



To: Honorable Public Utilities Board

Submitted by: _____ */s/* _____
Rebecca Irwin
AGM – Customer Resources

From: Kelly Birdwell Brezovec
Utility Energy Analyst

Approved by: _____ */s/* _____
Nicolas Procos
General Manager

Subject: Accept Alameda Municipal Power's SB 1037 Energy Efficiency Report for
FY 2017

RECOMMENDATION

By motion, accept Alameda Municipal Power's (AMP) Senate Bill (SB) 1037 Energy Efficiency Report for Fiscal Year (FY) 2017.

BACKGROUND

The report serves as the annual report to customers and the California Energy Commission (CEC) of AMP's investment and results in energy efficiency programs.

Enacted into law in September 2005, 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 CEC, 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.

Since 2006, AMP has reported to the 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 2016.

In addition, the consulting firm Energy and Environmental Economics (E3) was retained to update its software tool to measure energy efficiency program savings and cost-effectiveness to provide results in the CEC's format. The TRM June 2016 data is in the E3 tool used for FY 2017 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. In March 2018, 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 2017 to participate in energy efficiency programs, which were funded from the following sources:

- Cap & Trade funds on efforts that reduce City of Alameda greenhouse-gas emissions. This funded the My Energy Program.
- The short-term sale of AMP's renewable energy certificates (RECs) not needed for compliance with the State's Renewable Portfolio Standard (RPS). This source funded all remaining programs as described below.

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 100 customers, over half of them small commercial, participated in lighting and refrigeration upgrades with low co-pay amounts due to AMP's rebates. This program will remain open until December 2019.

2. **My Energy** – The My Energy program, powered by Opower, concluded in December 2016. The program provided residential customers with regular mail and email distributions of energy efficiency tips and behavior changes. AMP’s energy savings were based on differences in energy use between test and control groups.
3. **Non-residential Lighting (Custom) Program** – This program, like Energy Plus, offered non-residential customers rebates for lighting upgrades. While there were few participants in this program, AMP maintains this program as a means of offering customers a do-it-yourself option for energy efficiency upgrades. This is a common pathway for chain retailers who are trying to manage incentivized upgrades across various locations.
4. **Residential Online Rebates** – Alamedans have been able to participate in residential energy efficiency rebates using a simple web application since March 2016. In FY 2017 the tool received nearly 400 applications. Rebates were available for LED bulbs, LED fixtures, LED decorative string lights, electric clothes dryers, washing machines, heat pump water heaters, refrigerators, freezers, and refrigerator/freezer recycling. This program will remain open in FY 2018.
5. **Instant Rebate Program (Upstream Lighting)** – The Instant Rebate Program was an upstream LED offering that provided residents the opportunity to purchase pre-rebated LEDs from select Alameda retailers. Most of the savings from this program were captured in the FY 2016 savings, but some savings ran into the first month of FY 2017. In the final month of the program, customers purchased 377 LEDs.
6. **LED streetlight retrofit** – The bulk of the streetlight retrofit was in FY 2016. In FY 2017, AMP completed one additional street that had not been completed in FY 2016.

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, HVAC, or other custom measures this year. These programs will remain open to AMP’s non-residential customers during the next fiscal year. 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 – 2017

AMP saved 2,295 megawatt-hours (MWh) in FY 2017, 4 percent above the target. The target, set in March 2017 as part of the AB 2021 10-year energy efficiency targets, was 2,207 MWh. The energy savings represent 0.7 percent of FY 2017 energy sales. Table 1 shows a summary of the FY 2017 energy efficiency by sector in kilowatt-hours (kWh).

Table 1: Summary of FY 2017 Energy Efficiency Targets, Actuals, and Percentage of Energy Sales

Sector	Target (kWh)	Actual Net Savings (kWh)	FY 2017 Energy Sales	Percent of FY 2017 Energy Sales
Residential	386,000	753,364	126,850,402	0.6% of residential
Non-Residential	1,821,000	1,541,390	217,064,582	0.7% of non-residential
Total	2,207,000	2,294,754	343,914,984	0.7%

Savings by Sector and Program

AMP’s residential and non-residential programs contributed valuable electricity savings in FY 2017. Two-thirds of the savings, 1,541,390 kWh, were attributed to non-residential programs. The remaining one-third, or 753,364 kWh, was attributed to residential. Savings by category are detailed in Table 2, below. Note that non-residential lighting is inclusive of both Energy Plus and the customized program. Energy Plus lighting projects resulted in 1,117,335 kWh of savings. All residential programs, with the exception of My Energy and the LEDs sold as part of the Instant Rebate (upstream) LED Program, are part of the online rebate program.

Table 2: Savings by Category

Program	Net Annual Energy Savings (kWh)
Energy Plus Program Lighting	1,117,335
Energy Plus Program Refrigeration	265,847
Refrigerator Rebate & Recycle Online Rebate	39,522
Refrigerator/Freezer Recycle-Only Online Rebate	19,763
Electric Dryer Online Rebate	1,892
Washing Machine Online Rebate	556
LED Fixture Online Rebate	3,525
LED Bulbs Online Rebate	7,028
Decorative String Lights Online Rebate	340
Non-Residential Lighting (Custom) Program	156,777
My Energy (Opower)	676,666
Instant Rebate LED Program	4,072
Street Light Retrofit	1,431
Non-Residential Energy Plus Program	1,383,182
Residential Online Rebate Program	72,626
Other	838,946
Portfolio Total	2,294,754

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.

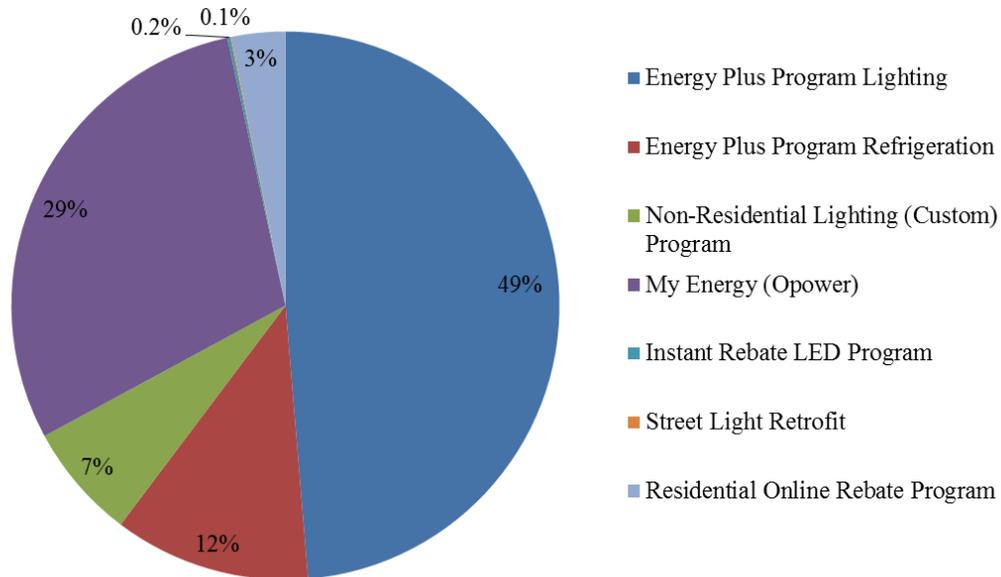


Figure 1: Percent Savings by Category

My Energy, the Opower-driven residential behavior change program, contributed 29 percent of total savings. This program will not be part of AMP's portfolio in FY 2018. Unlike the other programs, particularly long-life LED lighting upgrades, the savings from residential behavior change programs does not have persistence beyond this year.

In FY 2018, AMP expects to see non-residential refrigeration become a larger portion of savings as Energy Plus customers who have seen successes in their lighting upgrades become interested in other opportunities to save energy. Staff will continue to seek growth in customer engagement and savings in the residential sector.

Program Costs

AMP's energy efficiency programs cost \$1,104,284 in FY 2017. The program cost includes customer rebates and program overhead. Over 65 percent, \$722,110, of the total utility cost was program overhead. The remaining 35 percent, \$382,174, went to customers in the form of rebates.

Program overhead includes all program management fees and the cost for AMP staff. For FY 2017, staff overhead is 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. Note that there is no program overhead included for the Street Light Retrofit since that was not categorized as residential or non-residential in the model. The only overhead for the Street Light Retrofit was AMP staff time. Staff's time is already fully

included in the costs for the other programs.

Table 3: Program Costs and Price per Kilowatt-hour

Program	Net Annual Energy Savings (kWh)	Customer Rebates	Program Overhead	Total Utility Cost (\$)
Energy Plus Program Lighting	1,117,335	\$ 285,541	\$ 334,881	\$ 620,422
Energy Plus Program Refrigeration	265,847	\$ 55,514	\$ 69,724	\$ 125,238
Refrigerator Rebate & Recycle Online Rebate	39,522	\$ 7,150	\$ 79,557	\$ 86,707
Refrigerator/Freezer Recycle-Only Online Rebate	19,763	\$ 1,575	\$ 28,389	\$ 29,964
Electric Dryer Online Rebate	1,892	\$ 3,800	\$ 11,331	\$ 15,131
Washing Machine Online Rebate	556	\$ 900	\$ 8,436	\$ 9,336
LED Fixture Online Rebate	3,525	\$ 3,055	\$ 14,151	\$ 17,206
LED Bulbs Online Rebate	7,028	\$ 2,240	\$ 20,612	\$ 22,853
Decorative String Lights Online Rebate	340	\$ 270	\$ 7,884	\$ 8,154
Non-Residential Lighting (Custom) Program	156,777	\$ 19,597	\$ 23,472	\$ 43,069
My Energy (Opower)	676,666	\$ -	\$ 116,164	\$ 116,164
Instant Rebate LED Program	4,072	\$ 2,352	\$ 7,510	\$ 9,863
Street Light Retrofit	1,431	\$ 179		\$ 179
Non-Residential Energy Plus Program	1,383,182	\$ 341,055	\$ 404,605	\$ 745,660
Residential Online Rebate Program	72,626	\$ 18,990	\$ 170,360	\$ 189,350
Other	838,946	\$ 22,129	\$ 147,146	\$ 169,274
Portfolio Total	2,294,754	\$ 382,174	\$ 722,110	\$ 1,104,284

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 67 percent of the total program cost. The “Other” category includes My Energy, the Instant Rebate LED Program, and the Street Light Retrofit.

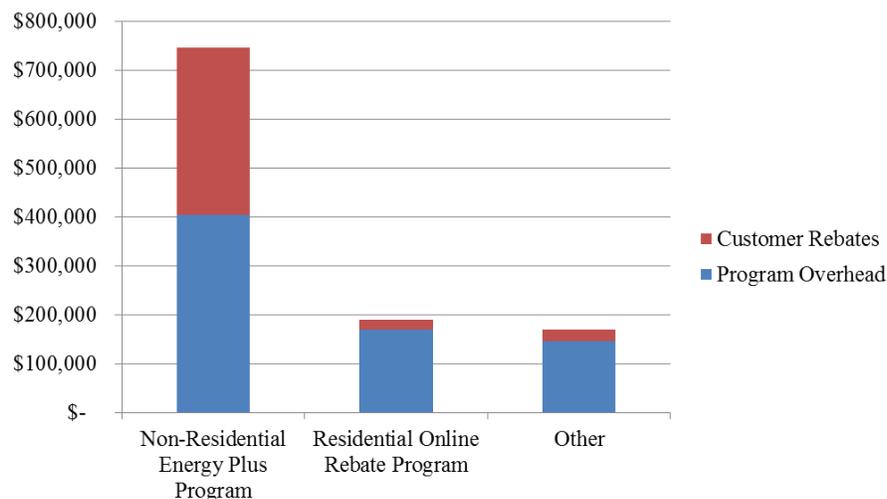


Figure 2: Total Utility Cost by Program

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 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 net-to-gross (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 net-to-gross ratios used so they are better 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: DEER NTG ratios and AMP’s NTG ratios

Program	DEER NTG	AMP NTG
My Energy (Opower)	100%	100%
Street Light Retrofit	80%	80%
Non-Residential Lighting (Custom) Program	80%	80%
Energy Plus Program Lighting	80%	90%
Refrigerator Rebate & Recycle Online Rebate	70%	70%
Electric Dryer Online Rebate	60%	60%
Energy Plus Program Refrigeration	60%	90%
LED Fixture Online Rebate	54%	85%
LED Bulbs Online Rebate	54%	85%
Instant Rebate LED Program	54%	54%
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 90 percent for Energy Plus lighting and from 60 to 90 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 full LED fixture retrofits that cannot be easily removed, or wholesale changes to the refrigeration system. 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 NTG ratio on Energy Plus savings

Non-Residential Direct Install (Energy Plus)	Savings in kWh			Difference (kWh)
	Gross	80% NTG	90% NTG	
Lighting	1,241,484	993,187	1,117,336	124,148
Refrigeration	295,386	236,309	265,847	29,539
Total	1,536,870	1,229,496	1,383,183	153,687

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 150 MWh in savings when using 90 percent NTG instead of 80 percent. Since these programs provide 60 percent of AMP’s portfolio, using 90 percent NTG increased the total savings for the year by 7 percent.

AMP has updated the NTG ratio for residential LEDs purchased using the online rebate platform from 54 to 85 percent. The residential LED programs were studied as part of the 2016 evaluation, measurement, and verification (EM&V) review. This study reported 89-90 percent installation rate and also substantiated AMP’s claimed savings figures. While the change in NTG ratio for these programs has less of an overall effect to 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 2017 gross annual energy savings were 2,521,520 kWh. Net savings, as discussed through this report, were 2,294,754 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.

Staff used the same avoided cost that was calculated for the Eligible Renewable Generation (ERG) solar compensation program. The ERG credit rate, currently set at \$0.06447, is AMP’s avoided cost of energy. It is calculated based on actual data from the prior calendar year:

- Avoided Energy – the average rate per kWh from the California Independent System Operator (CAISO) NP15 trading hub adjusted for the hours when solar systems are generating in Alameda (between 8 a.m. and 5 p.m.)
- Avoided Transmission Cost – the CAISO transmission access charge (TAC) that was

applicable

- Renewable Attribute Value – the value of renewable energy credits (REC) for California from Platt’s December REC report
- Avoided Transmission Losses - the average rate per kWh from the CAISO for transmission losses
- Avoided Capacity Value – the capacity cost of complying with CAISO’s requirement to provide sufficient generating capacity to support the grid during certain contingencies.

This is the first year that AMP will be using its own avoided cost calculation rather than the default values in the EE Tool. The default costs are higher than AMP’s avoided costs, which means that AMP’s TRC for FY 2017 is lower than in previous years and is also lower than one. See Table 6 for a comparison of the past TRC values.

AMP has a commitment to serve equally 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 net-to-gross 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: TRC by Program

Program	TRC
Street Light Retrofit	6.7
Non-Residential Lighting Retrofit	1.6
Non-Residential Refrigeration Direct Install Program	1.2
Non-Residential Lighting Direct Install Program	0.8
Residential Refrigerator Rebate & Recycle Online Rebate	0.4
Opower Residential Behavior Program	0.4
Residential Instant Rebate LED Program	0.3
Residential Refrigerator/Freezer Recycle-Only Online Rebate	0.2
Residential LED Bulbs Online Rebate	0.2
Residential Electric Dryer Online Rebate	0.1
Residential LED Fixture Online Rebate	0.1
Residential Washing Machine Online Rebate	0.04
Residential Decorative String Lights Online Rebate	0.01
Portfolio	0.8

Program Costs and Historical Comparison

AMP’s total expenses to acquire the savings, including overhead for FY 2017, were \$1,104,284. The total utility cost for energy efficiency for FY 2017 was \$0.07 per kilowatt hour (kWh), just one cent higher than last year when AMP’s net savings were nearly double that of this year. The total utility cost of \$0.07 per kWh is just higher than AMP’s avoided cost of \$0.06447 per kWh, which includes power generation, transmission, distribution, and environmental factors.

Table 7 compares program costs to previous years. Rebates and costs are aligned with previous years that were also able to include proceeds from the short-term sale of REC funds to boost energy efficiency program spending. The reduction in the TRC is the same as 2014, a year with high program development costs. As discussed earlier, energy efficiency is getting more challenging and expensive, so we would naturally expect a softening of the TRC. The drop below “one” is mainly due to the change in avoided cost, as previously mentioned.

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)
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

Using another way of looking at past performance, Figure 3 below shows FY 2017 compared to FY 2013–2016. The average net savings was 2,580 MWh per year. FY 2017 was not far below the average. FY 2016 was a particularly good year for energy efficiency in Alameda in large part because of the non-residential direct install programs, street light conversion to LEDs, the My Energy program, and residential LED promotions.

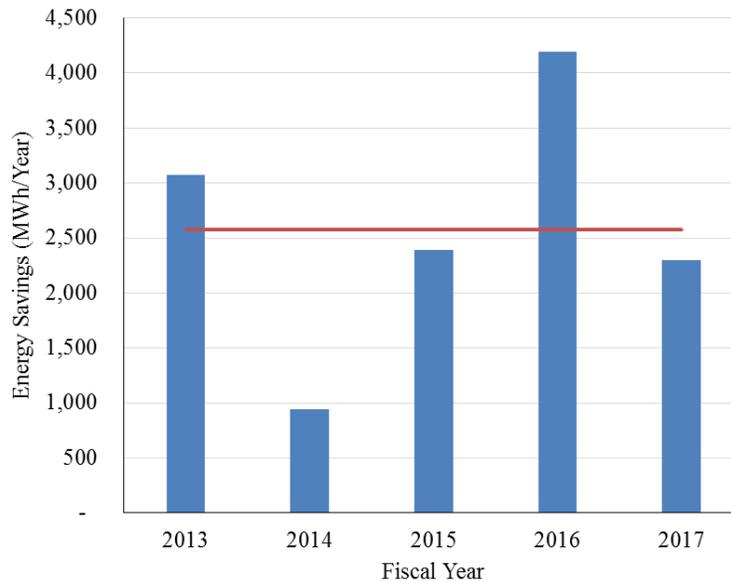


Figure 3: Energy Savings by Fiscal Year, 2013 to 2017

Greenhouse Gas Reductions

The 2,295 MWh savings achieved is equal to the annual energy use of 580 average Alameda

residential customers. The resulting annual greenhouse-gas (GHG) emissions reduction from the 2017 energy efficiency programs is 753 metric tons of equivalent carbon dioxide (CO₂e).

The emissions factor of 0.339 MT/MWh is used and based on California grid non-specified sources. The GHG emissions due to FY 2017 energy efficiency savings is equivalent to the annual emissions of 366 cars, according to the Environmental Protection Agency's Greenhouse Gas Equivalency Calculator.

Table 8 shows the GHG emissions reductions for 2013 to 2017, totaling 4,349 metric tons of CO₂e. This is equivalent to removing more than 900 cars from the road for one year, or more than 10 million passenger-car miles.

Table 8: Greenhouse gas reductions by year

Fiscal Year	Greenhouse Gas Reduction (Metric Tons CO₂e)**
2013	1,043
2014	319
2015	811
2016	1,423
2017	784
Total	4,380

Analysis and Conclusions – FY 2017

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

The net annual energy savings of 2,295 MWh for FY 2017 is 4 percent higher than the target approved at the March 2017 Public Utilities Board meeting. The savings were as expected, based on the forecast. The FY 2018 target is 1,459 MWh, which will require programs to stretch to meet the savings lost by the conclusion of the residential behavioral program. The non-residential Energy Plus program delivered the bulk of the savings and will continue to do so in FY 2018 with a renewed program emphasis on marketing to attract those hard-to-reach customers.

Measurement and verification is conducted in alternating years and was not part of FY 2017. The Energy Plus program will be the main area of focus for that study in FY 2018.

Using AMP's actual avoided cost resulted in a TRC value less than one. In addition to now

reflecting AMP's true costs, the 0.8 TRC also indicates that, when using this metric, the cost-effectiveness of energy efficiency programs is on the decline.

For FY 2017, the utility cost per kWh, or levelized utility cost, was \$0.07 and avoided cost was \$0.06447. At just \$0.00553 difference, and given the amount of forecasting and assumptions, staff recommends treating these as equal, meaning that the avoided cost was essentially equal to the utility cost per (saved) kWh.

Staff recommends considering other metrics besides TRC and utility cost to measure energy efficiency performance. The Program Administrator Cost (PAC) Test compares the total utility lifecycle avoided resource costs to the total program costs. AMP's PAC Test for FY 2017 is 1.2. A value above one here demonstrates that the avoided cost over the life of the installed measures is greater than the one-time program cost. LED lighting upgrades, a large portion of AMP's portfolio, have a lifetime of 15 or more years. The PAC Test captures all 15 years of savings, while the TRC only measures savings from the first year of the installation.

Looking to the future, the SB 1037 energy efficiency report may begin to look quite different than it does today. The easy upgrades have been completed and future energy savings will be from programs with higher administrative and rebate costs. Additionally, in 2020 when AMP's energy portfolio is expected to be carbon neutral, the GHG-mitigating effects of energy efficiency as calculated today will effectively be zero. Valuable customer programs will be those that lower demand for fossil fuels through the electrification of both heating appliances and transportation. AMP welcomes the challenge of adapting to this changing landscape.

FINANCIAL IMPACT

AMP contracted with Efficiency Services Group, or ESG, to complete the energy efficiency data analysis and these funds were accounted for in the FY 2017 budget. 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

KRA 1: Customer Programs and Experience
Goal 1.2: Increase customer energy efficiency

EXHIBITS

- A. FY 2017 Energy Efficiency Summary Report
- B. FY 2017 AMP SB1037 Narrative Report
- C. Power Point Presentation

ALAMEDA MUNICIPAL POWER

Alameda Municipal Power At a Glance

- Climate Zone 3A
- Number of retail customer connections: 35,000 connections. 88 percent residential, 12 percent non-residential.
- Annual total retail sales by customer class: \$55,696,886 (\$21,510,126 - residential, \$34,186,759 – non-residential)
- Annual total budget for energy efficiency programs: \$1,438,348
- Annual total amount actually expended for energy efficiency programs: \$1,104,284

Alameda Municipal Power Overview

- Due to Alameda's temperate climate and small amount of industry, the peak demand for electricity is in the winter (December and January) in the early evening. Alameda Municipal Power's (AMP) electric load is relatively flat compared to most California utilities and there is no residential air conditioning.
- In calendar year 2017, AMP installed advanced metering infrastructure (AMI), or smart meters, throughout Alameda. All customers will have access to their interval data by summer 2018 via a new online portal.
- AMP has committed to spending much of our cap-and-trade and renewable energy credit (REC) funds to reduce greenhouse gas emissions in its service area.
- Total energy sales have been relatively flat since 2014, around 345,000 MWh per year. The average residential energy use has been hovering around 340 kWh per month since 2015. AMP does not expect to see an increase over time as energy generation from solar and energy efficiency programs and standards offset potential increases due to electric vehicles. This trend is similar to other utilities both in California and nationally.

Major Program Changes

Fiscal year (FY) 2016 was AMP's top year for energy efficiency savings due to convergence of the commercial lighting direct install program, LED streetlight retrofit, and residential behavior change program. FY 2017 savings included a very successful non-residential direct install program, but just one final portion of streetlights and the final half-year of the residential behavior change program. Overall, FY 2017 was a year of continuing programs, rather than creation of new offerings.

Program Highlight

AMP's non-residential direct-install program, Energy Plus, provided more than 60 percent of total savings. The program, which provided 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.

Program Descriptions

- Program name – Sector-Category: 1-2 sentence description of EE program available to customers.
- Energy Plus Program – Non-Residential Lighting, Non-Residential Refrigeration: 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 100 customers, over half of them small commercial, participated in lighting and refrigeration upgrades with low co-pay amounts due to AMP's rebates. This program will remain open until December 2019.
- My Energy – Residential Behavior: The My Energy program, powered by Opower, concluded in December 2016. The program provided residential customers with regular mail and email distributions of energy efficiency tips and behavior changes. AMP's energy savings were based on differences in energy use between test and control groups.
- Non-residential Lighting (Custom) Program – Non-Residential Lighting – This program, like Energy Plus, offered non-residential customers rebates for lighting upgrades. While there were few participants in this program, AMP maintains this program as a means of offering customers a do-it-yourself option for energy efficiency upgrades. This is a common pathway for chain retailers who are trying to manage incentivized upgrades across various locations.
- Residential Online Rebates – Residential Clothes Washers, Lighting, Refrigeration, Other (Electric Clothes Dryers): Alamedans have been able to participate in residential energy efficiency rebates using a simple web application since March 2016. In FY 2017 the tool received nearly 400 applications. Rebates were available for LED bulbs, LED fixtures, LED decorative string lights, electric clothes dryers, washing machines, heat pump water heaters, refrigerators, freezers, and refrigerator/freezer recycling. This program will remain open in FY 2018.
- Instant Rebate Program (Upstream Lighting) – Residential Lighting: The Instant Rebate Program was an upstream LED offering that provided residents the opportunity to purchase pre-rebated LEDs from select Alameda retailers. Most of the savings from this program were captured in the FY 2016 savings, but some savings ran into the first month of FY 2017. In the final month of the program, customers purchased 377 LEDs.
- LED streetlight retrofit: Non-Residential Lighting: The bulk of the streetlight retrofit was in FY 2016. In FY 2017, AMP completed one additional street that had not been completed in FY 2016.

EM&V

AMP completes an EM&V study every other year with a focus on the two previous years. The most recent EM&V report, by Energy & Resource Solutions is available [here](#). The next report will cover the non-residential direct install programs for FY 2016 and FY 2017 within a \$40,000 budget.

Sources of Energy Savings

With a goal of getting the most accurate energy savings, AMP staff used a variety of sources. For the residential lighting energy savings, AMP used historical AMP customer program data, buoyed by a high realization rate in the FY 2015 EM&V report. The energy savings figures for the residential refrigerator/freezer, LED string lights, and washing machines were from the “Technical Resource Manual” (TRM 2016) for the CA Municipal Utility Association. The electric clothes dryer savings was from an Energy Star report. Energy savings from My Energy, AMP’s residential behavior program, were from actual AMP billing records and compared the test group, those that received the printed Home Energy Report (HER), to the control group that did not receive HERs. Opower, the vendor responsible for My Energy, handled these calculations.

Energy savings for non-residential programs were calculated using a hybrid of actual pre- and post-installation inspections and the TRM 2016. Streetlights and customized lighting projects were fully calculated. Savings from the direct install program, Energy Plus, used a combination of the TRM 2016 and full pre and post calculations.

Complimentary Programs

- Low-Income Programs: AMP continues to provide financial assistance to Alameda's low-income families through the EASE (Energy Assistance through Supportive Efforts) and EAP (Energy Assistance Program) programs. For FY 2017, EASE, an emergency relief program, helped 58 households receive a total of \$7,474 in electric bill assistance. A maximum amount of \$200 is available per household within a three-year period through the EASE program. The EAP provides a 25 percent monthly discount on the electric bill. A total of \$82,107 was allocated to 587 Alameda households. 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 \$0.015/kWh. As of the end of FY 2017, there were 2,100 residential and 70 commercial customers enrolled in Alameda Green. AMP staff encouraged enrollment through Alameda Green mentions in AMP's customer newsletter, four bill inserts, social media, an outreach program, and a contest among customer service representatives. In June 2017, AMP earned a national ranking 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 2016.

- Research, Development, and Demonstration: There was no AMP activity in research, development, and demonstration in FY 2017.
- Electric Vehicles: In FY 2017 there were a total of 445 AMP customers registered to receive the electric vehicle (EV) discount. The percent of Alamedans with an EV is roughly double that of the state average. AMP has seen a steady increase in EV discount participants since there were 58 in FY 2014. AMP has five plug-in vehicles in its own fleet.
- Energy Storage: AMP does not have any onsite storage and an evaluation of energy storage was done in 2014 as required by California AB 2514. The evaluation concluded that energy storage was not cost effective at this time. However, AMP continues to evaluate the potential for this technology.

Alameda Municipal Power Energy Efficiency Report for FY 2017

February 26, 2018

Overview

- Background
- Energy Efficiency Program Review
- Results
- Analysis
- Summary
- Looking Ahead

Background: Senate Bill 1037

- SB 1037, September 2005
 - Publicly owned utilities (POUs), in procuring energy, shall first acquire all available energy efficiency that is cost effective, reliable, and feasible.
 - POUs must report annually to customers and the California Energy Commission (CEC) their investment in energy efficiency.



The screenshot shows the California Legislative Information website for Senate Bill 1037. The page title is "SB-1037 Energy efficiency. (2005-2006)". The main content area displays the bill's title, "Senate Bill No. 1037 CHAPTER 366", and a summary: "An act to amend and repeal Section 454.5 of, and to add Sections 454.55, 454.56, 1002.3, and 9615 to, the Public Utilities Code, relating to public utilities." It also notes that the bill was approved by the Governor on September 29, 2005, and filed with the Secretary of State on the same date. The page includes a "LEGISLATIVE COUNSEL'S DIGEST" section with a summary of the bill's purpose and a reference to the Warren-Alquist State Energy Resources Conservation and Development Act.

Energy Efficiency Programs: Non-Residential



Energy Plus Program – Direct-install lighting, refrigeration, heating, ventilation, and air conditioning (HVAC) program.



Non-residential Lighting (Custom) Program – Rebates for do-it-yourself lighting upgrades.

Energy Efficiency Programs: Residential



My Energy – Mail-based behavior-change program.

Residential Online Rebates – Incentives for appliances and lighting.

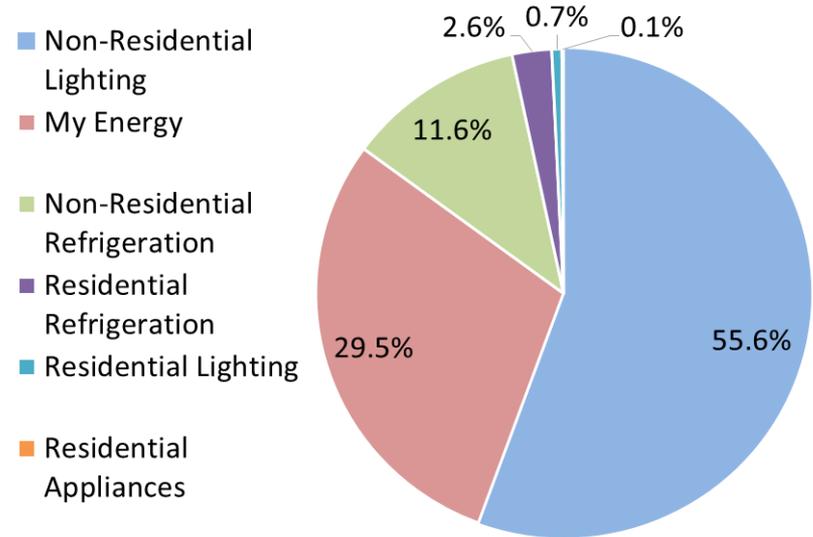


Instant Rebate Program – Upstream LED sales.

Results

Sector	Target (kWh)	Actual Net Savings (kWh)	FY 2017 Energy Sales	Percent of FY 2017 Energy Sales
Residential	386,000	753,364	126,850,402	0.6% of residential
Non-Residential	1,821,000	1,541,390	217,064,582	0.7% of non-residential
Total	2,207,000	2,294,754	343,914,984	0.7%

Category	Net Annual Savings (kWh)
Non-Residential Lighting	1,275,543
My Energy	676,666
Non-Res Refrigeration	265,847
Residential Refrigeration	59,285
Residential Lighting	14,965
Residential Appliances	2,448
Non-Residential	1,541,390
Residential	753,364
Total	2,294,754



Results: Greenhouse Gas Reductions

GHG reductions for the past five years are equivalent to removing more than 900 cars from the road for one year, or more than 10 million passenger-car miles.

Fiscal Year	Greenhouse Gas Reduction (Metric Tons CO ₂ e)
2013	1,043
2014	319
2015	811
2016	1,423
2017	753
Total	4,349

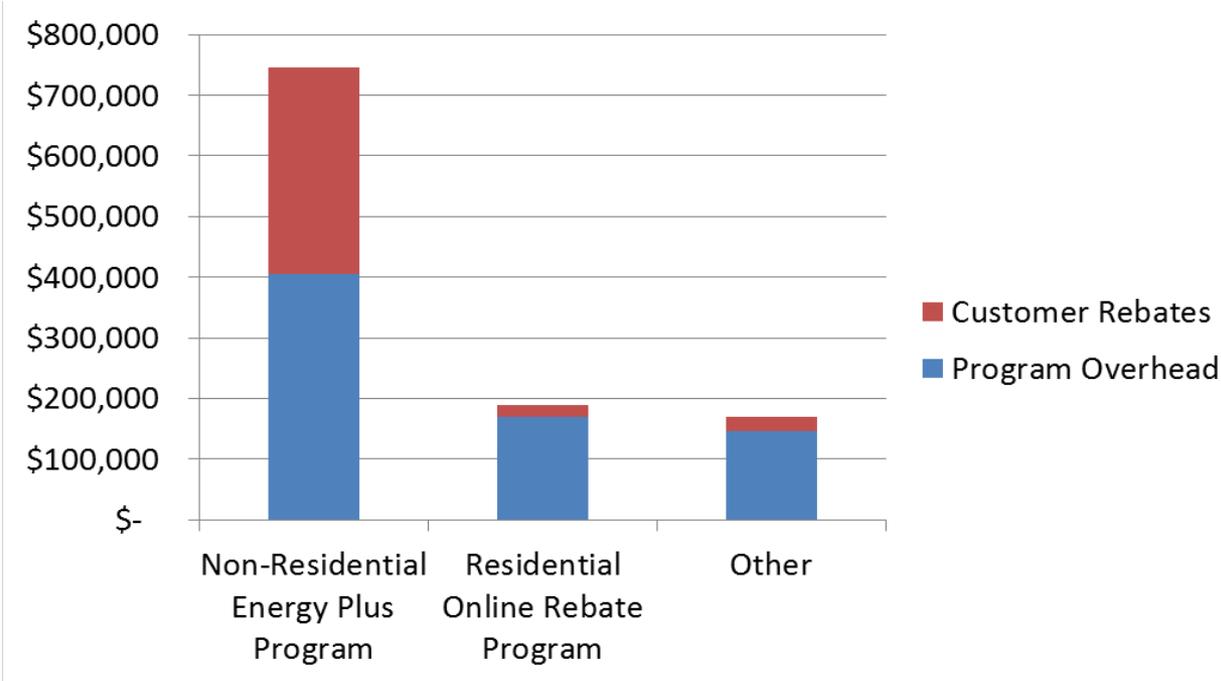


Analysis: Total Resource Cost

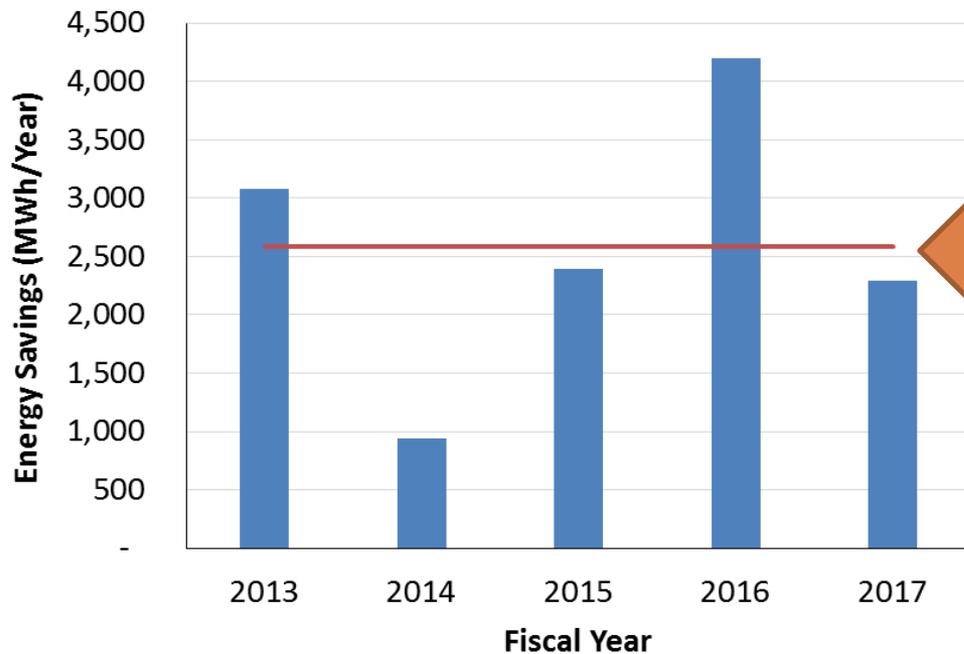
Fiscal Year	Total Cost to AMP	Net Savings (MWh/year)	Utility Cost per kWh	Total Resource Cost Test (TRC)
2013	\$1,080,783	3,076	\$0.04	1.6
2014	\$750,548	941	\$0.14	0.8
2015	\$1,176,585	2,391	\$0.10	1.3
2016	\$1,463,831	4,197	\$0.06	1.4
2017	\$1,104,284	2,295	\$0.07	0.8

Analysis: Program Costs

Rebates to Customers	Administrative & Overhead Costs	Total Cost to AMP	Net Savings (MWh/year)	Utility Cost per kWh	Total Resource Cost Test (TRC)
\$382,174	\$722,110	\$1,104,284	2,295	\$0.07	0.8



Analysis: Historical Comparison



Fiscal Year	EE Target (MWh/year)	Net Savings (MWh/year)
2013	1,771	3,076
2014	1,154	941
2015	1,101	2,391
2016	1,158	4,197
2017	2,207	2,295

Average Savings: 2,580 MWh

Analysis: Program Administrator Test

- The Program Administrator Cost (PAC) Test compares the total utility lifecycle avoided resource costs to the total program costs.
- AMP's PAC Test for FY 2017 is 1.2.



Summary

- FY 2017 was a good year for energy efficiency! AMP exceeded our target by 4 percent.
- Energy efficiency is fully funded in FY 2018.
- FY 2019 budget will include new energy efficiency programs.



Looking Ahead

- Looking to the future, the energy efficiency report may begin to look quite different than it does today.
 - AMP will continue to use our own avoided costs for analysis.
 - PAC will be reported in addition to TRC.
 - AMP's energy portfolio is expected to be carbon neutral in 2020, which will impact GHG reduction reporting.
 - The most valued customer programs will lower demand for fossil fuels through electrification of appliances and transportation.



Contact Information

Kelly Birdwell Brezovec

Utility Energy Analyst

510-814-6415

birdwell@alamedamp.com