



City of Palo Alto

City Council Staff Report

(ID # 12068)

Report Type: Consent Calendar

Meeting Date: 5/3/2021

Summary Title: Updated 10 Year Energy Efficiency Goals

Title: Staff and the Utilities Advisory Commission Recommend the City Council Approve the City's 10 Year Energy Efficiency Goals for 2022-2031

From: City Manager

Lead Department: Utilities

Recommendation

Staff and the Utilities Advisory Commission (UAC) recommend approval of the proposed annual and cumulative Electric Efficiency Goals for the period 2022 to 2031 as shown in the table below.

Executive Summary

Palo Alto has long recognized cost-effective energy efficiency (EE) as the highest priority energy resource, given that EE typically displaces relatively expensive electricity generation, lowers energy bills for customers, and contributes to economic development and job creation. As required by state legislation, the City adopted its first set of 10-year energy efficiency goals in April 2007, and updated these goals in 2010, 2012, and 2017.

EE savings that can be counted towards these goals are restricted to those savings directly attributable to utility programs that are funded by a mandated public benefits charge (2.85% of electric retail revenue). EE upgrades that customers undertake without participating in utility programs as well as EE savings achieved through federal and state appliance and building standards currently cannot be counted towards the City's EE goals. The savings reported here and targeted by these goals represent a subset of the actual energy efficiency upgrades taking place in Palo Alto. Over the past decade, building and appliance efficiency standards have become increasingly stringent. As federal and state efficiency standards increase, the energy savings attributable to utility programs decline.

For this current EE goals update, staff proposes annual EE savings targets of 0.5% in 2022, increasing to 0.75% in 2026, then 0.8% in 2029 and holding stable through 2031, with a cumulative 10-year EE savings of 4.4% of the City's projected electric load. These targets reflect gradual recovery of savings from the City's existing programs to their pre-economic downturn

levels, plus the launch of new programs focused on behavioral-based savings and conservation voltage reduction once Advanced Metering Infrastructure (AMI) is in place.

**Summary Table: Annual Electric Energy Efficiency Goals
(% of total City customer usage reduction)**

	Electric (%)	Electric MWh
2022	0.50%	4,300
2023	0.50%	4,500
2024	0.55%	4,900
2025	0.60%	5,300
2026	0.75%	6,600
2027	0.75%	6,600
2028	0.75%	6,500
2029	0.80%	6,900
2030	0.80%	6,900
2031	0.80%	6,900
Cumulative¹ 10-year EE Goal	4.40%	37,940

Staff expects that the programs implemented to achieve these EE goals will need to be coordinated with new programs established as part of the S/CAP. Since EE programs and electrification programs serve the same groups of customers and impact energy use, they should be delivered in coordination rather than separately. Some EE programs (particularly those that improve the building envelope) complement electrification programs (e.g. heat pump space heating programs are more efficient when building envelope improvements are made). Staff will evaluate how to coordinate these programs as it completes public review of the S/CAP and develops near-term program implementation plans.

Background

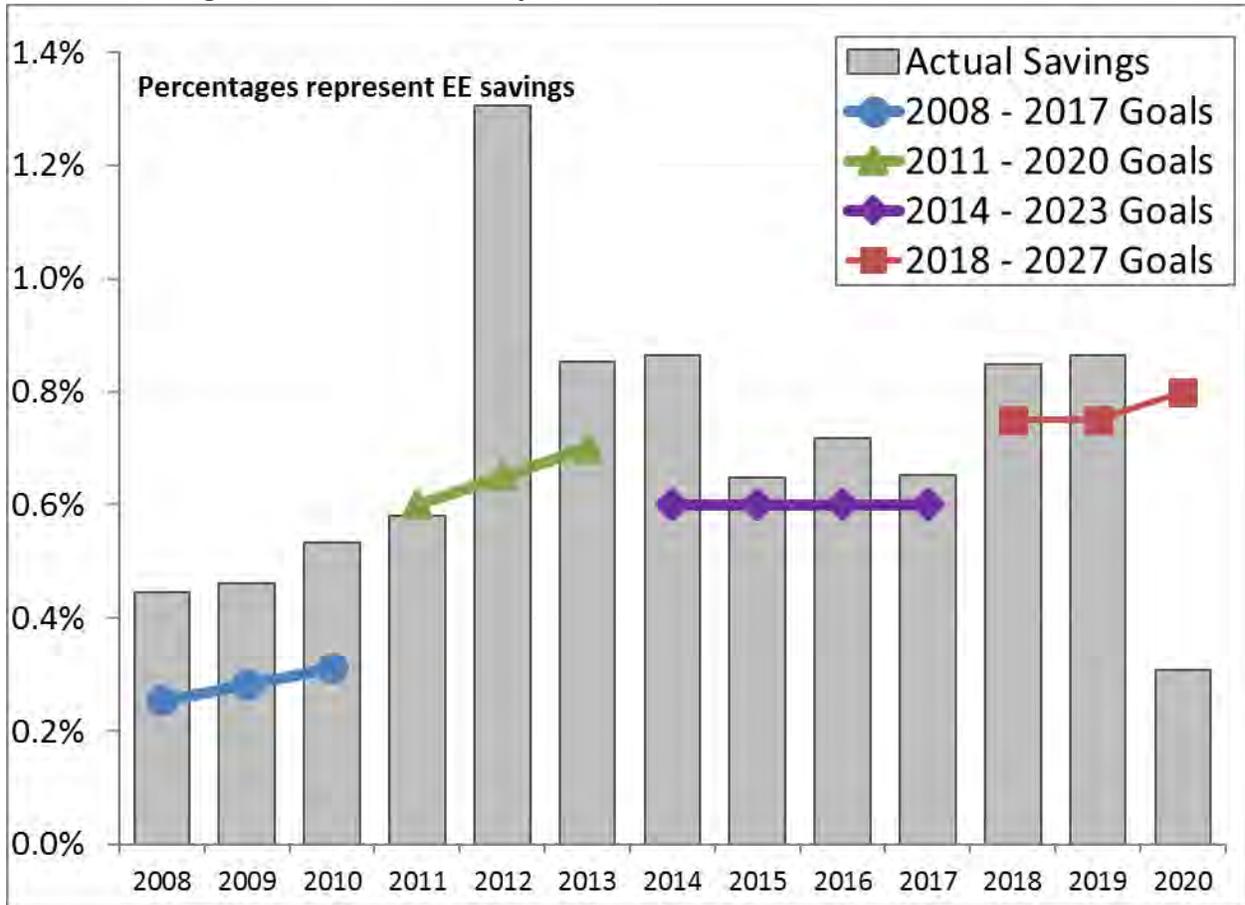
Council adopted the City’s first 10-year electric EE goals in April 2007. These goals targeted a cumulative reduction in the City’s electric usage of 3.5% by 2017. The goals met the state legislative requirements established by AB 2021 (2006) requiring publicly owned electric utilities to adopt annual electric efficiency savings goals over a 10-year period, with the first set

¹ Cumulative EE savings are not equal to the sum of the annual incremental goals due to the differences in how long the electricity savings persist for different measures and different types of EE savings. For example, new hardware upgrades contribute savings over their expected lifetimes, perhaps 15 years, whereas electricity savings from changing thermostat set-points are assumed to contribute savings over a much shorter period of time.

of goals due by June 1, 2007 and every three years thereafter. These EE goals were used for the City of Palo Alto Utilities' (CPAU's) resource planning as well as for EE program budget planning. In May 2010 City Council updated the 10-year EE goals to reduce cumulative electric load by 7.2% between 2011 and 2020. The most recent set of 10-year EE goals was adopted by City Council in March 2017, with cumulative 10-year electric savings of 5.7% between 2018 and 2027. AB 2227 (2012) changed the triennial energy efficiency target-setting schedule to a quadrennial schedule, beginning March 15, 2013 and every fourth year thereafter. The next EE goals update is due to be submitted to the California Energy Commission by March 15, 2021.

Figure 1 provides a summary of the annual EE goals and achievements since Fiscal Year (FY) 2011. The figure shows that actual CPAU EE achievements meet or exceed goals for most years.

Figure 1. Electric Efficiency Goals and Achievements for 2011-2020.²



In 2015 California passed a landmark piece of energy legislation called Senate Bill 350 (SB-350) the “Clean Energy and Pollution Reduction Act of 2015”. SB 350 reinforces California’s position as a leader in clean energy and greenhouse gas reduction and codified Governor Brown’s ambitious “50/50/50” plan to procure 50% of electricity from renewable resources, reduce petroleum use by 50%, and double building efficiency in both electric and natural gas end uses

² The sharp drop in savings in 2020 were lower than the goal as a result of delays in launching the direct install EE program targeting small to medium businesses and the home energy reports, challenges related to Covid-19 that have stopped or delayed projects, and overall load decline.

Actual savings in 2018 and 2019 are calculated using a net to gross ratio of 0.85 to compare goals using identical underlying assumptions. Demand side management reports for these same years used an average net to gross ratio of 0.65 and as a result do not align with the actual savings shown in this graph. The net to gross ratio represents an estimate of the proportion of participants in a utility-run program who would have installed efficiency measures even without the utility-run program. A net to gross ratio of 0.85 means that 85% of program participants reduced consumption primarily as a result of their participation in the utility program, and would not have reduced consumption if the program had not been available.

by 2030. The statute lists a variety of programs to achieve the doubling of efficiency savings, including: 1) appliance and building standards; 2) utility programs that offer financial incentives, rebates, technical assistance and support to customers to increase EE; 3) programs that achieve EE savings through operational, behavioral and retro commissioning activities; and 4) programs that save energy in final end uses through reducing distribution feeder voltage (i.e. conservation voltage reduction).

In 2017, City Council adopted ambitious 10-year EE goals for 2018 to 2027, approximately 30% higher than the previous efficiency goals, and a corresponding 30% increase in efficiency spending. Given the declines in electricity sales since 2017 and large load declines from COVID, maintaining these higher reach goals is not being proposed for this goal cycle. Electrification measures may be able to count towards either gas energy efficiency or electric energy efficiency, but since staff is still evaluating this, these measures were not included in the EE goals. Currently staff counts electrification toward gas EE goals rather than electric, but this may change. Electrification and emissions reduction goals are also included in the S/CAP, however.

Discussion

CPAU has offered energy efficiency programs since the 1970s. Its Long-term Electric Acquisition Plan (LEAP), approved by City Council in March 2007 and last updated in 2018 as the Electric Integrated Resource Plan (EIRP), affirmed cost-effective energy efficiency as the highest priority resource, with the goal of reducing average customer bills. The portfolio of EE programs has evolved over time. Originally the programs focused on rebates for customers administered by CPAU staff, but now they include a combination of rebates and programs administered by third parties that provide EE audit and turnkey EE services to customers. Some of the notable programs in recent years include a comprehensive home efficiency audit and retrofit program that targets low income and multi-family residences, a new construction assistance program for commercial customers to increase building efficiency, and third party administered programs that offer turnkey efficiency services to businesses. Palo Alto also has an ongoing Program for Emerging Technologies to evaluate, test and implement innovative emerging technologies that could help customers manage or reduce energy and water use.

Besides utility rebate programs, Palo Alto continues pursuing energy savings through its local building code. In December 2019, City Council adopted an Energy Reach Code which requires additional energy efficiency savings beyond California's Title 24 building energy standards for non-residential mixed-fuel new construction projects³. The City's Energy Reach Code has been in place since 2008 and has continued to evolve with California's building standards (Title 24). As a reach code specific to only the City of Palo Alto, energy savings from this code are savings that may be counted towards these EE goals.

³ Under Palo Alto's current Energy Reach Code, additional efficiencies are not required of non-residential all-electric new construction projects.

From a supply resource planning perspective, CPAU has incorporated both historic EE savings as well as forecast EE savings (from Council-approved EE goals) when forecasting the aggregate customer loads for a 10-year planning period. Energy efficiency related savings impacted directly by utility programs over the past 10 years is estimated at 6.7% of 2020 loads, i.e. without such programs, Palo Alto's electrical loads would have been 6.7% (64,500 MWh) higher in 2020.

Proposed Electric Efficiency Goals

Staff proposes new annual electric EE targets at 0.5% of forecast electric load beginning in FY 2022, increasing to 0.75% in FY 2026 when the conservation voltage reduction program can be implemented. These proposed goals reflect staff's anticipation that savings levels will take time to recover following the economic downturn. In addition, a few programs are in the process of transitioning to new vendors, and this will also contribute to the trend of increasing savings over time. The proposed goals are based on the results of a EE potential model that takes into account planned program offerings, expenditures, market saturation of energy efficient technologies, load forecast, and a planned conservation voltage reduction program following the city-wide deployment of Advanced Metering Infrastructure (AMI). Overall, these goals are similar to the annual electric EE targets adopted in 2012 (see Figure 2). The goals adopted in 2017 were based on an aggressive scenario that assumed an increase of 30% staffing and incentives as well as a growing electric load over time. With load decline, the 2017 goals are no longer economical and goals have been adjusted to reflect this change. Figure 3. Historic EE Savings and Proposed Annual Electric EE Goals on an Energy Basis. shows the actual historical EE savings and the proposed 2022 to 2031 EE goals.

Further, the City's energy efficiency potential model estimates a market potential lower than the adopted 2012 and 2017 goals and a smaller market potential with more stringent codes and standards⁴. Staff believes these goals are aggressive, but are achievable targets given low-cost energy efficiency technologies are approaching market saturation, so the market potential is declining. These proposed goals are also projected to be cost-effective based on both the model projections and past EE program costs.

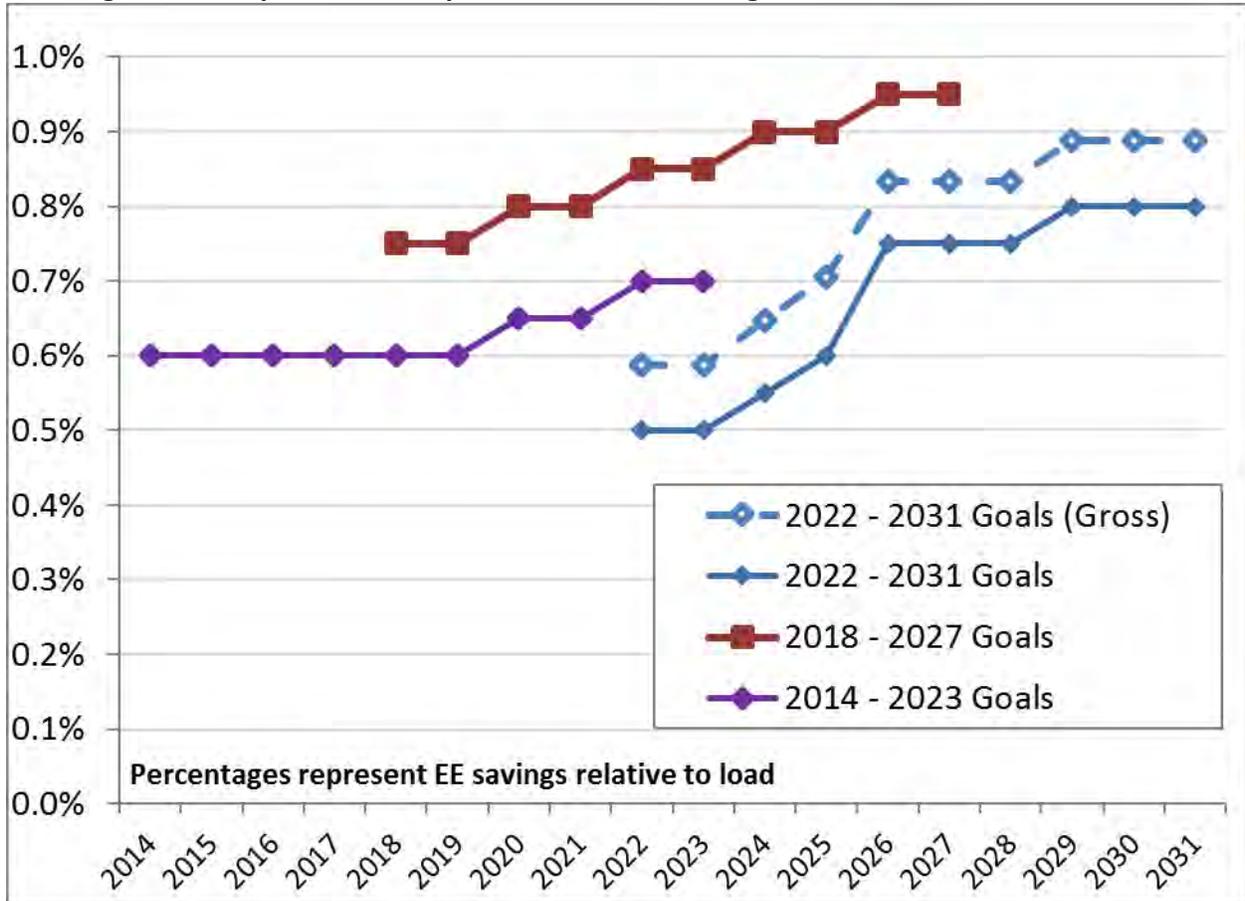
Savings from EE can be reported on a net basis, meaning they *exclude* energy impacts from free-riders (program participants who would have installed EE even without incentives), or on a gross basis, meaning they *include* impacts from program participants that are free-riders. The goals in Figure 4 are based on "net" EE savings rather than "gross" EE savings.⁵ This means they do not include the energy savings that would have occurred in the absence of utility incentives, and therefore most accurately reflect the EE savings attributable to CPAU's programs. CPAU also excludes savings attributable to the state's building and appliance standards. In order to

⁴ EE savings attributed to state mandated codes and standards are excluded from the EE potential for CPAU, and therefore also cannot count toward meeting its EE goals.

⁵ The 2022 – 2031 Goals assumes free-ridership at the measure level using an average net-to-gross (NTG) ratio of 0.85 except for low income and conservation voltage reduction programs, where the assume is 1.0 (no free ridership). The NTG ratios are based on California statewide evaluation studies and are documented in Database of Energy Efficiency Results (DEER). Generally, mature, low-cost technologies tend to have higher free-ridership.

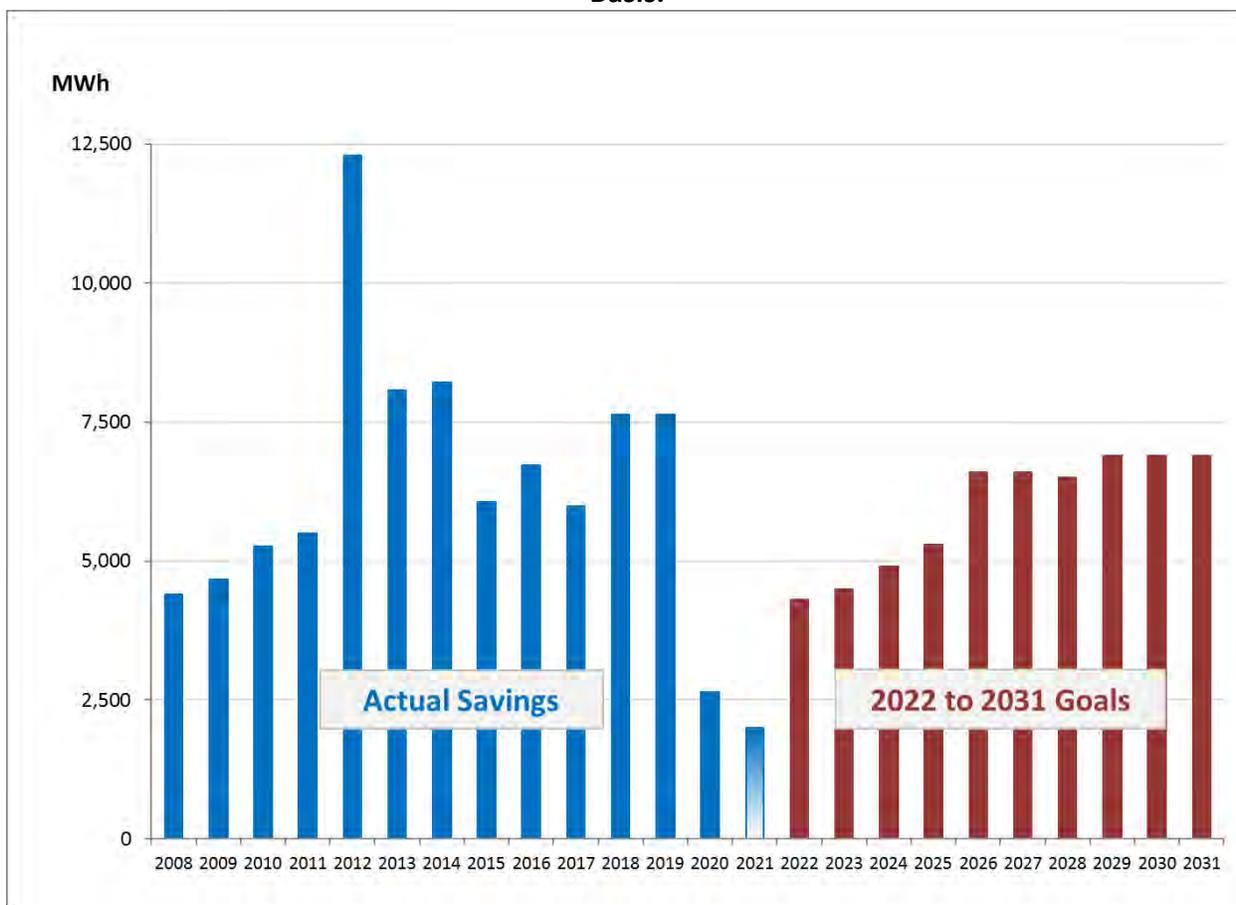
allow comparison with other utilities that set goals on a gross basis, the proposed annual goals in Figure 2 are shown as proposed (on a net basis without including codes and standards), as well as on a gross basis.

Figure 2. Comparison of Proposed 2017 Electric EE goals and 2012 Electric EE Goals.



Below, Figure 3. Historic EE Savings and Proposed Annual Electric EE Goals on an Energy Basis. shows the reported EE savings as well as the proposed annual electric EE goals expressed in MWh. The big jump in 2012's reported savings was due to the completion of a significant EE project at a large commercial site, which is unlikely to be replicable. The sharp drop in savings in 2020 were lower than the goal as a result of delays in launching the direct install EE program targeting small to medium businesses, and the home energy report program, challenges related to Covid-19 that have stopped or delayed projects, and overall load decline. Impacts of the economic recession are expected to continue into 2021 with a gradual rebound beginning in 2022.

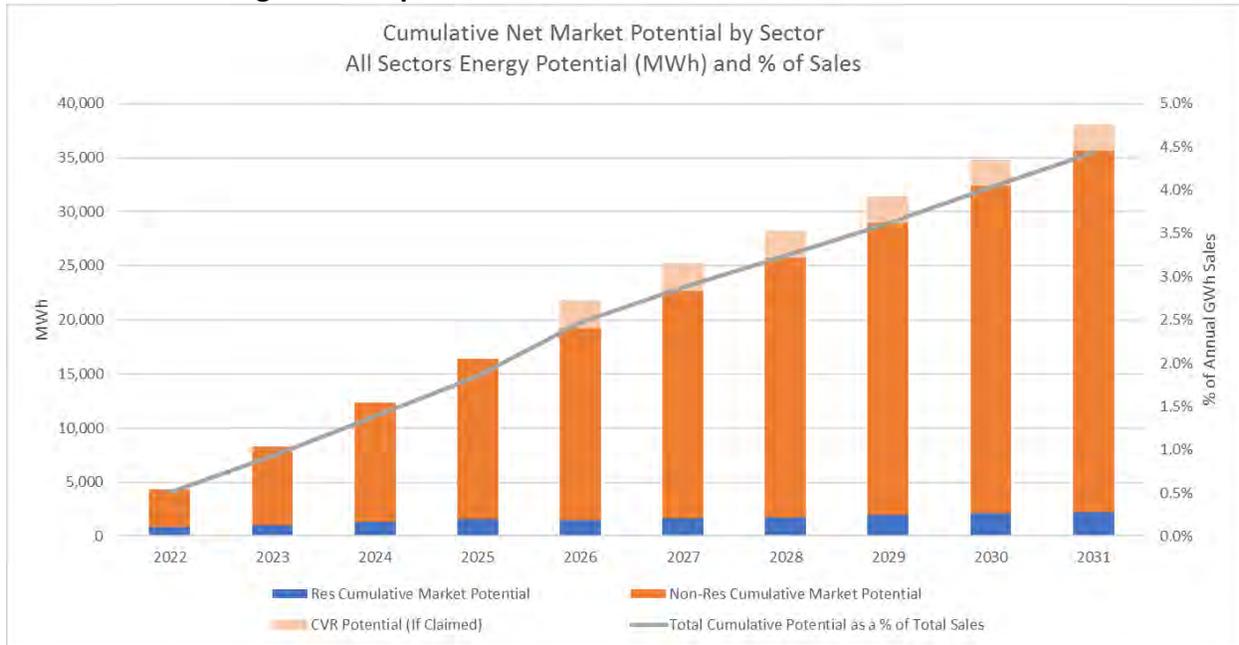
Figure 3. Historic EE Savings and Proposed Annual Electric EE Goals on an Energy Basis.



On a cumulative basis, the total EE savings from the proposed 2022 to 2031 targets represent 4.4% of the forecasted electric load in 2031. The cumulative impact of the annual targets for this 10-year period is shown in Figure 4. Importantly, some EE savings have a longer-lasting effect than others, as different EE measures have different useful lifetimes. Measure life for

Light Emitting Diode (LED) bulbs can be up to 12 years, whereas behavioral savings last only last a few years. Due to the differences in EE savings persistence, the cumulative EE impact over the 10-year period is not equal to the sum of the annual EE goals for the 10 years.

Figure 4. Proposed 2022-2031 Cumulative Electric EE Goals.



Strategies for Achieving the Proposed EE Goals

Achieving these EE goals will require the aggressive deployment of both new and existing programs, especially developing program approaches to reach previously under-served sections of the energy efficiency market potential.

While the proposed EE goals may appear small relative to past goals and the historical savings, the proposed goals will require excellent program execution and successful AMI implementation prior to launching a conservation voltage reduction program.

In the past, staff has held a training seminar for facilities managers called Building Operator Certification. This training, if offered again, could help tap into potential energy efficiency savings for large commercial and industrial customers.

Staff is in the process of soliciting third party program proposals targeting energy efficiency savings in the commercial and industrial (C&I) sectors. C&I programs have generated the majority of energy efficiency savings over time, so successful execution of these programs is critical to the success of reaching these goals.

Further, staff is in the process of launching Home Energy Reports to drive additional residential energy savings. This program launch has been delayed due to resource and technology constraints. Getting this program in place by 2022 will be critical to reaching the goals.

In addition, once the City implements an Advanced Metering Infrastructure (AMI) backbone of a smart-grid system, staff plans to start a conservation voltage reduction program using the AMI infrastructure on its 68 primary feeders. Potential savings from this program are estimated to be up to 1% of the City's annual electricity load and are targeted to start in 2026. These plans are subject to Council consideration and approval. Staff is also investigating a demand reduction pilot, which could potentially contribute EE savings from smart devices like thermostats and other behind-the-meter technologies.

This evolution of CPAU's EE portfolio is consistent with the general consensus among utilities that new approaches are needed to reach increasingly aggressive EE targets as traditional EE programs approach market saturation limitations.

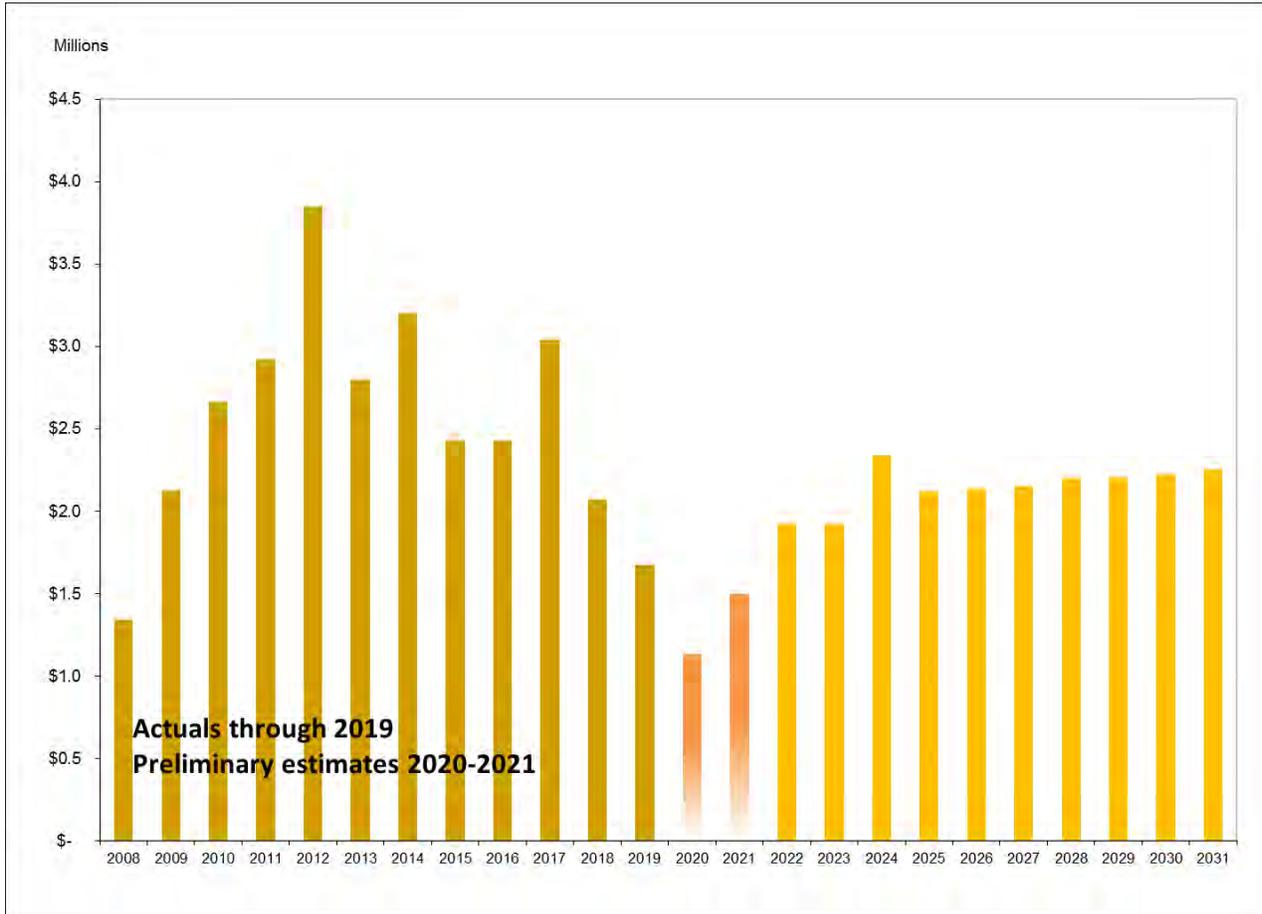
Projected Electric EE Program Costs

Funding for EE programs comes from a mandated Public Benefit (PB)⁶ surcharge of 2.85% of the electric utility bill for all customers. To meet the proposed EE goals, staff estimates an annual EE budget of \$1.9M to \$2.4M per year from 2022 to 2031. This projected EE program budget is anticipated to be funded roughly 65% by the annual PB collections.

Figure 5 shows the actual electric EE program expenditures for FY 2008 through FY 2019, estimates for FY20 and FY21, and the estimated annual EE budget between 2022 and 2031.

⁶ Locally owned municipal utilities like CPAU must collect Public Benefits funds as required by section 385 of the Public Utilities Code, to be used on cost-effective energy efficiency and conservation, low income programs, investments in renewable energy resources and technologies, and research and development.

Figure 5. Actual and Projected Electric EE Program Costs.



Retail Rate & Average Customer Bill Impact of the Proposed Electric EE Goals

EE programs impact retail rates in two ways. First, a lower electric load means that fixed costs (capital investments and fixed operating costs to run the electric utility) must be distributed over a lower electric sales volume, thereby increasing the average electric retail rate. Second, the use of funds to support EE programs increases the revenue requirements for the electric utility.

Overall, these proposed goals are estimated to amount to a cumulative increase in the retail rate of approximately 3.5% by the year 2031. The majority of this retail rate increase is due to the cumulative load reduction from the proposed 10-year EE goals. Increased charging of electric vehicles, electrification of natural gas appliances, and other electric load growth could mitigate the retail rate impact of the EE programs. While rates increase, total bills are expected to be reduced over the lifetime of the EE savings.

Timeline, Resource Impact, Policy Implications

This report contains preliminary estimates of the costs of achieving the proposed electric EE goals. The detailed budget plan and staffing needs to meet the annual EE goals will be part of the annual City budgeting process. The annual budget will present the costs for both internally administered, as well as contractor supported, efficiency programs.

Adoption of the proposed electric 10-year EE goals will replace the 2017 10-year electric EE goals and will inform the EE program planning and load forecasting for the next four years. These goals will also be included in the Electric Utility Integrated Resource Plan, and the City's Sustainability Implementation Plan. The proposed 2022 - 2031 electric EE goals are consistent with the Utilities Strategic Plan, and the City's S/CAP.

Stakeholder Engagement

Energy efficiency is included as a key action for the Sustainability and Climate Action Plan (S/CAP), and stakeholder engagement has taken place as part of the development of that plan. Staff does not typically do stakeholder outreach in developing plans but does assess market potential of various programs and discusses available efficiency measures with industry experts. Outreach related to specific efficiency programs includes direct engagement with key account customers, monthly newsletters, home efficiency advisor phone support, utility bill inserts, online webinars and workshops and social media posts.

Many of the City's existing energy efficiency programs will likely need to be modified and greatly expanded so they can be integrated with and aligned with new S/CAP programs. The details of these programs are not yet determined and require some coordination with community review efforts being established by Council as part of the S/CAP.

Commission Review

The UAC reviewed these proposed goals at its March 3, 2021 meeting ([UAC Report and Presentation #11789](#)) and unanimously recommended that the City Council approve them. Commissioners asked questions about specific programs, including the Conservation Voltage Regulation and Home Energy Reports programs. There were Commissioner comments about ensuring electrification was considered in customer programs planning and that resources for efficiency were balanced against the need for resources for electrification. There was also a comment that staff should consider the impact of potential changes in the way office work is managed given increasing remote work.

Environmental Review

The UAC's recommendation that Council approve the 2021 10-year electric EE goals does not require California Environmental Quality Act review, because the plan does not meet the definition of a project under Public Resources Code Section 21065 and CEQA Guidelines Section 15378(b)(5), as an administrative governmental activity which will not cause a direct or indirect physical change in the environment.