



To: Honorable Public Utilities Board

Submitted by: **/S/**
Rebecca Irwin
AGM – Customer Resources

From: Harpreet Singh
Utility Energy Analyst

Approved by: **/S/**
Nicolas Procos
General Manager

Subject: By Motion, Accept Alameda Municipal Power’s Senate Bill 1037 (2005) Energy
Efficiency Report for Fiscal Year 2020

RECOMMENDATION

By motion, accept Alameda Municipal Power’s Senate Bill 1037 (2005) Energy Efficiency Report for fiscal year 2020.

BACKGROUND

Enacted into law in September 2005, Senate Bill (SB) 1037, Section 9615, requires the following of all publicly owned electric utilities:

- 1) Each publicly owned electric utility, in procuring energy, shall first acquire all available energy-efficiency and demand-reduction resources that are cost-effective, reliable, and feasible.
- 2) Each publicly owned electric utility shall report annually to its customers and to the California Energy Commission, its investment in energy-efficiency and demand-reduction programs. The report shall contain a description of programs, expenditures, and expected and actual energy savings results.

The report serves as the annual report to customers and the California Energy Commission of Alameda Municipal Power’s investment and results in energy-efficiency programs. Since 2006, Alameda Municipal Power (AMP) has reported to the California Energy Commission (CEC) its investment in energy-efficiency programs as part of a collaborative effort of the California Municipal Utilities Association (CMUA), Northern California Power Agency (NCPA), and the Southern California Public Power Authority (SCPPA). Approximately 40 publicly owned electric utilities across the state participate in this effort. The collaborative process ensures consistency in reporting.

As part of this collaboration, CMUA retained the consulting firm Energy & Resources Group to develop a Technical Resource Manual (TRM) to standardize the energy savings based on existing, widely accepted sources such as white papers from the CEC and studies from Pacific Gas and Electric Company (PG&E). The TRM provides the methods, formulas, and default assumptions used for estimating energy savings and peak-demand impacts from energy-efficiency measures. The energy-savings estimates are used to report program accomplishments and measure progress towards program goals. The TRM was updated in June 2017.

In addition, NCPA retained the firm Energy Platforms to re-design the Economy-Energy-Environment (E3) tool used by utilities to measure energy-efficiency program savings and cost-effectiveness per the CEC's guidelines. The TRM June 2017 data is in the E3 tool used for fiscal year (FY) 2020 reporting.

AMP is required to notify the CEC and AMP customers of its investment in energy-efficiency programs annually. This Administrative Report is part of the notification process, and information will be available on AMP's website and in AMP's customer newsletter, The Flash. On March 15, 2021, NCPA will submit the final SB 1037 report to the CEC. It will include the results from all California municipal utilities.

The goals of AMP's energy efficiency programs are to:

- 1.) Meet Board-approved annual energy-efficiency targets, as approved on March 20, 2017, and comply with California Assembly Bill (AB) 2021.
- 2.) Acquire all available energy-efficiency and demand-reduction resources that are cost effective, reliable, and feasible.
- 3.) Enhance customer satisfaction.
- 4.) Comply with all state policies.
- 5.) Provide equal opportunity for all customers to participate.

DISCUSSION

Energy-Efficiency Programs

AMP customers had a variety of opportunities in FY 2020 to participate in energy-efficiency programs. Funding for these programs came from the short-term sale of AMP's renewable energy certificates (RECs) not needed for compliance with the State's Renewable Portfolio Standard (RPS), as well as from the utility's Public Purpose Fund, which requires utilities to set aside 2.85 percent of revenues for energy efficiency, renewables, research and development, and low-income assistance.

1. **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. More than 149 customers participated in lighting and refrigeration upgrades with low co-pay amounts due to AMP's rebates. The program was temporarily suspended during the final quarter of FY 2020 due to the COVID-19 pandemic. This program will remain open until February 28, 2021.
2. **Non-Residential Lighting (Custom) Program** – This program, like Energy Plus, offered non-residential customers rebates for lighting upgrades. 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 energy-efficiency upgrades. This is a common pathway for chain retailers who are trying to manage incentivized upgrades across various locations.

3. **Residential Online Rebates** – Alamedans have been able to participate in residential energy-efficiency rebates using a simple web application since March 2016. In FY 2020, the tool received nearly 402 applications. Rebates were available for light-emitting diode (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. Refrigerator and freezers measures were discontinued at the end of FY 2020. This program will remain open in FY 2021.
4. **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 energy-efficiency upgrades, including LED bulbs, LED fixtures, refrigerators, SMART power strips, low-flow shower heads and weatherization, at no cost. From October 2019 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.

AMP's program offerings also included a few non-residential programs that did not attract customers during this fiscal year. Customers did not participate in rebate programs for non-residential new construction and HVAC this year. These programs will remain open to AMP's non-residential customers during FY 2021. AMP keeps these programs available because participation is variable and depends on the overall financial climate, emerging technology, and construction. Offering a wide variety of options also allows more customers the opportunity to participate.

Energy Efficiency Results – 2020

Energy efficiency can be measured and reported as either gross or net savings. Each has its role in valuing the performance of an energy-efficiency program. Gross savings generally include all savings claimed by a program, regardless of the reason for participation in the program. In contrast, net savings tend to exclude some savings due to reasons such as "free ridership," where the customer would have taken the same action promoted by the program even if there was no program, or "spillover," where customers implement measures not incentivized by the program.

However, a consistent approach is needed for collectively tracking energy-efficiency program savings at the state level. For the purposes of regulatory compliance reporting, all municipal utilities are required to provide both gross- and net-savings estimates to the CEC. The use of stipulated net-to-gross factors is the simplest approach to developing net-savings estimates and, per the CEC, should continue to be used as the default method in the E3 reporting tool.

AMP's energy-efficiency programs resulted in net savings of 1,027 megawatt-hours (MWh) in FY 2020. The target, set in March 2017 as part of the AB 2021 10-year energy efficiency targets, was 831 MWh. The energy savings represent 0.30 percent of FY 2020 energy sales.

Energy sales were 3 percent higher in FY 2020 as compared to FY 2019. Due to the impact of the COVID-19 pandemic, actual net savings were 56 percent lower overall in FY 2020 as compared to FY 2019. Table 1 shows a summary of the FY 2020 energy efficiency by sector in kWh.

Table 1: Summary of Fiscal Year (FY) 2020 Energy Efficiency Targets, Actuals, and Percentage of Energy Sales

Sector	Target (kWh)	Gross Annual Energy Savings (kWh)	Actual Net Savings (kWh)	FY 2020 Energy Sales	Percent of FY 2020 Energy Sales
Residential	170,000	118,937	91,537	129,591,566	0.07% of residential
Non-Residential	661,000	1,020,959	935,585	212,191,174	0.44% of non-residential
Total	831,000	1,139,896	1,027,123	341,782,740	0.30%

Savings by Sector and Program

AMP’s residential and non-residential programs contributed valuable electricity savings in FY 2020. Ninety-one percent of the net savings—935,585 kWh—were attributed to non-residential Energy Plus and Custom programs. The remaining 9 percent, 91,537 kWh, were attributed to residential. As part of the total 9 percent kWh savings in residential, 6 percent savings, 57,044 kWh, were attributed to the EAP Plus program for income-qualified customers. Savings by category are detailed in Table 2 below.

Table 2: Savings by Category

Program	Gross Annual Energy Savings (kWh) FY20	Net Annual Energy Savings (kWh) FY20	Net Annual Energy Savings (kWh) FY19	Percent Change from FY19
Energy Plus Program Lighting	477,460	453,587	2,057,535	-78%
Energy Plus Program Refrigeration	314,660	298,927	17,334	1625%
Energy Plus Program Pool Pump	-	-	19,478	-100%
Refrigerator Rebate & Recycle Online Rebate	29,484	20,639	14,877	39%
Refrigerator/Freezer Recycle-Only Online Rebate	2,098	1,469	738	99%
Electric Dryer Online Rebate	6,059	3,635	3,038	20%
Washing Machine Online Rebate	1,704	528	792	-33%
LED Fixture Online Rebate	3,211	2,729	2,729	0%
LED Bulbs Online Rebate	5,290	4,497	8,034	-44%
Decorative String Lights Online Rebate	175	95	38	150%
Heat Pump Water Heater	1,504	902	902	0%
Non-Residential Self-Install Program	228,839	183,071	186,235	-2%
Residential Low-Income Program	69,412	57,044	-	0%
Non-Residential Energy Plus Program	792,120	752,514	2,094,348	-64%
Residential Online Rebate Program	118,937	91,537	31,149	194%
Non-Residential Self-Install Custom Program	228,839	183,071	186,235	-2%
Portfolio Total	1,139,896	1,027,123	2,311,731	-56%

Figure 1, Percent Savings by Category, highlights the contribution by category and the importance of non-residential lighting upgrades to AMP’s energy-efficiency portfolio. AMP will continue to put resources into the non-residential lighting area, though staff expects that this sector is nearing saturation and will become challenging in the coming years.

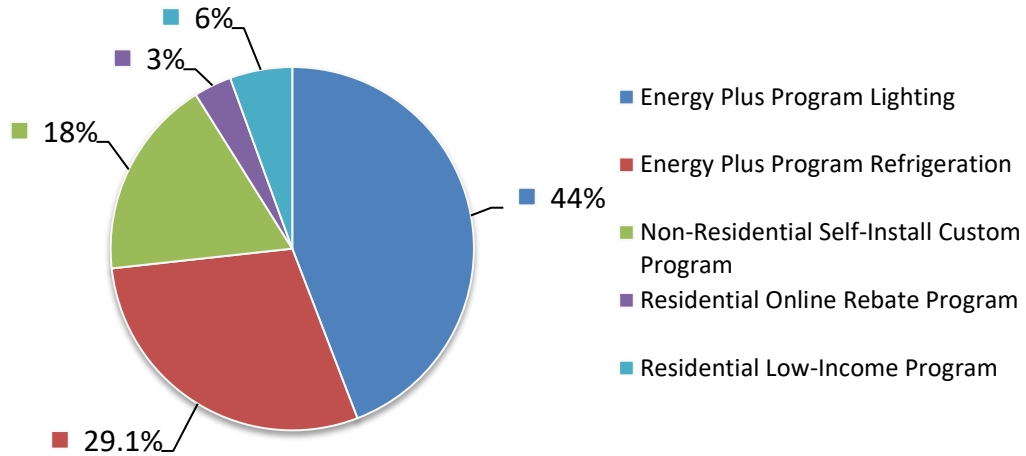


Figure 1: Percent Savings by Category

Program Costs

AMP's energy efficiency programs cost \$1,001,971 in FY 2020. The program cost includes customer rebates and program overhead. Over 67 percent, \$674,449, of the total utility cost was program overhead. The remaining 33 percent, \$327,523, went to customers in the form of rebates.

Program overhead includes all program management fees and the cost for AMP staff. For FY 2020, staff overhead was split evenly between residential and non-residential programs. The program management fees for third-party programs are displayed by category when possible. For example, the administrative fee for Energy Plus is measured per kWh saved and can be attributed to each specific project. The fee for the online rebate program is allocated evenly among the various rebate categories.

Program costs are listed in Table 3, below. Staff's time is already fully included in the costs for the other programs.

Table 3: Program Costs and Price per Kilowatt-hour (kWh)

Program	Gross Annual Energy Savings (kWh)	Net Annual Energy Savings (kWh)	Customer Rebates (\$)	Program Overhead (\$)	Total Utility Cost (\$)
Energy Plus Program Lighting	477,460	453,587	\$ 109,816	\$ 216,470	\$ 326,286
Energy Plus Program Refrigeration	314,660	298,927	\$ 72,372	\$ 146,245	\$ 218,617
Refrigerator Rebate & Recycle Online Rebate	29,484	20,639	\$ 3,640	\$ 73,454	\$ 77,094
Refrigerator/Freezer Recycle-Only Online Rebate	2,098	1,469	\$ 270	\$ 5,223	\$ 5,493
Electric Dryer Online Rebate	6,059	3,635	\$ 7,300	\$ 15,304	\$ 22,604
Washing Machine Online Rebate	1,704	528.24	\$ 900	\$ 1,593	\$ 2,493
LED Fixture Online Rebate	3,211	2,729	\$ 2,007	\$ 12,139	\$ 14,146
LED Bulbs Online Rebate	5,290	4,497	\$ 1,244	\$ 19,998	\$ 21,243
Decorative String Lights Online Rebate	175	94.50	\$ 75	\$ 149	\$ 224
Heat Pump Water Heater	1,504	902.40	\$ 2,799	\$ 5,023	\$ 7,822
Non-Residential Lighting/ (Custom) Program	228,839	183,071	\$ 46,585	\$ 36,718	\$ 83,303
Residential Low-Income Program	69,412	57,044	\$ 80,515	\$ 142,131	\$ 222,646
Non-Residential Energy Plus Program	792,120	752,514	\$ 182,188	\$ 362,715	\$ 544,903
Residential Online Rebate Program	118,937	91,537	\$ 98,750	\$ 275,016	\$ 373,766
Non-Residential Self-Install Custom Program	228,839	183,071	\$ 46,585	\$ 36,718	\$ 83,303
Portfolio Total	1,139,896	1,027,123	\$ 327,523	\$ 674,449	\$ 1,001,971

The total utility cost, or sum of the customer rebates and program overhead, is shown for AMP's marquee programs in Figure 2. The non-residential direct-install program, Energy Plus, dwarfs the other programs and is responsible for 54 percent of the total program cost.

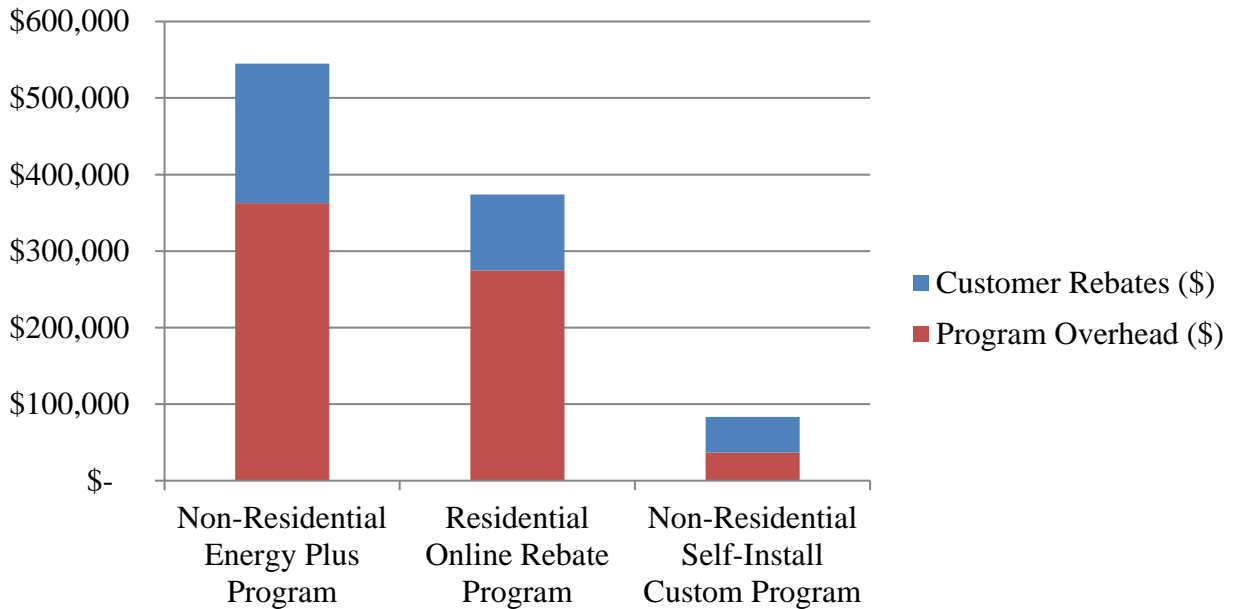


Figure 2: Total Utility Cost by Program

Net-to-Gross Ratio

Net-energy savings are what remain after the gross savings have been reduced to account for the following factors:

- Equipment failure
- Equipment that was not installed or removed before the end of its lifetime
- Free riders — defined as customers who would have installed the measure without the utility incentive

The model used to calculate the results has pre-set net-to-gross (NTG) ratios for programs and measures commonly used by publicly owned utilities in California and set using the Database for Energy Efficiency Resources (DEER).

Past measurement and verification studies of AMP’s programs correlate with staff’s assumptions that these NTG ratios are often too conservative for AMP’s programs, which often require a full pre-install inspection, additional photos of the product, or are managed by a direct-install contractor. Staff has updated the NTG ratios used so they are more reflective of AMP’s programs.

Table 4 details the default NTG ratios from highest to lowest and the AMP updates. Four programs, highlighted in grey, have been updated to AMP’s custom NTG ratio.

Table 4: Database for Energy Efficiency Resources (DEER) Net-to-Gross (NTG) Ratios and Alameda Municipal Power’s (AMP) NTG Ratios

Program	DEER NTG	AMP NTG
Non-Residential Lighting Self-Install Program	80%	80%
Energy Plus Program Lighting	80%	95%
Energy Plus Program Refrigeration	60%	95%
Residential Low-Income Program	68%	68%
Refrigerator Rebate & Recycle Online Rebate	70%	70%
Electric Dryer Online Rebate	60%	60%
LED Fixture Online Rebate	54%	85%
LED Bulbs Online Rebate	54%	85%
Decorative String Lights Online Rebate	54%	54%
Washing Machine Online Rebate	31%	31%

The non-residential direct-install program NTG ratios were changed from 80 to 95 percent for Energy Plus lighting and from 60 to 95 percent for Energy Plus refrigeration programs. Generally, non-residential customers who participate in a direct-install program are approached directly by AMP or by a contractor’s representative and were not necessarily seeking to do these upgrades. These upgrades are typically full LED fixture retrofits that cannot be easily removed or wholesale changes to the refrigeration and other systems. In contrast, residential customers tend to seek out energy-efficiency upgrades to replace a broken appliance such as washing machine. In this instance, a 31 percent NTG is prudent.

Table 5 shows the effect of the NTG ratio on the Energy Plus program.

Table 5: Effect of Net-to-Gross (NTG) Ratio on Energy Plus Savings

Non-Residential Direct Install (Energy Plus)	Savings in kWh			Difference (kWh)
	Gross	80% NTG	95% NTG	
Lighting	477,460	381,968	453,587	71,619
Refrigeration	314,660	188,796	298,927	110,131
Total	792,120	570,764	752,514	181,750

As shown in Table 5, the difference in net savings, what is included in AMP’s energy-efficiency portfolio, is significant. The portfolio gains over 181 MWh in savings when using 95 percent NTG instead of 80 percent.

AMP’s NTG ratio from 54 percent to 85 percent for residential LEDs purchased using the online rebate platform remains unchanged from last year. The residential LED programs were studied as part of the 2019 evaluation, measurement, and verification (EM&V) review. This study reported a 103 percent installation rate and substantiated AMP’s claimed-savings figures. While the change in NTG ratio for these programs has less of an overall effect toward AMP’s savings, it is more reflective of how AMP views customer participation in its programs.

For reference, AMP’s overall net savings are approximately 90 percent of gross savings. The FY 2020 gross annual energy savings were 1,139,896 kWh. Net savings, as discussed through this report, were 1,027,123 kWh.

Avoided Costs and Total Resource Costs

Avoided energy costs are used as a means of calculating the cost effectiveness of energy efficiency programs. The “negawatt,” or energy that is not needed because it was displaced by behavior change or a new technology, comes at a price. The price of energy efficiency is compared to the price of the energy that is “avoided.”

Total Resource Cost (TRC) is the cost-effectiveness test currently preferred by the CEC. Generally, a value greater than one has been associated with a successful program, meaning that the kilowatt-hour saved is less expensive than procuring power. The TRC does not include societal benefits, such as lower levels of greenhouse gases (GHGs) or a reduction in night-sky light pollution associated with highly directional LED streetlights.

As mentioned earlier, a new E3 reporting tool was created in FY 2018. The E3 reporting tool includes updated avoided cost assumptions. The avoided cost assumptions used in AMP’s report are PG&E avoided-cost calculations based on AMP’s climate zone.

AMP is committed to serving both residential and non-residential customers. Residential programs require higher administration costs for a lower return on energy savings. In addition, they have a lower NTG ratio than non-residential programs, so even less of their savings is realized in the final portfolio.

Table 6 shows the TRC by program from highest to lowest.

Table 6: Total Resource Cost (TRC) by Program

Program	TRC
Non-Residential Self Install Custom Retrofit	3.1
Non-Residential Lighting Direct Install	2.3
Non-Residential Refrigeration Direct Install	1.7
Residential Refrigerator Rebate & Recycle Online Rebate	0.6
Residential Refrigerator/Freezer Recycle-Only Online Rebate	0.6
Residential Low-Income Program	0.4
Residential LED Bulbs Online Rebate	0.3
Residential LED Fixture Online Rebate	0.3
Residential Electric Dryer Online Rebate	0.3
Residential Heat Pump Water Heater	0.2
Residential Washing Machine Online Rebate	0.2
Residential Decorative String Lights Online Rebate	0.1
Portfolio	1.1

Program Costs and Historical Comparison

AMP’s total cost to acquire the savings, including overhead for FY 2020, was \$1,001,971. The total utility cost for energy efficiency for FY 2020 was \$0.09 per kWh. Table 7 compares program costs to previous years.

Table 7: Program Expenses and Utility Costs

Fiscal Year	Rebates to Customers	Other Costs – Admin, Overhead, Marketing, etc.	Total Cost to Utility	Net Savings (MWh/year)	Utility Cost per kWh	Total Resource Cost Test (TRC)
2010	\$115,465	\$463,603	\$579,068	1,326	\$0.05	1.8
2011	\$224,026	\$429,790	\$653,816	1,433	\$0.06	1.5
2012	\$427,182	\$455,312	\$882,494	2,527	\$0.03	2.3
2013	\$532,584	\$548,199	\$1,080,783	3,076	\$0.04	1.6
2014	\$124,271	\$626,277	\$750,548	941	\$0.14	0.8
2015	\$488,329	\$688,256	\$1,176,585	2,391	\$0.10	1.3
2016	\$532,761	\$931,070	\$1,463,831	4,197	\$0.06	1.4
2017	\$382,174	\$722,110	\$1,104,284	2,295	\$0.07	0.8
2018	\$298,254	\$577,382	\$875,637	1,362	\$0.06	1.2
2019	\$527,651	\$934,053	\$1,461,704	2,312	\$0.06	1.5
2020	\$327,523	\$674,449	\$1,001,971	1,027	\$0.09	1.1

Greenhouse Gas Reductions

The resulting annual GHG emissions reduction from the 2020 energy efficiency programs is 282 metric tons (MT) of equivalent carbon dioxide (CO_{2e}).

The emissions factor of 0.339 MT/MWh was used and based on California grid non-specified sources. The GHG emissions due to FY 2020 energy-efficiency savings is equivalent to the annual emissions of 700,000 passenger-car miles, according to the Environmental Protection Agency’s Greenhouse Gas Equivalency Calculator.

Please note that the majority of these reductions were achieved in the first half of the fiscal year. AMP transitioned to 100% clean energy in the second half of the fiscal year, shortly before the onset of the Covid pandemic and the resulting drop in customer participation in energy-efficiency programs. As a result, the transition to clean energy was not accounted for in the GHG emissions calculations.

Table 8 shows the GHG emissions reductions for 2013 to 2020, totaling 5,908 metric tons of CO_{2e}. This is equivalent to removing more than 1,279 cars from the road for one year, or more than 14 million passenger-car miles.

Table 8: Greenhouse Gas (GHG) Reductions by Year

Fiscal Year	Greenhouse Gas Reduction (Metric Tons CO₂e)**
2013	1,043
2014	319
2015	811
2016	1,423
2017	784
2018	462
2019	784
2020	282
Total	5,908

Analysis and Conclusions – FY 2020

Overall, the costs and energy savings fluctuate from year to year depending on the following:

- The timing of programs and customer projects
- The cost-effectiveness and reliability of energy efficiency technologies
- AMP’s budget
- Building codes
- Appliance standards
- California state policies

Despite the impact of the pandemic on AMP’s energy efficiency programs, the net annual energy savings of 1,027 MWh for FY 2020 is 24 percent more than the target approved at the March 2017 Public Utilities Board meeting. The FY 2020 target is 823 MWh. The non-residential Energy Plus program delivered the bulk of the savings in FY 2020 and will continue to do so in FY 2021, until the program’s conclusion on Feb 28, 2021. AMP is currently exploring other channels and services to provide similar programs for non-residential customers in FY 2022.

Evaluation, measurement, and verification is conducted in alternating years and was part of FY 2020 for the non-residential self-install and residential programs. The most recent EM&V report, by CADMUS is available [here](#). Non-residential direct-install programs will be the main area of focus for that study in FY 2022.

FINANCIAL IMPACT

There was no direct incremental cost to AMP to prepare the SB 1037 report, except for staff time to provide data and reporting. Consulting services for the development of the Measure Quantification Methodology and the E3 software tool were funded by the NCPA member-services budget.

NEXT STEPS

Exhibits A and B will be submitted to NCPA and incorporated into the final report from CMUA, NCPA, and SCPPA, and will be sent to the CEC.

LINK TO KEY RESULT AREAS AND GOALS

- Sustainability, Strategy 1: Support opportunities to reduce GHG emissions

EXHIBITS

- A. FY 2020 Energy Efficiency Summary Report
- B. FY 2020 AMP SB 1037 Narrative Report

EXHIBIT A

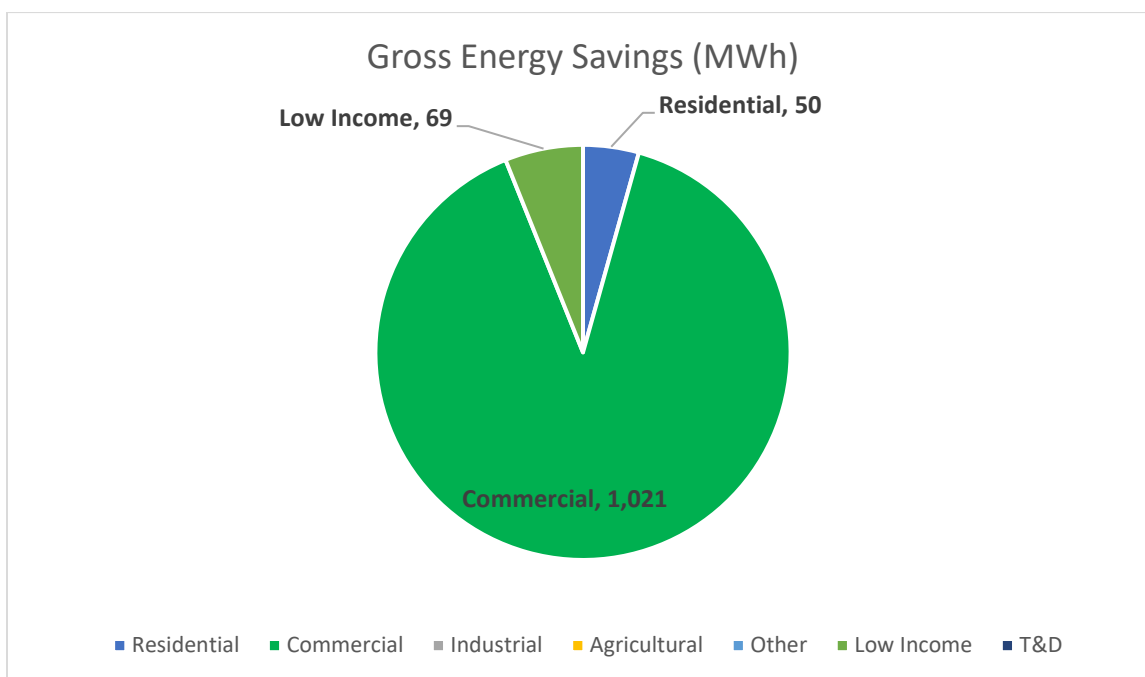
Summary by Measure	Resource Savings Summary											Cost of Efficiency		Cost Test Ratios				
	Measure	Units Installed	Gross Peak Savings (kW)	Gross Annual Savings (kWh)	Gross Lifecycle Energy Savings (kWh)	Net Peak Savings (kW)	Net Annual Energy Savings (kWh)	Net Lifecycle Energy Savings (kWh)	Net Lifecycle Gas Savings (Therms)	Net Lifecycle GHG Reductions (Tons)	Net Lifecycle Combined Energy Savings (MMBtu)	Utility (\$/kWh)	Total Resource (\$/kWh)	PAC	TRC	PCT	RIM	MTRC
Commercial Lighting Direct Install Program FY20 - Exterior	1	0	95,743	1,148,912	0	90,956	1,091,466	0	523	3,721	0.075	0.148	1.86	0.95	2.19	0.51	0.95	
Commercial Lighting Direct Install Program FY20 - Interior	1	54	381,718	5,725,764	51	362,632	5,439,476	0	1,928	18,546	0.064	0.088	1.87	1.37	4.86	0.45	1.38	
Commercial Lighting Self-Install Program FY20 - Exterior	1	0	32,686	392,232	0	26,149	313,786	0	150	1,070	0.054	0.162	2.59	0.86	1.61	0.48	0.90	
Commercial Lighting Self-Install Program FY20 - Interior	1	34	147,679	1,772,148	27	118,143	1,417,718	0	514	4,834	0.051	0.079	2.28	1.45	4.01	0.40	1.57	
Commercial Refrigeration Direct Install Program FY20	1	32	314,660	4,719,900	31	298,927	4,483,905	0	1,652	15,288	0.065	0.071	1.88	1.73	8.19	0.46	1.76	
Commercial Refrigeration Self-Install Program FY20	1	7	48,474	581,688	5	38,779	465,350	0	174	1,587	0.035	0.142	3.31	0.81	1.68	0.43	0.83	
ENERGY STAR clothes washer, electric hot water, electric dryer	6	0	1,704	18,744	0	528	5,811	0	2	20	0.530	0.535	0.22	0.22	4.24	0.10	0.29	
ENERGY STAR Electric Dryer	73	0	6,059	96,944	0	3,635	58,166	0	19	198	0.530	0.478	0.24	0.26	6.42	0.14	0.31	
ENERGY STAR Freezer	4	0	1,424	19,936	0	997	13,955	0	5	48	0.431	0.428	0.32	0.32	22.46	0.18	0.32	
ENERGY STAR HP water heater 50 gal. located in garage/basement	1	0	1,504	15,040	0	902	9,024	0	4	31	1.048	0.969	0.22	0.24	3.05	0.17	0.29	
ENERGY STAR Refrigerator: >7.75 cu-ft. average savings	49	0	19,012	266,168	0	13,308	186,318	0	70	635	0.422	0.420	0.32	0.32	24.63	0.18	0.32	
Freezer recycling	2	0	674	2,696	0	472	1,887	0	1	6	0.512	0.532	0.28	0.27	4.94	0.17	0.27	
LED holiday lights - FY20	25	1	175	875	0	95	473	0	0	2	0.516	0.835	0.23	0.14	0.73	0.13	0.16	
Refrigerator recycling	34	2	10,472	52,360	1	7,330	36,652	0	15	125	0.508	0.525	0.28	0.27	5.50	0.18	0.28	
Res LED Bulb Online Rebate Program FY20	1	0	5,290	79,350	0	4,497	67,448	0	26	230	0.421	0.421	0.33	0.33	11.86	0.20	0.33	
Res LED Fixtures Online Rebate Program FY20	1	0	3,211	48,165	0	2,729	40,940	0	16	140	0.462	0.462	0.30	0.30	5.08	0.19	0.31	
Energy Efficiency Subtotal	202	130	1,070,484	14,940,922	117	970,079	13,632,375	0	5,101	46,480	0.075	0.102	1.63	1.21	4.41	0.43	1.24	
Energy Star Refrigerator: Top Freezer without ice 15-cu-ft. - Alameda	6	0	240	3,360	0	168	2,352	0	1	8	4.367	4.367	0.04	0.04	1.08	0.03	0.05	
Energy Star Refrigerator: Top Freezer without ice 18-cu-ft. - Alameda	8	0	400	5,600	0	280	3,920	0	1	13	3.735	3.735	0.04	0.04	1.09	0.04	0.06	
Faucet Aerators - 0.5 GPM Electric	2	0	96	960	0	58	576	0	0	2	0.250	0.250	0.46	0.46	7.69	0.19	0.50	
LED Bulb Rebate - FY20	749	212	35,952	539,280	180	30,559	458,388	0	180	1,563	0.282	0.282	0.49	0.49	7.14	0.25	0.50	
LED Fixture Rebate Retrofit 1X4"	27	0	2,241	33,615	0	2,241	33,615	0	13	115	0.345	0.345	0.40	0.40	3.14	0.24	0.40	
LED Fixtures Rebate - FY20	291	79	18,624	279,360	67	15,830	237,456	0	93	810	0.434	0.434	0.32	0.32	2.37	0.20	0.34	
Low Flow Showerhead - 2.0 GPM Electric	4	0	256	2,560	0	154	1,536	0	1	5	0.336	0.336	0.34	0.34	3.59	0.16	0.41	
Low Flow Showerhead with Thermo-valve Electric	1	0	215	2,150	0	129	1,290	0	0	4	0.289	0.289	0.39	0.39	4.90	0.17	0.45	
Refrigerator recycling	14	0	8,624	43,120	0	6,037	30,184	0	13	103	0.285	0.285	0.50	0.50	8.86	0.25	0.53	
Smart Power Strip - Alameda	12	3	2,544	20,352	2	1,526	12,211	0	5	42	0.425	0.425	0.35	0.35	3.09	0.19	0.42	
Weatherization for Electric Homes	1	0	220	4,400	0	62	1,232	0	1	4	9.540	9.540	0.05	0.05	1.10	0.05	0.15	
Low-Income Subtotal	1,115	293	69,412	934,757	249	57,044	782,760	0	308	2,669	0.376	0.376	0.37	0.37	2.99	0.22	0.41	
EE and Low Income Subtotal	1,317	423	1,139,896	15,875,679	365	1,027,123	14,415,135	0	5,409	49,149	0.091	0.117	1.35	1.06	4.23	0.40	1.10	
C&S, T&D and Electrification Subtotal	0	0	0	0	0	0	0	0	0	0	0.000	0.000						
Utility Total	1,317	423	1,139,896	15,875,679	365	1,027,123	14,415,135	0	5,409	49,149	0.091	0.117	1.35	1.06	4.23	0.40	1.10	

Summary by Measure	Measure Costs						Avoided Costs		Net Benefit (\$)				
	Measure	Utility Incentives (\$)	Customer Incentives (\$)	Program Overhead (\$)	Free Rider Costs (\$)	NTG Adjusted Participant Cost (\$)	Gross Participant (\$)	Lifecycle Avoided Resource Costs (\$)	Lifecycle Bill Savings (\$)	PAC	TRC	PCT	RIM
Commercial Lighting Direct Install Program FY20 - Exterior	\$22,021	\$22,021	\$43,168	\$1,101	\$84,202	\$88,633	\$121,436	\$171,851	\$56,247	-\$7,035	\$105,238	-\$115,604	-\$5,934
Commercial Lighting Direct Install Program FY20 - Interior	\$87,795	\$87,795	\$173,301	\$4,390	\$178,983	\$188,403	\$487,512	\$827,535	\$226,415	\$130,837	\$726,927	-\$601,120	\$135,227
Commercial Lighting Self-Install Program FY20 - Exterior	\$7,287	\$7,287	\$6,177	\$1,457	\$32,828	\$41,035	\$34,912	\$58,669	\$21,448	-\$5,551	\$24,920	-\$37,221	-\$4,093
Commercial Lighting Self-Install Program FY20 - Interior	\$33,966	\$33,966	\$22,981	\$6,793	\$59,618	\$74,523	\$129,892	\$265,073	\$72,944	\$40,499	\$224,516	-\$192,128	\$47,292
Commercial Refrigeration Direct Install Program FY20	\$72,372	\$72,372	\$146,245	\$3,619	\$87,557	\$92,165	\$411,400	\$682,159	\$192,783	\$173,979	\$662,366	-\$489,376	\$177,598
Commercial Refrigeration Self-Install Program FY20	\$5,332	\$5,332	\$7,560	\$1,066	\$44,027	\$55,034	\$42,730	\$87,007	\$29,838	-\$9,924	\$37,305	-\$57,170	-\$8,858
ENERGY STAR clothes washer, electric hot water, electric dryer	\$900	\$900	\$1,593	\$621	\$307	\$990	\$558	\$3,301	-\$1,935	-\$1,963	\$3,211	-\$5,236	-\$1,342
ENERGY STAR Electric Dryer	\$7,300	\$7,300	\$15,304	\$2,920	\$2,190	\$3,650	\$5,358	\$16,132	-\$17,247	-\$15,057	\$19,782	-\$33,378	-\$12,137
ENERGY STAR Freezer	\$200	\$200	\$4,387	\$60	\$112	\$160	\$1,450	\$3,393	-\$3,138	-\$3,110	\$3,433	-\$6,531	-\$3,050
ENERGY STAR HP water heater 50 gal. located in garage/basement	\$2,799	\$2,799	\$5,023	\$1,120	\$1,086	\$1,810	\$1,758	\$2,713	-\$6,064	-\$5,470	\$3,702	-\$8,776	-\$4,351
ENERGY STAR Refrigerator: >7.75 cu-ft. average savings	\$2,450	\$2,450	\$57,569	\$735	\$1,372	\$1,960	\$19,100	\$45,825	-\$40,919	-\$40,576	\$46,315	-\$86,744	-\$39,841
Freezer recycling	\$70	\$70	\$836	\$21	\$84	\$120	\$250	\$522	-\$656	-\$691	\$472	-\$1,179	-\$670
LED holiday lights - FY20	\$75	\$75	\$149	\$35	\$179	\$332	\$52	\$168	-\$172	-\$310	-\$89	-\$339	-\$276
Refrigerator recycling	\$1,190	\$1,190	\$15,885	\$357	\$1,428	\$2,040	\$4,830	\$10,024	-\$12,245	-\$12,840	\$9,174	-\$22,269	-\$12,483
Res LED Bulb Online Rebate Program FY20	\$1,244	\$1,244	\$19,998	\$187	\$1,058	\$1,244	\$7,001	\$13,507	-\$14,242	-\$14,242	\$13,507	-\$27,749	-\$14,055
Res LED Fixtures Online Rebate Program FY20	\$2,007	\$2,007	\$12,139	\$301	\$1,706	\$2,007	\$4,250	\$8,199	-\$9,896	-\$9,896	\$8,199	-\$18,095	-\$9,595
Energy Efficiency Subtotal	\$247,008	\$247,008	\$532,317	\$24,782	\$496,737	\$554,107	\$1,272,487	\$2,196,078	\$493,161	\$218,650	\$1,888,979	-\$1,702,916	\$243,432
Energy Star Refrigerator: Top Freezer without ice 15-cu-ft. - Alameda	\$7,350	\$7,350	\$487	\$2,205	\$5,145	\$7,350	\$284	\$578	-\$7,554	-\$7,554	\$578	-\$8,132	-\$5,349
Energy Star Refrigerator: Top Freezer without ice 18-cu-ft. - Alameda	\$10,360	\$10,360	\$812	\$3,108	\$7,252	\$10,360	\$473	\$964	-\$10,699	-\$10,699	\$964	-\$11,663	-\$7,591
Faucet Aerators - 0.5 GPM Electric	\$26	\$26	\$93	\$10	\$16	\$26	\$54	\$173	-\$65	-\$65	\$173	-\$238	-\$54
LED Bulb Rebate - FY20	\$14,943	\$14,943	\$81,725	\$2,241	\$12,701	\$14,943	\$47,582	\$91,799	-\$49,086	-\$49,086	\$91,799	-\$140,885	-\$46,844
LED Fixture Rebate Retrofit 1X4"	\$2,673	\$2,673	\$5,993	\$0	\$2,673	\$2,673	\$3,489	\$5,722	-\$5,177	-\$5,177	\$5,722	-\$10,899	-\$5,177
LED Fixtures Rebate - FY20	\$34,775	\$34,775	\$42,335	\$5,216	\$29,558	\$34,775	\$24,648	\$47,554	-\$52,462	-\$52,462	\$47,554	-\$100,016	-\$47,245
Low Flow Showerhead - 2.0 GPM Electric	\$178	\$178	\$249	\$71	\$107	\$178	\$145	\$462	-\$282	-\$282	\$462	-\$744	-\$211
Low Flow Showerhead with Thermo-valve Electric	\$100	\$100	\$209	\$40	\$60	\$100	\$122	\$388	-\$187	-\$187	\$388	-\$575	-\$147
Refrigerator recycling	\$1,050	\$1,050	\$6,831	\$315	\$735	\$1,050	\$3,977	\$8,255	-\$3,904	-\$3,904	\$8,255	-\$12,159	-\$3,589
Smart Power Strip - Alameda	\$1,794	\$1,794	\$2,676	\$718	\$1,076	\$1,794	\$1,558	\$3,758	-\$2,912	-\$2,912	\$3,758	-\$6,670	-\$2,195
Weatherization for Electric Homes	\$7,267	\$7,267	\$721	\$5,232	\$2,035	\$7,267	\$420	\$708	-\$7,568	-\$7,568	\$708	-\$8,276	-\$2,336
Low-Income Subtotal	\$80,515	\$80,515	\$142,131	\$19,157	\$61,358	\$80,515	\$82,752	\$160,361	-\$139,895	-\$139,895	\$160,361	-\$300,256	-\$120,738
EE and Low Income Subtotal	\$327,523	\$327,523	\$674,449	\$43,939	\$558,095	\$634,622	\$1,355,238	\$2,356,439	\$353,267	\$78,755	\$2,049,340	-\$2,003,172	\$122,695
C&S, T&D and Electrification Subtotal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Utility Total	\$327,523	\$327,523	\$674,449	\$43,939	\$558,095	\$634,622	\$1,355,238	\$2,356,439	\$353,267	\$78,755	\$2,049,340	-\$2,003,172	\$122,695

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 energy efficiency 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 greenhouse gas emissions in its service area.

Major Program and Portfolio Changes

FY 2020 savings included the continuation a 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 20 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 will remain open until February 28, 2021.

Non-Residential Self-Install Program: This program, like Energy Plus, offers non-residential customers rebates for energy efficiency upgrades such as lighting, HVAC and refrigeration. In FY 2020, 6 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 energy efficiency upgrades. This is a common pathway for chain retailers who are trying to manage incentivized upgrades across various locations. This program will remain open in FY 2021.

Residential Programs

Residential Online Rebates – Lighting and Appliances: Alamedans have been able to participate in residential energy efficiency rebates using a simple web application since March 2016. In FY 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.

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 energy efficiency 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 20 due to the COVID-19 pandemic.

Complementary Programs

- **Electric Vehicle (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 2 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 EASE (Energy Assistance through Supportive Efforts) and EAP (Energy Assistance Program) 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.
- **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 and an evaluation of energy storage was done again in 2017 as required by California AB 2514. The evaluation concluded that while some costs of energy storage system have decreased, energy storage for the utility was not cost effective at this time. However, AMP continues to evaluate the potential for this technology.

Evaluation, Measurement & Verification Studies

AMP completes an EM&V study every other year with a focus on the two previous years. The most recent EM&V report for FY2018 – FY2019, by CADMUS is available here. 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 CA POU TRM for Energy Savings

With a goal of getting the most accurate energy savings, AMP staff used a variety of sources. For the residential lighting energy savings, AMP used historical AMP customer program data, buoyed by a high realization rate in the FY 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 “Technical Resource Manual” (TRM 2017) for the California Municipal Utility Association (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.