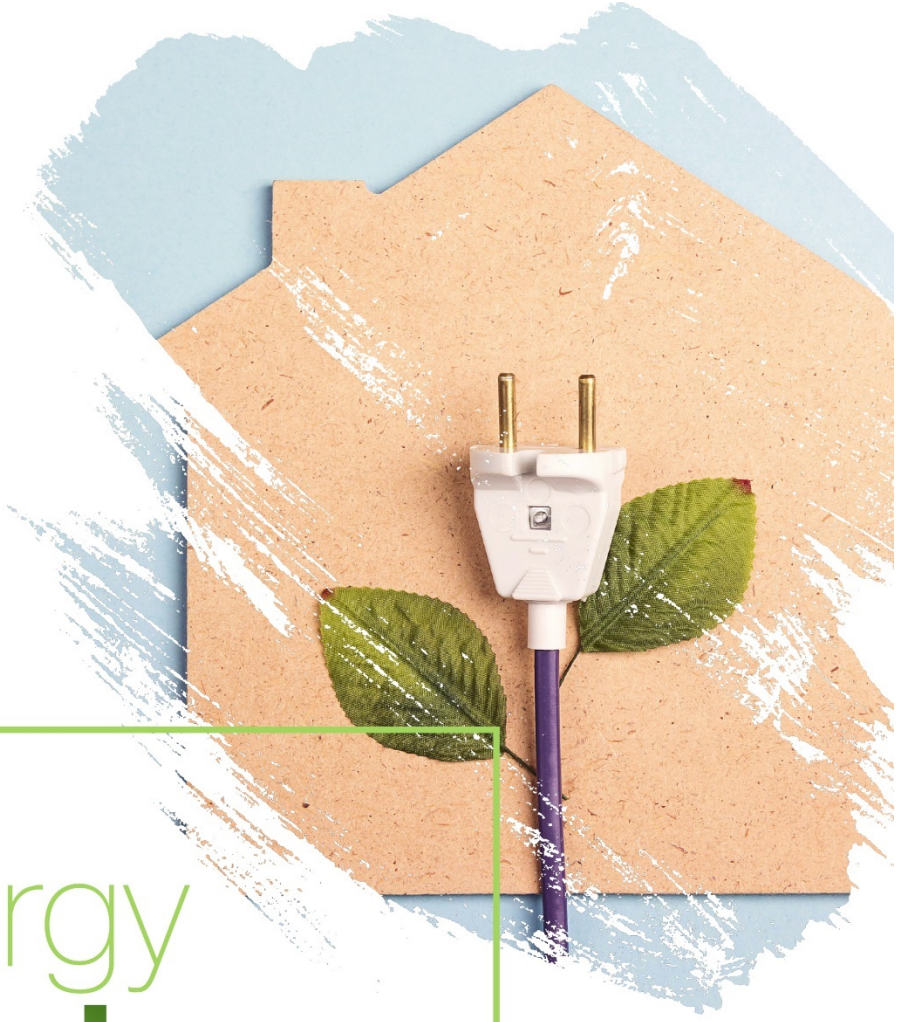

Energy Efficiency

in California's Public Power Sector

15th Edition — 2021

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ACKNOWLEDGEMENTS

This report would not be possible without the substantial contributions of the following individuals:

Project Managers: Bryan Cope, Southern California Public Power Authority (SCPPA)
Frank Harris, California Municipal Utilities Association (CMUA)
Emily Lemei, Northern California Power Agency (NCPA)

Harpreet Singh
Alameda Municipal Power
Andrew Kanzler and Andrew Markis
Anaheim Public Utilities
Paul Reid and Liza Sagun
Azusa Light & Water
Veronica Craghead, Amber Rockwell and Jim Steffens
City of Banning
Marlee Mattos
City of Biggs
Joe Flores, Ruzan Soloyan and James Daza
Burbank Water & Power
Jessica Sutorus and Adrianne Rogers
City of Colton
Herbert Garcia
Glendale Water & Power
Felicia Smith
City of Healdsburg
Hugo Valdez and Sabrina Barber
Imperial Irrigation District
Theresa Phillips
Lassen Municipal Utility District
Astrida Trupovnieks
City of Lodi
Steven Valle
City of Lompoc
Armen Saiyan Jeremiah Valera, and Luke Sun
Los Angeles Department of Water & Power
Vanessa Lara
Merced Irrigation District
Peter Govea and Bob Hondeville
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Rainie Torrance
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Micah Babbitt and Lena Perkins
City of Palo Alto Utilities
Jonathan Sun
Pasadena Water & Power
Vanessa Xie
City of Pittsburg
Corby Erwin
Plumas-Sierra Rural Electric Cooperative
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Port of Oakland
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City of Rancho Cucamonga
Kamryn Hutson
Redding Electric Utility
Rebecca Cortez
Riverside Public Utilities
Renee Laffey
Roseville Electric
Jillian Rich and Richard Oberg
Sacramento Municipal Utility District
Daniel Young and James Hendry
San Francisco Public Utilities Commission
James Takehara
City of Shasta Lake
Mary Medeiros McEnroe
Silicon Valley Power
Sarah Sheetz
Trinity Public Utility District
Steve Poncelet
Truckee Donner Public Utilities District
Aldo Lara and Monique Hampton
Turlock Irrigation District
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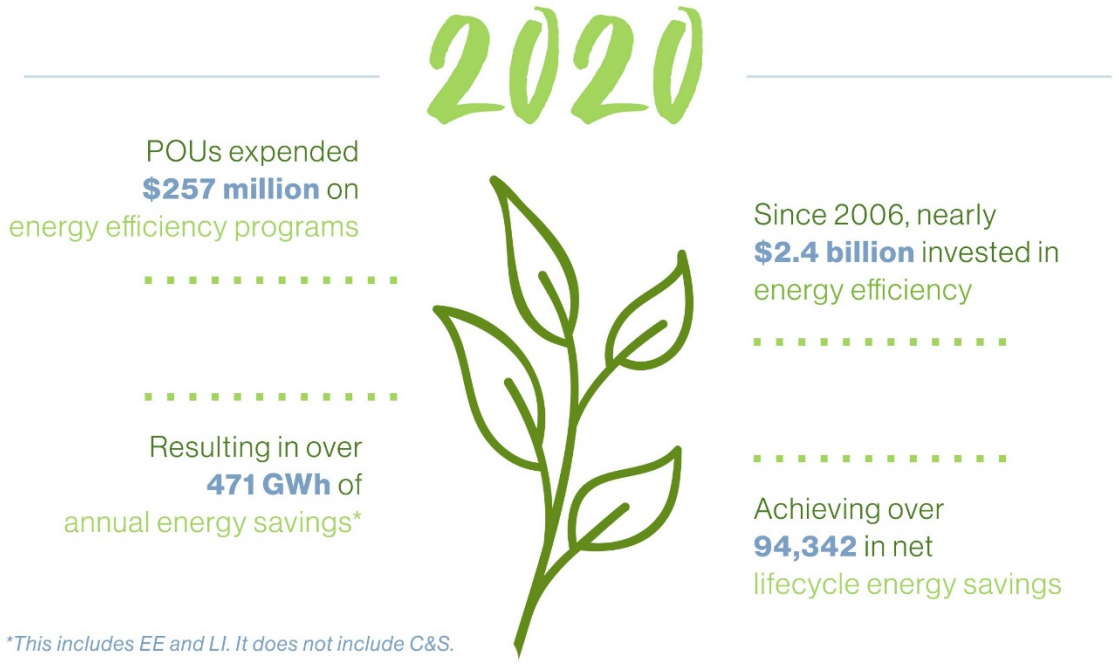
EXECUTIVE SUMMARY

California's publicly owned utilities (POUs) continue to collaborate to develop cost-effective EE programs and report annual results to their customers and the California Energy Commission (Energy Commission) in a consistent and comprehensive manner. This 15th report presents the latest results from POUs' wide range of EE (EE) programs.

During the Fiscal Year (FY) 2020 reporting cycle, POUs expended **$257 million** on EE programs for their communities, including low-income customers, resulting in **471 Gigawatt hours (GWh)** of net annual energy savings and reducing peak demand by **126 Megawatts (MW)**. Since the enactment of Senate Bill (SB) 1037 (Kehoe, 2005), public power has spent nearly **$2.4 billion** on EE and demand reduction, achieving over **94,342 GWh** in net lifecycle energy savings.



Comparing these numbers with those of previous years shows the clear impact that the Coronavirus (COVID-19) pandemic has had on EE performance and California's energy economy in general. California's electricity demand was down for 2020, reducing EE program yields. 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.

Moving forward, public power's ability to work together and creatively solve problems will be key to the success of California's aggressive initiatives to cost-effectively reduce both energy use

and greenhouse gas (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 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 not only to look back on the success of the past year, but also to look ahead and inform discussions on how to achieve additional energy savings in the future.

> "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 2020. 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 2020 are equal to that of Calendar Year 2020.[2]

In summary, during the 2020 reporting cycle, POUs collectively spent **$257** million on EE programs, resulting in **471 GWh** of net annual energy savings, with **5,180 GWh** of net lifecycle energy savings and reduced peak demand by **126 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	125,956	471,483	5,180,294	$257,566,909
Total	**1,515,511**	**8,017,027**	**94,342,485**	**$2,335,775,764**

As shown in **Table 1**, since 2006, public power has collectively spent **$2.34 billion** on EE programs, resulting in **94,342 GWh** in net lifecycle energy savings – and avoided the development of **1,515 MW** of generation resources to serve peak demand during that time. Table 1 also shows that Net Annual Savings were 27% lower in FY 2020 than in FY 2019. This represents the greatest one-year drop in EE production in this same time period, 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 2020 equals **4,034 GWh,** as presented in **Table 2,** below. In spite of the effects of the pandemic, these cumulative savings remain **529 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

First Year Savings (GWh) per Installation Year						Cumulative Savings	CEC Cumulative Savings Target
2015	2016	2017	2018	2019	2020		
644.7	771.6	861.9	638.7	646.3	471.0	4,034.2	3,505.0

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

Therefore, in addition to the representation of POUs' cumulative savings in Table 2, POUs have also calculated alternative representations of the cumulative energy savings from their combined portfolios that potentially better reflect the true cumulative impact of 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 measures EE installed each year in the POUs' EE portfolios.

TABLE 3. California POU Cumulative Lifecycle Savings Comparison

Lifecycle Savings (GWh) per Installation Year						Cumulative Savings
2015	2016	2017	2018	2019	2020	
7,836.6	10,253.6	11,991.6	8,267.5	7,312.3	5,180.2	50,841.8

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.*

calculated today, may be a better representation of cumulative savings than 1st year, Annual Savings.

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

TABLE 4. California POU Cumulative Active Measure Energy Savings Comparison

Cumulative Savings (GWh) per Installation Year						Cumulative Savings
2015	2016	2017	2018	2019	2020	
1,172.0	1,645.7	2,225.1	2,774.9	3,289.0	3,645.5	14,752.1

Table 5 below provides a comprehensive summary of the EE savings for all POUs' respective EE Portfolios in FY 2020. The 16 largest utilities subject to Integrated Resource Plan (IRP) requirements account for the majority of savings within the public power community. As in past years, the two largest POUs, Los Angeles Department of Water & Power (LADWP) and Sacramento Municipal Utility District (SMUD), accounted for roughly two-thirds of total POU savings during the 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	130	1,070,484	14,940,922	117	970,079	13,632,375	5,101	$779,325	1.63	1.21	0.075
Anaheim	2,672	17,208,136	195,536,678	2,672	17,208,136	195,536,678	73,842	$3,216,782	6.04	9.77	0.021
Azusa	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$937,035	2.70	10.84	0.045
Banning	228	330,272	2,805,860	167	224,568	1,808,401	800	$233,481	1.67	1.65	0.159
Biggs	-	-	-	-	-	-	-	$0			0.000
Burbank	2,486	7,077,836	85,290,294	2,486	7,077,836	85,290,294	31,188	$2,432,105	3.84	1.39	0.036
Colton	733	3,885,727	51,445,027	729	3,871,713	51,292,690	20,362	$170,419	32.23	4.02	0.004
Corona	-	-	-	-	-	-	-	$0			0.000
Glendale	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$2,246,349	2.81	1.88	0.068
Gridley	1	8,652	128,933	1	5,217	77,723	29	$45,261	0.16	0.15	0.777
Healdsburg	123	888,265	10,117,082	100	730,774	8,333,624	3,189	$305,996	2.54	1.95	0.046
Imperial	2,836	11,155,767	192,976,528	2,537	9,839,560	169,981,613	74,333	$3,521,312	5.90	13.77	0.030
IPUC	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$30,251	12.66	1.78	0.009
Lassen	21	63,467	694,954	16	47,608	518,606	215	$48,097	1.22	0.29	0.116
Lodi	735	2,337,591	27,179,375	480	1,761,259	20,254,809	8,204	$507,320	5.29	2.50	0.031
Lompoc	62	926,527	10,125,335	55	783,904	8,464,753	3,680	$248,297	3.48	2.63	0.036
Los Angeles	57,540	232,869,232	2,442,225,756	57,540	232,869,232	2,442,225,756	121,679	$163,727,961	0.85	0.48	0.091
Merced	-	859,742	8,638,629	-	683,112	6,850,312	2,547	$707,615	0.96	0.68	0.128
Modesto	501	13,602,468	119,875,714	390	10,909,864	96,422,667	40,914	$2,408,847	3.55	1.28	0.030
Moreno Valley	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$445,352	4.92	4.97	0.028
Needles	-	378	4,158	-	117	1,289	0	$3,048	0.05	0.07	2.918
Palo Alto	368	2,702,368	28,397,989	313	2,297,012	24,138,291	12,866	$1,162,831	2.15	0.91	0.059
Pasadena	1,744	12,351,469	53,032,988	1,720	12,295,120	52,416,815	20,065	$2,872,434	2.30	2.30	0.063
Pittsburg	14	143,208	1,438,946	14	143,208	1,438,181	525	$30,925	4.11	7.63	0.026
Plumas-Sierra	95	26,796	484,400	94	21,568	422,618	208	$114,330	0.62	0.68	0.414
Port of Oakland	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$61,257	11.64	3.76	0.010
Rancho Cucamonga	1	5,587	89,394	1	5,587	89,394	30	$32,509	0.34	0.34	0.511
Redding	813	3,741,773	34,398,625	485	2,414,806	22,024,663	9,084	$1,144,324	0.96	0.45	0.057
Riverside	26,950	19,580,225	359,560,982	26,463	17,902,851	310,410,043	116,871	$3,450,744	11.83	28.84	0.016
Roseville	2,494	23,093,694	181,152,354	2,316	18,870,745	167,657,620	63,132	$5,282,208	1.83	2.03	0.040
Sacramento	12,182	73,773,773	860,791,867	9,428	59,492,792	710,797,461	99,328	$17,675,990	0.30	0.23	0.032
San Francisco	741	2,245,465	33,681,975	741	2,245,465	33,681,975	12,206	$2,079,050	1.67	0.91	0.083
Shasta Lake	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$181,188	8.42	8.14	0.014
Silicon Valley Power	2,549	13,522,283	176,649,932	1,668	10,833,950	144,393,742	28,730	$5,913,536	2.41	1.71	0.054
Trinity	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
Truckee Donner	41	169,421	1,879,402	30	120,633	1,387,491	696	$221,839	0.79	1.02	0.214
Turlock	2,815	14,456,226	216,887,333	2,789	14,134,695	212,144,384	80,200	$2,639,253	8.01	1.92	0.017
Ukiah	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$73,868	8.47	2.91	0.015
Vernon	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,284,968	7.25	4.83	0.015
Victorville	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$33,902	14.25	1.51	0.008
EE and Low Income Subtotal	**131,682**	**502,966,259**	**5,522,342,982**	**125,970**	**471,482,924**	**5,180,348,795**	**943,749**	**$257,531,013**	**1.37**	**0.86**	**0.066**

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 (**51%**) 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	1,137	6,436,326	83,643,513	1,134	6,297,318	82,203,630	30,612	4,747,892	1.68	3.14	0.075
Appliance & Plug Loads	3,123	14,552,483	119,927,399	2,219	10,246,423	88,590,544	17,585	$3,711,209	0.75	0.32	0.052
BROs	-	9,904,783	9,904,783	-	6,537,157	6,537,157	2,998	477,303	0.85	0.85	0.073
Building Envelope	14,167	15,591,106	221,349,609	13,889	14,858,779	207,952,215	38,306	$27,606,347	1.16	0.73	0.188
Codes & Standards											
Commercial Refrigeration	759	6,299,737	83,283,800	679	5,599,982	73,123,198	12,023	$2,246,772	1.22	0.87	0.042
Food Service	1,388	5,468,183	55,624,297	1,380	5,428,580	55,149,270	3,406	1,600,888	2.00	2.15	0.038
HVAC - Cooling	30,772	70,888,371	1,124,554,981	29,938	66,858,909	1,044,894,814	175,365	$39,715,559	2.59	0.81	0.055
HVAC - Heat Pump	2,359	2,703,533	39,919,160	1,438	1,683,637	24,665,489	4,034	1,003,699	0.45	0.30	0.054
HVAC - Heating	-	18,645,784	203,292,445	-	13,530,971	142,311,921	40,866	$4,672,566	1.21	0.66	0.041
Lighting - Indoor	36,546	225,002,532	2,297,148,016	34,622	217,359,423	2,232,598,504	342,611	118,459,949	1.07	0.83	0.068
Lighting - Outdoor	2,486	21,306,724	275,994,507	2,285	19,861,597	253,043,140	97,755	$6,052,420	3.27	2.23	0.032
Miscellaneous	4,215	43,672,145	404,458,935	4,108	42,814,413	393,320,194	57,541	10,278,533	0.87	0.76	0.035
Process	2,808	20,066,498	259,128,445	2,521	18,568,685	238,832,655	44,807	$3,065,996	3.51	1.65	0.017
Service & Domestic Hot Water	0	3,310	(69,394)	(1)	(8,966)	(193,674)	368	88,154	0.46	0.44	-0.852
Transmission & Distribution											
Water Pumping / Irrigation	27,043	18,968,036	48,007,426	27,027	18,886,385	47,192,109	5,053	599,669	4.15	3.99	0.015
Whole Building	432	7,277,748	130,702,785	331	6,756,860	124,323,853	41,671	$2,119,898	5.04	4.85	0.025
EE Subtotal	**127,234**	**486,787,299**	**5,356,870,709**	**121,568**	**455,280,153**	**5,014,545,019**	**915,000**	**$226,446,852**	**1.49**	**0.89**	**0.060**
	4,431	16,174,431	165,404,354	4,388	16,199,148	165,749,440	28,724	$31,120,057	0.44	0.52	0.244
EE and Low Income Subtotal	**131,665**	**502,961,731**	**5,522,275,062**	**125,957**	**471,479,301**	**5,180,294,459**	**943,724**	**$257,566,909**	**1.37**	**0.86**	**0.066**
Codes and Standards	41,481	277,866,403	4,104,810,964	41,481	277,866,403	4,104,810,964	197,875	$10,395,815	14.38	14.38	0.004
Electrification	(2,635)	(15,133,750)	(203,435,091)	(2,169)	(12,500,144)	(169,131,762)	(23,791)	$9,456,892	-0.14	-0.13	-0.073
Transmission and Distribution	52	4,507,901	6,600,480	52	4,507,901	6,600,480	3,332	$352,889	1.35	1.37	0.055
C&S, T&D and Electrification Subtotal	**38,899**	**267,240,554**	**3,907,976,353**	**39,364**	**269,874,160**	**3,942,279,682**	**177,416**	**$20,205,595**	**7.36**	**7.31**	**0.008**
Utility Total	**170,564**	**770,202,285**	**9,430,251,416**	**165,321**	**741,353,461**	**9,122,574,141**	**1,121,139**	**$277,772,504**	**1.80**	**1.17**	**0.044**

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 (77%) while residential programs resulted in 21% of the gross annual EE program savings.

TABLE 7. 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	1,807	6,218,593	92,985,863	1,804	6,199,058	92,751,443	33,837	$845,659	10.67	4.81	0.012
Commercial	79,887	356,918,241	3,913,510,207	77,389	341,776,859	3,752,941,391	586,681	$156,846,709	1.29	0.71	0.055
Industrial	2,729	19,568,963	270,692,510	2,483	18,599,571	258,801,755	94,006	$1,727,502	12.58	2.44	0.009
Other	765	4,144,845	39,032,027	765	4,133,094	38,855,759	16,657	$1,764,014	1.66	0.90	0.056
Residential	42,047	99,936,658	1,040,650,102	39,128	84,571,572	871,194,672	183,819	$65,262,968	1.57	1.21	0.104
EE Subtotal	**127,234**	**486,787,299**	**5,356,870,709**	**121,568**	**455,280,153**	**5,014,545,019**	**915,000**	**$226,446,852**	**1.49**	**0.89**	**0.060**
Low Income	4,431	16,174,431	165,404,354	4,388	16,199,148	165,749,440	28,724	$31,120,057	0.44	0.52	0.244
EE and Low Income Subtotal	**131,665**	**502,961,731**	**5,522,275,062**	**125,957**	**471,479,301**	**5,180,294,459**	**943,724**	**$257,566,909**	**1.37**	**0.86**	**0.066**
Codes and Standards	41,481	277,866,403	4,104,810,964	41,481	277,866,403	4,104,810,964	197,875	$10,395,815	14.38	14.38	0.004
Electrification	(2,635)	(15,133,750)	(203,435,091)	(2,169)	(12,500,144)	(169,131,762)	(23,791)	$9,456,892	-0.14	-0.13	-0.073
Transmission and Distribution	52	4,507,901	6,600,480	52	4,507,901	6,600,480	3,332	$352,889	1.35	1.37	0.055
C&S, T&D and Electrification Subtotal	**38,899**	**267,240,554**	**3,907,976,353**	**39,364**	**269,874,160**	**3,942,279,682**	**177,416**	**$20,205,595**	**7.36**	**7.31**	**0.008**
Utility Total	**170,564**	**770,202,285**	**9,430,251,416**	**165,321**	**741,353,461**	**9,122,574,141**	**1,121,139**	**$277,772,504**	**1.80**	**1.17**	**0.044**

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	23,097	148,450,610	1,474,015,849	21,765	141,179,526	1,389,229,751	296,077	$36,771,516	2.58	1.56	0.034
Assembly	1,196	8,242,762	80,013,922	1,178	8,112,778	79,089,580	4,395	$6,072,907	0.51	0.49	0.099
Education - Community College	48	351,364	4,901,647	47	345,241	4,809,845	501	$139,912	0.76	0.46	0.040
Education - Primary School	362	1,688,974	23,248,254	357	1,645,235	22,776,067	6,303	$382,787	3.58	0.80	0.022
Education - Secondary School	2,854	15,781,767	155,044,452	2,841	15,658,914	153,899,777	8,168	$32,302,474	0.21	0.19	0.273
Education - University	418	1,766,033	16,390,099	418	1,763,555	16,366,824	830	$771,088	1.12	0.41	0.062
Grocery	727	5,845,167	68,831,477	614	4,933,698	57,695,697	8,708	$1,936,498	0.52	0.36	0.044
Health/Medical - Hospital	1,192	8,631,747	105,896,284	1,179	8,535,994	104,477,749	8,934	$4,003,191	0.73	0.62	0.051
Health/Medical - Nursing Home	53	396,623	3,986,695	52	395,688	3,972,698	219	$182,662	0.88	0.87	0.060
Lodging - Hotel	91	552,152	5,330,061	81	488,177	4,797,392	605	$222,639	0.63	0.59	0.059
Lodging - Motel	16	113,719	795,917	13	90,975	636,736	99	$51,447	0.10	0.09	0.093
Manufacturing Biotech	319	2,424,824	36,006,497	308	2,344,507	34,873,288	4,666	$241,238	1.08	1.00	0.009
Manufacturing Light Industrial	2,719	18,636,086	251,408,505	2,394	17,088,588	234,431,229	48,001	$2,605,597	3.55	1.90	0.015
Office - Large	3,402	16,938,548	213,881,739	3,311	16,264,839	207,397,783	35,771	$6,148,762	1.77	0.14	0.040
Office - Small	2,436	18,201,030	185,065,765	2,400	17,902,708	181,938,862	12,317	$14,118,858	0.50	0.47	0.100
Other Agricultural	2,656	13,445,554	186,315,010	2,585	12,908,638	178,263,443	46,439	$2,051,876	4.88	2.75	0.015
Other Commercial	31,698	49,406,953	644,114,466	31,278	47,338,708	625,994,158	156,617	$17,050,299	2.78	2.17	0.037
Other Industrial	7,375	45,192,749	570,104,061	7,373	45,178,077	569,884,083	72,787	$20,089,428	1.50	0.94	0.048
Residential	15,571	55,237,087	455,558,088	12,932	43,770,577	340,399,994	117,325	$17,124,344	2.42	2.50	0.070
Residential - Mobile Home											
Residential - Multi-Family	4,787	9,765,692	109,155,576	4,756	9,572,222	107,646,117	8,161	$3,695,459	2.82	1.92	0.046
Residential - Single-Family	21,427	34,624,693	468,082,860	21,202	30,824,422	414,436,967	53,499	$44,152,806	1.11	0.78	0.149
Restaurant - Fast-Food	44	244,544	2,113,374	40	221,889	1,922,732	170	$86,081	0.65	0.29	0.056
Restaurant - Sit-Down	508	2,998,873	29,318,133	487	2,880,922	28,274,390	1,867	$1,994,465	0.54	0.54	0.091
Retail - Big Box	9	424,629	4,329,175	7	339,703	3,463,340	1,291	$360,658	0.97	0.67	0.129
Retail - Large	1,116	6,321,947	51,793,228	936	5,167,523	43,432,707	6,047	$1,201,170	0.91	0.40	0.034
Retail - Small	2,598	16,150,331	156,424,582	2,530	15,766,179	153,581,353	8,923	$10,841,751	0.56	0.55	0.091
Storage - Conditioned	91	1,013,480	9,204,145	77	846,641	7,650,042	1,655	$130,862	2.83	0.08	0.021
Storage - Unconditioned	214	1,870,769	17,525,702	204	1,792,900	16,981,440	1,087	$1,322,691	0.42	0.42	0.100
Warehouse - Refrigerated	210	2,068,594	28,015,146	202	1,921,330	26,220,974	3,536	$393,386	3.60	1.94	0.021
EE Subtotal	**127,234**	**486,787,299**	**5,356,870,709**	**121,568**	**455,280,153**	**5,014,545,019**	**915,000**	**$226,446,852**	**1.49**	**0.89**	**0.060**
Low Income	4,431	16,174,431	165,404,354	4,388	16,199,148	165,749,440	28,724	$31,120,057	0.44	0.52	0.244
EE and Low Income Subtotal	**131,665**	**502,961,731**	**5,522,275,062**	**125,957**	**471,479,301**	**5,180,294,459**	**943,724**	**$257,566,909**	**1.37**	**0.86**	**0.066**
Codes and Standards	41,481	277,866,403	4,104,810,964	41,481	277,866,403	4,104,810,964	197,875	$10,395,815	14.38	14.38	0.004
Electrification	(2,635)	(15,133,750)	(203,435,091)	(2,169)	(12,500,144)	(169,131,762)	(23,791)	$9,456,892	-0.14	-0.13	-0.073
Transmission and Distribution	52	4,507,901	6,600,480	52	4,507,901	6,600,480	3,332	$352,889	1.35	1.37	0.055
C&S, T&D and Electrification Subtotal	**38,899**	**267,240,554**	**3,907,976,353**	**39,364**	**269,874,160**	**3,942,279,682**	**177,416**	**$20,205,595**	**7.36**	**7.31**	**0.008**
Utility Total	**170,564**	**770,202,285**	**9,430,251,416**	**165,321**	**741,353,461**	**9,122,574,141**	**1,121,139**	**$277,772,504**	**1.80**	**1.17**	**0.044**

Table 9 compares the actual savings in 2020 to the POUs' adopted annual targets for each utility. In total, the actual energy savings were approximately 41% below forecasted levels for 2020.

TABLE 9. 2020 Annual Target and Actual Savings Comparison [4] [5]

Fiscal Year	Net Peak Savings (kW)	Net Annual Savings (MWh)	Net Lifecycle Savings (MWh)	Total Utility Expenditures
Alameda	Net	832	970	116.6%
Anaheim	Gross	18,456	17,208	93.2%
Azusa	Net	1,660	3,132	188.7%
Banning	Net	399	225	56.2%
Biggs	Net	7	0	0.0%
Burbank	Gross	11,385	7,078	62.2%
Colton	Net	7,895	3,872	49.0%
Glendale	Net	19,517	10,613	54.4%
Gridley	Net	312	5	1.7%
Healdsburg	Net	469	731	156.0%
Imperial	Net	48,958	9,840	20.1%
Lassen	Net	1,043	48	4.6%
Lodi	Net	1,399	1,761	125.9%
Lompoc	Gross	697	927	132.9%
Los Angeles	Gross	231,157	232,869	100.7%
Merced	Net	4,056	683	16.8%
Modesto	Net	30,266	10,910	36.0%
Moreno Valley	Net	2,266	1,947	85.9%
Needles	Net	62	0	0.2%
Palo Alto	Gross	7,760	2,702	34.8%
Pasadena	Net	28,345	12,295	43.4%
Plumas-Sierra	Net	440	22	4.9%
Port of Oakland	Gross	1,550	771	49.7%
Rancho Cucamonga	Gross	895	6	0.6%
Redding	Net	3,666	2,415	65.9%
Riverside	Net	20,309	17,903	88.2%
Roseville	Gross	14,852	23,094	155.5%
Sacramento	Gross	305,060	73,774	24.2%
San Francisco	Net	2,764	2,245	81.2%
Shasta Lake	Net	1,556	1,363	87.6%
Silicon Valley Power	Net	14,015	10,834	77.3%
Trinity	Net	19	6	33.7%
Truckee Donner	Gross	2,022	169	8.4%
Turlock	Net	16,437	14,135	86.0%
Ukiah	Net	1,323	534	40.3%
Vernon	Net	9,039	8,580	94.9%
Victorville	Net	490	423	86.4%
EE Total		**811,373**	**474,089**	**58.4%**

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

[5] Not all Small, Non-IRP POUs are included in this list because they either did not exist when the 2017 forecasts were developed, did not develop forecasts in 2017, or did not have any energy savings in 2020.

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 the bulk of 2020 under a stay-at-home order. The State's economic shutdown and stay-at-home order had 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.

While full year data are forthcoming, the Energy Commission has shown that 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 2020. 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.

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[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

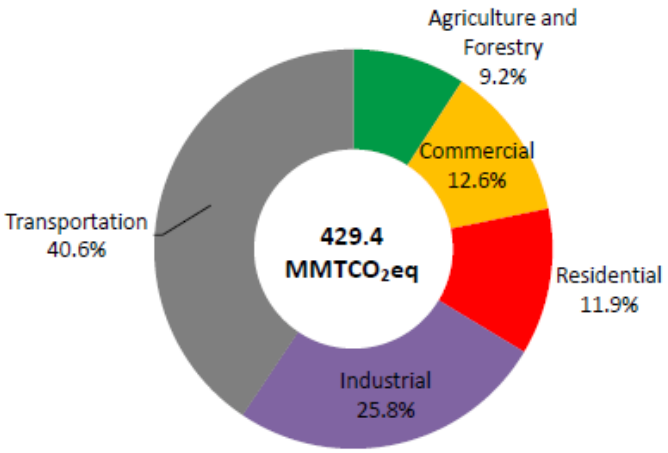
[7] California Energy Commission Energy Insights, Available at: https://www.energy.ca.gov/news/2020-05/energy-commission-releases-new-data-how-covid-19-impacting-energy-sector

EE and Carbon Reduction

California's SB 100 (De León, 2018) 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), directing 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).

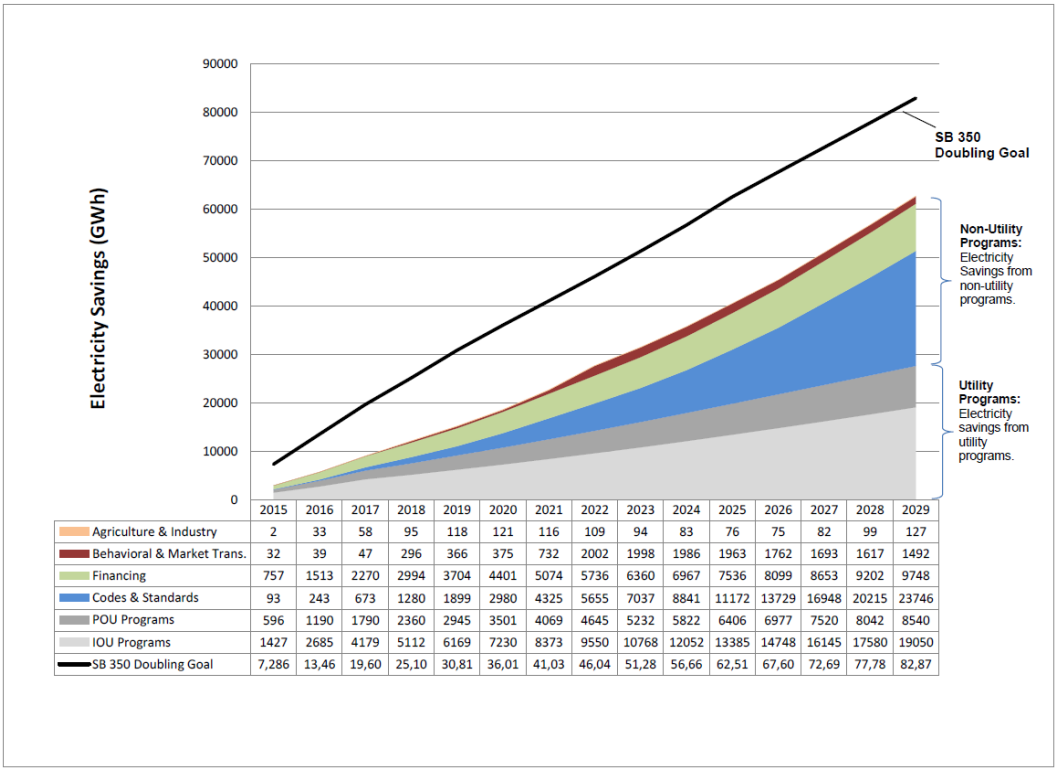
[9] See Figure 6, Energy Commission, September 2018, EE Tracking Progress, Available: https://www.energy.ca.gov/sites/default/files/2019-12/Greenhouse_Gas_Emissions_Reductions_ada.pdf

[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 POU 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 2018 were calculated using this same methodology, as presented in **Table 2,** above, which shows that to date POUs have exceeded the State's forecast for their collective, cumulative EE savings in 2019 by more than 618 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

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

customer in mind, as the success of an EE program is ultimately dependent on the actions of the customer.

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

There is strong analytical support, and real-world experience, that confirm energy usage behaviors and practices do change for EE program participants. For example, a consumer who installs a high efficiency measure, such as a light emitting diode (LED) lamp, is highly unlikely to go back to an older, less efficient product like a compact fluorescent lamp (CFL) once the LED no longer works.[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.

[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.*

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 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 on electric utility operations on an hourly basis, including GHG reductions. In addition, utilities are continuing to expand their resource planning platforms and analytical tools to optimize utility operations.

Building electrification and decarbonization measures can deliver both energy savings and GHG emissions reductions. 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

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

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 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

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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.

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 and TE will increase electric load and therefore 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:

- retail rates,

[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.

- 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

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

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

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.

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

[23] For more information on the CalTF, visit: http://www.caltf.org/
[24] Cal. Pub. Util. Code § 9505(d).

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]

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

[25] See: https://www.cmua.org/emv-reports.
[26] Cal. Pub. Util. Code § 9505(a)(3).
[27] *Id.* § 385.
[28] California Code of Regulations (CCR), Title 17, § 95801.

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.

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.

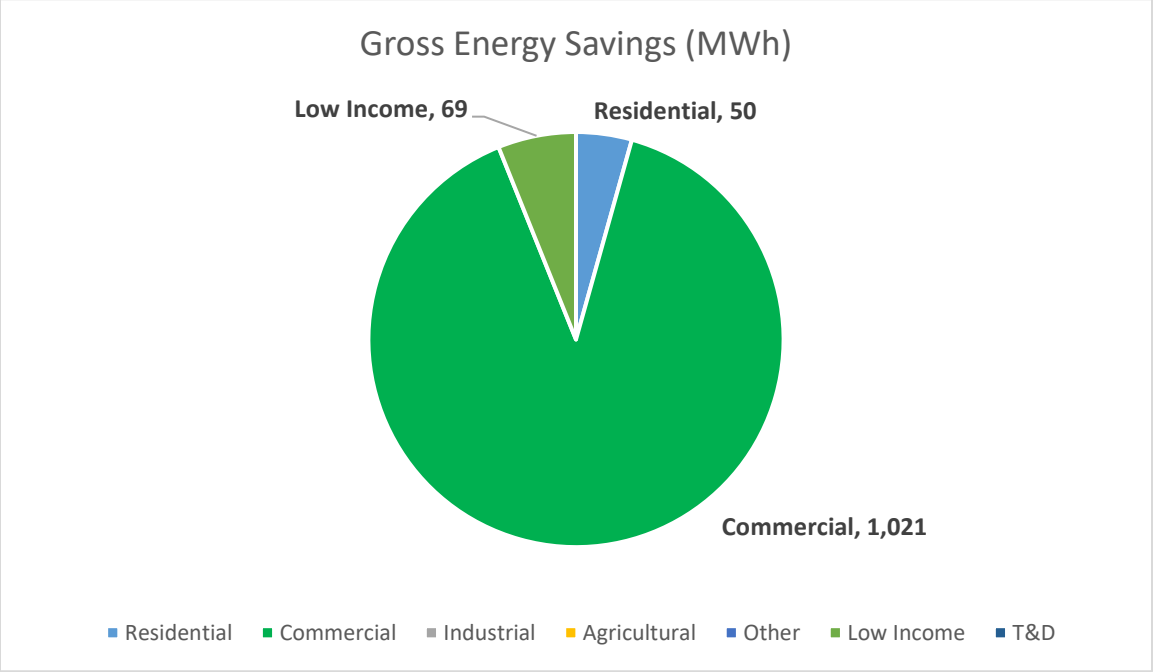
TABLE 10. 2021 Annual EE Program Summary

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	130	1,070,484	14,940,922	117	970,079	13,632,375	$779,325
Anaheim	2,672	17,208,136	195,536,678	2,672	17,208,136	195,536,678	$3,216,782
Azusa	542	3,208,194	26,044,973	541	3,132,215	25,770,182	$937,035
Banning	228	330,272	2,805,860	167	224,568	1,808,401	$233,481
Biggs	-	-	-	-	-	-	$0
Burbank	2,486	7,077,836	85,290,294	2,486	7,077,836	85,290,294	$2,432,105
Colton	733	3,885,727	51,445,027	729	3,871,713	51,292,690	$170,419
Corona	-	-	-	-	-	-	$0
Glendale	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	$2,246,349
Gridley	1	8,652	128,933	1	5,217	77,723	$45,261
Healdsburg	123	888,265	10,117,082	100	730,774	8,333,624	$305,996
Imperial	2,836	11,155,767	192,976,528	2,537	9,839,560	169,981,613	$3,521,312
IPUC	116	382,928	4,965,296	93	306,342	3,972,237	$30,251
Lassen	21	63,467	694,954	16	47,608	518,606	$48,097
Lodi	735	2,337,591	27,179,375	480	1,761,259	20,254,809	$507,320
Lompoc	62	926,527	10,125,335	55	783,904	8,464,753	$248,297
Los Angeles	57,540	232,869,232	2,442,225,756	57,540	232,869,232	2,442,225,756	$163,727,961
Merced	-	859,742	8,638,629	-	683,112	6,850,312	$707,615
Modesto	501	13,602,468	119,875,714	390	10,909,864	96,422,667	$2,408,847
Moreno Valley	177	2,164,765	21,655,748	159	1,947,322	19,478,542	$445,352
Needles	-	378	4,158	-	117	1,289	$3,048
Palo Alto	368	2,702,368	28,397,989	313	2,297,012	24,138,291	$1,162,831
Pasadena	1,744	12,351,469	53,032,988	1,720	12,295,120	52,416,815	$2,872,434
Pittsburg	14	143,208	1,438,946	14	143,208	1,438,181	$30,925
Plumas-Sierra	95	26,796	484,400	94	21,568	422,618	$114,330
Port of Oakland	44	770,816	9,384,813	35	616,653	7,507,850	$61,257
Rancho Cucamonga	1	5,587	89,394	1	5,587	89,394	$32,509
Redding	813	3,741,773	34,398,625	485	2,414,806	22,024,663	$1,144,324
Riverside	26,950	19,580,225	359,560,982	26,463	17,902,851	310,410,043	$3,450,744
Roseville	2,494	23,093,694	181,152,354	2,316	18,870,745	167,657,620	$5,282,208
Sacramento	12,182	73,773,773	860,791,867	9,428	59,492,792	710,797,461	$17,675,990
San Francisco	741	2,245,465	33,681,975	741	2,245,465	33,681,975	$2,079,050
Shasta Lake	37	1,714,821	20,732,531	23	1,363,315	16,425,565	$181,188
Silicon Valley Power	2,549	13,522,283	176,649,932	1,668	10,833,950	144,393,742	$5,913,536
Trinity	26	8,392	119,200	20	6,446	92,688	$140,949
Truckee Donner	41	169,421	1,879,402	30	120,633	1,387,491	$221,839
Turlock	2,815	14,456,226	216,887,333	2,789	14,134,695	212,144,384	$2,639,253
Ukiah	81	669,263	7,945,088	65	533,695	6,317,934	$73,868
Vernon	987	8,579,669	108,939,761	987	8,579,669	108,939,761	$1,284,968
Victorville	164	529,040	6,876,024	131	423,232	5,500,819	$33,902
EE and Low Income Subtotal	**131,682**	**502,966,259**	**5,522,342,982**	**125,970**	**471,482,924**	**5,180,348,795**	**$257,531,013**

ALAMEDA

Alameda at a Glance

- Climate Zone(s): 3
- Customers: 36,561
- Total annual retail sales (MWh): 315,556
- Annual Retail Revenue: $62,731,636
- Annual EE expenditures for reporting year: $1,001,971
- Gross annual savings from reporting year portfolio (MWh): 1,140



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 GHG emissions in its service area.

Major Program and Portfolio Changes

FY 2020 savings included the continuation of very successful non-residential direct-install program and a residential online rebate portal. AMP also launched a direct-install program for income-qualified residential customers.

Program and Portfolio Highlights

AMP's non-residential direct-install program, Energy Plus, provided more than 70 percent of total savings. The program, which provides both lighting and refrigeration upgrades, is particularly attractive to small businesses that are eager to benefit from the energy savings, but do not have in-house expertise in energy-saving technologies and installations. The Energy Plus rebates can cover up to 90 percent of the upgrade cost for small businesses and 80 percent for all other non-residential customers.

Commercial, Industrial & Agricultural Programs

Energy Plus Program: The Energy Plus Program, which started in January 2016, is a non-residential direct-install lighting, refrigeration, heating, ventilation, and air conditioning (HVAC) program. In FY 2020, 10 customers participated in lighting and refrigeration upgrades with low co-pay amounts, due to AMP's rebates. This program was temporarily 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 remained open until February 28, 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 2020, 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 2021.

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 2020 the tool received 402 applications. Rebates were available for LED bulbs, LED fixtures, LED decorative string lights, electric clothes dryers, washing machines, heat pump water heaters, refrigerators, freezers, refrigerator/freezer recycling and EV chargers. AMP discontinued its refrigerator and freezer measures at the end of FY 2020. However, the residential online rebate program will remain open in FY 2021.

Energy Assistance Program (EAP) Plus – In October 2019, AMP launched a direct-install program, called EAP Plus, targeting income-qualified residents living in single and multi-family homes. Participating customers receive EE upgrades, including LED bulbs, LED fixtures, refrigerators, SMART power strips, low-flow shower heads and weatherization, at no cost. From October 2019 to through March 2020, the program served 56 customers. The program was temporarily suspended during the final quarter of FY 2020 due to the COVID-19 pandemic.

Complementary Programs

EV Programs: AMP offers two incentive programs to encourage EV adoption. The first is in the form of a rate discount, which the utility has offered since 1998. In FY 2020, 303 customers

signed up for the discount, bringing the total number of program participants to 1,036. In February 2018, AMP launched its second incentive program in the form of rebates for purchasing level 2 chargers for homes and workplaces. In FY 2020 the residential charger rebate was increased from $500 to $800 and the workplace charger rebate was increased from $3,000 to $5,000 per charger. During FY 2020, 128 residential customers and two non-residential customers had installed EV level 2 chargers.

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 2020, EASE, an emergency relief program, helped 67 households receive a total of $9,542 in electric-bill assistance. A maximum amount of $200 is available per household within a three-year period through the EASE program. EAP provides a 25% monthly discount on the electric bill. A total of $131,674 was allocated to 900 Alameda households in FY 2020. These programs are funded through the public purpose component of AMP's energy charge.

Renewable Energy Programs: Alameda Green, AMP's voluntary green power program, provides customers with the option to choose 100% renewable energy at an additional cost of $0.020/kWh. As of the end of FY 2020, there were 3,654 customers enrolled in Alameda Green. In September 2020, AMP earned two national rankings for green utility programs from the U.S. Department of Energy's National Renewable Energy Laboratory (NREL). AMP's Alameda Green program made NREL's "Top 10" lists for its high participation rate and green power sales rate in 2019.[29]

Research, Development, and Demonstration: There was no AMP activity in research, development, and demonstration in FY 2020.

Energy Storage: AMP does not have any onsite storage. An evaluation of energy storage was performed in 2017 as required by 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, developed by the CADMUS Group, is available. The next report will cover non-residential direct install programs for FY 2018 and FY 2019 with a projected $50,000 budget.

Major Differences or Diversions from California POU TRM for Energy Savings

[29] National Renewable Energy Laboratory *Top Ten Utility Green Pricing Programs (2020)*. Available at: https://www.nrel.gov/analysis/assets/pdfs/utility-green-power-ranking.pdf.

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 2017 TRM for CMUA. The electric clothes dryer savings were from an ENERGY STAR® report.

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

TABLE AMP 1. 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	33,286	359,904	2	22,636	244,623	93	$5,270	0.31	0.31	0.441
Commercial Refrigeration	39	363,134	5,301,588	36	337,706	4,949,255	1,826	$147,200	1.96	1.57	0.062
Lighting - Indoor	88	537,898	7,625,427	78	488,001	6,965,582	2,484	$266,177	1.78	1.31	0.067
Lighting - Outdoor	1	128,604	1,542,019	1	117,199	1,405,724	674	$130,000	1.98	0.92	0.071
Miscellaneous	0	6,059	96,944	0	3,635	58,166	19	$3,650	0.24	0.26	0.530
Service & Domestic Hot Water	0	1,504	15,040	0	902	9,024	4	$1,810	0.22	0.24	1.048
EE Subtotal	130	1,070,484	14,940,922	117	970,079	13,632,375	5,101	$554,107	1.63	1.21	0.075
Appliance & Plug Loads	3	11,808	72,432	2	8,011	48,667	20	$20,554	0.20	0.20	0.729
Building Envelope	0	220	4,400	0	62	1,232	1	$7,267	0.05	0.05	9.540
Lighting - Indoor	291	56,817	852,255	247	48,631	729,459	286	$52,390	0.42	0.42	0.334
Service & Domestic Hot Water	0	567	5,670	0	340	3,402	1	$303	0.38	0.38	0.304
Low-Income Subtotal	293	69,412	934,757	249	57,044	782,760	308	$80,515	0.37	0.37	0.376
EE and Low Income Subtotal	423	1,139,896	15,875,679	365	1,027,123	14,415,135	5,409	$634,622	1.35	1.06	0.091
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	423	1,139,896	15,875,679	365	1,027,123	14,415,135	5,409	$634,622	1.35	1.06	0.091

TABLE AMP 2. 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	127	1,020,959	14,340,644	115	935,585	13,211,702	4,942	$539,794	1.95	1.36	0.063
Residential	3	49,525	600,278	2	34,494	420,673	159	$14,313	0.30	0.30	0.466
EE Subtotal	130	1,070,484	14,940,922	117	970,079	13,632,375	5,101	$554,107	1.63	1.21	0.075
Residential	293	69,412	934,757	249	57,044	782,760	308	$80,515	0.37	0.37	0.376
Low-Income Subtotal	293	69,412	934,757	249	57,044	782,760	308	$80,515	0.37	0.37	0.376
EE and Low Income Subtotal	423	1,139,896	15,875,679	365	1,027,123	14,415,135	5,409	$634,622	1.35	1.06	0.091
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	423	1,139,896	15,875,679	365	1,027,123	14,415,135	5,409	$634,622	1.35	1.06	0.091

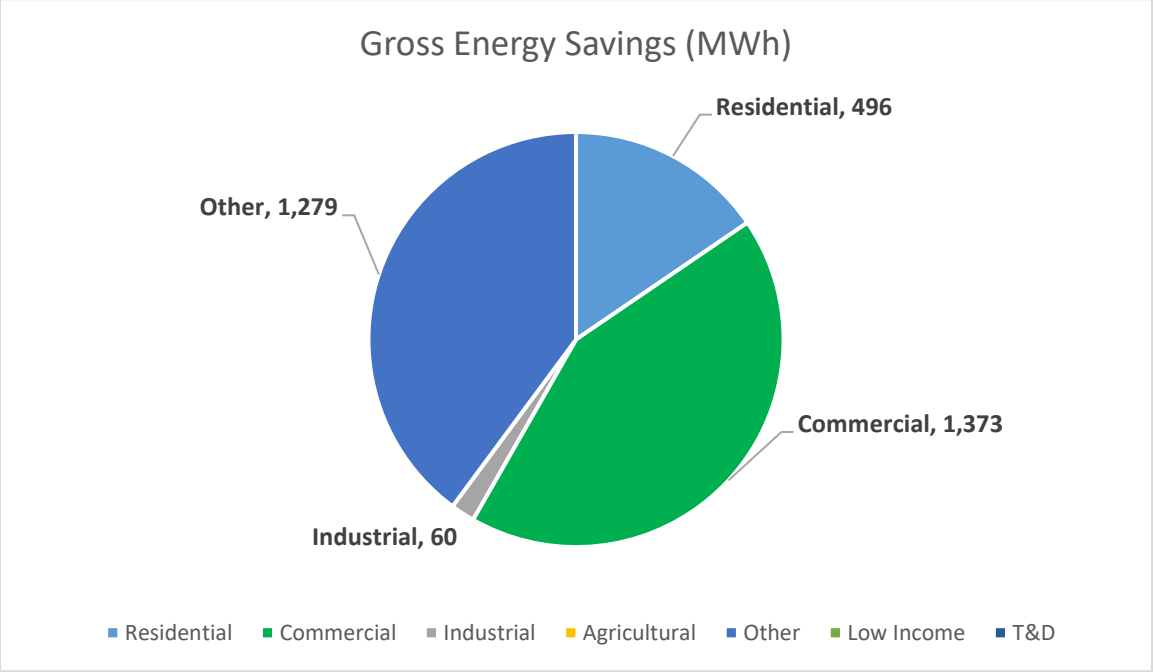
TABLE AMP 3. EE Program Results by Building Type

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	98	717,620	9,676,675	86	644,555	8,766,808	3,306	$450,120	1.92	1.20	0.064
Grocery	32	314,660	4,719,900	31	298,927	4,483,905	1,652	$92,165	1.88	1.73	0.065
Residential	0	17,768	258,243	0	12,292	181,389	67	$9,702	0.28	0.29	0.502
Residential - Single-Family	0	20,436	286,104	0	14,305	200,273	75	$2,120	0.32	0.32	0.423
EE Subtotal	130	1,070,484	14,940,922	117	970,079	13,632,375	5,101	$554,107	1.63	1.21	0.075
All	0	8,624	43,120	0	6,037	30,184	13	$1,050	0.50	0.50	0.285
Residential	293	59,581	877,007	248	50,219	742,902	292	$61,451	0.40	0.40	0.350
Residential - Multi-Family	0	567	5,670	0	340	3,402	1	$303	0.38	0.38	0.304
Residential - Single-Family	0	640	8,960	0	448	6,272	2	$17,710	0.04	0.04	3.972
Low-Income Subtotal	293	69,412	934,757	249	57,044	782,760	308	$80,515	0.37	0.37	0.376
EE and Low Income Subtotal	423	1,139,896	15,875,679	365	1,027,123	14,415,135	5,409	$634,622	1.35	1.06	0.091
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	423	1,139,896	15,875,679	365	1,027,123	14,415,135	5,409	$634,622	1.35	1.06	0.091

AZUSA

Azusa at a Glance

- Climate Zone(s): 9
- Customers: 18,485
- Total annual retail sales (MWh): 242,611
- Annual Retail Revenue: $35,587,304
- Annual EE expenditures for reporting year: $979,286
- Gross annual savings from reporting year portfolio (MWh): 3,208



Azusa Overview

Since inception of the EE programs, Azusa Light & Water has expended over $14 Million toward providing energy conservation information to the Azusa community and rewarding businesses and residents for upgrading inefficient energy consuming equipment with more energy efficient equipment. These efforts have resulted in an annual peak demand and energy use reductions of approximately one percent.

Major Program and Portfolio Changes

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

Program and Portfolio Highlights

The direct install Small Business Audit/Retrofit Program continues to provide the maximum impact on meeting the needs of the harder to reach businesses and small retailers within the service

territory. These hard to reach customers have a very tight cash flow and in many times are unable to participate in the rebate programs unless there is little to no up-front monetary outlay. This program allows customers to immediately see the savings and avoid the initial cash outlay associated with the typical rebate type programs.

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.

Keep Your Cool Audit/Retrofit Program: Provide free utility audit, free LED case lighting retrofits, free refrigeration tune-ups, free case seal replacements, auto door closing devices and fan controllers.

Residential Programs

Home Weatherization and Residential EnergyStar® Appliance Rebate Program: Rebates are offered for a variety of home weatherization measures and most high efficiency appliances that have the EnergyStar® rating, including but not limited to, refrigerators, air conditions, LED Televisions and computer monitors, dishwashers, clothes washers, pool pumps, ceiling fans and various lighting measures.

Free Home-in-Home Energy Audits: Provide recommendations for the effective use of energy within the residence.

Free On-Line Home Energy Audit Program: Customers can enter various parameters that match their home and lifestyle and receive an immediate list of conservation recommendations and

measures along with an estimate of what each appliance within the home is using in the way of energy.

Complementary Programs

Public Facilities Programs: Similar to the current commercial and industrial programs and 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 SCPPA, is an active member of the American Public Power Association (APPA) Demonstration of Energy & Efficiency Developments (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.[30] Azusa Light & Water will continue to make EM&V reports available to the Energy Commission and other parties as they are completed and will continue with its EM&V programs and practices in the future.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

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

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

TABLE ALW 1. 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	5	10,491	188,838	4	8,393	151,070	58	$0	1.39	4.65	0.112
Building Envelope	295	1,081,082	15,623,827	295	1,080,512	15,606,739	5,250	$0	2.86	11.06	0.045
Miscellaneous	161	837,938	6,396,259	161	764,626	6,176,324	2,332	$0	1.69	10.45	0.070
Water Pumping / Irrigation	81	1,278,683	3,836,049	81	1,278,683	3,836,049	1,622	$0	11.24	11.24	0.009
EE Subtotal	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$0	2.70	10.84	0.045
EE and Low Income Subtotal	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$0	2.70	10.84	0.045
All	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
Codes & Standards Subtotal	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
C&S, T&D and Electrification Subtotal	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
Utility Total	643	3,703,546	30,998,493	642	3,627,567	30,723,702	11,054	$0	3.07	10.90	0.040

TABLE ALW 2. 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	414	1,372,858	18,183,632	414	1,372,858	18,183,632	6,201	$0	2.25	11.25	0.056
Industrial	10	60,199	902,985	10	60,199	902,985	306	$0	3.04	11.24	0.040
Other	81	1,278,683	3,836,049	81	1,278,683	3,836,049	1,622	$0	11.24	11.24	0.009
Residential	38	496,454	3,122,307	36	420,475	2,847,517	1,132	$0	3.28	8.49	0.039
EE Subtotal	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$0	2.70	10.84	0.045
EE and Low Income Subtotal	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$0	2.70	10.84	0.045
Other	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
Codes & Standards Subtotal	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
C&S, T&D and Electrification Subtotal	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
Utility Total	643	3,703,546	30,998,493	642	3,627,567	30,723,702	11,054	$0	3.07	10.90	0.040

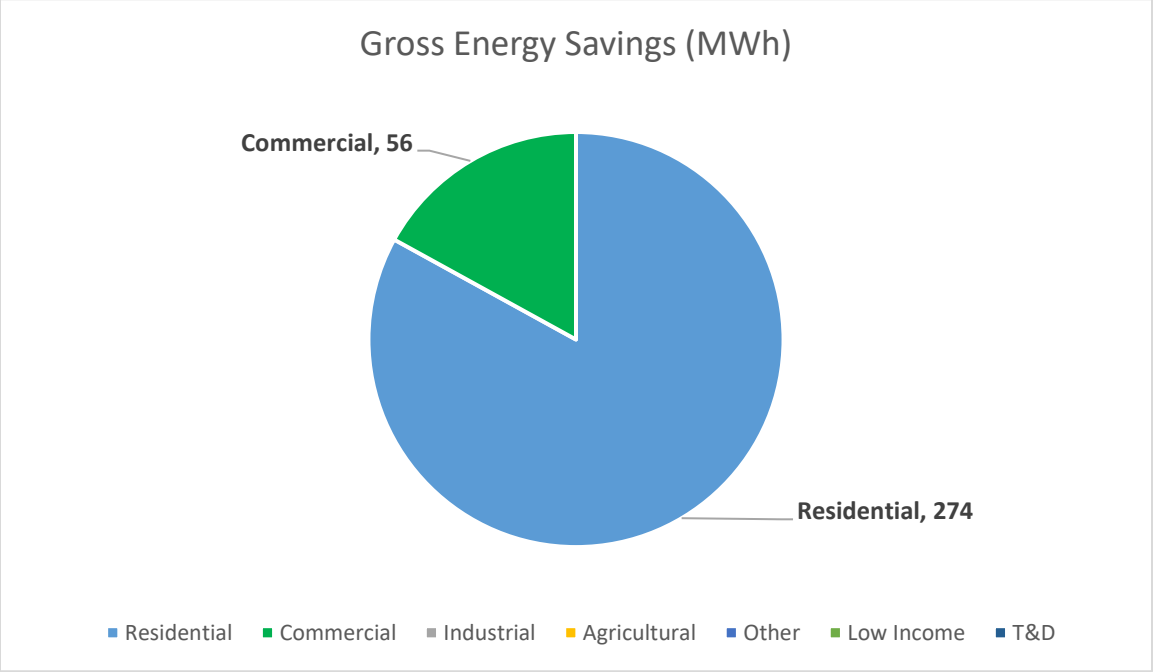
TABLE ALW 3. EE Program Results by Building Type

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	680,864	8,438,845	244	680,864	8,438,845	2,921	$0	1.42	11.24	0.087
Other Agricultural	81	1,278,683	3,836,049	81	1,278,683	3,836,049	1,622	$0	11.24	11.24	0.009
Other Commercial	170	691,994	9,744,787	170	691,994	9,744,787	3,279	$0	4.52	11.26	0.028
Other Industrial	10	60,199	902,985	10	60,199	902,985	306	$0	3.04	11.24	0.040
Residential	38	496,454	3,122,307	36	420,475	2,847,517	1,132	$0	3.28	8.49	0.039
EE Subtotal	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$0	2.70	10.84	0.045
EE and Low Income Subtotal	542	3,208,194	26,044,973	541	3,132,215	25,770,182	9,261	$0	2.70	10.84	0.045
All	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
Codes & Standards Subtotal	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
C&S, T&D and Electrification Subtotal	101	495,352	4,953,520	101	495,352	4,953,520	1,793	$0	11.24	11.24	0.010
Utility Total	643	3,703,546	30,998,493	642	3,627,567	30,723,702	11,054	$0	3.07	10.90	0.040

BANNING

Banning at a Glance

- Climate Zone(s): 15
- Customers: 12,339
- Total annual retail sales (MWh): 137,850
- Annual Retail Revenue: $25,723,461
- Annual EE expenditures for reporting year: $233,481
- Gross annual savings from reporting year portfolio (MWh): 330



Banning Overview

The City of Banning customer base consists of 85% residential customers and 25% commercial customers. During FY 2020, Banning Electric Utility spent $195,286 in EE programs, which have provided 330,273 kWh energy savings.

City of Banning is located in an economically disadvantaged area. A significant portion of the City's population consists of low income or senior citizens living on a fixed income. Due to the economic demographics of Banning's population, a significant portion of Public Benefits dollars are utilized to provide low-income assistance through a monthly utility bill credit.

Major Program and Portfolio Changes

Residential - One of Banning's main goals for FY 2020 was to increase participation in the residential AC rebate with the focus on equipment with a Seasonal Energy Efficiency Rating (SEER)

of 18 or greater. Increased incentives made higher SEER units more affordable and attractive to customers.

Commercial - The goal was to increase participation in Banning EE Funds (B.E.E.F.) commercial lighting retrofit and refrigeration programs, primarily through the adoption of significantly increased monetary incentives for our small commercial businesses. To accomplish this goal, the budget of the B.E.E.F. program was increased. Unfortunately, the pandemic caused participation in the B.E.E.F. program to come to a screeching halt during the second half of FY 2020 and no commercial audits or energy saving measures were performed.

Banning adopted 2019 Title 24 Construction Standards.

Program and Portfolio Highlights

Renewable Portfolio Standard - In 2019, the City of Banning's energy portfolio was 55% renewable.

Solar Energy - Banning has met its California SB1 requirements by providing $2.4 million in rebates for the installation of solar photovoltaic systems in its service territory. The rebates have helped install approximately 0.75 MW of customer-owned solar photovoltaic capacity in the city. Banning met the NEM Cap of 2.3 MW in 2018 and increased to 2.95 MW in 2019. Construction is underway on the Atwell Community by Pardee Homes. Soon, Banning will have an additional 4,862 energy-efficient, solar homes.

Electric Vehicles (EV) - The Executive Order preventing the sale of gas-powered vehicles by 2035 in California inspired the Banning Electric Utility to incorporate two new EVs into the utility fleet. These cars are used as a promotional tool to encourage EV sales and reduce GHG emissions.

The City is partnering with the Energy Commission to have three EV charges installed near the 10 Freeway at the Farm's House Restaurant, and five EV chargers installed in a newly constructed parking lot at the Banning Civic Center.

Commercial, Industrial & Agricultural Programs

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

Commercial Programs: Monetary incentives for commercial customers to install more energy-efficient equipment such as lighting, signage, refrigeration, etc.

New Construction: Monetary incentives for new construction projects that exceed the EE above California's Title 24 standards.

Residential Programs

AC: Monetary incentives to replace an existing central air conditioning unit with a new high-efficiency unit.

AC Tune Ups: Monetary incentives for getting air conditioning units tuned up.

EnergyStar® Appliances: Monetary incentives for purchasing products that meet the Energy Star®" criteria.

EnergyStar® Refrigerator: A monetary incentive for replacing an old inefficient refrigerator with a new energy efficient unit.

Recycle: Rebates offered to remove and recycle operating old and inefficient refrigerators and freezers.

Energy Weatherization: Monetary incentives to replace inefficient materials with products that will improve the EE of their facility and reduce energy use.

Shade Tree: Rebates offered to plant shade trees around homes to help reduce the amount of energy used for air conditioning.

Smart Thermostat: Rebates offered for installation of a programmable, WIFI-enabled thermostat.

Complementary Programs

Energy Audits: Provide customers with a variety of recommendations for reducing energy consumption and evaluation of load profile to detect patterns of high usage.

Low Income Assistance: An electric utility discount for qualified customers. As mentioned above, the majority of the Public Benefits funds are spent providing low-income assistance.

Medical Equipment Assistance: An electric utility discount for qualified customers.

Used social media to inform customers about California Independent System Operator's (CAISO) Flex Alerts and promote EE tips during peak demand times.

EM&V Studies

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

TABLE BEU 1. 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	4,166	47,943	0	3,893	44,631	20	$1,805	1.42	2.05	0.111
Building Envelope	17	29,382	587,636	12	21,266	425,318	181	$8,762	5.30	4.30	0.056
Commercial Refrigeration	2	2,527	27,797	2	2,022	22,238	8	$4,420	1.45	0.53	0.083
HVAC - Cooling	188	240,585	1,552,752	153	197,388	1,316,215	591	$110,041	2.00	2.05	0.131
Lighting - Indoor	21	53,612	589,732	0	0	0	0	$4,450			0.000
EE Subtotal	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159
EE and Low Income Subtotal	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159

TABLE BEU 2. EE Program Results by Sector

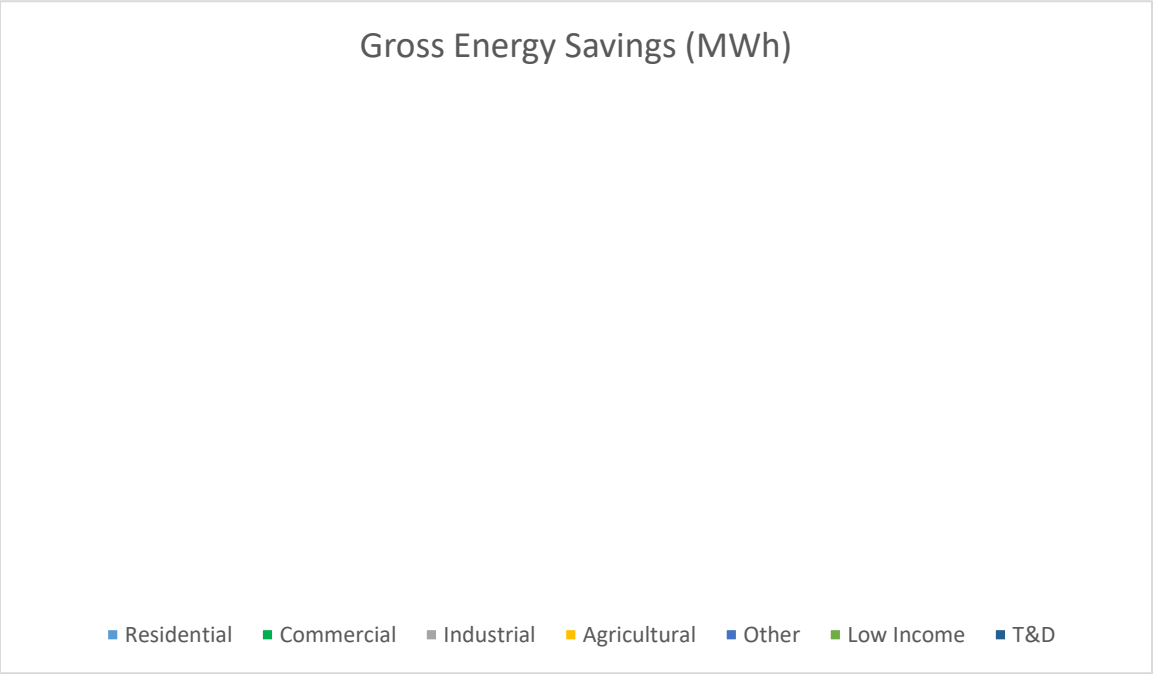
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	23	56,139	617,529	2	2,022	22,238	8	$8,870	0.03	0.03	3.646
Residential	205	274,133	2,188,331	165	222,547	1,786,163	792	$120,608	2.31	2.32	0.116
EE Subtotal	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159
EE and Low Income Subtotal	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159

TABLE BEU 3. 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	194	260,325	1,625,895	139	165,540	830,172	391	$74,460	2.00	1.30	0.128
Grocery	2	2,527	27,797	2	2,022	22,238	8	$4,420	1.45	0.53	0.083
Residential	32	65,310	1,122,626	26	55,067	928,841	390	$49,878	1.43	2.37	0.199
Residential - Single-Family	0	2,110	29,543	0	1,939	27,151	10	$720	1.78	2.55	0.086
EE Subtotal	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159
EE and Low Income Subtotal	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	228	330,272	2,805,860	167	224,568	1,808,401	800	$129,478	1.67	1.65	0.159

Biggs at a Glance

- Climate Zone(s): 11
- Customers: 727
- Total annual retail sales (MWh): 16,722
- Annual Retail Revenue: $659,140
- Annual EE expenditures for reporting year: $0
- Gross annual savings from reporting year portfolio (MWh): 0



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 8.19% load increase in FY 2020. This increased load occurred in the residential and industrial sectors, while the commercial sector load decreased by 5.66%. Customer focus continued to be solar photovoltaic (PV), with little interest in EE measures.

Major Program and Portfolio Changes

There have been no major changes in programs offered. Our Street Light Replacement Project was completed during the prior reporting period, so is no longer included.

Program and Portfolio Highlights

Commercial, Industrial & Agricultural Programs

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

Residential Programs

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

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

Complementary Programs

Low-Income Programs: Biggs works with Community Action Agency of Butte County to provide Home Energy Assistance Program (HEAP) grants to income-qualified household within our service territory. Complimentary on-site energy audits are performed by our partner, Efficiency Services Group, to resolve high usage complaints.

EM&V Studies

In 2007, in response to AB 2021, Biggs hired a third-party contractor to formulate an EM&V plan. In 2008, 2009 & 2010, Biggs contracted with Navigant Consulting to perform 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 evaluate 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 $18,000 toward fulfilling our EM&V requirement.

Major Differences or Diversions from California POU TRM for Energy Savings

None.

TABLE Biggs 1. 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	$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 Biggs 2. EE Program Results by Sector

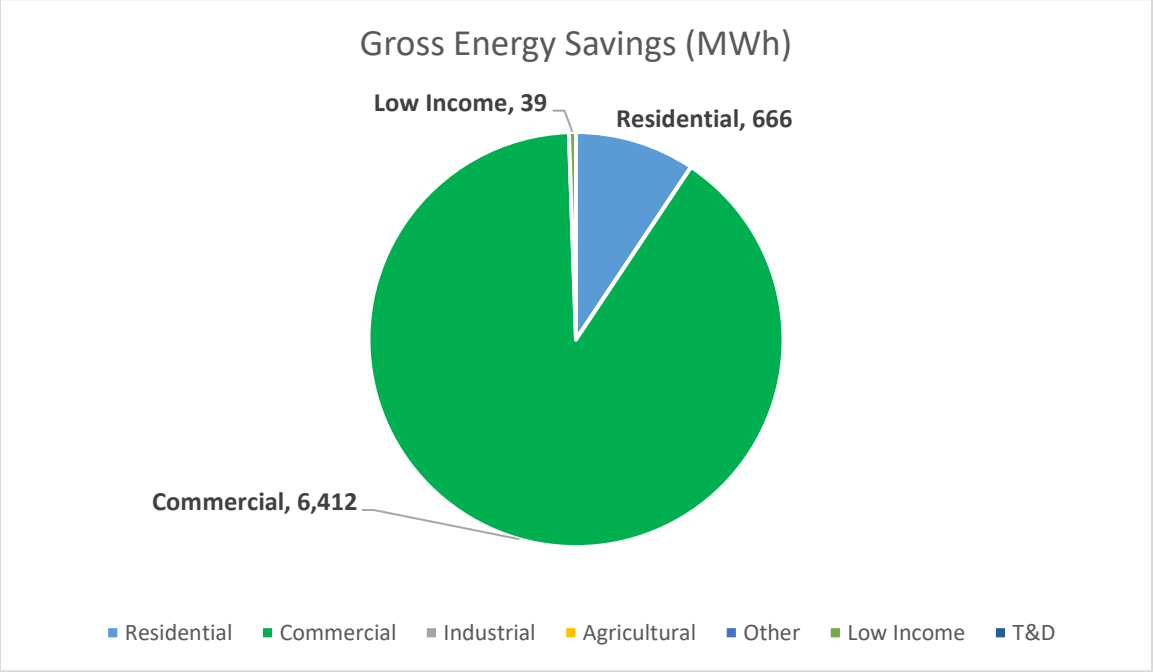
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (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 Biggs 3. 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	$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

Burbank at a Glance

- Climate Zone(s): 9
- Customers: 53,030
- Total annual retail sales (MWh): 1,019,371
- Annual Retail Revenue: $158,716,937
- Annual EE expenditures for reporting year: $2,623,561
- Gross annual savings from reporting year portfolio (MWh): 7,117



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. These major studios are also supported by numerous small media businesses in our city that provide 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 is designed to reflect 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 GHG emissions by beneficial electrification and renewable energy integration.

BWP plays a key role in facilitating the adoption of TE through education and development of programs and initiatives that help customers overcome barriers to TE adoption. In FY 2020, BWP implemented a Used EV Rebate Program. The rebate program supports adoption of EVs by customers who prefer to acquire a used EV or have income constraints that make a used EV a better buying decision.

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

BWP hosts events to empower customers with education and awareness of utility programs and services. In 2019, BWP hosted an Open House event at the BWP LEED-certified EcoCampus in a family friendly "Learn, Play, and Explore" themed environment. The Burbank community was invited to tour the BWP EcoCampus and explore how their community-owned utility operates.

During the event, customers attended educational workshops, learned about BWP programs, and services that support the community goal of a GHG free future. An estimated 750-800 guests attended the event.

Major Program and Portfolio Changes

Due to the COVID-19 pandemic, and state and local stay home orders, both residential and commercial EE programs that provided on-site visits were temporarily suspended since March 2020. In response, BWP created an income eligible program that provides payment assistance to residential customers experiencing unemployment due to the pandemic. Although, there are lower than planned participation in efficiency programs, BWP played a role to help residential customers afford essential electric service and ensure programs that did not require on-site visits to continue to operate.

Program and Portfolio Highlights

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

Among them, the Home Improvement Program (HIP) serves BWP's residential customers offering energy and water conservation services through direct installation at no additional out of pocket

cost to the customer. The program includes in-home energy and water surveys, education on energy and water efficiency and conservation, and the installation of more easily accessible energy and water conservation measures. The program then delivers deeper, harder to reach installation measures including attic insulation, duct sealing and measuring, air sealing, and combustion safety tests.

BWP introduced the program in November 2009 as a whole house, direct install program, and it has been expanding ever since. In partnering with SoCal Gas and the Metropolitan Water District of Southern California, BWP has been able to reduce energy and water use at customers' homes.

During FY 2020, BWP continued providing direct installation and packaged weatherization retrofits to residential homes through the HIP. Even though, program participation rates declined during the third and fourth quarters of the fiscal year, because of the COVID-19 pandemic, the program was able to serve 479 homes before the implementation of state and local stay home orders, producing 234 MWh and 0.29 MW peak demand savings.

Commercial, Industrial & Agricultural Programs

Expenditures for commercial, industrial, and institutional programs were $1,508,037, with the delivery of 1.94 MW of peak-load reduction and 6,412 MWh in annual energy savings.

Business Rebates: Rebates are awarded to Burbank businesses who retire their inefficient equipment and install new energy-efficient products.
Business Bucks Program: The program offers an 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 City of Burbank 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.

AC Tune-Up: The program provides air conditioning tune-up services to residential and commercial customers to help them save energy by ensuring that their air conditioning and duct systems are functioning at the optimal level.

Residential Programs

Expenditures for residential programs were $1,115,524, with the delivery of 0.56 MW of peak-load reduction and 705 MWh in annual energy savings.

Home Rewards Rebates Program: BWP provides rebates for the purchase and installation of ENERGY STAR® rated appliances 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 students attending public school in Burbank.

OPower Web Portal: The portal provides residential customers with web access to their electric usage information in hourly, daily, weekly, and monthly intervals to help them better understand their energy use and reduce their electricity consumption.

Complementary Programs

Lifeline Program: 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 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 a program to income-qualified and Lifeline approved customers for the replacement of an old inefficient refrigerator with a new ENERGY STAR® certified refrigerator at no cost. Through this program, 63 inefficient refrigerators were removed and replaced with more efficient models, resulting in more than 38 MWh of annual electricity savings.

EVs

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.

Codes and Standards

BWP has recorded 2,265 MWh and 0.462 MW of energy and peak demand savings that are drawn from the statewide allocation of energy and peak demand savings credits for FY 2019-2020 due to the State's Building and Appliance Standards that are applied and enforced in the Burbank service territory.

EM&V Studies

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

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

BWP uses a third-party verifier to perform quality inspections for 100% of Air Conditioner (AC) Tune-Up participants.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

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

TABLE BWP 1. 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	58,498	654,516	2	58,498	654,516	256	$36,700	1.65	1.65	0.087
Building Envelope	220	179,528	3,581,696	220	179,528	3,581,696	1,478	$44,115	1.63	2.83	0.222
HVAC - Cooling	611	1,202,719	17,322,956	611	1,202,719	17,322,956	6,150	$382,280	3.37	3.34	0.053
Lighting - Indoor	1,427	4,642,897	51,116,613	1,427	4,642,897	51,116,613	17,967	$4,810,272	5.60	0.92	0.021
Lighting - Outdoor	126	550,000	6,600,000	126	550,000	6,600,000	3,208	$55,000	5.44	5.44	0.023
Miscellaneous	0	108,057	972,474	0	108,057	972,474	391	$102,513	0.88	0.88	0.137
Process	100	336,136	5,042,040	100	336,136	5,042,040	1,737	$89,800	7.38	3.41	0.017
EE Subtotal	2,486	7,077,836	85,290,294	2,486	7,077,836	85,290,294	31,188	$5,520,679	3.84	1.39	0.036
Appliance & Plug Loads	8	38,808	194,040	8	38,808	194,040	83	$49,470	0.45	0.45	0.296
Low-Income Subtotal	8	38,808	194,040	8	38,808	194,040	83	$49,470	0.45	0.45	0.296
EE and Low Income Subtotal	2,494	7,116,644	85,484,334	2,494	7,116,644	85,484,334	31,271	$5,570,149	3.77	1.38	0.037
Codes & Standards	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
Codes & Standards Subtotal	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
C&S, T&D and Electrification Subtotal	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
Utility Total	2,956	9,381,911	96,810,669	2,956	9,381,911	96,810,669	36,141	$5,570,149	4.10	1.56	0.034

TABLE BWP 2. 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	1,935	6,411,839	76,000,743	1,935	6,411,839	76,000,743	27,322	$5,154,210	5.46	1.24	0.022
Residential	552	665,996	9,289,551	552	665,996	9,289,551	3,866	$366,469	1.88	2.46	0.162
EE Subtotal	2,486	7,077,836	85,290,294	2,486	7,077,836	85,290,294	31,188	$5,520,679	3.84	1.39	0.036
Residential	8	38,808	194,040	8	38,808	194,040	83	$49,470	0.45	0.45	0.296
Low-Income Subtotal	8	38,808	194,040	8	38,808	194,040	83	$49,470	0.45	0.45	0.296
EE and Low Income Subtotal	2,494	7,116,644	85,484,334	2,494	7,116,644	85,484,334	31,271	$5,570,149	3.77	1.38	0.037
Other	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
Codes & Standards Subtotal	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
C&S, T&D and Electrification Subtotal	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
Utility Total	2,956	9,381,911	96,810,669	2,956	9,381,911	96,810,669	36,141	$5,570,149	4.10	1.56	0.034

TABLE BWP 3. 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	2,110	6,548,813	77,370,480	2,110	6,548,813	77,370,480	27,926	$5,195,745	5.43	1.28	0.023
Residential	376	529,023	7,919,814	376	529,023	7,919,814	3,262	$324,934	1.64	2.21	0.180
EE Subtotal	2,486	7,077,836	85,290,294	2,486	7,077,836	85,290,294	31,188	$5,520,679	3.84	1.39	0.036
Residential	8	38,808	194,040	8	38,808	194,040	83	$49,470	0.45	0.45	0.296
Low-Income Subtotal	8	38,808	194,040	8	38,808	194,040	83	$49,470	0.45	0.45	0.296
EE and Low Income Subtotal	2,494	7,116,644	85,484,334	2,494	7,116,644	85,484,334	31,271	$5,570,149	3.77	1.38	0.037
All	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
Codes & Standards Subtotal	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
C&S, T&D and Electrification Subtotal	462	2,265,267	11,326,335	462	2,265,267	11,326,335	4,870	$0	10.08	10.08	0.013
Utility Total	2,956	9,381,911	96,810,669	2,956	9,381,911	96,810,669	36,141	$5,570,149	4.10	1.56	0.034

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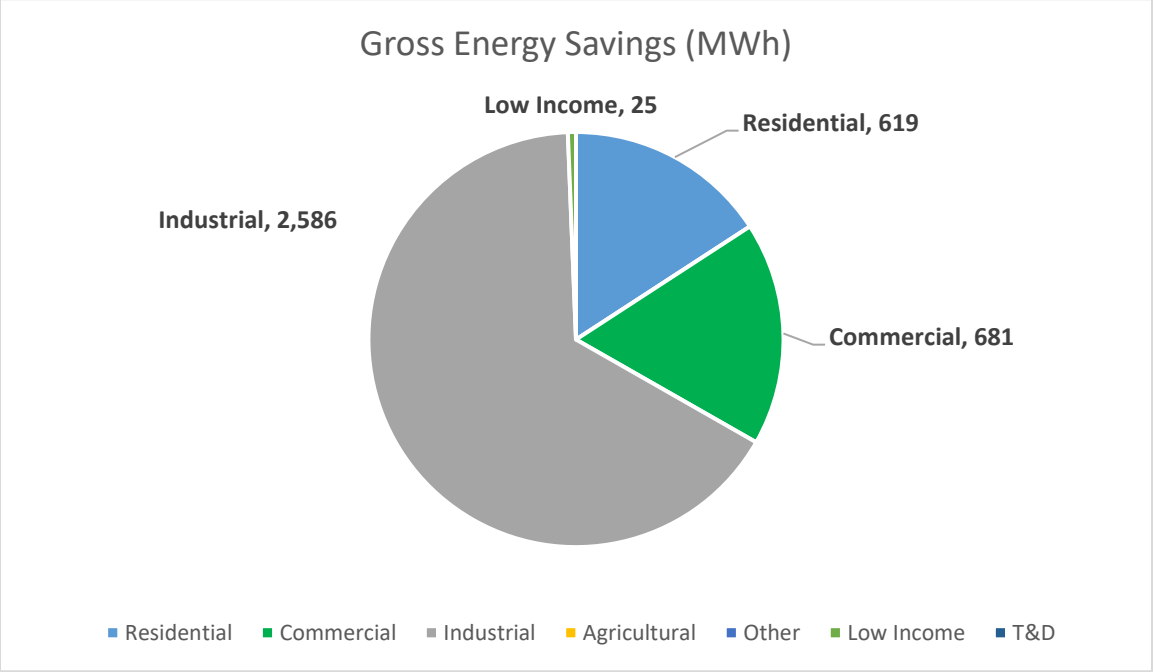
Colton at a Glance

- Climate Zone(s): 10
- Customers: 19,900
- Total annual retail sales (MWh): 338,996
- Annual Retail Revenue: $54,724,870
- Annual EE expenditures for reporting year: $968,652
- Gross annual savings from reporting year portfolio (MWh): 3,910



Colton Overview

Colton Electric Department (CED) is committed to provide cost-effective EE and conservation programs for residents and businesses in the Colton Electric Service territory. 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 now working from home. CED continues to focus on EE rebates, direct installation programs, inter-utility partnerships with Southern California 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 focused on online platforms to better serve customers with EE. As a result of this we were better prepared for what we did not know was coming which was a world-wide pandemic at the end of this reporting

period. Having already launched an online audit platform the Energy Services Division shifted its focus to marketing rebates for EE that would now be available via electronic format. With so many students and families all quarantined EE would be a priority to reduce energy consumption. The other major focus shift was on low income assistance and a COVID relief program.

Program and Portfolio Highlights

Due to the World Wide Pandemic the Energy Services Division developed the COVID-19 Assistance Program. This emergency program was launched to assist Colton Electric Utility customers during the crisis from the date of March 19, 2020 to present.

The COVID-19 Assistance program provides a $25 bill credit to the electric portion of the utility bill for a period of six (6) months.

To be eligible for the program, customers must have a job loss related to COVID-19.
This credit can only be applied once per account/household.

Customers will need to provide verification with either documentation indicating job loss or proof-of-filing for unemployment as income loss verification.

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 Direct Install: This program provided direct installation of EE measures throughout City owned facilities.

Commercial Direct Install: 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: Automated energy is an online energy review CED offers to its TOU customers. Automated energy provides access to specific interval meter data through their website.

Commercial Energy Audit: Small commercial businesses that use less than 30 kWh annually qualify to participate in CED commercial energy audit. Businesses can be eligible for additional direct install opportunities depending on audit recommendations. CED is offering $1,000 of direct install measured recommendations. This is a program to assist small businesses who are concerned with their energy consumption and want to learn how they can minimize their usage, shift their load, and save on energy costs.

Multifamily EE Direct Install Program: apartment complexes throughout CED territory can apply to have common area EE upgrades in lighting, thermostats, and AC tune-ups.
EE Upgrade Rebates: CED offers varying rebates on a number of home EE improvements. Currently CED offers rebates on: Occupancy sensors, ENERGY STAR® ceiling fans, box fans, pool pumps, solar attic fans, whole house fans, room ACs, evaporative coolers, solar tube lights, ENERGY STAR® clothes washer, ENERGY STAR® dishwasher and ENERGY STAR® refrigerators. Customers who participate in the rebate program will experience a reduction in their annual energy costs.

Residential Programs

AC Tune-Up Rebate: This program offers a rebate for preventative maintenance on residential customer AC units up to 5 tons in size. The program requires the customer to select their own licensed AC contractor that will replace filters, checks refrigerant levels, and adjusts the AC unit to minimize seasonal air conditioning costs.

AC Upgrade and Replacement Program: This program offers up to $150/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 ENERGY STAR® refrigerator to replace an existing inefficient refrigerator to qualified customers for the low cost of $240. The customer is charged $20 a month for 12 consecutive months. To qualify for the new refrigerator, customers must have an older, inefficient refrigerator that CED can recycle.

Residential Energy Audit: CED residential customers with energy usage of over 10,000 kWh annually can qualify to participate in a residential energy audit. Participants can be eligible for additional direct install opportunities depending on audit recommendations. For customers who previously participated in an energy audit in the past two years with over 10,000 kWh of usage they can participate in up to $500 of direct install measured recommendations.

Residential WebShop: CED residents can now purchase LED light bulbs, smart power strips, holiday lights and smart thermostats from the comfort of their own home. CED provides up to $50.00 per FY to buy down the cost of these items and provides free shipping. The customer can order directly from CED's website and the items are shipped directly to the customer's home.

Residential Weatherization Rebates: CED offers residential customers rebates for installing replacement windows and insulation in their homes. Windows must meet ENERGY STAR® approval with a U-Factor less than 0.35 and a Solar Heat Gain Coefficient (SHGC) below 0.30 at a rebate amount of $4.00 per sq. ft. Insulation may be added to the attic, and/or exterior walls. Rebates will also be provided for radiant barrier installed within the attic space. Insulation and radiant barrier must meet the following R-Values:

Attic Insulation - Minimum R-30 Rebate is $0.40 per sq. ft.
Radiant Barrier - Minimum R-19 Rebate is $0.30 per sq. ft.
Exterior Walls - Minimum R-13 Rebate is $0.20 per sq. ft.

Treebate: CED residents are offered up to $50.00 a tree to plant an approved tree on their property that would reduce their energy bill by providing shade to their home. Residents have a maximum of 5 trees a lifetime.

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 (EUEF) 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 EUEF 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.

Living Wise Program: The Living Wise Resource Action 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 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. During this reporting cycle the program was suspended due to COVID-19 pandemic.

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 EUEF, funded the planning and construction of a community solar project.

Research, Development, and Demonstration: CED participated in an emerging technology demonstration of a solar powered, ductless mini-split air conditioning systems in a commercial setting. CED placed the unit on the City of Colton Water Department outdoor water pumping house. The results of the study is available online at www.coltononline.com.
EVs: CED continues to grow its EV program. The utility currently has 17 level II public chargers available, an EV rate which adds 250 kWh to residential 2nd Tier of energy, and an EV charger rebate of $500 for level II chargers. CED also installed 7 Level II chargers for fleet and 1 fast

charger. CED continues to work on facilitating the state incentives to expand fleet EVs with participation in LCFS and developing rebate programs to incentivize customers to participate.

Energy Storage: Colton Electric Utility participates in an energy storage working group through SCPPA. Energy storage is being renewed for future participation. CED has purchased 8 Ice Bear thermal energy storage units for installation in 2018 as part of trial project.

Digital Monthly Newsletter on EE: residential and commercial customers receive a monthly newsletter that provides current information on EE (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.[31] CED will continue to make EM&V reports available to the CEC and other parties as they are completed and will continue with its EM&V programs and practices in the future budgeting $10,000 per year.

Major Differences or Diversions from California POU TRM for Energy Savings

The sources used to calculate program performance were the TRM and DEER data. The TRM was utilized for all measures that had not been updated in the 2016 Title 24 code changes.

[31] See: www.ci.colton.ca.us/DocumentCenter/View/3225.

TABLE CED 1. 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	12,155	145,739	1	6,175	76,118	31	$9,021	1.95	1.29	0.078
Building Envelope	16	19,254	308,821	13	15,650	246,469	100	$151,769	13.97	0.32	0.021
HVAC - Cooling	107	151,234	2,208,737	107	151,016	2,205,464	1,445	$18,336	9.98	9.48	0.029
Lighting - Indoor	210	1,380,866	14,277,216	210	1,376,654	14,260,124	5,492	$246,609	20.23	4.40	0.006
Miscellaneous	9	65,751	657,510	9	65,751	657,510	243	$35,666	19.70	1.70	0.006
Process	388	2,256,467	33,847,005	388	2,256,467	33,847,005	13,051	$761,139	79.64	4.38	0.002
EE Subtotal	733	3,885,727	51,445,027	729	3,871,713	51,292,690	20,362	$1,222,538	32.23	4.02	0.004
Appliance & Plug Loads	3	24,548	155,176	2	17,184	108,623	45	$263,228	0.02	0.03	8.473
Low-Income Subtotal	3	24,548	155,176	2	17,184	108,623	45	$263,228	0.02	0.03	8.473
EE and Low Income Subtotal	737	3,910,275	51,600,203	731	3,888,896	51,401,313	20,407	$1,485,766	5.68	3.08	0.025
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	737	3,910,275	51,600,203	731	3,888,896	51,401,313	20,407	$1,485,766	5.68	3.08	0.025

TABLE CED 2. 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	128	681,397	7,681,045	128	681,397	7,681,045	2,797	$164,823	17.49	3.68	0.007
Industrial	444	2,585,623	36,999,557	444	2,585,623	36,999,557	14,225	$837,468	79.64	4.31	0.002
Residential	161	618,706	6,764,426	157	604,692	6,612,088	3,341	$220,247	11.62	3.35	0.015
EE Subtotal	733	3,885,727	51,445,027	729	3,871,713	51,292,690	20,362	$1,222,538	32.23	4.02	0.004
Residential	3	24,548	155,176	2	17,184	108,623	45	$263,228	0.02	0.03	8.473
Low-Income Subtotal	3	24,548	155,176	2	17,184	108,623	45	$263,228	0.02	0.03	8.473
EE and Low Income Subtotal	737	3,910,275	51,600,203	731	3,888,896	51,401,313	20,407	$1,485,766	5.68	3.08	0.025
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	737	3,910,275	51,600,203	731	3,888,896	51,401,313	20,407	$1,485,766	5.68	3.08	0.025

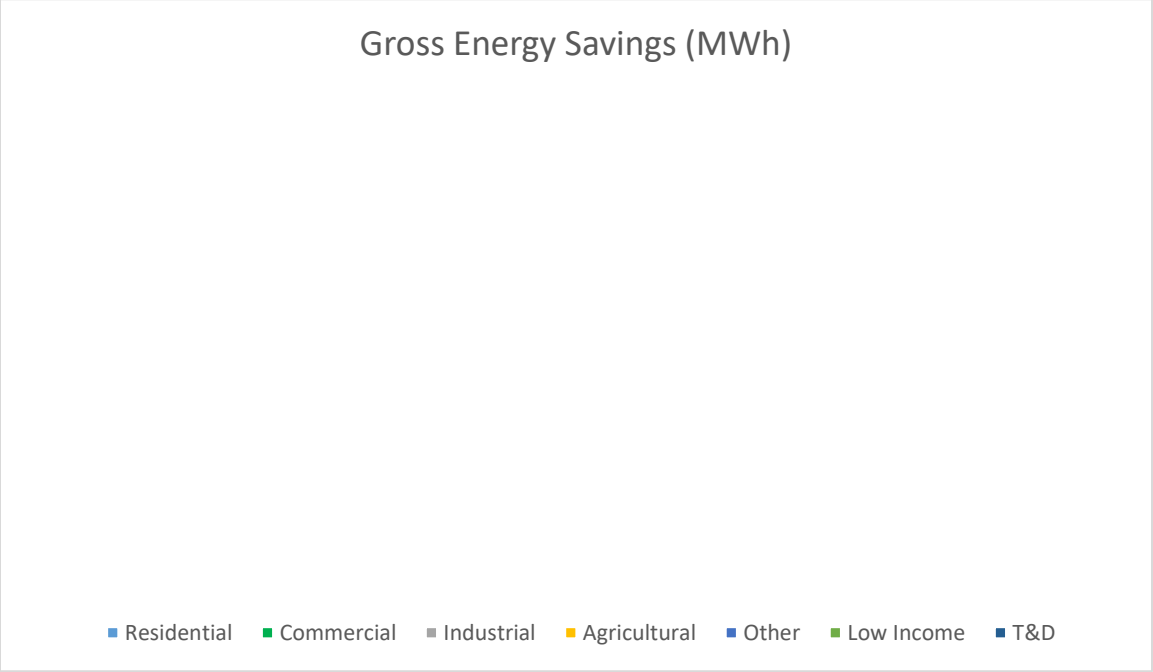
TABLE CED 3. EE Program Results by Building Type

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	7	24,185	266,738	7	23,436	257,954	90	$2,749	8.67	8.86	0.014
Education - Secondary School	18	64,913	1,038,608	18	64,913	1,038,608	318	$6,491	79.64	10.20	0.001
Lodging - Hotel	9	23,163	347,445	9	23,163	347,445	104	$0	8.24	19.70	0.021
Manufacturing Light Industrial	426	2,520,710	35,960,949	426	2,520,710	35,960,949	13,907	$830,976	79.64	4.26	0.002
Office - Large	85	471,836	5,644,872	85	471,836	5,644,872	2,069	$119,332	19.70	3.61	0.006
Other Commercial	17	98,255	786,040	17	98,255	786,040	295	$9,826	19.70	5.90	0.006
Residential	5	9,713	144,093	2	3,436	50,495	21	$13,063	3.34	1.13	0.071
Residential - Multi-Family	9	65,751	657,510	9	65,751	657,510	243	$35,666	19.70	1.70	0.006
Residential - Single-Family	156	607,201	6,598,773	155	600,213	6,548,817	3,315	$204,436	11.90	3.43	0.015
EE Subtotal	733	3,885,727	51,445,027	729	3,871,713	51,292,690	20,362	$1,222,538	32.23	4.02	0.004
All	3	20,944	104,720	2	14,661	73,304	31	$131,614	2.86	0.10	0.048
Residential - Single-Family	1	3,604	50,456	0	2,523	35,319	13	$131,614	0.01	0.01	29.500
Low-Income Subtotal	3	24,548	155,176	2	17,184	108,623	45	$263,228	0.02	0.03	8.473
EE and Low Income Subtotal	737	3,910,275	51,600,203	731	3,888,896	51,401,313	20,407	$1,485,766	5.68	3.08	0.025
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	737	3,910,275	51,600,203	731	3,888,896	51,401,313	20,407	$1,485,766	5.68	3.08	0.025

CORONA

Corona at a Glance

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



Corona Overview

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

<u>Major Program and Portfolio Changes</u>

CDWP continued to offer customers the same EE programs.

Program and Portfolio Highlights

CDWP serves municipal facilities that can be interrupted as scheduled. No EE incentive payments were disbursed to customers.

Commercial, Industrial & Agricultural Programs

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

Incentives are available to install cost effective lighting applications, that reduce energy usage by a specified amount.

Incentives are available to install cost effective HVAC units that reduce annual energy usage or load requirements by a specified amount.

Incentives are available to install cost effective refrigeration equipment that reduces annual energy usage or load requirements by a specified amount.

Incentives are available to install cost effective motors, pumps, and equipment that reduce annual energy usage by a specified amount.

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

Residential Programs

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

Offer EE kits that include low flow showerheads, low flow faucet aerators, and energy conservation tips brochure.

Rebates are available 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 CDWP's net metering tariff schedule.
CDWP has installed 350 kW of photovoltaic systems.
CDWP installed eight electric charging vehicle stations.

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

EM&V Studies

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE CDWP 1. 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 CDWP 2. 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

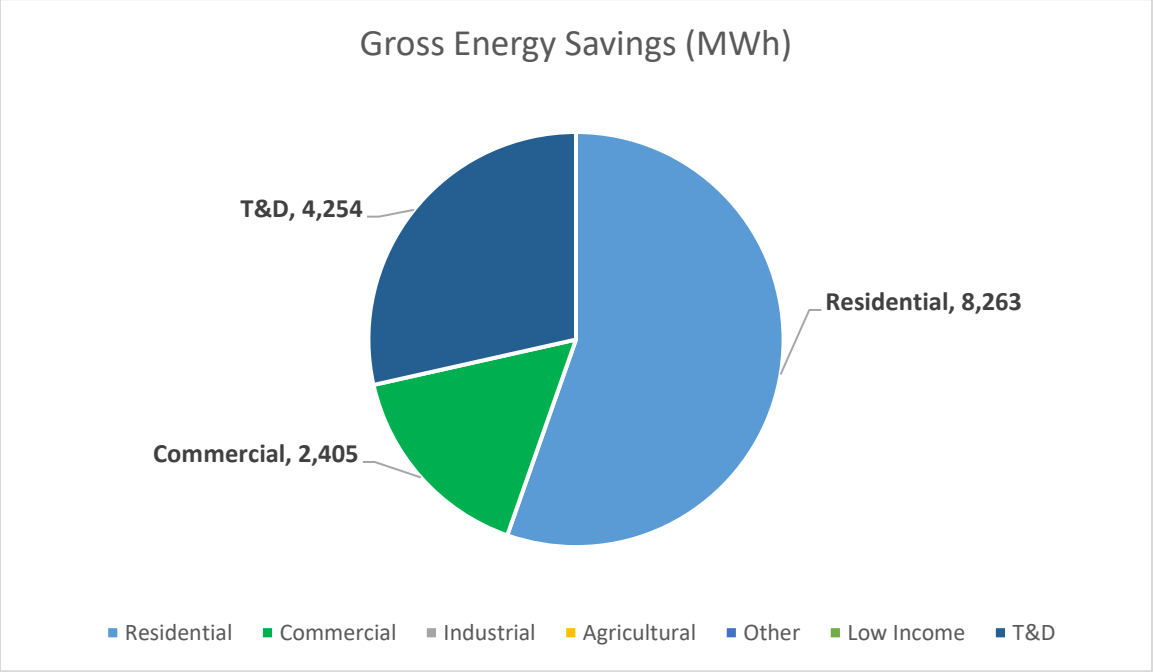
TABLE CDWP 3. EE Program Results by Building Type

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

Glendale at a Glance

- Climate Zone(s): 9
- Customers: 90,030
- Total annual retail sales (MWh): 995,645
- Annual Retail Revenue: $193,550,000
- Annual EE expenditures for reporting year: $2,393,316
- Gross annual savings from reporting year portfolio (MWh): 14,921



Glendale Overview

Glendale Water & Power (GWP) is a municipal utility that serves the citizens and community of Glendale, California including over 34,350 water customers and 90,030 electric customers. The City is located in Climate Zone 9 with a population of 205,331 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 FY 2020 reporting year, GWP's EE programs saved a total Net Annual Energy Savings of 14,867 MWh and reduced peak demand by 6.1 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. As a result of GWP's continued effort, in 2020 GWP earned a Smart Energy

Provider (SEP) designation from the American Public Power Association for demonstrating commitment to and proficiency in EE, distributed generation, and environmental initiatives that support a goal of providing low-cost, quality, safe, and reliable electric service.

GWP is on a journey of maintaining electric and water reliability while incorporating new technologies to make to be a better utility provider, improve the customer experience, optimize performance, and measure effectiveness. GWP has made many strides forward to change the way business is conducted and being a more innovative reliable service provider.

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. The RFP was open to any technology type and allowed for clean energy proposals. In October 2020, the Glendale City Council approved agreements with contractors for a four-year Commercial and Residential Electric Demand Response Program and a seven-year Commercial Direct Install EE Program. Council also authorized the City Manager to negotiate contracts for a residential Virtual Power Plant for a term of up to 25 years, with contracts 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.

Major Program and Portfolio Changes

In FY 2020 GWP experienced a drastic participation decrease in multiple EE programs which resulted in lower kWh savings for this reporting year. The closure of some GWP's EE programs was a result of the onset of COVID-19 Pandemic and Glendale's response to the "Safer at Home Order" and impacted participation in multiple customer programs. The Business Energy Solutions program, the Smart Home Energy and Water Saving Upgrade program and the Smart Business Energy Savings Upgrade program resulted in lower customer participation and therefore yielded lower energy savings for our overall portfolio. There was an increase in kW energy savings compared to previous reporting year, and this kW increase was due to our implementation of the Behavioral Demand Response program for FY 2020 and therefore a total increase in reported kW energy savings.

Program and Portfolio Highlights

GWP's Home Energy Reports, Business Energy Solutions program and Smart Business Energy Savings Upgrades continue 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. 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 Business Energy Savings Upgrade program offers small and medium size customers the ability to

participate in a comprehensive no-cost energy surveys and offers up to $2,000 worth of cost-effective energy conservation measures.

Commercial, Industrial & Agricultural Programs

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

Smart Business Energy Saving Upgrades - CMUA award winning program that provides small business customers with comprehensive no-cost energy surveys, customized written reports, energy education, and directly installs as much as $2,000 worth of cost-effective energy conservation measures.

Smart Business AC Tune-Ups - Provided by Proctor Engineering, helps small business customers save energy by ensuring that their air conditioning systems are functioning at their optimal level.

Residential Programs

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

Opower Web Portal - Provides up to 75,000 customers with web-access to electric usage information from their digital meters. The software analytics engine enables the coupling of insightful messaging with specific, targeted action steps for each household to help the customer reduce their electricity consumption. The addition of interval electric usage data has given customers the ability to view their usage in monthly, weekly, daily, or hourly intervals. Access to granular information coupled with the analytic engine will provide customers with greater insight into their usage and provide more in-depth ways for them to save energy and money.

Smart Home Energy and Water Savings Rebates - Provides incentives to promote the purchase of approved energy and water saving appliances and devices. Currently GWP offers a web portal for residents to submit their rebate applications online.

Smart Home AC Tune-Ups - Provided by Proctor Engineering, helps residential customers save energy by ensuring that their air conditioning and duct systems are functioning at their optimal level.

Livingwise® - Provides energy and water conservation education materials for Glendale public and private school students. These materials support 10 hours of intensive energy education as well as in-home installation of energy saving devices including LED light bulbs.

Tree Power - Provides up to three free shade trees and arborist services to ensure that the trees are planted correctly. When properly sited and cared for, a healthy, mature shade tree helps provide shade that cools the home and helps reduce air conditioning use.

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 and launched the High Bill Alerts to all GWP customers that sign up for the service. High Bill Alerts are designed to analyze AMI data to help customers save energy and money when they are likely to consume more energy than usual for a billing period. Before the end of a billing period, High Bill Alerts inform customers that they are likely to have high energy use, and they provide insights to help customers reduce their consumption before the billing period ends.

Smart Home Energy and Water Saving Upgrade Program - The program evaluates the efficiency of customer homes, installs free energy and water saving devices and makes recommendations for additional energy and water measures customers can implement.

Complementary Programs

Low-Income Programs: In FY 2020, 41% of the annual PBC expenditure went towards funding the below low income programs.

Senior Care - This program provides electric bill discounts for low-income seniors and disabled customers 55 and older. Senior Care was closed to new participants in 2009 when Glendale Care was implemented.

Glendale Care - This program offers all eligible low-income customers a discount of $15 on their electric bills.

Guardian - This program provides bill discounts for households with special electrically powered medical equipment needs.

Helping Hand - This program provides bill payment and deposit assistance for low-income customers 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. Towards the end of FY 2020, GWP modified the program income guidelines and enrollment process to provide immediate assistance for those customers financially affected by COVID-19 pandemic.

Renewable Energy Programs:
Smart Home Solar Solutions - Residents and businesses in Glendale have taken action to go solar. As of 2020, the City had 2,033 interconnected solar systems, with the total capacity of 21.5 MW. Of these systems, 1,506 were incentivized, with a total capacity of 12 MW. The Smart Home Solar Solutions program continues to provide incentives to promote the installation of grid-connected solar photovoltaic systems in Glendale. GWP also offers program participants the ability to utilize PowerClerk, which is an online service that integrates best practices and self-service features for GWP's solar program staff and ability for solar applicants to fill out applications, electronically sign documents and review their application status.

Solar School House - In partnership with The Rahus Institute, the Solar School House program provides Glendale Unified School District and/or local private schools an array of photovoltaic training and activities for educators, and the tools to implement a K-12 solar education program.

Research, Development, and Demonstration:
Conservation Voltage Reduction (CVR) - GWP partnered with Dominion Voltage, Inc. (DVI) to provide their EDGE solution, a conservation voltage reduction (CVR) program. CVR conserves electricity by operating electric customer voltages in the lower half of the ten percent (10%) voltage band required by ANSI equipment standards. The CVR program builds on GWP's investment in Automated Metering Infrastructure (AMI) by using the data generated by the new digital meters to reduce power costs by increasing the efficiency of GWP's distribution system. During the FY 2020, the program produced energy savings of 4,254 MWh.

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

TE: GWP is responding to the growth in the EV market and has planned the expansion of our EV charging infrastructure to accommodate more EVs in Glendale. GWP continues to install publicly accessible charging stations around the city and have plans to add more in the coming years.

EV Level II Charger Rebate - This program offers a maximum $500 rebate to residential customers who install a Level II (240V) EV charger in Glendale. The program also offers a Public Access EV charging station rebates to commercial customers who install a level 2 (240 Volt) or higher plug-in EV chargers at locations accessible to patrons, multi-family dwelling residents, commuters, and visitors. Under this program GWP reimburses customers for out-of-pocket expenses up to $3,000 per charging station for public access locations. Commercial and Multi-family building customers may qualify to receive an additional $1,000 rebate if the chargers are installed at a DAC, installed at income-qualified housing structures or are publicly accessible.

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

EM&V Studies

Glendale Water & Power plans to initiate EM&V analysis of energy efficient programs in FY 2021-22 in support of AB 2021. For FY 2022 Glendale has included $50,000 in its EE budget to conduct EM&V studies through the use of a third-party contractor. GWP will select EE programs based on the kWh savings. The purpose of the EM&V study is to ensure that measures are installed as claimed by GWP and to lend credibility to GWP's savings reports as compared to the industry standards that were available at the time of GWP's program processing and implementation. It is Glendale's plan to review all EE programs in terms of cost effectiveness, customer participation and administration.

Currently GWP consistently performs the following in support of EM&V activities:

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

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

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

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

TABLE GWP-1. 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	58,345	698,379	0	34,691	423,718	183	$49,609	0.83	0.75	0.151
Building Envelope	53	36,929	396,350	50	32,535	332,925	137	$15,086	7.52	6.91	0.067
HVAC - Cooling	5,296	913,273	4,420,003	5,276	896,453	3,945,350	1,642	$1,184,657	3.58	1.66	0.202
Lighting - Indoor	452	2,024,713	21,539,280	451	2,019,563	21,462,035	7,761	$979,018	3.81	2.41	0.040
Lighting - Outdoor	0	7,865	117,975	0	4,247	63,707	25	$8,703	1.65	0.77	0.077
Miscellaneous	398	7,625,985	12,671,775	398	7,625,985	12,671,775	5,439	$799,312	1.49	1.49	0.073
EE Subtotal	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$3,036,385	2.81	1.88	0.068
EE and Low Income Subtotal	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$3,036,385	2.81	1.88	0.068
All	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
T&D Subtotal	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
C&S, T&D and Electrification Subtotal	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
Utility Total	6,199	14,921,299	44,097,952	6,177	14,867,664	43,153,699	17,408	$3,156,214	2.78	1.90	0.064

TABLE GWP-2. EE Program Results by Sector

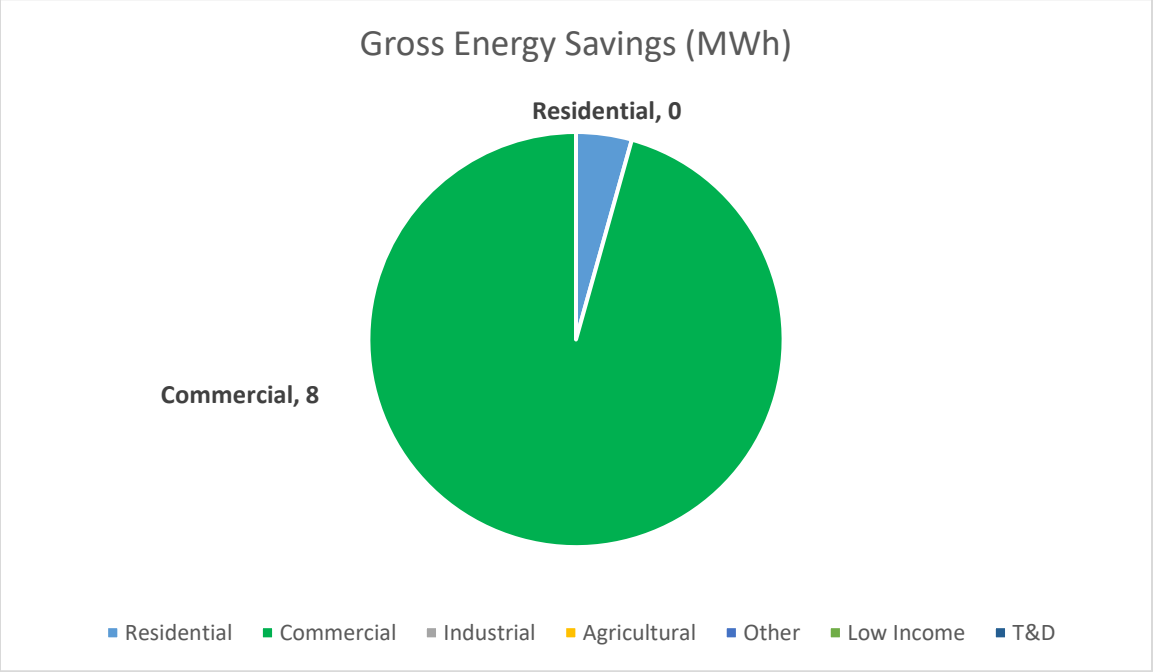
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	655	2,404,516	22,122,800	655	2,404,516	22,122,800	7,955	$1,759,289	3.49	1.49	0.045
Residential	5,545	8,262,593	17,720,962	5,522	8,208,958	16,776,709	7,232	$1,277,096	2.42	2.37	0.097
EE Subtotal	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$3,036,385	2.81	1.88	0.068
EE and Low Income Subtotal	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$3,036,385	2.81	1.88	0.068
Residential	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
T&D Subtotal	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
C&S, T&D and Electrification Subtotal	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
Utility Total	6,199	14,921,299	44,097,952	6,177	14,867,664	43,153,699	17,408	$3,156,214	2.78	1.90	0.064

TABLE GWP-3. 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	4,212	42,120	0	2,527	25,272	16	$1,300	0.53	0.77	0.255
Office - Large	648	2,398,120	22,058,840	648	2,398,120	22,058,840	7,936	$1,758,279	3.48	1.48	0.045
Residential	5,539	8,212,003	17,107,693	5,519	8,176,649	16,378,625	7,072	$1,253,835	2.46	2.41	0.096
Residential - Single-Family	5	46,378	571,149	2	29,781	372,812	145	$21,961	1.10	1.06	0.121
Retail - Large	7	6,396	63,960	7	6,396	63,960	19	$1,010	9.77	9.77	0.038
EE Subtotal	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$3,036,385	2.81	1.88	0.068
EE and Low Income Subtotal	6,199	10,667,109	39,843,762	6,177	10,613,474	38,899,509	15,187	$3,036,385	2.81	1.88	0.068
All	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
T&D Subtotal	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
C&S, T&D and Electrification Subtotal	0	4,254,190	4,254,190	0	4,254,190	4,254,190	2,221	$119,829	2.36	2.43	0.035
Utility Total	6,199	14,921,299	44,097,952	6,177	14,867,664	43,153,699	17,408	$3,156,214	2.78	1.90	0.064

Gridley at a Glance

- Climate Zone(s): 11
- Customers: 2,986
- Total annual retail sales (MWh): 30,195
- Annual Retail Revenue: $6,196,709
- Annual EE expenditures for reporting year: $45,261
- Gross annual savings from reporting year portfolio (MWh): 9



Gridley Overview

Gridley is a neighborhood community with agricultural roots and an historic downtown. It is 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 2020. 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 2020 has decreased from last year. Program activity tends to fluctuate from year to year. GMU has achieved 125% of the EE targets for net kWh over the last ten years.

Program and Portfolio Highlights

The commercial program was responsible for 96% of the total net kWh savings. GMU is pleased to be able to support local businesses with the program.

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 ENERGY STAR® qualified products, including clothes washers, room air conditioners, dishwashers, pool pumps and refrigerators.

Residential Weatherization Program: GMU offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments, window replacement or air/duct sealing.

Residential Water Heater Rebate Program: GMU offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

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

EM&V Studies

GMU is planning to complete EM&V in FY 2020 by working with several other utilities to gain economies of scale.

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 GRD-1. 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	375	4,792	0	251	3,238	1	$100	0.01	0.01	11.876
Commercial Refrigeration	1	8,276	124,141	1	4,966	74,485	27	$2,808	0.44	0.40	0.276
EE Subtotal	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777
EE and Low Income Subtotal	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777

TABLE GRD-2. EE Program Results by Sector

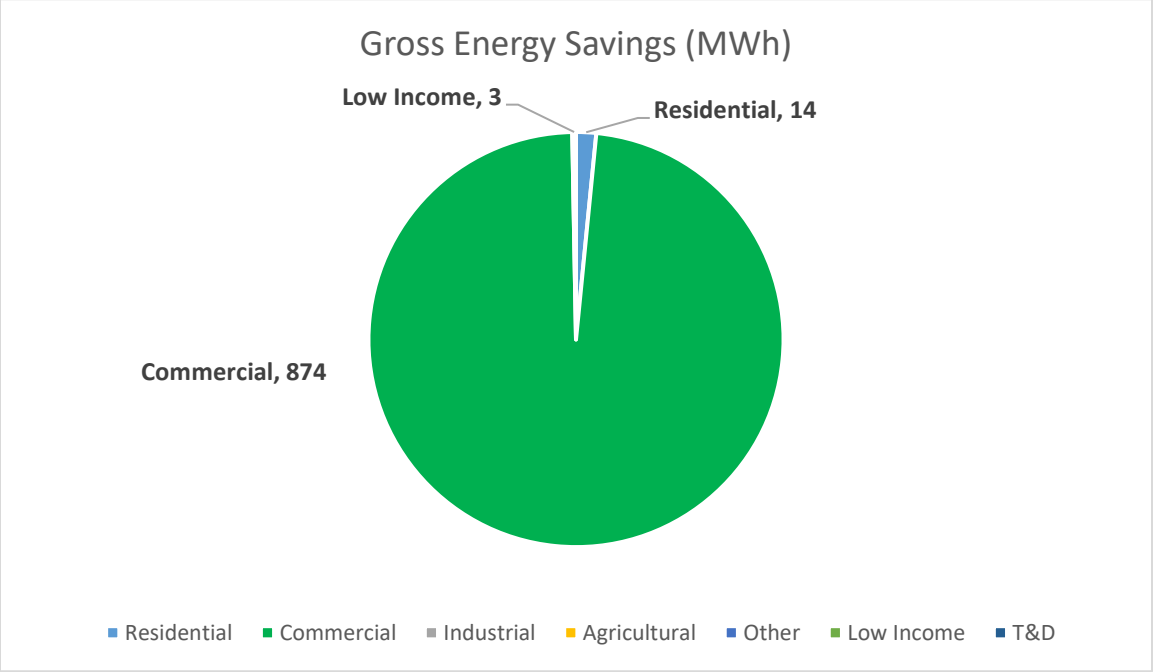
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	1	8,276	124,141	1	4,966	74,485	27	$2,808	0.44	0.40	0.276
Residential	0	375	4,792	0	251	3,238	1	$100	0.01	0.01	11.876
EE Subtotal	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777
EE and Low Income Subtotal	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777

TABLE GRD-3. 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	$20	0.01	0.01	11.487
Grocery	1	8,276	124,141	1	4,966	74,485	27	$2,808	0.44	0.40	0.276
Residential - Single-Family	0	259	3,632	0	182	2,542	1	$80	0.01	0.01	11.992
EE Subtotal	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777
EE and Low Income Subtotal	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	8,652	128,933	1	5,217	77,723	29	$2,908	0.16	0.15	0.777

Healdsburg at a Glance

- Climate Zone(s): 2
- Customers: 6,003
- Total annual retail sales (MWh): 73,909
- Annual Retail Revenue: $12,146,945
- Annual EE expenditures for reporting year: $327,333
- Gross annual savings from reporting year portfolio (MWh): 891



Healdsburg Overview

The City of Healdsburg's Electric Department manages a comprehensive EE and GHG 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 generally site specific and developed as customer programs to allow the greatest program flexibility and variety of incentives to the end users. All custom commercial incentives must be accompanied with analysis demonstrating a benefit to cost ratio greater than one and acceptable to the end user.

Major Program and Portfolio Changes

As a result of the global pandemic that began in March 2020, the Electric Department concentrated funding and resources on income-qualified customers that may have been adversely affected by loss of wages and other COVID-19 related impacts. The Electric Department

increased the allowable income for eligibility in the CARE program, increased the discount from 25% to 100% for several months, and contributed $196,325 to bill relief to approximately 550 families.

In addition to direct financial relief, the Electric Department developed 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.

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 ENERGY STAR® Wi-Fi-enabled products.

Program and Portfolio Highlights

In early 2020, the Healdsburg Electric Department completed a direct install commercial refrigeration program called "Keep Your Cool" for twenty-nine customers. The total project cost was $63,000 and yielded in 235 MWh savings and 34.50 KW peak demand reduction. The Keep Your Cool program was designed to be easy to participate in, increase EE in refrigeration uses, an improve customer satisfaction and awareness of energy programs.

In November 2020, an attic insulation direct install program was implemented to serve qualified single-family homes that have less than 6 inches of insulation. So far, the program has improved insulation for nearly 5,000 sq ft of attic space. Participation is expected to increase as vaccinations become more widely administered, and therefore residents feel safe with contractors entering their homes.

Commercial, Industrial & Agricultural Programs

The City offers the following commercial programs:
Commercial Lighting Rebates: This program engages local lighting and electrical contractors to promote and install energy efficient lighting upgrades through technical assistance and financial incentives available from Healdsburg's Electric Department.

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

Custom 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.

Residential Programs

The City offers the following residential programs:

Residential Heat Pump Rebates: The City offers tiered rebates for residential and small business customers who install high performance heat pumps. The tiered rebate levels are designed to incentive 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: The City offers incentives for high-performance clothes washers to encourage EE and water conservation. The City also provides a rebate for ENERGY STAR® 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 roughly 550 families, or about 13% of the City's residential customers. Income qualified customers are receiving 75%-50% off their electric bill through this program during the COVID-19 pandemic.

EVs: 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.

Green Rate: The Healdsburg Electric Department offers a voluntary opt-in 100% renewable electricity rate for $0.018/kWh additional.

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. In 2020, the City had a total of 5.673 MW AC capacity.

EM&V Studies

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE HEA-1. 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	4,823	61,592	1	3,196	41,275	16	$2,125	0.76	0.79	0.194
Building Envelope	6	6,338	126,032	3	3,326	65,906	120	$23,220	0.95	0.57	0.496
Commercial Refrigeration	36	302,094	3,020,940	28	235,633	2,356,333	912	$62,942	2.24	2.24	0.049
HVAC - Cooling	3	2,761	41,763	2	2,206	33,369	18	$5,110	0.82	0.65	0.316
HVAC - Heat Pump	0	34	169	0	29	143	0	$689	0.25	0.04	0.716
Lighting - Indoor	77	572,216	6,866,586	65	486,383	5,836,598	2,125	$219,748	3.06	2.13	0.037
EE Subtotal	123	888,265	10,117,082	100	730,774	8,333,624	3,189	$313,835	2.54	1.95	0.046
Building Envelope	2	2,569	51,389	2	2,184	43,681	114	$6,957	0.82	0.82	0.719
Low-Income Subtotal	2	2,569	51,389	2	2,184	43,681	114	$6,957	0.82	0.82	0.719
EE and Low Income Subtotal	125	890,834	10,168,471	102	732,958	8,377,305	3,303	$320,792	2.43	1.89	0.049
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	125	890,834	10,168,471	102	732,958	8,377,305	3,303	$320,792	2.43	1.89	0.049

TABLE HEA-2. EE Program Results by Sector

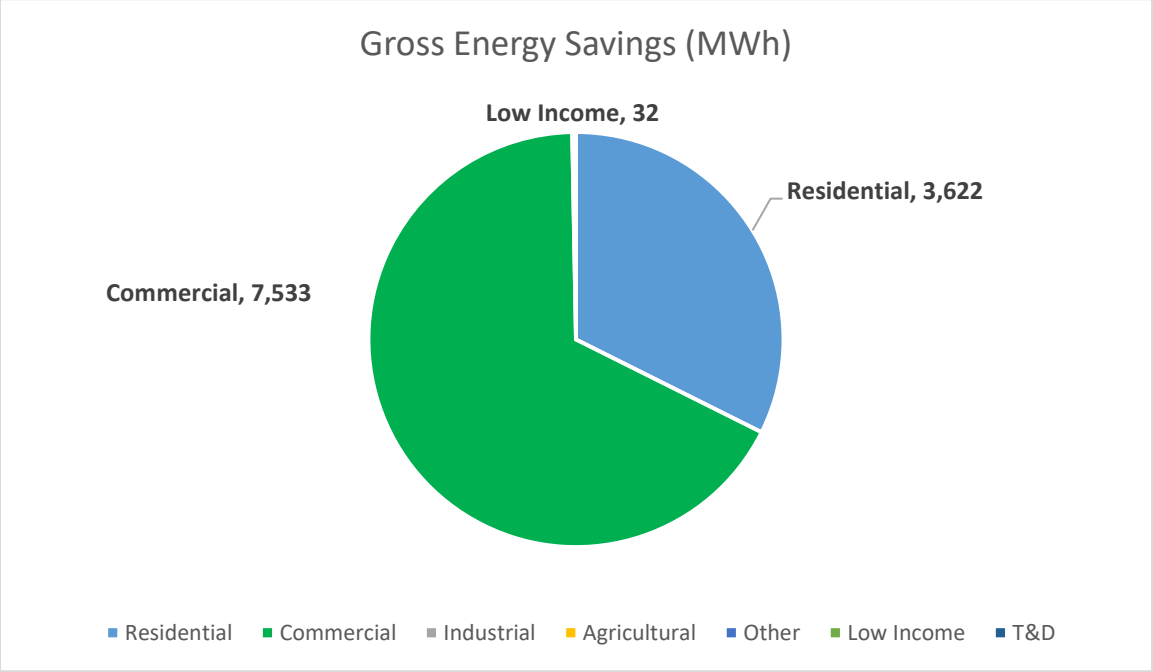
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	113	874,310	9,887,526	94	722,016	8,192,931	3,036	$282,691	2.77	2.16	0.041
Residential	10	13,955	229,556	6	8,757	140,693	153	$31,144	0.89	0.60	0.357
EE Subtotal	123	888,265	10,117,082	100	730,774	8,333,624	3,189	$313,835	2.54	1.95	0.046
Residential	2	2,569	51,389	2	2,184	43,681	114	$6,957	0.82	0.82	0.719
Low-Income Subtotal	2	2,569	51,389	2	2,184	43,681	114	$6,957	0.82	0.82	0.719
EE and Low Income Subtotal	125	890,834	10,168,471	102	732,958	8,377,305	3,303	$320,792	2.43	1.89	0.049
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	125	890,834	10,168,471	102	732,958	8,377,305	3,303	$320,792	2.43	1.89	0.049

TABLE HEA-3. 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	113	874,368	9,888,106	94	722,051	8,193,279	3,036	$282,701	2.77	2.16	0.041
Residential	6	6,540	115,442	3	3,311	54,320	90	$9,996	0.90	0.76	0.478
Residential - Single-Family	3	7,357	113,534	3	5,411	86,025	63	$21,138	0.88	0.49	0.281
EE Subtotal	123	888,265	10,117,082	100	730,774	8,333,624	3,189	$313,835	2.54	1.95	0.046
Residential - Single-Family	2	2,569	51,389	2	2,184	43,681	114	$6,957	0.82	0.82	0.719
Low-Income Subtotal	2	2,569	51,389	2	2,184	43,681	114	$6,957	0.82	0.82	0.719
EE and Low Income Subtotal	125	890,834	10,168,471	102	732,958	8,377,305	3,303	$320,792	2.43	1.89	0.049
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	125	890,834	10,168,471	102	732,958	8,377,305	3,303	$320,792	2.43	1.89	0.049

Imperial at a Glance

- Climate Zone(s): 15
- Customers: 158,258
- Total annual retail sales (MWh): 3,325,115
- Annual Retail Revenue: $447,119,923
- Annual EE expenditures for reporting year: $3,582,739
- Gross annual savings from reporting year portfolio (MWh): 11,188



Imperial Overview

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

In 2020, IID earned a Reliable Public Power Provider (RP3) ® designation from APPA for providing reliable and safe electric service. IID was awarded with a Diamond designation, the highest achievement possible under the association's assessment. Diamond status signifies that the IID has met over 98 percent of the total evaluation criteria.

As a consumer-owned utility, IID works to meet our customers' demands efficiently and effectively at the best possible rates, tying our area's low-cost of living directly with low-cost utilities. Our

diverse resource portfolio provides our customers with some of the lowest cost rates in southern California which is critical given unemployment rates within the service territory are one of the highest in the nation.

IID's EE programs are a key factor in the utility's overall goal. These programs provide a positive impact on utility 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 with previous years. New introductions during the 2020 year included:

- Prescriptive rebates for next-generation thermostats
- Keep Your Cool non-residential program
- Replacement of residential on-site energy assessments with an online energy assessment tool

Due to impacts related to the COVID-19 pandemic, all programs requiring on-site interaction 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. Further, a budget transfer of $2M was reallocated from the EE portfolio to IID's rate assistance programs to provide additional support to customers that faced economic challenges due to the pandemic.

Other considerations presenting a challenge for utilities, including IID, are the obligation related to the expected doubling of utilities' EE savings resulting from SB 350. 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 have consulted with for their upgrades and have identified the details of their project prior to applying for the rebate. However, for all other commercial customers that may not have access to an 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 filling out 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 a large number of IID's residential customers participate in its income-qualified programs, a significant portion of revenue generated through the public benefits charge is allocated towards these programs. In 2019, IID modified its rate assistance eligibility criteria to allow for greater participation such as a reduction in age for qualifying seniors and an increase in the maximum income level Residential Energy Assistance Program expenditures for the 2019 year totaled over $3.3M, with an average enrollment of 11,120 customers

Residential Energy Assistance Program (REAP) – This program provides customers with a discounted rate on their electric bill. Qualification is based on the number of residents per household and the total gross income of all the income sources in the home. Qualifying customers may receive a 20 percent discount on their monthly bill. Qualifying seniors 60 or older may apply to receive a 30 percent discount.

Emergency Energy Assistance Program (EEAP) – This program provides financial assistance to customers in a financial crisis, facing disconnection for nonpayment.

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

Energy Storage:

The District's first ever battery energy storage system went online in November 2016. The project is a 30-megawatt, 20-megawatt-hour lithium-ion battery storage system that will increase reliability across the IID grid by providing the ability to balance power and integrate solar while providing spinning reserve and black start power restoration capabilities. IID anticipates its customers will benefit from reduced operating costs throughout the lifetime of the project, providing a significant cost savings to ratepayers. The project is one of the largest of its kind in the western United States.

Renewable Energy Programs:

Net Billing – The Net Billing Program is NEMs successor program and also compensates net-surplus customers in accordance with the Distributive Self-Generation Service Rate

E-Green Solar Program - in 2019, IID finalized its e-Green Community Solar Program that benefits all of IID's qualified, low-income customers. The program utilizes a 23-year term power purchase agreement with Citizens Energy Corporation for 30 megawatts of solar energy, of which 10 MW has been allocated specifically for the e-Green program. The program allows low-income customers to benefit from renewable clean solar energy without the concern and financial means needed to purchase and install rooftop solar. IID's REAP customers will receive an

additional discount on their electric bills under the eGreen program. No enrollment is required and REAP customers will be automatically enrolled onto the program.

Green Energy Rate Program – Under the green energy rate, customers can designate how much renewable energy they wish to be served with. Customers can elect to be served up 100% of their energy needs with renewables through renewable energy or 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.

EM&V Studies

IID has historically conducted EM&V studies on a two-year program cycle. The latest report covering program years 2014 and 2015 summarized the evaluation effort led by ADM Associates Inc. and included the Energy Rewards prescriptive rebates, Weatherization, Quality AC Maintenance, Customer Energy Solutions and New Construction EE programs. Evaluation activities consisted of calculation of energy and demand savings attributable to the efficiency programs, a process evaluation to identify actionable information aimed at program improvements and recommendations for future program years. Given cost considerations and the consistency 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 CALIFORNIA POU TRM for Energy Savings

IID utilized a combination of savings from the TRM (Energy Rewards, Refrigerator Recycling and Replacement), utility work papers & 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 IID-1. 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	10	26,532	530,640	9	23,083	461,657	151	$0	10.77	20.43	0.013
Appliance & Plug Loads	133	718,432	7,280,198	114	619,144	6,304,969	2,500	$0	3.81	9.71	0.038
Building Envelope	449	2,104,371	34,196,205	401	1,949,944	31,532,629	13,298	$0	7.94	10.44	0.024
Commercial Refrigeration	7	225,324	4,506,480	6	191,525	3,830,508	1,402	$0	4.51	12.38	0.030
HVAC - Cooling	1,153	2,393,976	39,042,828	1,114	2,348,991	38,420,025	15,550	$0	4.54	22.62	0.061
Lighting - Indoor	18	172,898	2,593,470	17	164,253	2,463,797	860	$0	7.20	7.20	0.018
Lighting - Outdoor	936	4,814,096	96,281,920	777	3,995,700	79,913,994	38,056	$0	8.75	15.18	0.016
Miscellaneous	41	163,107	489,322	24	95,815	287,445	123	$0	0.26	0.26	0.423
Process	89	537,031	8,055,465	75	451,106	6,766,591	2,393	$0	4.77	12.42	0.027
EE Subtotal	2,836	11,155,767	192,976,528	2,537	9,839,560	169,981,613	74,333	$0	5.90	13.77	0.030
Appliance & Plug Loads	6	32,032	480,480	5	22,422	336,336	127	$0	61.98	61.98	0.002
Low-Income Subtotal	6	32,032	480,480	5	22,422	336,336	127	$0	61.98	61.98	0.002
EE and Low Income Subtotal	2,842	11,187,799	193,457,008	2,541	9,861,983	170,317,949	74,460	$0	5.91	13.79	0.030
Codes & Standards	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	61.98	61.98	0.002
Codes & Standards Subtotal	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	61.98	61.98	0.002
Appliance & Plug Loads	0	0	0	0	0	0	0	$0			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
C&S, T&D and Electrification Subtotal	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	34.24	53.96	0.004
Utility Total	2,842	27,930,799	210,200,008	2,541	26,604,983	187,060,949	82,143	$0	6.40	14.79	0.027

TABLE IID-2. EE Program Results by Sector

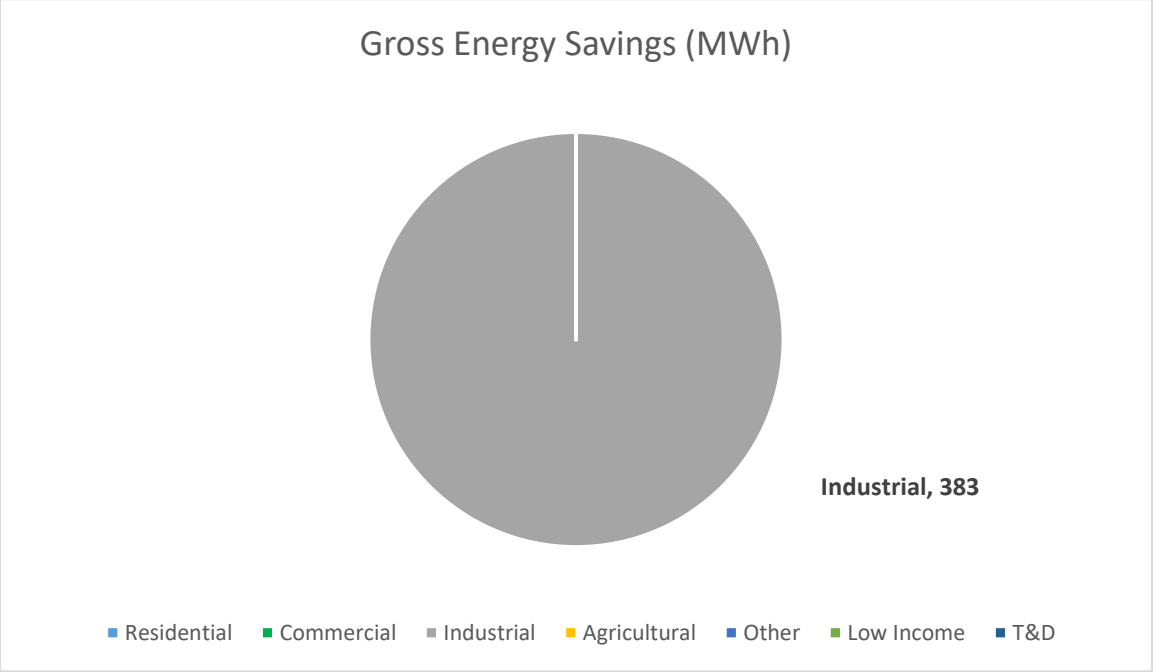
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	1,360	7,533,394	138,652,316	1,153	6,470,293	118,377,641	51,194	$0	7.59	11.77	0.018
Residential	1,476	3,622,373	54,324,212	1,384	3,369,268	51,603,971	23,139	$0	4.73	16.99	0.057
EE Subtotal	2,836	11,155,767	192,976,528	2,537	9,839,560	169,981,613	74,333	$0	5.90	13.77	0.030
Residential	6	32,032	480,480	5	22,422	336,336	127	$0	61.98	61.98	0.002
Low-Income Subtotal	6	32,032	480,480	5	22,422	336,336	127	$0	61.98	61.98	0.002
EE and Low Income Subtotal	2,842	11,187,799	193,457,008	2,541	9,861,983	170,317,949	74,460	$0	5.91	13.79	0.030
Residential	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	61.98	61.98	0.002
Codes & Standards Subtotal	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	61.98	61.98	0.002
Residential	0	0	0	0	0	0	0	$0			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
C&S, T&D and Electrification Subtotal	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	34.24	53.96	0.004
Utility Total	2,842	27,930,799	210,200,008	2,541	26,604,983	187,060,949	82,143	$0	6.40	14.79	0.027

TABLE IID-3. 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	1,205	5,858,258	113,525,276	1,006	4,878,913	94,506,953	43,175	$0	7.70	14.26	0.018
Other Commercial	155	1,675,136	25,127,040	147	1,591,379	23,870,688	8,018	$0	7.20	7.20	0.019
Residential	264	672,468	10,138,227	216	538,970	8,671,686	5,571	$0	5.73	9.42	0.052
Residential - Multi-Family	1	705	14,096	0	613	12,263	5	$0	2.71	11.77	0.104
Residential - Single-Family	1,212	2,949,200	44,171,889	1,167	2,829,685	42,920,022	17,563	$0	4.56	20.61	0.058
EE Subtotal	2,836	11,155,767	192,976,528	2,537	9,839,560	169,981,613	74,333	$0	5.90	13.77	0.030
Residential	6	32,032	480,480	5	22,422	336,336	127	$0	61.98	61.98	0.002
Low-Income Subtotal	6	32,032	480,480	5	22,422	336,336	127	$0	61.98	61.98	0.002
EE and Low Income Subtotal	2,842	11,187,799	193,457,008	2,541	9,861,983	170,317,949	74,460	$0	5.91	13.79	0.030
All	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	61.98	61.98	0.002
Codes & Standards Subtotal	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	61.98	61.98	0.002
Residential	0	0	0	0	0	0	0	$0			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
C&S, T&D and Electrification Subtotal	0	16,743,000	16,743,000	0	16,743,000	16,743,000	7,683	$0	34.24	53.96	0.004
Utility Total	2,842	27,930,799	210,200,008	2,541	26,604,983	187,060,949	82,143	$0	6.40	14.79	0.027

IPUC at a Glance

- Climate Zone(s): 9
- Customers: 109
- Total annual retail sales (MWh): 39,300
- Annual Retail Revenue: $4,501,000
- Annual EE expenditures for reporting year: $15,805,249
- Gross annual savings from reporting year portfolio (MWh): 383



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 was completed for a Large General Service Customer.

Commercial, Industrial & Agricultural Programs

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

On-site energy audits, at no cost to the customer, that 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, that analyze usage and demand to develop recommendations designed to improve energy operating efficiency and reduce load

requirements. Incentives are available for approved Energy Star® appliances and program allowance for the installation of specified energy measures.

Complementary Programs

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

EM&V Studies

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE IPUC-1. 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	$3,035			0.000
Lighting - Indoor	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$258,720	0.02	0.11	4.775
EE Subtotal	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
EE and Low Income Subtotal	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776

TABLE IPUC-2. EE Program Results by Sector

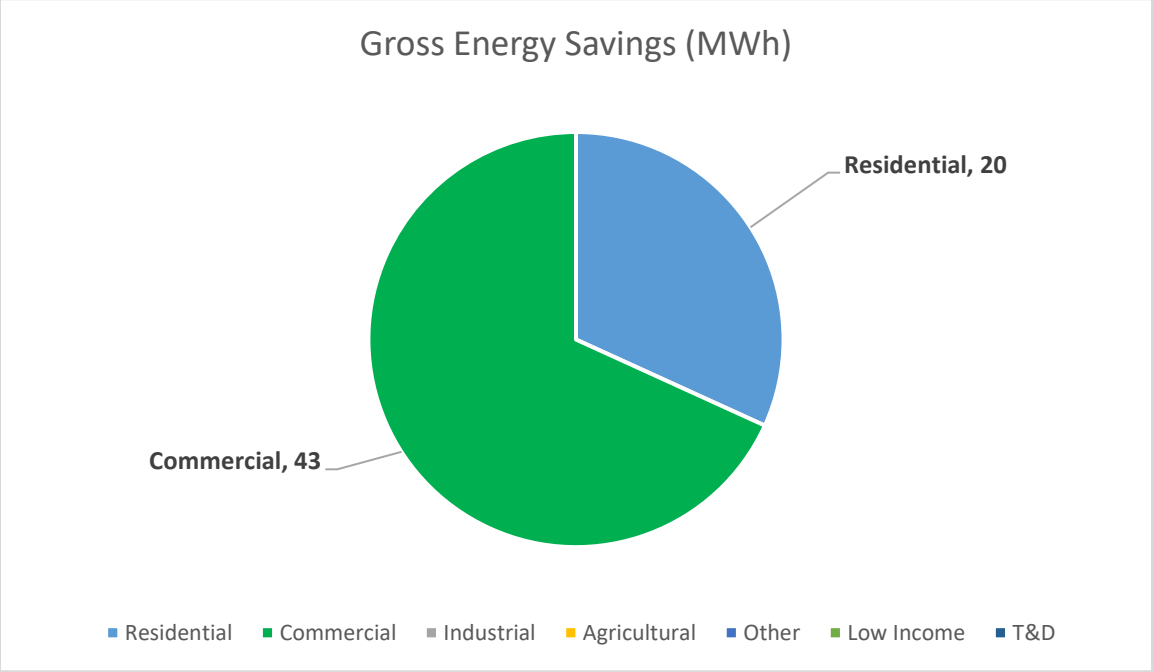
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Industrial	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
EE Subtotal	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
EE and Low Income Subtotal	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776

TABLE IPUC-3. 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	$3,035			0.000
Manufacturing Light Industrial	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$258,720	0.02	0.11	4.775
EE Subtotal	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
EE and Low Income Subtotal	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	116	382,928	4,965,296	93	306,342	3,972,237	1,385	$261,755	0.02	0.11	4.776

Lassen at a Glance

- Climate Zone(s): 16
- Customers: 9,000
- Total annual retail sales (MWh): 123,290
- Annual Retail Revenue: $20,779,569
- Annual EE expenditures for reporting year: $48,097
- Gross annual savings from reporting year portfolio (MWh): 63



Lassen Overview

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.

<u>Major Program and Portfolio Changes</u>

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 2020. We find that the customers and local contractors value consistency in program offerings.

Program and Portfolio Highlights

Program activity tends to vary year to year. LMUD has achieved 97% of the target net kWh savings over the last four years.

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 ENERGY STAR® qualified products, including clothes washers, room air conditioners, dishwashers, refrigerators, freezers, and advanced power strips.

Residential Water Heater Rebate Program: LMUD offers rebates to customers who purchase new, energy efficient electric water heaters and heat pump water heaters.

Complementary Programs

Low-Income Programs: LMUD offers two low-income programs. ECAP offers rate assistance, November through April based on the type of home heating. EEAP provides a one-time assistance payment to help avoid disconnection in the case of a financial emergency. This program is funded by LMUD's Public Benefits Program and administered by the local Salvation Army Office.

Renewable Energy Programs: LMUD offers customers a Net Energy Metering program that pays customers for excess net generation. Our NEM limit of 5% total peak load of 25MW was met in 2018. LMUD no longer offers NEM for solar or other distributed generation systems. LMUD now offers a Customer Distributed Generation rate of 0.045 per exported kilowatt hour.

EVs: LMUD offers customers rebates on EV charging stations. Publicly accessible and residential are based on a first come, first served basis.

EM&V Studies

LMUD is planning to complete EM&V in FY 2020 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 TRM. Non-residential lighting, custom projects and non-deemed refrigeration measures use custom savings calculations.

TABLE LMUD-1. 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	8,388	102,466	0	4,219	53,613	20	$3,715	0.34	0.34	0.450
Building Envelope	0	171	3,420	0	48	958	0	$712	1.07	0.45	0.213
HVAC - Cooling	7	10,348	57,192	6	8,355	45,876	23	$186,191	0.68	0.05	0.304
Lighting - Indoor	12	26,974	323,436	9	21,159	253,772	93	$11,815	2.51	1.58	0.047
Lighting - Outdoor	0	16,432	196,890	0	13,135	157,457	76	$5,631	5.26	3.13	0.029
Service & Domestic Hot Water	2	1,155	11,550	1	693	6,930	3	$506	0.21	0.25	0.610
EE Subtotal	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116
EE and Low Income Subtotal	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116

TABLE LMUD-2. 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	11	43,282	503,422	9	34,703	402,860	165	$15,856	4.48	2.55	0.029
Residential	10	20,185	191,532	7	12,905	115,746	50	$192,715	0.43	0.09	0.411
EE Subtotal	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116
EE and Low Income Subtotal	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116

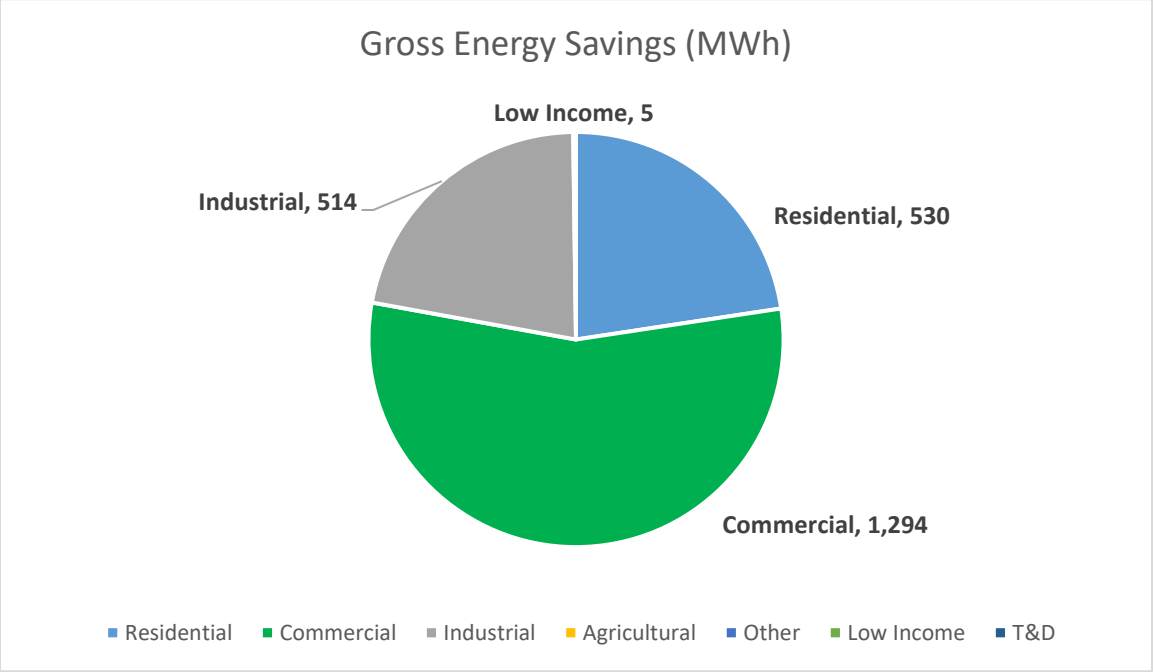
TABLE LMUD-3. EE Program Results by Building Type

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	12	42,996	510,696	9	34,114	406,447	166	$15,917	3.80	2.33	0.035
Other Commercial	1	1,534	2,446	1	1,304	2,079	1	$1,245	0.38	0.24	0.240
Residential	8	15,206	130,075	6	9,568	73,774	34	$190,188	0.49	0.07	0.385
Residential - Single-Family	0	3,731	51,737	0	2,622	36,305	14	$1,220	0.35	0.36	0.448
EE Subtotal	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116
EE and Low Income Subtotal	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	21	63,468	694,954	16	47,608	518,606	215	$208,570	1.22	0.29	0.116

LODI

Lodi at a Glance

- Climate Zone(s): 12
- Customers: 27,007
- Total annual retail sales (MWh): 417,004
- Annual Retail Revenue: $72,181,616
- Annual EE expenditures for reporting year: $511,354
- Gross annual savings from reporting year portfolio (MWh): 2,343



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 2020, with a median household income of $58,621 and nearly half (45.8%) 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 renewable energy goals.

Major Program and Portfolio Changes

In FY 2020, 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 increased from last year due to an increase in commercial and industrial projects. Over the past three years, In FY 2020, Lodi has achieved 126% of net savings targets.

Program and Portfolio Highlights

LEU continued to offer the Residential Direct Install and Snapshot Audit program that it started in FY16. This program offered installation of LEDs, advanced power strips, thermostatic shower valves, shower heads, and aerators in 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 be the main source of energy savings achieved, accounting for 60% of annual net savings for FY 2020. 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.

Residential Programs

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

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

Residential HVAC: LEU offers rebates to homeowners who install high performance heat pumps and air-conditioners that exceed current state requirements. LEU also offers a rebate for duct sealing when not required by code.

Residential Equipment: LEU offers rebates to homeowners who purchase new ENERGY STAR® qualified products, including clothes washers, dishwashers, pool pumps, refrigerators, and advanced power strips.

Residential Weatherization: LEU offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments, solar attic fans, and air sealing.

Residential Water Heater Rebate: LEU offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Residential Direct Install: Audits are performed on residential homes and advanced smart power strips, faucet aerators, thermostatic shower valves, and ENERGY STAR® rated LEDs are installed at no cost to the customer. The Direct Install program paused temporarily during COVID-related shelter in place orders.

Complementary Programs

Low-Income Programs:

Lodi C.A.R.E. Package Program: Provides grants to very low-income customers in need of assistance paying their electric utility account; the program coordination/customer screening is performed by the Lodi Salvation Army. In 2020, in response to the COVID pandemic, Lodi Electric

Utility expanded eligibility requirements, level of financial resources dedicated to this program, and added one third party administrator to provide a digital option for customers to apply.

Lodi SHARE Discount Rate: LEU provides a rate discount of 30% for qualifying residential customers on their electric utility monthly billing statement; Over $516K was budgeted in FY 2020 for this rate discount from the Lodi Public Benefits Program fund.

Renewable Energy Programs: LEU's Solar PV Rebate program ended on December 31, 2018 and LEU no longer offers Net Energy Metering (NEM). LEU has since implemented a new solar ordinance and rate tariff for customers interested in installing new or expanded solar facilities.

EVs: In 2019, LEU launched its EV program. In addition to its ongoing partnership with the California Municipal Utilities Association, the California Center for Sustainable Energy, and the Clean Vehicle Rebate Project in association with the American Public Power Association, LEU now offers rebates for EV residential and commercial charging stations, and a separate rebate to offset the permitting and installation of a charging station and meter. The residential rebates for Level 2 Chargers are $500, and $500 for permitting and installation. Commercial rebates for Level 2 or DC fast Chargers are $3,000, and $3,000 for permitting and installation.
An EV Ride and Drive Event planned for FY 2020 was delayed because of state-mandated social distancing rules.

In late 2019, LEU applied for a CaleVIP grant from the State of California's San Joaquin County's Incentive Project. By November 2020, staff was notified that grant funds had been reserved to replace the City's seven first-generation EV public chargers and expand the number of public chargers by three. Plans are underway to procure these new EV chargers. LEU also offers residential customers a TOU EV charging rate with installation of a separate meter.

EE and Conservation Curriculum: Lodi Electric Utility has successfully implemented a K-12 educational curriculum designed to teach students about how to use energy responsibly. Content and classroom activities are aligned to support federal and state education standards, feature hands-on activities, and are combined with take-home EE Kits for reach student. In March 2020, the educational curriculum provider quickly responded to at-home learning by converting the classroom learning to a digital learning experience. About 75 percent of the 300 planned student population and their teachers participated in the program despite COVID-related challenges related to classroom learning.

EM&V Studies

Previously completed EM&V reports are available for review at:
www.ncpa.com/policy/reports/emv/.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

For FY 2020, LEU has relied heavily on the savings listed in the TRM. The Commercial Lighting and Commercial Custom programs use custom savings calculations based on actual pre and post equipment specifications.

TABLE LODI-1. 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	4	68,820	773,826	2	41,402	472,054	178	$28,154	0.79	0.87	0.173
Building Envelope	72	95,116	1,894,763	28	33,932	676,530	611	$391,070	2.51	0.70	0.163
Commercial Refrigeration	31	174,275	1,918,282	29	165,122	1,817,092	686	$42,579	3.37	3.27	0.034
HVAC - Cooling	18	237,938	2,790,728	15	192,206	2,259,762	1,064	$60,230	13.58	9.86	0.034
HVAC - Heat Pump	0	108	1,186	0	86	949	0	$250	5.27	1.46	0.080
Lighting - Indoor	190	1,155,582	13,635,612	153	941,637	11,073,508	4,080	$574,232	4.70	2.02	0.026
Lighting - Outdoor	1	90,042	1,007,865	0	77,347	859,654	389	$85,092	3.71	1.15	0.033
Process	420	515,428	5,154,280	252	309,257	3,092,568	1,194	$14,599	38.01	25.01	0.003
Service & Domestic Hot Water	0	283	2,834	0	269	2,692	1	$75	3.25	3.06	0.035
EE Subtotal	735	2,337,591	27,179,375	480	1,761,259	20,254,809	8,204	$1,196,282	5.29	2.50	0.031
Lighting - Indoor	0	3,766	37,661	0	3,578	35,778	15	$3,294	1.06	1.06	0.116
Lighting - Outdoor	0	1,308	13,080	0	1,243	12,426	5	$540	2.15	2.15	0.058
Low-Income Subtotal	0	5,074	50,741	0	4,820	48,204	20	$3,834	1.22	1.22	0.101
EE and Low Income Subtotal	735	2,342,665	27,230,116	481	1,766,080	20,303,013	8,224	$1,200,116	5.25	2.50	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	735	2,342,665	27,230,116	481	1,766,080	20,303,013	8,224	$1,200,116	5.25	2.50	0.032

TABLE LODI-2. 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	221	1,294,350	15,453,846	182	1,062,676	12,669,110	4,670	$592,884	6.49	2.24	0.018
Industrial	420	513,621	5,136,210	252	308,173	3,081,726	1,190	$14,350	40.53	25.72	0.003
Residential	95	529,621	6,589,319	47	390,411	4,503,973	2,344	$589,048	3.74	2.24	0.088
EE Subtotal	735	2,337,591	27,179,375	480	1,761,259	20,254,809	8,204	$1,196,282	5.29	2.50	0.031
Residential	0	5,074	50,741	0	4,820	48,204	20	$3,834	1.22	1.22	0.101
Low-Income Subtotal	0	5,074	50,741	0	4,820	48,204	20	$3,834	1.22	1.22	0.101
EE and Low Income Subtotal	735	2,342,665	27,230,116	481	1,766,080	20,303,013	8,224	$1,200,116	5.25	2.50	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	735	2,342,665	27,230,116	481	1,766,080	20,303,013	8,224	$1,200,116	5.25	2.50	0.032

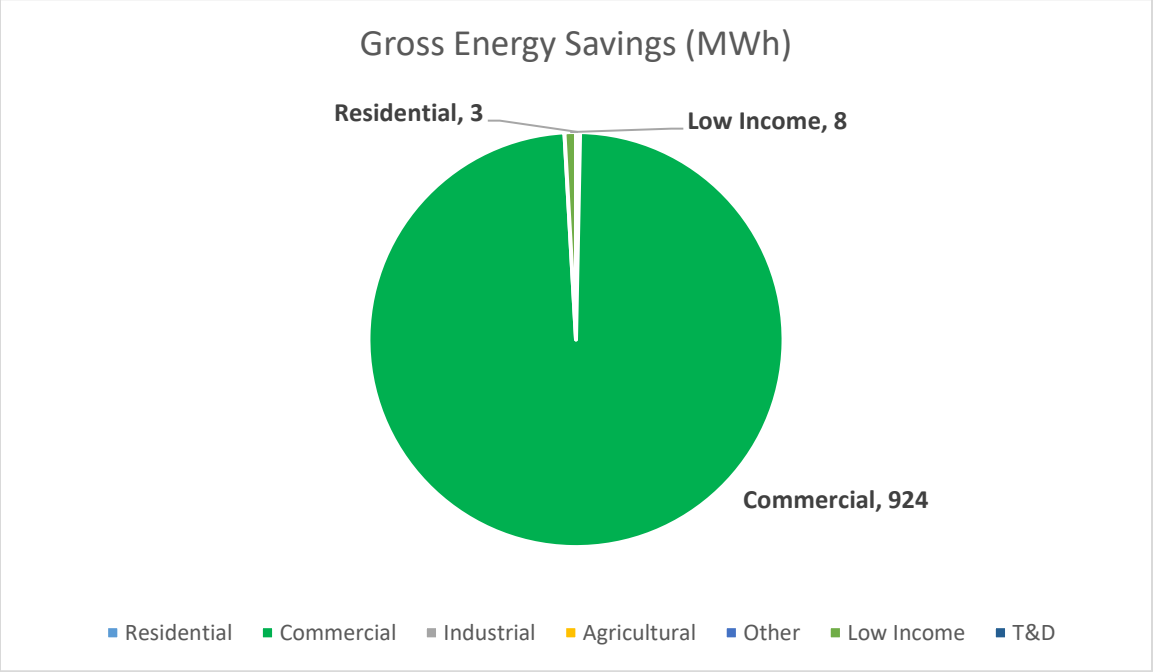
TABLE LODI-3. EE Program Results by Building Type

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	210	1,259,266	14,929,654	173	1,032,337	12,218,643	4,526	$582,330	6.42	2.20	0.019
Manufacturing Light Industrial	420	513,621	5,136,210	252	308,173	3,081,726	1,190	$14,350	40.53	25.72	0.003
Other Commercial	11	37,110	543,602	9	31,544	462,062	149	$11,195	6.02	3.94	0.022
Residential	90	473,473	5,948,362	44	353,772	4,077,154	2,180	$567,862	4.41	2.39	0.079
Residential - Single-Family	5	54,122	621,547	3	35,434	415,224	159	$20,544	0.82	0.93	0.171
EE Subtotal	735	2,337,591	27,179,375	480	1,761,259	20,254,809	8,204	$1,196,282	5.29	2.50	0.031
Residential	0	5,074	50,741	0	4,820	48,204	20	$3,834	1.22	1.22	0.101
Low-Income Subtotal	0	5,074	50,741	0	4,820	48,204	20	$3,834	1.22	1.22	0.101
EE and Low Income Subtotal	735	2,342,665	27,230,116	481	1,766,080	20,303,013	8,224	$1,200,116	5.25	2.50	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	735	2,342,665	27,230,116	481	1,766,080	20,303,013	8,224	$1,200,116	5.25	2.50	0.032

LOMPOC

Lompoc at a Glance

- Climate Zone(s): 5
- Customers: 15,027
- Total annual retail sales (MWh): 128,841
- Annual Retail Revenue: $21,553,090
- Annual EE expenditures for reporting year: $284,452
- Gross annual savings from reporting year portfolio (MWh): 935



Lompoc Overview

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

Residential customers make up 88% of the customer base, with an average electric use of 304 kWh per month. Only 12% of the retail customer connections are commercial and demand customers, where the majority of savings opportunities can be found. The City has no industrial or agricultural customers.

The demographics also have an impact on the participation rate of EE programs. The average median household income in Lompoc is $54,855 with 17.3% of the population living in poverty (2021 US Census Quick Facts). Many residential customers have limited funds or incentive to make

EE improvements to their homes, especially if they are renting. To assist these customers, the City provided programs to help low income customers make EE upgrades.

Major Program and Portfolio Changes

In FY 2020, the City offered a new program for commercial refrigeration, called the Keep Your Cool Program. The program is designed to serve small, locally owned businesses by providing upgrades to their refrigeration equipment. This program provided 34% of the annual savings for FY 2020.

Program and Portfolio Highlights

To help encourage low income customer participation in EE upgrades, the City continues to offer the Income Qualifying ENERGY STAR® Refrigerator Replacement and Recycle Program. Success of this program can be attributed to working with one local dealer who installs the new appliance and recycles the old appliance for the customer. This helps make it easier for a customer to participate and the City ensures that the old appliances is recycled properly at the City landfill.

Commercial, Industrial & Agricultural Programs

The Commercial Lighting Program provided the majority of the reported energy savings at 62%. This program had the greatest participation rate among the Commercial Programs. Several large, corporate-owned retail stores took advantage of the rebate program to retrofit to LED lighting after staff worked with store managers. The City classifies industrial and agricultural customers as commercial customers; therefore, there are no specific programs for these sectors.

Residential Programs

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

The City continues to see good participation in the ENERGY STAR® Low-Income Refrigeration Replacement and Recycle program. The City helps to purchase an appliance to replace a customer's inefficient appliance from a participating dealer. The customer must qualify for the Electric Rate Assistance Program and pay a portion of the cost back to the City over a year.

Complementary Programs

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

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

The Customer Energy Audit Program continues to be successful in meeting customers' needs. Customers can borrow a watt meter to measure the energy use of appliances and electronics. Because the City has automatic meter reading capability, staff is able to view electric daily and hourly use data which has proven to be helpful. Customers are provided reports of their electric use which can help them better understand their usage and implement staff suggestions to reduce energy use without making investments in EE upgrades.

EM&V Studies

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

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

TABLE LOM-1. 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	2,559	28,074	0	1,282	14,070	9	$3,270	0.13	0.14	1.443
Building Envelope	0	151	1,510	0	42	423	0	$46	0.13	0.13	2.274
Commercial Refrigeration	42	321,220	2,864,221	40	305,159	2,721,010	1,055	$93,868	2.13	2.13	0.053
Food Service	5	22,994	275,928	3	13,796	165,557	59	$3,136	5.17	4.58	0.023
Lighting - Indoor	15	81,622	980,040	12	65,248	783,283	269	$43,760	4.44	1.71	0.025
Lighting - Outdoor	0	497,981	5,975,562	0	398,377	4,780,411	2,288	$146,115	5.69	3.50	0.024
EE Subtotal	62	926,527	10,125,335	55	783,904	8,464,753	3,680	$290,195	3.48	2.63	0.036
Appliance & Plug Loads	1	8,316	63,763	1	5,822	44,634	18	$1,900	0.15	0.18	0.971
Low-Income Subtotal	1	8,316	63,763	1	5,822	44,634	18	$1,900	0.15	0.18	0.971
EE and Low Income Subtotal	63	934,843	10,189,098	56	789,726	8,509,387	3,698	$292,095	3.06	2.42	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	63	934,843	10,189,098	56	789,726	8,509,387	3,698	$292,095	3.06	2.42	0.041

TABLE LOM-2. 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	62	923,595	10,092,721	55	782,460	8,448,624	3,670	$286,546	3.75	2.76	0.034
Residential	0	2,932	32,614	0	1,444	16,129	10	$3,649	0.13	0.13	1.436
EE Subtotal	62	926,527	10,125,335	55	783,904	8,464,753	3,680	$290,195	3.48	2.63	0.036
Residential	1	8,316	63,763	1	5,822	44,634	18	$1,900	0.15	0.18	0.971
Low-Income Subtotal	1	8,316	63,763	1	5,822	44,634	18	$1,900	0.15	0.18	0.971
EE and Low Income Subtotal	63	934,843	10,189,098	56	789,726	8,509,387	3,698	$292,095	3.06	2.42	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	63	934,843	10,189,098	56	789,726	8,509,387	3,698	$292,095	3.06	2.42	0.041

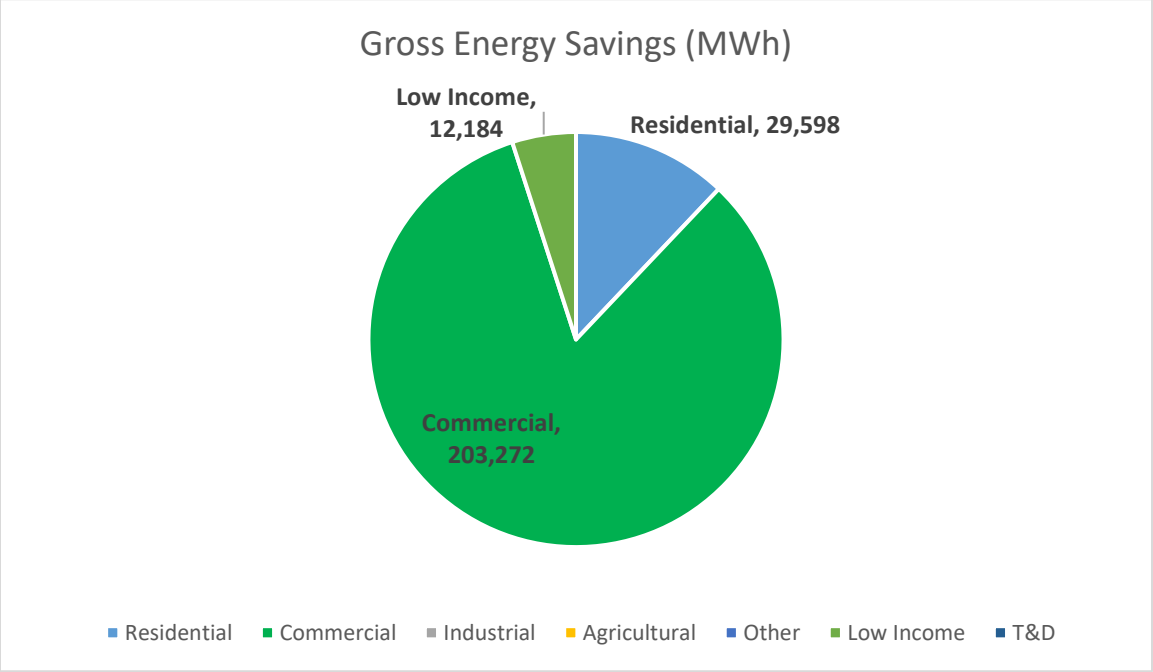
TABLE LOM-3. EE Program Results by Building Type

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	62	924,101	10,096,091	55	782,793	8,450,791	3,671	$286,703	3.73	2.75	0.034
Residential	0	1,626	18,654	0	615	7,183	7	$3,246	0.10	0.11	2.216
Residential - Single-Family	0	800	10,590	0	496	6,779	3	$246	0.18	0.18	0.810
EE Subtotal	62	926,527	10,125,335	55	783,904	8,464,753	3,680	$290,195	3.48	2.63	0.036
All	1	5,852	29,260	1	4,096	20,482	9	$1,140	0.13	0.17	1.060
Residential - Single-Family	0	2,464	34,503	0	1,725	24,152	9	$760	0.17	0.19	0.881
Low-Income Subtotal	1	8,316	63,763	1	5,822	44,634	18	$1,900	0.15	0.18	0.971
EE and Low Income Subtotal	63	934,843	10,189,098	56	789,726	8,509,387	3,698	$292,095	3.06	2.42	0.041
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	63	934,843	10,189,098	56	789,726	8,509,387	3,698	$292,095	3.06	2.42	0.041

LOS ANGELES

Los Angeles at a Glance

- Climate Zone(s): 6, 8, 9
- Customers: 1,500,000
- Total annual retail sales (MWh): 22,382,000
- Annual Retail Revenue: $4,200,000,000
- Annual EE expenditures for reporting year: $194,330,516
- Gross annual savings from reporting year portfolio (MWh): 245,053



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 (1.5 million customer accounts) in four different climate zones: CZ6, CZ8, CZ9, and CZ16. A peak demand of 5,678 MW was registered on September 4, 2019.

Major Program and Portfolio Changes

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

Program and Portfolio Highlights

Efficient Product Marketplace (EPM):

The Efficient Product Marketplace (EPM) now offers a point of sale credit option to customers, eliminating the need for completing a rebate application. Another new component of the EPM provides customers with the ability to customize a solar system for their home and compare and choose offers from a list of local third-party vendors.

Food Service Program

The Point-of-Sale (POS) component is complementary to the Food Service Program. It enables non-residential customers to receive an instant rebate as a line item discount directly on their sales invoice for eligible equipment. It influences commercial food service vendors to stock and sell energy-efficient equipment.

Custom Performance Program (CPP):

While COVID-19 restrictions impacted everyday life, LA's building operators and maintenance workers remained on the frontlines to ensure their facilities' safe and efficient operation. In support of their efforts, LADWP's Custom Performance Program adjusted its operations. It worked with its engineering services providers to develop new remote verification processes to enable the program to continue the vital work of processing rebate applications and payments during the pandemic without interruption.

As businesses struggled with funding, continued payment of incentives, such as CPP's, was even more critical as companies fought to survive. LADWP's Custom Performance Program is proud to support its commercial, industrial, and institutional customers during this difficult time.

External Studies:

LADWP has contributed to several research studies as it relates to Building Electrification, including the following:

- New Buildings Institute's Building Electrification Technology Roadmap (BETR)[32]
- E3's Residential Building Electrification in California[33]

LADWP is also partnered with 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

[32] See: https://newbuildings.org/resource/building-electrification-technology-roadmap/

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

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

provide more accurate potential studies and develop a pipeline of new technology assessments to determine the appropriate intervention required to get maximum benefits. The goal is to quantify achievable contributions towards goals set by state and local energy policies for the lowest cost.

Commercial, Industrial & Agricultural Programs

City Plants:
The City Plants (CP) Program provides free shade trees for residents and property owners in Los Angeles to promote tree planting to improve the city's tree canopy, air quality, stormwater retention, and, importantly, building EE. This program is operated by the City Plants team under the city's Board of Public Works and supported by LADWP.

Through this partnership, City Plants can provide free shade trees for residents and property owners and information on where to plant the trees for maximum EE benefits. City Plants currently focuses on delivering trees to residential and commercial 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 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 kilowatts (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 kilo-watts (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 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, retro commissioning, 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. ESAP offers efficiency measures for the individual residential units. (Res Comprehensive).

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

LADWP Facilities:
The LADWP Facilities Upgrade Program strives to improve EE throughout LADWP's facilities with EE upgrades in lighting. It identifies and assists those LADWP facilities in reducing energy and water usage, which will result in a reduction in energy procurement expense for LADWP that LADWP customers would otherwise bear. (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 (SBD):
The Savings by Design (SBD) Program is a California statewide non-residential new construction program in which LADWP partners with SoCal Gas to offer a uniform, multi-faceted program designed to serve the needs of the commercial building community consistently. SBD encourages energy-efficient building design and construction practices, promoting the efficient use of energy by offering up-front design assistance, owner incentives, design team incentives, and energy design resources. (Non-Res Comprehensive)
The LADWP and SoCal Gas have also partnered together in the statewide Savings by Design (SBD) non-residential new construction incentive program. SBD encourages energy-efficient building design and construction practices and promotes EE by offering up-front design assistance, owner and design team incentives, and energy design resources. Developers may receive owner incentives to help offset the cost of building more efficiently, while Design Team incentives are also available to encourage designers to reach more aggressive energy savings goals. (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 participates through its partnership with the Southern California Gas Company. CAHP incentivizes builders and designers to create environmentally-friendly, energy-efficient communities for potential home buyers. CAHP is available to single and multi-family residential new construction projects and helps builders prepare for future code changes by encouraging them to build homes that exceed code, ultimately driving new homes to Zero Net Energy (ZNE). (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, HEIP's priority is to serve the neediest customers. (Res Shell, Res Lighting)

Home Energy Upgrade California:
The Home Energy Upgrade Program is a collaborative effort in which LADWP partners with SoCal Gas to deliver a whole house residential retrofit EE program. The HU Program offers incentives to homeowners who complete selected energy-saving home improvements on single-family residences or -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 (REP) / Window AC:
The Refrigerator Exchange Program (REP) is a free refrigerator replacement program designed to target customers that qualify on either LADWP's Low-Income or its Senior Citizen/Disability Lifeline Rates as well as Multi-Residential or Non-Profit customers. The program was expanded to include the following entities, multi-family, or mobile home communities, civic, community, faith-based organizations, and educational institutions. This Program leverages a 3rd-party contractor, ARCA, to administer the program's delivery and provide energy-efficient refrigerators for this customer segment to replace older, inefficient, but operational models. Additionally, customers can pair the REP with the Window AC 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 $50 rebate, along with free pick-up, to residential customers to turn-in old refrigerators and freezers for recycling. Eligible units must be fully operational and satisfy certain age and size requirements. LADWP leverages 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. Plans for other campaigns are being 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 (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.

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 EPRI.

EV Charger Rebate Program:
LADWP introduced the EV Charger Rebate Program, "Charge Up L.A.!" to encourage the installation of convenient EV charging stations at residential and commercial locations to support the purchase and use of EVs. This program benefits the environment and helps EV users save on fuel costs at the same time. The rebate is offered to qualifying commercial customers who purchase and install Level 2 (240-volt) chargers at their 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 kilowatt-hour (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 NTE 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.

The new round of LADWP EM&V activities started Q2 of 2020 in retrospective and concurrent timeframes for impact evaluations and concurrent only for process evaluations. This evaluation will review past impact savings from FY15/16 thru 19/20 while simultaneously reviewing impact savings as it occurs, from FY 2021 thru FY 2023. The process evaluation portion of the scope will only review the concurrent period.

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. Moving forward, LADWP will be tasking its third-party EM&V consultants to evaluate the EE market impacts of all the combined efforts of the City of Los Angeles (inclusive of LADWP's efficiency programs). 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 are set to be delivered by June of 2021. With comprehensive final results and report provided by May of 2023.[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 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.

[35] LADWP will publish all past and future reports on the LADWP Website: https://www.ladwp.com/cs/idcplg?IdcService=GET_FILE&dDocName=OPLADWPCCB436019&RevisionSelectionMethod=LatestReleased

TABLE LADWP-1. 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	23	110,300	1,535,789	23	110,300	1,535,789	79	$3,759,824	0.39	0.02	0.176
Building Envelope	12,156	10,383,057	135,115,975	12,156	10,383,057	135,115,975	7,326	$37,644,301	0.92	0.55	0.262
Commercial Refrigeration	263	2,056,850	23,473,388	263	2,056,850	23,473,388	1,146	$1,193,138	1.67	0.66	0.033
Food Service	1,353	5,288,151	53,464,948	1,353	5,288,151	53,464,948	3,120	$88,900	2.02	2.2	0.038
HVAC - Cooling	18,573	38,861,261	597,059,523	18,573	38,861,261	597,059,523	25,802	$96,396,637	1.63	0.42	0.069
HVAC - Heat Pump	18	19,928	297,896	18	19,928	297,896	16	$21,516	1.74	1.25	0.112
HVAC - Heating	0	255,606	6,015,983	0	255,606	6,015,983	269	$405,990	2.24	0.28	0.016
Lighting - Indoor	20,413	140,193,601	1,406,808,186	20,413	140,193,601	1,406,808,186	71,403	$95,316,245	0.56	0.46	0.094
Lighting - Outdoor	635	6,885,788	55,013,952	635	6,885,788	55,013,952	3,943	$3,718,160	1.51	0.58	0.036
Miscellaneous	769	5,540,144	66,603,968	769	5,540,144	66,603,968	3,464	$3,990,052	0.71	0.59	0.081
Process	733	6,063,686	57,581,296	733	6,063,686	57,581,296	2,788	$2,152,083	1.92	0.82	0.026
Service & Domestic Hot Water	-4	-29,494	-442,203	-4	-29,494	-442,203	-19	($11,175)	1.44	1.44	0.037
Water Pumping / Irrigation	2,610	17,240,353	39,697,054	2,610	17,240,353	39,697,054	2,343	$350,216	7.72	3.81	0.007
Energy Efficiency Subtotal	57,540	232,869,232	2,442,225,756	57,540	232,869,232	2,442,225,756	121,679	$245,025,886	0.85	0.48	0.091
Appliance & Plug Loads	50	259,938	2,856,872	50	259,938	2,856,872	160	$170,588	0.72	0.72	0.09
BROs	2	7,636	152,599	2	7,636	152,599	7	$274	0.27	0.27	0.277
Building Envelope	1,084	904,395	15,485,648	1,084	904,395	15,485,648	1,848	$3,943,825	0.37	0.36	0.679
Codes & Standards	0	0	0	0	0	0	0	$36,723			0
Food Service	1,181	4,475,788	44,743,058	1,181	4,475,788	44,743,058	2,641	$3,376,764	0.32	0.32	0.244
HVAC - Cooling	72	59,759	564,192	72	59,759	564,192	35	$56,635	0.24	0.24	1.059
HVAC - Heating	0	0	0	0	0	0	0	$8,363			0
Lighting - Indoor	616	4,630,719	44,651,829	616	4,630,719	44,651,829	2,670	$293,778	0.47	0.47	0.118
Lighting - Outdoor	233	1,749,939	13,987,149	233	1,749,939	13,987,149	884	$309,040	1.52	1.52	0.036
Miscellaneous	0	0	0	0	0	0	1,381	$488,109	0.49	0.3	0
Service & Domestic Hot Water	0	2,660	2,451	0	2,660	2,451	0	$1,735	0.04	0.04	0.897
Water Pumping / Irrigation	21	93,242	881,605	21	93,242	881,605	51	$207,741	0.13	0.13	0.57
Low-Income Subtotal	3,259	12,184,077	123,325,403	3,259	12,184,077	123,325,403	9,678	$8,893,574	0.39	0.38	0.225
EE and Low Income Subtotal	60,799	245,053,309	2,565,551,159	60,799	245,053,309	2,565,551,159	131,357	$253,919,460	0.79	0.47	0.097
All	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
Codes & Standards Subtotal	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
C&S, T&D and Electrification Subtotal	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
Utility Total	90,785	443,936,201	6,540,973,265	90,785	443,936,201	6,540,973,265	294,329	$253,919,460	1.49	0.9	0.045

TABLE LADWP-2. 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	33,511	203,271,538	2,067,083,799	33,511	203,271,538	2,067,083,799	101,483	$193,940,543	0.73	0.39	0.080
Residential	24,029	29,597,694	375,141,957	24,029	29,597,694	375,141,957	20,196	$51,085,343	1.21	0.80	0.151
EE Subtotal	57,540	232,869,232	2,442,225,756	57,540	232,869,232	2,442,225,756	121,679	$245,025,886	0.85	0.48	0.091
Residential	3,259	12,184,077	123,325,403	3,259	12,184,077	123,325,403	9,678	$8,893,574	0.39	0.38	0.225
Low-Income Subtotal	3,259	12,184,077	123,325,403	3,259	12,184,077	123,325,403	9,678	$8,893,574	0.39	0.38	0.225
EE and Low Income Subtotal	60,799	245,053,309	2,565,551,159	60,799	245,053,309	2,565,551,159	131,357	$253,919,460	0.79	0.47	0.097
Commercial	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
Codes & Standards Subtotal	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
C&S, T&D and Electrification Subtotal	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
Utility Total	90,785	443,936,201	6,540,973,265	90,785	443,936,201	6,540,973,265	294,329	$253,919,460	1.49	0.90	0.045

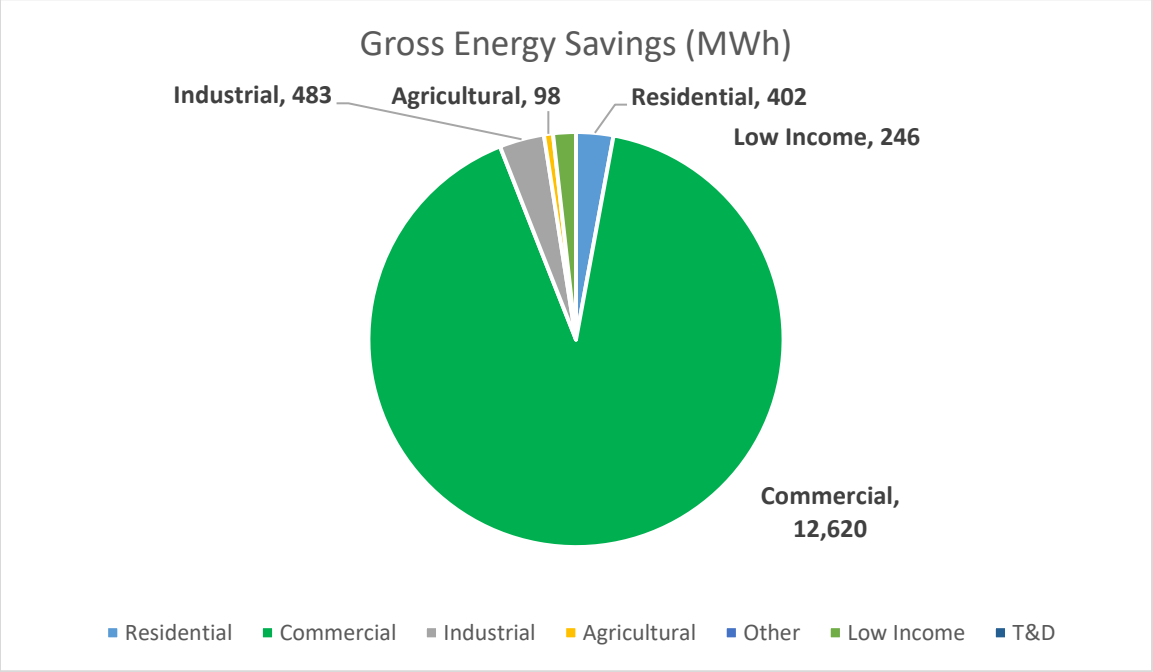
TABLE LADWP-3. EE Program Results by Building Type

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	11,537	78,518,809	651,339,467	11,537	78,518,809	651,339,467	33,395	$26,824,857	1.30	0.79	0.041
Assembly	1,107	7,592,166	75,382,049	1,107	7,592,166	75,382,049	3,829	$4,525,469	0.53	0.51	0.100
Education - Community College	28	147,252	1,841,603	28	147,252	1,841,603	90	$153,242	0.85	0.47	0.075
Education - Primary School	23	160,637	1,299,110	23	160,637	1,299,110	61	$223,569	0.39	0.21	0.127
Education - Secondary School	2,743	14,909,952	145,525,237	2,743	14,909,952	145,525,237	6,701	$28,502,806	0.20	0.18	0.287
Education - University	417	1,753,646	16,273,723	417	1,753,646	16,273,723	816	$1,831,221	1.13	0.41	0.062
Grocery	99	731,371	4,808,071	99	731,371	4,808,071	269	$778,653	0.67	0.24	0.078
Health/Medical - Hospital	833	5,637,629	61,090,752	833	5,637,629	61,090,752	3,161	$3,064,133	0.75	0.62	0.076
Health/Medical - Nursing Home	51	391,946	3,916,713	51	391,946	3,916,713	212	$100,274	0.89	0.89	0.060
Lodging - Hotel	26	163,021	1,628,485	26	163,021	1,628,485	87	$38,670	0.97	0.97	0.060
Manufacturing Light Industrial	192	1,625,913	24,203,875	192	1,625,913	24,203,875	1,096	$362,992	2.56	1.58	0.021
Office - Large	1,308	5,275,441	75,979,730	1,308	5,275,441	75,979,730	3,172	$72,123,129	1.81	0.05	0.042
Office - Small	2,191	16,166,705	161,543,358	2,191	16,166,705	161,543,358	8,316	$10,299,146	0.48	0.48	0.108
Other Commercial	3,703	15,196,339	216,948,747	3,703	15,196,339	216,948,747	8,828	$9,720,763	0.94	0.77	0.076
Other Industrial	6,000	34,704,576	412,784,853	6,000	34,704,576	412,784,853	20,816	$23,834,244	1.01	0.63	0.063
Residential	6	5,256	78,687	6	5,256	78,687	4	$60,994	0.10	0.10	2.167
Residential - Multi-Family	4,600	8,627,202	99,437,357	4,600	8,627,202	99,437,357	5,554	$3,165,472	2.98	2.03	0.046
Residential - Single-Family	19,424	20,965,235	275,625,912	19,424	20,965,235	275,625,912	14,638	$47,858,877	1.05	0.69	0.190
Restaurant - Fast-Food	22	131,271	1,160,165	22	131,271	1,160,165	61	$148,622	0.89	0.31	0.062
Restaurant - Sit-Down	402	2,403,528	24,010,025	402	2,403,528	24,010,025	1,233	$1,186,772	0.61	0.61	0.092
Retail - Large	211	543,428	9,926,662	211	543,428	9,926,662	373	$1,333,783	2.45	0.37	0.035
Retail - Small	2,258	14,224,928	142,138,868	2,258	14,224,928	142,138,868	7,235	$7,439,540	0.57	0.57	0.095
Storage - Conditioned	21	179,285	1,433,630	21	179,285	1,433,630	83	$62,616	1.01	0.77	0.049
Storage - Unconditioned	167	1,481,423	14,804,391	167	1,481,423	14,804,391	758	$972,627	0.44	0.44	0.109
Warehouse - Refrigerated	171	1,332,274	19,044,285	171	1,332,274	19,044,285	891	$413,418	2.17	1.29	0.026
EE Subtotal	57,540	232,869,232	2,442,225,756	57,540	232,869,232	2,442,225,756	121,679	$245,025,886	0.85	0.48	0.091
Residential - Multi-Family	1,905	9,213,593	83,859,368	1,905	9,213,593	83,859,368	7,557	$4,723,793	0.50	0.48	0.148
Residential - Single-Family	1,354	2,970,484	39,466,035	1,354	2,970,484	39,466,035	2,121	$4,169,780	0.29	0.29	0.409
Low-Income Subtotal	3,259	12,184,077	123,325,403	3,259	12,184,077	123,325,403	9,678	$8,893,574	0.39	0.38	0.225
EE and Low Income Subtotal	60,799	245,053,309	2,565,551,159	60,799	245,053,309	2,565,551,159	131,357	$253,919,460	0.79	0.47	0.097
All	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
Codes & Standards Subtotal	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
C&S, T&D and Electrification Subtotal	29,986	198,882,892	3,975,422,106	29,986	198,882,892	3,975,422,106	162,971	$0	14.83	14.83	0.004
Utility Total	90,785	443,936,201	6,540,973,265	90,785	443,936,201	6,540,973,265	294,329	$253,919,460	1.49	0.90	0.045

MODESTO

Modesto at a Glance

- Climate Zone(s): 12
- Customers: 131,601
- Total annual retail sales (MWh): 2,588,109
- Annual Retail Revenue: $372,045,466
- Annual EE expenditures for reporting year: $2,688,704
- Gross annual savings from reporting year portfolio (MWh): 13,848



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 2020 annual retail electric sales by customer class are: 38.3% residential, 25.9% commercial, 30.5% industrial, 4.2% agricultural and pumping, 1.1% other. For 2020 load growth was 5.83% (based on Total System Input GWH) and the 10-year system peak of 697 MW occurred in 2017.

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

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

Program and Portfolio Highlights

MID continued to promote low to moderate income EE programs by providing staff presentations on EE to non-profit agencies and low-income advocacy groups in our area in 2020. Social media promotions have improved the customer awareness of MID programs.

Commercial, Industrial & Agricultural Programs

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

Residential Programs

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

Complementary Programs

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

New Energy Saving and Carbon Reduction Programs: MID added two new programs to our EE portfolio for 2020. The first was a Touchless Lavatory Faucets Rebate and the second was a Residential Induction Cooktop / Range Rebate. The Touchless Lavatory Faucets Pilot Program was an attempt to identify potential embedded energy savings through conservation of municipal water supplies while simultaneously delivering a rebate to assist small businesses to follow CDC safe handwashing guidelines during the pandemic.

Renewable Energy Programs: MID's renewable energy programs are conducted in accord with legislative and regulatory mandates, such as the Renewable Portfolio Standard (RPS) and the

California Solar Initiative (CSI/SB1). To date, MID has procured enough renewable energy to satisfy the renewable energy trajectory that was established by the CEC through 2024. MID continues to work toward meeting the remaining targets through 2030.

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

EVs: In 2019 MID launched an EV Charger rebate program. Qualified Level 2 residential and commercial chargers received a $500 rebate per unit. Demand for the program was brisk as the adoption of EV's are growing in the MID service territory. MID hopes to expand the program to DC Quick-Charging in 2020 with greater incentives.

Energy Storage: In 2014, the MID board of directors adopted a policy determining that energy storage targets are not appropriate for MID, and subsequently adopted a policy update confirming the original determination that energy storage targets are not appropriate for MID. Although mandatory energy storage targets have not been adopted, the district's ongoing efforts to evaluate the benefits of energy storage have resulted in the inclusion of 10 Megawatts of energy storage capacity with the most recent renewable energy procurement.

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 2020, Power Services, Inc. (CMVP qualified) performed M&V on selected projects. Due to COVID-19 and safety issues Anchor Blue Consulting was unable to conducted M&V on the 2019 EE portfolio. This will take place along with the 2020 M&V.

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

None.

TABLE MID-1. 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	2,460	17,220	0	1,968	13,776	5	$1,950	2.94	0.83	0.042
Appliance & Plug Loads	39	157,626	1,482,032	24	98,069	916,483	360	$137,275	1.90	1.03	0.094
Building Envelope	69	90,011	1,487,802	38	49,508	818,325	404	$401,812	2.87	0.80	0.132
HVAC - Cooling	123	168,595	2,383,714	101	138,365	1,946,130	1,269	$408,294	1.54	1.18	0.240
HVAC - Heating	0	11,206,288	89,650,304	0	8,965,030	71,720,243	30,923	$4,604,827	3.91	1.15	0.022
Lighting - Indoor	240	1,597,609	20,277,800	203	1,352,106	17,332,516	6,252	$948,464	4.19	1.81	0.035
Lighting - Outdoor	29	373,781	4,485,372	23	299,025	3,588,298	1,669	$137,028	4.69	2.38	0.031
Service & Domestic Hot Water	1	6,098	91,470	1	5,793	86,897	31	$1,810	4.11	3.11	0.037
EE Subtotal	501	13,602,468	119,875,714	390	10,909,864	96,422,667	40,914	$6,641,460	3.55	1.28	0.030
Appliance & Plug Loads	8	31,840	573,120	8	31,840	573,120	209	$48,487	1.20	1.20	0.174
Building Envelope	1	5,035	50,081	1	5,035	50,081	20	$6,163	0.78	0.82	0.199
HVAC - Cooling	25	33,130	196,422	25	33,130	196,422	106	$49,032	0.99	0.99	0.381
Lighting - Indoor	22	172,171	1,242,655	22	172,171	1,242,655	527	$92,130	1.15	1.15	0.122
Miscellaneous	0	3,432	43,343	0	3,432	43,343	17	$3,013	1.18	1.18	0.130
Service & Domestic Hot Water	0	67	670	0	67	670	0	$35	1.36	1.36	0.097
Low-Income Subtotal	56	245,675	2,106,291	56	245,675	2,106,291	879	$198,860	1.12	1.12	0.162
EE and Low Income Subtotal	557	13,848,143	121,982,005	446	11,155,539	98,528,959	41,793	$6,840,320	3.30	1.27	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	557	13,848,143	121,982,005	446	11,155,539	98,528,959	41,793	$6,840,320	3.30	1.27	0.032

TABLE MID-2. 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	15	97,675	1,172,100	12	78,140	937,680	341	$50,403	4.67	1.87	0.031
Commercial	186	12,619,822	107,711,818	160	10,170,244	87,284,556	36,915	$5,274,402	3.96	1.31	0.024
Industrial	79	483,160	5,847,651	63	386,528	4,678,121	1,684	$399,670	4.46	1.33	0.033
Residential	221	401,811	5,144,145	155	274,952	3,522,310	1,974	$916,986	1.78	1.04	0.182
EE Subtotal	501	13,602,468	119,875,714	390	10,909,864	96,422,667	40,914	$6,641,460	3.55	1.28	0.030
Residential	56	245,675	2,106,291	56	245,675	2,106,291	879	$198,860	1.12	1.12	0.162
Low-Income Subtotal	56	245,675	2,106,291	56	245,675	2,106,291	879	$198,860	1.12	1.12	0.162
EE and Low Income Subtotal	557	13,848,143	121,982,005	446	11,155,539	98,528,959	41,793	$6,840,320	3.30	1.27	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	557	13,848,143	121,982,005	446	11,155,539	98,528,959	41,793	$6,840,320	3.30	1.27	0.032

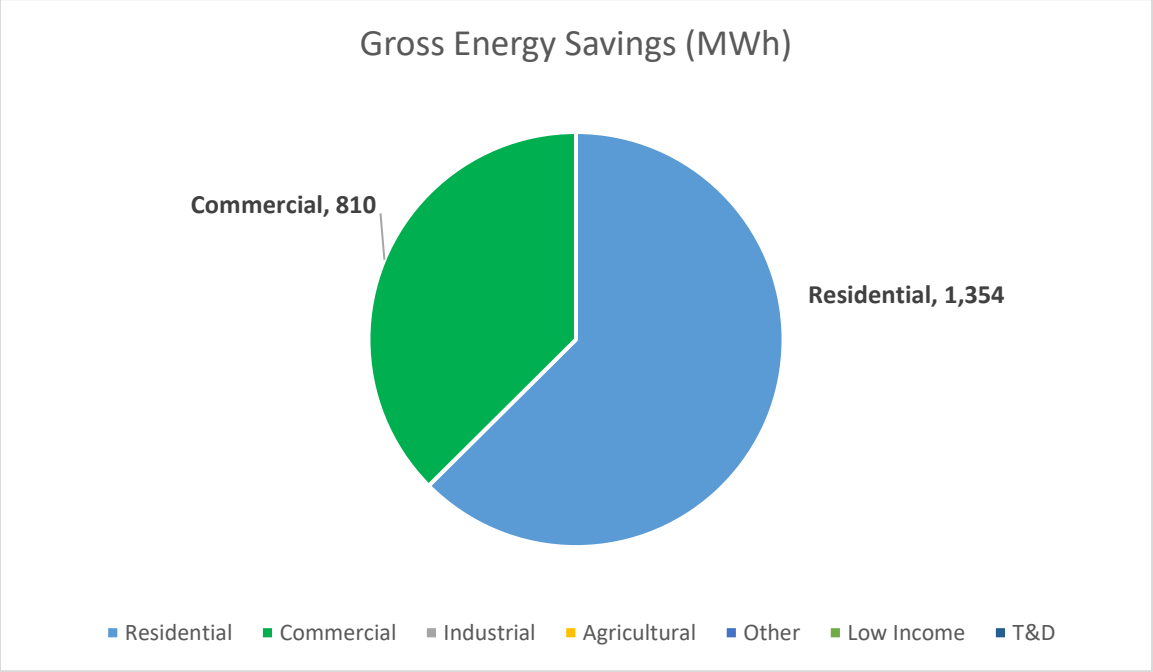
TABLE MID-3. EE Program Results by Building Type

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	276	13,204,448	114,580,710	232	10,635,908	92,769,890	38,912	$5,703,419	3.99	1.31	0.025
Residential	90	128,032	1,885,755	73	103,632	1,525,821	739	$284,969	1.30	1.18	0.266
Residential - Multi-Family	0	67	805	0	40	513	0	$775	0.93	0.21	0.383
Residential - Single-Family	125	253,345	3,159,789	79	157,023	1,927,520	1,207	$627,342	2.69	0.94	0.117
Retail - Big Box	9	16,577	248,655	7	13,262	198,924	57	$24,956	2.66	1.19	0.077
EE Subtotal	501	13,602,468	119,875,714	390	10,909,864	96,422,667	40,914	$6,641,460	3.55	1.28	0.030
Residential	23	174,793	1,274,797	23	174,793	1,274,797	542	$99,913	1.13	1.13	0.128
Residential - Mobile Home	23	32,901	205,420	23	32,901	205,420	103	$44,685	1.00	1.00	0.341
Residential - Multi-Family	1	3,485	57,271	1	3,485	57,271	21	$5,106	1.12	1.18	0.188
Residential - Single-Family	9	34,495	568,804	9	34,495	568,804	212	$49,155	1.19	1.19	0.173
Low-Income Subtotal	56	245,675	2,106,291	56	245,675	2,106,291	879	$198,860	1.12	1.12	0.162
EE and Low Income Subtotal	557	13,848,143	121,982,005	446	11,155,539	98,528,959	41,793	$6,840,320	3.30	1.27	0.032
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	557	13,848,143	121,982,005	446	11,155,539	98,528,959	41,793	$6,840,320	3.30	1.27	0.032

MORENO VALLEY

Moreno Valley at a Glance

- Climate Zone(s): 10
- Customers: 6,911
- Total annual retail sales (MWh): 195,674,067
- Annual Retail Revenue: $31,483,358
- Annual EE expenditures for reporting year: $445,352
- Gross annual savings from reporting year portfolio (MWh): 2,165



Moreno Valley Overview

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

Although MVU met its SB 1 goals in 2012 and ended solar rebates in 2016 both residents and businesses continue to express interest in solar. Local solar installers continue to engage MVU customers to install new solar, often maximizing the system size without offering cost-effective EE as a viable option per the state's loading order. MVU processed over 250 new solar interconnections and connected more than 1.2 megawatts of residential solar during this reporting period. MVU is also seeing customers express an interest in pairing battery storage with solar.

MVU experienced a decline in EE projects from its' largest customers due to the pandemic. The direct install program was placed on hold at the beginning of the pandemic but was able to resume in time to help MVU make its energy savings goal.

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 SB 350.

Program and Portfolio Highlights

MVU's highly-successful residential direct installation program was the main source of energy savings this reporting year. 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 Heating, Ventilation and Air Conditioning (HVAC) Retrofits – customers that install new high SEER HVAC units or replace older inefficient units can participate in this rebate program. The installation of new chillers that exceed Title 24 requirements or load-shifting Thermal Energy Storage (TES) systems may also qualify for rebates.

Motor Replacements – commercial customers that install premium efficiency motors are eligible for rebates under this program. Motors covered under this program must be new, three-phase induction motors (1hp to 200hp in size) and operate for at least 2,000 hours per year.

New Construction and Major Tenant Renovation – this program offers incentives for projects exceeding Title 24 by at least ten percent. Eligible customers are responsible for providing documentation of energy savings using energy modeling software and all calculations must be signed by a licensed mechanical engineer.

Outreach Programs – the utility contracts with Automated Energy to provide the largest commercial customers with detailed energy usage information to help efficiently manage their energy consumption and evaluate potential 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.

ENERGY STAR® Appliance Rebates – customers who purchase ENERGY STAR® Qualified appliances can apply for a fixed rebate amount under this program.

Weatherization – rebates are available for energy efficient windows, doors, attic insulation, and high SEER air conditioning and heat pumps.

Building Electrification - MVU offers rebates for electric heat pump water heaters for those customers who want to remove their natural gas appliances.

Complementary Programs

Low-Income Programs: MVU's Energy Bill Assistance Program provides income qualified residents with a 12% or 20% discount on monthly energy charges; this year's expenditures were over $120,000.

COVID-19 Assistance Program: this temporary program was created to provide relief to customers affected by the pandemic.

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 (EVs): MVU is experiencing increased interest and activity both for workplace charging and home charging. As one of the utility's Strategic Goals, MVU selected Alternative Energy Systems Consulting (AESC) to help develop a TE Roadmap and it has been completed. MVU has budgeted for the installation of additional EV charging stations at its Annex location across from City Hall. Construction began in November 2020 and is nearly complete.

Energy Storage: A few Tesla Powerwalls have been installed with solar at residential homes and other storage systems are being proposed. In the future MVU expects greater interest and activity in solar plus battery installations as prices move toward TOU.

Educational Program: MVU has contracted with Franklin Energy, formerly ResourceAction, in partnership with SoCal Gas to provide teachers, students, and their families a school-based EE program.

EM&V Studies

Engineering analysis programs such as DOE-2 are the basis for calculated energy savings and incentive calculations. 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 (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 CEC.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

None

TABLE MVU-1. 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	1,329,689	13,296,890	0	1,196,720	11,967,201	4,727	$355,518	3.76	3.76	0.038
Appliance & Plug Loads	0	2,940	37,498	0	1,680	22,117	8	$1,965	2.18	1.89	0.069
Lighting - Indoor	177	810,475	8,104,750	159	729,428	7,294,275	2,669	$52,024	11.96	11.96	0.010
Miscellaneous	0	21,661	216,610	0	19,495	194,949	78	$0	3.95	26.02	0.031
EE Subtotal	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028
EE and Low Income Subtotal	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028

TABLE MVU-2. 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	177	810,475	8,104,750	159	729,428	7,294,275	2,669	$52,024	11.96	11.96	0.010
Residential	0	1,354,290	13,550,998	0	1,217,895	12,184,267	4,813	$357,483	3.76	3.80	0.038
EE Subtotal	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028
EE and Low Income Subtotal	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028

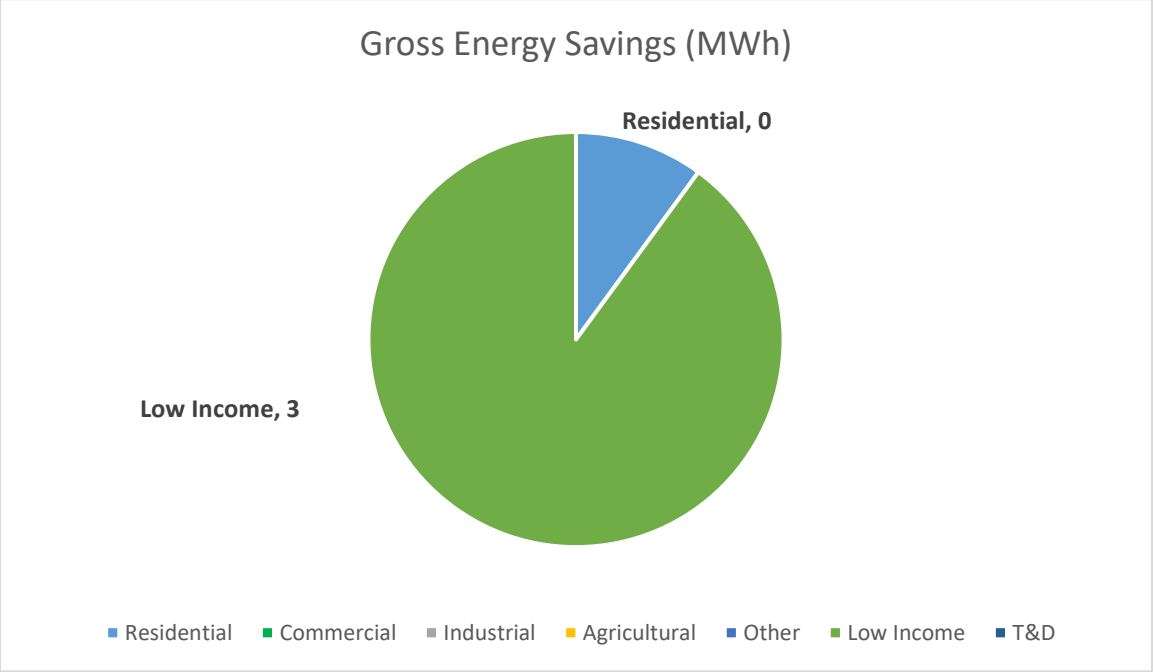
TABLE MVU-3. EE Program Results by Building Type

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	232	2,320	0	139	1,392	1	$40	1.16	2.01	0.124
Other Commercial	177	810,475	8,104,750	159	729,428	7,294,275	2,669	$52,024	11.96	11.96	0.010
Residential	0	1,352,259	13,523,499	0	1,216,497	12,165,250	4,806	$357,003	3.76	3.80	0.038
Residential - Single-Family	0	1,799	25,179	0	1,259	17,625	7	$440	3.51	4.05	0.043
EE Subtotal	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028
EE and Low Income Subtotal	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	177	2,164,765	21,655,748	159	1,947,322	19,478,542	7,482	$409,507	4.92	4.97	0.028

NEEDLES

Needles at a Glance

- Climate Zone(s): 14
- Customers:
- Total annual retail sales (MWh):
- Annual Retail Revenue:
- Annual EE expenditures for reporting year: $3,048
- Gross annual savings from reporting year portfolio (MWh): 4



Needles Overview

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

Major Program and Portfolio Changes

Program and Portfolio Highlights

Commercial, Industrial & Agricultural Programs

Residential Programs

The City funds the low income residential program and provides the following services; AC, evaporated cooler with SEER 15 or higher, Sun Shade Program, and ENERGY STAR® Qualified Appliances (Qualified Appliances are; Dishwashers, Clothes Washers, Refrigerators and Freezers).

Complementary Programs

EM&V Studies

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE NDL-1. 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	378	4,158	0	117	1,289	0	$554	0.05	0.07	2.918
EE Subtotal	0	378	4,158	0	117	1,289	0	$554	0.05	0.07	2.918
Appliance & Plug Loads	0	1,027	14,375	0	719	10,062	4	$240	0.15	0.44	0.984
HVAC - Cooling	1	2,356	35,340	1	2,356	35,340	14	$2,873	0.08	1.62	4.315
Low-Income Subtotal	1	3,383	49,715	1	3,075	45,402	18	$3,113	0.08	1.24	3.565
EE and Low Income Subtotal	1	3,761	53,873	1	3,192	46,691	19	$3,667	0.08	0.99	3.546
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	3,761	53,873	1	3,192	46,691	19	$3,667	0.08	0.99	3.546

TABLE NDL-2. EE Program Results by Sector

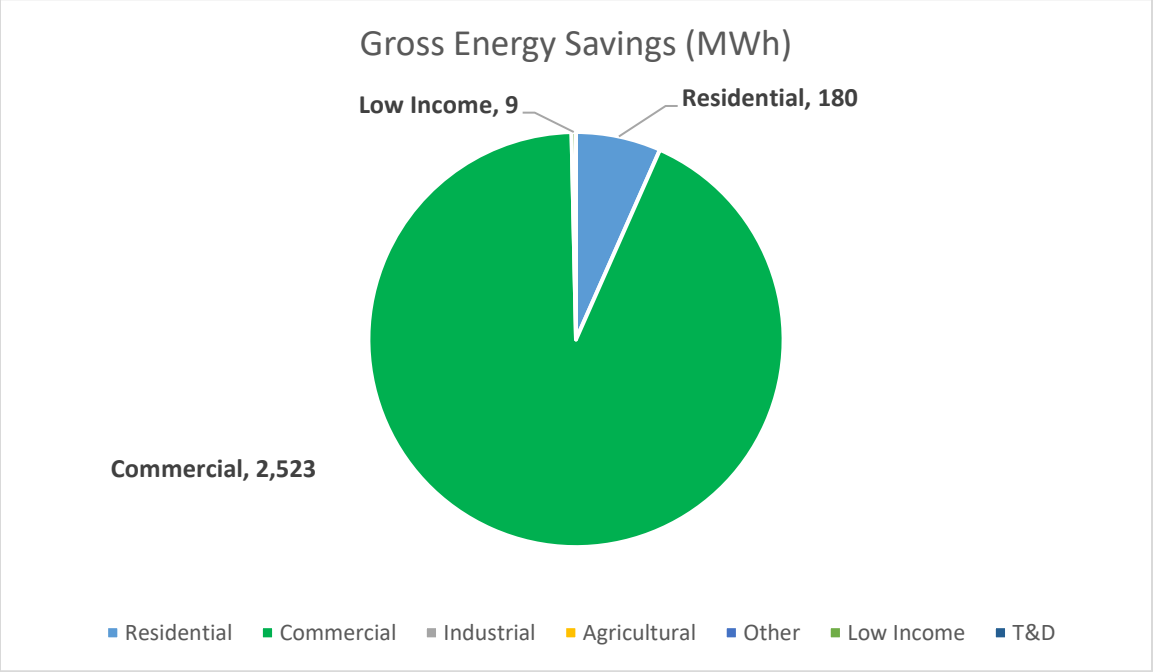
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Residential	0	378	4,158	0	117	1,289	0	$554	0.05	0.07	2.918
EE Subtotal	0	378	4,158	0	117	1,289	0	$554	0.05	0.07	2.918
Residential	1	3,383	49,715	1	3,075	45,402	18	$3,113	0.08	1.24	3.565
Low-Income Subtotal	1	3,383	49,715	1	3,075	45,402	18	$3,113	0.08	1.24	3.565
EE and Low Income Subtotal	1	3,761	53,873	1	3,192	46,691	19	$3,667	0.08	0.99	3.546
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	3,761	53,873	1	3,192	46,691	19	$3,667	0.08	0.99	3.546

TABLE NDL-3. 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)**
Residential	0	378	4,158	0	117	1,289	0	$554	0.05	0.07	2.918
EE Subtotal	0	378	4,158	0	117	1,289	0	$554	0.05	0.07	2.918
Residential	1	2,356	35,340	1	2,356	35,340	14	$2,873	0.08	1.62	4.315
Residential - Single-Family	0	1,027	14,375	0	719	10,062	4	$240	0.15	0.44	0.984
Low-Income Subtotal	1	3,383	49,715	1	3,075	45,402	18	$3,113	0.08	1.24	3.565
EE and Low Income Subtotal	1	3,761	53,873	1	3,192	46,691	19	$3,667	0.08	0.99	3.546
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	3,761	53,873	1	3,192	46,691	19	$3,667	0.08	0.99	3.546

Palo Alto at a Glance

- Climate Zone(s): 4
- Customers: 25,684
- Total annual retail sales (MWh): 854,760
- Annual Retail Revenue: $135,962,139
- Annual EE expenditures for reporting year: $1,207,819
- Gross annual savings from reporting year portfolio (MWh): 2,712



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 2020 CPAU continued purchasing carbon offsets for its complete natural gas

portfolio and is currently supplying all customers with carbon neutral gas. Palo Alto continued investment into electrification and decarbonization by expanding services around EV charging and heat pump water heaters. FY 2020 is the third 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 0.27% verse its goal of 0.80%. There are many factors that contributed to the decline in savings and below-target achievements, including the suspension of many residential customer in-home services as well as programs such as the Small Medium Business program as a result Covid-19. In addition, there have been delays with launching Home Energy and Water reports due to a combination of vendor challenges and internal staffing constraints.

Major Program and Portfolio Changes

In FY 2020 CPAU continued efforts on building electrification efforts and increasing supply equipment for EV chargers while preparing to implement 3 new programs in 2021 including a small and medium business customer program, residential home energy reports, and revamped commercial and industrial program for customers to undertake EE-related projects and electrification studies. CPAU, for the fourth year, continued to claim the 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. Approximately sixty five percent of the 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 2020 staff worked with a variety of organizations to increase participation.

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 2020, the CAP program resulted in net annual electric savings of 294,485 kWh.

Commercial and Industrial EE Program (CIEEP): This program offers Key Accounts the option of picking one of three engineering consulting firms to evaluate and implement EE projects. In FY 2020, the CIEEP program produced net annual electric savings of 1,503,666 kWh.

Empower Small and Medium Business (SMB): This program focusing on EE savings from mostly lighting retrofits in the small and medium commercial sector was inactive during this program

year. A new SMB program was planned to be launched in FY 2020 but was delayed due to Covid-19.

Residential Programs

Multi-Family Plus: This program provides no-cost, direct installation of EE (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. In FY 2020, the Multi-Family Plus program resulted in net annual electric savings of 97,028 kWh.

Home Efficiency Genie: The Home Efficiency Genie is CPAU's flagship residential program. Launched in June 2015, residents can call the 'Genie' to receive free utility bill reviews and phone consultations. This program has a high educational value for Palo Alto residents and offers personalized consultation services for all utilities-related questions, including measures such as rooftop solar and newer technologies like EVs (EVs) and EV chargers, energy storage, heat pump technologies, smart home devices and carbon-reducing tactics such as electrification. At a highly-subsidized cost, residents have the option to receive an in-depth home assessment which includes air leakage testing, duct inspections, insulation analysis, energy modeling and a one-on-one review of assessment reports with an energy expert. This package is followed up with guidance and support throughout home improvement projects. During FY 2020, the Home Efficiency Genie program had net annual electric savings of 26,483 kWh that were directly attributable, while the ongoing energy education also likely led to substantial savings that are not claimed.

Residential Energy Assistance Program (REAP): This program provides weatherization and equipment replacement services to low-income residents and those with certain medical conditions, with no cost to the residents. This program has an equal focus on efficiency and comfort, and therefore is not meant to be cost-effective. Since this program serves only low-income residents' costs nor the savings are included in CPAU's calculation of portfolio cost effectiveness. With the addition of LED lighting upgrades to the list of measures in FY 2020, REAP recorded net annual electric savings of 9,342 kWh.

Complementary Programs

Codes and Standards:

Green Building Ordinance: CPAU helped the City of Palo Alto develop a building reach code that is more stringent than the state Title 24 standard. This ordinance applies to both residential and commercial buildings. During the review of the Green Building Ordinance data, In FY 2020, 346,243 kWh of savings were achieved by the building code. CPAU continues to choose not to participate in claiming savings from state-level codes and standards development.

Community Resource Education Programs:

CPAU offers free EE advice and energy education programs to the community. Activities include hosting Facility Manager Meetings for Key Account customers, residential energy workshops on

topics like the SunShares program or Heat Pump Water Heaters, and tabling at neighborhood association events, local fairs, and various special events throughout the City.

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

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

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

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

SunShares Solar Discount Programs: Palo Alto has participated in regional group-buy solar programs in 2015, 2016, 2017, 2018, 2019, and 2020. 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 2020 Bay Area SunShares solar group-buy program both in terms of the number of solar contracts signed and the number of kilowatts of rooftop solar capacity that will be installed through the program. Palo Alto residents signed 15 contracts for a total of 76 kilowatts of rooftop solar.

EM&V Studies

In FY 2020, 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 CPAU-1. 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	36,705	177,955	7	31,199	151,262	55	$0	0.26	0.26	0.369
Building Envelope	122	448,527	6,118,085	103	381,248	5,200,372	2,730	$37,255	2.39	2.09	0.052
HVAC - Cooling	137	1,104,979	7,055,904	117	939,232	5,997,518	5,488	$908,752	2.17	0.79	0.077
Lighting - Indoor	98	1,048,092	14,405,400	83	890,878	12,244,590	4,037	$1,106,847	2.33	0.79	0.044
Lighting - Outdoor	3	63,940	639,400	2	54,349	543,490	259	$16,550	2.14	1.55	0.049
Service & Domestic Hot Water	0	125	1,245	0	106	1,058	297	$0	0.89	0.89	38.297
EE Subtotal	368	2,702,368	28,397,989	313	2,297,012	24,138,291	12,866	$2,069,404	2.15	0.91	0.059
Appliance & Plug Loads	0	106	1,060	0	106	1,060	0	$783	0.38	0.09	0.277
Building Envelope	3	1,793	22,992	3	1,793	22,992	54	$13,328	0.38	0.21	0.956
Lighting - Indoor	1	7,443	107,945	1	7,443	107,945	40	$8,226	0.38	0.28	0.289
Service & Domestic Hot Water	0	0	0	0	0	0	11	$676	0.38	0.31	0.000
Low-Income Subtotal	4	9,342	131,997	4	9,342	131,997	105	$23,013	0.38	0.25	0.430
EE and Low Income Subtotal	372	2,711,710	28,529,986	317	2,306,355	24,270,288	12,971	$2,092,417	2.08	0.89	0.061
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	372	2,711,710	28,529,986	317	2,306,355	24,270,288	12,971	$2,092,417	2.08	0.89	0.061

TABLE CPAU-2. 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	272	2,522,609	26,227,317	231	2,144,218	22,293,219	10,813	$1,985,548	2.59	0.93	0.047
Residential	96	179,759	2,170,672	81	152,795	1,845,071	2,053	$83,856	0.94	0.77	0.208
EE Subtotal	368	2,702,368	28,397,989	313	2,297,012	24,138,291	12,866	$2,069,404	2.15	0.91	0.059
Residential	4	9,342	131,997	4	9,342	131,997	105	$23,013	0.38	0.25	0.430
Low-Income Subtotal	4	9,342	131,997	4	9,342	131,997	105	$23,013	0.38	0.25	0.430
EE and Low Income Subtotal	372	2,711,710	28,529,986	317	2,306,355	24,270,288	12,971	$2,092,417	2.08	0.89	0.061
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	372	2,711,710	28,529,986	317	2,306,355	24,270,288	12,971	$2,092,417	2.08	0.89	0.061

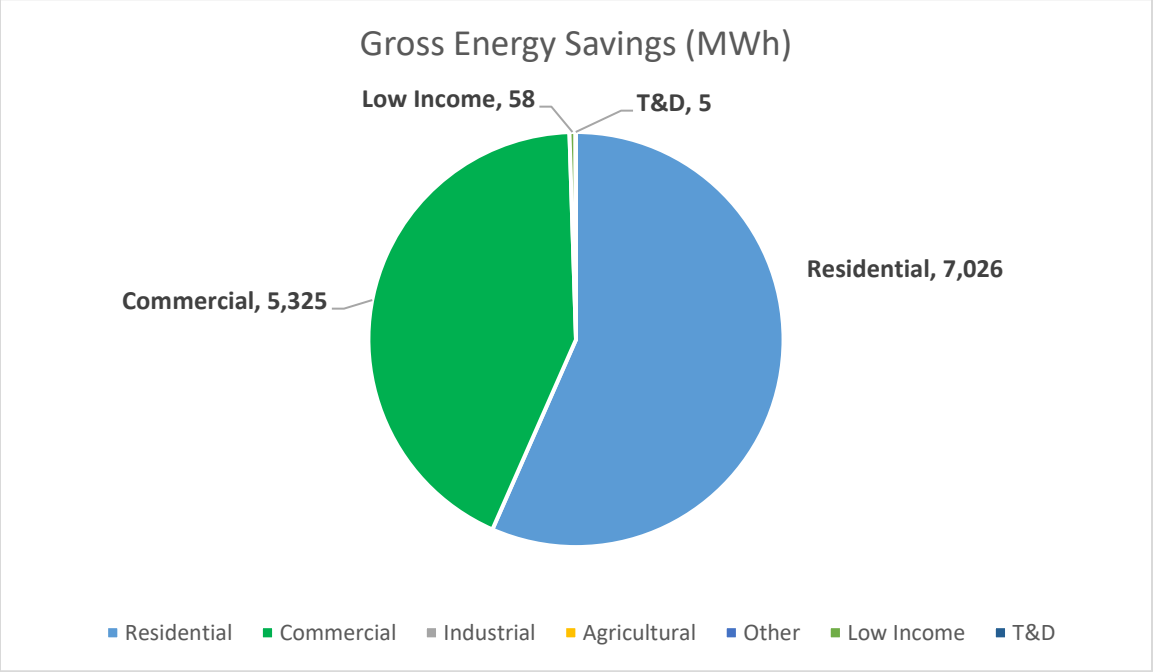
TABLE CPAU-3. EE Program Results by Building Type

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	48	407,137	5,292,781	41	346,066	4,498,864	1,401	$0	5.26	5.26	0.019
Office - Large	180	1,625,324	14,540,136	153	1,381,525	12,359,116	7,627	$1,182,428	2.22	0.93	0.061
Office - Small	44	490,148	6,394,400	37	416,626	5,435,240	1,784	$803,120	2.84	0.57	0.036
Residential	8	34,243	164,475	7	29,107	139,804	51	$0	0.25	0.25	0.390
Residential - Multi-Family	43	116,384	1,469,894	37	98,926	1,249,410	1,121	$83,856	1.25	0.82	0.136
Residential - Single-Family	45	29,132	536,303	38	24,762	455,858	881	$0	0.89	0.89	0.356
EE Subtotal	368	2,702,368	28,397,989	313	2,297,012	24,138,291	12,866	$2,069,404	2.15	0.91	0.059
Residential	4	9,342	131,997	4	9,342	131,997	105	$23,013	0.38	0.25	0.430
Low-Income Subtotal	4	9,342	131,997	4	9,342	131,997	105	$23,013	0.38	0.25	0.430
EE and Low Income Subtotal	372	2,711,710	28,529,986	317	2,306,355	24,270,288	12,971	$2,092,417	2.08	0.89	0.061
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	372	2,711,710	28,529,986	317	2,306,355	24,270,288	12,971	$2,092,417	2.08	0.89	0.061

PASADENA

Pasadena at a Glance

- Climate Zone(s): 9
- Customers: 67,440
- Total annual retail sales (MWh): 989,663
- Annual Retail Revenue: $192,209,000
- Annual EE expenditures for reporting year: $3,040,484
- Gross annual savings from reporting year portfolio (MWh): 12,414



Pasadena Overview

Number of Retail Customers: 67,440

- Residential: 56,650 (84%)
- Commercial: 10,790 (16%)

Climate Zone: 9
FY 2020 Expenditures on EE Programs: $3.04 Million
FY 2020 total retail electric sales by customer class:

- Residential: 336,485 MWh (34%)
- Commercial: 653,178 MWh (66%)

Overview:
Pasadena is home to the iconic Rose Bowl, world-class institutions like the California Institute of Technology and a variety of small businesses, many of which of are restaurants. At the same time,

Pasadena has a vibrant residential community, with a diverse mix of single-family homes that ranges from craftsman homes to bungalows and two-story tract homes. In the recent years, there has been an increase in 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 2017 called for 13,500 MWh of annual savings (about 1.3 % of retail sales/year). PWP's long standing EE programs, combined with new codes and standards, independent efficiency improvements and customer investments in clean, local distributed generation have resulted in a net 20.1% 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 2020, EE programs expenditures totaled $3.04 million, which is roughly 1.6 % 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 related expenses represented approximately 76% of Pasadena's PBC expenditures in FY 2020. The solar incentives represented 4%, TE incentives represented 10%, and bill payment assistance accounted for 10%.

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.

PWP launched a digital bill assistance application portal that allows customers to submit directly online.

PWP introduced six new residential all-electric appliance rebates, providing customers with the option of switching to alternative technologies that will help reduce overall carbon footprint and GHG emissions.

PWP began offering virtual evaluations for the Home Improvement Program, allowing customers to participate in the initial energy and water evaluation remotely without a technician on-site.

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

PWP maintains its ongoing collaboration with the SoCalGas to the end of 2024. The long-standing partnership continues to enable residential direct install offerings like the Home

Improvement Program (HIP) and Energy Savings Assistance Program (ESAP). Both programs provide no-cost direct installation of efficiency upgrades for eligible residential customers.
•PWP continues to provide residential EV and EV charger (EVSE) rebates through its rebate portal. The utility provides a $250 base rebate when residential electric customers purchase/lease a new/used EV, plus additional bonuses if vehicle is purchased from a local dealer or if customer is enrolled in bill assistance. A $200 rebate is also offered for customers who purchase/install a standard level 2 EV charger and a $600 rebate for level 2 Wi-Fi enabled EV chargers.

Program and Portfolio Highlights

In summary, energy savings for FY19/20 are broken down into five separate categories. Commercial EE programs contributed 4,633 MWh, Residential EE programs contributed 7,086 MWh, Codes & Standards (C&S) contributed 2,112 MWh, Water-Energy transfer (embedded energy savings from water conservation efforts) contributed 693 MWh and Transmission and Distribution (T&D) upgrades contributed 4.8 MWh. In total, PWP's EE programs produced 14,528 MWh of energy savings for FY 2020.

PWP has four EE programs that account for roughly 76% of its annual savings for FY 2020, programs with the greatest impact are as follows:

On the commercial side, the customized incentive program (CIP) rebate program provided customers with customized incentives on various LED lighting and mechanical projects to encourage energy conservation and load reduction. In its second year of implementation, the CIP contributed 584 MWh (4%) towards the annual energy savings.

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 3,565 MWh (25%) towards the annual energy savings.

On the residential side, the Home Energy Report, a behavioral program that is available to all PWP residential electric customers, contributed 6,238 MWh (43%) towards the annual energy savings. The personalized quarterly behavioral reports provide insightful and easy to understand information about household energy use, empowering homeowners with the knowledge to act and make their home more energy efficient.

Lastly, the HIP provides residential electric customers with no cost direct install services. Measures include lighting, HVAC Tune-up, weatherization, high efficiency toilets, smart thermostats, and smart irrigation systems. The HIP contributed 631 MWh (4%) towards the annual energy savings.

Commercial, Industrial & Agricultural Programs

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

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

The no-cost direct install WeDIP program serves small businesses and includes a free evaluation to go with a customized report. Efficiency measures offered through the WeDIP include LED Lighting, refrigeration upgrades, aerators, and efficient kitchen equipment/low-flow toilet replacements.

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 SoCalGas customers.

Residential Programs

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

The Home Energy Rebate program provides rebates on the purchase of ENERGY STAR® certified appliances, qualifying variable speed pool pumps, efficient air conditioning/heat pump equipment and various building shell improvements (insulation, whole house ventilation fans, cool roofs, skylights, window film, shade trees, etc.).

The appliance-recycling program is a free service that encourages PWP electric customers to recycle their old refrigerator/freezer (functioning) and purchase a newer, more efficient model.

The ESAP is a partnership with SoCalGas that provides no cost direct install services to qualifying income qualified customers. As part of the program, eligible residential customers will receive various efficiency upgrades to help improve the comfort of their home while lowering energy/water consumption. Measures include attic insulation, AC Tune-up, LED light bulbs, smart power strips, smart thermostats, smart irrigation controllers, low-flow toilets and much more.

The Home Improvement program provides no cost direct install services to all residential electric customers. As part of the program, eligible residential customers will receive various efficiency upgrades to help improve the comfort and efficiency of their home. Measures include attic insulation, duct sealing, AC Tune-up, smart thermostats, smart irrigation controllers and much more.

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

The Home Energy Report is a residential behavioral program that is mailed to approximately 40,000 customers on a quarterly basis, helping residents better understand their energy consumption and how it compares with similar households in the vicinity. The report also has customizable sections that help promote other PWP efficiency programs that may be of interest.

The Public Benefits fund also help share the cost of the utility's education programs for school-aged children. 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

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

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.

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.

Research, Development, and Demonstration (RD&D): PWP has invested resources in a variety of different RD&D projects to align with industry trends and utility objectives. For FY 2020, PWP continued its support for TE, with a focus on Plug-in EVs and procured new EVs to replace its existing fleet.

TE: The utility is also encouraging the private sector to build additional charging sites for public and private fleet use through a robust incentive program offering rebates of up to $50,000 per commercial 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 or made available for public use. Incentives are also in place to encourage Pasadena residents to buy or lease an EV and EV charger to enable charging at home. In particular, PWP residential electric customers can receive up to $1,500 for a new or used EV and up to $600 for a new Wi-Fi enabled EV charger.

For FY 2020, PWP approved 375 qualifying residential EV notification rebates and paid out $108,250 in incentives. For residential EV charging, PWP approved 69 qualifying applications

and paid out $32,896 in rebates. Lastly, for commercial EV chargers, PWP approved 72 qualifying applications and paid out $397,500 in incentives.

To support public EV awareness and education, PWP also participates in regular events that display EV technology.

EM&V Studies

PWP expended approximately $48,000 on EM&V efforts for various EE programs to justify program design, expenditures and verify results:

Residential Rebate Program: Third party contractor and utility staff performed site verifications on a percentage of all residential energy-efficient equipment purchases and installations

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

Commercial Rebate Programs: For custom projects, utility staff and/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 CalTF e-TRM data, where available, supplemented by best available technical data from independent engineering analysis where TRM measures are not yet available. For commercial programs, as discussed above, PWP may rely on independent engineering analysis conducted by PWP's third-party engineering consultant and/or an online rebate estimator with industry models. 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 PWP-1. 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	611	631,096	5,048,768	611	631,096	5,048,768	2,091	$844,652	1.31	1.31	0.237
Appliance & Plug Loads	15	86,319	760,741	10	54,701	474,765	193	$57,419	0.91	0.91	0.153
Building Envelope	9	19,145	350,825	3	7,959	148,570	127	$23,592	1.48	1.48	0.253
Commercial Refrigeration	22	121,780	1,217,800	22	121,780	1,217,800	471	$18,316	5.24	5.24	0.025
HVAC - Cooling	30	30,094	293,576	19	19,520	202,696	88	$36,020	1.59	1.59	0.247
HVAC - Heat Pump	5	7,344	110,160	4	5,875	88,128	37	$9,180	2.23	2.23	0.161
Lighting - Indoor	900	4,052,883	31,407,398	900	4,052,883	31,407,398	11,515	$930,283	3.13	3.13	0.041
Miscellaneous	14	6,964,154	7,440,630	14	6,964,154	7,440,630	3,297	$412,069	1.29	1.29	0.059
Service & Domestic Hot Water	1	6,196	76,240	1	4,693	61,210	22	$1,920	3.07	3.07	0.047
Whole Building	137	432,458	6,326,850	137	432,458	6,326,850	2,223	$72,990	6.76	6.76	0.027
EE Subtotal	1,744	12,351,469	53,032,988	1,720	12,295,120	52,416,815	20,065	$2,406,441	2.30	2.30	0.063
All	12	22,105	243,155	12	22,105	243,155	97	$61,970	0.69	0.69	0.354
Appliance & Plug Loads	12	35,619	240,870	12	35,619	240,870	99	$89,173	0.35	0.35	0.438
Low-Income Subtotal	24	57,724	484,025	24	57,724	484,025	195	$151,143	0.50	0.50	0.397
EE and Low Income Subtotal	1,767	12,409,193	53,517,013	1,743	12,352,844	52,900,840	20,260	$2,557,584	2.20	2.20	0.066
Codes & Standards	431	2,112,179	2,112,179	431	2,112,179	2,112,179	930	$0	30.40	30.40	0.003
Codes & Standards Subtotal	431	2,112,179	2,112,179	431	2,112,179	2,112,179	930	$0	30.40	30.40	0.003
Appliance & Plug Loads	0	0	0	0	0	0	0	$420			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$420			0.000
Transmission & Distribution	1	4,809	144,270	1	4,809	144,270	52	$0	30.40	30.40	0.005
T&D Subtotal	1	4,809	144,270	1	4,809	144,270	52	$0	30.40	30.40	0.005
C&S, T&D and Electrification Subtotal	432	2,116,988	2,256,449	432	2,116,988	2,256,449	982	$420	28.82	28.82	0.004
Utility Total	2,199	14,526,181	55,773,462	2,175	14,469,832	55,157,289	21,242	$2,558,004	2.27	2.27	0.063

TABLE PWP-2. 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	1,071	5,325,212	40,186,599	1,071	5,325,212	40,186,599	14,693	$1,063,278	3.50	3.50	0.039
Residential	673	7,026,257	12,846,389	648	6,969,908	12,230,216	5,372	$1,343,163	1.27	1.27	0.137
EE Subtotal	1,744	12,351,469	53,032,988	1,720	12,295,120	52,416,815	20,065	$2,406,441	2.30	2.30	0.063
Residential	24	57,724	484,025	24	57,724	484,025	195	$151,143	0.50	0.50	0.397
Low-Income Subtotal	24	57,724	484,025	24	57,724	484,025	195	$151,143	0.50	0.50	0.397
EE and Low Income Subtotal	1,767	12,409,193	53,517,013	1,743	12,352,844	52,900,840	20,260	$2,557,584	2.20	2.20	0.066
Commercial	431	2,112,179	2,112,179	431	2,112,179	2,112,179	930	$0	30.40	30.40	0.003
Codes & Standards Subtotal	431	2,112,179	2,112,179	431	2,112,179	2,112,179	930	$0	30.40	30.40	0.003
Residential	0	0	0	0	0	0	0	$420			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$420			0.000
Commercial	1	4,809	144,270	1	4,809	144,270	52	$0	30.40	30.40	0.005
T&D Subtotal	1	4,809	144,270	1	4,809	144,270	52	$0	30.40	30.40	0.005
C&S, T&D and Electrification Subtotal	432	2,116,988	2,256,449	432	2,116,988	2,256,449	982	$420	28.82	28.82	0.004
Utility Total	2,199	14,526,181	55,773,462	2,175	14,469,832	55,157,289	21,242	$2,558,004	2.27	2.27	0.063

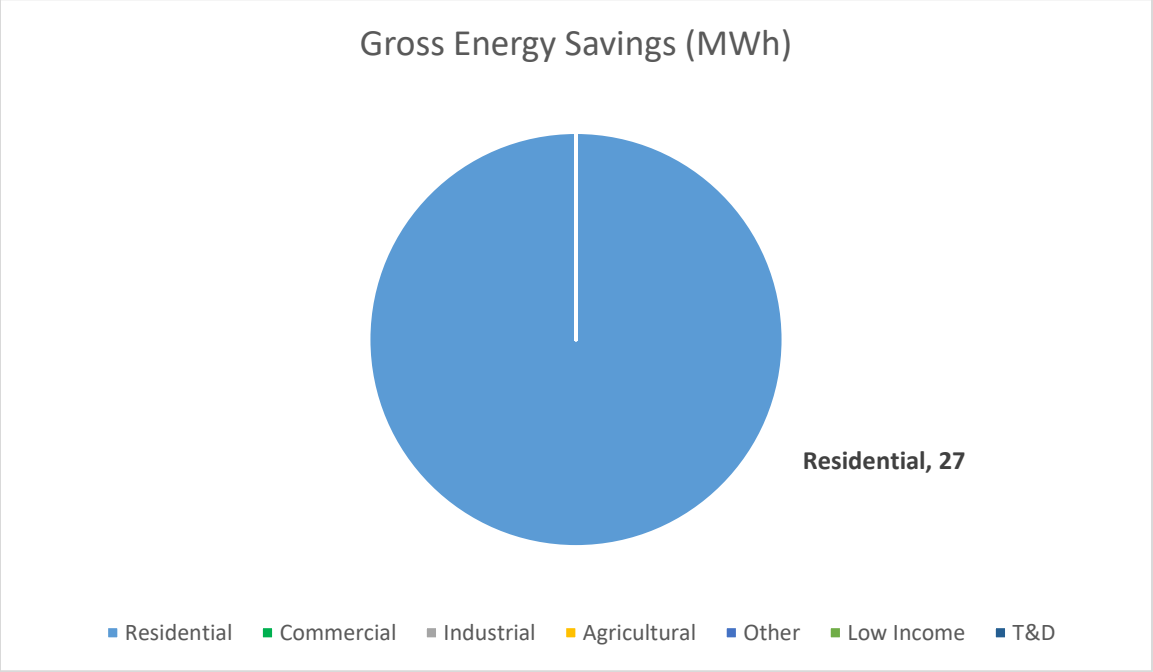
TABLE PWP-3. EE Program Results by Building Type

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	949	4,934,282	33,990,986	945	4,924,396	33,942,192	12,509	$1,035,170	3.05	3.05	0.042
Office - Large	135	421,028	6,315,420	135	421,028	6,315,420	2,218	$42,103	8.89	8.89	0.021
Residential	653	6,957,673	12,327,442	637	6,927,946	11,927,429	5,247	$1,304,678	1.28	1.28	0.137
Residential - Multi-Family	0	2,856	42,840	0	2,856	42,840	15	$1,120	3.35	3.35	0.039
Residential - Single-Family	6	35,630	356,300	2	18,893	188,934	76	$23,370	0.94	0.94	0.159
EE Subtotal	1,744	12,351,469	53,032,988	1,720	12,295,120	52,416,815	20,065	$2,406,441	2.30	2.30	0.063
Residential	24	57,724	484,025	24	57,724	484,025	195	$151,143	0.50	0.50	0.397
Low-Income Subtotal	24	57,724	484,025	24	57,724	484,025	195	$151,143	0.50	0.50	0.397
EE and Low Income Subtotal	1,767	12,409,193	53,517,013	1,743	12,352,844	52,900,840	20,260	$2,557,584	2.20	2.20	0.066
All	431	2,112,179	2,112,179	431	2,112,179	2,112,179	930	$0	30.40	30.40	0.003
Codes & Standards Subtotal	431	2,112,179	2,112,179	431	2,112,179	2,112,179	930	$0	30.40	30.40	0.003
Residential	0	0	0	0	0	0	0	$420			0.000
Electrification Subtotal	0	0	0	0	0	0	0	$420			0.000
All	1	4,809	144,270	1	4,809	144,270	52	$0	30.40	30.40	0.005
T&D Subtotal	1	4,809	144,270	1	4,809	144,270	52	$0	30.40	30.40	0.005
C&S, T&D and Electrification Subtotal	432	2,116,988	2,256,449	432	2,116,988	2,256,449	982	$420	28.82	28.82	0.004
Utility Total	2,199	14,526,181	55,773,462	2,175	14,469,832	55,157,289	21,242	$2,558,004	2.27	2.27	0.063

PLUMAS-SIERRA

Plumas-Sierra at a Glance

- Climate Zone(s): 16
- Customers: 8,116
- Total annual retail sales (MWh): 149,004
- Annual Retail Revenue: $26,118,250
- Annual EE expenditures for reporting year: $114,330
- Gross annual savings from reporting year portfolio (MWh): 27



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.

Plumas-Sierra's service territory encompasses more than 1,700 square miles with more than 1,300 miles of transmission and distribution power line. PSREC serves just six members per mile of line, compared to the average of 34 customers per mile of line for investor-owned utilities.

The goal of PSREC's EE program is to help members understand and control their energy use. An important aspect to note is PSREC's unique peak demand occurs during winter. Therefore, the most cost-effective program concentration is to reduce demand in the winter. The reporting model

has limitations in how coincident peak demand savings are reported since PG&E's load profile is applied as the default.

Major Program and Portfolio Changes

For 2020, 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 2020. The program provided 55% 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 ENERGY STAR® LED holiday light strands.

Water Heater Sales and Rebates: Discounted sales of, and rebates for the purchase of high-efficiency electric water heaters, including heat pump water heaters.

Weatherization Rebates: PSREC offers members rebates for upgrading windows and insulation in their homes. By retrofitting a home to above-code R-Values, and upgrading windows to double-pane high-performance windows, members not only realize the added comfort, but also gain increased home values. PSREC encourages members to invest in weatherization measures prior to, or in addition to, investing in a new heating source for energy conservation.

Annual Member Meeting Efficiency Giveaways: PSREC provides members who attend the annual meeting with efficiency items such as LED lights, low-flow showerheads, faucet aerators, etc.

Efficiency Education: PSREC provides 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 EV charging infrastructure and other program options to encourage the adoption of EVs 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 UES measure list. Savings for the commercial lighting program are custom calculations based on the specific equipment replaced.

TABLE PSREC-1. 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	9,422	81,630	1	5,741	47,790	19	$2,785	0.27	0.27	0.556
Building Envelope	91	15,128	367,626	91	14,132	347,714	177	$21,187	0.83	0.89	0.334
HVAC - Cooling	2	1,742	30,151	2	1,394	24,121	11	$8,124	0.24	0.33	1.044
Lighting - Outdoor	0	8	42	0	5	23	0	$44	0.00	0.00	31.525
Service & Domestic Hot Water	1	495	4,950	0	297	2,970	1	$217	0.25	0.28	0.522
EE Subtotal	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
EE and Low Income Subtotal	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414

TABLE PSREC-2. 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	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
EE Subtotal	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
EE and Low Income Subtotal	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414

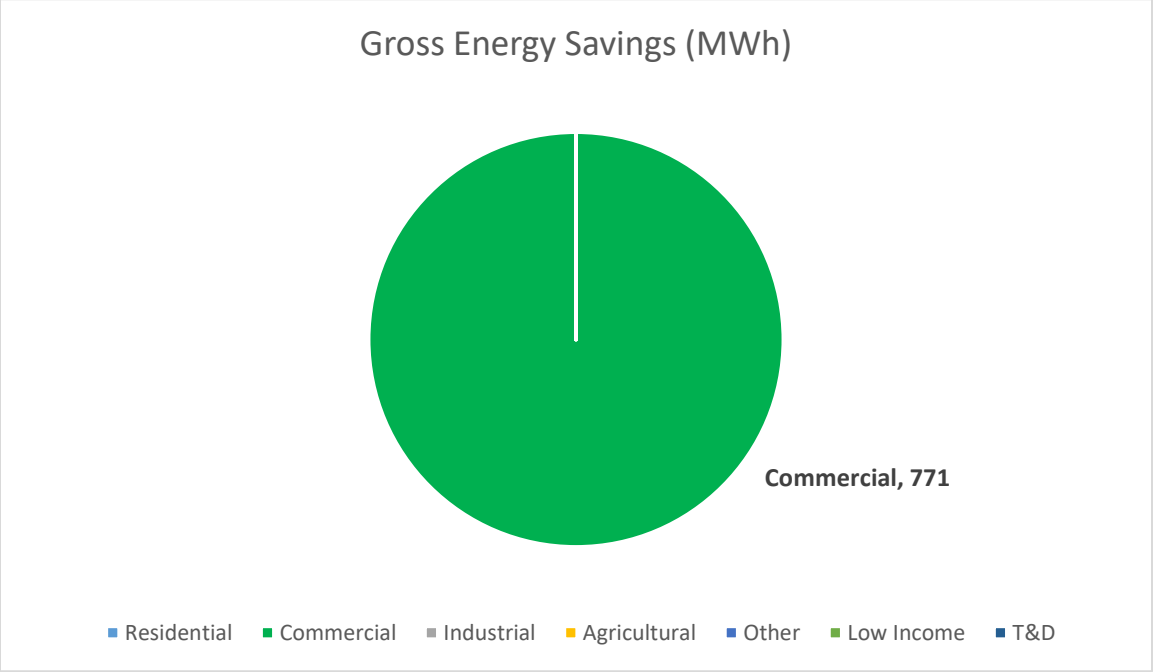
TABLE PSREC-3. EE Program Results by Building Type

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	5,150	28,362	1	3,552	19,325	8	$1,034	0.24	0.25	0.583
Residential	95	19,495	426,307	94	16,504	382,414	193	$30,633	0.69	0.77	0.393
Residential - Single-Family	0	2,150	29,730	0	1,513	20,879	8	$690	0.29	0.29	0.546
EE Subtotal	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
EE and Low Income Subtotal	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	95	26,796	484,400	94	21,568	422,618	208	$32,357	0.62	0.68	0.414

PORT OF OAKLAND

Port of Oakland at a Glance

- Climate Zone(s): 3
- Customers: 167
- Total annual retail sales (MWh): 111,872,000
- Annual Retail Revenue: $22,491,589
- Annual EE expenditures for reporting year: $61,257
- Gross annual savings from reporting year portfolio (MWh): 771



Port of Oakland Overview

The Port of Oakland (the Port) oversees the Oakland seaport, Oakland International Airport, and 20 miles of waterfront. Together with its business partners, the Port supports more than 84,000 jobs in the region and nearly 827,000 jobs nationwide. The Port exemplifies a unique combination of public/private endeavors. It encompasses a world-class container port, a thriving airport, an array of retail and commercial buildings and acres of recreational and open space. The Port has approximately 167 commercial electric customers.

Major Program and Portfolio Changes

In FY 2020, the Port provided incentives and procedures to promote EE programs and encouraged customers and contractors to participate. The Port is working to update our EE program to match the changes our unique customer base requires. The primary focus of our EE program is to encourage new construction to surpass code and support EV expansion.

Program and Portfolio Highlights

In FY 2020, 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 EVs due to our customer base. We are working with customers to identify needs and assess potential for renewable energy, storage, EV adoption and EV charging infrastructure programs and investments.

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

TABLE PORT-1. 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	36	503,330	6,039,960	29	402,664	4,831,968	1,776	$44,793	11.18	8.43	0.011
Process	7	222,479	2,669,748	6	177,983	2,135,798	790	$92,316	12.26	2.52	0.010
Whole Building	0	45,007	675,105	0	36,006	540,084	199	$64,681	13.92	0.95	0.009
EE Subtotal	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
EE and Low Income Subtotal	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010

TABLE PORT-2. 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	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
EE Subtotal	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
EE and Low Income Subtotal	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010

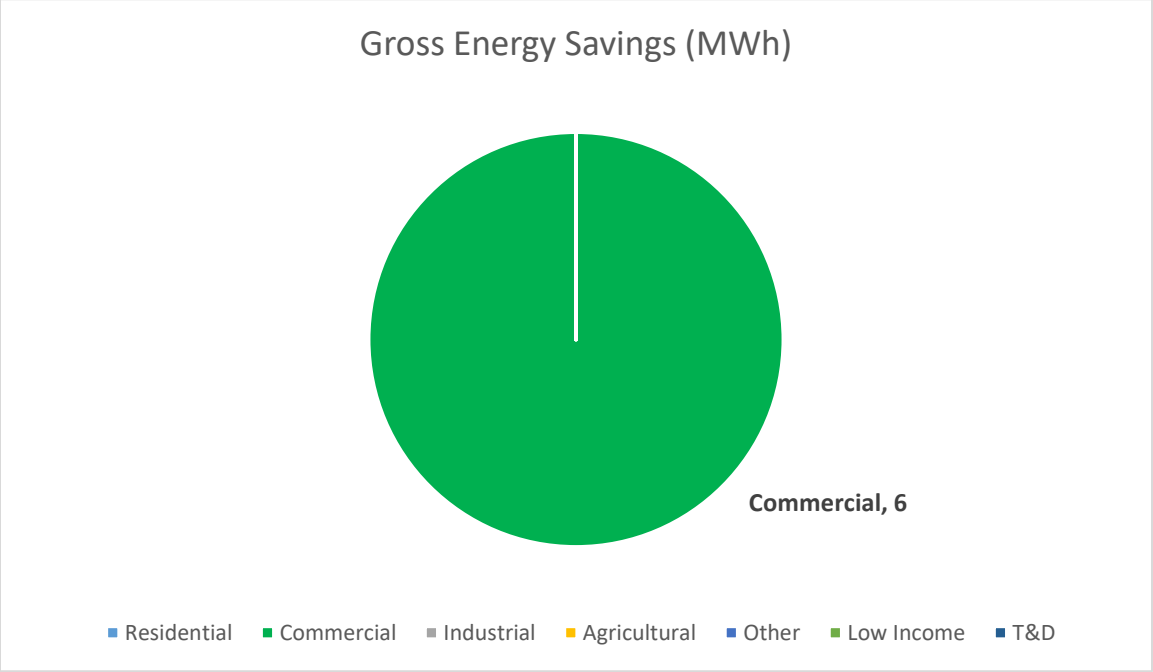
TABLE PORT-3. EE Program Results by Building Type

Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Other Commercial	5	34,496	413,952	4	27,597	331,162	120	$31,500	5.46	1.12	0.021
Warehouse - Refrigerated	39	736,320	8,970,861	31	589,056	7,176,689	2,645	$170,291	12.26	4.20	0.010
EE Subtotal	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
EE and Low Income Subtotal	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	44	770,816	9,384,813	35	616,653	7,507,850	2,765	$201,791	11.64	3.76	0.010

RANCHO CUCAMONGA

Rancho Cucamonga at a Glance

- Climate Zone(s): 10
- Customers: 1,744
- Total annual retail sales (MWh): 76,307
- Annual Retail Revenue: $10,728,000
- Annual EE expenditures for reporting year: $32,509
- Gross annual savings from reporting year portfolio (MWh): 6



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 2020.

Program and Portfolio Highlights

In previous years, the greatest participation in EE programs has been attained by the commercial EE rebate program. This fiscal year, participation was down with multiple customers placing their

preapproved applications on hold as businesses were unsure of the impact COVID-19 would have.
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.

EV 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.

EM&V Studies

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE RCMU-1. 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	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
EE Subtotal	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
EE and Low Income Subtotal	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511

TABLE RCMU-2. EE Program Results by Sector

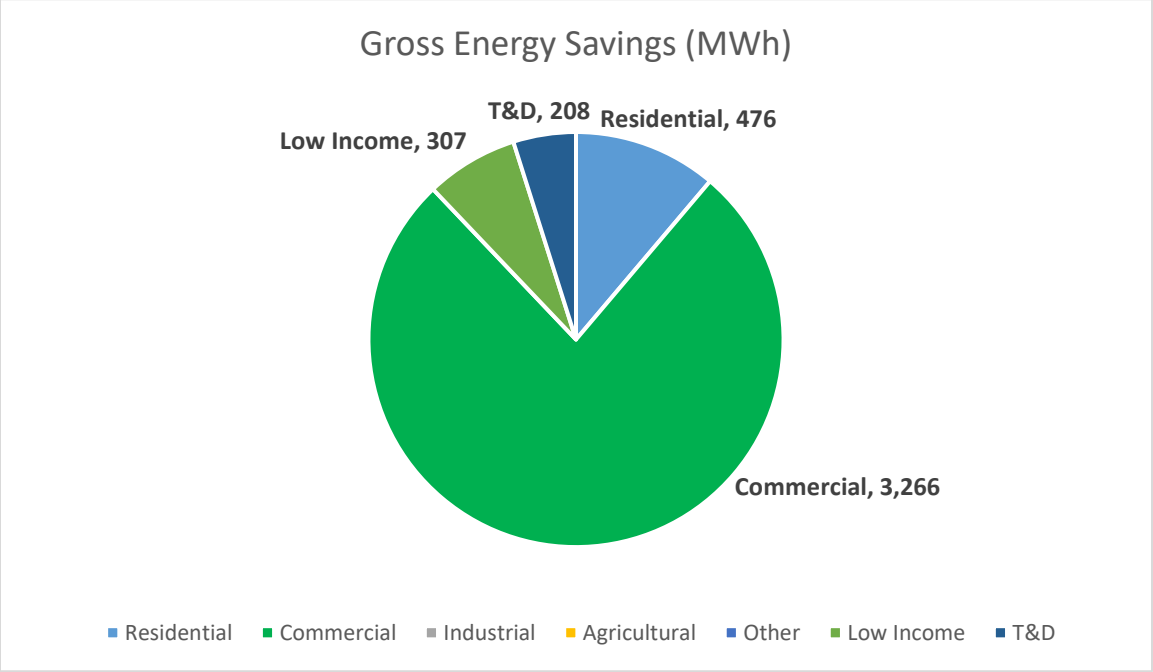
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
EE Subtotal	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
EE and Low Income Subtotal	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511

TABLE RCMU-3. 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)**
Restaurant - Sit-Down	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
EE Subtotal	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
EE and Low Income Subtotal	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	1	5,587	89,394	1	5,587	89,394	30	$0	0.34	0.34	0.511

Redding at a Glance

- Climate Zone(s): 11
- Customers: 44,149
- Total annual retail sales (MWh): 710,747
- Annual Retail Revenue: $106,053,965
- Annual EE expenditures for reporting year: $1,896,114
- Gross annual savings from reporting year portfolio (MWh): 4,257



Redding Overview

Total sales for FY 2020 were 710,747 MWh – a 1.5 percent decrease compared to FY 2019. Redding will continue to forecast declining electric sales. Redding Electric Utility (REU) attributes this decline to lower economic activity and the impacts of EE programs, more stringent building and appliance standards, and increased customer-owned distributed generation.

Due to Redding's hot summer climate and high residential load, REU's peak demand typically occurs in the summer between 4:00-5:00 p.m. and is more than double the peak demand during non-cooling months.

REU has committed much of our Cap-and-Trade auction proceeds to efforts that reduce GHG emissions, combat poverty, and achieve reliable energy savings.

<u>Major Program and Portfolio Changes</u>

REU continued to evaluate changes to the public benefits programs in FY 2020 to maximize the benefits to the community and maintain compliance with State and Federal Regulations. No major program changes were made in FY 2020.

Program and Portfolio Highlights

In FY 2020, REU's total commercial sector lighting savings remained close to FY 2019 levels at 3.2 million kWh (net). REU anticipates that lighting rebates will continue to deliver the majority savings in Redding for the foreseeable future. However, REU expects projects to decrease in savings as Redding reaches saturation.

Commercial, Industrial & Agricultural Programs

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

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

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

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

Residential Programs

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

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

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

Complementary Programs

Shade Trees Program – Utility funded program to provide Shade Trees for residential and commercial customer.

Low-Income Programs – Low-income assistance spending (through the CARES Program and Residential Energy Discount) continues to be the second largest area of our Public Benefits Program expenditures. During FY 2020, rate discounts represented about $1.6 million paid with

public benefits funds. Low-income programs have been most beneficial to a significant portion of our customer base that has limited situational and/or financial means to participate in other EE programs.

EV and Charging Infrastructure – Redding offers TE incentives for chargers and vehicle purchases for residential and commercial ratepayers. Funding has also 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.

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

For the vast amount of its 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 EE, Streetlights) REU used the custom measure feature in ESP to represent the energy and demand impacts of those programs. For the Commercial Lighting Program, REU utilizes a custom calculation.

TABLE REU-1. 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	57,155	348,046	6	35,739	214,757	78	$51,928	0.53	0.24	0.101
Building Envelope	47	76,315	1,524,786	15	23,471	469,006	473	$179,589	0.79	0.51	0.193
HVAC - Cooling	52	329,405	4,712,743	42	238,005	3,401,676	1,652	$345,022	0.43	0.45	0.143
Lighting - Indoor	702	2,544,672	21,835,920	421	1,531,184	13,167,270	4,555	$2,325,164	1.23	0.37	0.041
Lighting - Outdoor	0	729,352	5,928,380	0	583,482	4,742,704	2,315	$193,066	1.87	1.21	0.029
Service & Domestic Hot Water	0	4,875	48,750	0	2,925	29,250	11	$5,647	0.35	0.27	0.158
EE Subtotal	813	3,741,773	34,398,625	485	2,414,806	22,024,663	9,084	$3,100,417	0.96	0.45	0.057
Appliance & Plug Loads	0	15,450	202,944	0	15,450	202,944	77	$54,516	0.16	0.16	0.345
Building Envelope	0	21,175	423,491	0	21,175	423,491	124	$65,143	0.27	0.27	0.218
HVAC - Cooling	0	91,303	669,756	0	91,303	669,756	323	$116,273	0.24	0.24	0.218
HVAC - Heat Pump	0	9,444	188,880	0	9,444	188,880	451	$93,225	0.48	0.48	0.756
Lighting - Indoor	0	144,436	2,167,332	0	144,436	2,167,332	851	$81,881	0.87	0.87	0.065
Miscellaneous	0	0	0	0	0	0	0	$2,357			0.000
Service & Domestic Hot Water	0	25,407	260,121	0	25,407	260,121	105	$20,637	0.49	0.49	0.112
Low-Income Subtotal	0	307,215	3,912,525	0	307,215	3,912,525	1,931	$434,034	0.44	0.44	0.159
EE and Low Income Subtotal	813	4,048,989	38,311,149	485	2,722,021	25,937,188	11,015	$3,534,450	0.80	0.45	0.072
Lighting - Outdoor	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
T&D Subtotal	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
C&S, T&D and Electrification Subtotal	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
Utility Total	864	4,256,891	40,390,169	537	2,929,923	28,016,208	12,025	$3,670,471	0.77	0.46	0.075

TABLE REU-2. EE Program Results by Sector

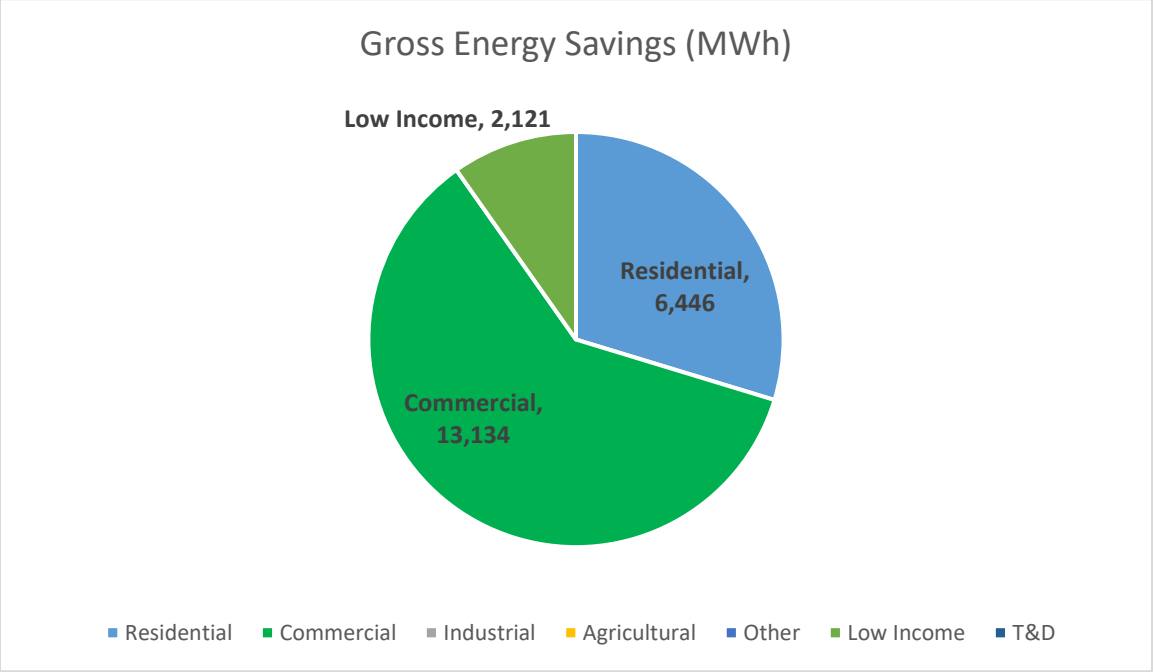
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	705	3,265,620	27,607,271	423	2,107,522	17,776,499	6,813	$2,523,464	1.46	0.46	0.035
Residential	108	476,154	6,791,354	62	307,284	4,248,164	2,270	$576,953	0.46	0.43	0.153
EE Subtotal	813	3,741,773	34,398,625	485	2,414,806	22,024,663	9,084	$3,100,417	0.96	0.45	0.057
Residential	0	307,215	3,912,525	0	307,215	3,912,525	1,931	$434,034	0.44	0.44	0.159
Low-Income Subtotal	0	307,215	3,912,525	0	307,215	3,912,525	1,931	$434,034	0.44	0.44	0.159
EE and Low Income Subtotal	813	4,048,989	38,311,149	485	2,722,021	25,937,188	11,015	$3,534,450	0.80	0.45	0.072
Other	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
T&D Subtotal	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
C&S, T&D and Electrification Subtotal	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
Utility Total	864	4,256,891	40,390,169	537	2,929,923	28,016,208	12,025	$3,670,471	0.77	0.46	0.075

TABLE REU-3. EE Program Results by Building Type

Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Other Commercial	705	3,265,620	27,607,271	423	2,107,522	17,776,499	6,813	$2,523,464	1.46	0.46	0.035
Residential	89	256,664	4,051,519	51	171,965	2,583,638	1,429	$366,290	0.45	0.46	0.161
Residential - Single-Family	19	219,490	2,739,835	11	135,319	1,664,526	841	$210,663	0.48	0.38	0.142
EE Subtotal	813	3,741,773	34,398,625	485	2,414,806	22,024,663	9,084	$3,100,417	0.96	0.45	0.057
Residential	0	13,089	130,883	0	13,089	130,883	62	$47,393	0.12	0.12	0.442
Residential - Single-Family	0	294,127	3,781,641	0	294,127	3,781,641	1,870	$386,641	0.48	0.48	0.148
Low-Income Subtotal	0	307,215	3,912,525	0	307,215	3,912,525	1,931	$434,034	0.44	0.44	0.159
EE and Low Income Subtotal	813	4,048,989	38,311,149	485	2,722,021	25,937,188	11,015	$3,534,450	0.80	0.45	0.072
All	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
T&D Subtotal	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
C&S, T&D and Electrification Subtotal	52	207,902	2,079,020	52	207,902	2,079,020	1,010	$136,020	0.51	0.51	0.108
Utility Total	864	4,256,891	40,390,169	537	2,929,923	28,016,208	12,025	$3,670,471	0.77	0.46	0.075

Riverside at a Glance

- Climate Zone(s): 10
- Customers: 110,951
- Total annual retail sales (MWh): 2,113,574
- Annual Retail Revenue: $310,714,132
- Annual EE expenditures for reporting year: $4,125,428
- Gross annual savings from reporting year portfolio (MWh): 21,702



Riverside Overview

In FY 2020, Riverside Public Utilities (RPU) met 100% of the kWh savings goal of 1% of retail sales as adopted by the Board of Public Utilities in 2017.

The final quarter of FY 2020 posed a challenge for reaching the savings target due to the world-wide pandemic. RPU staff was able to create some low income programs to assist customers with their utility bills to ease some of the financial burden on them.

Major Program and Portfolio Changes

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

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

Our solar rebate program sunset at the end of calendar year 2017, which allowed us to shift funds to focus on more low-income programs. During FY 2020, the RPU team continued to focus on revamping our low-income programs to be most beneficial to our rate payers.

Program and Portfolio Highlights

RPU did not operate our direct install programs this reporting year but will resume in the next reporting year. RPU's Commercial Lighting, Small Business Direct Installation (SBDI) and Keep Your Cool (KYC) Direct Installation programs continue to be a highlight of RPU's overall program portfolio in terms of both customer acceptance and kWh savings.

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

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

RPU contractors have found that the market potential for this program is substantial and that there is no shortage of businesses that can realize significant savings from EE upgrades provided through this program.

The Keep Your Cool (KYC) Program is similar but more specifically focused on a direct installation of cooling and refrigeration measures in mini-markets, delis, convenience stores and restaurants.

Commercial, Industrial & Agricultural Programs

Air Conditioning Incentives – Rebates for replacement of energy inefficient AC units (Non-Res Cooling).

ENERGY STAR® Appliances – Rebates for purchase of ENERGY STAR®-rated refrigerators, dishwashers, commercial clothes washers, solid door refrigerator/freezers, ceiling fans and televisions (Non Res-Lighting, Non Res-Cooling, and Non-Res Refrigeration).

Lighting Incentive – Rebates for kWh savings on installation of more energy efficient lighting and controls (Non-Res Lighting).

Tree Power – Rebates for purchase and planting of up to 5 qualifying shade trees per year (Non-Res Cooling).

Weatherization – Rebates for installation of insulation, window film and cool roofs (Non-Res Shell).

Performance Based Incentive – Rebates for customers who can demonstrate a kWh savings based on custom energy-efficiency measures (Non-Res Comprehensive).

Commercial Food Service Program – Program specifically targeting commercial food service customers such as restaurants, hospitality providers, institutional, medical/hospital customers, schools, and government customers. The program is offered in conjunction with SoCalGas and provides customers with a comprehensive facility audit offering recommendations on specific EE measures, estimated return on investment, and applicable utility incentives.

Key Account EE Program (KEEP) – Program targeting RPU's largest Time of Use Customers. This customer segment includes the top 300 RPU customers in terms of consumption. KEEP is intended to provide Key Account customers with a comprehensive EE plan including a priority list of recommended EE measures along with an estimated return on investment and applicable utility incentives. RPU is also working with SoCalGas on this program. Customers are also offered additional technical and contracting assistance to bring large EE projects from concept to completion (Non-Res Comprehensive). 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 EE, renewable energy, energy storage, strategic energy research, and TE (RD&D Program).

Upstream HVAC Rebate Program – Rebate incentive for commercial high efficiency HVAC equipment purchases that exceed Title 24 requirements, provided upstream at the wholesale

distribution channel level, thereby encouraging distributors to stock and sell more efficient HVAC equipment (Non-Res Cooling).

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

New Construction and LEED construction Incentives – Rebates for energy savings exceeding Title 24 standards for pre-approved new construction projects.

Pool and Spa Pumps Incentive – Rebates for purchase of qualifying multi-flow or variable speed high-efficiency pumps and motors.

Premium Motor Incentives – Rebates for the purchase of premium high efficiency electric motors (none claimed in FY 2020).

Thermal Energy Storage Incentive – Feasibility study and incentives available for use of thermal energy storage based on program guidelines (none claimed in FY 2020).

Residential Programs

ENERGY STAR® Appliances – Rebates for purchase of ENERGY STAR®-rated refrigerators, dishwashers, clothes washers, room air conditioners, ceiling fans, and televisions (Res Cooling, Res dishwashers, Res Clothes Washers, Res Electronics).

Cool Cash – Rebates for replacing Central Air Conditioners with a SEER rating of 15 above (Res Cooling).

Tree Power – Rebates for purchasing and planting of up to five qualifying shade trees per year and one free qualifying shade tree coupon printed on the March back of the bill (Res Cooling).

Pool Saver – Rebates for purchase and installation of high efficiency, variable speed, or multi-flow pool pump motors (Res Pool Pump).

Weatherization – Rebates for installing attic insulation or wall insulation, standard rebates for duct replacement, duct testing/sealing, window film, solar and standard attic fans, whole house fans, and cool roofs (Res Shell, Res Cooling).

Appliance Recycling – Free recycling service for old inefficient refrigerators and freezers (Res Refrigeration).

Multi-Family and Mobile Home Direct Installation – Program offering multi-family and mobile home residents direct installation measures including HVAC tune-ups, lighting efficiency upgrades, weatherization, and Tier 2 advanced power strips. Also addresses EE measures in common areas

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

Energy Savings Assistance Program (ESAP) – Direct installation program targeting low-income customers, offered in partnership and cooperation with SoCalGas. Measures include lighting efficiency upgrades, HVAC tune-ups, smart power strips, and refrigerator recycling (low-income assistance, Res Lighting, Res Cooling, Res Refrigeration).

Complementary Programs

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. These important Key Account customers agree to voluntarily shed or shift a combined total of 11MW of electric load during the peak summer months from June-September if it is deemed necessary to call on this resource by RPU in cooperation with the CAISO.

Pool Pump Timer Credit Load Shift Program – This program offers a bill credit of $5 per month for customers who agree to install and program their residential pool pump timer so that the pump operates only during off-peak hours. RPU has implemented an ongoing inspection program to inspect 100% of these timers for program compliance.

EM&V Studies

RPU is committed to providing cost-effective, ongoing evaluation, measurement, and verification (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:

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

A pre-and post-inspection of 100% of commercial rebate participants, including a review of historical energy usage, energy-saving calculations, and post-measure bill analysis.

All residential and commercial solar PV installations are field inspected and verified by city personnel for program compliance, system inter-connection standards, and rated production output.

Contracted with the engineering firm Partner Energy to verify claimed energy savings on large, complex, or technical commercial projects prior to issuing a rebate incentive.

Audits and installations performed by third-party contractors for RPU direct installation programs have high inspection rates that are performed by both the contractor and RPU staff.

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE RPU-1. 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	3,388	33,880	0	3,388	33,880	12	$249	4.25	9.68	0.029
Appliance & Plug Loads	209	549,103	3,907,676	198	519,757	3,693,388	1,504	$0	2.13	18.23	0.066
Building Envelope	252	272,729	5,275,408	240	260,821	5,048,453	1,861	$68	6.75	25.98	0.032
HVAC - Cooling	2,177	6,081,925	172,153,674	1,713	4,450,693	123,487,476	48,859	$0	14.04	26.70	0.022
Lighting - Indoor	0	7,391,355	73,913,550	0	7,391,355	73,913,550	27,045	$0	9.32	32.99	0.013
Miscellaneous	1	8,991	35,964	1	8,092	32,368	14	$0	0.29	2.67	0.397
Service & Domestic Hot Water	0	3,990	39,900	0	0	0	0	$3,837			0.000
Water Pumping / Irrigation	24,311	58,043	754,559	24,311	58,043	754,559	285	$0	0.36	32.99	0.382
Whole Building	0	5,210,701	103,446,370	0	5,210,701	103,446,370	37,291	$0	19.73	32.99	0.007
EE Subtotal	26,950	19,580,225	359,560,982	26,463	17,902,851	310,410,043	116,871	$4,154	11.83	28.84	0.016
Appliance & Plug Loads	0	53,888	215,424	0	53,888	215,424	94	$9,619	0.45	2.58	0.299
HVAC - Cooling	0	237,678	2,825,910	0	237,678	2,825,910	1,199	$54,539	3.72	8.17	0.071
Lighting - Indoor	0	1,829,867	27,448,005	0	1,829,867	27,448,005	10,963	$198,344	5.94	9.64	0.022
Low-Income Subtotal	0	2,121,433	30,489,339	0	2,121,433	30,489,339	12,255	$262,502	4.92	9.15	0.029
EE and Low Income Subtotal	26,950	21,701,658	390,050,321	26,463	20,024,284	340,899,382	129,127	$266,656	10.70	24.82	0.018
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	26,950	21,701,658	390,050,321	26,463	20,024,284	340,899,382	129,127	$266,656	10.70	24.82	0.018

TABLE RPU-2. EE Program Results by Sector

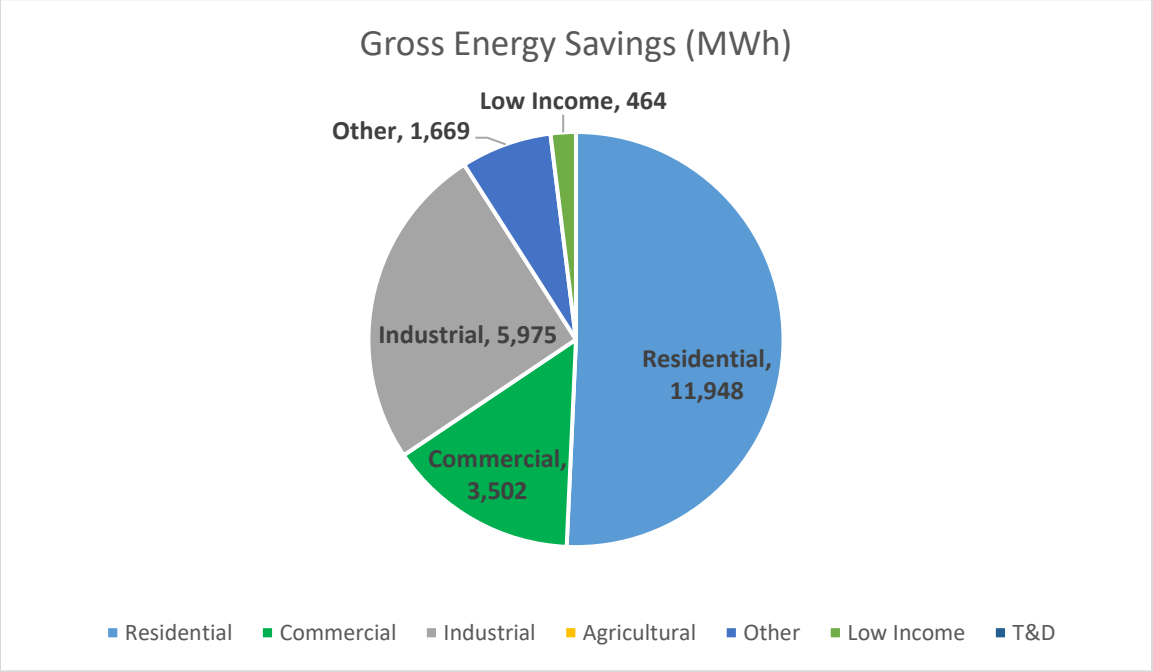
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	24,795	13,133,816	185,908,160	24,790	13,131,343	185,868,329	67,176	$249	11.34	32.56	0.012
Residential	2,155	6,446,409	173,652,822	1,673	4,771,508	124,541,714	49,695	$3,905	12.25	26.43	0.025
EE Subtotal	26,950	19,580,225	359,560,982	26,463	17,902,851	310,410,043	116,871	$4,154	11.83	28.84	0.016
Residential	0	2,121,433	30,489,339	0	2,121,433	30,489,339	12,255	$262,502	4.92	9.15	0.029
Low-Income Subtotal	0	2,121,433	30,489,339	0	2,121,433	30,489,339	12,255	$262,502	4.92	9.15	0.029
EE and Low Income Subtotal	26,950	21,701,658	390,050,321	26,463	20,024,284	340,899,382	129,127	$266,656	10.70	24.82	0.018
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	26,950	21,701,658	390,050,321	26,463	20,024,284	340,899,382	129,127	$266,656	10.70	24.82	0.018

TABLE RPU-3. 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	493	525,115	8,584,959	488	522,642	8,545,128	2,866	$249	6.14	25.81	0.023
Other Commercial	24,311	12,626,367	177,675,963	24,311	12,626,367	177,675,963	64,453	$0	11.81	32.99	0.011
Residential	2,145	6,428,743	173,300,060	1,663	4,753,842	124,188,952	49,552	$3,905	12.27	26.42	0.025
EE Subtotal	26,950	19,580,225	359,560,982	26,463	17,902,851	310,410,043	116,871	$4,154	11.83	28.84	0.016
Residential	0	2,121,433	30,489,339	0	2,121,433	30,489,339	12,255	$262,502	4.92	9.15	0.029
Low-Income Subtotal	0	2,121,433	30,489,339	0	2,121,433	30,489,339	12,255	$262,502	4.92	9.15	0.029
EE and Low Income Subtotal	26,950	21,701,658	390,050,321	26,463	20,024,284	340,899,382	129,127	$266,656	10.70	24.82	0.018
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	26,950	21,701,658	390,050,321	26,463	20,024,284	340,899,382	129,127	$266,656	10.70	24.82	0.018

Roseville at a Glance

- Climate Zone(s): 11
- Customers: 61,700
- Total annual retail sales (MWh): 1,124,363
- Annual Retail Revenue: $155,688,704
- Annual EE expenditures for reporting year: $5,767,261
- Gross annual savings from reporting year portfolio (MWh): 23,557



Roseville Overview

The City of Roseville is the largest city in Placer County and significantly influences the economy in South Placer County.

Municipal owned Roseville Electric Utility offers affordable electric rates and reliable power to over 54,900 residential customers and 6,800 commercial customers.

In 2020 Roseville issued 1,225 residential single family, 411 multifamily and 25 commercial building construction permits. Industrial vacancy rate is 2.3%, Office at 9.6 % and Retail at 6.4%.

The median household income in Roseville is $89,082 and 39% of residents over 25 have a bachelor's degree or higher. Interest in rooftop solar and EVs is high.

Major Program and Portfolio Changes

In response to COVID-19, the Utility changed the focus of the Home Energy Reports to increase public outreach on ways that Roseville Electric could lend support during this pandemic. Smart thermostat rebates were increased and new programs were developed to focus on household appliances to help residents increase efficiency while working and schooling from home. In addition, low income rate assistance programs were enhanced to assist those who lost employment due to the pandemic.

The small business community was provided a new program entitled "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.

During the summer months an enhanced HVAC tune up program was offered.

Roseville continues to develop a building electrification pilot program. The goal is to launch the program in early 2021.

Program and Portfolio Highlights

Residential customers participating in the Home Energy Reports (HERS) behavioral program contributed 34 % of Roseville Electric's EE savings) for FY 20. Through the Home Energy Reports program, Roseville Electric is able to educate customers with tips to save energy in their homes. The 6,537,157 kWh savings represents a full year of energy reports to over 38,000 customers and is reported with a NTG of 66% as recommended by the EM&V performed on this program in 2019.

Custom EE projects for commercial/municipal customers contributed 8,154,158 kWh in FY 20, 42% of total reported energy savings. These projects included HVAC & Chiller recommissioning and replacement and LED streetlights in the City of Roseville.

Interior and exterior commercial LED lighting retrofits contributed an additional 13% of total energy savings.

The EE savings achieved from the residential HER's, commercial Custom and Lighting programs contributed 17,211,797 kWh, 89% 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: Roseville Electric assisted approximately 1,600 customers with a rate reduction to their utility bills in FY 2020. Roseville worked with local agencies and libraries to offer assistance workshops to low income residents.

Low Income EE: Roseville offered two direct install programs designed for low income households in 2020. Both programs were possible through funding provided from the CARB GHG Cap and Trade program. The multifamily program provided energy education, a smart thermostat, HVAC tune up, a bathroom occupancy sensor and the installation of several water conservation measures. The refrigerator replacement program gave low income residents the opportunity to have an older refrigerator recycled and replaced with a new ENERGY STAR® unit.

Residential Windows: Program for retrofit Windows must be ENERGY STAR® rated with a U-value of .30 and a 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.

Complementary Programs

EV Program:
In FY 2020, residential customers purchasing new EVs were eligible for incentives for both the vehicle and the plug in charger. 301 EVs were purchased by residential customers in Roseville and received a rebate in FY 2020. Of the 301, 28 customers were enrolled in our low-income rate assistance program. 198 Level II chargers were also purchased by residential customers in Roseville and received a rebate in FY 2020. Of the 198, 8 customers were enrolled in our low-income rate assistance program. These numbers were lower than expected due to the COVID-19 pandemic.

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 backbone fees and to promote EVs 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 commercial vehicles and chargers to promote fleet conversion and workplace charging. This includes enhanced rebates for non-profit businesses. Commercial customers may also request a free site assessment. For Residential customers, the new vehicle rebate will be replaced by the Clean Fuel Reward program at point of purchase and Roseville will open a new rebate program for used EVs.

In 2018, an independent assessment of the potential impact of EVs to the City of Roseville Electric grid was prepared for Roseville Electric Utility and provided recommendations for a strategic approach to address the electrification of the transportation industry. Roseville staff is using this report and other industry research to identify opportunities for improvements and expansion of our existing EV program. Roseville plans to update this assessment in 2021.

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

City of Roseville Utility Exploration Center:
Roseville Electric contributed $431,757 to the Utility Exploration Center in FY 2020 for the ongoing development and maintenance of exhibits for this 4000 sq. ft. educational facility. The mission of this facility is to educate visitors of all ages with information about water and energy conservation and achieving a sustainable lifestyle.

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 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 ROSE-1. EE Program Results by End Use

Summary by End Use	Resource Savings Summary								Cost Test Results		
End Use	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Appliance & Plug Loads	7	148,280	1,482,800	4	88,968	889,680	348	$100,100	0.93	0.58	0.076
BROs	0	9,904,783	9,904,783	0	6,537,157	6,537,157	2,998	$0	0.85	0.85	0.073
Building Envelope	202	639,291	12,597,456	152	371,587	7,378,996	3,423	$651,373	1.09	0.91	0.092
Commercial Refrigeration	0	4,300	51,600	0	3,440	41,280	15	$1,179	1.21	1.34	0.056
HVAC - Cooling	1,187	7,926,519	107,941,101	1,132	7,679,350	106,718,717	35,672	$1,061,795	3.41	3.67	0.022
Lighting - Indoor	342	1,350,029	14,850,319	308	1,215,026	13,365,287	4,911	$0	1.37	3.95	0.049
Lighting - Outdoor	754	3,119,375	34,313,125	719	2,974,324	32,717,567	15,762	$1,560,625	0.93	1.02	0.072
Process	0	1,117	11,170	0	894	8,936	3	$266	0.62	1.09	0.107
EE Subtotal	2,494	23,093,694	181,152,354	2,316	18,870,745	167,657,620	63,132	$3,375,338	1.83	2.03	0.040
Appliance & Plug Loads	24	463,641	3,356,160	24	463,641	3,356,160	1,367	$11,460	0.42	2.54	0.164
Low-Income Subtotal	24	463,641	3,356,160	24	463,641	3,356,160	1,367	$11,460	0.42	2.54	0.164
EE and Low Income Subtotal	2,518	23,557,335	184,508,514	2,339	19,334,386	171,013,780	64,499	$3,386,798	1.71	2.04	0.043
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,518	23,557,335	184,508,514	2,339	19,334,386	171,013,780	64,499	$3,386,798	1.71	2.04	0.043

TABLE ROSE-2. 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	836	3,502,377	41,774,925	760	3,194,713	38,587,416	15,430	$323,760	1.67	2.67	0.042
Industrial	799	5,974,757	89,621,355	799	5,974,757	89,621,355	28,837	$479,280	8.06	8.06	0.009
Other	407	1,668,868	18,357,548	407	1,668,868	18,357,548	8,844	$1,560,625	0.64	0.64	0.106
Residential	451	11,947,692	31,398,526	350	8,032,407	21,091,301	10,021	$1,011,673	0.82	0.84	0.101
EE Subtotal	2,494	23,093,694	181,152,354	2,316	18,870,745	167,657,620	63,132	$3,375,338	1.83	2.03	0.040
Residential	24	463,641	3,356,160	24	463,641	3,356,160	1,367	$11,460	0.42	2.54	0.164
Low-Income Subtotal	24	463,641	3,356,160	24	463,641	3,356,160	1,367	$11,460	0.42	2.54	0.164
EE and Low Income Subtotal	2,518	23,557,335	184,508,514	2,339	19,334,386	171,013,780	64,499	$3,386,798	1.71	2.04	0.043
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,518	23,557,335	184,508,514	2,339	19,334,386	171,013,780	64,499	$3,386,798	1.71	2.04	0.043

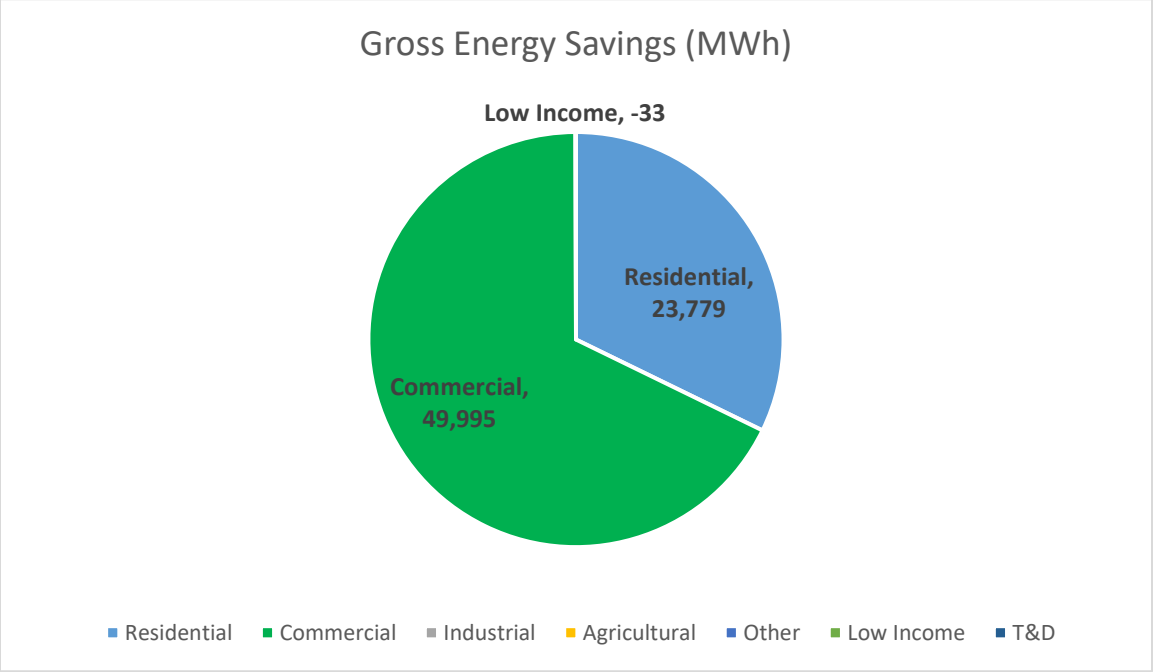
TABLE ROSE-3. EE Program Results by Building Type

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	760	3,036,689	33,307,762	725	2,899,365	31,806,464	13,786	$1,562,070	0.82	0.98	0.082
Education - Primary School	7	25,699	151,398	6	21,844	128,688	45	$55,309	0.20	0.15	0.398
Education - Secondary School	10	41,506	99,067	9	35,280	84,207	32	$29,057	0.26	0.19	0.294
Manufacturing Light Industrial	94	510,533	10,210,660	94	510,533	10,210,660	3,368	$112,800	2.51	2.51	0.032
Office - Large	25	89,953	221,665	21	76,460	188,415	69	$118,234	0.13	0.10	0.550
Office - Small	0	1,599	23,985	0	1,359	20,387	7	$6,916	0.19	0.17	0.385
Other Commercial	347	1,465,267	16,117,937	312	1,318,740	14,506,143	6,967	$0	2.29	4.47	0.029
Other Industrial	799	5,974,757	89,621,355	799	5,974,757	89,621,355	28,837	$479,280	8.06	8.06	0.009
Residential	250	11,039,799	24,077,271	196	7,336,794	15,516,303	7,288	$908,031	0.94	0.80	0.084
Residential - Single-Family	201	907,893	7,321,255	154	695,613	5,574,999	2,733	$103,642	0.61	0.96	0.153
EE Subtotal	2,494	23,093,694	181,152,354	2,316	18,870,745	167,657,620	63,132	$3,375,338	1.83	2.03	0.040
All	24	117,656	588,280	24	117,656	588,280	249	$11,460	0.27	1.35	0.250
Residential - Multi-Family	0	345,985	2,767,880	0	345,985	2,767,880	1,118	$0	0.48	3.16	0.145
Low-Income Subtotal	24	463,641	3,356,160	24	463,641	3,356,160	1,367	$11,460	0.42	2.54	0.164
EE and Low Income Subtotal	2,518	23,557,335	184,508,514	2,339	19,334,386	171,013,780	64,499	$3,386,798	1.71	2.04	0.043
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,518	23,557,335	184,508,514	2,339	19,334,386	171,013,780	64,499	$3,386,798	1.71	2.04	0.043

SACRAMENTO

Sacramento at a Glance

- Climate Zone(s): 12
- Customers: 640,712
- Total annual retail sales (MWh): 10,233,511
- Annual Retail Revenue: $1,403,354,000
- Annual EE expenditures for reporting year: $33,022,730
- Gross annual savings from reporting year portfolio (MWh): 73,741



Sacramento Overview

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.
- Due to the 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 California Energy Commission (CEC) and it was accepted. This was a 20-year plan, which included moves to a more carbon-free resource mix, building and TE and continuation of EE. 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.
- The increased emphasis on carbon reduction goals will also direct the utility industry to encourage the use of an increasingly renewable electric portfolio over natural gas.

- Predominate use of natural gas is used in homes compared to commercial businesses, so programs will more likely be focused on the residential sector.
- The expectations of residential and commercial customers are growing. Besides low-cost and reliable service, the expectation of the customer is now quality customer service and products that meet their business needs and personal lifestyles.
- There will be a continuation of more complex rate schedules that will mimic the cost and availability of renewable power and the intensities of carbon in the power mix.
- EE, building electrification, TE, solar and storage will continue to converge toward complete energy solutions, customized to meet the needs of the customer and the utility.
- Commercial customers' interest in Zero Net Energy (ZNE) solutions is growing.
- More and more customers prefer to access information and communicate via mobile devices.
- Consumers are becoming increasingly interconnected, fundamentally shifting channels of social interaction.
- Customers want clear and simple choices, which may be in conflict with complex rates and carbon reduction efforts.

Major Program and Portfolio Changes

There was a major reduction in the overall EE budget, with an ensuing reduction in the energy and peak savings achieved in 2020. This was both 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 biggest change in our EE program suite was due to pandemic issues. In the spring, the EE budgets were reduced by half to help with the financial stability of SMUD. Later in the year as we started to grasp the implications of the pandemic more fully, the funding was nearly fully restored. But these swings in budget did encourage us to embrace the move more fully to electrification. Several EE measures in various programs were eliminated or greatly reduced as we focused on the move to electrification and the new carbon reduction goal.

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 EVs 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.

Improved the Refrigerator Recycling online scheduling process, which added no-contact pickups because of COVID-19 as a standard offering and confirm appointments via text message.

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 the 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.

Advanced Commercial Solutions EE projects exceeded expectations despite the pandemic. The program received strong contributions to from cannabis and heavy industry, with the balance of the goal coming from a broad range of participants including hospitals, education, data centers, light manufacturing, grocery, and office buildings. The commercial building electrification programs released the first rebates for a suite of gas-to-electric conversions including heat pump water heaters, heat pump HVAC, cooking equipment and custom solutions. While participation in the retrofit market has been limited due in part to the pandemic, the new-construction market has been enthusiastic. Five electrification projects in 2020 ranged from a small bank to the large State of CA DGS office building. Thirteen applications have been received for commercial new construction projects electing to pursue electrification in 2021.

The Advanced Homes program continued its growth from 2019, with Heat Pump Space Heater rebate exceeding goals by 76% by October, incenting over 1,000 installations. The Heat Pump Water Heater rebate offering met installation goals, incenting over 1,000 installations by the end of the year. This resulted in more than 1,000 equivalent homes electrified in 2020.

The Home Appliance program achieved noteworthy results for a number of product offerings. The Refrigerator Recycling program recycled over 5,000 working refrigerators with continued partnerships with local retailers and second-hand appliance stores to recycle the oldest, most inefficient models that would otherwise have gone onto the secondhand market. 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 100 gas-to-electric induction conversion projects were rebated by year-end. SMUD co-founded a subcommittee of the Building Decarbonization Coalition called the Kitchen Electrification Group (KEG). KEG will support a list-serve, maintain a clearinghouse of reports and collateral, serve as a technical committee to vet customer messaging, coordinate and amplify engagement with manufacturers and vendors, and collaborate on joint projects that may include bulk purchasing and applying for grant funding.

The Multifamily Program shifted its program model to electrification, providing bundled solutions to deliver holistic multifamily property upgrades: including EE, commercial EVs and charging installations, tenant engagement opportunities, and low-income incentives. In 2020, of the 5 projects that participated in the program, two projects combined building electrification and EE measures adopting: one, heat pump space heating and heat pump water heating within a low income Multifamily community center and two, a central plant heat pump water heating upgrade for a senior housing site serving 124 apartments.

The Smart Homes Program completed 220 all electric homes this year, along with 2,200 commitments for additional homes and multifamily units to be constructed by 2024. We added KB Homes, one of the nation's largest homebuilders, to build 236 new all-electric homes. We currently have 5 top nationally ranked homebuilders participating in the program. We are also partnering with iconic national developer DeBartolo Development for an additional 400 multifamily units. This project is the first to pursue a transitional electrification strategy through the mixed-fuel option. The first completions for this project are expected in 2021. We began construction of the 1st All Electric high rise mixed-use project in SMUD's service territory, equipped with a singularly innovative central heat pump domestic hot water system.

Program and Portfolio Highlights

On July 17, 2020, the SMUD Board of Directors adopted a climate emergency declaration. 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

SMUD has a long history of environmental leadership, helping to pioneer renewable energy programs and standards. In 2018, SMUD successfully reduced GHG emissions by 50 percent from 1990 levels, the equivalent of removing 377,000 vehicles from the road. Furthermore, SMUD has reduced the carbon intensity of its power mix, which is now 50 percent carbon free on average. SMUD has also partnered to plant more than 500,000 shade trees throughout the Sacramento region to improve air quality, sequester carbon and reduce customer bills.

Building on its success, SMUD adopted its most recent IRP in 2018 that set a roadmap to achieving carbon neutrality by 2040, five years ahead of the state. The plan, approved in January 2020 by the California Energy Commission, focuses on local renewables, and includes a $7 billion investment

For 2020, SMUD spent $18.6 million for residential and commercial energy-efficiency programs, compared to a budget of $25.1 million.2 All expenditures are public-goods funded. These programs delivered 127.4 GWh of annual energy savings.

Commercial, Industrial & Agricultural Programs

Expenditures for commercial/industrial EE retrofit programs for existing buildings and facilities were $8.2 million, with delivery of 51.8 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 energy-efficiency programs for existing homes were $7.7 million and achieved 23.6 GWh in annual energy savings.

Equipment Efficiency: Provides rebates and/or SMUD financing for qualifying (ENERGY STAR®, Consortium for EE, and/or other high-efficiency levels) efficiency improvements to homes' building shells and equipment. Improvements include mini split heat pump, whole fans, central air conditioners and heat pumps and heat pump water heaters.

Home Performance Program: Participating contractors use building-science principles and diagnostic equipment to evaluate the current performance of the whole house, and then recommend comprehensive improvements that will yield an optimal combination of savings and comfort for homeowners. Once the homeowner selects the improvements that fit their needs and budget, participating contractors will do the work to Building Performance Institute standards.

Appliance Efficiency Program: Included in this program are Refrigerator/Freezer Recycling, Pool Pumps, and the Retail Partnership Program.

Refrigerator/Freezer Recycling provides rebates for the free pick-up and environmental recycling of old refrigerators and freezers.

Retail Partnership Program is an upstream program that works with big box retailers to pay retailer incentives for all the EE items they sell in their stores.

Complementary Programs

Information/Education Programs

Expenditures for Information and Education programs were $0.3M in 2020 and achieved 4.0 MW of peak-load reduction and 0.0 GWh in annual energy savings.

Home Electricity Reports: A scientifically designed program to measure the impact of sending electricity-usage reports to residential customers. The reports compare the customer's monthly usage to that of the previous year and to about 100 neighbors in similar-size homes with the same heat energy source. The reports are customized to each house and provide energy tips to assist the customer in making behavior changes that reduce their energy use.

Demand-Reduction Programs

Peak Corps (Residential AC 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.

Shade Trees: Provides free shade trees to SMUD customers. Implemented through the community-based non-profit Sacramento Tree Foundation (STF). STF foresters review tree selection and site locations with customers, who plant the trees.

Smart Homes: New construction program that integrates EE, demand response and other technologies in an aligned vision. The program is designed to complement SMUD's other portfolio programs (EE, DR, EV, etc.) to support SMUD's future load requirements. The resulting home design from those builders that participate will be an innovative use of energy-efficient design technologies, integrated built-in DR capabilities, automated peak shifting strategies, and other

"smart" connected options desired by homeowners. The All-Electric Smart Homes program focuses on increasing the opportunities for reducing carbon emissions in residential new construction.

Low-Income Programs: SMUD provides a low-income rate subsidy, a medical assistance rate subsidy, and no-cost weatherization and electrification services to our low-income customers.

EVs: In 2020, SMUD's Drive Electric program continued to promote adoption of plug-in EVs through special PEV rate offerings, participation in educational events, and educational offerings through our website SMUD.org/PEV.

Energy Storage: SMUD 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: Incentives for net-energy-metered PV; a feed-in tariff for mid-scale systems (currently closed); voluntary green pricing programs including SolarShares, which supports expansion of distributed PV; and commercial and residential REC purchase programs.

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.

Research, Development, and Demonstration: SMUD has a centralized research and development program that conducts public good research across the electricity enterprises from the supply side to demand side. Research is conducted in eight research areas which include renewable energy, TE, climate change, distributed generation, EE, demand response, storage, and smart grid. These programs seek to track emerging technologies, demonstrate promising technologies, and prepare SMUD and SMUD customers for adoption of these emerging technologies.

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" (June 2004) and "California EE Evaluation Protocols" (April 2006).

SMUD is planning to allocate approximately one percent of its total energy-efficiency budget towards impact- and persistence-focused M&V studies. These studies will be conducted primarily 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 2020:

Residential Equipment Efficiency

In 2021, M&V will be conducted for the following:

Residential Retrofit Building Electrification, which will include the Home Performance Program, Equipment Efficiency, and Multifamily Retrofit.

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 goal is to use the most current studies/workpapers which best represent CZ12 and SMUD customers.

TABLE SMUD-1. 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	2,585	11,774,037	94,838,537	1,751	7,974,346	68,325,785	9,927	$3,037,430	0.29	0.15	0.034
Commercial Refrigeration	312	2,706,927	40,584,914	250	2,165,542	32,467,931	4,418	$313,981	0.22	0.21	0.044
Food Service	27	136,990	1,642,845	22	109,592	1,314,276	186	$35,100	0.32	0.25	0.030
HVAC - Cooling	336	566,977	7,545,639	268	452,953	6,033,391	788	$254,456	0.37	0.21	0.036
HVAC - Heat Pump	2,301	2,546,000	38,078,440	1,381	1,527,600	22,847,064	3,488	$1,340,000	0.23	0.16	0.057
HVAC - Heating	0	7,183,890	107,626,159	0	4,310,334	64,575,695	9,674	$3,307,500	0.09	0.08	0.068
Lighting - Indoor	2,849	19,671,397	137,621,410	2,279	15,737,118	110,097,128	16,784	$3,595,910	0.22	0.17	0.042
Miscellaneous	2,467	19,970,234	299,258,810	2,377	19,259,650	288,617,519	38,392	$2,538,615	0.67	0.55	0.015
Process	968	7,423,612	111,302,359	881	6,755,487	101,285,146	13,526	$1,571,000	0.52	0.37	0.019
Water Pumping / Irrigation	41	204,127	2,038,294	25	122,476	1,222,976	186	$77,000	0.10	0.10	0.096
Whole Building	296	1,589,582	20,254,460	195	1,077,695	14,010,549	1,959	$1,604,500	0.07	0.06	0.139
EE Subtotal	12,182	73,773,773	860,791,867	9,428	59,492,792	710,797,461	99,328	$17,675,492	0.30	0.23	0.032
Appliance & Plug Loads	0	-1,558	-15,566	0	-1,558	-15,566	-2	$9,500	-0.01	-0.01	-1.491
HVAC - Heating	0	-1,670,550	-21,686,514	0	-1,670,550	-21,686,514	-3,382	$222,000	-0.09	-0.45	-0.066
Service & Domestic Hot Water	-41	-370,872	-4,821,233	-33	-296,698	-3,856,986	-539	$151,500	-0.12	-0.16	-0.075
Whole Building	406	2,010,216	20,072,852	406	2,010,216	20,072,852	3,047	$1,326,000	0.04	0.08	0.249
Low-Income Subtotal	365	-32,764	-6,450,461	373	41,410	-5,486,214	-876	$1,709,000	0.01	0.01	-1.637
EE and Low Income Subtotal	12,547	73,741,009	854,341,407	9,801	59,534,202	705,311,247	98,452	$19,384,492	0.23	0.21	0.042
All	10,501	52,000,000	78,150,685	10,501	52,000,000	78,150,685	13,000	$0	1.34	1.34	0.007
Codes & Standards Subtotal	10,501	52,000,000	78,150,685	10,501	52,000,000	78,150,685	13,000	$0	1.34	1.34	0.007
Appliance & Plug Loads	-1	-3,198	-31,951	-1	-3,198	-31,951	-5	$62,400	0.00	0.00	-4.416
HVAC - Heat Pump	-1,925	-9,525,671	-123,668,847	-1,541	-7,621,846	-98,948,141	-14,258	$4,586,718	-0.19	-0.16	-0.055
Miscellaneous	-172	-1,295,704	-19,410,346	-167	-1,256,833	-18,828,036	-2,536	$32,000	-1.25	-1.24	-0.008
Service & Domestic Hot Water	-391	-3,554,901	-45,770,964	-316	-2,873,378	-36,911,352	-5,170	$1,527,000	-0.08	-0.11	-0.109
Whole Building	-145	-754,276	-14,552,983	-144	-744,889	-14,412,282	-1,822	$1,282,770	-0.06	-0.05	-0.193
Electrification Subtotal	-2,635	-15,133,750	-203,435,091	-2,169	-12,500,144	-169,131,762	-23,791	$7,490,888	-0.14	-0.13	-0.073
C&S, T&D and Electrification Subtotal	7,866	36,866,250	-125,284,405	8,332	39,499,856	-90,981,077	-10,791	$7,490,888	-0.07	-0.06	-0.181
Utility Total	20,413	110,607,259	729,057,001	18,133	99,034,058	614,330,171	87,661	$26,875,380	0.14	0.13	0.068

TABLE SMUD-2. 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	6,729	49,995,173	591,686,342	5,897	44,125,507	535,242,086	73,387	$8,003,717	0.42	0.34	0.023
Residential	5,454	23,778,600	269,105,525	3,531	15,367,285	175,555,375	25,942	$9,671,775	0.15	0.11	0.060
EE Subtotal	12,182	73,773,773	860,791,867	9,428	59,492,792	710,797,461	99,328	$17,675,492	0.30	0.23	0.032
Residential	365	-32,764	-6,450,461	373	41,410	-5,486,214	-876	$1,709,000	0.01	0.01	-1.637
Low-Income Subtotal	365	-32,764	-6,450,461	373	41,410	-5,486,214	-876	$1,709,000	0.01	0.01	-1.637
EE and Low Income Subtotal	12,547	73,741,009	854,341,407	9,801	59,534,202	705,311,247	98,452	$19,384,492	0.23	0.21	0.042
Other	10,501	52,000,000	78,150,685	10,501	52,000,000	78,150,685	13,000	$0	1.34	1.34	0.007
Codes & Standards Subtotal	10,501	52,000,000	78,150,685	10,501	52,000,000	78,150,685	13,000	$0	1.34	1.34	0.007
Commercial	-186	-1,400,000	-20,973,687	-180	-1,351,742	-20,250,676	-2,719	$84,500	-0.30	-0.40	-0.034
Residential	-2,449	-13,733,750	-182,461,404	-1,989	-11,148,402	-148,881,086	-21,072	$7,406,388	-0.13	-0.12	-0.078
Electrification Subtotal	-2,635	-15,133,750	-203,435,091	-2,169	-12,500,144	-169,131,762	-23,791	$7,490,888	-0.14	-0.13	-0.073
C&S, T&D and Electrification Subtotal	7,866	36,866,250	-125,284,405	8,332	39,499,856	-90,981,077	-10,791	$7,490,888	-0.07	-0.06	-0.181
Utility Total	20,413	110,607,259	729,057,001	18,133	99,034,058	614,330,171	87,661	$26,875,380	0.14	0.13	0.068

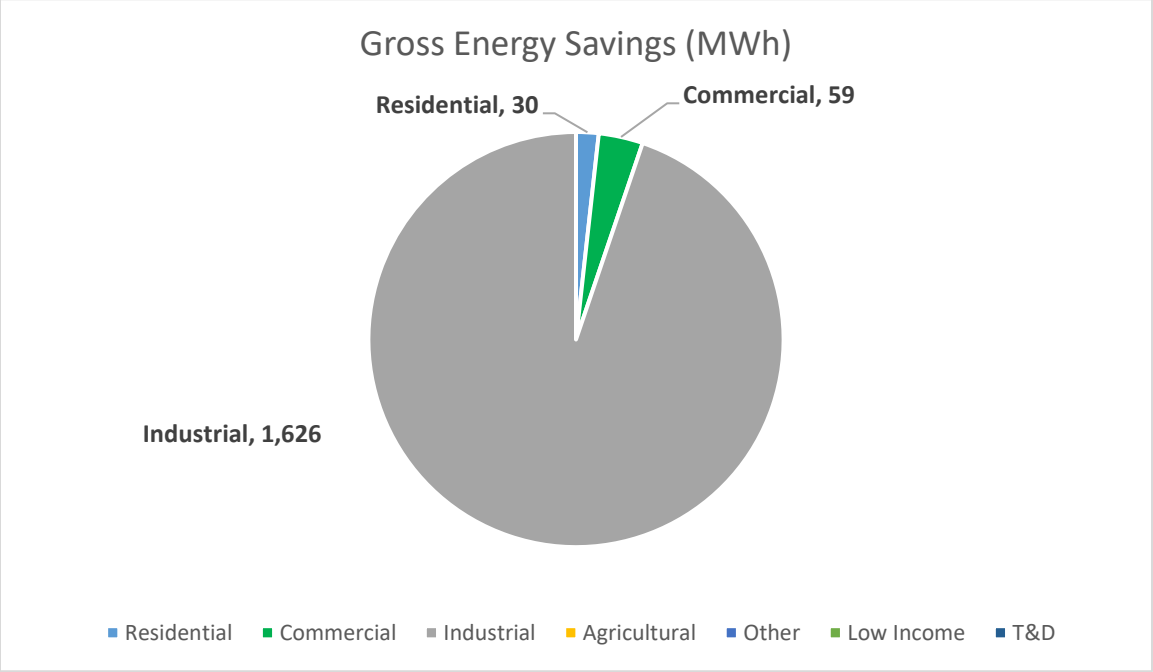
TABLE SMUD-3. EE Program Results by Building Type

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	89	650,596	4,631,873	71	520,612	3,707,530	566	$205,863	0.12	0.09	0.079
Education - Community College	20	204,112	3,060,043	20	197,989	2,968,242	411	$36,000	0.51	0.44	0.018
Education - Primary School	56	550,930	7,522,126	51	511,047	7,072,649	875	$94,600	0.61	0.41	0.016
Education - Secondary School	82	706,641	7,500,201	71	601,765	6,546,653	864	$111,780	0.37	0.34	0.026
Education - University	1	12,387	116,376	1	9,910	93,100	14	$6,000	0.15	0.11	0.061
Grocery	590	4,776,237	58,970,128	480	3,886,736	48,161,847	6,698	$812,810	0.26	0.22	0.038
Health/Medical - Hospital	358	2,986,914	44,733,492	346	2,892,601	43,329,365	5,751	$304,400	0.62	0.64	0.016
Health/Medical - Nursing Home	2	4,677	69,982	1	3,742	55,986	7	$3,861	0.17	0.13	0.072
Lodging - Hotel	56	365,465	3,346,581	46	301,565	2,815,045	412	$73,080	0.16	0.14	0.062
Lodging - Motel	16	113,719	795,917	13	90,975	636,736	99	$23,000	0.10	0.09	0.093
Manufacturing Biotech	319	2,424,824	36,006,497	308	2,344,507	34,873,288	4,666	$114,000	1.08	1.00	0.009
Manufacturing Light Industrial	1,280	10,522,094	138,025,970	1,184	9,768,688	130,676,613	17,635	$1,064,672	0.54	0.46	0.018
Office - Large	855	6,231,354	83,455,366	794	5,814,937	79,185,680	10,698	$1,085,210	0.50	0.39	0.020
Office - Small	200	1,473,792	16,416,162	172	1,262,989	14,389,589	2,004	$368,003	0.31	0.25	0.032
Other Agricultural	783	5,965,730	89,461,853	713	5,428,814	81,410,286	10,882	$1,350,000	0.51	0.35	0.020
Other Commercial	357	2,619,504	18,340,756	286	2,095,603	14,672,605	2,247	$646,160	0.30	0.17	0.031
Other Industrial	58	489,066	7,332,607	56	474,394	7,112,628	944	$50,000	0.76	0.66	0.013
Residential	5,240	15,367,065	144,442,200	3,372	10,129,590	97,937,935	14,455	$5,627,930	0.20	0.13	0.052
Residential - Multi-Family	126	879,473	6,434,249	101	703,578	5,147,399	784	$172,132	0.23	0.17	0.041
Residential - Single-Family	213	8,409,402	124,631,363	158	5,235,989	77,591,871	11,483	$4,039,845	0.10	0.09	0.068
Restaurant - Fast-Food	23	113,273	953,209	18	90,618	762,567	109	$23,810	0.21	0.22	0.047
Restaurant - Sit-Down	104	589,758	5,218,714	83	471,806	4,174,971	604	$90,612	0.13	0.12	0.077
Retail - Large	898	5,409,991	38,181,287	718	4,327,993	30,545,029	4,602	$746,889	0.34	0.26	0.028
Retail - Small	341	1,925,403	14,285,715	273	1,541,251	11,442,486	1,689	$496,005	0.22	0.17	0.044
Storage - Conditioned	70	592,020	4,137,890	56	473,616	3,310,312	500	$36,000	0.55	0.47	0.017
Storage - Unconditioned	46	389,346	2,721,312	37	311,477	2,177,050	329	$92,830	0.22	0.17	0.042
EE Subtotal	12,182	73,773,773	860,791,867	9,428	59,492,792	710,797,461	99,328	$17,675,492	0.30	0.23	0.032
Residential	406	2,010,216	20,072,852	406	2,010,216	20,072,852	3,047	$1,326,000	0.04	0.08	0.249
Residential - Single-Family	-41	-2,042,980	-26,523,313	-33	-1,968,806	-25,559,066	-3,923	$383,000	-0.09	-0.32	-0.068
Low-Income Subtotal	365	-32,764	-6,450,461	373	41,410	-5,486,214	-876	$1,709,000	0.01	0.01	-1.637
EE and Low Income Subtotal	12,547	73,741,009	854,341,407	9,801	59,534,202	705,311,247	98,452	$19,384,492	0.23	0.21	0.042
All	10,501	52,000,000	78,150,685	10,501	52,000,000	78,150,685	13,000	$0	1.34	1.34	0.007
Codes & Standards Subtotal	10,501	52,000,000	78,150,685	10,501	52,000,000	78,150,685	13,000	$0	1.34	1.34	0.007

Education - Secondary School	-10	-77,543	-1,162,400	-9	-70,564	-1,057,784	-134	$36,000	-0.12	-0.11	-0.082
Grocery	-2	-15,955	-239,184	-2	-14,519	-217,658	-29	$1,500	-0.04	-0.04	-0.265
Lodging - Motel	-86	-647,852	-9,713,188	-84	-628,416	-9,421,793	-1,282	$16,000	-1.25	-1.24	-0.008
Manufacturing Light Industrial	-1	-5,893	-88,335	-1	-5,363	-80,385	-11	$3,000	0.00	-0.01	-3.955
Office - Large	-1	-4,905	-73,421	-1	-4,464	-66,813	-9	$12,000	-0.01	-0.01	-1.082
Office - Small	-86	-647,852	-9,697,158	-83	-628,416	-9,406,243	-1,254	$16,000	-1.25	-1.25	-0.008
Residential - Multi-Family	-19	-153,831	-1,538,223	-19	-153,831	-1,538,223	-229	$138,623	-0.03	-0.03	-0.303
Residential - Single-Family	-2,429	-13,579,919	-180,923,181	-1,970	-10,994,571	-147,342,863	-20,843	$7,267,765	-0.13	-0.13	-0.076
Electrification Subtotal	-2,635	-15,133,750	-203,435,091	-2,169	-12,500,144	-169,131,762	-23,791	$7,490,888	-0.14	-0.13	-0.073
C&S, T&D and Electrification Subtotal	7,866	36,866,250	-125,284,405	8,332	39,499,856	-90,981,077	-10,791	$7,490,888	-0.07	-0.06	-0.181
Utility Total	20,413	110,607,259	729,057,001	18,133	99,034,058	614,330,171	87,661	$26,875,380	0.14	0.13	0.068

Shasta Lake at a Glance

- Climate Zone(s): 11
- Customers: 4,595
- Total annual retail sales (MWh): 208,441
- Annual Retail Revenue: $22,052,600
- Annual EE expenditures for reporting year: $181,188
- Gross annual savings from reporting year portfolio (MWh): 1,715



Shasta Lake Overview

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

Major Program and Portfolio Changes

The net annual energy savings for FY 2020 were 248% of the net kWh annual savings target. 95% of the savings reported in FY 2020 are attributed to a project at a large industrial customer site. Reportable savings tend to fluctuate dramatically from year to year. In the last five years, CSL has achieved 145% of net kWh savings targets.

Program and Portfolio Highlights

CSL piloted a new Commercial Lighting Program in FY 2020. 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/bulbs, ceiling fans and LED holiday lights.

Residential HVAC Program: CSL offers rebates to homeowners who install high performance heat pumps, central air-conditioners, room air-conditioners, or whole house fans that exceed current state requirements. CSL also offers a rebate for duct sealing when not required by code.

Residential Equipment Program: CSL offers rebates to homeowners who purchase new ENERGY STAR® qualified products, including clothes washers, room air conditioners, dishwashers, pool pumps, and refrigerators.

Residential Weatherization Program: CSL offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments/replacement, air/duct sealing and radiant barriers.

Residential Water Heater Rebate Program: CSL offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

Low-Income Programs: Lifeline monthly rate discount program and one-time bill assistance known as SHARE

Renewable Energy Programs: Focus on customized solar projects that benefit the City

Research, Development, and Demonstration: Focuses on LED lighting in various applications, community solar charging station(s) and latest HVAC applications in City owned facilities

EVs: Support of local business in conversion of combustion engine vehicles to EVs

EM&V Studies

The CSL is planning to complete EM&V in FY 2021 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 TRM. Non-residential lighting, custom projects and non-deemed measures utilize custom savings calculations.

TABLE CSL-1. 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	3,560	43,199	0	2,058	25,562	10	$1,530	0.21	0.22	0.654
Building Envelope	16	15,864	317,281	5	5,456	109,113	119	$20,773	1.04	0.90	0.404
HVAC - Cooling	3	8,713	132,508	2	6,898	104,558	47	$18,492	0.80	0.88	0.447
Lighting - Indoor	19	59,751	718,773	15	47,648	572,729	209	$19,494	2.42	2.28	0.050
Lighting - Outdoor	0	143,417	1,721,267	0	114,712	1,376,679	477	$28,726	4.10	4.10	0.027
Process	0	1,482,176	17,786,112	0	1,185,741	14,228,890	5,039	$53,145	25.78	23.89	0.004
Service & Domestic Hot Water	0	1,339	13,390	0	803	8,034	3	$905	0.68	0.59	0.165
EE Subtotal	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014
EE and Low Income Subtotal	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014

TABLE CSL-2. 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	19	59,164	709,968	15	47,331	567,974	207	$18,499	2.83	2.70	0.043
Industrial	0	1,625,507	19,506,089	0	1,300,406	15,604,872	5,516	$81,812	17.87	17.02	0.006
Residential	18	30,149	516,473	7	15,578	252,719	181	$42,755	0.76	0.75	0.454
EE Subtotal	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014
EE and Low Income Subtotal	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014

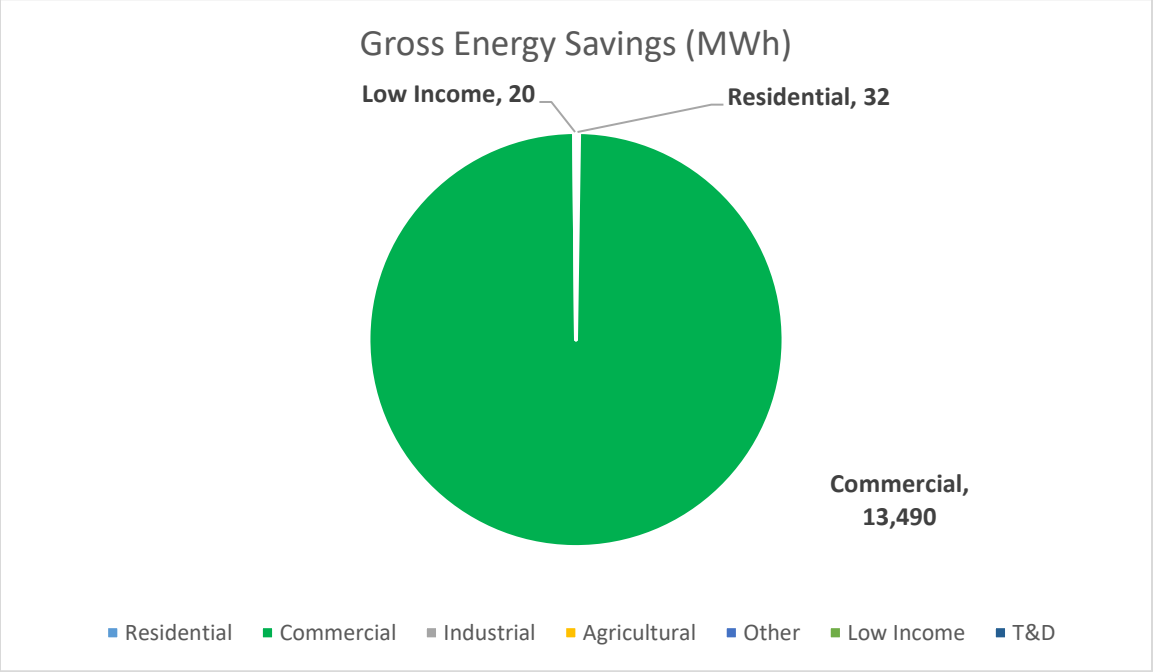
TABLE CSL-3. EE Program Results by Building Type

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	19	202,843	2,433,425	15	162,205	1,946,044	685	$47,225	3.54	3.48	0.032
Manufacturing Light Industrial	0	1,482,176	17,786,112	0	1,185,741	14,228,890	5,039	$53,145	25.78	23.89	0.004
Residential	15	23,768	409,184	5	11,627	186,899	157	$23,867	0.85	0.94	0.474
Residential - Single-Family	3	6,033	103,810	2	3,743	63,731	22	$18,828	0.45	0.31	0.382
EE Subtotal	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014
EE and Low Income Subtotal	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	37	1,714,821	20,732,531	23	1,363,315	16,425,565	5,904	$143,065	8.42	8.14	0.014

SILICON VALLEY POWER

Silicon Valley Power at a Glance

- Climate Zone(s): 4
- Customers: 57,165
- Total annual retail sales (MWh): 3,593,748
- Annual Retail Revenue: $422,917,148
- Annual EE expenditures for reporting year: $6,018,969
- Gross annual savings from reporting year portfolio (MWh): 13,542



Silicon Valley Power Overview

Silicon Valley Power (SVP) is unique in its mix of customers. While 84% of the customers are residential, over 90% of the utility retail sales are to commercial and industrial customers. Approximately 75.4% of our electric load is attributable to our largest "Key" Customers. Over 56% comes from data centers. Historically, it is those customers, including the large data centers, who implement a few large projects each year that make up the majority of our energy savings for the year. Combined with this unique customer mix and our mild climate, very little energy savings comes from the residential sector, as we do not have a high residential air conditioning load which often makes up a large percentage of energy portfolio savings in other climate zones.

Major Program and Portfolio Changes

In FY 2020, SVP made the following changes to its program portfolio:

Added a Residential Refrigerator Recycling Rebate Program - SVP offers customers a $50 rebate to recycle their old, working refrigerator or freezer through its program in order to ensure inefficient units are removed from the electric grid and recycled according to the EPA's Responsible Appliance Disposal (RAD) requirements.

Added a Nonprofit Grant program, which provides 501c3 organizations with the ability to receive up to $25,000 per program year for implementation of EE projects. The grant requires a 20% matching funds contribution through cash, other grant funding, donations, or some other documented means.

Added a COVID-19 EE Rebate - This program provided a one-time $30 rebate credit to all residential electric bills at the beginning of the pandemic and encouraged customers to use the funds to help improve the efficiency of their homes while working or attending school from home in order to offset the additional electric consumption. It was intended for customers to invest in smart power strips, efficiency lightbulbs, or smart plugs. Because of the nature of the program, there was no way to track measures installed, so no EE savings are being claimed under the program in this report.

Program and Portfolio Highlights

In FY 2020, SVP customers completed a total of 28 custom incentive projects under the Customer Directed Rebate and Date Center Rebate programs. These projects contributed over 9.4 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 SVP's customers, as the rebate is paid to the facility's operating budget annually after the initial capital project is closed. This was a benefit to the customer that utility staff did not anticipate and has been carried into other program design.

Commercial, Industrial & Agricultural Programs

Emerging Technologies Grant: The program provides grants to encourage businesses to develop new energy-related technologies. The incentive is $0.35/kWh, paid in two payments. The first payment of 50% of the incentive will be paid upon completion of the project and the second payment of 50% will be paid upon verification of energy savings. This is intended to encourage

customers to implement innovative EE projects and minimize some of the risks involved if the savings do not materialize as expected, which has been one of the barriers to program adoption. SVP is actively researching emerging technologies and reaching out to customers to inform them about the program and appropriate emerging technologies for their business.

Commercial New Construction Rebate: This program provides a rebate to customers who exceed Title 24 by 10% for the measure being incentivized, in line with our other prescriptive rebates for retrofit projects. A Design Team Incentive matching the Investor Owned Utilities' program is provided as follows: at 10% savings, the incentive rate is $0.033 per kWh. The incentive rate increases as the savings increase, up to 30% savings and $0.10 per kWh. The incentive rate remains at $0.10 per kWh until the project savings exceed 40%. At 40% and above, the incentive rate is $0.13 per kWh. The Design Team Incentive, capped at $50,000, also includes an incentive of $33 per peak kW reduction.

Business Energy Audits: Provides free EE audits to business customers. Energy & Resource Solutions administers this and other business PBC programs.

Business Rebates: Encourages businesses to install energy efficient lighting, air conditioners, motion sensors, programmable thermostats, food service equipment, etc. The programs are occasionally changed to match statewide programs.

Enhanced Ventilation Controls Rebate: This program provides an incentive of $160 per ton for adding enhanced ventilation controls to HVAC rooftop packaged units 15 tons or smaller.

Small Business Efficiency Services Program – This program is targeted at small business customers and aids in identifying EE projects, selecting and managing contractors, and help with filling out rebate application paperwork. The program also provides a 35% incentive for lighting and HVAC rebates, provided that customers to install the lighting measures within 6 months of program enrollment and HVAC measures within 12 months of enrollment in order to receive the additional incentive.

Controls Program – This program is available for projects where at least 80% of the savings come from the control strategies. Incentives are paid on a performance basis with 6 payments made over 5 years at a rate of $0.02/kWh saved annually, capped at 65% of total project cost, which is above the statewide program cap of 50%. The first payment is made upon project completion and each additional annual payment will be subject to commissioning of the controls system and validation of persistent energy savings.

Public Facilities' 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.

Keep Your Cool, which focused on replacement of refrigeration gaskets and use of strip curtains in commercial refrigeration facilities was launched in 2007. A second version of this program ran in FY 2015 and focused on strip curtains, efficient refrigeration motors, and LED case lighting. The latest version was launched in April 2017 and adds additional EE measures.

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

Energy Efficient Water Systems Program - This program provides engineering support and analysis to large customer facilities with cooling towers, significant wastewater systems, and significant pumping loads to assist in implementing EE measures which will also likely result in water conservation. The program provides an audit of the facilities and project management support to customers during the implementation phase to make the recommended EE improvements and validate the energy savings.

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

Data Center Efficiency Program – This program targets data centers with IT server load greater than 350 kW or cooling load greater than 100 tons. The incentive is paid as a performance incentive, where the customer will receive five annual payments based on actual measured energy savings, with the first payment made three months after project completion. The incentive payment is $0.03 per kWh in energy savings.

Customer Directed Rebate – This program provides incentives based on actual energy saved for EE measures that do not fall into SVP's standard business rebate programs. Lighting with network lighting controls will be removed from the Customer Directed rebate program and will now be covered under the standard lighting rebate.

Commercial Lighting Rebates – Incentives are determined through a lighting rebate calculator based on energy savings exceeding Title 24. This is available online so that customers and contractors can easily enter information about the project, facility, and operating hours in order to determine the amount of the rebate.

Commercial Prescriptive Lighting Rebate: We offer a prescriptive rebate for three types of LED retrofits: LED integral troffers, LED high bay fixtures, and LED low bay fixtures. These three

categories of lamp have the lowest program adoption rates and require a higher incentive than provided through the standard lighting rebate calculator to encourage adoption. The simplicity of a prescriptive rebate also makes this easier for contractors to sell.

Residential Programs

Residential Pool Pump Rebate: This program provides a $100 rebate to residential customers installing a new variable speed pool pump with a qualifying controller.

ENERGY STAR® Ceiling Fan: Residents who purchase ENERGY STAR® qualified ceiling fans (limit 3 per household) will be able to receive a $35 rebate per ceiling fan. The program will encourage customers to use ceiling fans to help cool their homes instead of using air conditioning.

ENERGY STAR® Residential Heat Pump Electric Water Heater Rebate – SVP offers a maximum rebate of $500 per household for the purchase of an ENERGY STAR®-qualified electric heat pump water heater.

Residential In-Home Energy Audits, Education, and Hot Line: The program encourages residents to become more energy efficient and reduce their energy bills. Staff members visit homes and provide information and energy saving items. Also, the SVP information booth will continue to be displayed at several City events, providing education on 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 ENERGY STAR® -qualified electric clothes dryer having a Combined Energy Factor (CEF) of 4.3-5.4. For ENERGY STAR®-qualified clothes dryers with a CEF of 5.5 or greater, the rebate is $200.

Complementary Programs

Financial Rate Assistance Program (FRAP) – This program provides a 25% discount on the electric portion of utility bills for income-qualified residential customers, up to the first 800 kWh of use per month.

Low Income EVSE 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.

EVSE Infrastructure Rebate - funded through non-Public Benefits fund sources, this program provides a rebate up to $1,000 per residential EV charger installed at residences receiving electricity from SVP. 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.

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 due to the COVID-19 stay at home order. 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

SVP recently conducted an EM&V study of its Custom rebates and Lighting Rebate programs. The study will be available in March 2020. All past EM&V studies conducted on behalf of SVP can be found on the California Municipal Utilities Association website.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

SVP uses the California Publicly Owned Utilities Technical Reference Manual (TRM) for the majority of its energy savings. Where no savings value exists, SVP uses actual savings verified through metering or an approved measurement and verification plan. In the case of lighting projects, SVP uses a lighting calculator that utilizes actual operating hours.[36]

[36] A copy of the calculator can be found at https://www.siliconvalleypower.com/businesses/rebates.

TABLE SVP-1. 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	5	29,071	196,538	3	20,037	129,333	24	$9,821	0.04	0.04	3.118
Building Envelope	0	151	1,510	0	42	423	0	$46	0.04	0.04	5.041
Food Service	2	20,048	240,576	2	17,041	204,490	41	$10,943	3.97	1.67	0.031
HVAC - Cooling	483	9,786,734	143,951,439	410	8,318,724	122,358,723	24,405	$5,414,577	4.58	1.86	0.029
Lighting - Indoor	1,989	3,037,724	24,055,605	1,193	1,939,058	14,782,633	2,874	$633,623	1.08	1.10	0.108
Lighting - Outdoor	0	68,058	258,374	0	46,378	171,654	33	$39,964	0.37	0.37	0.285
Process	70	577,489	7,915,810	60	490,866	6,728,439	1,349	$45,021	7.55	5.69	0.018
Service & Domestic Hot Water	0	3,008	30,080	0	1,805	18,048	4	$1,810	0.04	0.04	2.744
EE Subtotal	2,549	13,522,283	176,649,932	1,668	10,833,950	144,393,742	28,730	$6,155,804	2.41	1.71	0.054
Appliance & Plug Loads	0	19,651	39,303	0	19,651	39,303	7	$5,428	0.04	0.04	2.742
Low-Income Subtotal	0	19,651	39,303	0	19,651	39,303	7	$5,428	0.04	0.04	2.742
EE and Low Income Subtotal	2,549	13,541,934	176,689,235	1,669	10,853,601	144,433,044	28,738	$6,161,232	2.37	1.69	0.055
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,549	13,541,934	176,689,235	1,669	10,853,601	144,433,044	28,738	$6,161,232	2.37	1.69	0.055

TABLE SVP-2. EE Program Results by Sector

Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	2,544	13,490,053	176,421,804	1,665	10,812,066	144,245,938	28,703	$6,144,127	3.78	1.87	0.034
Residential	5	32,230	228,128	3	21,884	147,804	28	$11,677	0.01	0.02	16.836
EE Subtotal	2,549	13,522,283	176,649,932	1,668	10,833,950	144,393,742	28,730	$6,155,804	2.41	1.71	0.054
Residential	0	19,651	39,303	0	19,651	39,303	7	$5,428	0.04	0.04	2.742
Low-Income Subtotal	0	19,651	39,303	0	19,651	39,303	7	$5,428	0.04	0.04	2.742
EE and Low Income Subtotal	2,549	13,541,934	176,689,235	1,669	10,853,601	144,433,044	28,738	$6,161,232	2.37	1.69	0.055
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,549	13,541,934	176,689,235	1,669	10,853,601	144,433,044	28,738	$6,161,232	2.37	1.69	0.055

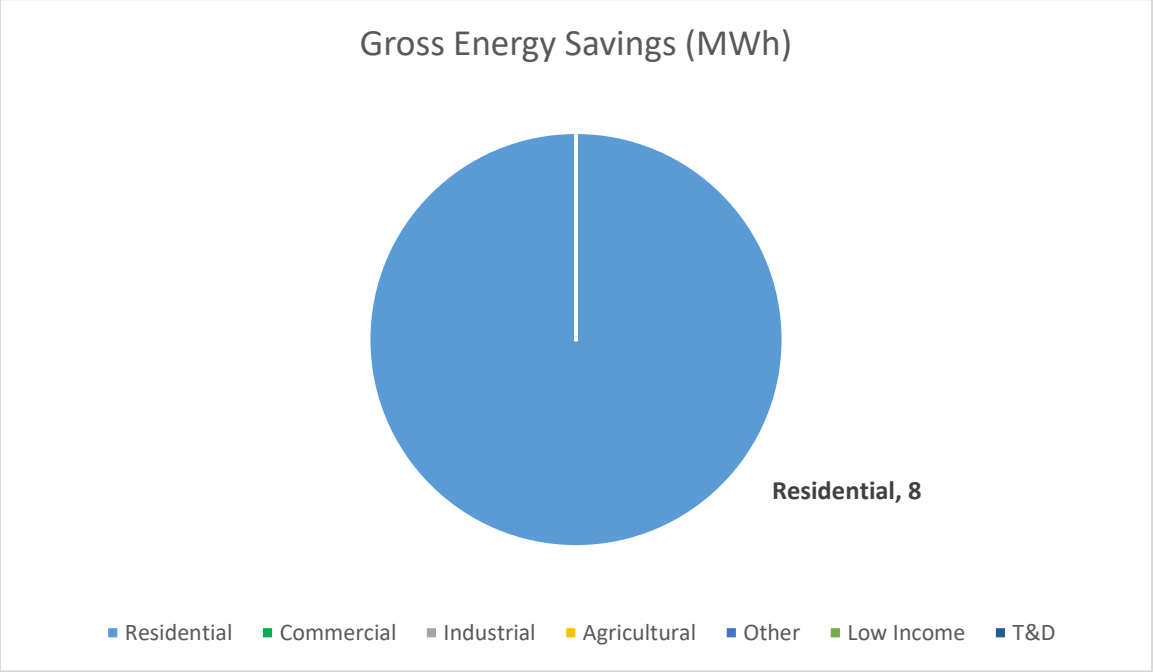
TABLE SVP-3. EE Program Results by Building Type

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	2,546	13,502,065	176,481,864	1,667	10,820,474	144,287,980	28,710	$6,146,467	3.66	1.84	0.035
Residential	0	3,008	30,080	0	1,805	18,048	4	$1,810	0.00	0.00	119.928
Residential - Single-Family	3	17,210	137,988	2	11,671	87,714	17	$7,527	0.05	0.04	3.156
EE Subtotal	2,549	13,522,283	176,649,932	1,668	10,833,950	144,393,742	28,730	$6,155,804	2.41	1.71	0.054
Residential - Single-Family	0	19,651	39,303	0	19,651	39,303	7	$5,428	0.04	0.04	2.742
Low-Income Subtotal	0	19,651	39,303	0	19,651	39,303	7	$5,428	0.04	0.04	2.742
EE and Low Income Subtotal	2,549	13,541,934	176,689,235	1,669	10,853,601	144,433,044	28,738	$6,161,232	2.37	1.69	0.055
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,549	13,541,934	176,689,235	1,669	10,853,601	144,433,044	28,738	$6,161,232	2.37	1.69	0.055

TRINITY

Trinity at a Glance

- Climate Zone(s): 16
- Customers: 7,312
- Total annual retail sales (MWh): 119,949
- Annual Retail Revenue: $11,010,000
- Annual EE expenditures for reporting year: $140,949
- Gross annual savings from reporting year portfolio (MWh): 8



Trinity Overview

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

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

Serves small economically depressed area in northern California consisting of approximately 7,300 meters in mountainous terrain covering an area the size of Delaware. TPUD is comprised of nine small substations serving 600 miles of distribution line. TPUD has a peak coincident demand of approximately 25 megawatts, which may occur in winter or summer. More than 60 percent of TPUD's load is residential.

Major Program and Portfolio Changes

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

Program and Portfolio Highlights

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

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

Commercial, Industrial & Agricultural Programs

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

Residential Programs

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

Complementary Programs

EM&V Studies

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE TRIN-1. 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	26	7,056	105,840	20	5,645	84,672	40	$140,917	0.11	0.18	2.224
Service & Domestic Hot Water	0	1,336	13,360	0	802	8,016	3	$32	26.67	0.76	0.005
Energy Efficiency Subtotal	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
EE and Low Income Subtotal	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014

TABLE TRIN-2. EE Program Results by Sector

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	26	7,056	105,840	20	5,645	84,672	40	$140,917	0.11	0.18	2.224
Service & Domestic Hot Water	0	1,336	13,360	0	802	8,016	3	$32	26.67	0.76	0.005
Energy Efficiency Subtotal	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
EE and Low Income Subtotal	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014

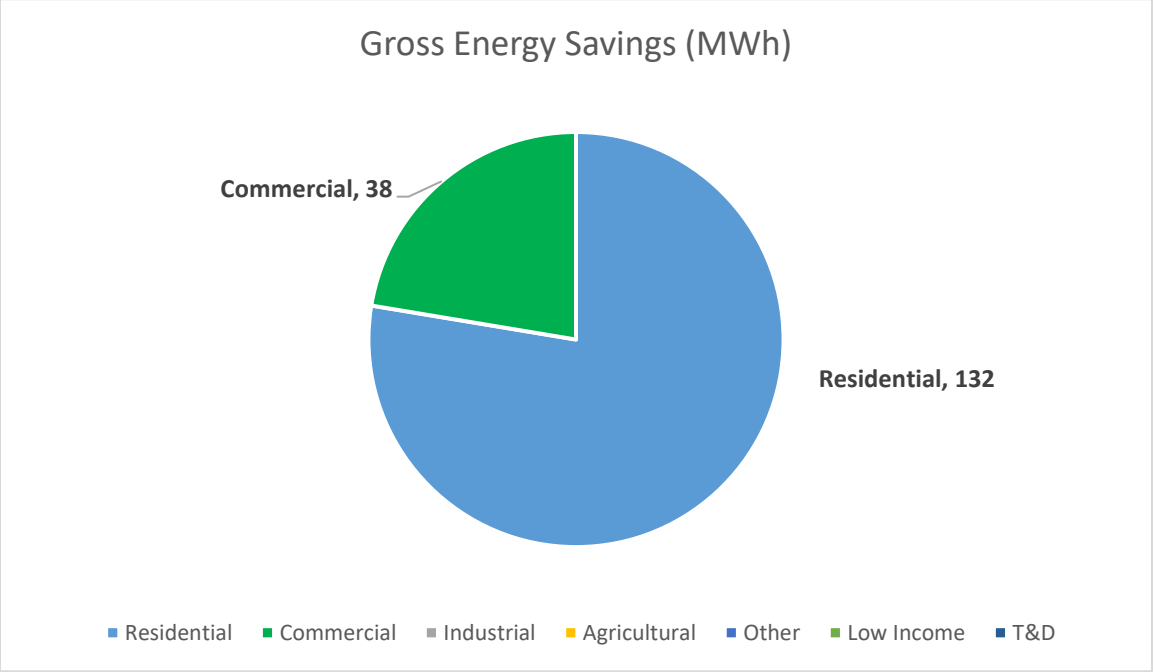
TABLE TRIN-3. EE Program Results by Building Type

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	26	7,056	105,840	20	5,645	84,672	40	$140,917	0.11	0.18	2.224
Service & Domestic Hot Water	0	1,336	13,360	0	802	8,016	3	$32	26.67	0.76	0.005
Energy Efficiency Subtotal	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
EE and Low Income Subtotal	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	26	8,392	119,200	20	6,446	92,688	43	$140,949	0.11	0.19	2.014

TRUCKEE DONNER

Truckee Donner at a Glance

- Climate Zone(s): 16
- Customers: 14,270
- Total annual retail sales (MWh): 159,130
- Annual Retail Revenue: $26,605,273
- Annual EE expenditures for reporting year: $221,839
- Gross annual savings from reporting year portfolio (MWh): 169



Truckee Donner Overview

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.

In 2020, TDPUD continued to invest in public benefit, low income, and renewable power programs. TDPUD treats EE as an electric resource (first loading order) and is therefore motivated by actual savings.

Major Program and Portfolio Changes

Energy savings and program spending were a challenge in 2020 due to the COVID-19 Pandemic.

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 historic savings and this is reflected in the 2020 results.

TDPUD completed its AMI installation project in 2019 and implemented a Prepay program as its first Behavioral program. We have also begun to explore home energy reports and other customer engagement tools.

Our low income program was changed from a one-time bill credit up to $200 to an annual credit up to the customer's highest bill in 2019. TDPUD's Board, in response to the COVID-19 crisis, doubled the amount of assistance to twice the customers highest bill (up to $800).

TDPUD, in 2019, added a Heat Pump Water Heater rebate of $1,000 for electric upgrades, or $3,000 for gas to electric conversions. TDPUD has been tracking the results of this pilot program and engaged a consultant in 2020 to perform and overall electrification study for the electric utility including evaluation and recommendation for new programs.

To replace historic savings from lighting programs, TDPUD has engaged with large commercial customers (sewer plant, airport, schools, Town of Truckee, etc.) to explore customer commercial projects going forward.

Due, in part, to saturation of EE programs and diminishing returns, TDPUD has started to transition resources to electrification and other cost-effective GHG opportunities.

Program and Portfolio Highlights

TDPUD's program offerings were restricted during the COVID-19 pandemic due to safety concerns. However, traditional programs – such as residential appliance and other rebates – continued to perform well. 2020 was a difficult year for working directly with commercial customers on EE due financial concerns and the ability to engage.

TDPUD's Residential Energy Survey's was a very popular program with customers. The 'visual survey' comes complete with over 20 free energy and water saving measures – including up to 50 free LED bulbs - that are delivered at the end of the survey for free. This program allows customers to implement the 'low hanging fruit' immediately and the educational component empowers customers to pursue more complicated EE opportunities. Unfortunately, this program

was suspended in early 2020 due to COVID-19 and remains suspended at the time of this writing in March of 2021.

Commercial, Industrial & Agricultural Programs

Business Green Partners Lighting Program (Non-Res Lighting): Provides energy efficient screw-in LED bulbs, free of charge, to replace existing incandescent and halogen bulbs. TDPUD conservation specialist visits business to evaluate lighting needs and provide solutions.

Commercial Lighting Rebate (Non-Res Lighting): Provides incentives to commercial customers for replacing inefficient lighting equipment with high efficiency lighting. Customers may receive a rebate equal to 1/3 of project cost (up to $10,000) for replacing old linear fluorescent fixtures with reduced wattage T8 fluorescent or LED fixtures. Other lighting retrofits may qualify for a rebate equivalent to projected first year energy saving.

Commercial Custom Rebate (Non-Res Process): Provides incentives to commercial electric customers for replacing inefficient plant equipment with high efficiency equipment. Customers may receive a rebate equal to the projected first year energy savings.

Residential Programs

Residential Green Partner Lighting Program (Res Lighting): Encourages customers to replace incandescent and halogen light bulbs with energy efficient lighting by distributing, mostly in person and for free, five types of LED's. This program is only available through the Residential Energy Survey Program.

Residential Energy Survey – RES (Res Lighting): Provides free residential energy surveys and free energy and water-saving measures including the installation of up to 50 energy efficient LED bulbs, and 2 low-flow shower heads at the time of survey. Customers are also informed about TDPUD conservation programs that they may benefit from and provided with associated literature.

Residential Appliance Rebate (Appliance): Provides increasing incentives to customers to purchase more energy efficient appliances (clothes washers, dishwashers, and refrigerators) as identified by ENERGY STAR® and the Consortium for EE (CEE). Rebates range from $75 to $125.

Refrigerator Recycle (Res Refrigeration): Promotes the recycling of older, working refrigerators and freezers by providing customers with free pick-up and a $30 rebate.

Heat Pump Water Heater (Res Electric Water Heater): Provides a $1,000 rebate for electric water heaters with a UEF > 2.85, and $3,000 for gas to electric conversions.

LED Holiday Light Program (Res Lighting): Provides a $5/$10 rebate for 100/300 LED light strands, respectively.

Payment Assistance Program Income-Qualified (Res Lighting): 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 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.

Residential Building Efficiency Rebates (Res Shell): Provides an incentive of up to $75 each for building envelope and/or duct air leakage tests and up to $250 (50% of project cost) each for building envelope or duct leakage mitigation.

Thermally Efficient Windows Rebate (Res Shell): Provides an incentive of $5 per square foot of window to replace qualifying single-pane windows. Primary heating source must be a permanent electric space heating system.

Water-Efficient Toilet Rebate (Non-Res Process): Encourages customers to replace high-water use toilets with low water use toilets (1.28 and 1.6 GPF) by providing increasing incentives for more efficient toilets. Rebates range from $25 to $100.

Patricia S. Sutton Conservation Garden (Not Evaluated): Promotes water-efficient landscaping by demonstrating, at the TDPUD's headquarters, native and drought tolerant plants, hardscaping/mulching techniques, and efficient irrigation. Plant lists, design, and materials used in the project are all available via a web-based resource at www.tdpud.org.

School Conservation Education (Res Lighting): Promotes energy and water conservation through an innovative series of programs designed to both educate students and deliver, for free, energy and water savings measures. 2020 handouts were suspended due to COVID-19.

Complementary Programs

Low-Income Programs: The TDPUD's income-qualified program, Payment Assistance Program, was also described in the Program Descriptions as the participation requires that customers also implement EE measures. This program 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 their highest energy charge in the past 12-months upon completion of the required Residential Energy Survey (RES). TDPUD's income-qualified program achieves a solid return on investment for both the customer and utility.

Renewable Energy Programs: TDPUD had a successfully fully subscribed our SB1 Solar Rebate program for our customers. TDPUD also achieved an estimated 63% Renewable Portfolio Standard (RPS) in 2020 using the methodology defined by the California Energy Commission. This number would be higher if we considered carbon-free resources. TDPUD has been able to transition our energy resource portfolio from primarily fossil fuel based in 2008 to a diversified

mix that includes wind, solar, landfill gas, and small hydro while maintaining stable and competitive rates.

Research, Development, and Demonstration: It is not practical for a small utility like TDPUD to run direct RD&D programs. However, through the Northern California Power Agency, TDPUD does participate in the APPA's DEED R&D program, the FLEX lab project and TDPUD Staff does investigate new energy and water conservation products and programs. TDPUD is researching innovative ways to capture residential EV charging data other than cost-prohibitive electric utility meters.

EVs: TDPUD installed two Plug-In EV (PEV) public access charging station's locations in 2015. Each location is monetized and has two, Level 2 PEV charging stations and are open to the public. One location is in the Truckee Train Depot in historic downtown Truckee and the other is located in the Pioneer Commerce Center. TDPUD has partnered with the Tahoe Regional Planning Agency (TRPA) on a Truckee-Tahoe PEV Readiness Plan and TRPA received a $200,000 grant from the California Energy Commission (CEC). TDPUD also offers a rebate up to $500 off Residential charging stations and $2,000 for Commercial charging stations. TDPUD is a participant in the Low Carbon Fuel Standard (LCSF) market.

Energy Storage: TDPUD has not identified any cost-effective energy storage projects for our customers or for a utility with our demand profile and size. This was confirmed by an outside consultant report in 2020.

EM&V Studies

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

None

TABLE TDPUD-1. 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	13	120,243	1,064,587	9	81,863	741,913	408	$0	1.64	2.56	0.107
Building Envelope	12	5,348	61,376	9	4,034	46,946	74	$0	0.57	0.93	0.675
Lighting - Indoor	17	43,830	753,439	13	34,737	598,632	214	$0	0.44	0.51	0.327
EE Subtotal	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214
EE and Low Income Subtotal	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214

TABLE TDPUD-2. 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	16	37,913	682,438	12	30,299	545,381	191	$0	1.40	2.06	0.091
Residential	25	131,508	1,196,964	17	90,334	842,110	505	$0	0.69	0.87	0.284
EE Subtotal	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214
EE and Low Income Subtotal	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214

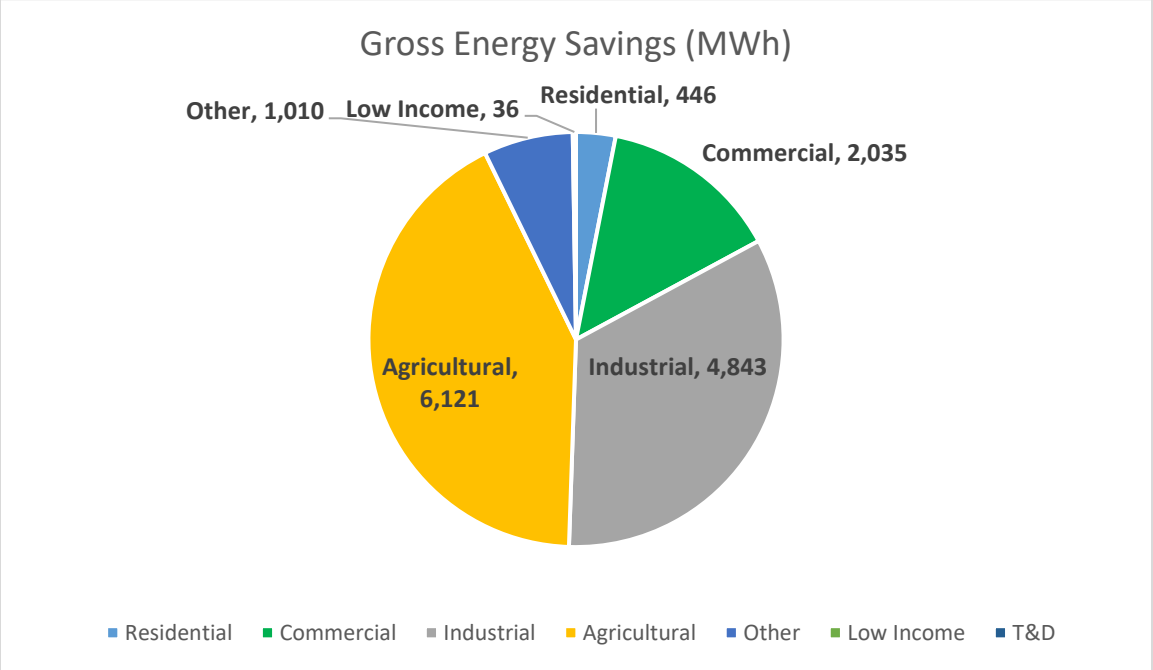
TABLE TDPUD-3. EE Program Results by Building Type

Summary by Building Type	Resource Savings Summary								Cost Test Results		
Building Type	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Other Commercial	16	37,913	682,438	12	30,299	545,381	191	$0	1.40	2.06	0.091
Residential	25	131,508	1,196,964	17	90,334	842,110	505	$0	0.69	0.87	0.284
EE Subtotal	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214
EE and Low Income Subtotal	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	41	169,421	1,879,402	30	120,633	1,387,491	696	$0	0.79	1.02	0.214

TURLOCK

Turlock at a Glance

- Climate Zone(s): 12
- Customers: 103,984
- Total annual retail sales (MWh): 2,213,432
- Annual Retail Revenue: $300,973,927
- Annual EE expenditures for reporting year: $2,694,032
- Gross annual savings from reporting year portfolio (MWh): 14,492



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. The majority of our savings are derived from LED lighting. However, TID provides a variety of options for businesses that are looking to make changes in their existing systems by making upgrades or retrofitting their existing facility. Rebates are available that address areas such as lighting, compressed air systems, refrigeration systems, motors, gaskets, chillers, and many other systems components.

Major Program and Portfolio Changes

TID launched the Dairy Fan rebate program in 2020. This program was designed to rebate the use of a variable frequency drive (VFD) on circulation fans that dairy farmers use to cool cattle during the summer months.

Program and Portfolio Highlights

TID took on a multi-year project to retrofit over 5,000 dusk to dawn lights to LED's. TID has saved over 1,889,276 kWh over the first two years of this project.

Commercial, Industrial & Agricultural Programs

Commercial LED rebate programs: TID offers our non-residential customers a lighting rebate that is paid based on kWh savings. Our non-residential LED rebate program is 80% of our overall savings.

Direct Install LED Lighting: TID offered our small/medium size non-residential customers an LED direct install program to encourage retrofitting to LED.

Dairy Fan VFD rebate program: TID offers our dairy customers a rebate for installing VFDs on cooling fans in their freestall and milk barns.

Residential Programs

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

During 2020, 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 2018 EM&V is available at: https://www.cmua.org/emv-reports

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TID calculates all non-residential LED lighting savings. We establish baseline and determine actual savings for new LED lighting installed. We are capturing actual savings and verifying quantities per project.

TABLE TID-1. 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	142,942	1,387,535	6	79,769	753,949	304	$72,250	2.25	1.68	0.067
Building Envelope	12	40,449	755,785	3	11,326	211,620	131	$38,133	4.74	2.78	0.076
Commercial Refrigeration	4	12,096	181,440	3	9,677	145,152	53	$26,527	1.46	0.57	0.083
HVAC - Cooling	32	558,682	9,069,548	25	446,946	7,255,638	2,906	$6,081,482	5.26	0.24	0.045
Lighting - Indoor	2,731	10,974,275	164,609,373	2,729	10,971,024	164,562,789	59,443	$3,987,108	10.56	3.67	0.012
Lighting - Outdoor	0	2,090,815	31,362,223	0	2,090,815	31,362,223	14,487	$1,040,050	4.00	2.77	0.033
Miscellaneous	0	5,274	58,014	0	4,219	46,411	17	$1,601	15.34	3.29	0.008
Process	28	629,294	9,439,416	22	519,480	7,792,201	2,852	$634,482	10.48	1.38	0.012
Service & Domestic Hot Water	0	2,400	24,000	0	1,440	14,400	5	$2,715	5.26	0.77	0.021
EE Subtotal	2,815	14,456,226	216,887,333	2,789	14,134,695	212,144,384	80,200	$11,884,346	8.01	1.92	0.017
Appliance & Plug Loads	1	2,189	28,666	0	1,483	19,571	7	$15,875	0.15	0.14	1.057
Building Envelope	1	1,538	15,664	0	431	4,386	2	$11,472	0.13	0.12	2.294
HVAC - Cooling	0	410	3,690	0	328	2,952	1	$500	0.16	0.54	1.932
Lighting - Indoor	3	25,182	377,730	1	13,598	203,974	80	$29,415	1.02	0.78	0.130
Lighting - Outdoor	0	6,944	104,160	0	3,750	56,246	22	$6,160	1.00	0.93	0.138
Low-Income Subtotal	5	36,263	529,910	3	19,589	287,130	112	$63,422	0.55	0.51	0.254
EE and Low Income Subtotal	2,820	14,492,489	217,417,243	2,792	14,154,284	212,431,513	80,312	$11,947,768	7.86	1.91	0.017
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,820	14,492,489	217,417,243	2,792	14,154,284	212,431,513	80,312	$11,947,768	7.86	1.91	0.017

TABLE TID-2. 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	1,792	6,120,918	91,813,763	1,792	6,120,918	91,813,763	33,496	$1,616,998	10.84	4.90	0.012
Commercial	151	2,035,355	30,509,230	151	2,032,533	30,471,121	13,261	$1,000,770	3.78	2.83	0.035
Industrial	540	4,843,460	72,651,902	533	4,683,643	70,254,643	25,843	$7,249,292	10.88	1.11	0.012
Other	277	1,010,464	15,156,960	277	998,713	14,980,692	5,574	$1,674,517	10.15	0.84	0.012
Residential	56	446,029	6,755,479	37	298,888	4,624,166	2,025	$342,769	3.77	3.02	0.081
EE Subtotal	2,815	14,456,226	216,887,333	2,789	14,134,695	212,144,384	80,200	$11,884,346	8.01	1.92	0.017
Residential	5	36,263	529,910	3	19,589	287,130	112	$63,422	0.55	0.51	0.254
Low-Income Subtotal	5	36,263	529,910	3	19,589	287,130	112	$63,422	0.55	0.51	0.254
EE and Low Income Subtotal	2,820	14,492,489	217,417,243	2,792	14,154,284	212,431,513	80,312	$11,947,768	7.86	1.91	0.017
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,820	14,492,489	217,417,243	2,792	14,154,284	212,431,513	80,312	$11,947,768	7.86	1.91	0.017

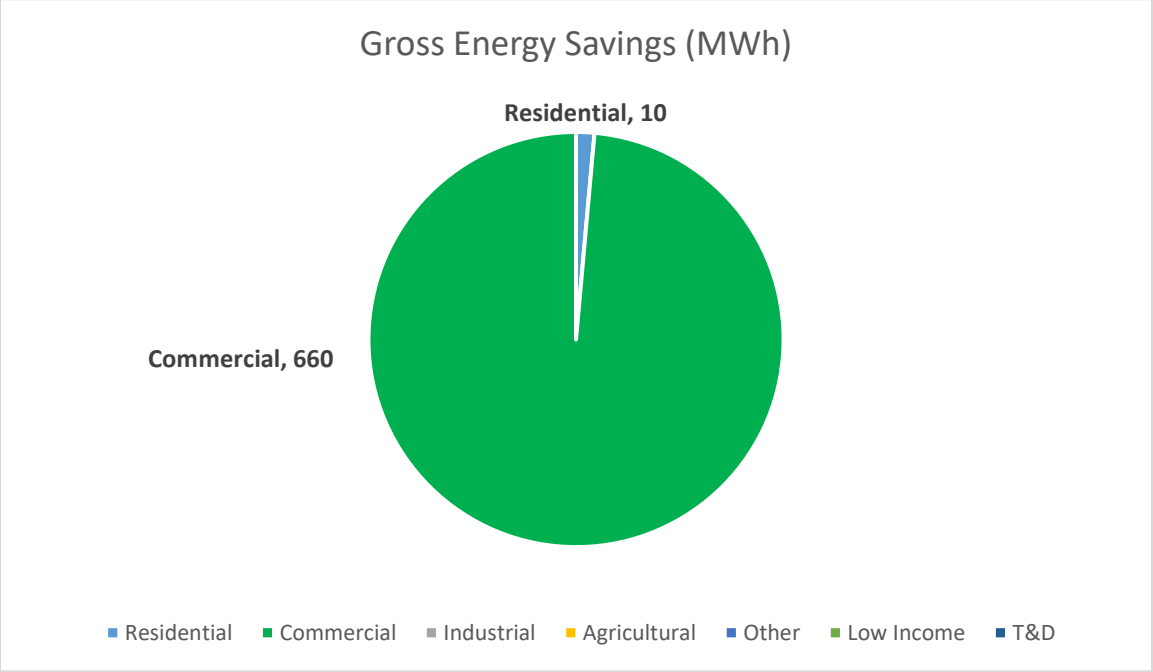
TABLE TID-3. EE Program Results by Building Type

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	29,967	147,139	6	20,901	102,617	43	$6,961	0.77	1.25	0.181
Education - Primary School	277	951,708	14,275,620	277	951,708	14,275,620	5,321	$1,260,854	9.88	0.98	0.012
Education - Secondary School	0	58,756	881,340	0	47,005	705,072	253	$413,663	14.94	0.32	0.013
Grocery	4	12,096	181,440	3	9,677	145,152	53	$26,527	1.46	0.57	0.083
Manufacturing Light Industrial	28	549,071	8,236,071	22	439,257	6,588,856	2,413	$580,140	10.87	1.30	0.012
Other Agricultural	1,792	6,201,141	93,017,108	1,792	6,201,141	93,017,108	33,935	$1,671,340	10.80	4.82	0.012
Other Commercial	151	2,031,099	30,445,390	151	2,029,128	30,420,049	13,243	$996,509	3.77	2.83	0.035
Other Industrial	508	3,964,151	59,462,261	508	3,964,151	59,462,261	21,884	$1,169,224	11.08	4.51	0.012
Residential	42	336,954	5,746,707	28	229,204	3,984,405	1,774	$288,517	4.13	3.28	0.082
Residential - Single-Family	6	79,109	861,633	3	48,783	537,143	208	$47,291	2.71	1.72	0.056
Storage - Conditioned	0	242,175	3,632,625	0	193,740	2,906,100	1,072	$5,423,321	11.08	0.07	0.012
EE Subtotal	2,815	14,456,226	216,887,333	2,789	14,134,695	212,144,384	80,200	$11,884,346	8.01	1.92	0.017
Residential	5	35,853	526,220	2	19,261	284,178	111	$62,922	0.59	0.51	0.234
Residential - Single-Family	0	410	3,690	0	328	2,952	1	$500	0.16	0.54	1.932
Low-Income Subtotal	5	36,263	529,910	3	19,589	287,130	112	$63,422	0.55	0.51	0.254
EE and Low Income Subtotal	2,820	14,492,489	217,417,243	2,792	14,154,284	212,431,513	80,312	$11,947,768	7.86	1.91	0.017
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	2,820	14,492,489	217,417,243	2,792	14,154,284	212,431,513	80,312	$11,947,768	7.86	1.91	0.017

UKIAH

Ukiah at a Glance

- Climate Zone(s): 3
- Customers: 8,233
- Total annual retail sales (MWh): 109,689
- Annual Retail Revenue: $14,901,916
- Annual EE expenditures for reporting year: $73,868
- Gross annual savings from reporting year portfolio (MWh): 669



Ukiah Overview

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

In recent years, incentives were adjusted to better match the rate at which Public Benefits (PB) funds were being utilized after the large PB balance being carried forward had been utilized. The incentives have resulted in a decrease in customer participation. The City has implemented a marketing plan to increase awareness and participation in the programs and is reassessing rebates levels to find the right rebate strategy that will utilize PB funds at the desired rate.

The City has experienced lower participation rates with "standard - cost sharing" EE incentive programs. The main reason for this is many customers do not have the discretionary income to

fund EE projects. Residential and commercial customers enthusiastically participate when the cost of their EE project is covered in full by the City's incentive programs. The City has responded by offering programs in the past to provide programs that deliver energy savings at no cost to residential and commercial customers.

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

Major Program and Portfolio Changes

There were no major program changes in FY 2020. The City is considering offering Low-Income and Commercial Lighting Direct Install programs.

Program and Portfolio Highlights

The Commercial Lighting Program delivered the greatest percentage of savings in FY 2020, accounting for 96% of the total savings. The City achieved 213% of the target energy savings for the reporting year.

Commercial, Industrial & Agricultural Programs

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

Non-Res Lighting: The City offers rebates to business owners who invest in the installation of EE lighting upgrades. There is a prevalence of inefficient lighting throughout the city instead of more efficiency fluorescent or LED fixtures.

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

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

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

Non-Res Electronics: The City offers rebates for uninterrupted power supplies, plug-load occupancy sensors and smart power strips.

Non-Res Custom: The City offers rebates to business owners based on site-specific consumption. Rebates are tailored to the individual business owner's needs based on the audit and the potential energy savings associated with the customer project.

Residential Programs

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

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

Residential HVAC: The City offers rebates to homeowners who install high performance heat pumps and air-conditioners that exceed current state requirements. The City also offers a rebate for duct sealing when not required by code.

Residential Equipment: The City offers rebates to homeowners who purchase new ENERGY STAR® qualified products, including clothes washers, dishwashers, pool pumps, refrigerators, and advanced power strips. Rebates are also available for refrigerator and freezer recycling.

Residential Weatherization: The City offers rebates to homeowners who invest in weatherizing their homes, including attic and wall insulation, window treatments/replacement, solar attic fans, and air sealing.

Residential Water Heater Rebate: The City offers rebates to homeowners who purchase a new, energy efficient electric water heater.

Complementary Programs

Low-Income Programs: The City offers a low-income bill assistance program to eligible customers.

Renewable Energy Program: The City offers assistance and net metering agreements to customers wishing to install Solar PV. The City also provides final performance inspections at no cost to the customer to ensure the solar PV system is performing properly.

EVs: In addition to the 8 Tesla Fast Charging stations, the Electric Utility is planning placement of Level II chargers at strategic locations throughout the City. The City has also received approval to offer a rebate for installation of a Level 2 EV charger in customer homes and up to $4,000 for public or workplace Level 2 chargers.

EM&V Studies

The City has received a proposal for partnering with a group of other NCPA utilities on an EM&V effort to gain economies of scale. The City plans to complete an EM&V project in FY 2020.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

The City has relied heavily on the savings listed in the California Municipal Utilities TRM. The Commercial Lighting and Commercial Custom programs use custom savings calculations.

TABLE UKI-1. 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	4,994	45,867	0	3,301	29,983	12	$1,430	0.18	0.19	0.846
Building Envelope	0	3,044	60,875	0	852	17,045	49	$4,196	0.90	0.90	0.854
Commercial Refrigeration	0	934	11,208	0	560	6,725	3	$1,363	2.87	0.69	0.041
HVAC - Cooling	5	19,596	138,793	4	16,424	113,506	43	$8,038	1.93	1.51	0.076
Lighting - Indoor	75	390,710	4,688,524	60	312,568	3,750,819	1,365	$147,909	15.65	2.63	0.007
Lighting - Outdoor	0	249,985	2,999,820	0	199,988	2,399,856	1,151	$43,522	18.26	5.79	0.007
EE Subtotal	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015
EE and Low Income Subtotal	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015

TABLE UKI-2. EE Program Results by Sector

Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	80	659,717	7,811,791	64	528,491	6,252,803	2,553	$195,636	15.44	3.40	0.008
Residential	2	9,546	133,297	1	5,203	65,131	69	$10,821	0.52	0.50	0.707
EE Subtotal	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015
EE and Low Income Subtotal	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015

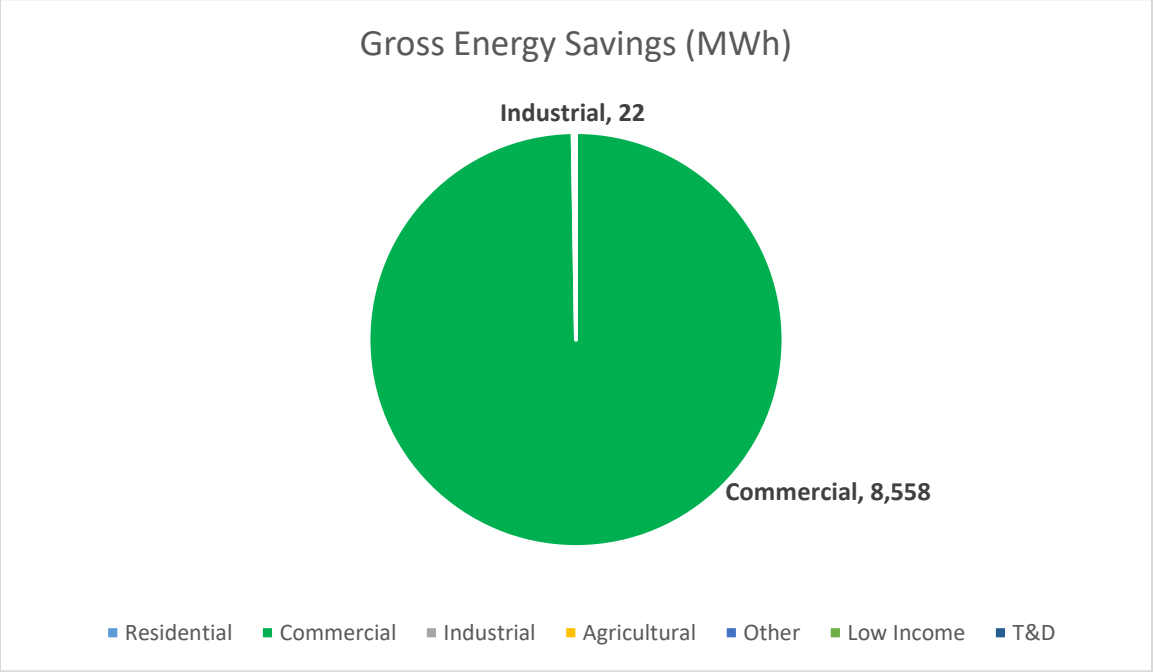
TABLE UKI-3. EE Program Results by Building Type

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	76	394,224	4,713,212	61	314,923	3,766,864	1,372	$149,772	11.92	2.50	0.010
Lodging - Hotel	0	503	7,549	0	428	6,417	2	$336	0.92	1.79	0.175
Other Commercial	4	267,570	3,104,510	3	214,935	2,488,843	1,183	$46,029	16.08	5.63	0.008
Residential	1	4,735	86,880	1	1,967	35,148	50	$8,362	0.97	0.85	0.549
Residential - Single-Family	0	2,231	32,936	0	1,442	20,663	15	$1,959	0.25	0.25	0.902
EE Subtotal	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015
EE and Low Income Subtotal	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	81	669,263	7,945,088	65	533,695	6,317,934	2,623	$206,457	8.47	2.91	0.015

VERNON

Vernon at a Glance

- Climate Zone(s): 9
- Customers: 1,912
- Total annual retail sales (MWh): 1,086,101
- Annual Retail Revenue: $156,047,627
- Annual EE expenditures for reporting year: $1,284,968
- Gross annual savings from reporting year portfolio (MWh): 8,580



Vernon Overview

Vernon Public Utilities (VPU), in climate zone 8, has started to implement some of the recommendations of the comprehensive IRP. The IRP recommendations has guided the Utility'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 has a goal to double its EE from FY 18/19 and contribute toward the statewide goal of doubling EE. VPU also has a goal is to achieve 6 GWh, double the amount, by implementing the following EE action plans in cooperation with other City departments:

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

Major Program and Portfolio Changes

VPU has not made any a major change in their programs but FY 2020 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 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, VPU has been a key ally to assist in any way possible to be more efficient. The challenges for VPU is that our customer baseline is 99 percent 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 VPU customer base is consist of commercial and industrial type buildings. We had one particular company Overhill Farms upgraded their existing ammonia refrigeration controls system hardware and software to take full advantage of existing technology. Our lighting program continues to be popular among our business community.

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 EE. Customers must fund at least 25 percent of total project cost. Projects are only eligible if they do not qualify for any of the other programs.

Energy Education & Demonstration Workshops: Provide customers with an array of information resources to encourage EE measures through EE workshops and other forms of customer outreach.

Energy Audit Program: Provide on-site audits for commercial/industrial businesses. A comprehensive audit includes an analysis of energy usage and costs, identification of energy conservation measures, and recommended actions.

TOU Programs: All customers loads exceeding 100 kilowatts demand are eligible to receive TOU rate; enabling them to reduce their energy cost through time management of their energy usage.

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

Residential Programs

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 RECs. In addition to the Green Power Program VPU is investigating programs that will:

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

TE

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

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

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:

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

EM&V Studies

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 one of our key customers, Overhill Farms, 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.

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE VPU-1. 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	5	1,972,993	29,594,894	5	1,972,993	29,594,894	10,888	$228,264	2.99	2.64	0.028
Lighting - Indoor	979	6,585,093	79,021,122	979	6,585,093	79,021,122	27,413	$1,019,011	11.61	6.30	0.010
Process	3	21,583	323,745	3	21,583	323,745	85	$26,576	1.10	0.59	0.119
EE Subtotal	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015
EE and Low Income Subtotal	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015

TABLE VPU-2. EE Program Results by Sector

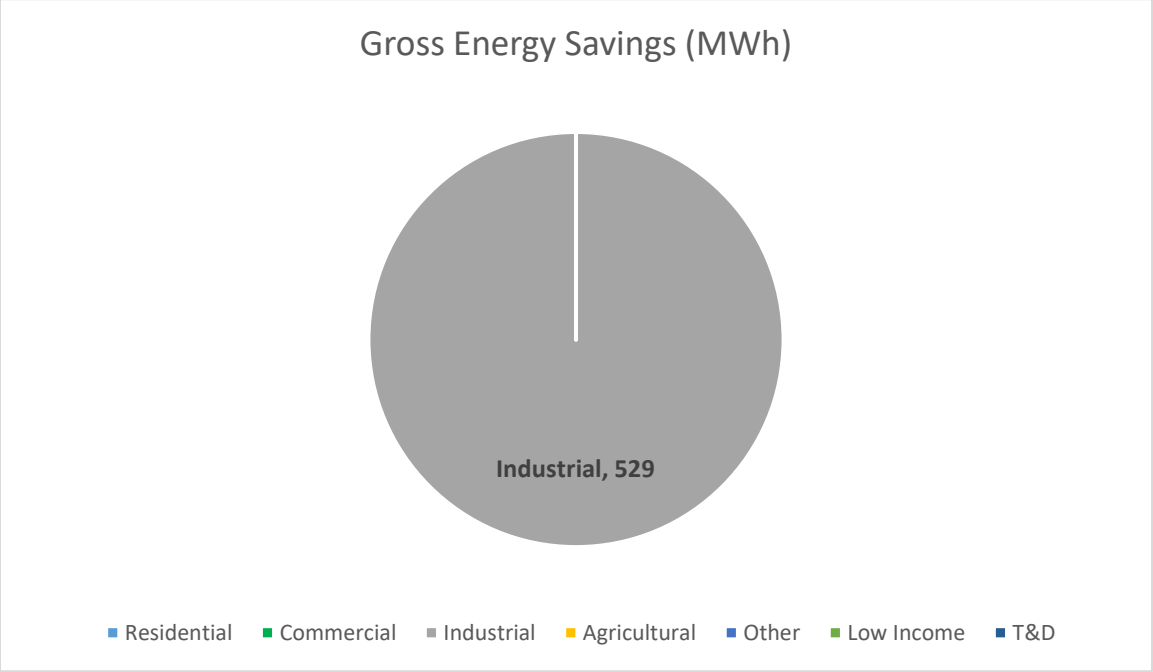
Summary by Sector	Resource Savings Summary								Cost Test Results		
Sector	**Gross Peak Savings (kW)**	**Gross Annual Savings (kWh)**	**Gross Lifecycle Energy Savings (kWh)**	**Net Peak Savings (kW)**	**Net Annual Energy Savings (kWh)**	**Net Lifecycle Energy Savings (kWh)**	**Net Lifecycle GHG Reductions (Tons)**	**Total Utility Cost**	**PAC**	**TRC**	**Utility ($/kWh)**
Commercial	984	8,558,086	108,616,016	984	8,558,086	108,616,016	38,301	$1,247,275	7.39	4.95	0.015
Industrial	3	21,583	323,745	3	21,583	323,745	85	$26,576	1.10	0.59	0.119
EE Subtotal	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015
EE and Low Income Subtotal	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015

TABLE VPU-3. 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	1,994,576	29,918,639	8	1,994,576	29,918,639	10,973	$254,840	2.90	2.49	0.029
Other Commercial	979	6,585,093	79,021,122	979	6,585,093	79,021,122	27,413	$1,019,011	11.61	6.30	0.010
EE Subtotal	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015
EE and Low Income Subtotal	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	987	8,579,669	108,939,761	987	8,579,669	108,939,761	38,386	$1,273,851	7.25	4.83	0.015

Victorville at a Glance

- Climate Zone(s): 14
- Customers: 68
- Total annual retail sales (MWh): 96,485
- Annual Retail Revenue: $11,291
- Annual EE expenditures for reporting year: $13,533,900
- Gross annual savings from reporting year portfolio (MWh): 529



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.

TOU meters and customers' access to their daily usage on the web portal provide the data to assess the cost of their energy usage and demand requirements.

Cost-effective, reliable, and feasible EE improvements are a priority in the VMUS' IRP.

VMUS serves municipal facilities that can be interrupted as scheduled.

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

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

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

Commercial, Industrial & Agricultural Programs

VMUS continued to offer customers the same EE programs.

Residential Programs

VMUS does not provide electric service to its customers.

Complementary Programs

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

EM&V Studies

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

Major Differences or Diversions from CALIFORNIA POU TRM for Energy Savings

TABLE VMUS-1. 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	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
EE Subtotal	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
EE and Low Income Subtotal	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300

TABLE VMUS-2. 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	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
EE Subtotal	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
EE and Low Income Subtotal	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300

TABLE VMUS-3. 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	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
EE Subtotal	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
EE and Low Income Subtotal	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	$0			0.000
Utility Total	164	529,040	6,876,024	131	423,232	5,500,819	1,966	$373,677	0.04	0.16	3.300

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:

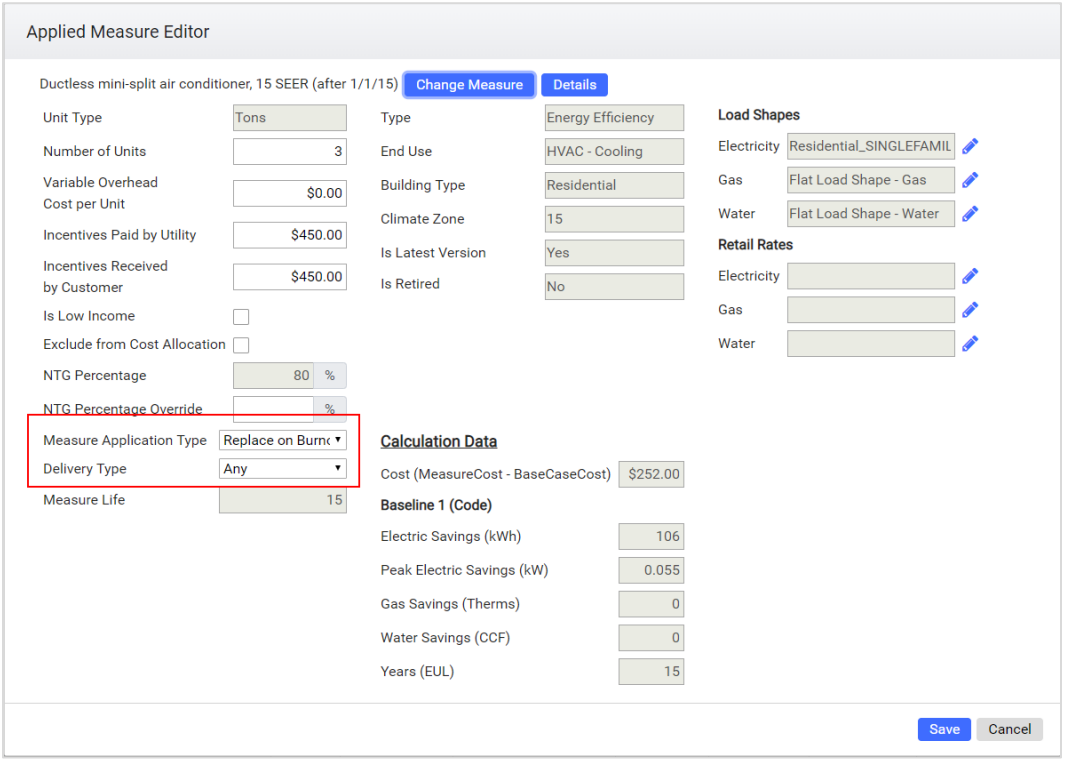
- Current version of the Load Shape
- Load Shape is either local to the organization or "Shared"
- The following attributes of the Load Shape match the same attribute of the Measure:
    - Climate Zone, or "All"
    - Building Type, or "All"
    - End Use
    - Sector, or "All"
- If an IOU is defined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

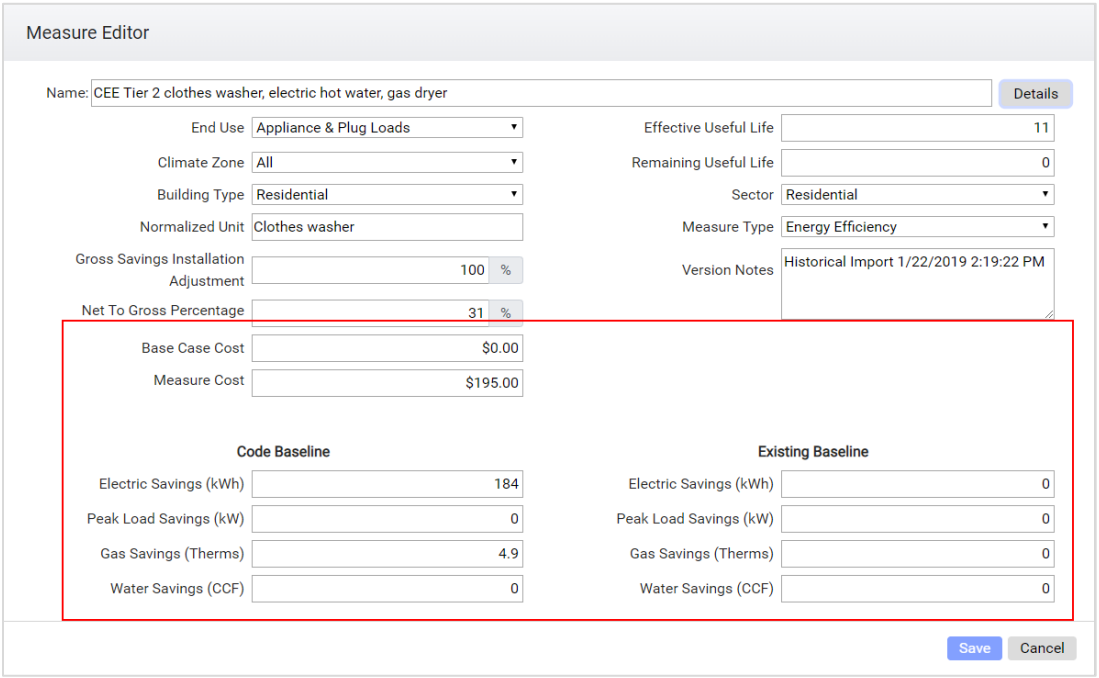
Dual Baseline Savings, Cost, and Measure Life

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

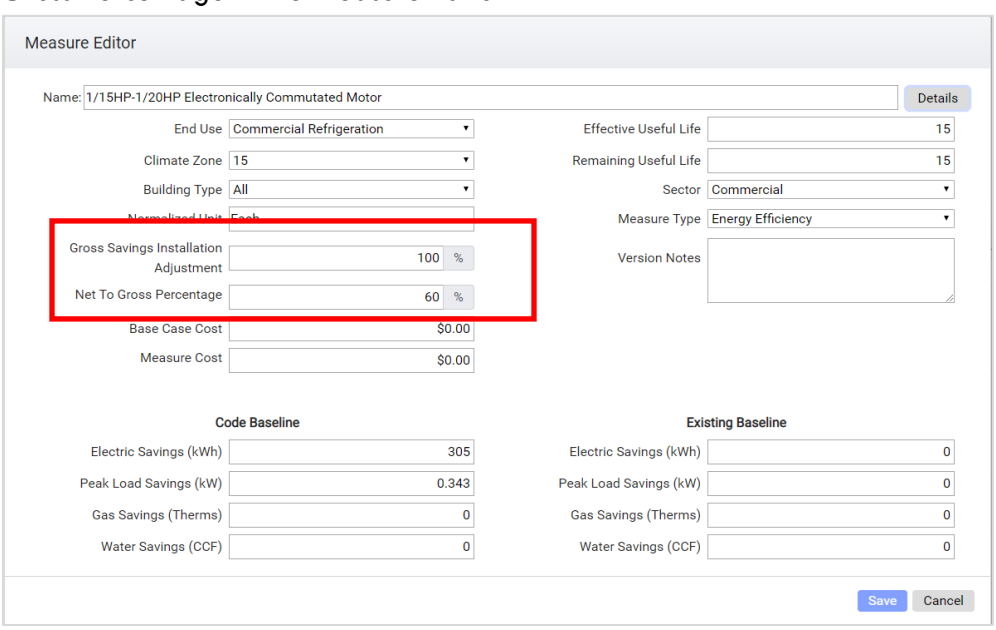
MC = Measure Costs
BC = Base Costs
RUL = Remaining Useful Life (years)
EUL = Estimated Useful Life (years)

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

Gross Savings, Adjusted Gross Savings, and Net Savings

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

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



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

- In-Service Rate – number of actual units installed

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

Adjusted Gross Savings

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

Adjusted Gross Savings = Gross Savings * GSIA

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

Net Savings

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

Net Savings = Adjusted Gross Savings * Net to Gross Percentage

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

Annual Data Calculations

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

Adjusted Gross Savings Benefit

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

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

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

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

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

Net Savings Benefit

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

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

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

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

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

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

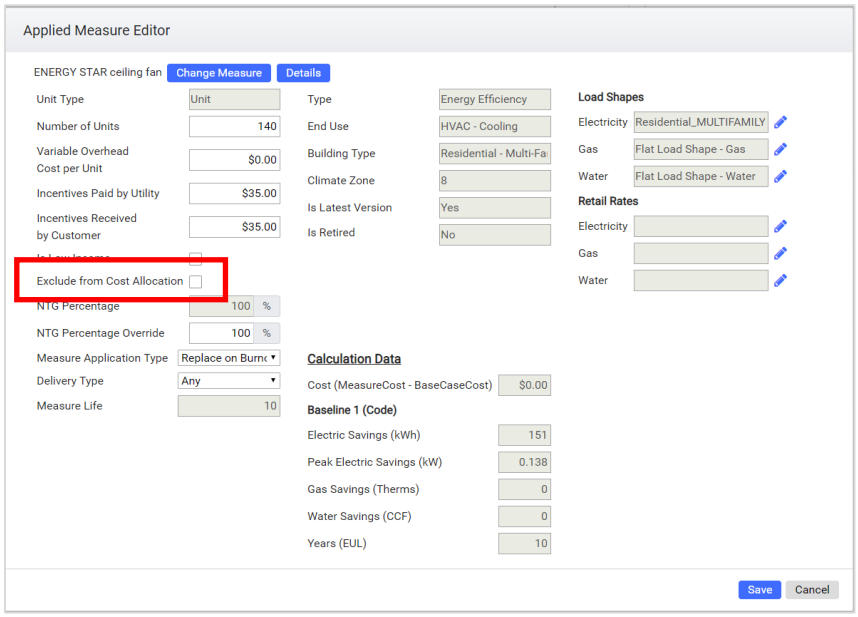
In ESP, each Load Shape resource contains one year of hourly data. As a result, each year of the calculation uses the same values for each year in the Measure lifetime.

Cost Allocation

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

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

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

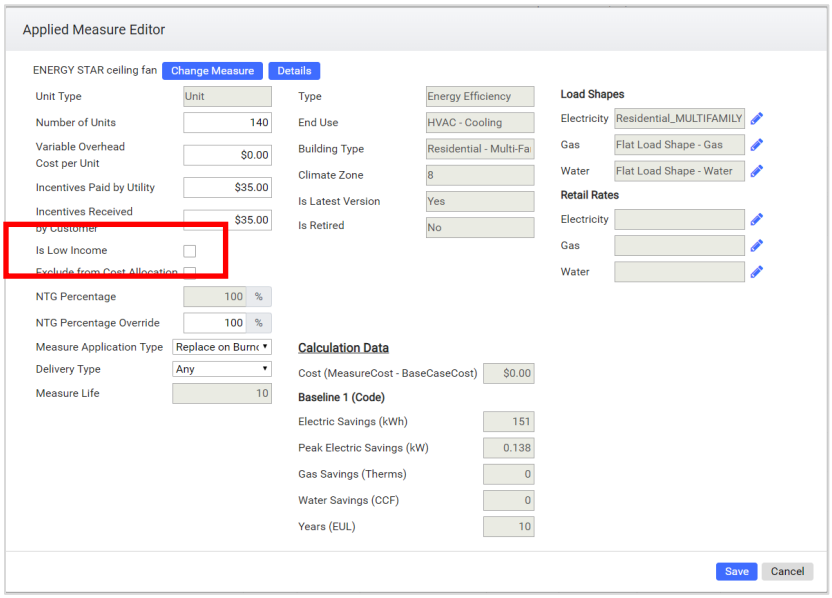


Cost Benefit calculations will not run if it cannot allocate a cost to any Applied Measures. For example, if you enter a cost in the Sector Overhead Residential field, but there are no Residential Measures to allocate the overhead costs, the cost benefit calculation will not run. This also applies to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

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

Low-Income

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



Cost Benefit Calculations

ESP supports the following cost/benefit tests:

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

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

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

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

Net Present Value Calculations

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

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