To: Honorable Public Utilities Board
Submitted by: /s/ Rebecca Irwin
AGM – Customer Resources

From: Meredith Owens
Energy Management Supervisor
Approved by: /s/ Elizabeth Warmerdam
Interim General Manager

Subject: By Motion, Accept Alameda Municipal Power’s SB 1037 Energy Efficiency Report for FY 2016

RECOMMENDATION

By motion, accept Alameda Municipal Power’s (AMP) Senate Bill (SB) 1037 Energy Efficiency Report for Fiscal Year (FY) 2016. 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.

BACKGROUND

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 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 2016 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 also be available on AMP’s website and in AMP’s customer newsletter, The Flash. The final SB 1037 report, which will include the results from all California municipal utilities, will be submitted by NCPA to the CEC on March 15, 2017.

The goals of AMP’s energy-efficiency programs are to:

1.) Meet Board-approved annual energy-efficiency targets 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.

AMP provides energy-efficiency programs and services to all residential and non-residential customers. The residential sector includes the following AMP rate schedules:

- D-1 Residential Service
- D-2 Multi-Family Residential Service (Master Meter)

The non-residential sector includes the following AMP rate schedules:
AGENDA ITEM NO.: 5.B.3  
MEETING DATE: 01/23/2017  
ADMINISTRATIVE REPORT NO.: 2017-110

- A-1 General Service
- A-2 General Service – Demand Metered
- A-3 Medium General Service – Demand Metered
- A-4 Large General Service – Demand Metered (No customers currently served under this schedule.)
- CT General Service – Demand Metered
- OL Outdoor Street and Area Lighting
- MU1 – Municipal Electric Service – except street lighting
- MU2 – Municipal Electric Service – street lighting
- MU3 – Municipal Electric Service – AMP accounts

DISCUSSION

Energy Efficiency Results - 2016

AMP’s actual net savings in FY 2016 exceeded the target by 362 percent. The actual net savings were 4,197 megawatt hours (MWh), compared to the FY 2016 target of 1,158 MWh. The energy savings represent 1.2 percent of FY 2016 energy sales. AMP’s energy-efficiency portfolio has a Total Resource Cost (TRC) ratio of 1.4. The TRC tracks the cost and benefits of an energy efficiency measure based on the total cost to the utility and its customers. A ratio higher than 1 indicates the measure passes the test.

Some AMP programs have a TRC less than 1.0. For example, the residential Energy Star Appliance Program for the high-efficiency electric dryer has a TRC of 0.6 and the My Energy Program has a TRC of 0.7. Typically, residential programs do not perform as well as non-residential programs in terms of cost-effectiveness. The energy savings are lower, and the cost to develop and implement residential programs is higher on a per-kWh basis.

The following Table 1 is a summary of AMP’s net energy-efficiency savings for the past years of SB 1037 reporting and the projected savings for FY 2017. Net energy savings consist of total savings reduced from the gross 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. Table 2 provides a comparison of the target and actual energy savings per year.
Table 1 – Actual Net Energy Savings by Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Net Energy Savings (MWh/Year)</th>
<th>Total Expenditures</th>
<th>Total Resource Cost Test (TRC)</th>
<th>Greenhouse Gas Reduction (Metric Tons CO\textsubscript{2}e)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual 2006</td>
<td>279</td>
<td>$175,926</td>
<td>1.23</td>
<td>95</td>
</tr>
<tr>
<td>Actual 2007</td>
<td>923</td>
<td>$414,382</td>
<td>1.77</td>
<td>313</td>
</tr>
<tr>
<td>Actual 2008</td>
<td>2,136</td>
<td>$415,455</td>
<td><strong>6.21</strong></td>
<td>724</td>
</tr>
<tr>
<td>Actual 2009</td>
<td>2,211</td>
<td>$510,067</td>
<td>1.93</td>
<td>750</td>
</tr>
<tr>
<td>Actual 2010</td>
<td>1,326</td>
<td>$579,068</td>
<td>1.77</td>
<td>450</td>
</tr>
<tr>
<td>Actual 2011</td>
<td>1,433</td>
<td>$653,816</td>
<td>1.46</td>
<td>486</td>
</tr>
<tr>
<td>Actual 2012</td>
<td>2,527</td>
<td>$882,494</td>
<td>2.34</td>
<td>857</td>
</tr>
<tr>
<td>Actual 2013</td>
<td>3,076</td>
<td>$1,080,782</td>
<td>1.59</td>
<td>1,043</td>
</tr>
<tr>
<td>Actual 2014</td>
<td>941</td>
<td>$791,244</td>
<td>0.80</td>
<td>319</td>
</tr>
<tr>
<td>Actual 2015</td>
<td>2,391</td>
<td>$1,176,585</td>
<td>1.3</td>
<td>811</td>
</tr>
<tr>
<td>Actual 2016</td>
<td>4,197</td>
<td>$1,463,831</td>
<td>1.4</td>
<td>1,423</td>
</tr>
<tr>
<td>Projected 2017</td>
<td>2,222</td>
<td>$1,119,000</td>
<td>TBD</td>
<td>753</td>
</tr>
</tbody>
</table>

* The very high TRC in FY 2008 is due to a large energy-efficiency retrofit of the U.S. Coast Guard base, of which the available data is unverified and extremely limited due to security reasons.

** The emissions factor of 0.339 MT/MWh is used and based on California grid non-specified sources, which will be the first electricity sources AMP will lay off as a result of energy efficiency.

The 4,197 MWh savings achieved in 2016 is equal to the annual energy use of 1,052 average Alameda residential customers. The resulting annual greenhouse-gas emissions reduction from the 2016 energy-efficiency programs is 1,423 metric tons of equivalent carbon dioxide (CO\textsubscript{2}e), which equals the annual emissions of 374 cars.

Table 2 provides a comparison of AMP’s targeted savings and actual energy savings per year.

Table 2 – Target vs. Actual Energy Savings by Year

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>EE Target (net MWh/year)</th>
<th>Actual EE Savings (net MWh/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>760</td>
<td>2,136</td>
</tr>
<tr>
<td>2009</td>
<td>760</td>
<td>2,211</td>
</tr>
<tr>
<td>2010</td>
<td>760</td>
<td>1,326</td>
</tr>
<tr>
<td>2011</td>
<td>1,574</td>
<td>1,433</td>
</tr>
<tr>
<td>2012</td>
<td>1,675</td>
<td>2,527</td>
</tr>
<tr>
<td>2013</td>
<td>1,771</td>
<td>3,076</td>
</tr>
<tr>
<td>2014</td>
<td>1,154*</td>
<td>941**</td>
</tr>
<tr>
<td>2015</td>
<td>1,101*</td>
<td>2,391</td>
</tr>
</tbody>
</table>
The targets vary from year to year depending on AMP’s forecasted load and the impact of changes in energy building codes and appliance efficiency standards. **2014 was focused on planning and evaluation, both by AMP and major Alameda non-residential customers such as the school district and college Prop 39-funded projects. The time to start a new program is lengthy due to the approval and contract process; and program ramp-up. Also, it is not possible to control the scope and timing of large customer projects.**

Tables 3 and 4 provide a breakdown by customer sector of the FY 2016 customer rebates and energy savings to customers.

**Table 3 - Energy Efficiency Savings by Customer Sector**

<table>
<thead>
<tr>
<th>Sector</th>
<th>Customer Rebates ($)</th>
<th>% of Total (Rebates)</th>
<th>Net Savings (MWh/year)</th>
<th>% of Total (Savings)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>$79,156</td>
<td>15%</td>
<td>1,777</td>
<td>42%</td>
</tr>
<tr>
<td>Non-Residential</td>
<td>$453,605</td>
<td>85%</td>
<td>2,420</td>
<td>58%</td>
</tr>
<tr>
<td>Total</td>
<td>$532,761</td>
<td>100%</td>
<td>4,197</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Table 4 – Energy Efficiency Savings by End Use**

<table>
<thead>
<tr>
<th>End Use</th>
<th>Energy Savings (MWh/year)</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Behavior</td>
<td>1,599</td>
<td>38%</td>
</tr>
<tr>
<td>Residential Lighting</td>
<td>127</td>
<td>3%</td>
</tr>
<tr>
<td>Residential Refrigeration</td>
<td>51</td>
<td>1%</td>
</tr>
<tr>
<td>Non-Residential Lighting</td>
<td>2,359</td>
<td>56%</td>
</tr>
<tr>
<td>Non-Residential Other</td>
<td>61</td>
<td>2%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>4,197</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 5 provides a breakdown by year for customer rebates, programs costs, net energy savings, and utility cost per kWh.

**Table 5 – Utility Cost of Energy Efficiency Programs**

<table>
<thead>
<tr>
<th>Year</th>
<th>Rebates to Customers ($1000)</th>
<th>Other Costs – Admin, Overhead, Marketing, etc. ($1000)</th>
<th>Total Cost to Utility ($1000)</th>
<th>Net Savings (MWh/year)</th>
<th>Utility Cost per kWh</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>$115,465</td>
<td>$463,603</td>
<td>$579,068</td>
<td>1,326</td>
<td>$0.05</td>
</tr>
<tr>
<td>2011</td>
<td>$224,026</td>
<td>$429,790</td>
<td>$653,816</td>
<td>1,433</td>
<td>$0.06</td>
</tr>
<tr>
<td>2012</td>
<td>$427,182</td>
<td>$455,312</td>
<td>$882,494</td>
<td>2,527</td>
<td>$0.03</td>
</tr>
<tr>
<td>2013</td>
<td>$532,584</td>
<td>$548,199</td>
<td>$1,080,783</td>
<td>3,076</td>
<td>$0.04</td>
</tr>
<tr>
<td>2014</td>
<td>$124,271</td>
<td>$626,277</td>
<td>$750,548</td>
<td>941</td>
<td>$0.14</td>
</tr>
<tr>
<td>2015</td>
<td>$488,329</td>
<td>$688,256</td>
<td>$1,176,585</td>
<td>2,391</td>
<td>$0.10</td>
</tr>
</tbody>
</table>
AMP’s total expenses to acquire the savings, including overhead for FY 2016, were $1,463,831. This equals a total utility cost for energy efficiency for FY 2016 of $0.06/kilowatt hour (kWh). The total utility cost of $0.06/kWh is less than AMP’s short-term avoided power-generation cost of $0.07/kWh, which includes power generation, transmission, distribution, and environmental factors. The short-term cost of power is low due to the current low market price of natural gas. However, the long-term cost of power supplies is expected to increase. In addition, renewable power supplies are expected to cost more than non-specific California grid purchases. AMP expects transmission costs to rise by 47 percent from 2017 to 2025.

**Analysis and Conclusions – FY 2016**

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 analysis and conclusions of AMP’s FY 2016 energy efficiency programs and services are below:

1.) **FY 2016** was AMP’s top year for energy efficiency savings, with more than 1,000 MWh saved than any other year (reference Table 5). AMP provided $532,761 in rebates to customers, who invested a total of $1,711,573 in energy efficiency projects. The reasons for this success are as follows:

- Many lighting-retrofit projects started in FY 2015 under the Commercial Lighting Direct Install Program were completed in FY 2016. A majority of the energy savings was from retrofitting exterior, high-intensity discharge fixtures with LEDs. The LED retrofits for exterior lighting are very cost-effective, a great variety of products is available on the market, and the light quantity and beam spread is excellent. LEDs have a lifetime of 12+ years, which means the largest savings to customers will be maintenance.

- AMP completed a retrofit of all shoebox- and cobra-head streetlights to LEDs. These fixtures make up 63 percent of Alameda’s streetlights.

- The My Energy Program provided a significant amount of savings with only a 1-year lifetime. With more than 11,000 participants, the 143 kWh/year per participant adds up to nearly 1,600 MWh.

2.) Energy savings are increasing, but costs are rising at a higher rate. Here are several reasons for these increases:

<table>
<thead>
<tr>
<th>Year</th>
<th>Rebates</th>
<th>Customer Investment</th>
<th>Energy Savings</th>
<th>Transmission Costs</th>
<th>Utility Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>$532,761</td>
<td>$1,711,573</td>
<td>$1,463,831</td>
<td>4,197</td>
<td>$0.06</td>
</tr>
</tbody>
</table>
• **Most low-cost measures are complete.**
Although energy-efficiency savings have increased, the cost to get those savings continues to rise as most of the low-cost opportunities have been completed. Furthermore, costs will increase because remaining efficiency options, such as comprehensive building retrofits, are more expensive.

• **Residential programs have higher costs.**
The average cost of the residential programs is $0.11/kWh, the highest being the Energy Star Appliance/Electric Dryer at $0.24/kWh. The average cost of the commercial programs is $0.04/kWh. Despite the cost difference, AMP provides energy-efficiency programs to all customers. Each customer contributes to energy efficiency funds and should have equal opportunity to participate.

• **Other costs – administration, overhead, marketing, program evaluation**
The three largest cost items in this category are the administrative costs for the non-residential direct install programs ($227,374); My Energy Program ($214,459); and AMP’s labor overhead ($204,276). AMP’s labor overhead rate is 2.26459 and includes all employee benefits and all AMP administrative costs. AMP reviews and updates its overhead rate every three years.

The other costs in this category ($284,960) consist of the following: AMP staff salaries, website tools, commercial and residential on-site audits, start-up and operating costs for AMP’s new residential online rebate platform, refrigerator recycling costs, administration for residential refrigerator and recycling programs, and program evaluation.

**Program Highlights – FY 2016**

AMP has committed to spending the funds from the short-term sale of AMP’s renewable energy certificates (RECs) not needed for compliance with the State’s Renewable Portfolio Standard (RPS) and Cap & Trade funds on efforts that reduce City of Alameda greenhouse-gas emissions.

The Cap & Trade-funded My Energy Program produced 1,599 MWh in energy savings. The REC-funded “other residential programs” and non-residential direct install programs produced 1,615 MWh in energy savings. Collectively, these programs will reduce AMP’s emissions by 1,090 metric tons of CO₂ equivalent per year. FY 2016 highlights are below:

1.) **Residential Online Rebate Platform** - In March 2016, all residential rebates were moved to an online system. The $25,000 program set-up fee was a major contributor to the $45,000 administration expense for this fiscal year. AMP expects lower administration figures for the online rebate program in FY 2017.

The online rebate program includes both a platform for customers to apply for rebates and rebate processing and disbursement. Removing rebate processing from AMP’s limited staff time has allowed AMP to offer rebates in new categories. In addition to
refrigerator/freezers, and LEDs (which were not always offered), rebates are now available for LED fixtures, electric clothes dryers, washing machines, and heat-pump water heaters.

2.) **Evaluation Measurement and Verification** - AMP completes the evaluation, measurement, and verification (EM&V) process every two years. This method is an economical use of staff resources. The most recent EM&V focused on three FY 2015 residential programs. The typical budget for EM&V is $40,000 for two years. The next EM&V study, for FY 2016 and 2017, may focus more on commercial programs.

The study reviewed these programs:

- **Great Light Bulb Change Out**: All residential service addresses in Alameda were mailed two 800-lumen LEDs, packaged as a gift from AMP. Alamedans received their LEDs in the period of February – March 2015.
- **LEDMANIA**: After customers received their LEDs in the mail, AMP simplified the LED-rebate process to a simple mail or email application between April and August.
- **Refrigerator/Freezer Recycle Program**: This program encourages Alamedans to disconnect and remove an extra refrigerator or freezer. AMP arranges a pickup (and proper recycling) of the old appliance and provides a rebate to the customer.

The following are highlights of the EM&V study:

- The installation rate for the Direct Mail Lighting Campaign is high. 90 percent of customers surveyed indicated that they installed the LED bulbs.
- The reported energy savings figure for the Direct Mail Lighting Campaign is a conservative estimate of the actual savings achieved. Verified savings indicate a 175 percent realization rate, but this estimate is likely overstated due to uncertainties associated with pre-existing lamp sizes reported by customers.
- The installation rate for the LED Rebate Lighting Program participants is also high; 89 percent of the lamps expected to be installed were verified on site. The verified savings for these participants is 114,785 kWh. Compared to the reported savings of 115,389 kWh, the realization rate is 99.5 percent.
- The refrigerator recycling verified savings for program year 2015 is 7,392 kWh with a realization rate of 57 percent. Verified savings are based on recycler records, which were incomplete and likely underrepresent the number of recycled refrigerators.
- Customer satisfaction with the LED light bulbs installed was generally very high.
- The majority of customers across both lighting programs were satisfied with the LED lamps that were installed, including the quantity and quality of light emitted.

The EM&V study helped inform staff’s need to keep records for our freezer and refrigerator hauler/recycler. AMP will now send a yearly electronic back up of pick-up information back to the hauler because a member of the hauler’s staff was regularly disposing of paper records.

The high realization rate (99.5 percent) for the LED Rebate Lighting Program creates confidence in AMP’s unique residential lighting baseline. AMP uses one-third compact
fluorescent and two-thirds incandescent lamps as existing, rather than the halogen incandescent as prescribed in the TRM. AMP expects to update this rate to match the TRM in future program years.

3.) **Residential LEDs** - Total residential-sector lighting savings were nearly 235 MWh (gross). Alamedans purchased more than 12,000 LEDs in FY 2016, which means that 40 percent of all residences could have installed a new LED. In FY 2015, customers purchased or received nearly 60,000 LEDs. In FY 2016, LEDs were purchased through three venues. In FY 2017, AMP will continue the online rebate program, which offers separate rebates for LED fixtures and lamps. AMP has already added a new rebate for LED decorative string lights and may consider another upstream LED program in FY 2017 or FY 2018. AMP expects to see continued interest, but without a major project, such as an upstream offering, a slowing of growth may occur in this area.

4.) **Commercial Lighting Direct Install Program** - In October, FY 2015, AMP started the REC-funded Commercial Lighting Direct Install Program, administered by a third-party vendor. The REC funding made the program feasible. The large-scale program requires significant staffing, back-office support, software, fair pricing of materials and labor, and assured energy savings. The goals of the program are to remove customer barriers to lighting retrofits. More than 70 percent of the participants were small commercial customers who had never before participated in AMP’s energy-efficiency programs. The program concluded on December 31, 2015, with energy savings of 1,390 MWh.

5.) **Energy Plus Program** – The Energy Plus Program, which started in January 2016, was based on the success of the Commercial Lighting Direct Install Program. Energy Plus is funded for $1.1 million and will run for two years or until the funds are exhausted. AMP expects the direct install program to provide 3,013 MWh of energy-efficiency savings. Energy Plus will include all non-residential customers (commercial and municipal), and HVAC and refrigeration measures. In FY 2016 this program provided energy savings of 47 MWh.

6.) **LED streetlight retrofit** - The LED retrofit of all cobra-head and shoebox streetlights was completed, resulting in savings of 868,224 kWh per year. The total project cost was $870,169. The annual energy cost savings for retrofitting the 3,202 fixtures is $203,346; and the AMP rebate was $86,822.36. These fixtures comprise 63 percent of Alameda’s streetlights. The lifetime of the new LEDs is expected to be 24 years, compared to the six-year lifespan of the previous streetlights. Clearly, the largest savings for the LEDs will be maintenance costs. The remaining streetlights are historic and decorative, and are expected to be completed by the end of FY 2017.

**2017 Energy Efficiency Forecast**

The target net energy savings for FY 2017 is 1,247 MWh, based on AMP’s 10-year energy efficiency target for FY 2014 to FY 2023. Staff expects to exceed this target largely due to additional REC funding. The following is a summary of expected energy-efficiency programs for FY 2017:
1) Residential Energy Efficiency Programs

- **My Energy, powered by Opower** – The My Energy program, powered by Opower, will end in December 2016. While AMP has benefitted from a high level of measured and defensible savings with this program, it is at a high cost and has a TRC of less than one. Despite attempts in the first two years of the program, AMP found it challenging to encourage customers to fully embrace the tool and log in to view their information and tips online. In the past three years, only 70 customers have logged into their account four or more times. Customers needed to create a login and password that was different from their online bill pay account.

AMP will launch a new customer experience, including online bill pay and usage viewing, in tandem with its new Energy inView portal during FY 2017 and 2018. The portal will allow customers to view neighbor-comparison data similar to what they may receive today with the My Energy service. Plus, customers will be able to access energy savings tips and links to AMP’s rebate programs. While the portal will not contribute the same measurable savings that Opower provides, customers can benefit from self-guided education.

- **Residential Online Rebate Platform** - This year was transitional for residential rebates as AMP moved toward the online rebate platform. Most rebates were new to customers, but the refrigerator and freezer rebate has been part of AMP’s program offering for over 10 years. There was a continued decrease in participation from 208 units in FY 2013, to 110 this year. AMP expects this slowing to continue because the rebate amount will decrease in calendar year 2017. Other programs, such as appliances, will grow as the platform reaches more customers and benefits from repeat participants.

Staff will look for opportunities to add new offerings to the platform, such as smart power strips and other new Energy Star categories.

- **Multifamily** – As is the case with many other utilities, multifamily participants are underrepresented in AMP’s energy-efficiency programs. Multifamily residents may be lower income and are more likely to be renters than owners. In most cases, multifamily properties are owned by a landlord, but the tenant pays the utility bill.

In March 2016, AMP collaborated with the local Energy Upgrade California implementer, StopWaste.org, to send a mailing to property managers. The mailing included information about AMP’s new online rebate tool and staff contact information. AMP received very few follow-up inquiries. One of these property managers had already changed out lighting in their building through participation in AMP’s upstream-lighting program. Staff will continue to investigate other opportunities with the intention of creating a targeted program in FY 2017 or FY 2018.

2) Non-residential Energy Efficiency Programs

- **Energy Plus Program – Direct Install**

The Energy Plus program, described earlier in this report, will continue through FY 2017 and half of FY 2018. Some expected larger projects for FY 2017 are the Alameda Unified School District, City of Alameda Garage, College of Alameda Library, and the
pier lighting at Alameda Point. Staff expects energy savings from this program in FY 2017 to be 2,000 MWh. Partial funding for the school district and the College of Alameda will come from Proposition 39. Due to the complexities of an LED retrofit and the Title 24 Standards, a direct-install program is the only way to get significant energy efficiency savings in the non-residential sector.

- **LED Streetlight Conversion – Decorative and Historic Lights**
  The retrofit of the decorative and historic streetlights is expected to start in FY 2017. These lights comprise 37 percent of Alameda’s streetlights. Once they are retrofitted, all of Alameda’s streetlights will be LED.

### Impact of California Policies

The following recent policies impact AMP’s energy efficiency effort programs and services.

1.) **2013 Title 24 Building Energy Efficiency Standards (T24)**
   The 2013 T24 Standards, which went into effect on July 2014, apply to lighting retrofits in existing non-residential buildings. Typically, 60 percent of AMP’s energy-efficiency portfolio comprises non-residential lighting retrofits. The 2013 T24 has become a barrier to many customers, and has decreased the scope of many retrofits while increasing the costs. This also makes it more difficult for utilities to achieve their energy-efficiency targets. The impacts are:
   - Longer time and increased costs for lighting installers to do audits and compliance for projects that trigger the T24 code.
   - The lighting controls required by the 2013 T24 are costly.
   - Customers are not doing comprehensive retrofits and are opting for smaller projects that do not trigger code upgrades. For example, a customer decreased the scope of their lighting retrofit projects by almost 70 percent.
   - According to a lighting retrofit vendor that has worked with AMP customers, the costs for projects that trigger T24 code have doubled.

2.) **“Existing Buildings Energy Efficiency Action Plan” (Plan), September 2015**
   Required by CA AB 758 (2009), the Plan provides a 10-year framework to transform California’s existing building stock into high-performing energy-efficient buildings. The vision of the Plan is a doubling of the energy savings in California’s buildings. This equals a 20 percent reduction in statewide building use by 2030, compared to the projected level of energy use. Some highlights of the Plan include the following: An expectation that public buildings will lead by example; an emphasis on energy benchmarking; energy-use metrics using the Energy Star Portfolio Manager; ongoing building-performance monitoring; greater use of smart meter data and analytics; and the alignment of policies between agencies. The refinement and implementation of these goals will occur over the next 10 years. The installation of advanced metering infrastructure (AMI) in the AMP service area will be a valuable asset in this endeavor.

3.) **CA SB 350, October 2015**
   This law directs the CEC to set annual statewide targets by November 2017 to achieve a doubling of energy savings by 2030.
CA SB 350 uses the “Existing Buildings Energy Efficiency Action Plan” as the path to achieve statewide targets. The law does not replace the existing CA AB 2021, which required utilities to establish annual energy savings targets for a period of 10 years. However, it allows the CEC to critique a utility’s targets. The extent and enforcement of this critique is unknown at this time. There is much to be determined in this policy, such as its impacts on statewide energy-efficiency targets, cost effectiveness, feasibility and enforcement. AMP staff expects annual energy-efficiency targets to increase because of this policy.

4.) **CA AB 802, October 2015**
CA AB 802 replaces AB 1103 and becomes effective January 2017. It requires utilities to maintain the energy-use data of all buildings they serve, and at the customer’s request, provide the data to the customer or to the customer’s account in the Energy Star Portfolio Manager. Benchmarking of commercial and multifamily buildings over 50,000 ft² is part of the policy and the details on this are to be determined.

**Other Considerations**

- In FY 2015 AMP started installing AMI. As of November 2015, advanced meters have been installed for all medium- and large-commercial customers, and for about 1,700 residential customers. AMI commercial customers have access to a portal with their energy use data, which includes 15-minute interval data, kW, kWh, kVA, power factor and weather data. The data will help customers to better manage their energy use. Complete build-out for all AMP customers will be completed in CY 2017.

- AMP’s average residential energy use has been declining annually since 2011. With the exception of FY 2016, total energy sales have also been decreasing. This national trend, which is being experienced at many other utilities, is likely due to several factors:
  - Increase in customer energy efficiency;
  - Increase in customer-owned distributed generation (i.e., solar photovoltaic);
  - Increase in energy efficiency in codes and standards, particularly CA Title 24, the CA Building Standards, and Title 20 the 2012 Appliance Efficiency Regulations;
  - Consumer technology trends have decreased energy use. For example, LED TVs, which use 130 watts, have largely replaced plasma TVs, which used 400 watts. Laptop computers, which use five watts, have largely replaced desktop computers, which used 32 watts; and
  - Increase in the efficiency requirements for the Energy Star label.

### Electric Sales and Average Residential Electric Use

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual Electric Sales (MWh/year)</th>
<th>Residential Average Annual Electric Use (kWh/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>382,634</td>
<td>4,651</td>
</tr>
<tr>
<td>2012</td>
<td>373,787</td>
<td>4,555</td>
</tr>
</tbody>
</table>
FINANCIAL IMPACT

The SB 1037 Energy Efficiency Report presents and analyzes the costs and benefits from AMP’s and AMP’s customers’ investments in energy efficiency. Included in this analysis are the policy and industry-wide standard cost-effective tests. The most commonly used is the Total Resource Cost test described in the Discussion section of this report in Table 1. Further data is detailed in Tables 3 and 5. The Analysis and Conclusions-FY2016 section of this report provides more information on the financial impact of AMP’s energy efficiency programs and services.

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 software tool (E3) were funded by the NCPA member-services budget.

Staff time and consulting costs to comply with California and federal policies are not insignificant. To prepare all the required annual reports to comply with SB 1037 takes one full-time AMP employee one-to-two weeks per year. Support for the E3 modeling tool used in the reporting is handled by NCPA and the cost varies from year to year. AMP’s share of the E3 modeling support is approximately $3,000 per year.

NCPA takes the larger part of the burden of the reporting by contracting for the consultants, meeting with CEC staff and legislative staff, compiling all the data from the utilities, and preparing and filing the final report to the CEC. The cost to NCPA for completing the SB 1037 and AB 2021 reports includes staff time from the Member Services Manager and the Regulatory Affairs Manager, as well as consulting costs. The NCPA staff time required for this consumes about one-fourth of an NCPA staff person’s time per year.

LINK TO KEY RESULT AREAS AND GOALS

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

EXHIBITS

A. FY 2016 Energy Efficiency Actual Summary Report
B. FY 2016 AMP SB1037 Narrative Report
C. FY 2016 Energy Efficiency Report, Power Point Presentation
**Note:** All of the exhibits will be submitted to NCPA and incorporated into the final report from CMUA, NCPA, and SCPPA and will be sent to the CEC.
## Alameda Municipal Power FY 2016
### Energy Efficiency Summary

<table>
<thead>
<tr>
<th>Resource Savings Summary</th>
<th>Cost of Efficiency</th>
<th>Cost Test Ratios</th>
<th>Program Costs</th>
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<tr>
<td><strong>Gross Annual Energy Savings (kWh)</strong></td>
<td><strong>Gross Lifecycle Energy Savings (kWh)</strong></td>
<td><strong>Net Annual Energy Savings (kWh)</strong></td>
<td><strong>Net Lifecycle Energy Savings (kWh)</strong></td>
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<td>Res - Online LED Bulbs</td>
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<td>Street Lighting Retrofit</td>
<td>868,224</td>
<td>10,418,688</td>
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</table>

Note:
1. This table is directly from the E3 tool
*PAC refers to the Program Administrator Cost Test
** TRC refers to the Total Resource Cost Test
Alameda Municipal Power

Alameda Municipal Power at a Glance

- Climate Zone – 3A
- Number of retail customer connections – 35,336 (88% residential, 12% commercial)
- FY15-16 total retail sales - $53,759,746 ($19,869,104 - residential, $33,890,642 - commercial)
- FY15-16 total budget for energy-efficiency programs - $1,973,000
- FY15-16 total amount actually expended for energy-efficiency programs - $1,463,831

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. AMP’s electric load is relatively flat compared to most California utilities and there is no residential air conditioning.
- More than 9% of AMP’s load is maritime, which includes a Coast Guard Base, the Maritime Administration with nine ships home ported in Alameda, and a large ship yard.
- In FY 2016 AMP finished installing advanced metering infrastructure (AMI) on its 300 largest commercial customers and about 1,700 residential customers. The AMI commercial customers have access to a portal with their energy-use data, including 15-minute interval data, kW, kWh, kVA, power factor, and weather data. Complete build out for all AMP customers will be completed in 2018.
- 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.
- The average residential energy use has been declining annually since 2011. With the exception of FY 2016, total energy sales have been decreasing also. This trend is similar to other utilities both in California and nationally.

AMP Electric Sales and Average Residential Electric Use

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual Electric Sales (MWh/yr.)</th>
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<tr>
<td>2013</td>
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<td>2014</td>
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<tr>
<td>2015</td>
<td>342,203</td>
<td>4,053</td>
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<tr>
<td>2016</td>
<td>348,820</td>
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</table>
This downward trend is likely due to several factors, including:

- Increase in customer energy efficiency
- Increase is customer-owned distributed generation
- Increase in energy efficiency in codes and standards, particularly CA Title 24 – the CA Building Standards, and Title 20 the 2012 Appliance Efficiency Regulations
- Decreased energy use in consumer products. For example, LED TVs, which use 130 watts, have largely replaced plasma TVs, which used 400 watts. Also lap top computers, which use 5 watts, have largely replaced desktop computers, which used 32 watts.
- Increase in the efficiency requirements for the Energy Star label

Major Program Changes

- Residential LEDs: AMP offered three different LED rebates in FY 2016. The first was a continuation of LED MANIA, a mail-in rebate offer from FY 2015 with very attractive rebates. This program concluded with products purchased on July 31, 2015. Next, AMP participated in an upstream program with other Northern California Power Agency (NCPA) member utilities. This program ran from February through May. Finally, AMP’s online rebate program went live in March with rebates for LED bulbs and fixtures.
- Residential Online Rebates: In March 2016, all residential rebates were moved to an online system. The program set-up fees were a major contributor to the $45,000 administration costs for this fiscal year. AMP expects to see lower administration figures for the online rebate program in FY 2017. The online rebate program allowed AMP to add new rebate categories, including electric clothes dryers, washing machines, and heat pump water heaters.
- Non-residential Direct Install Programs: The Commercial Lighting Program ended December 2015. Based upon the success of that program, AMP started the Energy Plus Program to include all non-residential customers and refrigeration measures.

Program Highlights

- Total residential sector lighting savings was nearly 235 MWh (gross). Alamedans purchased more than 12,000 LEDs in FY 2016 – 40% of all residences could have installed a new LED. In FY 2015, customers purchased or received nearly 60,000 LEDs. AMP will continue to promote LEDs to residential customers, though it is expected that growth will slow as LEDs have become ubiquitous in Alameda. LEDs were purchased through three venues: LEDMANIA, a mail-in rebate program, the upstream, or Instant Rebate program, or AMP’s new online rebate.
  - LEDMANIA, AMP’s mail-in rebate program, was only available for one month, and was just the continuation of a short-term program offered in FY 2015.
  - The upstream program was very successful and offered from February to July. Customers purchased more than 7,500 LEDs during this five month period. There is some concern that a small percentage of these LEDs were installed outside of Alameda, but AMP also recognizes that with Alameda’s proximity to Pacific Gas & Electric’s (PG&E) territory, it is
very likely that Alamedans also purchased LEDs from PG&E’s upstream program. AMP may consider repeating this program during another year. AMP’s online rebate program started in March 2016. In its first four months, more than 100 LEDs and fixtures with integrated LEDs have been incentivized. Rebates are lower than the mail-in rebate, which reflects recent decreases in LED prices. AMP expects to see continued participation in this program over time.

• Commercial Lighting Program

A direct-install lighting program, the goals of the program were to remove customer barriers to lighting retrofits such as knowledge of lighting technologies, project management, quality of contractors and fair pricing, first costs, compliance with Title 24, and reach customers that have not participated in energy efficiency programs previously. The majority of the lighting retrofits were LEDs replacing various high-intensity discharge fixtures. More than 70% of the participants were small commercial customers who had never participated before in efficiency programs and the program rebates covered an average of 56% of the project cost. With a budget of $600,000 the Program resulted in energy savings of 1,660 MWh/year and a demand savings of 406.8 kW.

• Energy Plus Program

Based upon the success of Commercial Lighting Program, AMP started the Energy Plus Program in FY 2016 with a budget of $1.1 million to include all non-residential customers and refrigeration measures. This direct install program has a goal of 3,013 MWh energy savings and will run for two years or until the funds expire.

• Street Light Retrofit

The LED retrofit of all Alameda cobra head and shoebox street lights, 3,202 lights, was completed resulting in savings of 668,224 kWh per year. The annual energy cost savings for retrofitting the 3,202 fixtures is $203,346, and the AMP rebate was $86,822.36. The remaining historic and decorative street lights, 1,877 lights, will be retrofitted with LEDs in FY 2017 and 2018.

Program Descriptions
Residential Lighting

• LEDMANIA: AMP offered two LED rebate programs in FY 2016. The first, a mail-in rebate program, LED MANIA, was closed to purchases made after July 31, 2015. LED MANIA’s rebates were available for both fixtures and lamps--$5 for LEDs less than 1,000 lumens and $10 for 1,000 lumens and greater.

• LED Upstream Program: AMP partnered with other NCPA utilities and local Alameda retailers to offer pre-rebated LEDs. This program, which AMP called the Instant Rebate program, ran from February through July (meaning that one month of this program will be captured in FY 2017). The
program offered five types of LEDs: a candelabra, BR 30 flood, and A-lamps with 800, 1100, and 1600 lumen outputs.

- **Online Rebate Program:** AMP launched their online rebate program in March 2016. This program offers different rebates for LED lamps and fixtures. Lamps are rebated at $3 if less than 1,000 lumens and $10 if 1,000 lumens and greater. Fixture rebates are set at $8, and $15, respectively.

### Residential Refrigeration

- **Energy Star Refrigerator and Freezer Rebate & Recycle Program:** This program provides a $100 rebate to customers who purchase an Energy Star refrigerator or freezer and recycle their old appliance with AMP’s recycler. Part of the goal of the program is to educate customers about Energy Star and encourage the purchase of other Energy Star appliances and equipment. AMP expects this rebate amount to decrease in FY2017. Other utilities may limit this rebate to just the higher Consortium for Energy Efficiency (CEE) Tier 2, 3, 4, or Advanced levels. AMP continues to rebate based on Energy Star certification alone as a means of simplifying the program for participants, as well as keeping the program open to lower income residence.

- **Second Refrigerator or Freezer Pick-Up Program:** This program provides customers a $35 rebate to get rid of their extra refrigerator or freezer and recycle it properly with our recycler.

### Residential Appliances

- **Energy Star Electric Dryer:** AMP’s new online rebate program includes electric clothes dryers, which are eligible for a $100 rebate. Since March, four new units have been installed.

- **Energy Star Washing Machine:** Also new, this program offers electric-only customers a $150 rebate on Energy Star washing machines. As with refrigerators, this program is available for all Energy Star-certified washing machines. Customers that have natural gas service are not eligible for this rebate. AMP has not yet had any customers participate in this incentive.

- **Energy Star Heat Pump Water Heater:** The final new addition to AMP’s online rebate program incentivizes customers to upgrade to a new Energy Star-certified electric heat pump water heater. Like the washing machine incentive, AMP has not had any customers participate in this program, despite a $500 rebate opportunity.

### Residential Other

- **Monitor Lending Program:** Borrow a Kill A Watt monitor to measure the energy use of appliances.

- **Onsite Energy Audits:** Residential audits at no cost.

- **Online Energy Audit:** Online residential energy audit and associated tools such as an appliance calculator and energy library on AMP’s website.

- **My Energy Program:** As part of the My Energy program a home energy report is mailed to 50% of Alameda residential customers every two months that includes a summary of the homes’ historical energy usage.
and recent energy use, energy efficiency tips, and a comparison of their energy use to their neighbors. This program will close in December 2016.

Non-residential Direct Install Programs

- **Commercial Lighting Direct Install Program**: Started in FY 2015 and ended December 2015 (FY 2016) the Commercial Lighting Direct Install Program was administered by a third-party vendor.

- **Energy Plus Program**: The Energy Plus Program is an expansion of the Commercial Lighting Direct Install program that includes all non-residential customers and refrigeration measures. The program started in January 2016, funded for $1.1 million, is expected to run for two years.

Other Non-residential Programs

Non-Residential Cooling

- **Commercial HVAC Retrofit Program**: Prescriptive rebates for retrofitting existing buildings with energy-efficient HVAC equipment.

Non-Residential Lighting

- **Commercial Lighting Retrofit Program**: A program with rebates, both prescriptive and custom, for retrofitting lighting with energy-efficient equipment.

Non-Residential Process

- **Commercial Customized Rebate Program**: A program with customized rebates based upon the kWh/year savings not covered by the lighting or HVAC program

Non-Residential New Construction

- **New Construction Design Assistance**: Grants of up to $10,000 for energy-efficient design work.
- **New Construction Rebates**: Whole building and systems rebates for energy-efficient new construction.

Audits

- **Commercial On-Site audits**: Free energy audits for lighting, HVAC, refrigeration, process systems, etc.

**EM&V**

AMP completes the evaluation, measurement, and verification (EM&V) process every two years. This method is an economical use of staff resources. The most recent EM&V focused on three FY 2015 residential programs. The typical budget for EM&V is $40,000 for two years. The next EM&V will be for FY 2016 and 2017 and may focus more on commercial programs.

The following three programs were studied:
• “Great Light Bulb Change Out:” All residential service addresses in Alameda were mailed two 800 lumen LEDs, packaged as a gift from AMP. Alamedans received their LEDs February – March 2015. Residents were encouraged to replace their high-use incandescent lights with these new long-lasting energy-efficient LEDs.

• LEDMANIA: After customers received their LEDs in the mail, AMP simplified their LED rebate process. The pre- and post-install and savings based on kWh savings was replaced with a prescriptive rebate and a simple mail or email application.

• Refrigerator/Freezer Recycle Program: This program encourages Alamedans to disconnect and remove an extra refrigerator or freezer. AMP arranges a pick up (and proper recycling) of the old appliance and provides a rebate to the customer.

The following are highlights of the EM&V study:

• The installation rate for the Direct Mail Lighting Campaign is high. 90% of those surveyed indicated that the LED light bulbs provided by AMP were installed.

• The reported energy savings for the Direct Mail Lighting Campaign is a conservative estimate of the actual savings achieved. Verified savings indicate a 175% realization rate, but this estimate is likely overstated due to uncertainties associated with preexisting lamp sizes reported by customers.

• The installation rate for the LED Rebate Lighting Program participants is also high; 89% of the lamps expected to be installed were verified on-site. The verified savings for these participants is 114,785 kWh. Compared to the reported savings of 115,389 kWh, the realization rate is 99.5%.

• The refrigerator recycling program verified savings for program year 2015 is 7,392 kWh with a realization rate of 57%. Verified savings are based on recycler records, which were incomplete and likely underrepresent the number of recycled refrigerators.

• Customer satisfaction with the LED light bulbs installed was generally very high.

• The majority of customers across both lighting programs were satisfied with the LED lamps installed, including the quantity and quality of light emitted.

The EM&V study helped inform staff’s need to keep records for the freezer and refrigerator hauler/recycler. AMP will now send a yearly electronic back up of pick up information back to the hauler because a member of their staff was regularly disposing of paper records.

The high realization rate (99.5%) for the LED Rebate Lighting Program creates confidence in AMP’s unique a baseline of one-third compact fluorescent and two-thirds incandescent as existing. This data shows that Alamedans have not moved to halogen incandescent lighting. AMP expects to update this to match the “Technical Resource Manual” (TRM) in future program years.

The report can be found here.

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 programs 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 HER, to the control group that did not receive HERs. Opower, the vendor responsible for My Energy, handled these calculations. The City of Alameda Public Utilities Board requested that staff use a net-to-gross ratio of 1.0 for the My Energy program.

All of the energy savings from the commercial lighting measures are from the actual pre- and post-installation inspections. The energy savings from the refrigeration retrofit and the variable frequency drive were from the TRM 2016. The energy savings from the commercial new construction projects were from the Title 24 reports and the TRM 2016, and all were field-verified. Lastly, the commercial HVAC energy savings for the chiller retrofit were based upon calculations from Salas O’Brien Engineers.

Complimentary Programs

- **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 2016, there were 2,113 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, “Shop Clean & Local” week during Public Power Week, and a contest among customer service representatives. In May 2016, 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” list for its high participation rate in 2015.
- **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 2016, EASE, an emergency relief program, helped 82 households receive a total of $7,078.12 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 $73,973.46 was allocated to 601 Alameda households. These programs are funded through the public purpose component of AMP's energy charge.
- **Research, Development, and Demonstration**: There was no AMP activity in research, development, and demonstration in FY 2016.
- **Electric Vehicles**: In FY 2016 there were a total of 381 AMP customers registered to receive the electric vehicle (EV) discount, up from 291 registered in FY 2015 and 58 in 2014. AMP purchased two EVs and one plug-in hybrid for fleet vehicles in FY 2016.
- **Energy Storage**:

Agenda Item 5B
Meeting Date: 1/23/2017
Exhibit B
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 2016 and Forecast

January 2017
Compliance with SB 1037 (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.
SB 1037 Compliance

• One report submitted to the CEC for nearly all POUUs
• Ensures consistency in energy savings and reporting
  o E3 reporting tool
Goals of AMP’s Efficiency Programs

• Meet Board-approved targets (AB 2021)
• Acquire energy efficiency that is cost effective, feasible, reliable
• Enhance customer satisfaction
• Comply with all state policies
• Provide equal opportunity for all customers to participate
Results – FY 2016

• AMP’s energy-efficiency programs achieved:
  o 362% of the target savings – target was 1,158 MWh
  o Utility cost of $0.06/kWh
  o 4,197 MWh actual energy savings, which is equal to:
    • 1.2% of 2016 energy sales
    • Energy use of 1,052 AMP residential customers
More Results – FY 2016

- Total Resource Cost measures the cost and benefits of energy efficiency, based upon the total cost to both the utility and the customer.
- If >1.0, passes the test

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Net Energy Savings (MWh/yr)</th>
<th>EE Target Savings (MWh/yr)</th>
<th>Total Expenditures</th>
<th>Total Resource Cost Test (TRC)</th>
<th>Greenhouse Gas Reduction (Metric Tons CO2e)**</th>
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More Results – FY 2016

- Total Expenditures - $1,463,831
- Customer Rebates - $532,761
- All other costs - $931,070
  - Program administration – 3rd party
  - AMP overhead and salaries
  - My Energy Program
  - Web-based tools
  - Evaluation, Measurement, Verification
Analysis & Conclusions – FY 2016

• Top year ever for energy efficiency savings
  1.) Direct Install commercial lighting
  2.) LED street light retrofit
  3.) My Energy program – Residential

• Energy savings increasing, costs are increasing faster – largest costs are program administration, AMP overhead rate
  1.) Most low-cost measures done
  2.) Residential programs cost more
Highlights – Residential Upstream Lighting

- In partnership with NCPA
- Five different types of LEDs available in five local stores
- February – July 2016
- More than 7,500 LEDs purchased
Highlights – Residential Online Rebates

- Launched in March 2016
- Mobile-friendly application
- Nearly 70 applications completed in just four months
Highlights – Non-Residential

- Commercial Lighting Program followed by Energy Plus Program
- Direct Install administered by 3rd party
- Reduce customer barriers
- 92% of installed measures were LEDs
- Net savings 1,437 MWh
- 70% of participants were small businesses
Highlights – Non-Residential

- LED Street Light Retrofit
- 63% of all street lights- cobra head and shoebox
- Energy savings 868 MWh or $203,346/year
- Lifetime of 24 years
- Total project cost was $870,169
Energy Efficiency by Sector & End Use

<table>
<thead>
<tr>
<th>End Use</th>
<th>Energy Savings (MWh/year)</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Behavior</td>
<td>1,599</td>
<td>38%</td>
</tr>
<tr>
<td>Residential Lighting</td>
<td>127</td>
<td>3%</td>
</tr>
<tr>
<td>Residential Refrigeration</td>
<td>51</td>
<td>1%</td>
</tr>
<tr>
<td>Non-Residential Lighting</td>
<td>2,359</td>
<td>56%</td>
</tr>
<tr>
<td>Non-Residential Other</td>
<td>61</td>
<td>2%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>4,197</td>
<td>100%</td>
</tr>
</tbody>
</table>

- Majority of savings from lighting, trend will continue
- Most lighting is LED – lifetime of 12+ years
- Residential behavior program measures – persistance of one year
FY 2017 Forecast

- Target is 1,247 MWh
- Residential Sector
  - Increased participation in online rebates
  - Reduction in savings as My Energy ends in December 2016
- Non-residential Sector
  - Continuation of Energy Plus Program
  - Street lights - historic and decorative will start in FY 2017
Impact of California Policies

- Title 24 – Building Energy Efficiency Standards (effective July 2014)
- California SB 350
- California AB 802
Considerations for AMP

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual Electric Sales (MWh/yr)</th>
<th>Residential Average Annual Electric Use (kWh/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>382,634</td>
<td>4,651</td>
</tr>
<tr>
<td>2012</td>
<td>373,787</td>
<td>4,555</td>
</tr>
<tr>
<td>2013</td>
<td>363,444</td>
<td>4,434</td>
</tr>
<tr>
<td>2014</td>
<td>353,913</td>
<td>4,265</td>
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<tr>
<td>2015</td>
<td>342,203</td>
<td>4,053</td>
</tr>
<tr>
<td>2016</td>
<td>348,820</td>
<td>3,989</td>
</tr>
</tbody>
</table>

• Downward trend is similar to other utilities

• Why?
  o Increase in energy efficiency
  o Increase in customer-owned generation
  o Impact of codes and standards
  o Increases in efficiency ratings for Energy Star appliances
  o Consumer technology trends – plasma TVs 400 watts, LED TVs – 130 watts; desk top computers – 32 watts, lap top – 5 watts
Questions?
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