MEMORANDUM

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TO: UTILITIES ADVISORY COMMISSION

FROM: UTILTIES DEPARTMENT

DATE: February 1, 2017

SUBJECT: Utilities Advisory Commission Recommendation That Council Approve the Update on the City of Palo Alto's Ten-Year Electric Energy Efficiency Goals (2018 to 2027)

RECOMMENDATION

Staff recommends that the Utilities Advisory Commission (UAC) recommend that the Council approve the proposed annual and cumulative Electric Efficiency Goals for the period 2018 to 2027 as shown in the table below.

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

	Electric (%)	Electric MWh
2018	0.75%	7,300
2019	0.75%	7,300
2020	0.80%	7,800
2021	0.80%	7,800
2022	0.85%	8,300
2023	0.85%	8,300
2024	0.90%	8,600
2025	0.90%	8,600
2026	0.95%	9,100
2027	0.95%	9,200
Cumulative[1] 10-year EE Goal	**5.7%**	**54,900**

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

[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.

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 and 2012.

For the EE savings targets the City is required to establish under state law (AB 2227), EE savings that can be counted towards these goals are restricted to those savings directly attributable to utility programs which 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. Therefore the savings reported here and targeted by these goals represent a narrow subset of the actual energy efficiency upgrades taking place in Palo Alto. Over the past five years, 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 0.75% in 2018, increasing to 0.95% in 2027, with a cumulative 10-year EE savings of 5.7% of the City's projected electric load. These are aggressive targets for Palo Alto, and are roughly 30% more ambitious than the previous goals adopted in 2012. Staff will explore various program strategies as well as innovative EE technologies to achieve these goals over the next decade.

BACKGROUND

Council adopted the City's first 10-year electric EE goals in April 2007, which were to reduce the City's electric usage cumulatively by 3.5% by FY 2017. These 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 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 December 2012, with cumulative 10-year electric savings of 4.8%[2] between 2014 and 2023. 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, 2017.

Figure 1 provides a summary of the annual EE goals and achievements since Fiscal Year (FY) 2008. The figure shows that actual CPAU EE achievements have exceed goals for most years.

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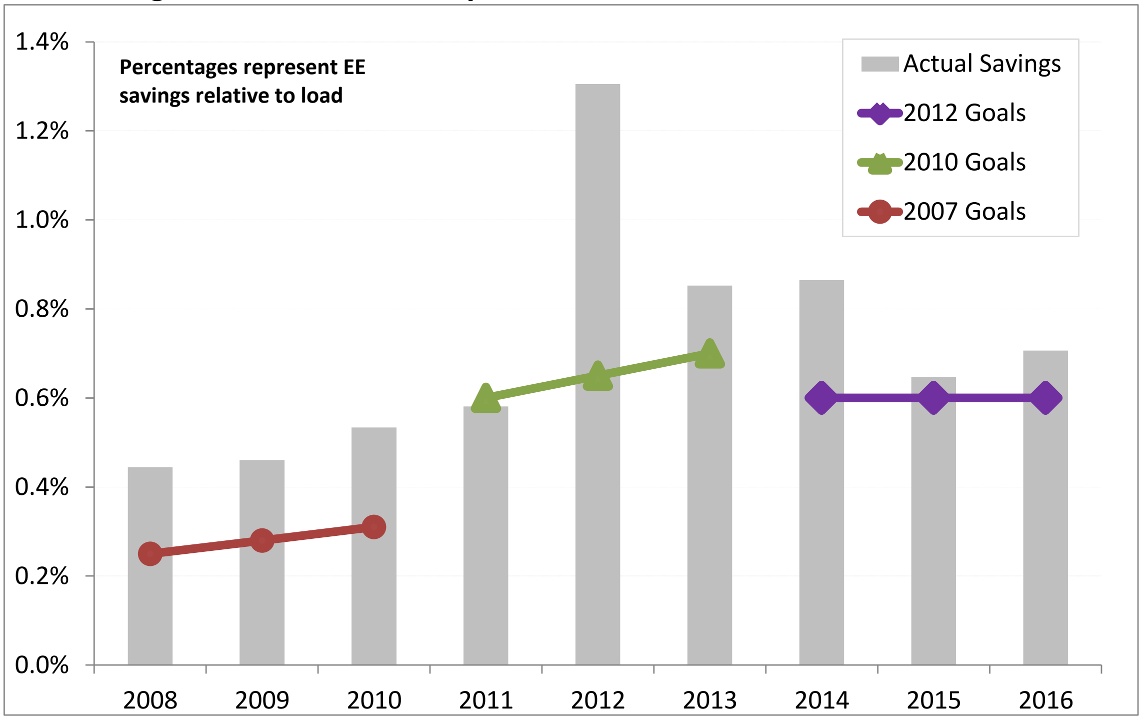
[2] The 2012 EE goals were lower than the 2010 EE goals because the 2010 EE Potential model did not exclude savings attributed to appliance codes and building standards from CPAU's EE savings potential. Many federal and state mandated codes and standards took effect between 20013 and 2018, including comprehensive lighting standards from AB1109 (2007).

Figure 1. Electric Efficiency Goals and Achievements for 2011-2016.



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 codifies 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 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 retrocommissioning activities; and 4) programs that save energy in final end uses through reducing distribution feeder voltage (i.e. conservation voltage reduction). In the spirit of SB 350's goal to double building energy efficiency, staff proposes an ambitious set of 10-year EE goals for 2018 to 2027. It should be noted that since Palo Alto's electric supply has been carbon-neutral since 2012 and that electric efficiency does not contribute additional greenhouse gas (GHG) reductions.

DISCUSSION

Overview of Palo Alto's Past Energy Efficiency Activities

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 2012, 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 include 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 turnkey lighting and refrigeration upgrade program for small businesses (Right Lights+), a comprehensive home efficiency audit and retrofit program that targets low income residences, a direct install program that implements sensors to power down beverage and snack vending machines at no charge to businesses, a new construction assistance program for commercial customers to increase building efficiency, a program that offers building commissioning services to large businesses, and a Home Energy Report program that provides individualized reports comparing residents' home energy usage with their neighbors in similarly sized homes.

Palo Alto was one of the first cities to pilot LED street light technology in 2009, in collaboration with the Pacific Northwest National Laboratory. Since 2014, the City has converted 85% of its streetlights to LED streetlights (the remaining are decorative streetlights.) CPAU 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 programs, Palo Alto is also pursuing energy savings through its local green building code. In June 2015, City Council adopted an energy reach code within the Green Building Ordinance that requires 15% energy efficiency savings beyond California's 2013 Title 24 building energy standards for single family, multifamily and non-residential new construction projects. This energy reach code was effective for the period from September 2015 to December 2016. Beginning January 2017 through December 2019, the energy reach code requires 10% energy efficiency savings beyond the state's 2016 Title 24 building energy standards for single family, multifamily and non-residential new construction projects. As a reach code specific to only the City of Palo Alto, energy savings from this code are savings which may be counted towards these EE goals.

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 6.8% of 2016 loads, i.e. without such programs, Palo Alto's electrical loads would have been 6.8% (60,300 MWh) higher in 2016.

Proposed Electric Efficiency Goals

Staff proposes new annual electric EE targets at 0.75% of forecast electric load beginning in FY 2018, increasing 0.05% every two years, and eventually reaching 0.95% in FY 2026 and FY 2027. These proposed goals are approximately 30% more ambitious than the annual electric EE targets adopted in 2012 (see Figure 2). Figure 3 shows the actual historical EE savings and the proposed 2018 to 2027 EE goals.

While the proposed EE goals may not initially appear aggressive relative to past goals and the historical savings, the proposed goals are quite ambitious considering that a) the computational model built by Navigant Consulting for Palo Alto[3] suggests a market potential lower than the

[3] Navigant Consulting was contracted by the Northern California Power Agency (NCPA) to build specific computational models for each of the NCPA member utilities. This model incorporates CPAU's avoided costs,

adopted 2012 goals for a business-as-usual approach, and b) the diminishing market potential due to more stringent codes and standards[4]. Staff believes these goals are ambitious but achievable given Palo Alto has consistently exceeded predicted EE market potential and that Staff has a number of new program strategies in preliminary stages. These proposed goals are also projected to be cost-effective based on both the model projections and past EE program costs. Lastly, they are also consistent with the principles expressed in Palo Alto's Sustainability and Climate Action Plan (S/CAP). If adopted, these EE goals will be included in the Efficiency implementation plan currently being developed for the S/CAP.

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 building and appliance codes and standards. In order to allow comparison with other utilities which 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. In addition, if energy savings from codes and standards were included, CPAU's goals would be approximately 1.1% per year as illustrated in Figure 2.

These distinctions are important, as California IOUs and a few large POUs actively participate in the development of these codes and standards and subsequently claim savings attributed to these codes and standards. For context, in 2015 nearly 45% of PG&E's claimed savings came from these codes and standards so one would expect California IOUs to have substantially higher EE goals than CPAU for claimed savings.

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retail rates, and building stock data. Additional explanation of the Navigant Consulting EE potential model and Staff goal development is in Attachment A.

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

[5] The 2016 EE Potential model assumes free-ridership at the measure level using a net-to-gross (NTG) ratio. 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.

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

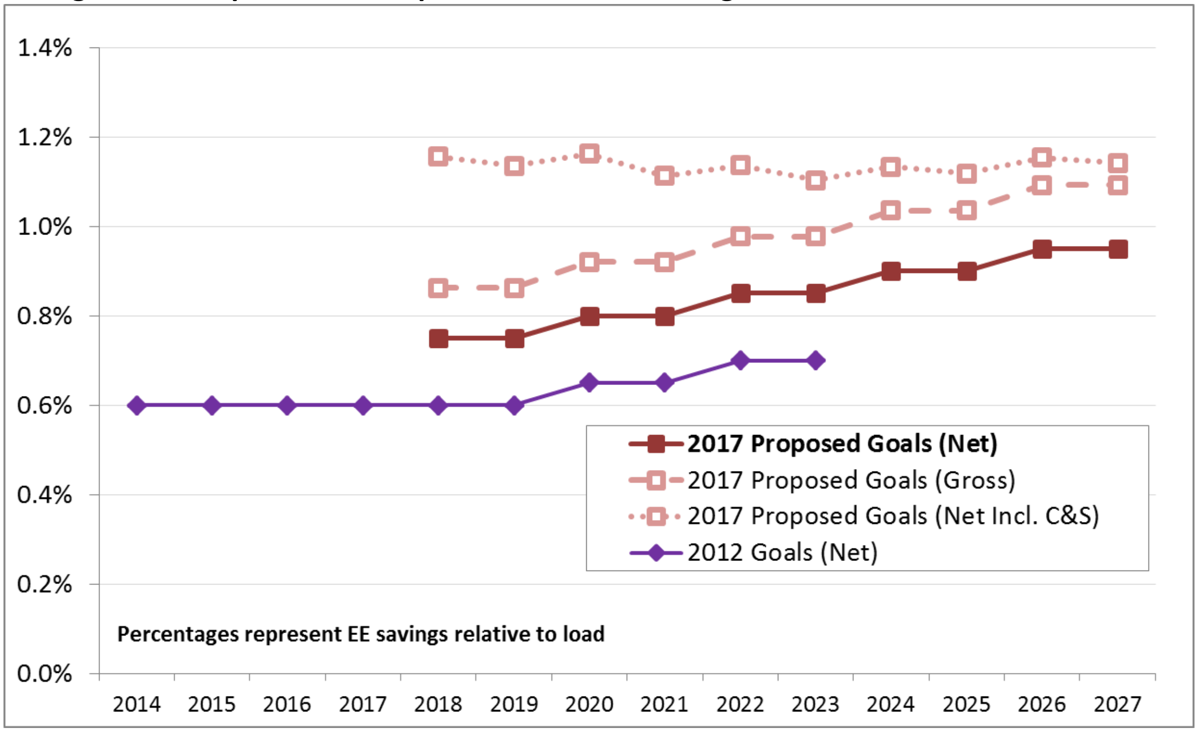
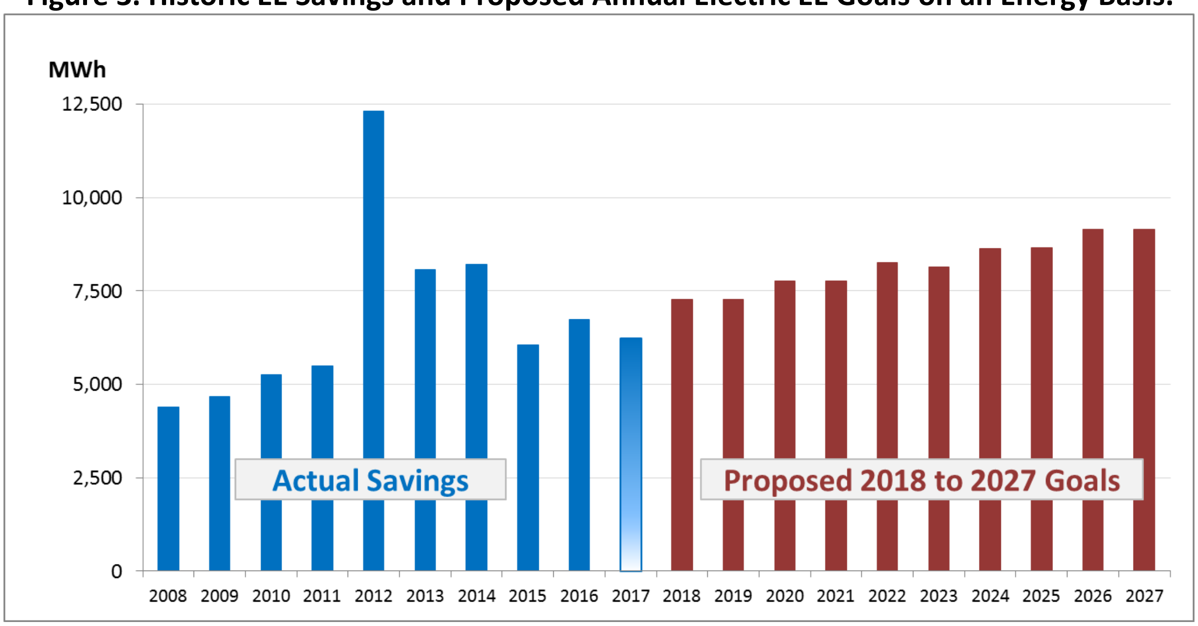


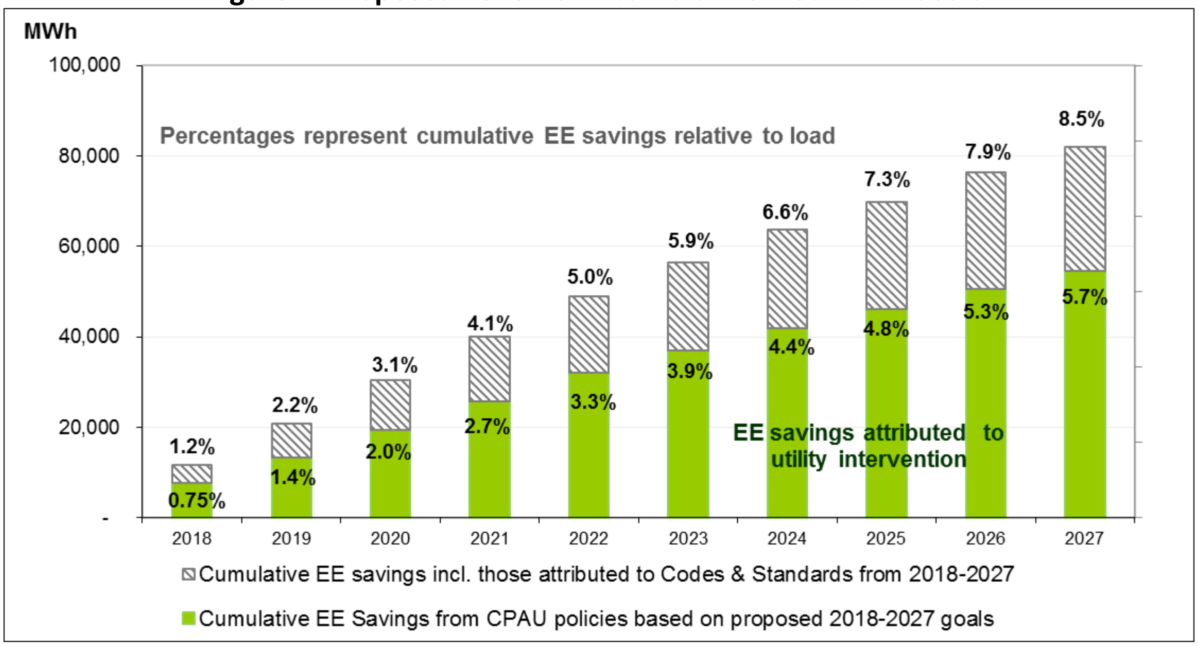
Figure 3 shows the reported EE savings as well as the proposed annual electric EE goals expressed in MWh. The big jump in 2012's reported savings was due to the completion of a significant EE project at a large commercial site, which is unlikely to be replicable.

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 2018 to 2027 targets represent 5.7% of the forecasted electric load in 2027, a 19% increase over the goals adopted in 2012. If the EE savings from codes and standards are included, the cumulative EE savings in 2027 is 8.5% of the forecasted electric load. The cumulative impact of the annual targets for this 10-year period is shown in Figure 4. It is important to note that 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 2018-2027 Cumulative Electric EE Goals.



Strategies for Achieving the Proposed EE Goals

Achieving these ambitious EE goals will require the deployment of new innovative programs structures, increasing awareness of existing programs, and developing other program approaches to reach previously stranded sections of the energy efficiency market potential.

One example of an innovative program structure that research suggests is highly effective is the idea of gamification[6] for behavioral residential energy savings. The Energy Lottery pilot program currently being developed by staff could provide extremely cost-effective residential behavioral savings through gamification.

Another example of a new pilot program currently underway is a training seminar for facilities managers called Building Operator Certification. This training could help tap into potential

[6] Gamification is the concept of applying of game-design elements and game principles to other areas in order to improve user engagement and other metrics.

energy efficiency savings for large commercial and industrial customers. Also, as discussed in an earlier section, Palo Alto has adopted Green Building Ordinance that requires additional energy savings beyond the state's building energy standards. Staff is currently investigating how to track and verify the energy savings attributed to the Green Building Ordinance.

In addition, if the City chooses to implement an Advanced Metering Infrastructure (AMI) backbone of a smart-grid system staff will investigate 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 could be realized by 2025 or 2026. All these plans are subject to Council consideration and approval. Staff is also investigating a distributed energy resources pilot, which could potentially contribute EE savings from smart thermostats and other emerging technologies. There are also potentially large EE savings from many City facilities, particularly if EE measures do not impact other operating constraints.

This evolution of our 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

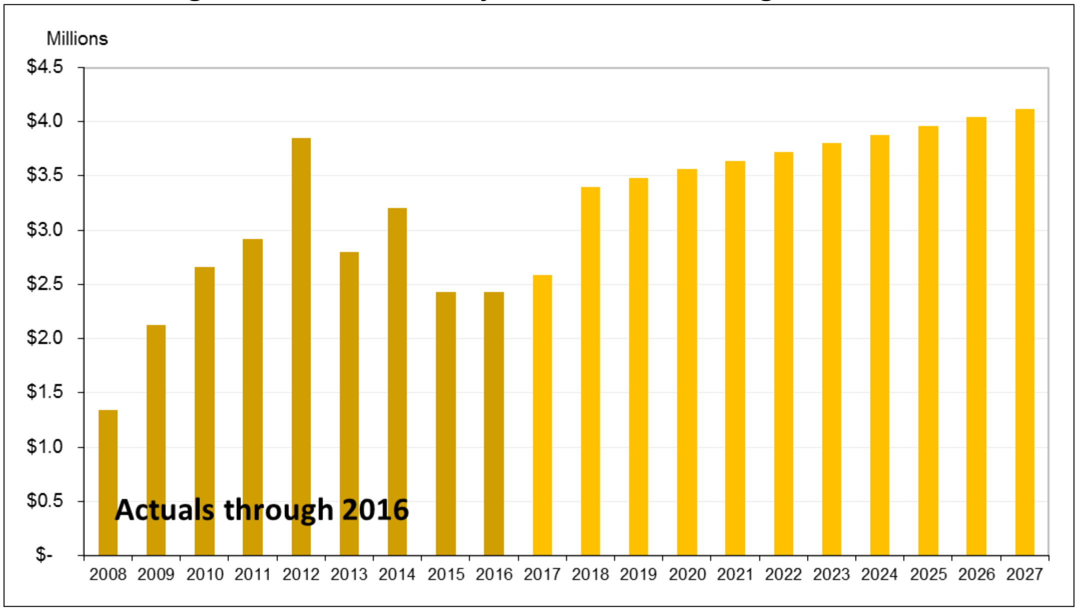
Funding for EE programs comes from a mandated Public Benefit (PB)[7] surcharge of 2.85% of the electric utility bill for all customers. Since all EE portfolios must be cost-effective, they can also be funded by supply resource funds.

To meet the proposed EE goals, staff estimates that the annual EE budget will grow from about $3.4 million in FY 2018 to about $4.2 million in FY 2027. This projected EE program budget is anticipated to be roughly 85% of the annual PB collections.

Figure 5 shows the actual electric EE program expenditures for FY 2008 through FY 2016 and the estimated annual EE budget between 2018 and 2027.

[7] Public Benefits funds are required to be collected by legislative statute and can only be used on cost-effective energy efficiency, low income programs, renewable electricity, 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 5% by the year 2027. 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. The total bill impact of the proposed goals is estimated to be neutral over the lifetime of the EE savings.

RESOURCE IMPACT

As discussed above, staff estimates that the annual EE budget will grow from about $3.4 million in FY 2018 to about $4.2 million in FY 2027, and these goals will have other rate and bill impacts. Although this report contains preliminary estimates of the costs of achieving the proposed electric and gas 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.

POLICY IMPLICATIONS

Adoption of the proposed electric 10-year EE goals will replace the 2012 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 LEAP, the Electric Utility Integrated Resource Plan, and the City's Sustainability Implementation Plan. The proposed 2017 electric EE goals are consistent with the Utilities Strategic Plan and the City's S/CAP.

ENVIRONMENTAL REVIEW

The UAC's recommendation that Council approve the 2017 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.

ATTACHMENTS

A. Energy Efficiency Potential Modeling
B. Cost-Effectiveness Tests for Energy Efficiency Programs
C. Top 20 Electric Efficiency Measures in 2018

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ATTACHMENT A: ENERGY EFFICIENCY POTENTIAL MODELING

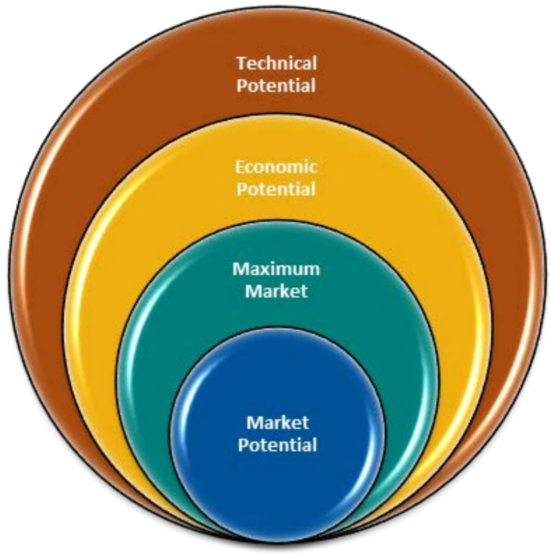
Energy Efficiency Potential Model Overview

The first step in establishing EE goals is to model the potential for energy savings within the City. This step was completed using an EE potential model developed by Navigant Consulting. The 2016 EE potential model is similar to the one used by CPAU and other California publicly owned utilities (POUs) in 2012 as well as the model most recently used by the California Public Utilities Commission to determine the EE potential for investor-owned utilities (IOUs). The model estimates the technical, economic and market potential for energy efficiency measures for residential and non-residential customers, defined as follows:

- **Technical potential** is the energy savings that would result from installation of the most energy efficient measures that are commercially available, regardless of cost-effectiveness.
- **Economic potential** includes only savings from the installation of cost-effective EE measures.
- **Maximum Market potential** is a subset of the economic potential which is scaled by customers' awareness and willingness to adopt energy efficient equipment.
- **Market potential** is the achievable portion of the maximum market potential calculated by the model, given: 1) the calibration of the model based on actual EE savings for a specific utility, and 2) the programs the utility chooses to include.

The model is calibrated based on the achieved EE savings by end use, and uses a 3-year average from 2013 to 2015 is used as the base year. The model also takes into account past EE program achievements as well as user-specified input such as projected avoided energy costs, retail rates of electricity, discount rate, building stock, and assumptions regarding appliance and equipment penetration. Efficiency measures included in the analysis cover over 170 current and emerging electric efficiency measures. For each year starting in 2015, the model steps through the calculation of the technical potential, then filters out the uneconomic measures to determine the economic potential, then estimates the maximum market potential based on customers' awareness and willingness to adopt and, finally, computes the market potential by applying a diffusion curve function to the maximum market potential for the portfolio of EE programs. The calculated market potential forms the basis of the proposed EE goals for 2018 to 2027. Figure A-1 shows the model's sequential narrowing from technical potential to market potential.

Figure A-1. 2016 Navigant EE Potential Model Steps for Modeling CPAU Market Potential.



Limitations of the EE Potential Model

The 2016 EE Potential model has some intrinsic limitations. One source of uncertainty is the values for "willingness and awareness" used within the model, which attempt to approximate customer awareness of energy efficiency measures and their willingness to install the measures. The projected market potential is extremely sensitive to these values, as the maximum market potential is essentially the product of the economic potential and the willingness and awareness values. The 2016 EE potential model applies generic values adopted from the IOUs' EE potential model. Given the unique demographics of Palo Alto, the "willingness and awareness" numbers for Palo Alto will likely be different from the IOUs'.

Cost projections from the model should also be treated as estimates, as the model's measure costs are based on Navigant's measure database, rather than actual CPAU measure costs. Also, the model does not readily accommodate analysis using different avoided costs.

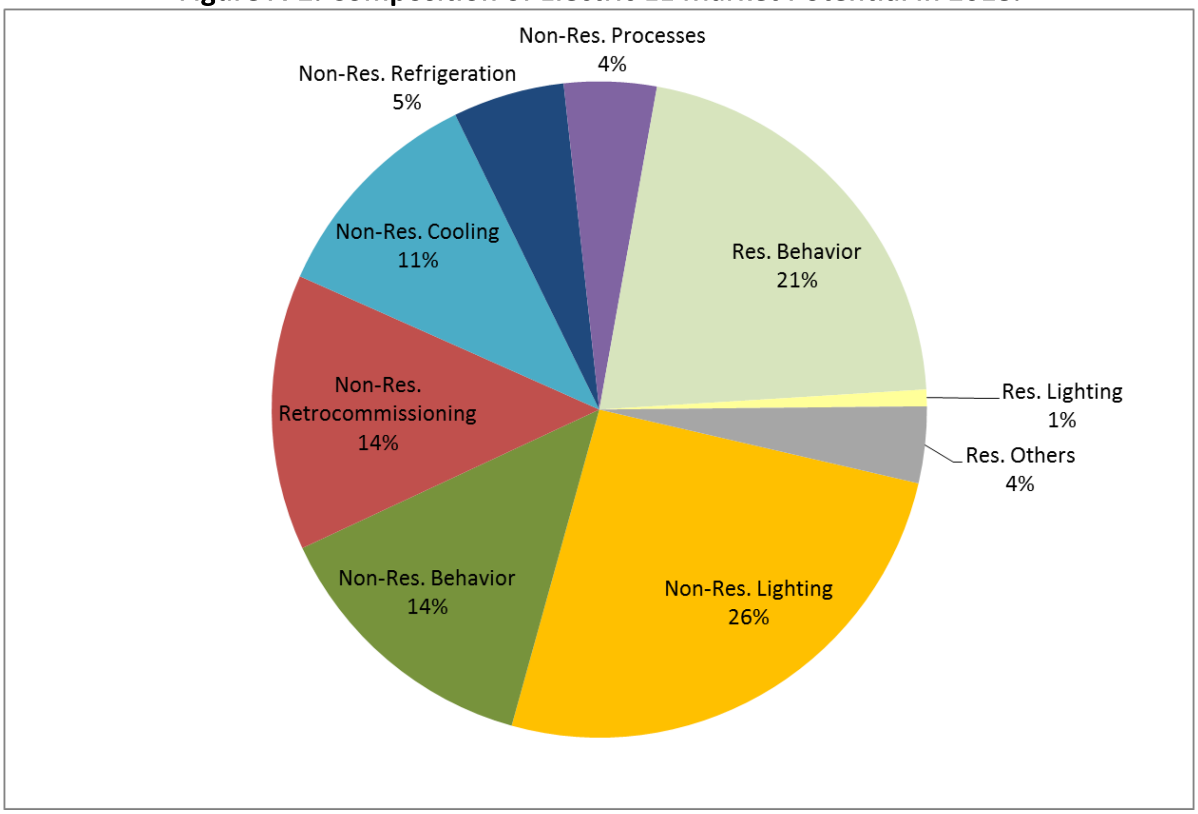
More broadly, this model cannot predict future disruptive technologies, or calculate savings from programs with completely new and different structures. One such example is the energy savings attributed to Palo Alto's Green Building Code.

Model Results

For Palo Alto, this 2016 EE potential model estimates an annual incremental market potential of 0.6% of the forecasted load for 2018-2027 if Palo relies solely on a business as usual approach. This 10% decline in market potential from the 2012 EE goals is due to both the model limitations as well the effects of market saturation for mature EE programs like Palo Alto's. However, given Palo Alto's reputation as a leader in energy efficiency and the statewide vision for doubling energy efficiency, Staff has used the model to estimate the types of programs needed and funds required to achieve ambitious but still cost-effective EE savings goals.

The 2016 EE Potential model also breaks down future market potential by end use. Figure A-2 shows that the majority of the 2018 energy savings are expected from the non-residential sector (74%) while only 26% of the savings are from the residential sector. Of the residential savings, over 80% is projected to come from behavioral programs, such as the Home Energy Reports. Savings from lighting make up another 27% of the total energy savings in 2018. However, it is important to note that with increasing lighting efficiency standards, lighting savings are predicted to only account for 12% of the incremental market potential by 2027. Non-residential comprehensive savings (14% of the incremental market share in 2018) are primarily energy savings from retrocommissioning activities such as resetting temperature and schedule of the building HVAC control system, recalibrating sensors and variable frequency drives. A list of the top twenty electric efficiency measures in 2018 is provided in Appendix B.

Figure A-2. Composition of Electric EE Market Potential in 2018.



ATTACHMENT B: COST-EFFECTIVENESS TESTS FOR ENERGY EFFICIENCY PROGRAMS

The primary aim of cost-effective energy efficiency programs is to reduce utility cost and hence customer bills while improving the environment. Cost-effectiveness can be measured in many ways. The four perspectives most commonly used in efficiency program cost-effectiveness testing are:

1. Participant: An energy efficiency measure that provides net savings to a customer is cost-effective for them as a "participant." If a customer's initial investment, after accounting for utility rebates and tax incentives, can be recouped with lower operating cost over the life of the measure, the measure is considered cost-effective from a participant's perspective.

2. Utility: A measure that lowers overall cost for the utility is cost-effective for the utility (also referred to as "Program Administrator"). For CPAU, this could also be considered the "all ratepayers test" or "average utility bill test," as it reflects the change in the utility bill to the average customer. To be cost-effective from the utility perspective, the cost of the program (administrative and rebate costs) must be less than the savings from not purchasing the energy supply.

3. Total Resource: If the combination of the utility and all customers together save money, it is cost-effective from a "Total Resource Cost (TRC)" or societal viewpoint.

4. Non-Participant: Even if the bill for the average customer shrinks significantly, retail rates could increase slightly, so that customers who do not reduce consumption could see a slight increase in rates and therefore bills. This effect is due to the portion of retail revenue that must be collected to pay for fixed costs. For this reason it is important to design diverse programs to be widely available in order to facilitate efficiency implementation in as broad a manner as possible. The Non-Participant perspective is also called the Rate Impact perspective.

The Total Resource Cost reflects the financial perspective of the Palo Alto community as a whole. The Utility Cost, Participant and Rate Impact perspectives should also be considered to ensure lower average bills and sufficient incentives to achieve participation

The costs and benefits that are used to calculate the benefit-cost ratios for each of these different perspectives are illustrated below:

Table B-1: Cost-Effectiveness Perspectives and Associated Costs and Benefits

Cost Effectiveness Test	Costs	Benefits
Participant Cost Test (PCT) *Does the participant save money?*	Measure Cost	Incentive to customer Bill Savings Tax Savings
Program Administrator Cost (PAC)-Average Bill *Are utility revenue requirements lowered?*	Incentive to customer Program Delivery Cost	Avoided Supply Costs
Total Resource Cost Test (TRC) Sum of Participant + Non-participant *Are total community expenditures lowered?*	Measure Cost Program Delivery Cost	Avoided Supply Costs Tax Savings
Rate Impact Measure (RIM) Also known as non-participant test *Are utility rates lowered?*	Incentives to customer Lost Revenues (=Bill Savings) Program Delivery Cost	Avoided Supply Costs

The Electric EE potential analysis assumes the cost of renewable energy as the avoided supply cost.

ATTACHMENT C: TOP 20 ELECTRIC EFFICIENCY MEASURES IN 2018

The following table lists the top twenty electric efficiency measures in 2018. This list does not included behavioral programs. The combined energy savings from these 20 measures represents around 50% of the total market potential.

Rank	Top Fifty Measures – 2018	2018 - Energy Savings (MWh)	Energy % of Total
1	Com-Office - Retro-commissioning (a)	565	12.3%
2	Com-ALL - Pump and Fan Variable Frequency Drive Controls (VFDs)	262	5.7%
3	Com-Office - Thermostat Replacement	172	3.7%
4	Res-SF New - T24 15% Stretch Goal Compliant Home	114	2.5%
5	Com-Office - Comprehensive Rooftop Unit Quality Maintenance (AC Tune-up)	112	2.4%
6	Electronics - Efficient Lighting Equipment	106	2.3%
7	Com-Retail - LED fixture: 33W, 3500 lumens	91	2.0%
8	Com-Retail - LED downlight, screw-in lamp, 1-3W, interior Average 2 Watts (a)	91	2.0%
9	Com-Office - Retro-commissioning (b)	86	1.9%
10	Com-Retail - LED downlight, screw-in lamp, 1-3W, interior Average 2 Watts (b)	74	1.6%
11	Other Industrial - Efficient Lighting Equipment	73	1.6%
12	Com-Office - Centrifugal Chiller - Average kW/Ton = 0.56	67	1.5%
13	Com-Office - Demand Controlled Ventilation	67	1.4%
14	Com-Lodging - LED fixture: 33W, 3500 lumens	59	1.3%
15	Com-Office - Bi-Level Lighting Fixture – Stairwells, Hallways, and Garages	58	1.3%
16	Com-Retail - Electronically Commutated (EC) Motor w/Fan Cycling Controls for Cold Storage Evaporator Fans	58	1.3%
17	Com-Office - Reciprocating Chiller - Average kW/Ton = 0.84	56	1.2%
18	Com-Office - Electronically Commutated (EC) Motor w/Fan Cycling Controls for Cold Storage Evaporator Fans	55	1.2%
19	Com-Office - Screw Chiller - Average kW/Ton = 0.68	52	1.1%
20	Com-Retail - LED fixture: 33W, 3500 lumens	49	1.1%
	Top 20 Total	**2,267**	49.2%