

platform allows transparency and consistency among the POUs in the estimation of energy-efficiency potential.

The following is a sample of the types of AMP-specific data used to create AMP's 10-year target data:

- Historic energy savings
- Rates, both current and forecasted
- Forecasted load by sector
- Customer building data
- Current program offerings and planned programs
- Avoided utility costs

The model uses AMP's data, along with statewide data, to forecast energy-savings and demand-reduction potential. The model categorizes the data into the technical, economic, and market potentials. Technical energy-efficiency potential is the total amount of savings that could be achieved without any economic barriers, including cost-effectiveness.

Economic potential is the technical potential minus those projects that are not cost-effective, meaning they do not meet the Total Resource Cost (TRC) test. The TRC is a commonly used economic test for energy-efficiency programs. The TRC is the ratio of the cost compared to the benefits of an energy-efficiency measure, program, or entire portfolio to the utility and the customer. It is based on the total cost of the measure(s) or program(s) to both the customer and the utility. Examples of utility costs are rebates, marketing materials, and administrative costs. Typically, a ratio of one or greater indicates the measure or program(s) passes the TRC test.

The last category is market potential. Market potential is an estimate of the portion of that economic potential that will likely be installed by customers. The market potential takes into consideration utility program design in conjunction with the awareness and willingness of customers to participate in programs. Program design considers retrofit measures, new construction, behavioral programs, and emerging technologies. Due to market potential being widely considered by utilities as the energy-efficient target, staff will focus the report on market potential as the achievable measure of the three potentials.

Building Electrification

Building electrification, defined as the conversion of gas appliances to electric (also known as fuel switching), is not included in the targets provided by GDS. Rather, GDS's energy-efficiency targets account only for conventional electric appliances that are upgraded to more efficient electric heat pump models. For example, the savings from an electric resistance water heater upgraded to a heat pump water heater are reflected in the model; however, a gas water heater that is replaced by an electric heat pump water heater is considered fuel switching and those savings are not included in the model. Once there is better guidance from the CEC on the methodology for reporting energy savings from fuel switching, it is expected that the next iteration of the 10-year targets will include this important metric.

Codes and Standards

There are specific codes and standards, such as Title 20 (building standards) and Title 24 (appliance standards) that are used to shape energy-efficiency policy and savings values. These standards are updated on a frequent basis by other governing agencies, such as the CEC. AMP is not involved in the participation or development of these codes and standards; however, the timing and impacts of these codes and standards could have potential impact on attributable savings for future years. These codes and standards establish the baseline that is used for measuring savings. As these codes and standards are updated, they are reflected in the minimum efficiency standards used for appliances and products and thus, affect potential energy savings. For example, residential customers who replace their old Cathode Ray Tube (CRT) television with a recent model, will not have any savings recorded with AMP, but will ultimately use less energy due to Title 20 Appliance Standards for residential customers. Therefore, as technology, codes and standards, and baselines for energy efficiency improve over time, the attributable savings factors will change as well.

DISCUSSION

AMP’s 10-year targets, created using the tool developed by GDS Associates with input from AMP staff, is displayed in Table 1.

Table 1: Incremental market potential in MWh and as a percentage of utility sales

Incremental Net Market Potential (MWh)				Incremental Market Potential As % of Total Sales (MWh)			
Year	Total	Residential	Non -Residential	Year	Total	Residential	Non-Residential
2022	1251	32	1219	2022	0.35%	0.02%	0.54%
2023	1243	38	1205	2023	0.34%	0.03%	0.52%
2024	1166	60	1106	2024	0.32%	0.04%	0.47%
2025	1101	87	1014	2025	0.30%	0.06%	0.43%
2026	1024	121	904	2026	0.27%	0.09%	0.39%
2027	905	166	739	2027	0.24%	0.12%	0.31%
2028	837	208	630	2028	0.22%	0.14%	0.27%
2029	695	257	438	2029	0.18%	0.17%	0.19%
2030	660	307	352	2030	0.17%	0.20%	0.15%
2031	700	351	348	2031	0.18%	0.23%	0.15%

Residential Sector

Residential energy-efficiency savings do not include heating, ventilation, and air conditioning (HVAC) since few homes have air conditioning due to Alameda’s mild temperatures and weather. This leads to reduced energy-efficiency savings for AMP. In addition, as appliance standards (Title 20) and building codes (Title 24) have largely contributed to creating more energy-efficient homes in Alameda, market saturation for some programs and measures in the

residential sector has occurred. For example, residential light-emitting diode (LED) lighting and refrigerators had high energy-efficiency savings when first implemented but have since reached market saturation. With the Technical Resource Manual (TRM) continually modifying energy-savings amounts for products as both technology and codes and standards improve, the magnitude of AMP's residential expected savings will be reduced.

However, as evidenced in Table 1, AMP is projecting increased energy savings over the next 10 years. This is due to the assumption that even though some lighting measures like standard and reflector bulbs have reached market saturation, new savings opportunities are expected from the end measures directly related to specialty bulbs and LED fixtures. The model assumes that there is still some opportunity for these specific lighting measures to become niches of the residential market over time. Refrigeration accounts for about two-thirds of the appliance savings, and the remainder of savings is due to larger scale installation efforts like heat pump water heating, heat pump space heating, and more efficient washers/dryers. Although AMP phased out refrigerator/freezer rebates and recycling, these measures are still included in the utility's direct-install program for low-income customers and will continue to provide savings.

AMP anticipates that its upcoming panel upgrade rebate will lead to higher energy-efficiency savings in the future. The installation of a heat pump space heater or water heater in a home usually entails a high-cost panel upgrade to make the home suitable for the increased electric load. AMP will base panel upgrade rebate eligibility on the installation of two measures along with the panel upgrade. Customers will be able to choose from a variety of measures, including heat pump water heaters, heat pump space heaters, induction stoves, electric vehicle charger installations, and electric washers and dryers.

AMP is shifting away from programs with minimal energy-efficiency savings to create programs that effectively identify and implement deeper-impact saving measures. Another tool that AMP plans to offer to facilitate this transition is the implementation of an online marketplace to replace its current rebate portal. The marketplace will provide a direct resource for customers to consult for guidance on products and appliances that will be used to electrify their home, encourage energy-efficiency goals, and bill savings. In conjunction with the marketplace, AMP is planning to offer a home energy advisor service for customers. This energy advisor will conduct in-depth analyses of the customer's current energy usage, building envelope of the customer's home, and assist the customer through the process of installing energy-efficient measures in their home. This service will provide customers the resources, education, and focused approach to increase overall residential savings.

Non-Residential Sector

The non-residential sector provides the majority of energy-efficiency savings for AMP up to year 2030. Though there is a downward trend in non-residential energy-efficiency savings that can be seen in Table 1, most of the energy-efficiency savings in early years are attributed to the large market potential for lighting that still exists in Alameda.

AMP's robust non-residential lighting programs led to a total of 4,600 MWh in net savings between 2018 and 2020. This indicates that there is high market potential for lighting measures

still to be implemented by non-residential customers throughout Alameda. Market saturation for lighting has not yet been achieved and is the reason why the numbers in the first four years of the forecast, from 2022 to 2026, are significantly higher than the later years. In the later years there is tapering in energy-efficiency savings observed in Table 1 largely attributed to the eventual lighting market saturation that will occur.

Most of these savings are reflective of Alameda's non-residential customers largely benefiting from two energy-efficiency programs: a direct-install program and a self-install program. Both programs provide rebates for upgrades to HVAC, refrigeration, interior and exterior lighting, and window film replacement. While both programs offer generous rebate amounts, the self-install program allows the customer to hire their own contractor while the direct-install provides a turn-key service that includes the contractor.

As market saturation is achieved for lighting, this tapering will be offset by the efficiency savings gained from other measures like retro-commissioning of buildings, wider implementation of variable frequency drives with fans and pumps, and demand control ventilation measures. These custom measures that are integrated into this forecast result in more equitable distribution of savings between lighting and non-lighting related measures.

AMP is phasing out its direct-install program in December of 2021 due to a shrinking viable participation pool but will continue to offer the self-install option to commercial customers. In the coming year, AMP will support commercial customers with new programs focused on kitchen electrification and heat pump water heaters and space heating.

Conclusion

While market saturation, especially in lighting, will restrict energy-efficiency savings in the latter years of the ten-year forecast, the impacts will be different for residential and commercial customers. The residential targets after 2022 reflect a shift of customers to heat pump water heating and space heating in the home and savings from specialized lighting. However, it is important to note that these residential energy-efficiency targets account only for conventional electric appliances that are upgraded to more efficient electric models and not for the conversion of gas appliances to electric. On the other hand, the non-residential energy-efficiency portfolio is heavily reliant on lighting measures. In addition, it is important to note that the impacts of codes and standards, such as Titles 20 and 24, are unknown.

The new targets provide more than 1,700 MWh in additional cumulative net savings as compared to the targets created in 2017.

Table 2: Incremental Market Potential comparison 2017 targets and 2022 targets with actual net savings for 2017-2020 listed in the 2022 target column.

Incremental Market Potential (MWh)		
Year	2017 Targets	2022 Targets
2017	2206	2295
2018	1459	1362
2019	1614	2281
2020	832	1027
2021	823	N/A
2022	818	1251
2023	858	1243
2024	818	1166
2025	818	1101
2026	756	1024
Total	11002	12750

There is also variability in how the COVID-19 pandemic will impact future goals. GDS predicted that COVID-19 will decrease potential savings 3 percent in 2022 for residential customers and 5 percent for non-residential. By 2023, those impacts will drop to 1.5 percent for residential and 2.5 percent for non-residential. These are basic adjustments made on current assumptions; however, it is difficult to estimate the cumulative effects of COVID-19 on energy-efficiency savings. GDS used an 18–24-month recovery period buffer, but the magnitude is largely dependent on how long the pandemic will last and when businesses can resume and at what capacity.

When this forecast exercise is repeated in 2025, future targets may be revised higher or lower depending on the political climate and associated national, state, and local policies. At a local level, it is unclear how rebates, the marketplace, and new energy-efficiency technology will influence these targets. It is expected that future targets will consider gas-to-electric conversions. When fuel switching is included in future projections, energy savings for both residential and the commercial sector could be modified.

Evaluation, Measurement, and Verification

Additionally, AB 2227 requires utilities to complete an independent evaluation, measurement, and verification (E,M,&V) of their reported energy savings annually. CEC staff have approved smaller utilities submitting their E,M,&V study every two years to reduce the burden on staff. Because AMP is a small utility with limited resources, it completes its E,M,&V every two years. The most recent E,M,&V report was completed for fiscal years (FY) 2018 and 2019. The evaluation focused on the energy-efficiency savings impacts of various programs and customer satisfaction survey responses.

The study reviewed these programs:

- **Online Rebate Application:** AMP placed rebate applications online to facilitate faster application approval times and increase participation in rebate programs. 335 residential customers installed measures and the evaluation showed a realization rate for lighting measures of 114 percent and 97 percent for non-lighting measures.
- **Self-Install Commercial Rebate:** AMP had various rebate programs for HVAC, interior lighting, exterior lighting, window films, and refrigeration for commercial customers to work with in-house staff or independent contractors to self-install these measures. Ten commercial customers installed measures and the evaluation showed a realization rate of 50 percent, which was lower than expected due to one HVAC project and its hours of operation.

AMP will begin the E,M,&V of FY 2020-21 energy-efficiency programs next year.

NEXT STEPS

The next steps for reporting AMP's 10-Year Energy-Efficiency Target are outlined below:

1. Utility governing board approval is needed for CEC reporting.
2. Northern California Power Agency (NCPA), Southern California Public Power Authority (SCPPA), and CMUA will prepare the final AB 2227 and SB 1037 report and submit the reports to the CEC in March 2021.
3. The energy-efficiency target will be the basis for energy-efficiency planning as well as for power-resource planning.

FINANCIAL IMPACT

Costs for energy-efficiency from FY 2022 to FY 2031 will be included in future budgets to be considered and approved by the Public Utilities Board.

LINKS TO STRATEGIC GOALS AND METRICS

- **Sustainability: Strategy 2:** Promote energy efficiency and building electrification
- **Customer Experience: Strategy 3:** AMP will maximize opportunities to meet customer needs and improve engagement

EXHIBIT

- A. Resolution
- B. AMP 10-Year Savings Output Tables
- C. 10-Year Narrative for CMUA Report
- D. 10-Year Energy Efficiency Targets, Power Point Presentation

CITY OF ALAMEDA
PUBLIC UTILITIES BOARD

RESOLUTION NO. _____

**APPROVE ALAMEDA MUNICIPAL POWER'S 10-YEAR ENERGY EFFICIENCY
TARGETS FOR FISCAL YEARS 2022 THROUGH 2031, AS REQUIRED BY
ASSEMBLY BILL 2021 (2006) AND ASSEMBLY BILL 2227 (2012)**

WHEREAS, Alameda Municipal Power recommended, and the Public Utilities Board approved, a 10-year energy efficiency target through FY 2031 as required by Assembly Bill (AB) 2021 and AB 2227; and,

WHEREAS, the target was developed using a model created by GDS Associated Engineering & Consultants firm, the third-party consultant hired by CMUA; and,

WHEREAS, the same model is used by other California publicly owned utilities for compliance with AB 2227; and,

WHEREAS, the target is based upon all potentially achievable and cost-effective energy-efficiency savings; and,

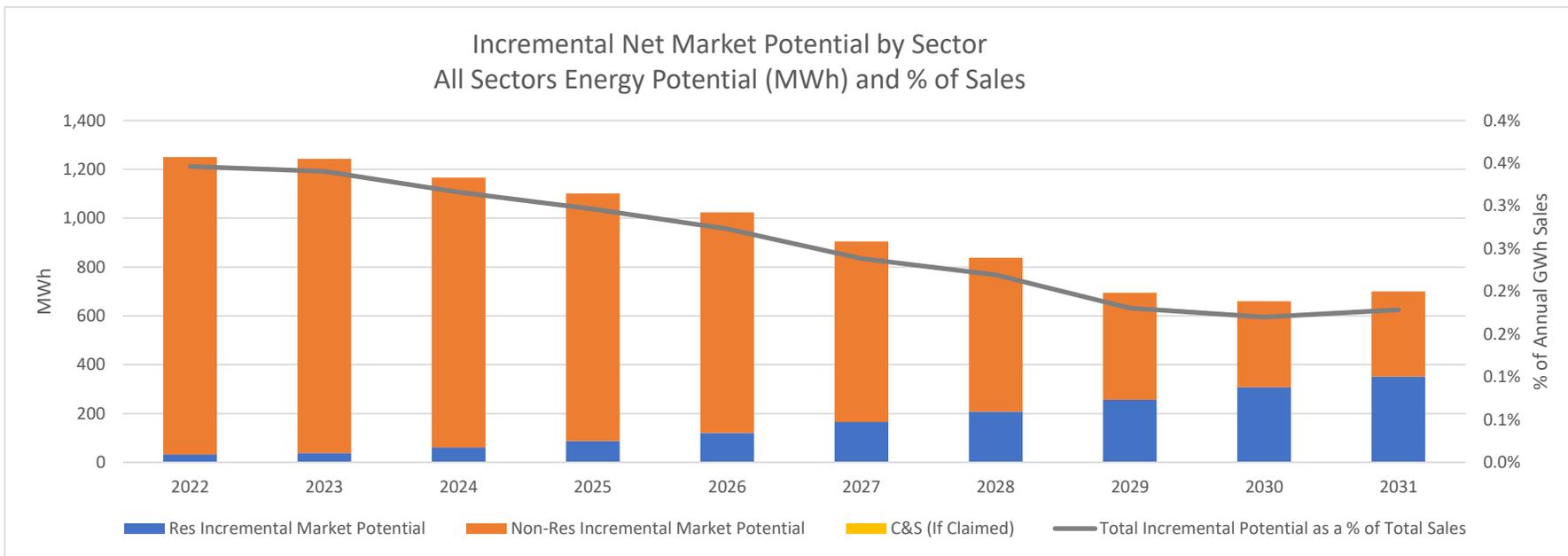
NOW, THEREFORE, BE IT RESOLVED that the Public Utilities Board of the City of Alameda approves the 10-year net energy-efficiency targets as required by AB 2021(2006) and AB 2227 (2012) and listed in the table below.

Year	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
MWh/yr Target	1251	1243	1166	1101	1024	905	837	695	660	700

Approved as to Form

By: _____/s_____
Alan M. Cohen
Assistant City Attorney

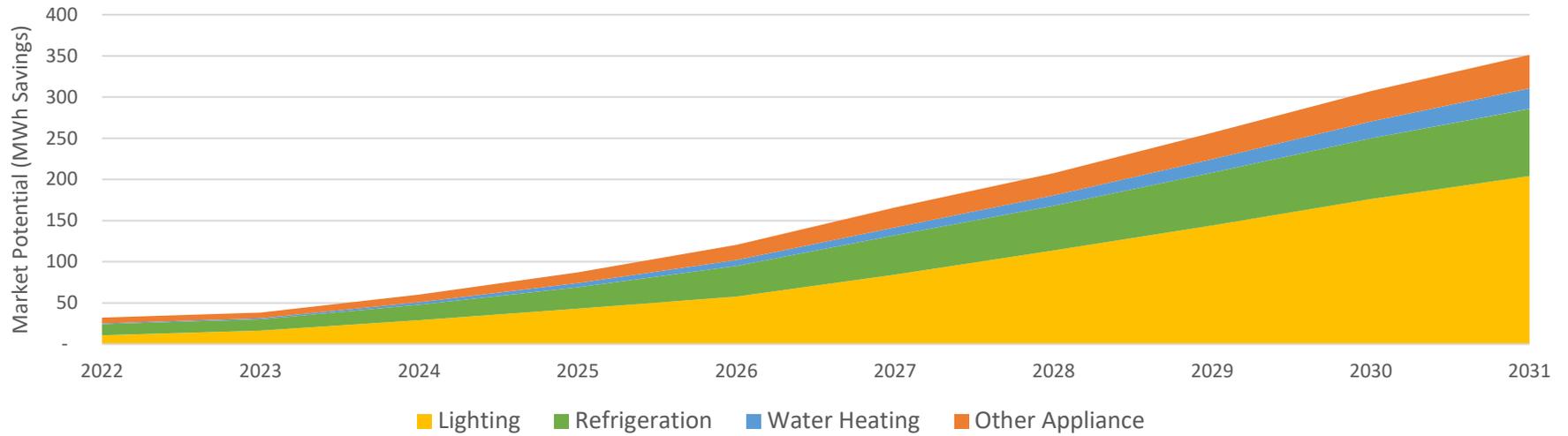
10 Year Energy Goals (Incremental Net MWh)



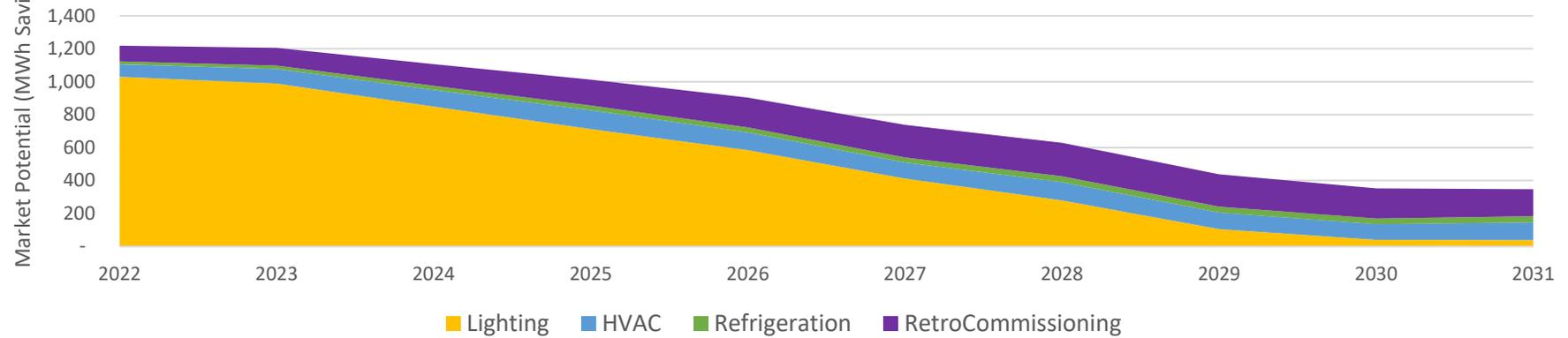
10 Year Energy Goals (Incremental Net MWh)

ALL Sectors (MWh)	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Total Incremental Market Potential	1,251	1,243	1,166	1,101	1,024	905	837	695	660	700
Res Incremental Market Potential	32	38	60	87	121	166	208	257	307	351
Non-Res Incremental Market Potential	1,219	1,205	1,106	1,014	904	739	630	438	352	348
C&S (If Claimed)										
Total Incremental Potential as a % of Total Sales	0.3%	0.3%	0.3%	0.3%	0.3%	0.2%	0.2%	0.2%	0.2%	0.2%
Res Incremental Potential as a % of Res Sales	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%
Non-Res Incremental Potential as a % of Non-Res Sales	0.5%	0.5%	0.5%	0.4%	0.4%	0.3%	0.3%	0.2%	0.1%	0.1%

Residential Breakdown 2022 Targets (Incremental)



Non-Residential Breakdown 2022 Targets (Incremental)



ALAMEDA MUNICIPAL POWER

Alameda Municipal Power 10-Year Energy Efficiency (EE) Potential Studies – At a Glance

- The annual targets are reported as net savings.
- Energy savings from future updates to Title 20 and 24 Appliance and Building Energy Efficiency Standards are not included in the annual targets.
- Fuel switching (from gas to electric) and future building electrification measures were not included in the annual targets.
- The baseline for measures is existing conditions for non-residential projects that require pre-install and post-install inspections and code for residential measures.

Overview of 2022-2031 10-Year EE Potential Studies

Residential Sector

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There is also variability in how the COVID-19 pandemic will impact future goals. GDS predicted that COVID-19 will decrease potential savings 3 percent in 2022 for residential customers and 5 percent for non-residential. By 2023, those impacts will drop to 1.5 percent for residential and 2.5 percent for non-residential. These are basic adjustments made on current assumptions; however, it is difficult to estimate the cumulative effects of COVID-19 on energy-efficiency savings. GDS used an 18–24-month recovery period buffer, but the magnitude is largely dependent on how long the pandemic will last and when businesses can resume and at what capacity.

When this forecast exercise is repeated in 2025, future targets may be revised higher or lower depending on the political climate and associated national, state, and local policies. At a local level, it is unclear how rebates, the marketplace, and new energy-efficiency technology will influence these targets. It is expected that future targets will consider gas-to-electric conversions. When fuel switching is included in future projections, energy savings for both residential and the commercial sector could be modified.

Assembly Bill 2227: 10-Year Energy Efficiency Targets

February 23, 2021

Background: Assembly Bill 2227

- Assembly Bill (AB) 2021 requires all publicly owned utilities (POUs) to develop 10-year estimates of energy-efficiency savings every three years.
- POUs must establish annual targets for all potentially achievable, cost-effective energy-efficiency savings.
- In 2012, AB 2227 was implemented to change the targets to be conducted every four years instead of three.

Assembly Bill No. 2021

CHAPTER 734

An act to add Section 25310 to the Public Resources Code, and to amend Section 9615 of the Public Utilities Code, relating to energy efficiency.

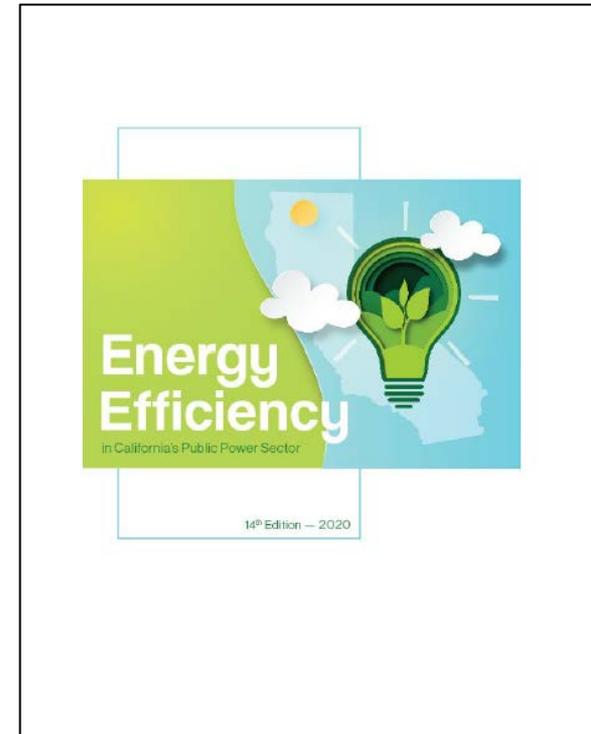
[Approved by Governor September 29, 2006. Filed with Secretary of State September 29, 2006.]

LEGISLATIVE COUNSEL'S DIGEST

AB 2021, Levine. Public utilities: energy efficiency.
(1) The Warren-Alquist State Energy Resources Conservation and Development Act establishes the State Energy Resources Conservation and Development Commission (Energy Commission) and requires it to prepare an integrated energy policy report on or before November 1, 2003, and every 2 years thereafter. Under that act, the Energy Commission also administers existing law with respect to energy conservation.
Existing law authorizes the Public Utilities Commission to regulate

How does this relate to SB 1037?

- Senate Bill (SB) 1037 requires a yearly reporting of all energy-efficiency activity.
- It compares actual numbers to the targets developed as part of the AB 2227 process.
- AB 2227 targets are reported along with SB 1037 data in one report submitted by California Municipal Utility Association (CMUA) to the California Energy Commission (CEC).



How Targets Are Developed

- The model: In collaboration with CMUA, Southern California Public Power Authority (SCPPA), and Northern California Power Agency (NCPA), GDS Associated Engineering and Consultants developed model for all POU's to use
- Targets are based on energy-efficiency savings as determined by kWh; fuel switching from gas to electric was not included because the CEC hasn't approved methodology to report savings.

• Data used:

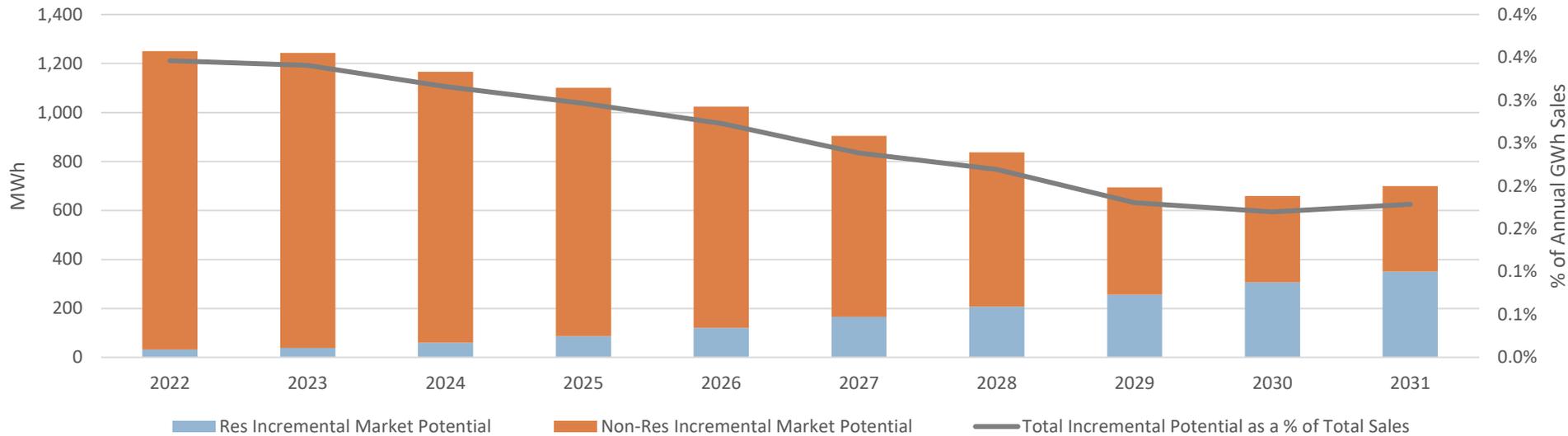
Statewide	AMP-specific
<ul style="list-style-type: none"> • Energy-efficiency impacts and costs 	<ul style="list-style-type: none"> • Historic energy savings
<ul style="list-style-type: none"> • Codes & standards 	<ul style="list-style-type: none"> • Rates, both current and forecasted
	<ul style="list-style-type: none"> • Forecasted load by sector
	<ul style="list-style-type: none"> • Customer building data
	<ul style="list-style-type: none"> • Current program offerings and planned programs
	<ul style="list-style-type: none"> • Avoided utility costs
	<ul style="list-style-type: none"> • COVID- 19 calibration for FY 2022 and 2023

Proposed 10-Year Net Targets

Incremental Market Potential (MWh)			
Year	Total	Residential	Non - Residential
2022	1251	32	1219
2023	1243	38	1205
2024	1166	60	1106
2025	1101	87	1014
2026	1024	121	904
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2028	837	208	630
2029	695	257	438
2030	660	307	352
2031	700	351	348

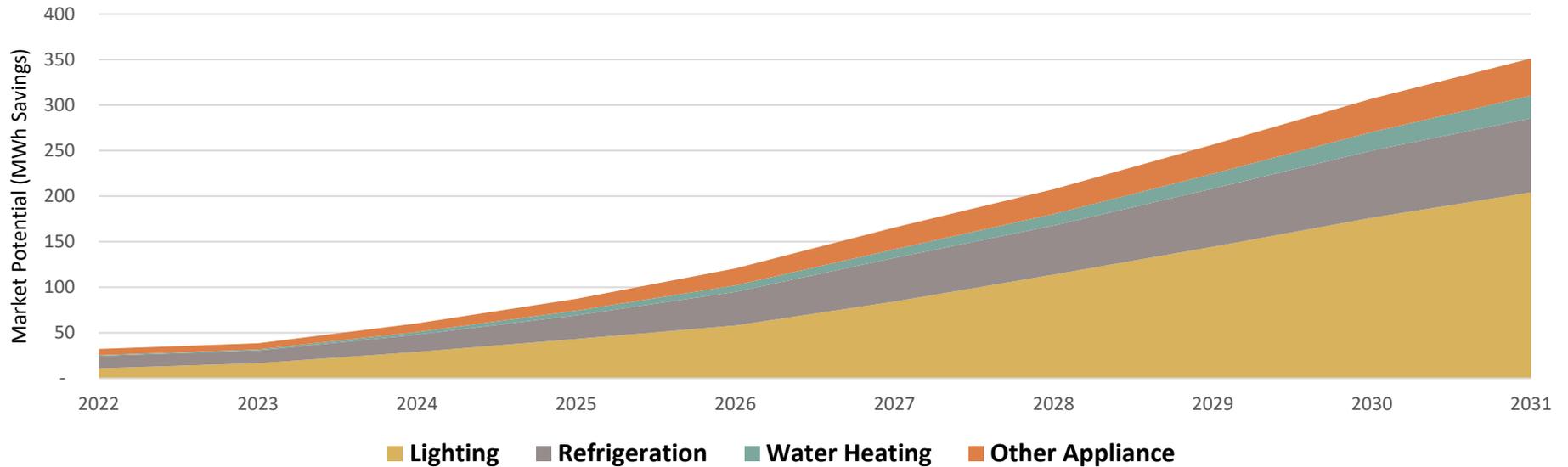
Proposed 10-Year Net Targets

Incremental Net Market Potential by Sector
All Sectors Energy Potential (MWh) and % of Sales



Sector: Residential

Residential Breakdown 2022 Targets (Incremental)



Current Residential Programs

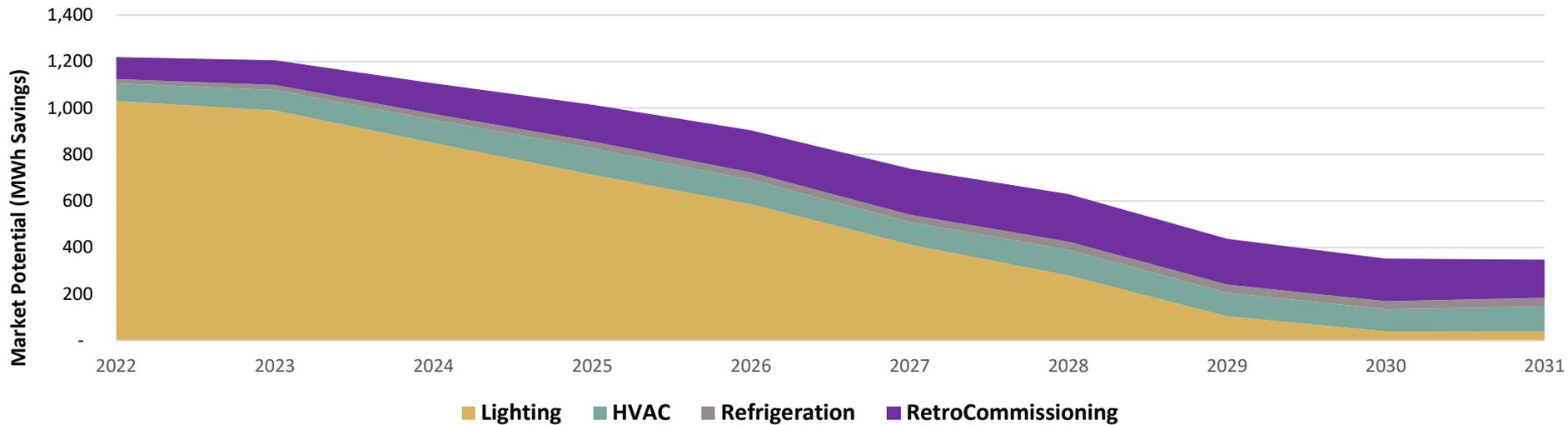
Rebate/ Program	Program Benefit
<ul style="list-style-type: none">• Heat Pump Water Heating	Ongoing \$1,500 rebate available
<ul style="list-style-type: none">• Lighting	Ongoing rebates. LEDs last 15 years!
<ul style="list-style-type: none">• Washer/Dryer	Rebate to install ENERGY STAR certified washers/dryers
<ul style="list-style-type: none">• Other measures	LED fixtures and decorative string lights
<ul style="list-style-type: none">• EAP Plus	Low-income direct install program for qualifying customers

Future Residential Programs

Rebate/ Program	Program Benefit
<ul style="list-style-type: none">• Electric Panel Upgrade	Assist customers in handling additional electric load with home improvements
<ul style="list-style-type: none">• Marketplace (will replace online rebate platform)	Assist customers in choosing energy-efficient products; anticipate launch in September 2021
<ul style="list-style-type: none">• Other Appliances (Heat Pump Space Heating)	Rebates being developed and will be offered in the upcoming fiscal year
<ul style="list-style-type: none">• Home Energy Efficiency Advisor Services	Provide hands-on, customer-specific services to facilitate a customer's journey to increase their energy efficiency

Sector: Non-Residential

Non-Residential Breakdown 2022 Targets (Incremental)



Non-Residential Programs

- Since 2015, direct-install and self-install programs have been the top contributor towards Alameda Municipal Power's (AMP) energy-efficiency savings. New construction rebates also offered.

Rebate Type	Program Benefits
<ul style="list-style-type: none">• HVAC	No need for specialized knowledge of technologies Guaranteed quality equipment and installation
<ul style="list-style-type: none">• Lighting (Interior and Exterior)	
<ul style="list-style-type: none">• Refrigeration	
<ul style="list-style-type: none">• Window film replacement	
<ul style="list-style-type: none">• Heat pump water heaters	
<ul style="list-style-type: none">• Food service equipment	

Upcoming for FY
2022

2017 Targets vs. 2022 Targets

Incremental Market Potential (MWh)		
Year	2017 Targets	2022 Targets
2017	2206	2295
2018	1459	1362
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Total	11002	12750

Actual Net Savings

Unknown Impacts to Targets

- National, state, and local policies
 - CEC developing universal electrification reporting standards
 - Title 20 and Title 24 codes and standards
 - COVID-19 impacts on customers (behaviors and program participation)
 - Continual evolution of electrification advancement
- New programs and services (panel upgrade, marketplace, home energy advisor services, restaurant equipment)
- Advancements in lighting technologies
 - Cost-effective linear fluorescent LED-retrofit fixture with wireless sensors

Conclusions

- Residential targets increasing:
 - Expect to be close to market saturation in some measures but to have increasing market potential in specialty lighting
 - Increase in number of installations of Heat Pump Water Heater and Heat Pump Space Heating
- Commercial targets decreasing over time; reflective of high participation in AMP rebate programs.
- Programs to-date have been successful.
- Staff will continue to look for cost-effective, feasible, reliable energy-efficiency opportunities.
- As a POU, AMP provides opportunity for all customers to participate in our programs.

Next Steps

- Staff recommends approving AMP's 10-Year Energy-Efficiency Targets.
- March 15, 2021: NCPA will submit AMP's energy-efficiency targets to the CEC, along with the SB 1037 report.
- The energy efficiency targets will be the basis for energy-efficiency planning as well as for power resource planning.
- AMP's progress toward the targets is reported monthly in the General Manager's Report.

Questions?

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