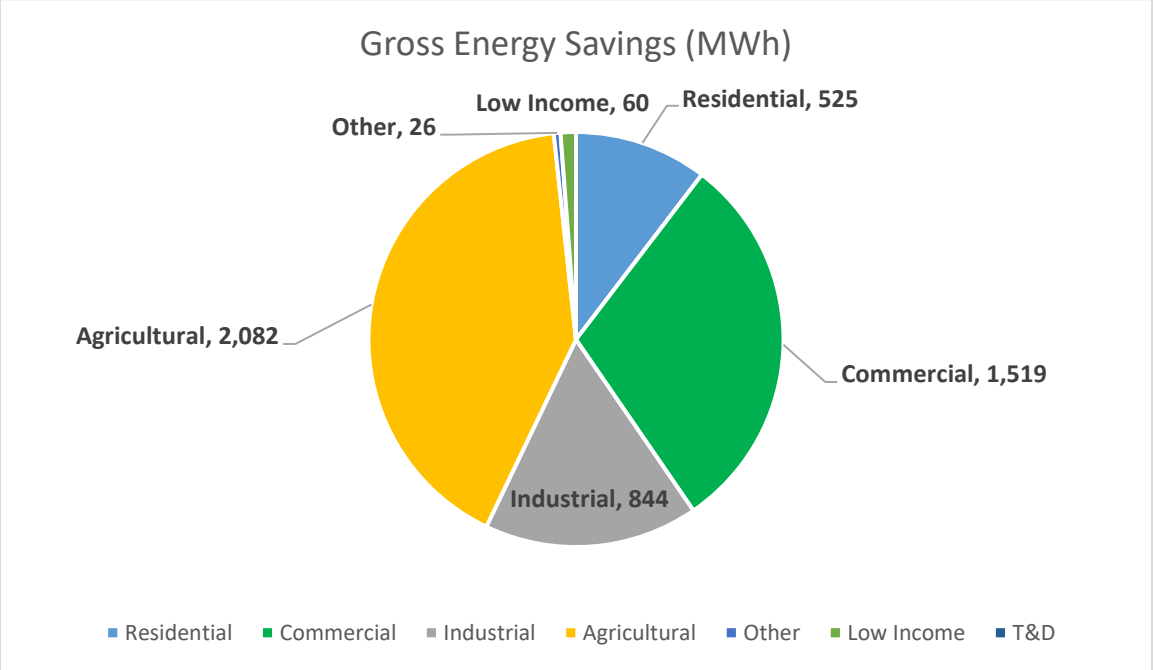
TABLE 3. TDPUD EE Program Results by Building Type

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	1	10,265	184,770	1	6,672	120,100	41	$38,513	0.29	0.29	0.454
Residential	14	88,517	789,022	10	64,551	586,115	251	$219,557	1.11	0.86	0.469
EE Subtotal	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
EE and Low Income Subtotal	15	98,782	973,792	11	71,224	706,216	293	$258,070	0.99	0.80	0.467
Residential	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
Electrification Subtotal	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
C&S, T&D and Electrification Subtotal	3	17,808	178,077	3	17,808	178,077	120	$114,835	0.25	0.28	0.780
Utility Total	18	116,590	1,151,869	14	89,031	884,293	413	$372,905	0.76	0.67	0.533

TURLOCK IRRIGATION DISTRICT

Turlock at a Glance

- Climate Zone: 12
- Customers: 93,916
- Total annual retail sales: 2,224,430 MWh
- Annual Retail Revenue: $308,292,632
- Annual EE expenditures for reporting year: $1,232,039
- Gross annual savings from reporting year portfolio: 5,056 MWh



Turlock 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 by industrial and commercial segments 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 Commercial Pool Pump and Commercial HVAC rebates in 2021. The Commercial Pool Pump rebate was designed to rebate installing EnergyStar® ® qualified variable-speed pumps on in-ground pools and the Commercial HVAC rebate was designed to rebate efficient

HVAC units of at least 15 SEER and web-enabled smart thermostats. The number of non-residential programs that TID processed in 2021 was down from 2020 due to COVID and supply chain delays.

Program and Portfolio Highlights

TID's Custom rebate accounted for almost 50% of total program savings in 2021. This was driven by a large project in which VFD's were added to fan motors in an indoor greenhouse.

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.
- TIDs 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 2021, we put together a contactless Premier Shade Tree Program Event. During this event, customers could apply for the program on our webpage, received vouchers via mail, and were able to visit our local nursery to have their tree kits loaded for them by nursery staff. This enabled us to run this program with success in light of current COVID-19 conditions. The feedback received was positive and the program thrived.

Complementary Programs

ASSISTANCE PROGRAMS:

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

EM&V Studies

Our 2019-2020 EM&V is available at https://www.cmua.org/emv-reports

Major Differences or Diversions from California POU TRM for Energy Savings

For all residential and some non-residential rebates TID uses deemed savings from the California Technical Reference Manual. For custom and lighting rebates TID calculates the savings for each

project by establishing a baseline and determining annual kWh savings for new equipment installed. We are capturing actual savings and verifying quantities per project.

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**	**Utility ($/kWh)**
Appliance & Plug Loads	12	145,164	1,306,816	8	84,787	736,070	288	$47,102	1.99	1.37	0.077
Building Envelope	3	20,169	371,790	1	5,647	104,101	41	$6,578	3.69	2.17	0.091
Commercial Refrigeration	6	89,713	1,345,688	5	86,745	1,301,168	469	$27,525	4.47	0.15	0.028
HVAC - Cooling	40	319,334	5,040,179	32	252,693	3,995,650	1,701	$221,676	4.06	3.09	0.084
Lighting - Indoor	205	1,353,893	20,197,006	203	1,329,833	19,874,725	7,085	$218,782	9.18	1.67	0.015
Lighting - Outdoor	0	1,362,221	20,433,315	0	1,362,221	20,433,315	9,638	$354,562	5.95	5.95	0.023
Process	3	1,702,162	25,452,781	2	1,697,184	25,398,020	8,958	$240,848	11.20	2.25	0.013
Service & Domestic Hot Water	1	3,530	35,300	0	2,118	21,180	8	$1,473	1.38	0.73	0.084
EE Subtotal	269	4,996,185	74,182,874	251	4,821,228	71,864,229	28,187	$1,118,547	7.12	2.01	0.021
Appliance & Plug Loads	0	3,630	50,820	0	2,541	35,574	13	$36,664	0.12	0.12	1.351
Building Envelope	6	6,562	66,126	2	1,837	18,515	8	$32,772	0.15	0.14	2.144
HVAC - Cooling	1	574	5,166	0	459	4,133	2	$6,591	0.16	0.57	1.890
Lighting - Indoor	4	39,064	585,960	2	21,095	316,418	122	$29,106	1.11	0.84	0.123
Lighting - Outdoor	0	10,354	155,310	0	5,591	83,867	32	$8,359	1.07	1.00	0.133
Low-Income Subtotal	11	60,184	863,382	4	31,523	458,508	177	$113,493	0.45	0.44	0.329
EE and Low Income Subtotal	280	5,056,369	75,046,256	255	4,852,752	72,322,737	28,364	$1,232,039	6.50	1.97	0.023
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	280	5,056,369	75,046,256	255	4,852,752	72,322,737	28,364	$1,232,039	6.50	1.97	0.023

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	14	2,081,854	31,227,809	14	2,081,854	31,227,809	11,045	$294,495	11.14	3.03	0.013
Commercial	26	1,519,243	22,771,609	26	1,514,621	22,710,788	10,442	$379,763	6.17	4.86	0.022
Industrial	169	843,969	12,579,882	167	833,330	12,440,206	4,413	$149,582	8.43	0.64	0.016
Other	4	26,470	397,051	4	26,470	397,051	140	$4,091	9.86	5.65	0.014
Residential	56	524,649	7,206,523	40	364,954	5,088,375	2,146	$290,615	3.56	2.62	0.083
EE Subtotal	269	4,996,185	74,182,874	251	4,821,228	71,864,229	28,187	$1,118,547	7.12	2.01	0.021
Residential	11	60,184	863,382	4	31,523	458,508	177	$113,493	0.45	0.44	0.329
Low-Income Subtotal	11	60,184	863,382	4	31,523	458,508	177	$113,493	0.45	0.44	0.329
EE and Low Income Subtotal	280	5,056,369	75,046,256	255	4,852,752	72,322,737	28,364	$1,232,039	6.50	1.97	0.023
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	280	5,056,369	75,046,256	255	4,852,752	72,322,737	28,364	$1,232,039	6.50	1.97	0.023

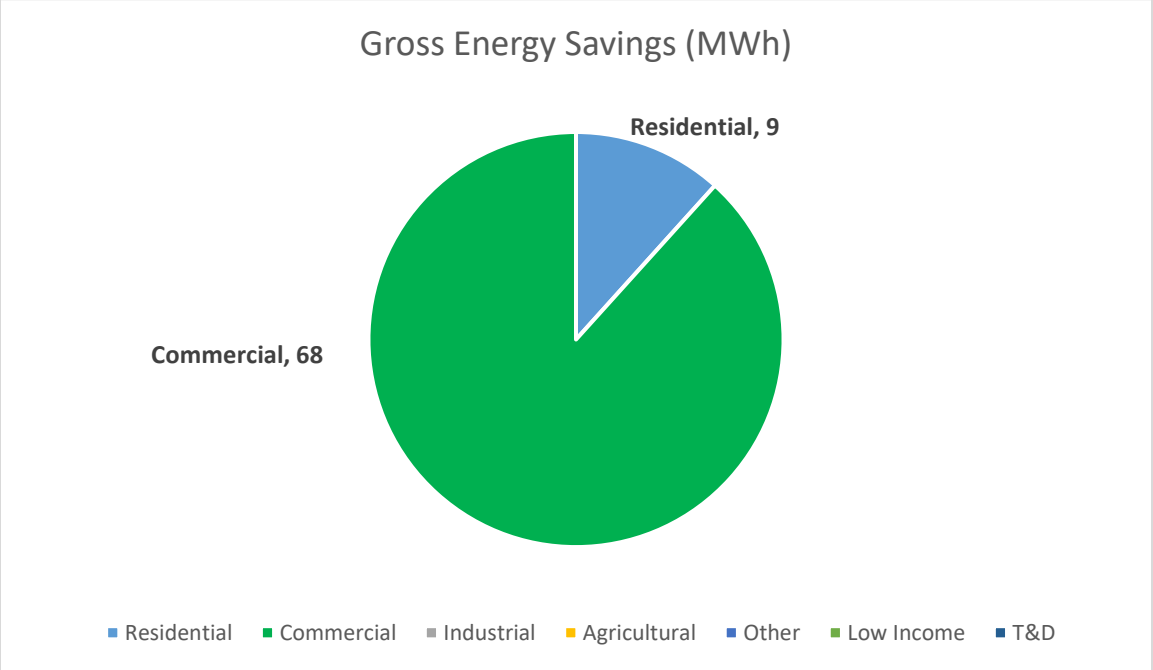
TABLE 3. TID EE Program Results by Building Type

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	8	50,700	245,075	6	34,147	164,837	68	$19,458	1.10	0.98	0.128
Education - Primary School	4	26,470	397,051	4	26,470	397,051	140	$4,091	9.86	5.65	0.014
Grocery	5	82,334	1,235,003	4	80,038	1,200,563	432	$26,123	4.34	0.14	0.029
Other Agricultural	14	2,235,614	33,534,213	14	2,235,614	33,534,213	11,872	$323,464	10.86	2.72	0.013
Other Commercial	26	1,519,243	22,771,609	26	1,514,621	22,710,788	10,442	$379,763	6.17	4.86	0.022
Other Industrial	163	600,496	8,927,790	162	592,825	8,832,635	3,118	$93,088	9.75	0.96	0.014
Residential	42	396,077	6,134,783	32	283,092	4,412,868	1,886	$246,214	3.85	2.85	0.084
Residential - Single-Family	5	77,872	826,665	3	47,715	510,671	192	$24,944	2.58	1.62	0.060
Retail - Small	1	7,379	110,685	0	6,707	100,605	36	$1,402	6.89	1.21	0.019
EE Subtotal	269	4,996,185	74,182,874	251	4,821,228	71,864,229	28,187	$1,118,547	7.12	2.01	0.021
Residential	10	59,610	858,216	4	31,064	454,375	175	$106,901	0.47	0.43	0.313
Residential - Single-Family	1	574	5,166	0	459	4,133	2	$6,591	0.16	0.57	1.890
Low-Income Subtotal	11	60,184	863,382	4	31,523	458,508	177	$113,493	0.45	0.44	0.329
EE and Low Income Subtotal	280	5,056,369	75,046,256	255	4,852,752	72,322,737	28,364	$1,232,039	6.50	1.97	0.023
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	280	5,056,369	75,046,256	255	4,852,752	72,322,737	28,364	$1,232,039	6.50	1.97	0.023

UKIAH

Ukiah at a Glance

- Climate Zone: 3
- Customers: 8,342
- Total annual retail sales: 113,076 MWh
- Annual Retail Revenue: $16,695,323
- Annual EE expenditures for reporting year: $68,245
- Gross annual savings from reporting year portfolio: 77 MWh



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 2021. Ukiah is considering offering Low-Income and Commercial Lighting Direct Install programs.

Program and Portfolio Highlights

The Commercial Lighting Program delivered the greatest percentage of savings in FY21, accounting for 85% of the total savings. Ukiah achieved 144% of the target energy savings for the past three 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. Energy specialists provide on-site energy audits. EE measures are recommended, and additional visits are completed upon request.

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

Residential Programs

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. Energy specialists provide on-site energy audits. EE measures are recommended, and additional visits are completed upon request.

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

Complementary Programs

- Low-Income Programs: The City offers a low-income bill assistance program to eligible customers.
- Renewable Energy Program: The City offers net metering agreements to customers wishing to install Solar PV.
- Electric Vehicles: In addition to the 8 Tesla Fast Charging stations, the Electric Utility has installed four Level II chargers in the downtown area and is reviewing additional locations throughout the 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 the Ukiah is provided at www.cmua.org.

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.

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	2,982	38,635	0	1,683	22,600	8	$12,294	0.22	0.23	0.706
Building Envelope	0	2,897	55,936	0	811	15,662	50	$13,002	0.68	0.69	1.212
HVAC - Cooling	1	4,203	63,524	1	3,486	52,569	19	$11,456	0.74	0.82	0.292
Lighting - Indoor	7	65,756	789,785	6	52,544	630,908	224	$21,609	2.76	1.01	0.043
Lighting - Outdoor	5	1,404	9,720	3	758	5,249	2	$9,238	0.06	0.06	2.078
Service & Domestic Hot Water	0	165	1,650	0	99	990	0	$647	0.15	0.15	0.790
EE Subtotal	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
EE and Low Income Subtotal	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119

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	8	68,362	828,875	7	54,832	665,231	234	$23,342	2.71	1.08	0.044
Residential	6	9,044	130,375	3	4,549	62,746	69	$44,903	0.39	0.38	0.956
EE Subtotal	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
EE and Low Income Subtotal	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119

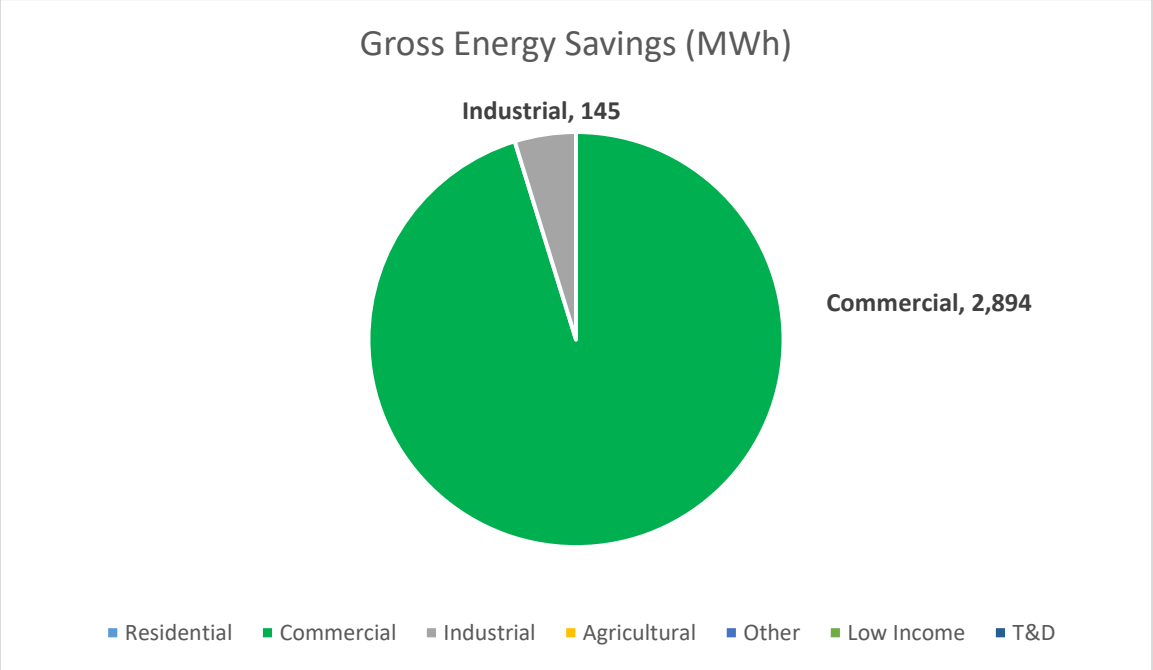
TABLE 3. Ukiah EE Program Results by Building Type

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	13	66,654	791,915	9	53,029	632,058	224	$25,008	2.39	0.96	0.050
Lodging - Motel	1	1,150	17,250	1	978	14,663	4	$1,280	1.37	1.56	0.117
Other Commercial	0	1,692	25,380	0	1,438	21,573	7	$3,171	0.59	1.41	0.196
Residential	0	5,395	88,062	0	2,415	37,984	46	$25,221	0.49	0.47	0.909
Residential - Single-Family	0	2,516	36,643	0	1,522	21,700	22	$13,565	0.35	0.36	0.826
EE Subtotal	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
EE and Low Income Subtotal	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	14	77,407	959,250	10	59,381	727,978	304	$68,245	1.18	0.77	0.119

VERNON PUBLIC UTILITIES

Vernon at a Glance

- Climate Zone: 9
- Customers: 1,905
- Total annual retail sales: 1,148,412 MWh
- Annual Retail Revenue: $167,398,961
- Annual EE expenditures for reporting year: $425,415
- Gross annual savings from reporting year portfolio: 3,039 MWh



Vernon Overview

Vernon Public Utilities (VPU), in Climate Zone 8, has implemented some of the recommendations of the comprehensive Integrated Resource Plan. The IRP recommendations have guided the 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 items is currently being implemented. VPU also has a goal by implementing the following EE action plans in cooperation with other City departments:

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

Major Program and Portfolio Changes

VPU has not made any major changes in their programs but the FY 2021 has continued to point to the business community that energy saving can be achieved by looking into great detail to the operation process side of their respectable businesses. The City of Vernon business community continues to explore smart efficient ways to be resourceful. By focusing on more projects like compressors, heat conversion, and refrigeration controls and not always relying on the lighting aspect of savings. As our customers get smarter and efficient to increase their bottom line, Vernon Public Utilities has been a key ally to assist in any way possible to be more efficient. The challenges for VPU is that our customer baseline is 99 percent commercial/industrial which limits the type measures/projects can be implemented each year without proper planning or funds being allocated for each project and/or budgeting for capital improvements. This creates a challenge to meet our projected goals every year.

Program and Portfolio Highlights

This year highlights have been in the refrigeration controls sector. Since Vernon Public Utilities customer base is consist of commercial and industrial type buildings. We had one particular company Choice Foods upgraded their existing refrigeration controls system hardware and software to take full advantage of energy savings. An Measurement & Verification report was to provide detail 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

VERNON PROGRAMS

- Customer Incentive Program: Fund the exploration and implementation of energy efficient technologies and equipment, such as lighting technologies, variable speed drives, air compressors, motors, refrigeration, and air conditioning. Provide cash incentives to businesses that install energy efficient technologies.
- Customer-Directed Program: Fund customized projects demonstrating energy and cost savings and/or commercial market potential in the area of energy efficiency. Customers must fund at least 25 percent of total project cost. Projects are only eligible if they do not qualify for any of the other programs.
- Energy Education & 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.
- Time of Use Rate Programs: All customers loads exceeding 100 kW demand are eligible to receive time-of-use rate; enabling them to reduce their energy cost through time management of their energy usage.

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

Complementary Programs

Distributed Solar

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

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

Transportation Electrification

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

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

Demand Response and Energy Storage

Demand response is one of the ways customers can conserve energy by curtailing electricity usage when it is most needed by the electric grid. Demand response programs have proven to be an effective means for utilities to manage system peaks by controlling customer loads. By participating in demand response programs, customers can help VPU achieve California GHG emissions reduction goals and delay infrastructure investments by the utility. Further, customers can be financially compensated for reducing usage when the price of energy is at its highest.

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

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

EM&V Studies

The City of Vernon continues to have numerous projects this past fiscal year which require an in depth analysis of the energy, measurement & verification of their projects to prove the validity of

the energy savings. Since we have the distinctiveness of being a small commercial/industrial city, we can provide smart and efficient reports to our customers proving their worth. 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.

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	26	207,175	3,107,625	26	207,175	3,107,625	1,133	$31,766	9.24	6.25	0.014
Lighting - Indoor	424	2,686,803	32,241,635	424	2,686,803	32,241,635	10,858	$368,003	8.46	5.80	0.014
Process	94	145,020	2,900,400	94	145,020	2,900,400	965	$25,646	10.42	3.51	0.013
EE Subtotal	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
EE and Low Income Subtotal	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014

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	450	2,893,978	35,349,260	450	2,893,978	35,349,260	11,990	$399,769	8.52	5.83	0.014
Industrial	94	145,020	2,900,400	94	145,020	2,900,400	965	$25,646	10.42	3.51	0.013
EE Subtotal	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
EE and Low Income Subtotal	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014

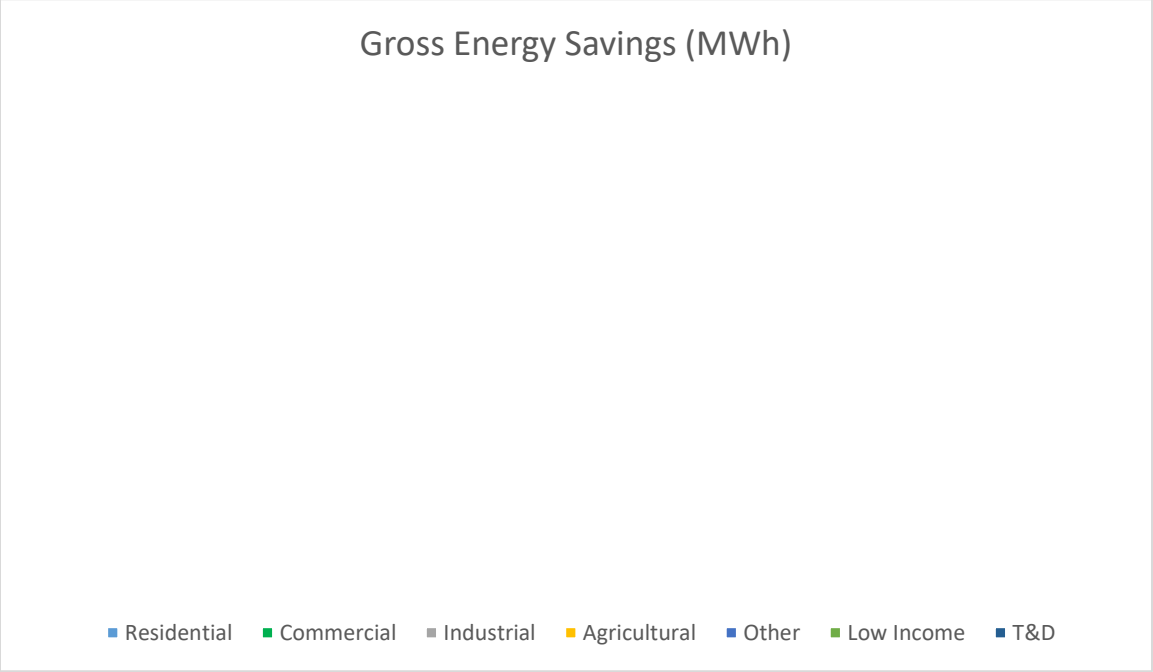
TABLE 3. VPU EE Program Results by Building Type

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)**
All	26	207,175	3,107,625	26	207,175	3,107,625	1,133	$31,766	9.24	6.25	0.014
Other Commercial	424	2,686,803	32,241,635	424	2,686,803	32,241,635	10,858	$368,003	8.46	5.80	0.014
Other Industrial	94	145,020	2,900,400	94	145,020	2,900,400	965	$25,646	10.42	3.51	0.013
EE Subtotal	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
EE and Low Income Subtotal	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	544	3,038,998	38,249,660	544	3,038,998	38,249,660	12,955	$425,415	8.63	5.56	0.014

VICTORVILLE MUNICIPAL UTILITY SERVICES

Victorville 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: $0
- Gross annual savings from reporting year portfolio: 0 MWh



Victorville Overview

Victorville Municipal Utility Services (VMUS) was established to provide safe, reliable, and cost-effective service to non-residential customers that continue to build new facilities located in the designated service territory. The peak demand was 16.9 megawatts (1.8% more than last year) and the load factor was 70.4%. Customers reside in climate zone 14 and all customers' facilities are less than fifteen years old and met the applicable Title 24 requirements. The recent age of these facilities provide less 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.
- Time-of-use meters and customers' access to their daily usage on the web portal provide the data to assess the cost of their energy usage and demand requirements.
- Cost-effective, reliable, and feasible 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 residential 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.

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	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. 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	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. 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	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

APPENDIX B

Energy Platforms, LLC

Calculation Reference

Lori Bovitz

Last Updated: 4-26-2019

Version: 1.0

COST BENEFIT CALCULATIONS

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

Load Shape Assignment

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

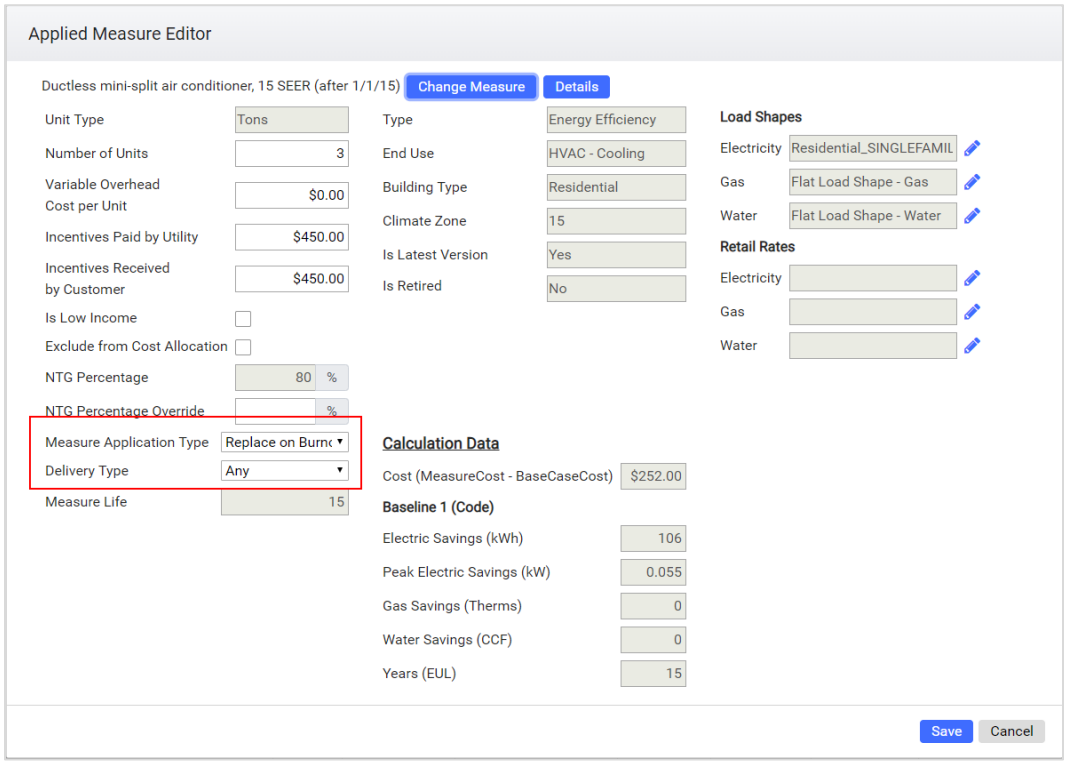
- Current version of the Load Shape
- Load Shape is either local to the organization or "Shared"
- The following attributes of the Load Shape match the same attribute of the Measure:
    - Climate Zone, or "All"
    - Building Type, or "All"
    - End Use
    - Sector, or "All"
- If an IOU is defined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

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

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

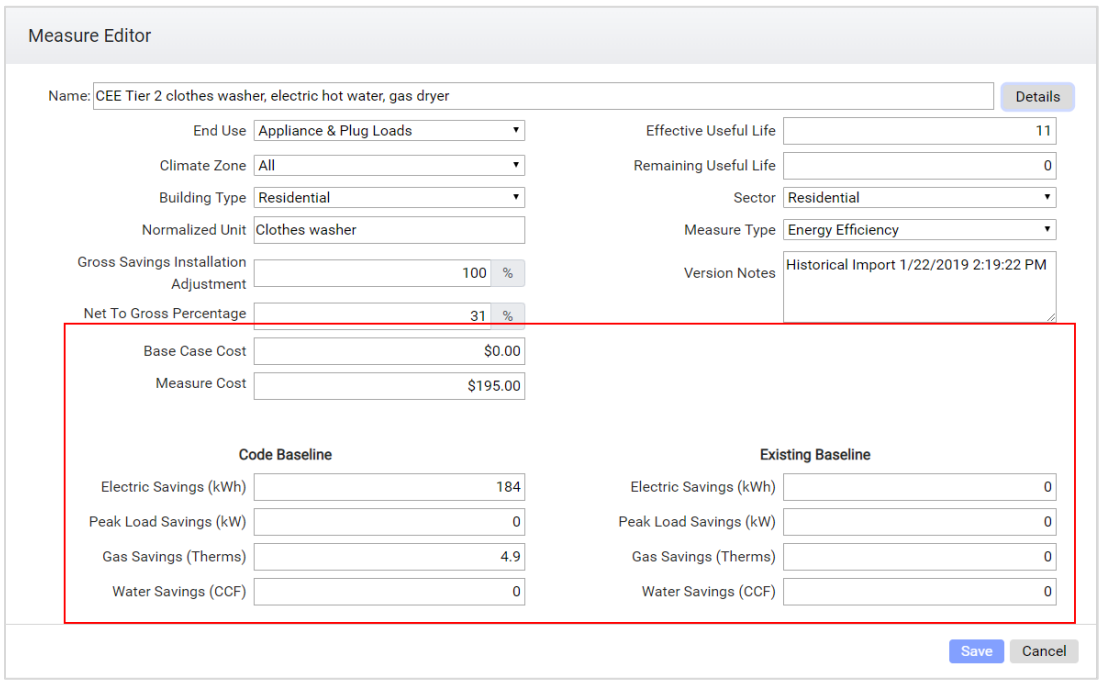
Dual Baseline Savings, Cost, and Measure Life

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



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

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



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

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

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

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

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

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

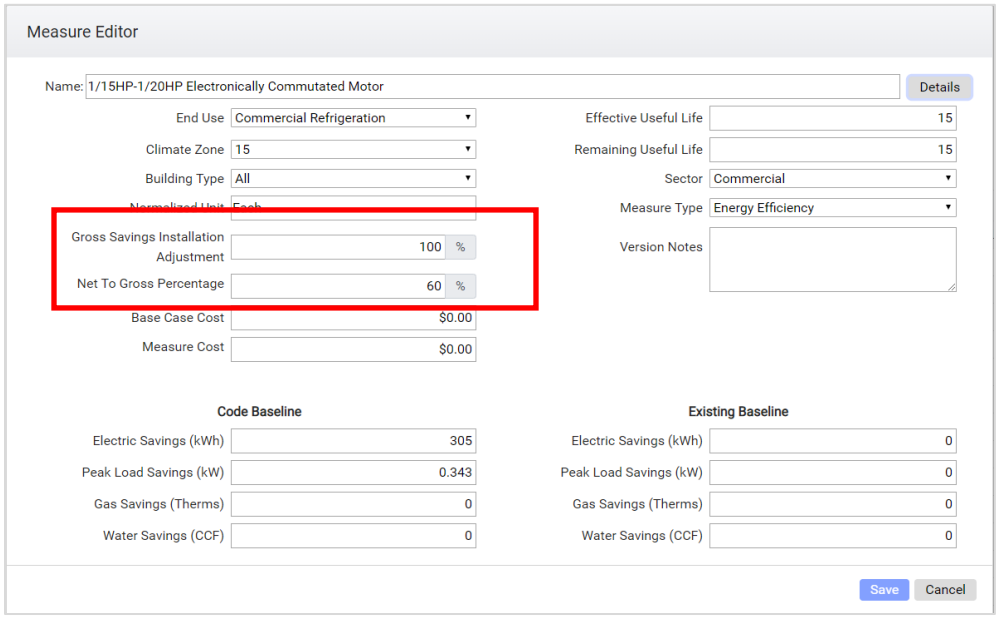
MC = Measure Costs
BC = Base Costs
RUL = Remaining Useful Life (years)
EUL = Estimated Useful Life (years)

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

Gross Savings, Adjusted Gross Savings, and Net Savings

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

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



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

- In-Service Rate – number of actual units installed

- Realization Rate – differences between actual and Measure savings based on impact evaluation studies

Adjusted Gross Savings

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

Adjusted Gross Savings = Gross Savings * GSIA

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

Net Savings

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

Net Savings = Adjusted Gross Savings * Net to Gross Percentage

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

Annual Data Calculations

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

Adjusted Gross Savings Benefit

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

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

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

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

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

Net Savings Benefit

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

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

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

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

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

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

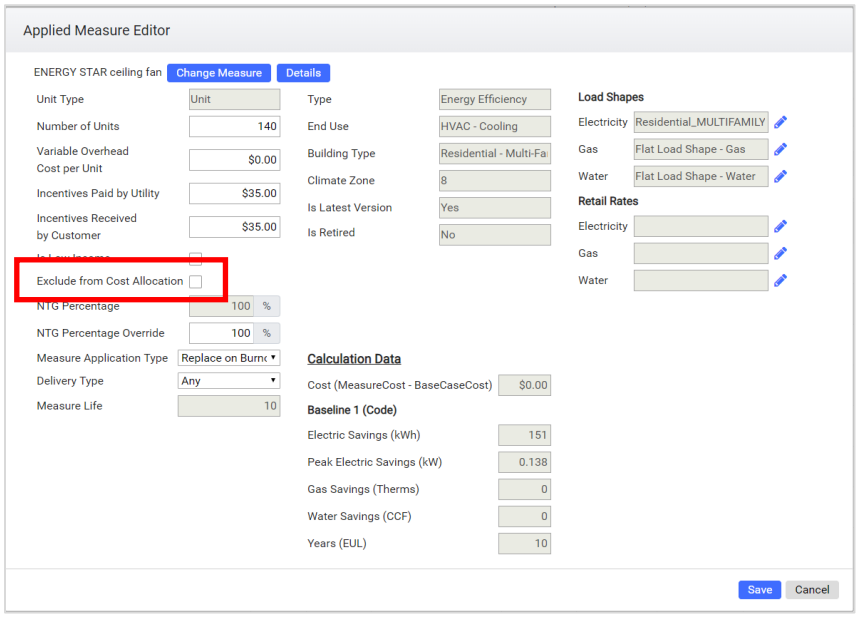
In ESP, each Load Shape resource contains one year of hourly data. As a result, each year of the calculation uses the same values for each year in the Measure lifetime.

Cost Allocation

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

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

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

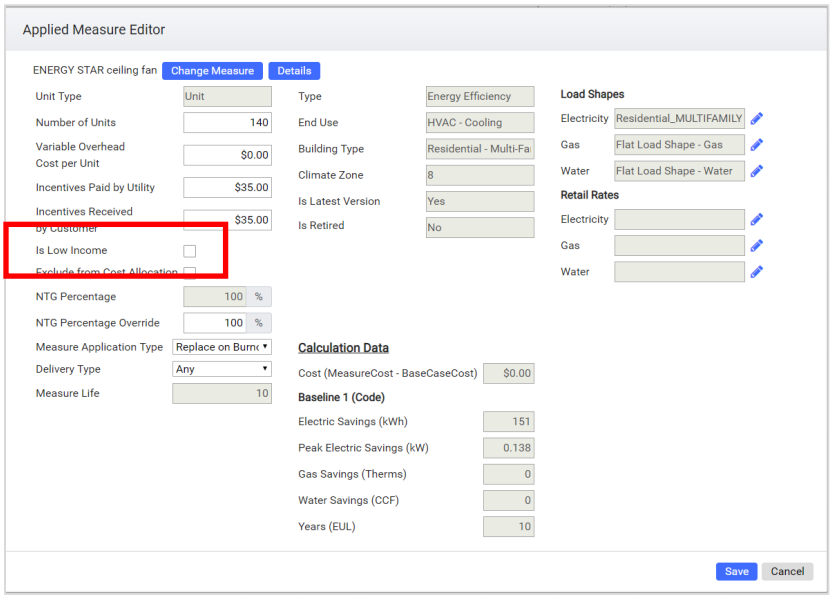


Cost Benefit calculations will not run if it cannot allocate a cost to any Applied Measures. For example, if you enter a cost in the Sector Overhead Residential field, but there are no Residential Measures to allocate the overhead costs, the cost benefit calculation will not run. This also applies to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

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

Low-Income

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



Cost Benefit Calculations

ESP supports the following cost/benefit tests:

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

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

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

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

Net Present Value Calculations

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

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