UTILITIES ADVISORY COMMISSION – REGULAR MEETING
FEBRUARY 1, 2023 – 6:00 PM
Council Chambers / ZOOM Webinar

NOTICE IS POSTED IN ACCORDANCE WITH GOVERNMENT CODE SECTION 54954.2(a) OR 54956
Supporting materials are available online at https://www.cityofpaloalto.org/gov/boards/uac/default.asp on Thursday, 5 days preceding the meeting.

Chairman: Lauren Segal Vice Chair: A.C. Johnston Commissioners: John Bowie, Lisa Forssell, Phil Metz, Greg Scharff, and Loren Smith Council Liaison: Ed Lauing

Join Zoom Webinar Here Meeting ID: 966 9129 7246 Phone: 1 (669) 900-6833

Pursuant to AB 361 Utilities Advisory Commission meetings will be held as "hybrid" meetings with the option to attend by teleconference or in person. To maximize public safety while still maintaining transparency and public access, members of the public can choose to participate from home or attend in person. Members of the public who wish to participate by computer or phone can find the instructions at the end of this agenda. Masks are strongly encouraged if attending in person. The meeting will be broadcast on Cable TV Channel 26, live on Midpen Media Center at https://midpenmedia.org, and live on YouTube at https://www.youtube.com/c/cityofpaloalto. Members of the public who wish to participate by computer or phone can find the instructions at the end of this agenda.

I. ROLL CALL 6:00 pm – 6:05 pm

II. AGENDA REVIEW AND REVISIONS 6:05 pm – 6:10 pm

III. ORAL COMMUNICATIONS 6:10 pm – 6:25 pm

Members of the public are invited to address the Commission on any subject not on the agenda. A reasonable time restriction may be imposed at the discretion of the Chair. State law generally precludes the UAC from discussing or acting upon any topic initially presented during oral communication.

IV. APPROVAL OF THE MINUTES 6:25 pm – 6:30 pm

Approval of the Minutes of the Utilities Advisory Commission Meeting Held on December 7, 2022

V. UNFINISHED BUSINESS

None

VI. UTILITIES DIRECTOR REPORT 6:30 pm – 6:45 pm

MATERIALS RELATED TO AN ITEM ON THIS AGENDA SUBMITTED TO THE COMMISSION AFTER DISTRIBUTION OF THE AGENDA PACKET ARE AVAILABLE FOR PUBLIC INSPECTION IN THE UTILITIES DEPARTMENT AT PALO ALTO CITY HALL, 250 HAMILTON AVE. DURING NORMAL BUSINESS HOURS.

AMERICANS WITH DISABILITY ACT (ADA)

Persons with disabilities who require auxiliary aids or services in using City facilities, services or programs or who would like information on the City's compliance with the Americans with Disabilities Act (ADA) of 1990, may contact (650) 329-2550 (Voice) 24 hours in advance.

VII. NEW BUSINESS

1. Staff Recommend the Utilities Advisory Commission Recommend the City Council Approve and Authorize the City Manager or Their Designee to Execute a Third Phase Agreement With Northern California Power Agency for the Purchase of up to 87,600 Megawatt Hours per Year of Geothermal Energy From Calpine Corporation's Geysers Power Company, LLC Over a Term of up to 12 Years for a Total Not to Exceed Amount of $76.2 Million (*ACTION* 6:45 pm – 7:30 pm) Staff: James Stack, PhD and Micah Babbitt

2. Discussion and Status Update on the One Water Plan (*DISCUSSION* 7:30 pm – 8:30 pm) Staff: Lisa Bilir

3. Staff Recommends the UAC Accept a Verbal Presentation on State Public Policy Actions and Recommend the City Council Approve the 2023 Utilities Legislative Guidelines (*ACTION* 8:30 pm – 9:00 pm) Staff: Heather Dauler

VIII. COMMISSIONER COMMENTS and REPORTS from MEETINGS/EVENTS 9:00 pm – 9:10 pm

INFORMATIONAL REPORTS

Informational Utilities Quarterly Report Update for Q1 of FY2023

IX. FUTURE TOPICS FOR UPCOMING MEETING March 1, 2023

SUPPLEMENTAL INFORMATION - The materials below are provided for informational purposes, not for action or discussion during UAC Meetings (Govt. Code Section 54954.2(a)(3)).

12-Month Rolling Calendar Public Letter(s) to the UAC

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PUBLIC COMMENT INSTRUCTIONS

Members of the Public may provide public comments to teleconference meetings via email, teleconference, or by phone.

1. **Written public comments** may be submitted by email to UACPublicMeetings@CityofPaloAlto.org.

2. **Spoken public comments using a computer** will be accepted through the teleconference meeting. To address the Commission, click on the link below for the appropriate meeting to access a Zoom-based meeting. Please read the following instructions carefully.
   - You may download the Zoom client or connect to the meeting in-browser. If using your browser, make sure you are using a current, up-to-date browser: Chrome 30+, Firefox 27+, Microsoft Edge 12+, Safari 7+. Certain functionality may be disabled in older browsers including Internet Explorer.
   - You will be asked to enter an email address and name. We request that you identify yourself by name as this will be visible online and will be used to notify you that it is your turn to speak.
   - When you wish to speak on an agenda item, click on "raise hand." The Attendant will activate and unmute speakers in turn. Speakers will be notified shortly before they are called to speak.
   - When called, please limit your remarks to the time limit allotted.
   - A timer will be shown on the computer to help keep track of your comments.

3. **Spoken public comments using a smart phone** use the telephone number listed below. When you wish to speak on an agenda item hit *9 on your phone so we know that you wish to speak. You will be asked to provide your first and last name before addressing the Council. You will be advised how long you have to speak. When called please limit your remarks to the agenda item and time limit allotted.

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City of Palo Alto (ID # 15050)

Utilities Advisory Commission Staff Report

Meeting Date: 2/1/2023 **Report Type: IV. APPROVAL OF THE MINUTES**

Title: Approval of the Minutes of the Utilities Advisory Commission Meeting Held on December 7, 2022

From: Director of Utilities

Lead Department: Utilities

Recommended Motion
Staff recommends that the UAC consider the following motion:

Commissioner _____ moved to approve the draft minutes of the December 7, 2022 meeting as submitted/Amended.

Commissioner _____ seconded the motion.

Attachments:

- Attachment A: Draft Minutes

UTILITIES ADVISORY COMMISSION MEETING
MINUTES OF DECEMBER 7, 2022 SPECIAL MEETING

CALL TO ORDER

Chair Segal called the meeting of the Utilities Advisory Commission (UAC) to order at 6:03 p.m.

Present: Chair Segal, Vice Chair Johnston, Commissioners Bowie, Forssell, Metz, and Smith
Absent: Commissioner Scharff

AGENDA REVIEW AND REVISIONS

None.

ORAL COMMUNICATIONS

None.

APPROVAL OF THE MINUTES

Chair Segal invited comments on the October 12, 2022 and November 2, 2022 UAC draft meeting minutes.

Commissioner Johnston moved to approve the draft minutes of the October 12, 2022 meeting as presented.

Commissioner Metz seconded the motion.

The motion carried 6-0 with Chair Segal, Vice Chair Johnston, and Commissioners Bowie, Forssell, Metz, and Smith voting yes.

Commissioner Scharff absent.

Commissioner Smith moved to approve the draft minutes of the November 2, 2022 meeting as presented.

Vice Chair Johnston seconded the motion.

The motion carried 6-0 with Chair Segal, Vice Chair Johnston, and Commissioners Bowie, Forssell, Metz, and Smith voting yes.

Commissioner Scharff absent.

UNFINISHED BUSINESS

None.

UTILITIES DIRECTOR REPORT

Dean Batchelor, Utilities Director, delivered the Director's Report.

Hydroelectric Update: As of December 5, precipitation totals for Northern California are about 80% of average for this time of year and in Central California about 120%. Most of this precipitation has been in the form of snow. The snowpack levels are about 160% of average in Northern and Central California. Reservoir levels remain very low due to the past several years of drought. Projections for 2024 are very low, about 56% of our long-term average levels of hydro output. Since hydro was much lower and the price for electric went up, the Finance Committee unanimously decided on a $0.48 increase, which will go to the Consent Calendar for the December 19 meeting for hopeful passage. Once approved by Council, the report will be brought back to the UAC.

High Natural Gas Prices This Winter: CPAU anticipates natural gas prices will be much higher than usual this winter due to market changes, supply and demand as well as weather, gas production and storage levels. CPAU purchases gas at market price on a monthly basis and has a pass-through cost to the customer. With the cold weather, there has been increased usage from customers. Cityofpaloalto.org/efficiencytips has energy efficiency tips to keep utility costs down.

AMI Project Update: CPAU will soon begin deploying approximately 1,800 electric, gas and water Advanced Metering Infrastructure (AMI) meters from January through March 2023. This a beta test for comparison of meter reads to AMI data, quality assurance of the AMI meters and systems, as well as provide an opportunity to look at some of our base load. We are going to deploy these in all-electric homes to look at the load shapes and transformer loading, which is essential for grid modernization. Approximately two weeks ago, 15 customers on a block had an outage because the transformer was overloaded. Of the 15 homes served off that transformer, 10 had electric vehicles (EVs) and some electrification had gone into the homes.

EV Programs Update: Stanford Medicine has successfully completed the installation of 15 new EV charging ports at the Hoover Pavilion garage off Quarry and Palo Alto roads. Stanford is in the permitting phase for installing EV chargers at two other garages. Our Communications team is coordinating a ribbon-cutting event with Stanford for middle to late January. The UAC will be apprised of the date and are welcome to attend.

Responsible Appliance Disposal (RAD) Award: CPAU recently earned a Champion Award from the U.S. EPA through the RAD program. CPAU was recognized for its refrigerator recycling program and reducing ozone and greenhouse gas emissions through insulation foam recovery.

One Water Plan: The One Water Plan is evaluating long-term water resource needs to make the City's water supply more resilient. The City held its second One Water Plan Community Workshop on December 6 to discuss water supply, conservation options and draft evaluation criteria. A recording of the workshop will be available on our website at cityofpaloalto.org/workshops. Staff will provide an update to the UAC on the One Water Plan in February 2023.

Water Supply Update: The San Francisco Public Utilities Commission (SFPUC) continues to call for voluntary water use reductions for the Regional Water System. Palo Alto's cutback level is 8%. The City

has taken measures to continue water-saving efforts, including increasing education and outreach programs. We have implemented water restrictions such as limiting irrigation to two days per week. These actions seem to be making an impact. For the billing months of July through November 2022, Palo Alto reduced its water usage by 10% compared to the baseline of 2020.

Commissioner Forssell asked for clarification on the deployment of 1800 meters as part of the AMI beta test going out to electric homes, if there were 1800 all-electric homes. Mr. Batchelor responded no, the beta phase is not just in electric homes. Staff is looking at where they think there is going to be electrification by using records of homes that are 100% electric and permit history for heat pump water heaters or electric heating. One area has 4 kV instead of a 12 kV system and is most likely the area that needs to be upgraded the most, so that will probably be part of the beta phase.

Chair Segal commented we do not have great visibility into who has EVs, which is important to know. There was a recent outage because of too many EVs on one transformer. Chair Segal wondered if there was a way to get EV information voluntarily from customers or through DMV records to have some of the beta homes in those areas. Mr. Batchelor thinks the information can be found through the Development Center or EV permit history.

NEW BUSINESS

ITEM 1: ACTION: Adoption of a Resolution Authorizing Use of Teleconferencing for Utilities Advisory Commission Meetings During Covid-19 State of Emergency

In response to Commissioner Forssell's query if we know when the State of Emergency was scheduled to end, Tabatha Boatwright, Utilities Administrative Assistant, responded that the State of Emergency would end in February 2023.

ACTION: Vice Chair Johnston moved Staff recommendation that the Utilities Advisory Commission (UAC) Adopt a Resolution (Attachment A) authorizing the use of teleconferencing under Government Code Section 54953(e) for meetings of the Utilities Advisory Commission (UAC) and its committees due to the COVID-19 declared state of emergency.

Seconded by Commissioner Smith.

Motion carries 6-0 with Chair Segal, Vice Chair Johnston, and Commissioners Bowie, Forssell, Metz, and Smith voting yes.

Commissioner Scharff absent.

ITEM 2: DISCUSSION: Discussion of Costs and Reliability of Different Back-Up Electricity Technologies

Hamilton Hitchings stated the the recent attack on the North Carolina Substation where 35,000 people are still without electric power puts a spotlight on the vulnerability of the electric grid. On April 16, 2013, a sniper attack disabled the PG&E Transmission Substation in San Jose, which included accessing an underground vault to disable phone lines beforehand. We should ensure our existing substations and the PG&E Delivery Station are hardened particularly from domestic terrorism but also from flood and earthquake, including ample alarms, security cameras, barbed wire, electrified fences and on-site security at the Colorado Ave site. He recommended doing a security audit to ensure existing mechanisms are working properly and adding additional ones as deemed appropriate. He thinks critical

infrastructure such as the Public Safety building should have microgrids to have the ability to go for one or two weeks after a major earthquake if there was no electric versus three days on their generator. Subsidizing batteries for residential use dramatically lowers the amount of electricity going in and out of the house from solar and can be used to lower peak hour supply during the summer. The ultimate solution is to have electric cars provide two-way charging.

Lena Perkins, PhD, Senior Resources Planner, delivered a slide presentation. The cost of different technologies for single-family residence back-up power was based on July 2022 but current prices are higher for natural gas, batteries and solar.

In reply to Chair Segal's question if the calculations included the assumption of air conditioning in the summer, Dr. Perkins answered yes.

In response to Commissioner Smith's inquiry on how capital costs were annualized, Dr. Perkins replied they were based on the 20-year net present value, batteries had to be replaced at 10 years and everything else was expected to last 20 years.

Commissioner Smith commented on the first slide. He suggested comparing the annualized cost to the current CPAU annualized cost to help customers make the decision to completely solar panel their house, put in an inverter and new battery. Dr. Perkins explained this was in addition to your bill, so it takes into account the bill savings. The uncertainty bar on the graph represents the degree you are able to offset your own usage versus exporting to the grid. The chart represents a 7-kilowatt solar system.

Commissioner Metz commented on the data Dr. Perkins shared with him. A mixed-fuel (gas and electric) house with no EV is 7500-kilowatt hours per year. An all-electric house with no EV is an additional 4200 kilowatt hours per year. EV is assumed 2000 kilowatt hours per year.

Commissioner Smith asked if there was a compelling argument for doing solar on mixed-fuel homes with no EV. Dr. Perkins thinks the costs are similar without a battery for a mixed-fuel home with a 5-kilowatt system. The costs are similar to the first yellow bar representing solar PV where you can potentially save money by offsetting your electric usage and largely net out close to zero additional cost by adding solar.

Commissioner Metz asked for an explanation on what was represented by the width of the bars on Table 2. Dr. Perkins explained if an outage occurred at night in the wintertime, you have different reliability from solar without storage. Therefore, an average was calculated across seasons and times to give a rough representation of the different reliability they can provide. The noise level, CO and CO_2 emissions are qualitative. Several stakeholders and the Stanford professors who were involved in the project thought it was important to demonstrate gasoline generators and natural gas generators had health and safety drawbacks solar did not have. In answer to Commissioner Metz's query if red was bad, meaning noise or emissions, Dr. Perkins answered yes. Commissioner Metz asked if the width represented reliability. Dr. Perkins responded that the left four columns were reliability and the other two columns were noise level and dangerous CO_2 and CO emissions. A nontrivial amount of CO poisoning occurs during broad outages and some of it is from portable generators.

Chair Segal asked for further explanation regarding what the wide green represents for the noise level, CO and CO_2 emissions. Dr. Perkins explained it was a qualitative representation in order to represent drawbacks which were not adequately captured by only looking at cost and reliability. Not having substantial noise and emissions is meaningful especially to health and safety. In response to Chair

Segal's query if the emissions width represented avoided emissions, Dr. Perkins replied it is representative of CO, NOx and SOx emissions rather than CO_2 emissions because it is from a health and safety perspective instead of avoided emissions.

Commissioner Smith remarked that if the majority of Palo Alto single-family residences are gas and electric but transformers were overloaded from homes functioning on PV, we need time to replace our grid. Commissioner Smith wanted to know the benefits of offering subsidies on PVs and battery storage systems, if it would buy us time and give the CPAU an opportunity to rebalance the load appropriately. Dr. Perkins replied it depends on how the battery is wired into the system, if it was an additional route to dump power into the system and back-feeding onto the grid. Commissioner Smith stated he was not suggesting that homes feed the grid as if selling our power back to PG&E or self-generation. If a homeowner charges their EV on a solar-powered battery, it takes the load off the grid and transformer. Dr. Perkins explained the issues when people install batteries is if they are satisfied with not back-feeding onto the grid or it could be wired differently after it is permitted and interconnected. Modifications after inspection can cause hot elements and safety issues if things are not appropriately upsized. Commissioner Smith suggested that the City manage the installation in exchange for a subsidy, the City can set the installation rules and place padlocks on the associated panels. Dean Batchelor, Utilities Director, agreed that City subsidies should include being involved with how the house panel looked and how the system was wired.

Mr. Batchelor commented it would be helpful if we knew there were quite a few EVs on one particular transformer. If neighbors knew exactly when they were going to charge, it would not create the outage we saw in the last couple weeks and it buys us some time. This needs to be part of the community education and communication for people who have EVs.

Dr. Perkins noted that if everyone was operating within their permit, not modifying things after inspection and permitting, then technology such as SPAN Smart Panels could be helpful for the homeowner to operate within the capacity of their electrical equipment. The question is whether our Engineering team is comfortable planning around that or whether it would be taken into account with the planned grid modernization. It would be beneficial if everyone were to flatten their loads as theycharge. If grid modernization was $80 million minimum, Commissioner Smith thought if we buy more time, perhaps that $80 million can be $40 million initially and then we will work on the rest but we would not have such an urgent issue if homeowners were taking responsibility for their own generation.

Regarding subsidizing battery storage, Commissioner Forssell stated she would be very surprised if locating energy storage at the granular level of single-family homes was cost effective. She thinks the much lower hanging fruit is an educational campaign around when to charge your car since that is the most shiftable load. If a block wanted to buy time for their transformer, coordinating their EV charging costs considerably less than subsidizing power walls on single-family homes that have a very limited ability to serve the community.

If there is a further iteration, Commissioner Forssell would be very interested in holding the period of power outage fixed and looking at different load requirements for the average single-family home as there seemed to be an assumption that the home was going to require everything it required as if it was a nonemergency situation. Commissioner Forssell would be very interested in what is the minimum required electrical output for a household with maybe a variation of 2-person, 4-person and a huge family, assuming they need a refrigerator, cooktop, some number of lumens of light, some number of gallons of hot water, internet and medical equipment.

Commissioner Forssell asked if part of this goes beyond the UAC, such as Utility marketing of the options or we will work with you or here is an informational pamphlet. Dr. Perkins stated one discussion they had with OES and others is if there is a major earthquake or giant power outage, not everyone will burn through their battery or tank of gas. The baseline for critical loads was 25% to 30% of average, which is part of the reason they represented the percentage of loads on Figure 3. It was capped at 48 hours because many technologies (other than battery) reach equilibrium after 48 hours, so two weeks looks similar to 48 hours, depending on weather and availability of natural gas and gasoline. In response to where does work on resiliency go after this, Dr. Perkins thinks there are high-level discussions with the S/CAP Committee. OES is interested in having some public education but in terms of the Utility staff time needed to create those public messaging campaigns, Dr. Perkins thinks we have many priorities competing for our limited Engineering resources. In response to Commissioner Forssell asking for clarification that this was not a preview of a currently planned campaign but just a conversation, Dr. Perkins replied this was not a preview although there were some discussions.

Vice Chair Johnston encouraged staff to think about putting this information out in a way that the community can grasp it because he thinks that people developing more resiliency would provide many benefits. Particularly if we were encouraging people to electrify, we want to encourage them to have a back-up plan. The available back-up plans as well as pros and cons of each is useful information and should be accessible to people in the community, maybe not a whole campaign but at least putting it on the Utility website and letting people know this information is available. Mr. Batchelor thinks this reliability and resilience plan is moving forward into the Council's Ad Hoc Sustainability and part of the work plan for the Council. Customer and community education is important.

Council Liaison Cormack, who sits on one of the ad hoc teams, stated there is a tradeoff between the City providing sufficient reliability to give people the confidence they can move over to electricity completely but just in case, you might want to spend a whole lot of extra money on something that will work for a little period. It is a tough message, although this information should be provided. We do not want people using a generator. From a policy perspective, it is interesting to think about our twin goals and one is to make sure the whole system is reliable so everyone feels comfortable moving and another is to be sure that in situations where people cannot tolerate an hour of outage that they have the information they need to make that decision. Staff was asked to come back and describe what it might look like if we created a commission around our climate work. There is an overlap of the climate work with the UAC and there is a lot of work to be done in both areas.

Chair Segal asked if the costs for using a library or community center as a community power backup in a major power outage would be similar to a multifamily community room. Dr. Perkins replied that an analysis would need to be performed but she thinks there would be less savings day to day because the utilization would be lower.

Commissioner Metz commented that having specs for what a system needs to enable somebody to stay afloat and communicating that to PV system owners and perhaps a clearinghouse to provide resources for owners and installers would be low cost and high value.

Chair Segal noted that the OES website has a list of what to have for an emergency. Even though much of this is beyond the purview of the UAC or the Utility but to get the conversation going is helpful. She worries that people with solar do not realize they will not have it when the system is down. She does not

think it is realistic to have a refrigerator running for two weeks when needed supplies include canned food and pasta.

ACTION: None.

ITEM 3: DISCUSSION: Presentation and Update on the City's Electric Grid Modernization Analysis

Hamilton Hitchings commented he is not convinced on the cost benefit of undergrounding except in the foothills where it is much more expensive and harder to diagnosis where problems are and fix them. He thinks we should accelerate electric poles, which are more resilient than our regular poles and do not catch fire. There is a disproportionate cost sharing on fiber as opposed to electric for the poles and so if that was switched around to make sure electric is paying for the appropriate cost, it may make the financials for fiber more attractive. Utility policies and fees on electric panel upgrades strongly discourage residential electrification. You can upgrade to 225 amps. Upgrading to 400 amps has a $10,000 fee and a much longer cycle. If you are a double-working family and want to charge two electric cars quickly, you need 50 amps per electric car. Most houses in Palo Alto will want 300 amps. He has three recommendations: (1) As fast as possible, remove the $10,000 residential fee. (2) Preorder transformers because it takes one to two years to receive them. (3) Change from 225 to 300 amps.

Sherry Listgarten remarked she is not convinced anybody needs more than 200 amps. We all need to be more cognizant of our power usage and have low, steady amounts of power, so some education on not running every high-powered appliance at the same time would be useful. A couple years ago, JuiceBox gave free chargers to utilities for their customers. There must be software to coordinate EV charging that would cost a fraction of whatever everything else is costing and people could be incentivized with a free charger for opting into it. If they need to charge in an emergency, they can opt out. Otherwise, it keeps everybody at 20 or 10 amps and it adjusts who is charging when. She suggested calling Enel-X who owns JuiceBox or there may be a company in San Jose.

David Coale echoed Ms. Listgarten's comments but disagreed with the first speaker. There is plenty of room in a 200-amp panel to electrify a house. Having a steeper cost would help people stay within a reasonable electric budget. EV chargers do not have to be 50 amps to be sufficient for almost all people's driving. Whether it is for resiliency or supporting the grid, there are 250 megawatt hours in EV battery storage already paid for by the residents that is not being used. If the Utility is going to subsidize anything, it should be vehicle-to-grid bidirectional chargers because they substantially reduce the load on transformers in problem neighborhoods. You could run a house for days with a minimum load of about 1 kilowatt for the refrigerator, some lights and the internet, so the calculations should be redone based on that. All these things will get cheaper with the Inflation Reduction Act, which he thinks was not factored into the cost in the previous item or grid electrification upgrades.

Tomm Marshall, Assistant Director Electric Utilities, showed slides for the grid modernization update. The Electric Infrastructure Analysis draft report was received last week. The focus of the first portion of the report was grid capacity and update recommendations. Costs are significantly higher than before to upgrade the grid. Staff will come back to the UAC with details. The main changes needed are upgrading distribution transformers and the secondary system serving customers, converting older substations from 4 kV to 12 kV as well as upgrading capacity at a couple of our substations. There were peak diversified load recommendations, which is about where we originally estimated at 6 KVA per home. We are designing this system for peak demand to have enough capacity to serve customers during emergency or unusual conditions.

We see the impacts of electrification in new building applications and panel replacements. About two-thirds of new panels are 400 amps, one-third are 225 amps. There are a number of 600 amp requests from customers with large homes and large loads such as heat pumps for swimming pools. We are seeing more transformer upgrades. We recently received 23 larger transformers from an order placed last year, which are currently in the yard. We have placed orders for next year. Many of these new homes are in the beginning process, so the upgrades to 400 amps are probably not going to show up on the system until middle or late next year. More load is going on the system that we do not have visibility in because they are permitted over the counter, such as electric-resistive water heating or having multiple units in the house. The Electric Utility does not review them unless it results in a panel upgrade. More EVs are coming on the system and impacting other customers. A lot of battery storage systems are coming on, so we have to plan for batteries charging off the utility system in the future. Since water heating fails regularly in homes, we are encouraging people to move to E-pumps because it has the least impact on the grid since they are not large loads.

Next year, we will probably run our first trial project on grid upgrades. The key is getting transformers, we are trying to order in advance but the lead times are about a year or a little more.

We are continuing to recruit staff but we are having difficulty finding experienced engineers who want to work in Palo Alto. Three recent graduates have come into the Department, so we are spending a lot of time getting new staff up to speed. We have three experienced engineers on staff, so we are very short on experienced staff. We have a backlog of infrastructure projects from pole replacements and two customer requests for large amounts of power, which requires rebuilding existing substations. We are very short on staff in operations as well. As we move into grid modernization, we need to have increases in staffing to manage the contracting work.

Staff has to coordinate between the programs going out into the community and the places where we are trying to incent people to switch to electrification. As we start developing the upgrade plans, we need to match them to where we have customers who want to electrify and coordinate in those neighborhoods to incent people to move to electrification in the areas where we have capacity.

Regarding staffing, Commissioner Metz asked how the UAC could help, such as having proposed solutions or partial solutions that the UAC might be able to advance to City Council. Mr. Marshall responded that the City is in the middle of a negotiation process with the unions and staff. Compensation and other things that are competitive in this area are important to us being able to attract and retain employees.

Commissioner Metz commented that the grid of tomorrow that we are planning and building is going to be different from the grid of today, particularly in having local resources for management, including bidirectional charging with EVs but that had not been discussed. Commissioner Metz asked if those were going to be increasingly important factors in designing the grid and if so, what were we doing about it. Mr. Marshall remarked that the next part of the study was expected to include the integration of more sophisticated systems to run the distribution network, including how to integrate batteries into the system as well as advanced protection schemes to make the grid more reliable. The capacity piece is moving ahead because it has to start as early as possible since it takes the longest time to implement.

Mr. Marshall explained that some of these other things we are talking about is immature technology, it is starting to come into the marketplace and some people are running pilot programs around these but

he does not know if they are ready for full deployment to relieve the need for capacity on the grid. Even though the technology is not ready, we are planning to incorporate that into the grid design and how we are going to do that will come in the next part of the study. There is some complex data analysis and communication needed to run these systems on a grid-wide basis, which is probably coming not too far in the distant future but it is not ready to implement on a full utility basis today.

Commissioner Smith requested further clarification on how solar homes can reduce demand. Mr. Marshall explained that demand is an instant in time. Many things drive demand on the system, such as plugging in vehicle chargers at the same time or everything coming on at the same time after a system outage. We plan for those times when the system is stressed. Commissioner Smith commented that if a 7000-kilowatt hour solar PV array on a home was used for a significant portion of the load, it reduces the assumption on an individual basis and it reduces the peak if that was applied to 26,000 residences. Mr. Marshall responded that battery storage could offset some of it. Solar is not operating when there is no sun, especially in winter, so it depends when the peak demand is happening.

Commissioner Smith pointed out we need to be creative in terms of how we design our new system when we are talking about spending this amount of money and time to implement these necessary improvements. Technology can help us with respect to spreading and managing load as well as education on when neighbors charge their car or managing their car charging time. Mr. Marshall stated that we need to think about how we would manage such a system and whether customers are willing to have the Utility control their load.

Regarding the three large customers with big power demands that require reengineering a substation and is placing demand on our limited engineering resources, Commissioner Forssell asked how the Utility prioritizes what the limited staff spends its time on and if there was a conscious decision that these three customers can use all the engineering time versus grid modernization efforts. Mr. Marshall responded that typically the focus is first on customer requests. We do not have staff to do CIP. We are using more contractors. In one of these cases, we are working with the customer for them to do the engineering and installation for a large substation upgrade but that still takes staff time. Commissioner Forssell reminded the UAC that we tend to be very focused on residential customers but commercial customers are 80% or 90% of our load.

Mr. Marshall responded to Chair Segal's question on over-the-counter permits not being captured into the demand on transformers and if there was an easy fix such as a monthly report. With the limited staff, there is no time to review everything that happened over the counter at the Development Center. There is state legislation that will require battery storage systems over the counter as well.

Chair Segal suggested that staff talk to Permitting. There should be a simple tool if it is computerized, such as an added box on the permit for load or a weekly report that totals the load. This will likely be a bigger problem down the road as there is more over the counter. Mr. Marshall commented that connecting the systems would take time to develop programming, aggregate things and associate them with the proper transformer. With more staff, they may be able to do that task. Dean Batchelor, Utilities Director, added that we do not know what is loaded on a transformer unless we physically go out and look at it, which we do not have the staff time to do. As we move forward with modernizing the grid, AMI will help us. Some technology is coming out that would be able to pull a report or look at the load on a transformer similar to looking at your home meter.

Chair Segal had questions regarding load assumptions when estimating peak demand, such as how many homes will be electrified, how many EVs per home and whether businesses were electrifying. Mr. Marshall replied that we are planning for full residential electrification as well as figuring out increases from businesses electrification. Typically, we would install a new transformer to supply vehicle charging for a large commercial customer. Businesses electrification is not as impactful as residential because there is usually more capacity.

Mr. Marshall confirmed Chair Segal's assumption that the main reason it is hard to get engineers to work in Palo Alto is due to the high cost of living in Palo Alto.

Council Liaison Cormack wanted to know if there was a connection between 6 kVA and the 600-amp panels that people were putting in. Mr. Marshall explained that 6 kVA was not a large load, probably less than 100 amps. It had to do with the aggregation and diversity of load on the system. You can have 10 people on a transformer. You could have somebody using 20 and four or five people using 1 or 2 kVA. Today, we use 2 to 3 but we believe it is going to be around 6 in the future.

Council Liaison Cormack felt strongly that we should not be maximizing any system. She asked if other municipal utilities were assuming 6 kV. Mr. Marshall replied that part of the data used was a large study done by the Los Angeles Department of Power and our numbers are very similar. Roseville uses 6 kVA per home before electrification because they have large air conditioning loads. We have to design for the worst case and 6 kVA per home is not thought to be excessively high.

In response to Council Liaison Cormack's question regarding Slide 6 indicating there is no staffing to manage this program, Mr. Marshall answered they are looking to fill positions and we will need additional staff to manage the work when we get into the system capacity increases. Since there is a mid-year budget coming and then there will be a new budget, Council Liaison Cormack hoped the Utilities Department will ask for all the positions they need to make progress on this.

Mr. Marshall addressed Council Liaison Cormack's query regarding the timeframes for the modernization steps on Slide 5. The expectation is that the data will be received in the first part of next year, maybe March. In reply to Council Liaison Cormack's question if the priority of the feeders and substations would be known, Mr. Marshall answered yes.

Council Liaison Cormack asked about the duration to complete the program. Mr. Marshall believed the residential neighborhoods would be done within five years. Mr. Batchelor thought it was a five-year program, maybe starting the first or second quarter of 2025 and the electrification portion could be completed in the residential areas by 2030.

ACTION: None.

The UAC took a break at 8:01 p.m. and resumed at 8:12 p.m.

ITEM 4: DISCUSSION: Discussion of City of Palo Alto Utilities' Long-Term Electric Load Forecast through 2045

David Coale commented he is hoping that modernization of the grid as well as vehicle to grid was taken into account in the long-term forecasts and that future loads would probably be substantially less than predicted even with electrification.

Hamilton Hitchings stated he is on the Housing Element Working Group for the City. Their plan would add 6000 new housing units in the next eight years. He questioned whether the model anticipated the new houses. All the houses will be electric.

Lena Perkins, PhD, Senior Resources Planner, made a slide presentation including low, mid and high load forecasts demonstrating additional EV load as well as building electrification load and additional commercial loads (largely new data center loads). There are many uncertainties in all forecasts and this was a snapshot in time. As housing is permitted and constructed, there is lead-time to procure sufficient electricity that meets out carbon-neutral electric portfolio standards. The long-range forecasts are updated every five years.

In reply to Commissioner Forssell's question regarding gas packs on Figure 2 for Building Load Assumption, Dr. Perkins responded that a gas pack is a rooftop heating unit that can be easily replaced by a heat pump.

Dr. Perkins explained that knowing what our hourly load shape is now and then breaking it into groups of EV, building electrification and additional commercial load, helps us modify those hourly load shapes for the whole city going forward. Vice Chair Johnston stated he is looking forward to discussing how we are going to meet these loads.

Commissioner Metz noted that traditional loads are flat to a little down on the chart on Figure 3, so the new load is coming from electrification, EVs and data centers. He asked if there was a plan to guide the loads in the future to make it easier and less costly to modernize the grid, such as pricing or time of day. Dr. Perkins replied that a time-of-use rate would be the primary mechanism for influencing the hourly shape of the loads. In response to Commissioner Metz's query if demand management would be a part of that, Dr. Perkins answered yes. There is a state program for customers to opt-in to an ISO-managed demand response program that can benefit the grid, which we may opt-in in the next couple years. In general, our load factor is quite high as a city, so the shaping is more important for the distribution system than it is for the wholesale markets. The hourly shape of the whole city is much flatter than the hourly shape of the residential sections, so the residential sections are where demand management could be helpful in the short term. Once you average the residential and commercial sectors, we have a favorable relatively flat load shape, so there is limited value in lowering our demand in certain hours.

In response to Commissioner Bowie's question if the EV load curve projections included transient or commuter loads, Dr. Perkins replied yes but the EV load forecast has the most uncertainty because we do not have an inventory of EVs commuting in and how much they are charging. Research says 80% of charging happens at home. With longer-range batteries, more charging could stay or shift to home, although there is debate over whether that is preferable since daytime charging is cleaner.

Commissioner Bowie asked if the projections took into account that the EV market is rapidly changing and increasing as more affordable vehicles come online. Dr. Perkins explained it was a forecast. The S/CAP goals for EVs were represented in blue for the high scenario. The mid scenario assumed 75% of S/CAP goals. All EVs coming into Palo Alto and living in Palo Alto are currently using 10 gigawatt hours per year, which was multiplied by a factor of 13 according to the table. One out of every three new vehicles we have is an EV, so there will be high penetrations of EVs in the future for commuter and residential vehicles.

Dr. Perkins addressed Commissioner Forssell's query if there was any insight as to why people were choosing Palo Alto. SBP (City of Santa Clara's municipal utility) was projecting their load going up 250%, largely driven by data centers. Dean Batchelor, Utilities Director, thought that real estate was causing some of the push with companies buying properties and rebuilding or expanding. Mr. Batchelor wished more data centers would come to Palo Alto because it is a 24/7 non-manned operation and are great loads because revenues exceed costs. Dr. Perkins explained it can be thought of as wires being a fixed cost and how much the wires are used is revenue.

Council Liaison Cormack remarked that this might fit in our Economic Development Group. A consultant was working on what industries we might want to target and what economic development programs we might want to implement. She encouraged staff to speak with Steve Guagliardo and the consultant as well as include this topic in the next S/CAP meeting.

ACTION: None.

COMMISSIONER COMMENTS and REPORTS from MEETINGS/EVENTS

Chair Segal attended the One Water Community Meeting last night. Among the participants, water quality and equity were high priorities. Karla Dailey, Acting Assistant Director Utilities Resource Management, remarked that participants maybe had more of an environmental primary interest, so cost ranked lower relative to other criteria in terms of importance. There were about 15 members of the public but she wishes every Palo Alto resident could provide their input.

FUTURE TOPICS FOR UPCOMING MEETINGS

Vice Chair Johnston thought the informational update on the electric supply portfolio was interesting. He noticed we retained a consultant to model and analyze the economics and portfolio fit of the options. He was curious as to when staff thought the results would be ready to be presented because he thought it would fit very well with February's topics regarding the geothermal contract, Western Base Resource and COTP since they are all potential resource changes. Jim Stack, PhD, Senior Resources Planner, has been working on the load analysis and portfolio rebalancing. The discussions in February on the geothermal contract, Western and COTP will be preliminary overviews of those topics. A consultant was recently engaged to do a more rigorous analysis of the rebalancing options, which was expected to be done around March and hopefully presented to the UAC around April.

Commissioner Metz requested an update, perhaps in the next quarter, on Director Batchelor's September 2022 discussion on outages and maintenance. Dean Batchelor, Utilities Director, stated that the quarterly reports would include a graph and Staff can talk about it at that time.

Commissioner Forssell requested an informational report be included the next time it is an agenized item. For the February meeting when specific contracts are discussed, maybe the Brown Act can be included in the reading material as an exhibit so commissioners can comment on. Mr. Batchelor suggested bringing this report back as a separate item because he is not sure it can mix in with the geothermal contract and Western Base. Chair Segal clarified that she appreciates that staff thinks of these as individual contracts but the UAC thinks of them collectively as our resources, so she requests to have that bigger context when individual contracts are discussed.

NEXT SCHEDULED MEETING: January 4, 2023

Commissioner Smith moved to adjourn. Commissioner Forssell seconded the motion. The motion carried 6-0 with Chair Segal, Vice Chair Johnston, and Commissioners Bowie, Forssell, Metz, and Smith voting yes.

Commissioner Scharff absent.

Meeting adjourned at 8:48 p.m.

Respectfully Submitted
Tabatha Boatwright
City of Palo Alto Utilities

City of Palo Alto (ID # 14678)

Utilities Advisory Commission Staff Report

Meeting Date: 2/1/2023 **Report Type: VII. NEW BUSINESS**

Title: Staff Recommend the Utilities Advisory Commission Recommend the City Council Approve and Authorize the City Manager or Their Designee to Execute a Third Phase Agreement With Northern California Power Agency for the Purchase of up to 87,600 Megawatt Hours per Year of Geothermal Energy From Calpine Corporation's Geysers Power Company, LLC Over a Term of up to 12 Years for a Total Not to Exceed Amount of $76.2 Million

From: Director of Utilities

Lead Department: Utilities

RECOMMENDATION

Staff recommends that the Utilities Advisory Commission (UAC) recommend that City Council:

1. Authorize the City Manager, or their designee, to execute a Third Phase Agreement (Attachment A) with the Northern California Power Agency (NCPA) to purchase up to 87,600 MWh of renewable energy/year from a portfolio of geothermal projects owned by Calpine Corporation's Geysers Power Company, LLC, over a period of 12 years, at a total cost not to exceed $76.2 million;
2. Authorize the City Manager, or their designee, to execute on behalf of the City all related documents or agreements necessary to administer the Third Phase Agreement that are consistent with the Palo Alto Municipal Code and City Council approved policies, including, but not limited to, collateral assignment agreements; and take any and all actions as are necessary or advisable to implement and administer the Third Phase Agreement;
3. Authorize the City Manager, or their designee, to approve and execute amendments to the Third Phase Agreement, as may be required from time to time, so long as the contract price and length of the agreement remain unchanged; and
4. Waive the application of the anti-speculation requirement of Section D.1 of the City's Energy Risk Management Policy as it may apply to surplus electricity purchases resulting from the City's participation in the Calpine contract, due to the variability of the City's hydroelectric resources and uncertainty around the City's long-term load forecast.

Background

SB 100 & Carbon Neutral Plan goals

As part of ongoing efforts to meet the City's Carbon Neutral Plan requirements, as well as to comply with the state Renewable Portfolio Standard (RPS) mandate of providing at least 60% of sales from qualifying renewable resources by 2030, staff pursued a power purchase agreement (PPA) opportunity presented by Calpine to NCPA. Calpine is offering to sell power from a geothermal[1] power plant, which qualifies as an in-state "Bucket 1" renewable resource under the state's RPS requirements.

Existing RPS portfolio

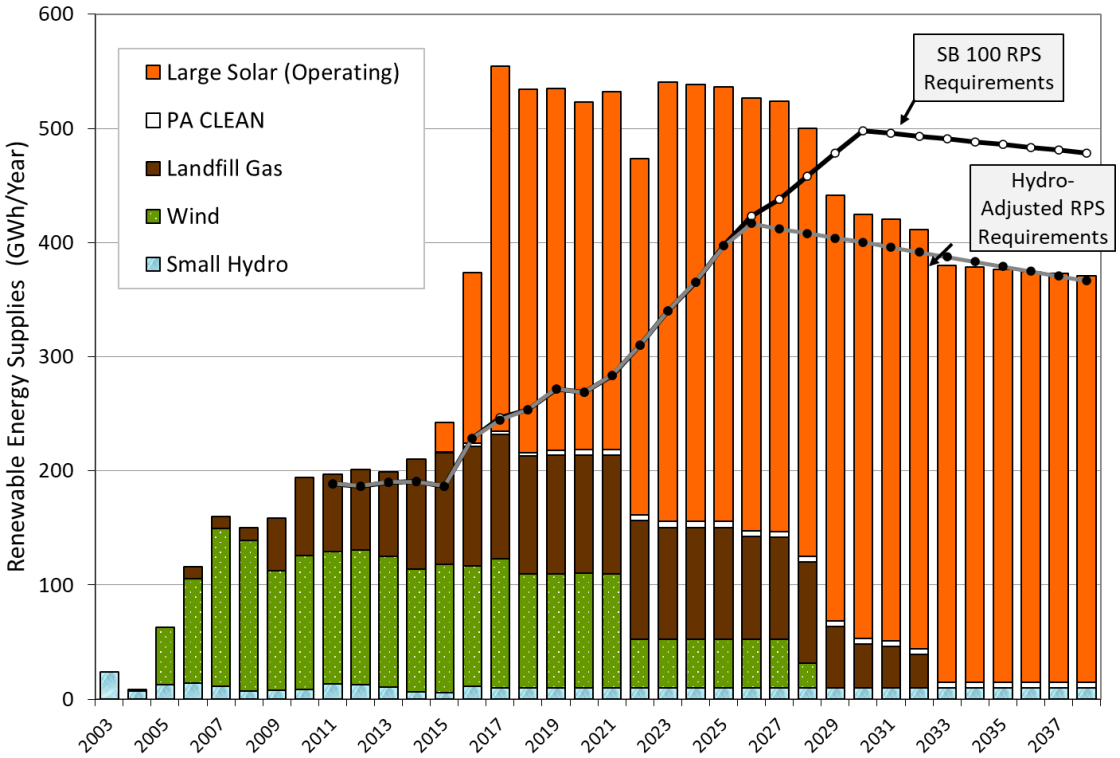
Over the past three years, the City has had an average RPS level of 63%[2] and is projected to maintain a high percentage of its power from renewable resources well into the future. Figure 1 below shows Palo Alto's projected RPS requirements along with the City's existing supply resources. Starting in 2029, the City is projected to have a deficit relative to its RPS requirement level (depending on the amount of large hydroelectric output the City receives[3]).

[1] Geothermal power plants have a small amount of carbon emissions associated with their operations from the natural release of greenhouse gases from the geysers

[2] This value refers to the total renewable energy content of the City's supply portfolio, including all of its in-state ("Bucket 1") renewable resources and its unbundled, out-of-state ("Bucket 3") renewable energy credits (RECs). For state RPS reporting purposes, the volume of Bucket 3 RECs that can be counted is limited; under this more restrictive framework the City's reported RPS level has averaged 31% over the last three years.

[3] Under the state's RPS law, utilities that receive significant amounts of generation from certain large hydroelectric facilities are able to satisfy their RPS requirements with a lower RPS level than is required of other utilities. Such utilities are only required to achieve an RPS level equal to the difference between their total retail sales volume and the amount of generation they receive from qualifying large hydro facilities.

Figure 1: Palo Alto's Existing RPS Supplies and RPS Requirement Levels



Discussion

The Market for Renewable Resources in California

The pricing and availability of renewable resources in California has evolved significantly over the past decade as state and federal policies have shifted the market landscape. While the trend over the last decade has been the declining cost of renewable PPAs, the last two years has seen increasing challenges to developing and building renewable projects resulting from material shortages, supply chain issues, inflation, labor shortages, and tariffs. Before 2020, the market would generally have been described as a buyer's market, however, in the last two and a half years, this characterization has shifted to a seller's market as there are more renewable buyers, increasing challenges to completing projects, and as a result PPA prices have risen from record lows.

While the downward trend in renewable energy pricing has reversed in the last couple of years, staff expects the generous subsidies included in the Inflation Reduction Act (IRA), which was signed into law August 16th, 2022, to eventually push renewable energy prices lower again. There are many details in the IRA that are being outlined by the Treasury Department, and the initial feedback from developers is that it is still too early to understand the net impact this law will have on Palo Alto's renewable resource options. Ultimately staff expects the IRA to reduce the cost of renewables. However, the consensus view in the California market is that it will likely be several years before these cost reductions materialize, given the extent of the current supply-demand imbalance and the various development challenges.

While the market prices for intermittent renewable resources such as solar and wind, and energy storage systems have fluctuated in recent years, the price for baseload firm renewable resources such as geothermal energy has remained relatively steady. The price for energy from geothermal resources is relatively high, reflecting its higher cost of development and its higher value to the electrical grid.

Results of Palo Alto's Renewable RFP (2022 RFP)

As staff discussed at the June UAC meeting, staff issued a Request for Proposals of new renewable and/or carbon-free generating resources and energy-storage resources. Staff's evaluation of the four conforming project proposals (all of which were for solar resources) indicated that their "green premiums" (i.e. their net cost to the City – their total value less their total cost) ranged from $3/MWh to -$18 /MWh. In comparison, the Calpine geothermal project's net cost is estimated at -$3/MWh (see below for more detail on this analysis). But in the course of reviewing the four responsive proposals, staff (1) became aware of efforts at the federal level to pass significant new clean energy legislation (in what became the IRA), and (2) learned about the Calpine geothermal project proposal. As a result of these two events, staff decided to reject the four conforming proposals received through this RFP.

Calpine Geothermal Project Summary

In May 2020, Calpine submitted a proposal to NCPA's[4] Renewables RFP for the sale of energy and associated attributes from Calpine's[5] existing portfolio of geothermal projects located in The Geysers area of Northern California. At the time Calpine submitted its proposal, NCPA members were evaluating other lower-cost project proposals. But shortly thereafter, the price of renewable projects started to significantly increase, due to the confluence of factors noted above. So in September 2021, NCPA requested proposal updates from Calpine and the other RFP respondents to see if their projects were still available and if there were any changes in price and/or terms initially offered. Section 2.30.340(d) of the City's Municipal Code permits the City to procure wholesale utility commodities and services through public agencies, including NCPA. After receiving the updated information, NCPA and member utility staff[6] reviewed and analyzed the projects again and determined the geothermal output from Calpine would best diversify their renewable energy portfolios, aid them in achieving California RPS requirements, help meet their sustainability goals, and meet the needs of their expected load growth.

[4] NCPA is a not-for-profit Joint Powers Agency whose membership includes municipalities, a rural electric cooperative, and other publicly owned entities, including the City of Palo Alto. The mission of NCPA is to provide members cost effective wholesale power, energy-related services, and advocacy on behalf of public power consumers through joint action.

[5] Calpine Corporation (Calpine) was founded in 1984 and, through its wholly-owned subsidiary GPC, is the largest owner of geothermal plants in The Geysers area in Northern California, with 725 MW of green energy capacity operating around the clock. The Geysers area is known as the world's largest geothermal field spanning an area of 30 square miles in Sonoma, Lake, Mendocino, Marin, and Napa counties.

[6] The City of Alameda, City of Biggs, City of Gridley, City of Lodi, City of Lompoc, Port of Oakland, and City of Santa Clara are all expected to sign onto the Third Phase Agreement to receive output from this project.

Over the course of 2022, NCPA staff led negotiation of a PPA with Calpine for renewable energy and RA from Calpine's Geysers geothermal facilities on behalf of the interested NCPA members. To enable NCPA to enter into the PPA with Calpine, participating NCPA members must execute a Third Phase Agreement with NCPA, which specifies the rights and obligations of NCPA and participating members regarding governance and administration of the PPA. The Third Phase Agreement also obligates the participating members to pay their assigned contract percentage share of all project costs (outlined in Exhibit A of the attached Third Phase Agreement), including but not limited to, administrative services costs, scheduling coordination costs, and all other costs related to the PPA.

Santa Clara, as the initial project participant, executed the Third Phase Agreement on December 23, 2022, which enabled NCPA to execute renewable energy and RA Agreements with Calpine for output from the Geysers geothermal facilities. As described in Exhibit A of the attached Third Phase Agreement, participating members become project participants by exercising their right to accept a transfer of a portion of the project participation percentage from Santa Clara by April 30, 2023.

In total, NCPA members have expressed interest in purchasing up to 100 MWs of generating capacity from Calpine for a term of 12 years. Palo Alto requested up to 20 MW of this capacity, but given the demand from NCPA members, has only been allocated 10 MW, with 5 MW starting in 2025, and 5 additional MW starting in 2027. This total geothermal capacity is expected to generate up to 876,000 MWh annually, of which Palo Alto would receive up to 87,600 MWh/year. This project will increase and further diversify Palo Alto's renewable energy portfolio in accordance with the City's adopted Integrated Resource Plan and RPS Procurement Plan. The proposed 10 MW share of the Calpine geothermal output is equivalent to 10.6% of Palo Alto's 2021 retail energy sales.

Due to increased demand for renewable energy generation resources, Calpine is limiting the amount of time it will reserve the quantity, price and terms of a PPA for prospective buyers. Therefore, staff recommends authorizing the City Manager to enter into the aforementioned Third Phase Agreement with NCPA. The benefits of the Calpine project are: (1) the units are fully constructed and are already in operation; (2) geothermal resources are baseload generators, meaning they produce a nearly uniform level of energy on a 24-hour basis; and (3) the units provide local resource adequacy (RA) capacity, of which the City has a significant shortage. Unlike many other new renewable energy projects, this project doesn't carry any development risk.

Economic Assessment of Calpine Geo Contract

The Calpine Geothermal PPA is expected to provide good value to CPAU customers while also reducing the supply portfolio's seasonal energy and RA capacity deficits, thereby reducing budget uncertainty. The geothermal project provides three valuable products to the electric portfolio: energy, resource adequacy, and renewable energy credits (RECs). If the sum of these

three values is greater than the cost of the power purchase agreement, then the City will see a net monetary benefit from this contract.

The primary value provided by this PPA is from the baseload energy output that the geothermal resource produces. Based on forward energy curves as of December 12, 2022, the average value of this energy is $71.80/MWh between 2025 and 2030.[7]

In addition to the energy component, each MWh of geothermal generation qualifies as a "Bucket 1" renewable energy credit (REC), which historically has been valued between $12-$18/MWh. Recently, Palo Alto sold surplus RECs for as much as $20/MWh.

Finally, the geothermal plant capacity qualifies as local RA, which the City can count towards its annual local and system RA requirements. RA is typically transacted and priced on a $/kW-month basis and has ranged between $6/kW-month to $8/kW-month recently, which would translate to approximately $8 to $11/MWh for the geothermal project. Staff transacted for system RA at a price around $15/MWh in October 2022, well above historical RA prices. The increase in RA prices is driven by increasing system RA requirements and reduced qualifying capacity of solar resources, leading to a market shortage of RA in high load summer months.

These benefits of the geothermal PPA in aggregate are estimated to range between $92 to $101/MWh against a PPA price of $79/MWh.

With each of these revenue streams, there is a large degree of uncertainty around what will happen to future prices from changes to macro-economic conditions, regulations, interdependent regional power markets, and overall market uncertainty. That said, forward pricing curves project off-peak power prices to become more valuable than on-peak prices within the next few years, and proposed changes to the RA market rules would reward generators that produce in times of the grid's greatest need. Furthermore, under the state's RPS legislation, all load serving entities are required to increase their share of renewable energy in their portfolios (to 60% by 2030), so there is increasing demand for RECs. All of these trends support the expected long-term value of the geothermal project, given its ability to generate renewable energy around the clock. The geothermal project's inability to reduce output during the sunshine hours will expose it to some lower prices, but these downsides are expected to be offset by the other trends mentioned. Staff conservatively estimates the geothermal project will provide a net benefit of at least $3/MWh[8], with the potential for significant upside if market prices stay high and there are further challenges to bringing new resources onto the grid in the coming 5-10 years.

[7] Note that all energy prices in California have increased sharply over the past two years, not just those of renewable energy projects: Two years ago, forward energy curves pegged the value of this product at $33/MWh, and even three months ago its value was projected to be just $54/MWh.

[8] The conservative net value estimate of $3/MWh is based on the lower-end estimates of the value of the project's RPS and RA products ($12/MWh and $8/MWh, respectively) and an energy value of $62/MWh instead of $71.80/MWh. The lower energy value estimate is equivalent to the energy value estimate of a few months ago, before the recent run-up in power and gas market prices.

Risk Management Assessment

Given this project is an existing power plant, there is no development risk, and instead only operational risk. There are some unique operational risks to running a geothermal power plant, but NCPA, who owns and manages an existing geothermal plant nearby, has confidence in Calpine's history of managing their steam fields and the plant's ability to reliably produce power over the term of the agreement.

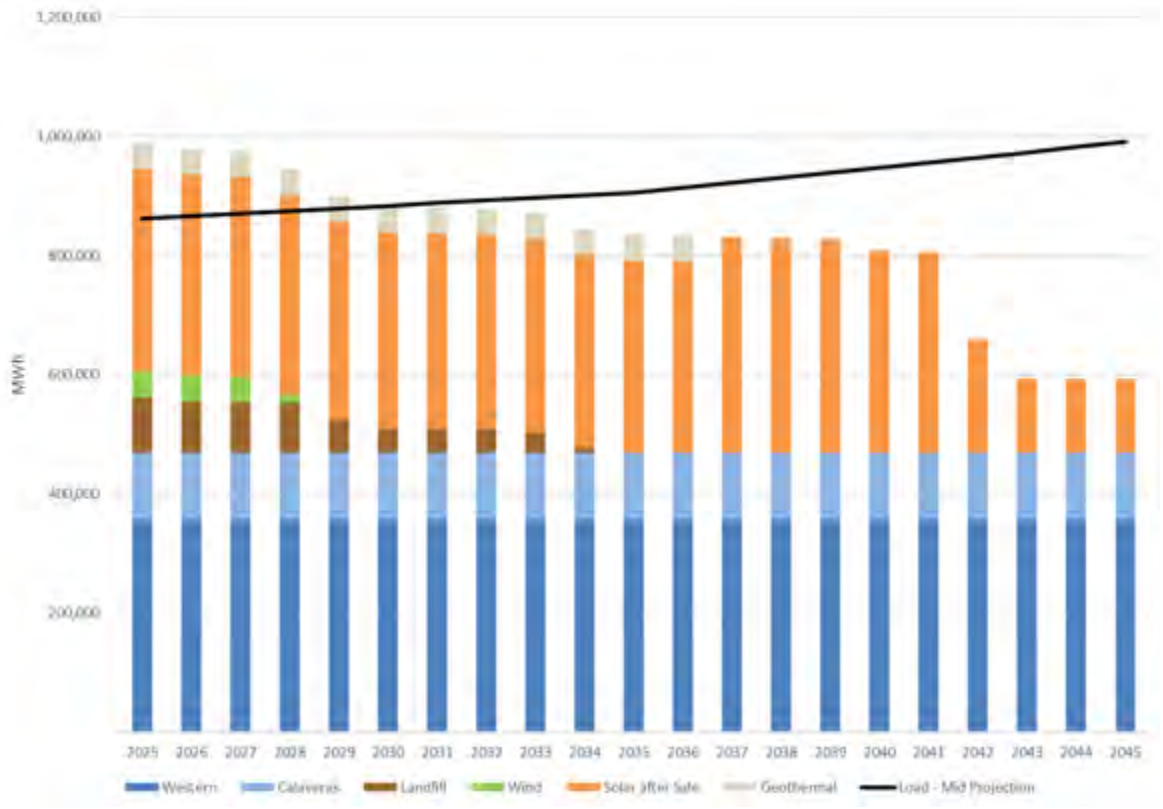
In general, businesses in the renewable industry lack extensive financial and operational track records, and because of the capital-intensive nature of these projects, they tend to be highly leveraged as well. In contrast to most of the City's renewable energy suppliers, Geysers Power Company, LLC (the wholly-owned subsidiary of Calpine that controls its geothermal assets) is an investment-grade company (BBB/stable credit rating), as determined by KBRA, a nationally recognized statistical rating organization (NRSRO), approved by the Securities and Exchange Commission (SEC). While Calpine has a higher projected default rate than the City's other (non-renewable) electric and gas suppliers, Calpine does have an excellent track record of operating a large portfolio of geothermal projects in the Geysers area over many years. And the output for this project will come from a collection of Calpine's resources in this area, so even if there are problems with one or two resources there is very little risk that the City will not receive the contracted volumes of output. To further mitigate this risk, in the event of a credit downgrade event, Calpine will provide collateral (in the form of cash or a letter of credit), in the amount of $2.5 million for the first two years of the contract and $5.0 million for the remainder of the contract, which would protect the City and the other PPA offtakers in a scenario where the facilities are unable to produce the contracted output and the market price of the replacement renewable power is higher than the price of the Calpine PPA. And perhaps most importantly, under the terms of the proposed PPA the City is not at risk for paying for output that is not delivered. As with all of the City's PPAs, the City will make no payments under the PPA until energy from the project is delivered.

Palo Alto's Energy Portfolio with Calpine Geo

Under the City's Energy Risk Management Procedures, staff regularly develops procurement plans for the prompt 36-month period to mitigate the City's market price exposure. Given the supply portfolio's heavy concentration of hydroelectric and solar resources, these procurement plans typically result in staff buying market energy in the fall/winter months and selling surplus energy during the spring/summer months. Furthermore, within any given day, the supply portfolio is routinely short during off-peak (nighttime) and long during on-peak (daytime) periods. This PPA would reduce the need for market purchases and increase the opportunity for market sales in the spring and summer months, depending on the level of output from the City's hydroelectric resources.

The existing supply portfolio[9] is projected to have an overall surplus position from 2025 through 2028 even without entering an agreement for the geothermal project, as shown in Figure 2 below. The load forecast shown in Figure 2 is based on the mid-range scenario presented at the December UAC meeting, which includes modest load growth from data centers, electric vehicles, and building electrification. The hydro generation estimates are based on long term historical averages, which have been significantly higher than actual generation in the last few years during the drought. However, as noted in the December UAC meeting discussion, there is significant uncertainty around both the load and hydro generation projections shown here. Staff recently learned about commercial development plans that could result in significantly greater data center load within the next few years; meanwhile, the impacts of climate change are likely to significantly reduce the long-term level of hydro generation. Combined, these two factors could flip the portfolio's overall surplus positions of the next few years to deficit positions—which is why staff recommends waiving the anti-speculation requirement of the City's Energy Risk Management Policy for this agreement.

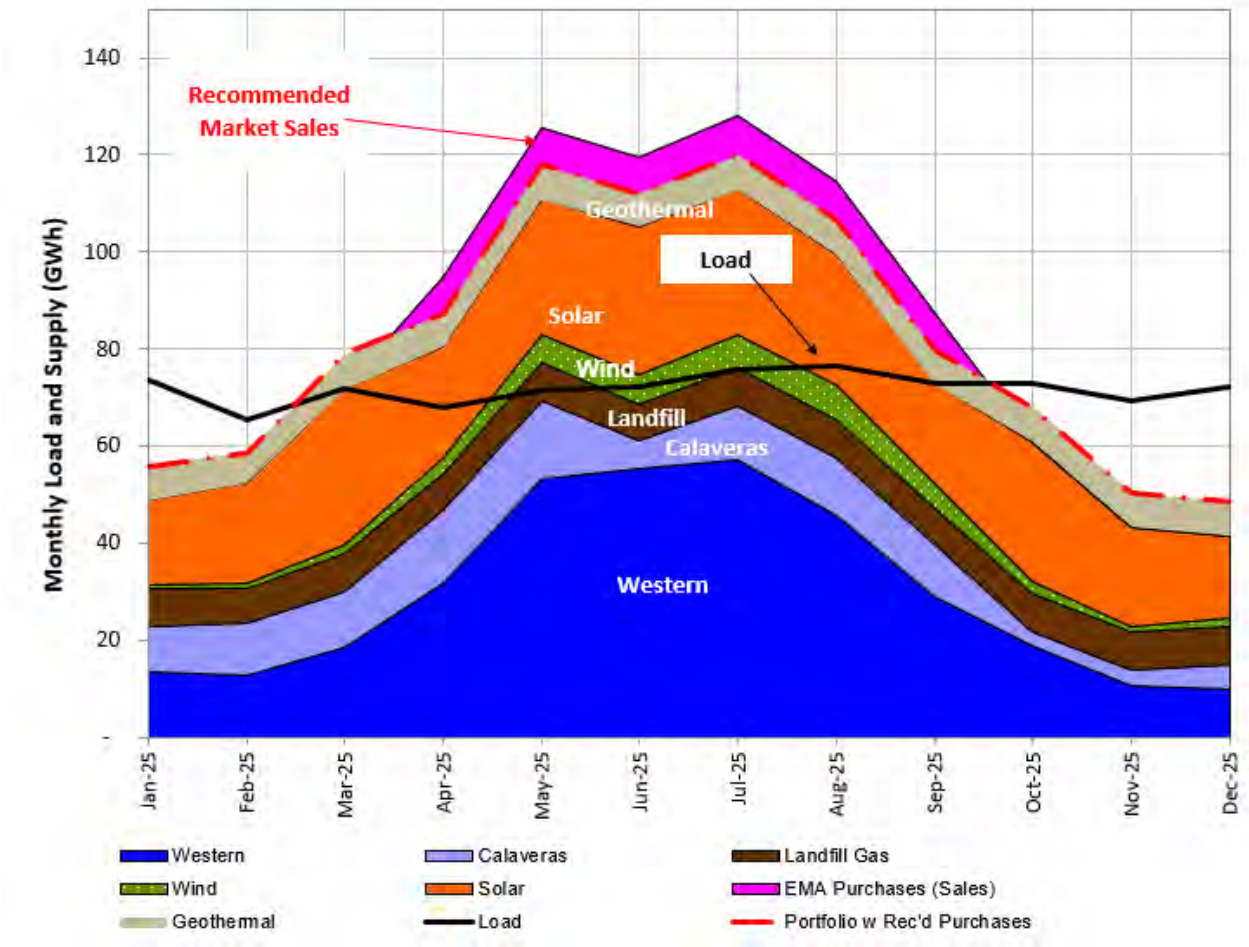
Figure 2: Projected Annual Load-Resource Balance, 2025-2045



[9] All six of the City's solar PPA extend to 2040 or later, while the landfill gas PPAs expire between 2026 and 2034. The City has one remaining wind PPA which expires in June 2028. Furthermore, the City can renew the Western Base Resource contract for a new 30-year term that would start in 2025, and for planning purposes it is currently included in the supply portfolio baseline assumptions. Lastly, the City owns its share of the Calaveras project and it is therefore expected to remain in the portfolio indefinitely.

While the supply portfolio, on average, has an overall surplus position in any given year, the portfolio is short during the 1st and 4th quarters of the calendar year given the seasonal generation from hydro and solar. Additionally, the portfolio is generally short during the non-solar (off-peak) hours. Monthly and daily load resource balance charts are shown in Attachments B and C. The geothermal project is a baseload power plant that produces electricity evenly across the day and year. Given the portfolio is currently projected to have surplus positions during the first few years of the geothermal PPA as shown above, staff is currently monitoring the City's actual load levels closely and evaluating whether to sell solar energy during the 2nd and 3rd quarters (an amount equal to the total purchase amount from the Calpine project) to hedge being overly long on energy, while also improving the daily load-resource balance. Figure 3 below shows a monthly load-resource balance for the City's portfolio with both the Calpine purchase and solar energy sales included. This would balance the portfolio supply and demand more evenly across the seasons within any given year. While the City's risk management policies don't prescribe a specific load-resource balance level, staff tries to minimize the portfolio's overall exposure to the market in either direction to mitigate large supply cost fluctuations from market pricing volatility.

Figure 3: Monthly Load-Resource Balance with Geothermal Energy Purchase and Q2/Q3 Solar Energy Sale Included



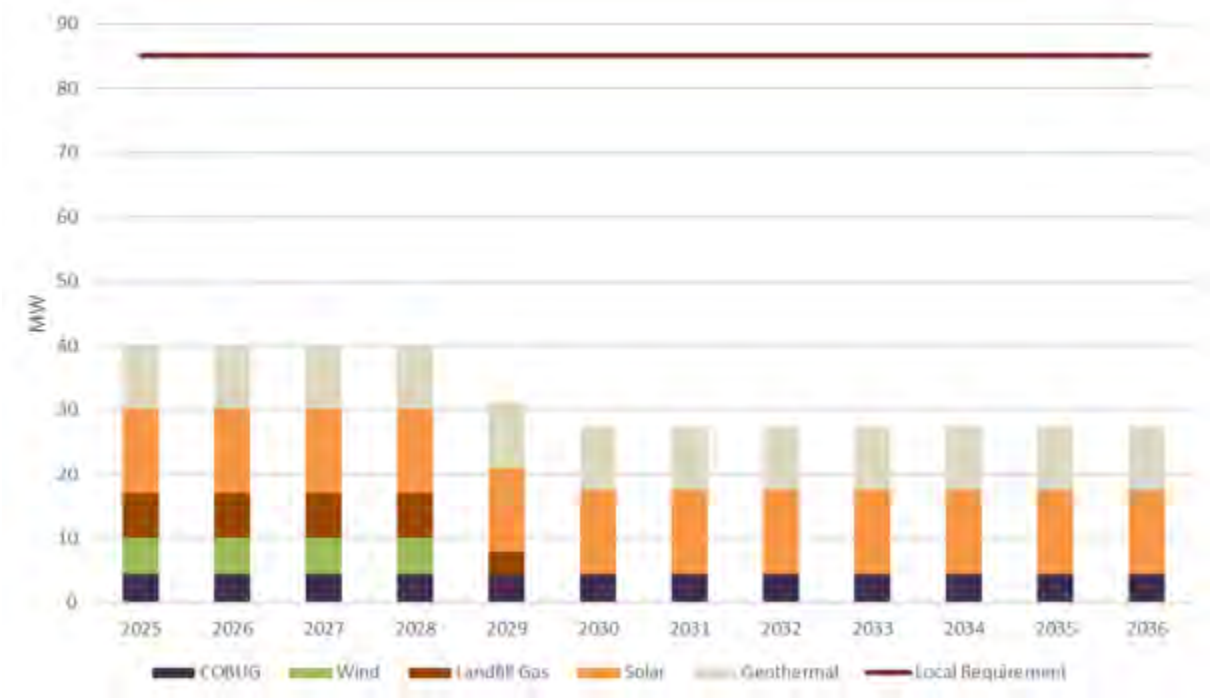
Palo Alto's Resource Adequacy Portfolio with Calpine Geo

Resource adequacy (RA) is another market that the City is required to participate in as a load serving entity in the California Independent System Operator (CAISO) balancing authority. The CAISO RA requirements dictate required levels of generating capacity the City must own or procure to meet local, system, and flexible resource requirements on an annual and monthly basis. Currently, staff manages the City's RA requirements by utilizing its own resources, participating in NCPA's Capacity Pool Program, and through bilateral transactions with other market participants.

The geothermal plant would qualify as local RA for the City, and it would also count towards the City's system RA requirements. As Figures 4 and 5 below indicate, the City has local RA deficits of approximately 50-80 MW per month, but surpluses of system RA that average approximately

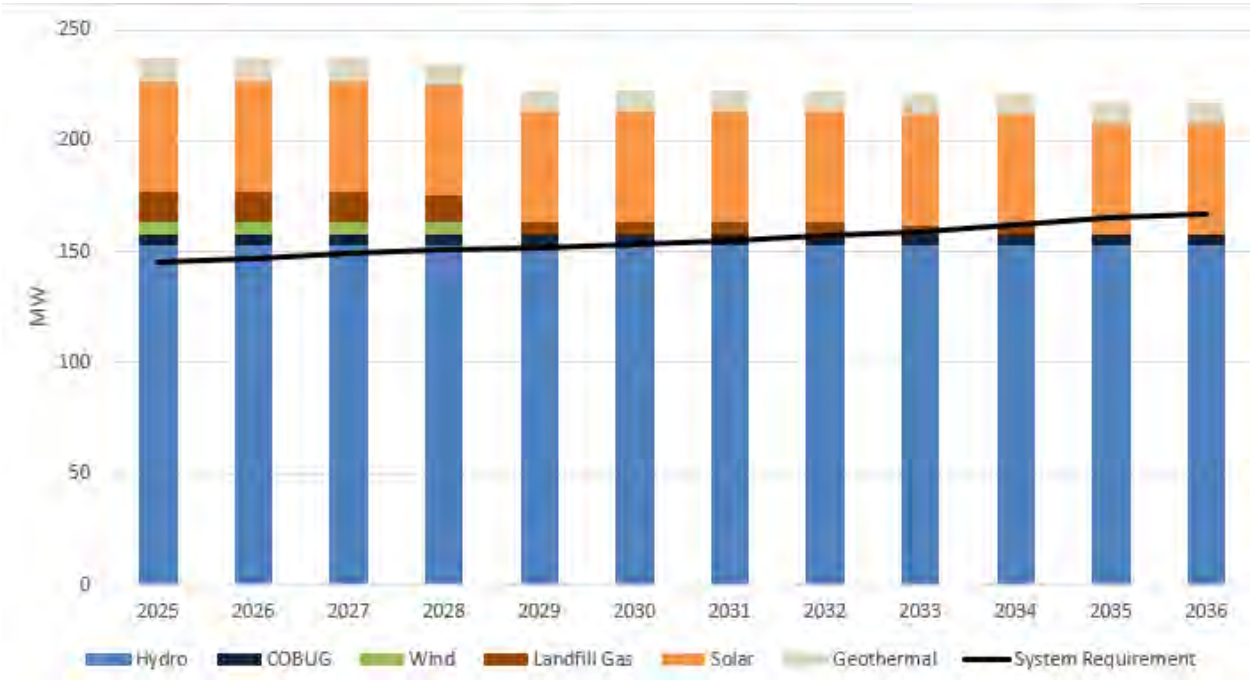
80 MW. This PPA would reduce the city's Local RA deficit by 10 MW and would increase the System RA surplus by an equivalent amount.[10]

Figure 4: Annual Average Local RA Balance Forecast, 2025-2036



[10] While the City would retain the geothermal capacity in its own portfolio to help satisfy its local RA requirements, the addition of this contract would free up capacity from other resources (which do not qualify as local RA) that the City could sell to generate additional revenue and reduce its system RA surplus positions.

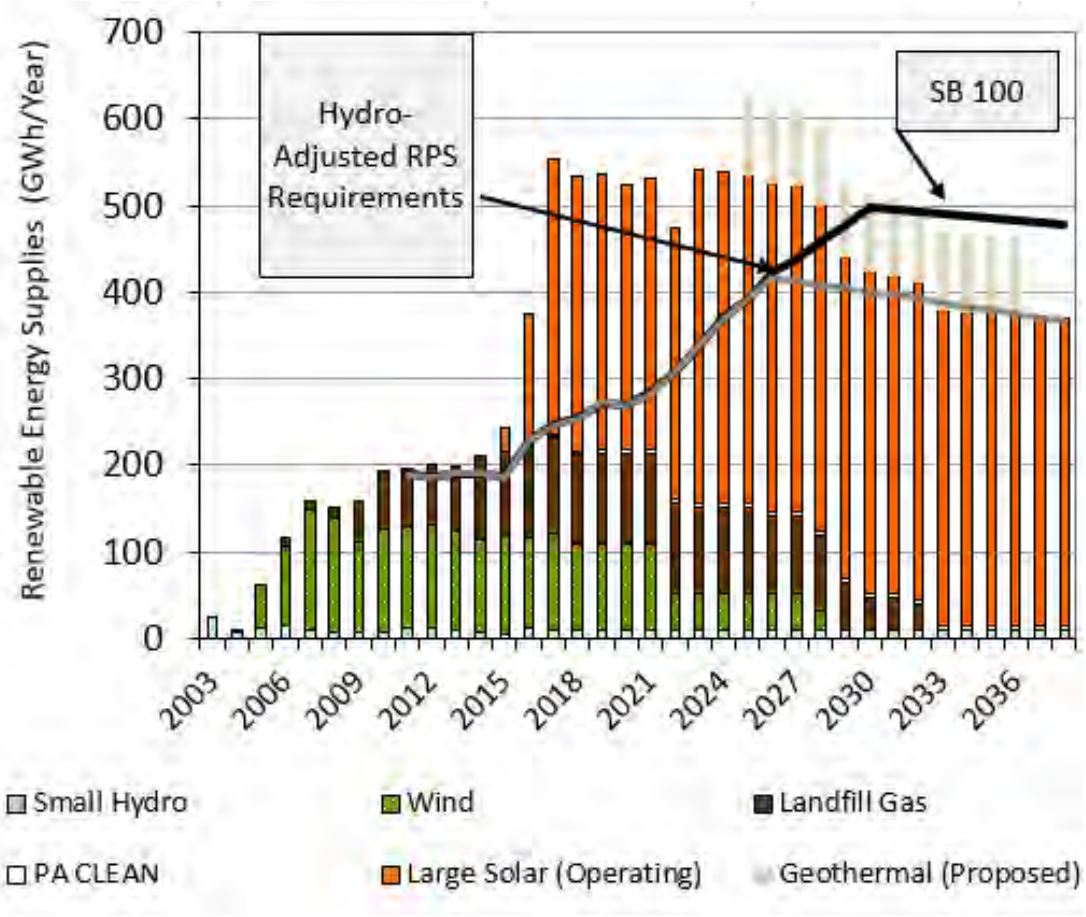
Figure 5: Annual Average System RA Balance Forecast, 2025-2036



Palo Alto's RPS Portfolio with Calpine Geo

The PPA will also increase the City's share of power being generated by renewable resources, as required by the state's RPS regulations. The City is already on track to meet state RPS targets without the geothermal PPA, so this is not a driving factor for this deal, but it would further increase the amount of Bucket 1 RECs the City is able to swap for lower-cost Bucket 3 RECs through its REC Exchange Program. In addition, increasing the City's RPS level provides further flexibility in the future if the City pursues a smaller share of the Western Base Resource contract.

Figure 6: Palo Alto's Existing RPS Supplies and RPS Requirement Levels, with the Calpine Project



Next Steps

The NPCA Commission approved Purchase Agreements Between Geysers Power Company, LLC and Northern California Power Agency, and the Third Phase Agreement for Purchase Agreements with Geysers Power Company, LLC at its December 1, 2022 meeting. Since then, NCPA, with input from attorneys representing participating members, completed PPA negotiations with Calpine. Santa Clara has executed the Third Phase Agreement with NCPA, and as the initial project participant has been allocated the full PPA output. Once Palo Alto and other participating members obtain their governing board approvals and execute the Third Phase Agreement as well, Santa Clara will assign shares of the PPA's energy, RECs and RA capacity to participating members, adding those members to the Third Phase Agreement between NCPA and Santa Clara. Santa Clara has asked all participating members to execute the Third Phase Agreement by April 2023. If the UAC recommends approval, staff will present the Third Phase Agreement to the Finance Committee and then to the City Council for approval.

Resource Impact

If Council approves the execution of this Third Phase Agreement with NCPA, the City will purchase up to 87,600 MWh/year for a total not-to-exceed amount of $6.93 million/year during

the 12-year contract term (2025-2036). Funding for the purchase of the renewable energy will be included in the Electric Utility Fund budget beginning in FY 2025.

Policy Impact

Approval of the proposed Third Phase Agreement is in conformance with the City's Sustainability and Climate Action Plan (S/CAP), Integrated Resource Plan, Carbon Neutral Plan, and RPS Procurement Plan, specifically the City's Renewable Portfolio Standard to meet at least 60% of the City's electric sales from renewable energy.

Environmental Review

The UAC's recommendation to approve the Third Phase Agreement does not meet the definition of a project under the California Environmental Quality Act (CEQA), pursuant to Public Resources Code Section 21065.

Attachments:

- Attachment A: NCPA Third Phase Agreement
- Attachment B: Monthly Load-Resource Balance for 2021 with the Calpine Geothermal Included
- Attachment C: Daily Load-Resource Balance for 2021 with the Calpine Geothermal Included
- Attachment D: Presentation

THIRD PHASE AGREEMENT

FOR

PURCHASE AGREEMENTS

WITH

GEYSERS POWER COMPANY, LLC

TABLE OF CONTENTS

This THIRD PHASE AGREEMENT ("this Agreement") is dated as of December 22, 2022 by and among the Northern California Power Agency, a joint powers agency of the State of California ("NCPA"), and the signatories to this Agreement other than NCPA ("Participants"). NCPA and the Participants are referred to herein individually as a "Party" and collectively as the "Parties".

RECITALS

A. NCPA has heretofore been duly established as a public agency pursuant to the Joint Exercise of Powers Act of the Government Code of the State of California and, among other things, is authorized to acquire, construct, finance, and operate buildings, works, facilities, and improvements for the generation and transmission of electric capacity and energy for resale.

B. Each of the Participants is a signatory to the Joint Powers Agreement which created NCPA and therefore is a Member.

C. Each of the Participants to this Agreement have executed the Amended and Restated Facilities Agreement, dated October 1, 2014, which establishes the framework under which Project Agreements are created for the development, design, financing, construction, and operation of specific NCPA Projects.

D. The Participants desire NCPA to enter into the following two agreements with Geysers Power Company, LLC ("Seller") for the benefit of the Participants'

customers: (1) Western Systems Power Pool Agreement Confirmation between Northern California Power Agency and Geysers Power Company, LLC, to purchase electric capacity (individually, "RA Agreement"); and (2) Western Systems Power Pool Agreement Confirmation between Geysers Power Company, LLC and Northern California Power Agency, to purchase renewable energy (individually, "RPS Agreement"). The RA Agreement and the RPS Agreement are collectively referred herein as the Purchase Agreements, attached hereto as Exhibit B.

E. Each Participant is authorized by its Constitutive Documents to obtain electric capacity and energy for its present or future requirements, through contracts with NCPA or otherwise.

F. To enable NCPA to enter into the Purchase Agreements on behalf of the Participants, pursuant to the terms and conditions of the Amended and Restated Facilities Agreement, NCPA and the Participants wish to enter into this Agreement to provide all means necessary for NCPA to fulfill obligations incurred on behalf of NCPA and the Participants pursuant to the Purchase Agreements, and to enable and obligate the Participants to take delivery of and pay for such electric capacity and energy and to pay NCPA for all costs it incurs for undertaking the foregoing activities.

G. Upon full execution of this Agreement, NCPA will enter into the Purchase Agreements on behalf of the Participants, and such Purchase Agreements shall be deemed a NCPA Project by the Commission.

H. Each of the Parties intends to observe the provisions of this Agreement in good faith and shall cooperate with all other Parties in order to achieve the full benefits of joint action.

I. The Parties desire to equitably allocate costs of NCPA's provision of services under this Agreement among the Participants.

J. The Participants further desire, insofar as possible, to insulate other Members who are not Participants, from risks inherent in the services and transactions undertaken on behalf of the Participants pursuant to this Agreement.

NOW, THEREFORE, the Parties agree as follows:

Section 1. Definitions.

1.1 Definitions. Whenever used in this Agreement (including the Recitals hereto), the following terms shall have the following respective meanings, provided, capitalized terms used in this Agreement (including the Recitals hereto) that are not defined in Section 1 of this Agreement shall have the meaning indicated in Section 1 of the Power Management and Administrative Services Agreement, dated October 1, 2014:

1.1.1 "Administrative Services Costs" means that portion of the NCPA administrative, general and occupancy costs and expenses, including those costs and expenses associated with the operations, direction and supervision of the general affairs and activities of NCPA, general management, treasury operations, accounting, budgeting, payroll, human resources, information technology, facilities management,

salaries and wages (including retirement benefits) of employees, facility operation and maintenance costs, taxes and payments in lieu of taxes (if any), insurance premiums, fees for legal, engineering, financial and other services, power management services, general settlement and billing services and general risk management costs, that are charged directly or apportioned to the provision of services under this Agreement. Administrative Services Costs as separately defined herein and used in the context of this Agreement is different and distinct from the term Administrative Services Costs as defined in Section 1 of the Power Management and Administrative Services Agreement.

1.1.2 "Agreement" means this Third Phase Agreement, including all Exhibits attached hereto.

1.1.3 "All Resources Bill" has the meaning set forth in the Power Management and Administrative Services Agreement.

1.1.4 "CAISO" means the California Independent System Operator Corporation, or its functional successor.

1.1.5 "CAISO Tariff" means the duly authorized tariff, rules, protocols and other requirements of the CAISO, as amended from time to time.

1.1.6 "Commission" has the meaning set forth in the Power Management and Administrative Services Agreement.

1.1.7 "Constitutive Documents" means, with respect to NCPA, the Joint Powers Agreement and any resolutions or bylaws adopted thereunder with respect to the governance of NCPA, and with respect to each Participant, the California Government Code and other statutory provisions applicable to such Participant, any applicable agreements, charters, contracts, or other documents concerning the formation, operation or decision making of such Participant, including, if applicable, its city charter, and any codes, ordinances, bylaws, and resolutions adopted by such Participant's governing body.

1.1.8 "Defaulting Participant" has the meaning set forth in Section 7.2.

1.1.9 "Electric System" has the meaning set forth in the Power Management and Administrative Services Agreement.

1.1.10 "Event of Default" has the meaning set forth in Section 7.2.

1.1.11 "General Operating Reserve" means the NCPA General Operating Reserve created through resolution of the Commission, as the same may be amended from time to time.

1.1.12 "NCPA" has the meaning set forth in the Recitals hereto.

1.1.13 "Participant" has the meaning set forth in the Recitals of this Agreement.

1.1.14 "Power Management and Administrative Services Agreement" means the NCPA Power Management and Administrative Services Agreement, dated

as of October 1, 2014 between NCPA and the Members who are signatories to that agreement by which NCPA provides Power Management and Administrative Services.

1.1.15 "Products" means collectively the RA Product and the Renewable Product.

1.1.16 "Purchase Agreements" have the meaning set forth in Recital D of this Agreement. Upon final execution of the Purchase Agreements, the Purchase Agreements shall be deemed a NCPA Project in accordance with the Amended and Restated Facilities Agreement, and therefore be referred to herein as the "Project".

1.1.17 "Project Costs" means all costs charged to and paid by NCPA pursuant to the Purchase Agreements.

1.1.18 "Project Participation Percentage" has the meaning set forth in the Power Management and Administrative Services Agreement, and are set forth in Exhibit A of this Agreement.

1.1.19 "Party" or "Parties" has the meaning set forth in the preamble hereto; provided that "Third Parties" are entities that are not Party to this Agreement.

1.1.20 "RA Product" means the resource adequacy capacity products described in Article 3 of the RA Agreement.

1.1.21 "Renewable Product" means renewable energy product and associated attributes which are defined as "Product" in the RPS Agreement.

1.1.22 "Revenue" means , with respect to each Participant, all income, rents, rates, fees, charges, and other moneys derived by the Participant from the ownership or operation of its Electric System, including, without limiting the generality of the foregoing: (a) all income, rents, rates, fees, charges or other moneys derived from the sale, furnishing and supplying of electric capacity and energy and other services, facilities, and commodities sold, furnished, or supplied through the facilities of its Electric System; (b) the earnings on and income derived from the investment of such income, rents, rates, fees, charges or other moneys to the extent that the use of such earnings and income is limited by or pursuant to law to its Electric System; (c) the proceeds derived by the Participant directly or indirectly from the sale, lease or other disposition of all or a part of the Electric System; and (d) the proceeds derived by Participant directly or indirectly from the consignment and sale of freely allocated greenhouse gas compliance instruments into periodic auctions administered by the State of California under the California Cap-and-Trade Program, provided that such proceeds are a permitted use of auction proceeds, but the term Revenues shall not include (i) customers' deposits or any other deposits subject to refund until such deposits have become the property of the Participant or (ii) contributions from customers for the payment of costs of construction of facilities to serve them.

1.1.23 "Scheduling Protocols" means the applicable provisions of the Amended and Restated Scheduling Coordination Program Agreement, and any other

contractual or other arrangements between NCPA and the Participants concerning the scheduling, delivery and metering of the Purchase Agreements.

1.1.24 "Security Deposit" means the account established by NCPA and funded by the Participants in accordance with Section 5, the funds of which are available for use by NCPA in accordance with the terms and conditions hereof.

1.1.25 "Seller" means Geysers Power Company, LLC, as set forth in Recital D of this Agreement, or as otherwise set forth in the Purchase Agreements.

1.1.26 "Term" has the meaning set forth in Section 10.

1.1.27 "Third Party" means an entity (including a Member) that is not Party to this Agreement.

1.2 Rules of Interpretation. As used in this Agreement (including the Recitals hereto), unless in any such case the context requires otherwise: The terms "herein," "hereto," "herewith" and "hereof" are references to this Agreement taken as a whole and not to any particular provision; the term "include," "includes" or "including" shall mean "including, for example and without limitation;" and references to a "Section," "subsection," "clause," "Appendix", "Schedule", or "Exhibit" shall mean a Section, subsection, clause, Appendix, Schedule or Exhibit of this Agreement, as the case may be. All references to a given agreement, instrument, tariff or other document, or law, regulation or ordinance shall be a reference to that agreement, instrument, tariff or other document, or law, regulation or ordinance as such now exists and as may be amended

from time to time, or its successor. A reference to a "person" includes any individual, partnership, firm, company, corporation, joint venture, trust, association, organization or other entity, in each case whether or not having a separate legal personality and includes its successors and permitted assigns. A reference to a "day" shall mean a Calendar Day unless otherwise specified. The singular shall include the plural and the masculine shall include the feminine, and *vice versa*.

Section 2. **Purpose.** The purpose of this Agreement is to: (i) set forth the terms and conditions under which NCPA shall enter into the Purchase Agreements on behalf of the Participants, (ii) authorize NCPA, acting on behalf of the Participants, to engage in all activities related to that basic purpose, and (iii) specify the rights and obligations of NCPA and the Participants with respect to the Purchase Agreements.

Section 3. **Sale and Purchase of Products.** By executing this Agreement, each Participant acknowledges and agrees to be bound by the terms and conditions of the Agreement, and that the Agreement is written as a "take-or-pay" agreement. Any Products delivered to NCPA under the Purchase Agreements shall be delivered to each Participant in proportion to such Participant's Project Participation Percentage as set forth in Exhibit A, and each Participant shall accept and pay for its respective percentage of such Products. To the extent a Participant is unable to accept such deliveries in full, NCPA shall dispose of such surplus in its sole discretion, in such a manner to attempt to maximize Participant value and that Participant shall reimburse to NCPA any costs

incurred by NCPA in doing so. Notwithstanding the above, NCPA may allocate Products procured through the Purchase Agreements among the Participants in such percentages as NCPA may, in its reasonable discretion, determine are necessary, desirable, or appropriate, in order to accommodate Participant transfer rights pursuant to Section 9.

3.1 Scheduling. Products delivered from Seller shall be scheduled for and to the Participants in accordance with Scheduling Protocols, and the terms and conditions of the Purchase Agreements.

Section 4. Billing and Payments

4.1 Participant Payment Obligations. Each Participant agrees to pay to NCPA each month its respective portion of the Project Costs, Administrative Services Costs, scheduling coordination costs, and all other costs for services provided in accordance with this Agreement and the Amended and Restated Facilities Agreement. In addition to the aforementioned monthly payment obligations, each Participant is obligated to fund: (i) any and all required Security Deposits calculated in accordance with Section 5, and (ii) any working capital requirements for the Project maintained by NCPA as determined, collected and set forth in the Annual Budget.

4.2 Invoices. NCPA will issue an invoice to each Participant for its share of Project Costs, Administrative Services Costs, scheduling coordination costs, and all other costs for services provided in accordance with this Agreement and the Amended and Restated Facilities Agreement. Such invoice may be either the All Resources Bill or

separate special invoice, as determined by NCPA. At NCPA's discretion, invoices may be issued to Participants using electronic media or physical distribution.

4.3 Payment of Invoices. All invoices delivered by NCPA (including the All Resources Bill) are due and payable thirty (30) Calendar Days after the date thereof; provided, however, that any amount due on a day other than a Business Day may be paid on the following Business Day.

4.4 Late Payments. Any amount due and not paid by a Participant in accordance with Section 4.3 shall be considered late and bear interest computed on a daily basis until paid at the lesser of (i) the per annum prime rate (or reference rate) of the Bank of America NT&SA then in effect, plus two percent (2%) or (ii) the maximum rate permitted by law.

4.5 Billing Disputes. A Participant may dispute the accuracy of any invoice issued by NCPA under this Agreement by submitting a written dispute to NCPA, within thirty (30) Calendar Days after the date of such invoice; nonetheless the Participant shall pay the full amount billed when due. If a Participant does not timely question or dispute the accuracy of any invoice in writing, then the invoice shall be deemed to be correct. Upon review of a submitted dispute, if an invoice is determined by NCPA to be incorrect, then NCPA shall issue a corrected invoice and refund any amounts that may be due to the Participant. If NCPA and the Participant fail to agree on the accuracy of an invoice within thirty (30) Calendar Days after the Participant has disputed it, then the General Manager shall promptly submit the dispute to the Commission for resolution. If the Commission

and the Participant fail to agree on the accuracy of a disputed invoice within sixty (60) Calendar Days after its submission to the Commission, then the dispute may then be resolved under the mediation and arbitration procedures set forth in Section 12 of this Agreement; provided, however, that prior to resorting to either mediation or arbitration proceedings, the full amount of the disputed invoice must be paid by the Participant.

4.6 Billing/Settlement Data and Examination of Books and Records.

4.6.1 Settlement Data. NCPA shall make billing and settlement data available to the Participants in the All Resources Bill, or other invoice, or upon request. NCPA may also, at its sole discretion, make billing and settlement support information available to Participants using electronic media (e.g. electronic data portal). Procedures and formats for the provision of such electronic data submission may be established by the Commission from time to time. Without limiting the generality of the foregoing, NCPA may, in its reasonable discretion, require the Participants to execute a non-disclosure agreement prior to providing access to the NCPA electronic data portal.

4.6.2 Examination of Books and Records. Any Participant to this Agreement shall have the right to examine the books and records created and maintained by NCPA pursuant to this Agreement at any reasonable, mutually agreed upon time.

Section 5. Security Deposit Administration

5.1 Security Deposit Requirements. Each Participant agrees that any funds deposited at NCPA to satisfy Participant's Security Deposit requirements pursuant to this Agreement shall be irrevocably committed and held by NCPA in the General Operating Reserve, and that such funds may be used by NCPA in accordance with Section 5.1.3. Each Participant's Security Deposit will be accounted separately from and in addition to any other security accounts or deposits maintained pursuant to any other agreement between NCPA and the Participant, or any other such security account or deposits required of Members. In connection with fulfilling the Security Deposit requirements of this Agreement, Participant may elect to use its uncommitted funds held in the General Operating Reserve to satisfy in whole or in part its Security Deposit required under Section 5. If Participant chooses to satisfy in whole or in part its security requirements using its uncommitted funds held in the General Operating Reserve, then Participant is required to execute and deliver to NCPA an Irrevocable Letter of Direction, directing NCPA to utilize Participant's uncommitted General Operating Reserve funds for such purposes, and the designated funds will thereafter be irrevocably committed and held by NCPA to satisfy the requirements of this Agreement.

5.1.1 Initial Amounts. No later than November 1, 2024, each Participant shall ensure that sufficient Security Deposit funds have been deposited with and are held by NCPA in an amount equal to the highest three (3) months of estimated Project

Costs for the initial term from January 2025 through December 2026, as estimated by NCPA.[1] No later than November 1, 2026, each Participant shall adjust the Security Deposit to an amount equal to the highest three (3) months of estimated Project Costs for the period January 2027 through December 2036, as estimated by NCPA.[2] Such Security Deposit requirement may be satisfied by Participant in whole or part either in cash, through irrevocable commitment of its uncommitted funds held in the General Operating Reserve in accordance with Section 5.1, or through a clean, irrevocable letter of credit satisfactory to NCPA's General Manager.

5.1.2 Subsequent Deposits. Periodically, and at least quarterly, NCPA shall review and revise its estimate of Project Costs for which Participant shall be obligated to pay under this Agreement. Following such review, NCPA shall determine whether each Participant has a sufficient Security Deposit balance at NCPA. To the extent that any Participant's Security Deposit balance is greater than one hundred and ten percent (110%) of the amount required herein, NCPA shall credit such amount as soon as practicable to the Participant's next following All Resources Bill, or by separate special invoice. To the extent that any Participant's Security Deposit balance is less than ninety percent (90%) of the amount required herein, NCPA shall add such amount

[1] The Security Deposit fund requirement for the initial term is structured to avoid a Downgrade Event to Buyer as such terms are defined in RPS Agreement.

[2] The Security Deposit fund requirement is increased in November of 2026 to reflect the increased contract quantity beginning on January 1, 2027, and is structured to avoid a Downgrade Event to Buyer as such terms are defined in RPS Agreement.

as soon as practicable to such Participant's next All Resources Bill, or as necessary, to a special invoice to be paid by Participant upon receipt. Credits or additions shall not be made to Participants who satisfy these Security Deposit requirements in whole through the use of a letter of credit; provided, that the amount of the letter of credit shall be adjusted, as required from time to time, in a like manner to assure an amount not to exceed the highest three (3) months of estimated Project Costs is available to NCPA, as determined by NCPA.

5.1.3 Use of Security Deposit Funds. NCPA may use any and all Security Deposit funds held by NCPA (or utilize a letter of credit provided in lieu thereof) to pay any costs it incurs hereunder, including making payments to Seller, without regard to any individual Participant's Security Deposit balance or proportionate share of Project Costs, and irrespective of whether NCPA has issued an All Resources Bill or special invoice for such costs to the Participants or whether a Participant has made timely payments of All Resources Bills or special invoices. Should Participant have satisfied its Security Deposit requirements in whole or part through a letter of credit, NCPA may draw on such letter of credit to satisfy Participant's obligations hereunder at NCPA's sole discretion. Notwithstanding the foregoing, if any Participant fails to pay any costs incurred by NCPA pursuant to this Agreement, NCPA shall first use that non-paying Participant's Security Deposit and

shall not use any other Participants' Security Deposit until such non-paying Participant's Security Deposit has been exhausted.

5.1.4 Accounting. If Security Deposit funds or a letter of credit are used by NCPA to pay any costs it incurs hereunder as described in Section 5.1.3, then NCPA will maintain a detailed accounting of each Participant's shares of funds withdrawn, and upon the collection of all or a part of such withdrawn funds, NCPA will credit back to each non-defaulting Participant the funds collected in proportion to such non-defaulting Participant's share of funds initially withdrawn.

5.1.5 Emergency Additions. In the event that funds are withdrawn pursuant to Section 5.1.3, or if the Security Deposit held by NCPA is otherwise insufficient to allow for NCPA to pay any invoice, demand, request for further assurances by Seller, or claims, NCPA shall notify all Participants of the deficiency. In conjunction with such notice, NCPA shall send a special or emergency assessment invoice to the Participant or Participants that caused or are otherwise responsible for the deficiency. Each Participant of such an invoice shall pay to NCPA such assessment when and if assessed by NCPA within two (2) Business Days of the invoice date of the assessment, or shall consent to and direct NCPA to draw on any existing letter of credit Participant has established for such purposes. In the event that the Participant or Participants that caused or are otherwise responsible for the deficiency cannot, does not or will not pay to NCPA the special or emergency assessment within two (2)

Business Days after the invoice date, NCPA shall immediately submit a special or emergency invoice to all remaining Participants, and such remaining Participants shall pay to NCPA such assessment within two (2) Business Days after the invoice date of the assessment, or shall consent to and direct NCPA to draw on any existing letter of credit that Participant has established for such purposes.

5.1.6 Security Deposit Interest. NCPA shall maintain a detailed accounting of each Participant's Security Deposits, and withdrawals of such funds, held by NCPA. Security Deposits held by NCPA shall be invested by NCPA in accordance with the General Operating Reserve policies and investment policies adopted by the NCPA Commission. Interest earned on the Security Deposit funds shall be proportionately credited to the Participants in accordance with their weighted average balances held therein. Any Security Deposit losses caused by early termination of investments shall be allocated among the Participants in accordance with the General Operating Reserve provisions and guidelines approved by the Commission, as the same may be amended from time to time; provided, however, to the extent that either the General Operating Reserve provisions and guidelines do not apply or the Security Deposit is not adequate to cover the losses, then such losses shall be allocated among the Participants in accordance with their proportionate Security Deposit balances.

5.1.7 Return of Funds. Upon termination or a permitted withdrawal of a Participant in accordance with this Agreement, the affected Participant may apply to NCPA for the return of their share of Security Deposit funds ninety (90) days after the effective date of such termination or withdrawal. However, NCPA shall, in its sole but reasonable discretion, as determined by the NCPA General Manager, estimate the then outstanding liabilities of the Participant, including any estimated contingent liabilities and shall retain all such funds, if any, until all such liabilities have been fully paid or otherwise satisfied in full. After all such liabilities have been satisfied in full, as determined by NCPA's General Manager, any remaining balance of the Participant's share of the Security Deposit will be refunded to the Participant within sixty (60) days thereafter.

Section 6. Cooperation and Further Assurances. Each of the Parties agree to provide such information, execute and deliver any instruments and documents and to take such other actions as may be necessary or reasonably requested by any other Party which are consistent with the provisions of this Agreement and which do not involve the assumption of obligations other than those provided for in this Agreement, in order to give full effect to this Agreement and to carry out the intent of this Agreement. The Parties agree to cooperate and act in good faith in connection with obtaining any credit support required in order to satisfy the requirements of this Agreement.

Section 7. Participant Covenants and Defaults

7.1 Each Participant covenants and agrees: (i) to make payments to NCPA, from its Electric System Revenues, of its obligations under this Agreement as an operating expense of its Electric System; (ii) to fix the rates and charges for services provided by its Electric System, so that it will at all times have sufficient Revenues to meet the obligations of this Agreement, including the payment obligations; (iii) to make all such payments due NCPA under this Agreement whether or not there is an interruption in, interference with, or reduction or suspension of services provided under this Agreement, such payments not being subject to any reduction, whether by offset or otherwise, and regardless of whether any reasonable dispute exists; and (iv) to operate its Electric System, and the business in connection therewith, in accordance with Good Utility Practices.

7.2 Events of Default. An Event of Default under this Agreement shall exist upon the occurrence of any one or more of the following by a Participant (the "Defaulting Participant"):

(i) the failure of any Participant to make any payment in full to NCPA when due;

(ii) the failure of a Participant to perform any covenant or obligation of this Agreement where such failure is not cured within thirty (30) Calendar Days following receipt of a notice from NCPA demanding cure; provided, that this subsection shall not apply to any failure to make payments specified by subsection 7.2 (i));

(iii) if any representation or warranty of a Participant material to the services provided hereunder shall prove to have been incorrect in any material respect when made and the Participant does not cure the facts underlying such incorrect representation or warranty so that the representation or warranty becomes true and correct within thirty (30) Calendar Days after the date of receipt of notice from NCPA demanding cure; or

(iv) if a Participant is in default or in breach of any of its covenants or obligations under any other agreement with NCPA and such default or breach is not cured within the time periods specified in such agreement.

7.3 Uncontrollable Forces. A Party shall not be considered to be in default in respect of any obligation hereunder if prevented from fulfilling such obligation by reason of Uncontrollable Forces; provided, that in order to be relieved of an Event of Default due to Uncontrollable Forces, a Party affected by an Uncontrollable Force shall:

(i) first provide oral notice to the General Manager using telephone communication within two (2) Business Days after the onset of the Uncontrollable Force, and provide subsequent written notice to the General Manager and all other Parties within ten (10) Business Days after the onset of the Uncontrollable Force, describing its nature and extent, the obligations which the Party is unable to fulfill, the anticipated duration of the Uncontrollable Force, and the actions which the Party will undertake so as to remove such disability and be able to fulfill its obligations hereunder; and

(ii) use due diligence to place itself in a position to fulfill its obligations hereunder and if unable to fulfill any obligation by reason of an Uncontrollable Force such Party shall exercise due diligence to remove such disability with reasonable dispatch; provided, that nothing in this subsection shall require a Party to settle or compromise a labor dispute.

7.4 Cure of an Event of Default. An Event of Default shall be deemed cured only if such default shall be remedied or cured within the time periods specified in Section 7.2 above, as may be applicable, provided, however, upon request of the Defaulting Participant the Commission may waive the default at its sole discretion, where such waiver shall not be unreasonably withheld.

7.5 Remedies in the Event of Uncured Default. Upon the occurrence of an Event of Default which is not cured within the time limits specified in Section 7.2, without limiting other rights or remedies available under this Agreement, at law or in equity, and without constituting or resulting in a waiver, release or estoppel of any right, action or cause of action NCPA may have against the Defaulting Participant, NCPA may take any or all of the following actions:

(i) suspend the provision of services under this Agreement to such Defaulting Participant; or

(ii) demand that the Defaulting Participant provide further assurances to guarantee the correction of the default, including the collection of a surcharge or increase

in electric rates, or such other actions as may be necessary to produce necessary Revenues to correct the default.

7.6 Effect of Suspension.

7.6.1 Generally. The suspension of this Agreement will not terminate, waive, or otherwise discharge any ongoing or undischarged liabilities, credits or obligations arising from this Agreement until such liabilities, credits or obligations are satisfied in full.

7.6.2 Suspension. If performance of all or any portion of this Agreement is suspended by NCPA with respect to a Participant in accordance with subsection 7.5(i), then such Participant shall pay any and all costs incurred by NCPA as a result of such suspension including reasonable attorney's fees, the fees and expenses of other experts, including auditors and accountants, or other reasonable and necessary costs associated with such suspension and any portion of the Project Costs, scheduling and dispatch costs, and Administrative Services Costs that were not recovered from such Participant as a result of such suspension.

Section 8. Administration of Agreement

8.1 Commission. The Commission is responsible for the administration of this Agreement. Each Participant shall be represented by its Commissioner or their designated alternate Commissioner ("Alternate") pursuant to the Joint Powers Agreement. Each

Commissioner shall have authority to act for the Participant represented with respect to matters pertaining to this Agreement.

8.2 Forum. Whenever any action anticipated by this Agreement is required to be jointly taken by the Participants, such action shall be taken at regular or special meetings of the NCPA Commission.

8.3 Quorum. For purposes of acting upon matters that relate to administration of this Agreement, a quorum of the Participants shall consist of those Commissioners, or their designated Alternate, representing a numerical majority of the Participants.

8.4 Voting. Each Participant shall have the right to cast one vote with respect to matters pertaining to this Agreement. A unanimous vote of all Participants shall be required for action regarding: (i) any transfer of rights to a Third Party as described in Section 9 of this Agreement; and (ii) for matters related to any of the following actions as provided for in the Purchase Agreements: (a) exercising any early termination provisions as set forth in the Purchase Agreements, and (b) exercising any assignment rights as set forth in the Purchase Agreements. For all other matters pertaining to this Agreement, a majority vote of the Participants shall be required for action.

Section 9. Transfer of Rights by Participants

9.1 A Participant has the right to make transfers, sales, assignments and exchanges (collectively "transfers(s)") of any portion of its Project Participation Percentage and rights thereto, subject to the approval provisions in Section 8.4 of this Agreement,

provided that the transferee satisfies all applicable criterion in the Purchase Agreements. If a Participant desires to transfer a portion or its entire share of the Project for a specific time interval, or permanently, then NCPA will, if requested by such Participant, use its best efforts to transfer that portion of the Participant's share of the Project.

9.2 Unless otherwise set forth in this Agreement, before a Participant may transfer an excess Project share pursuant to Section 9.1 to any person or entity other than a Participant, it shall give all other Participants the right to purchase the share on the same terms and conditions. Before a Participant may transfer an excess Project share pursuant to section 9.1 to any person or entity other than a Member, it shall give all Members the right to purchase the share on the same terms and conditions. Such right shall be exercised within thirty (30) days of receipt of notice of said right.

No transfer shall relieve a Participant of any of its obligations under this Agreement except to the extent that NCPA receives payment of these obligations from a transferee.

9.3 The provisions of this Section 9 do not apply to the Exhibit A, unless expressly set forth therein.

Section 10. **Term and Termination.** This Agreement shall become effective when it has been duly executed by all Participants, and delivered to and executed by NCPA (the "Effective Date"). NCPA shall notify all Participants in writing of the Effective Date. The Term of this Agreement shall be coterminous with the Purchase Agreements, and shall

commence on the Effective Date, and shall continue through the term of the Purchase Agreements.

Section 11. Withdrawal of Participants. No Participant may withdraw from this Agreement except as otherwise provided for herein.

Section 12. Settlement of Disputes and Arbitration. The Parties agree to make best efforts to settle all disputes among themselves connected with this Agreement as a matter of normal business under this Agreement. The procedures set forth in Section 10 of the Power Management and Administrative Services Agreement shall apply to all disputes that cannot be settled by the Participants themselves; provided, that the provisions of Section 4.5 shall first apply to all disputes involving invoices prepared by NCPA.

Section 13. Miscellaneous

13.1 Confidentiality. The Parties will keep confidential all confidential or trade secret information made available to them in connection with this Agreement, to the extent possible, consistent with applicable laws, including the California Public Records Act. Confidential or trade secret information shall be marked or expressly identified as such.

If a Party ("Receiving Party") receives a request from a Third Party for access to, or inspection, disclosure or copying of, any other Party's (the "Supplying Party") confidential data or information, which the Receiving Party has possession of ("Disclosure Request"), then the Receiving Party shall provide notice and a copy of the Disclosure Request to the Supplying Party within three (3) Business Days after receipt of the Disclosure Request.

Within three (3) Business Days after receipt of such notice, the Supplying Party shall provide notice to the Receiving Party either:

(i) that the Supplying Party believes there are reasonable legal grounds for denying or objecting to the Disclosure Request, and the Supplying Party requests the Receiving Party to deny or object to the Disclosure Request with respect to identified confidential information. In such case, the Receiving Party shall deny the Disclosure Request and the Supplying Party shall defend the denial of the Disclosure Request at its sole cost, and it shall indemnify the Receiving Party for all costs associated with denying or objecting to the Disclosure Request. Such indemnification by the Supplying Party of the Receiving Party shall include all of the Receiving Party's costs reasonably incurred with respect to denial of or objection to the Disclosure Request, including but not limited to costs, penalties, and the Receiving Party's attorney's fees; or

(ii) that the Receiving Party may grant the Disclosure Request without any liability by the Receiving Party to the Supplying Party.

13.2 Indemnification and Hold Harmless. Subject to the provisions of Section 13.4, each Participant agrees to indemnify, defend and hold harmless NCPA and its Members, including their respective governing boards, officials, officers, agents, and employees, from and against any and all claims, suits, losses, costs, damages, expenses and liability of any kind or nature, including reasonable attorneys' fees and the costs of litigation, including experts, to the extent caused by any acts, omissions, breach of

contract, negligence (active or passive), gross negligence, recklessness, or willful misconduct of that Participant, its governing officials, officers, employees, subcontractors or agents, to the maximum extent permitted by law.

13.3 Several Liabilities. No Participant shall, in the first instance, be liable under this Agreement for the obligations of any other Participant or for the obligations of NCPA incurred on behalf of other Participants. Each Participant shall be solely responsible and liable for performance of its obligations under this Agreement, except as otherwise provided for herein. The obligation of each Participant under this Agreement is, in the first instance, a several obligation and not a joint obligation with those of the other Participants.

Notwithstanding the foregoing, the Participants acknowledge that any debts or obligations incurred by NCPA under this Agreement on behalf of any of them shall be borne solely by such Participants in proportion to their respective Project Participation Percentages, and not by non-Participant Members of NCPA, pursuant to Article IV, Section 3(b) of the Joint Powers Agreement.

In the event that a Participant should fail to pay its share of the debts or obligations incurred by NCPA as required by this Agreement, the remaining Participants shall, in proportion to their Project Participation Percentages, pay such unpaid amounts and shall be reimbursed by the Participant failing to make such payments.

13.4 No Consequential Damages. FOR ANY BREACH OF ANY PROVISION OF THIS AGREEMENT FOR WHICH AN EXPRESS REMEDY OR MEASURE OF DAMAGES IS PROVIDED IN THIS AGREEMENT, THE LIABILITY OF THE DEFAULTING PARTY SHALL BE LIMITED AS SET FORTH IN SUCH PROVISION, AND ALL OTHER DAMAGES OR REMEDIES ARE HEREBY WAIVED. IF NO REMEDY OR MEASURE OF DAMAGE IS EXPRESSLY PROVIDED, THE LIABILITY OF THE DEFAULTING PARTY SHALL BE LIMITED TO ACTUAL DAMAGES ONLY AND ALL OTHER DAMAGES AND REMEDIES ARE HEREBY WAIVED. IN NO EVENT SHALL NCPA OR ANY PARTICIPANT OR THEIR RESPECTIVE SUCCESSORS, ASSIGNS, REPRESENTATIVES, DIRECTORS, OFFICERS, AGENTS, OR EMPLOYEES BE LIABLE FOR ANY LOST PROFITS, CONSEQUENTIAL, SPECIAL, EXEMPLARY, INDIRECT, PUNITIVE, OR INCIDENTAL LOSSES OR DAMAGES, INCLUDING LOSS OF USE, LOSS OF GOODWILL, LOST REVENUES, LOSS OF PROFIT OR LOSS OF CONTRACTS EVEN IF SUCH PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, AND NCPA AND EACH PARTICIPANT EACH HEREBY WAIVES SUCH CLAIMS AND RELEASES EACH OTHER AND EACH OF SUCH PERSONS FROM ANY SUCH LIABILITY.

The Parties acknowledge that California Civil Code section 1542 provides that: "A general release does not extend to claims which the creditor does not know or suspect to exist in his or her favor at the time of executing the release, which if known by him or her must

have materially affected his or her settlement with the debtor." The Parties waive the provisions of section 1542, or other similar provisions of law, and intend that the waiver and release provided by this Section of this Agreement shall be fully enforceable despite its reference to future or unknown claims.

13.5 Waiver. No waiver of the performance by a Party of any obligation under this Agreement with respect to any default or any other matter arising in connection with this Agreement shall be effective unless given by the Commission or the governing body of a Participant, as applicable. Any such waiver by the Commission in any particular instance shall not be deemed a waiver with respect to any subsequent performance, default or matter.

13.6 Amendments. Except where this Agreement specifically provides otherwise, this Agreement may be amended only by written instrument executed by the Parties with the same formality as this Agreement.

13.7 Assignment of Agreement.

13.7.1 Binding Upon Successors. This Agreement shall inure to the benefit of and shall be binding upon the respective successors and assignees of the Parties to this Agreement.

13.7.2 No Assignment. Neither this Agreement, nor any interest herein, shall be transferred or assigned by a Party hereto except with the consent in writing of the other Parties hereto, which consent shall not be unreasonably withheld.

13.8 Severability. In the event that any of the terms, covenants or conditions of this Agreement or the application of any such term, covenant or condition, shall be held invalid as to any person or circumstance by any court having jurisdiction, all other terms, covenants or conditions of this Agreement and their application shall not be affected thereby, but shall remain in force and effect unless the court holds that such provisions are not severable from all other provisions of this Agreement.

13.9 Governing Law. This Agreement shall be interpreted, governed by, and construed under the laws of the State of California.

13.10 Headings. All indices, titles, subject headings, section titles and similar items are provided for the purpose of convenience and are not intended to be inclusive, definitive, or affect the meaning of the contents of this Agreement or the scope thereof.

13.11 Notices. Any notice, demand or request required or authorized by this Agreement to be given to any Party shall be in writing, and shall either be personally delivered to a Participant's Commissioner or Alternate, and to the General Manager, or shall be transmitted to the Participant and the General Manager at the addresses shown on the signature pages hereof. The designation of such addresses may be changed at any time by written notice given to the General Manager who shall thereupon give written notice of such change to each Participant. All such notices shall be deemed delivered when personally delivered, two (2) Business Days after deposit in the United States mail

first class postage prepaid, or on the first Business Day following delivery through electronic communication.

13.12 Warranty of Authority. Each Party represents and warrants that it has been duly authorized by all requisite approval and action to execute and deliver this Agreement and that this Agreement is a binding, legal, and valid agreement enforceable in accordance with its terms. Upon execution of this Agreement, each Participant shall deliver to NCPA a resolution of the governing body of such Participant evidencing approval of and authority to enter into this Agreement.

13.13 Counterparts. This Agreement may be executed in any number of counterparts, and each executed counterpart shall have the same force and effect as an original instrument and as if all the signatories to all of the counterparts had signed the same instrument. Any signature page of this Agreement may be detached from any counterpart of this Agreement without impairing the legal effect of any signatures thereon, and may be attached to another counterpart of this Agreement identical in form hereto but having attached to it one or more signature pages.

13.14 Venue. In the event that a Party brings any action under this Agreement, the Parties agree that trial of such action shall be vested exclusively in the state courts of California in the County of Placer or in the United States District Court for the Eastern District of California.

13.15 Attorneys' Fees. If a Party to this Agreement brings any action, including an action for declaratory relief, to enforce or interpret the provisions of this Agreement, then each Party shall bear its own fees and costs, including attorneys' fees, associated with the action.

13.16 Counsel Representation. Pursuant to the provisions of California Civil Code Section 1717 (a), each of the Parties were represented by counsel in the negotiation and execution of this Agreement and no one Party is the author of this Agreement or any of its subparts. Those terms of this Agreement which dictate the responsibility for bearing any attorney's fees incurred in arbitration, litigation or settlement in a manner inconsistent with the provisions of Section 13.2 were intentionally so drafted by the Parties, and any ambiguities in this Agreement shall not be interpreted for or against a Party by reason of that Party being the author of the provision.

13.17 No Third Party Beneficiaries. Nothing contained in this Agreement is intended by the Parties, nor shall any provision of this Agreement be deemed or construed by the Parties, by any third person or any Third Parties, to be for the benefit of any Third Party, nor shall any Third Party have any right to enforce any provision of this Agreement or be entitled to damages for any breach by the Parties of any of the provisions of this Agreement.

IN WITNESS WHEREOF, NCPA and each Participant have, by the signature of its duly authorized representative shown below, executed and delivered a counterpart of this Agreement.

NORTHERN CALIFORNIA
POWER AGENCY
651 Commerce Drive
Roseville, CA 95678

By: Randy S. Howard
Title: General Manager
Date: 12/23/22

Approved as to form:

By: Jane E. Luckhardt
Its: General Counsel
Date: Dec 23, 2022

Attestation (if applicable):

By: TRISHA ZIMMER
Its: ASST. SECRETARY OF COMMISSION
Date: 12-23-2022

CITY OF SANTA CLARA
1500 Warburton Avenue
Santa Clara, CA 95050

Manuel Pineda

By: Manuel Pineda
Title: Assistant City Manager
Date: Dec 22, 2022

Approved as to form:

Daniel Ballin

By: Daniel Ballin
Its: City Attorney
Date: Dec 22, 2022

Attestation (if applicable):

By: NORA PIMENTEL
Its: Asst. City Clerk
Date: 12-22-2022

CITY OF ALAMEDA
2000 Grand Street
Alameda, CA 94501

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By:_____
Its: City Attorney
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF BIGGS
465 C Street
Biggs, CA 95917

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF GRIDLEY
685 Kentucky Street
Gridley, CA 95948

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney _____
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF LODI
221 W. Pine Street
Lodi, CA 95240

_____

By:_____
Title: _____
Date: _____

Approved as to form:

_____

By: _____
Its: City Attorney _____
Date: _____

Attestation (if applicable)

_____

By:_____
Its:_____
Date: _____

CITY OF LOMPOC
100 Civic Center Plaza
Lompoc, CA 93436

_____
By:_____
Title: _____
Date: _____

Approved as to form:

_____
By: _____
Its: City Attorney _____
Date: _____

Attestation (if applicable)

_____
By:_____
Its:_____
Date: _____

CITY OF PALO ALTO
160 Palo Alto Avenue
Palo Alto, CA 94301

_____
By:_____
Title: _____
Date: _____

Approved as to form:

_____
By: _____
Its: City Attorney _____
Date: _____

Attestation (if applicable)

_____
By:_____
Its:_____
Date: _____

CITY OF OAKLAND, acting
by and through its
Board of Port Commissioners
530 Water Street
Oakland, CA 94607

_____

By:_____

Title: _____

Date: _____

Approved as to form:

_____

By: _____

Its: City Attorney_____

Date: _____

Attestation (if applicable)

_____

By:_____

Its:_____

Date:_____

EXHIBIT A

PROJECT PARTICIPATION PERCENTAGES

On the Effective Date of the Agreement the initial Participant ("Initial Participant") who is signatory to this Agreement, and its respective initial Project Participation Percentage share of the Project is set forth in Table 1 of this Exhibit A ("Initial Project Participation Percentage"). The process set forth below is not subject to the requirements of Section 9 of this Agreement, except as set forth below.

Table 1
Initial Project Participation Percentages

Member	Project Participation Percentages	Project Participation MW (2025 - 2026)	Project Participation MW (2027 - 2037)
City of Santa Clara	100.0%	50.00	100.00
Total:	**100.0%**	**50.00**	**100.00**

Thereafter, a Member who is not a Participant may exercise a right to accept a transfer of a portion of the Initial Project Participation Percentage of the Initial Participant in an amount no greater than the amount set forth in Table 2 of this Exhibit A, no later than April 30, 2023 (the "Transfer Completion Deadline"), unless the Initial Participant otherwise agrees in writing to extend the Transfer Completion Deadline. The right to transfer described in this Exhibit A shall be exercised in writing (1) addressed to NCPA and the Initial Participant, and (2) by a Member's execution of this Agreement by the Transfer Completion Deadline. For purposes of this Exhibit A only, that Member who becomes a Participant shall be referred to as a "Table 2 Participant." Notwithstanding the foregoing,

the Transfer Completion Deadline applies only to the intended assumption of the Project Participation Percentage described in Table 2 of this Exhibit A, and shall not limit or reduce a Participant's rights set forth in Section 9 of this Agreement. Upon written notice and execution of this Agreement , the Table 2 Participant will assume all rights and obligations set forth in this Agreement for the portion of the Project Participation Percentage share of the Project as set forth in Table 2 of this Exhibit A. If any Members exercise their right to accept a transfer of a share of the Project Participation Percentage, the Parties shall add to this Exhibit A by preparing a Table 3 to reflect the Final Project Participation Percentage shares of the Project. NCPA shall prepare Table 3 after the Transfer Completion Deadline to reflect the Final Project Participation Percentages of each Participant, and such Table 3 will be added to this Exhibit A as an amendment to this Agreement once adopted by the Commission. In the event an intended Table 2 Participant does not become a Table 2 Participant by the Transfer Completion Deadline, the Initial Participant shall retain the Project Participation Percentage of the intended Table 2 Participant as described in Table 2 of this Exhibit A, and such will be reflected in Table 3.

Table 2
Draft Final Project Participation Percentages

Member	Project Participation Percentages	Project Participation MW (2025 - 2026)	Project Participation MW (2027 - 2037)
City of Alameda	5.0%	2.50	5.00
City of Biggs	0.4%	0.20	0.40
City of Gridley	0.6%	0.30	0.60
City of Lodi	10.0%	5.00	10.00
City of Lompoc	1.7%	0.85	1.70
City of Palo Alto	10.0%	5.00	10.00
Port of Oakland	2.3%	1.15	2.30
City of Santa Clara	70.0%	35.00	70.00
Total:	**100.0%**	**50.00**	**100.00**

EXHIBIT B

Purchase Agreements

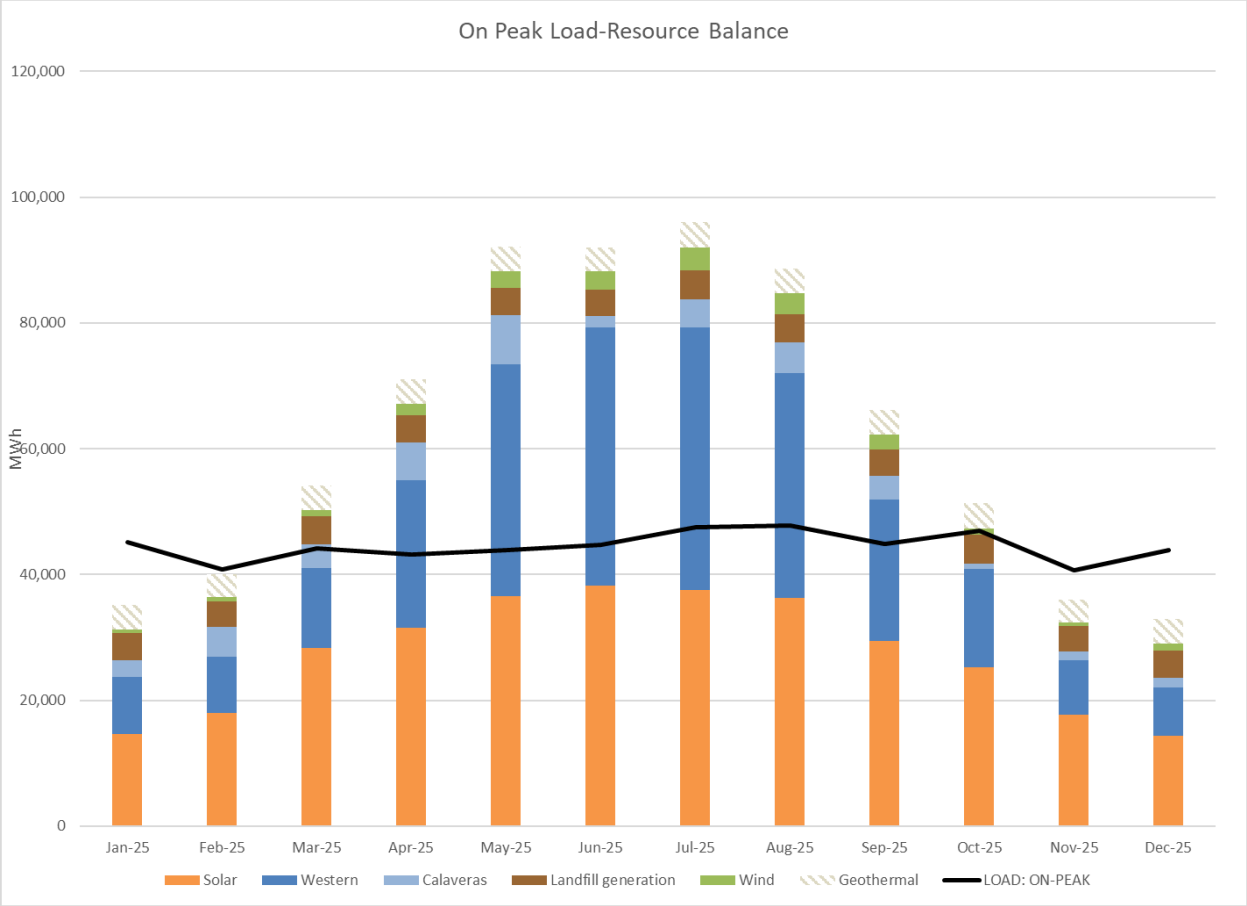
Western Systems Power Pool Agreement Confirmation between Northern California Power Agency and Geysers Power Company, LLC , to purchase electric capacity attached to this Exhibit B.

Western Systems Power Pool Agreement Confirmation between Geysers Power Company, LLC and Northern California Power Agency, to purchase renewable energy attached to this Exhibit B.

Attachment B

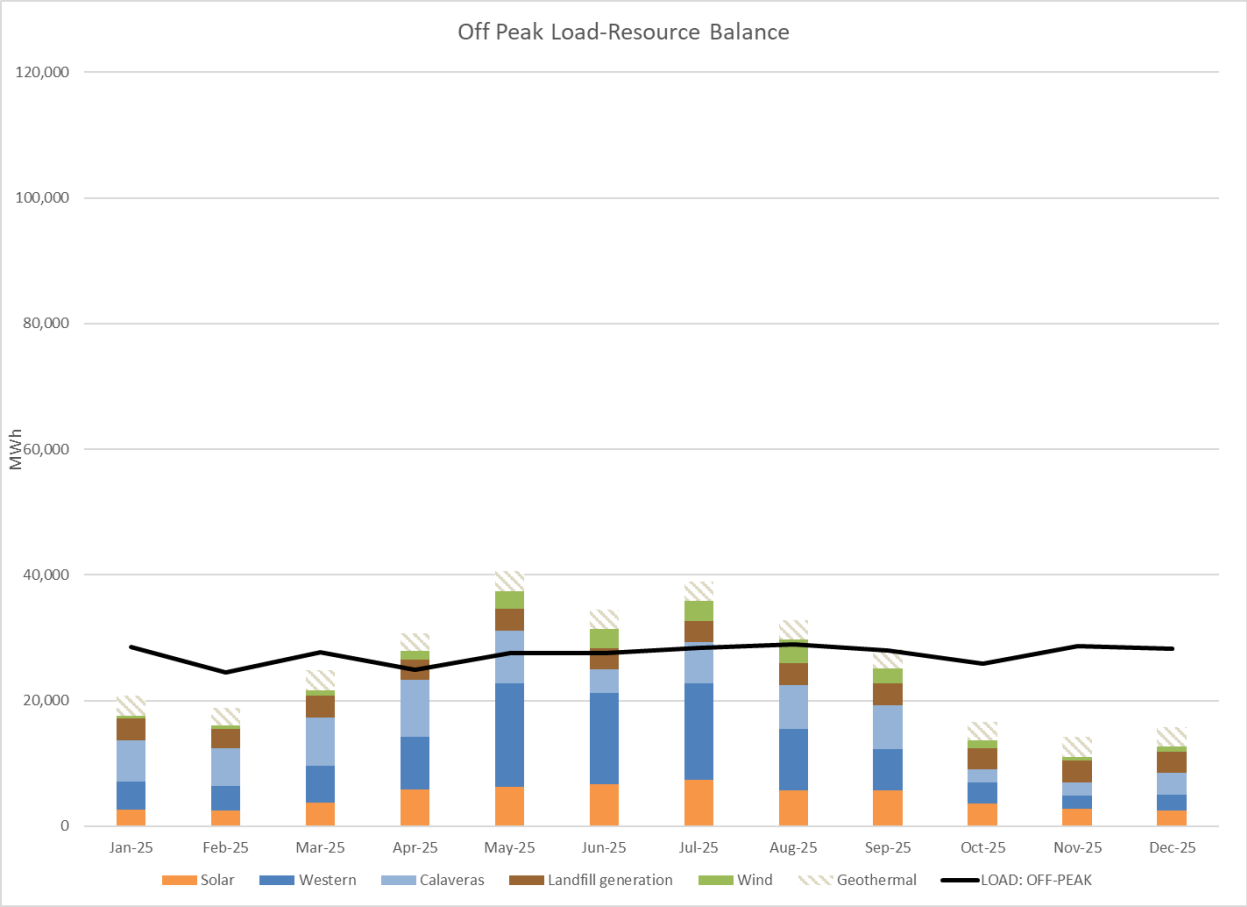
Monthly On-Peak and Off-Peak Load-Resource Balances for CY 2021

Figure A-1: Monthly On-Peak Load-Resource Balance for CY 2021, with Potential Calpine Geothermal Output Included



Attachment B

Figure A-2: Monthly Off-Peak Load-Resource Balance for CY 2021, with Potential Calpine Geothermal Output Included



Attachment C

Daily Load-Resource Balances for CY 2021 (January, April, July, and October)

Figure B-1: Average Hourly Load-Resource Balance for January 2021, with Potential Calpine Geothermal Output Included

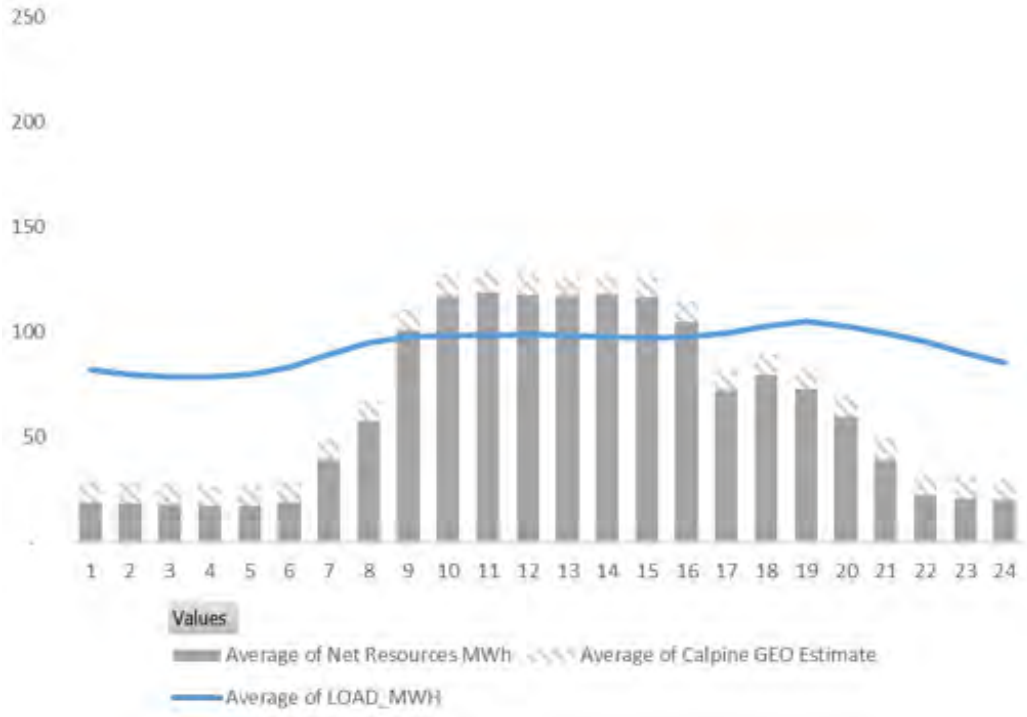


Figure B-2: Average Hourly Load-Resource Balance for April 2021, with Potential Calpine Geothermal Output Included

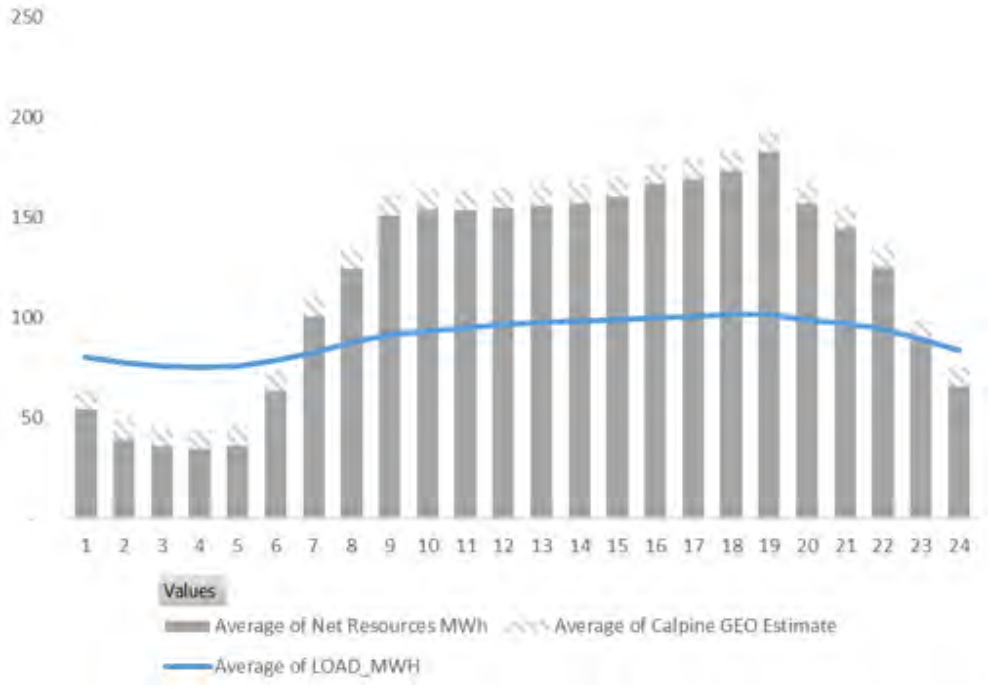


Figure B-3: Average Hourly Load-Resource Balance for July 2021, with Potential Calpine Geothermal Output Included

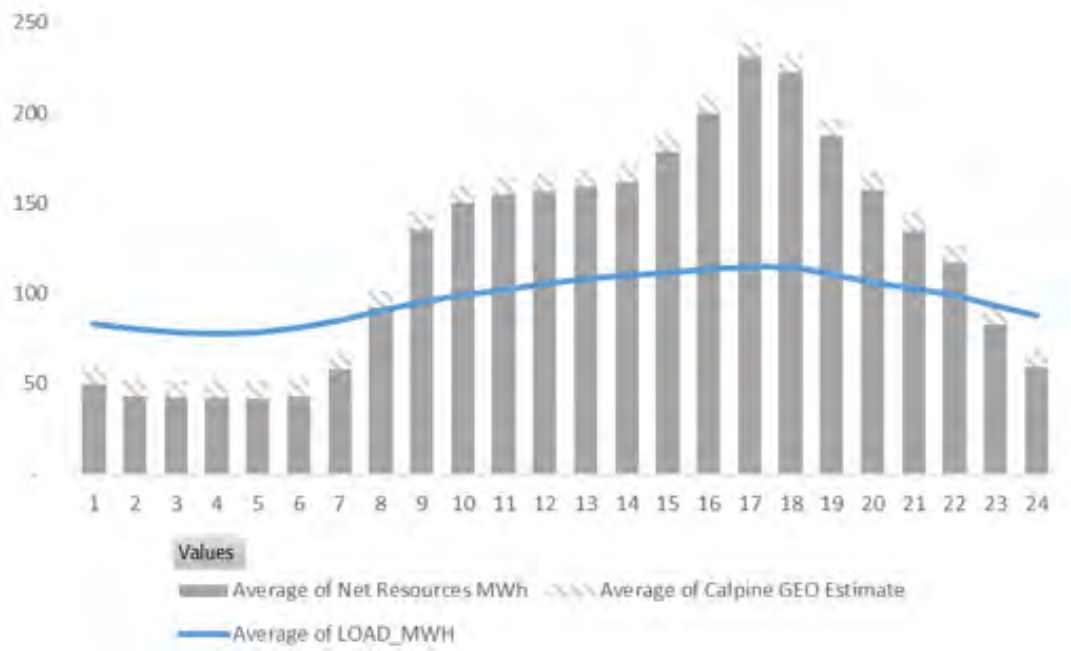
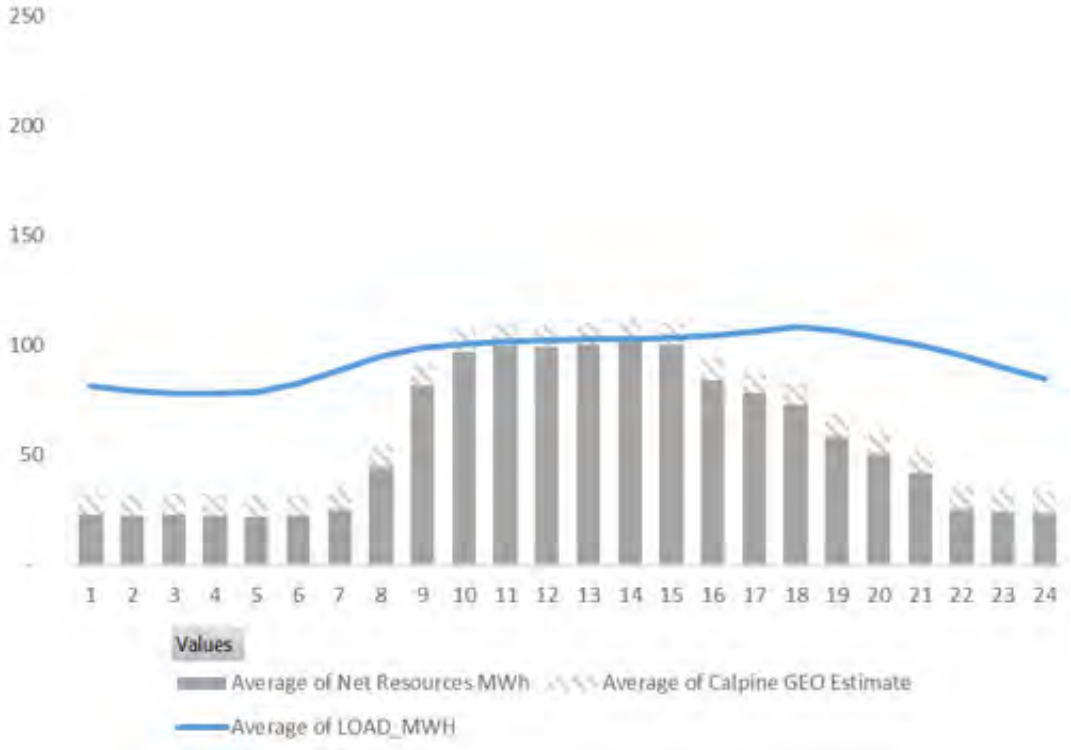


Figure B-4: Average Hourly Load-Resource Balance for October 2021, with Potential Calpine Geothermal Output Included



CITY OF PALO ALTO

Calpine Geothermal Contract

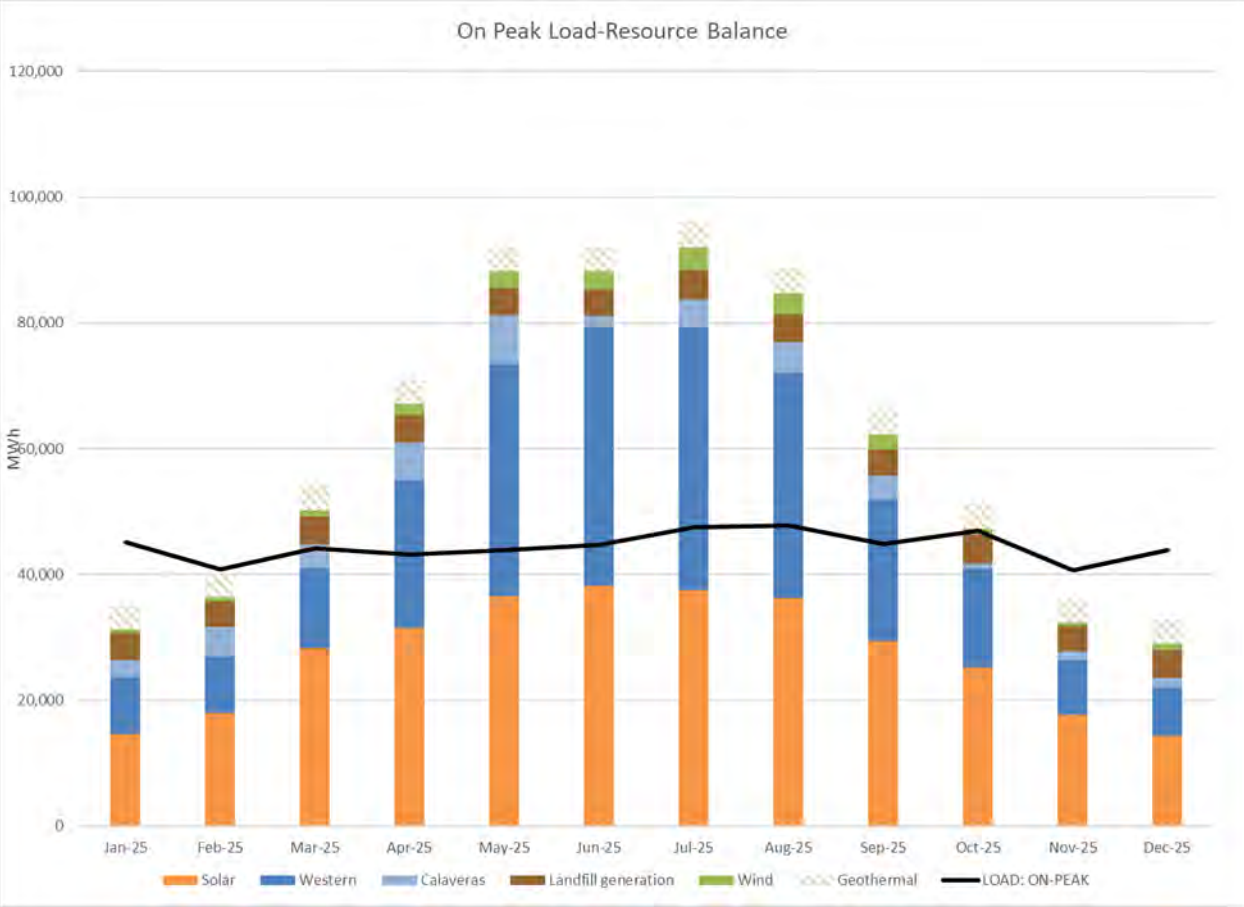
Utilities Advisory Commission

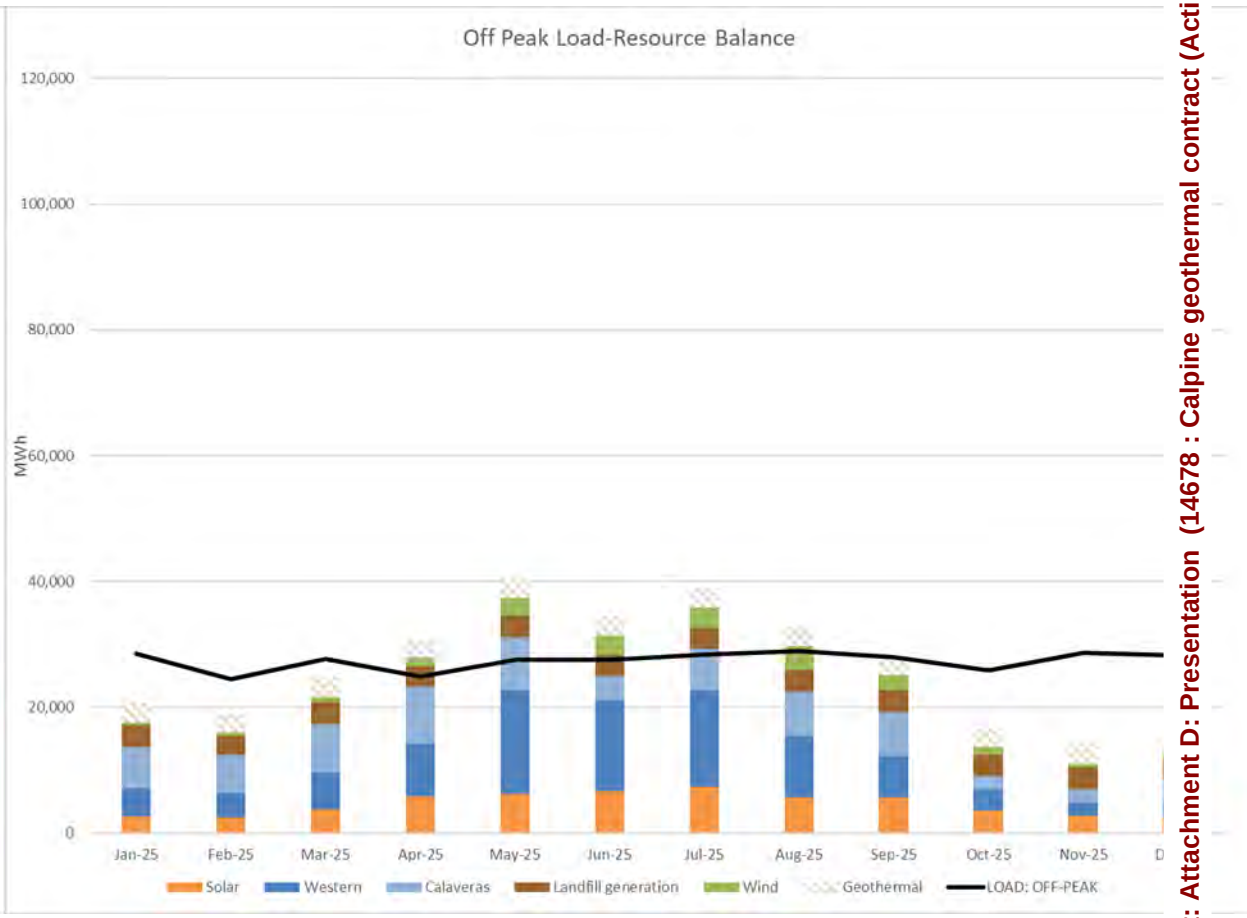
February 2023

Discussion Outline

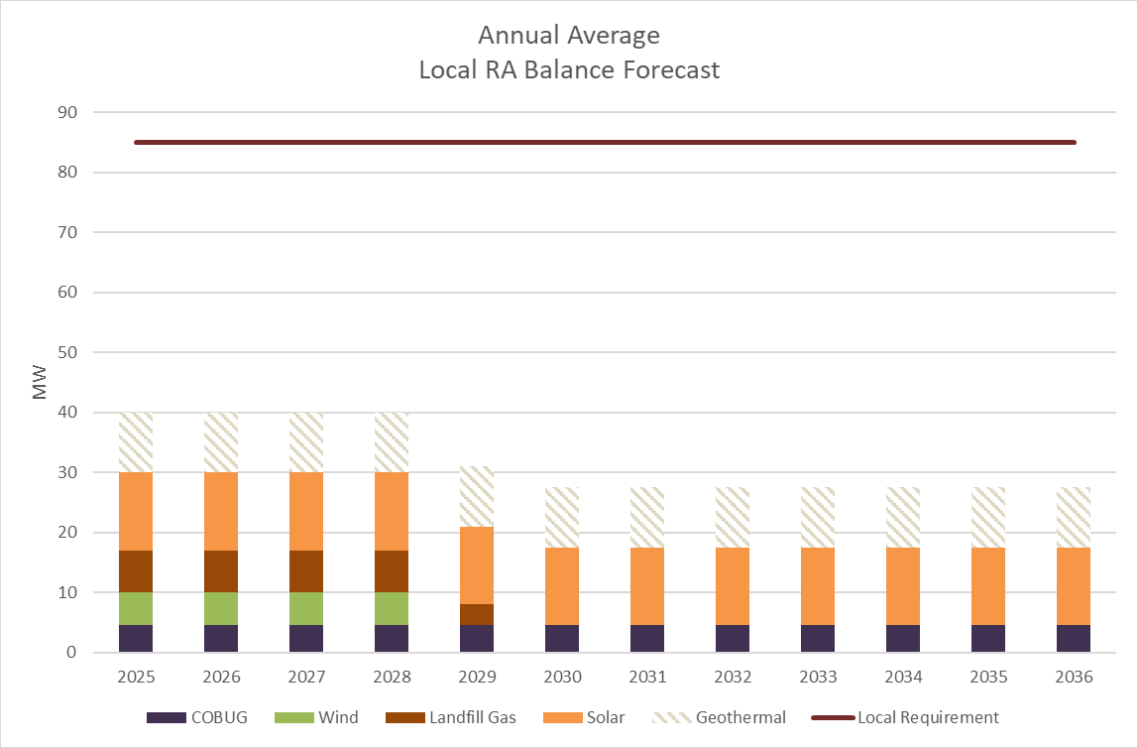
1. Overview of the current electric supply portfolio
2. Palo Alto electric load projections through 2045
3. Projection of California energy market dynamics through 2045
4. Calpine geothermal deal characteristics and economics
    - 5-10 MW purchase over 12 years starting in 2025 @ $79/MWh
5. Preliminary IRP analysis findings

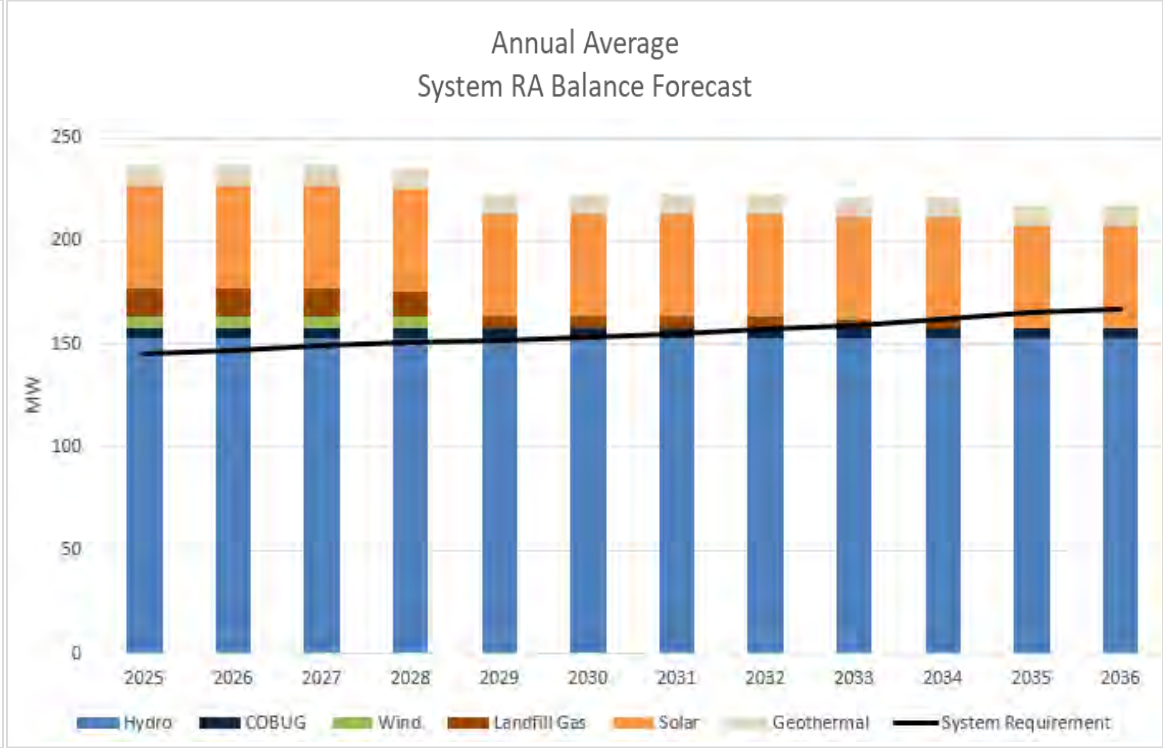
Monthly On Peak and Off Peak Energy Balance



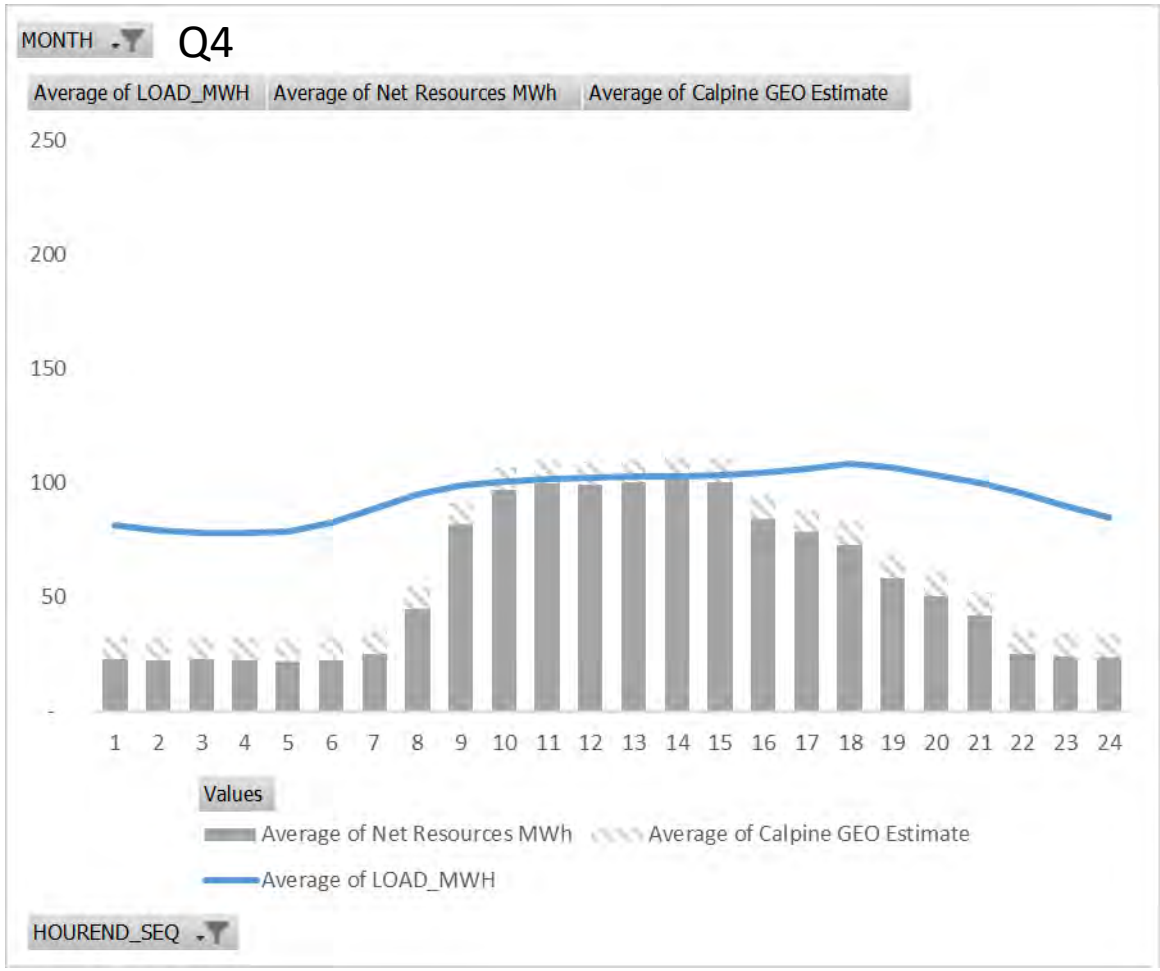


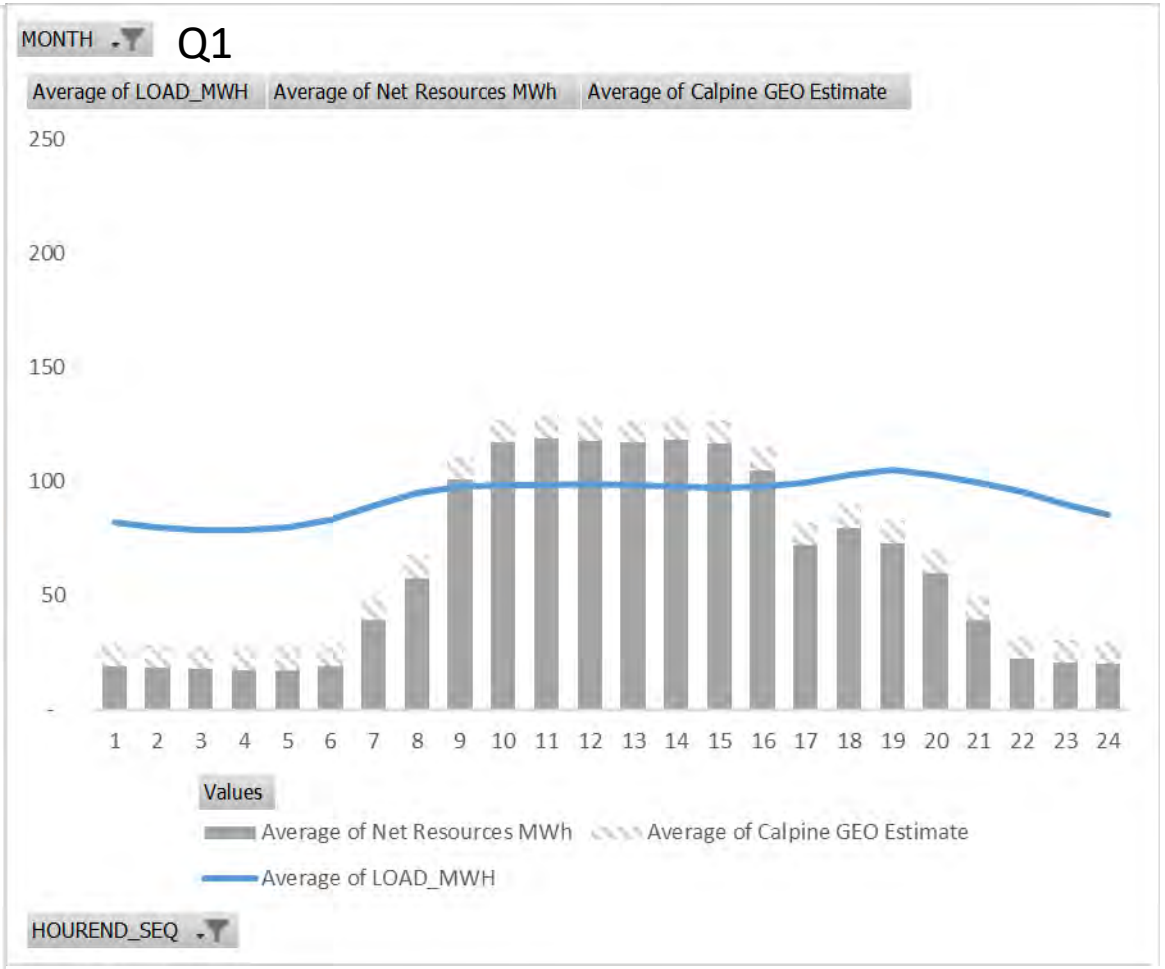
Average Local and System Capacity Balances



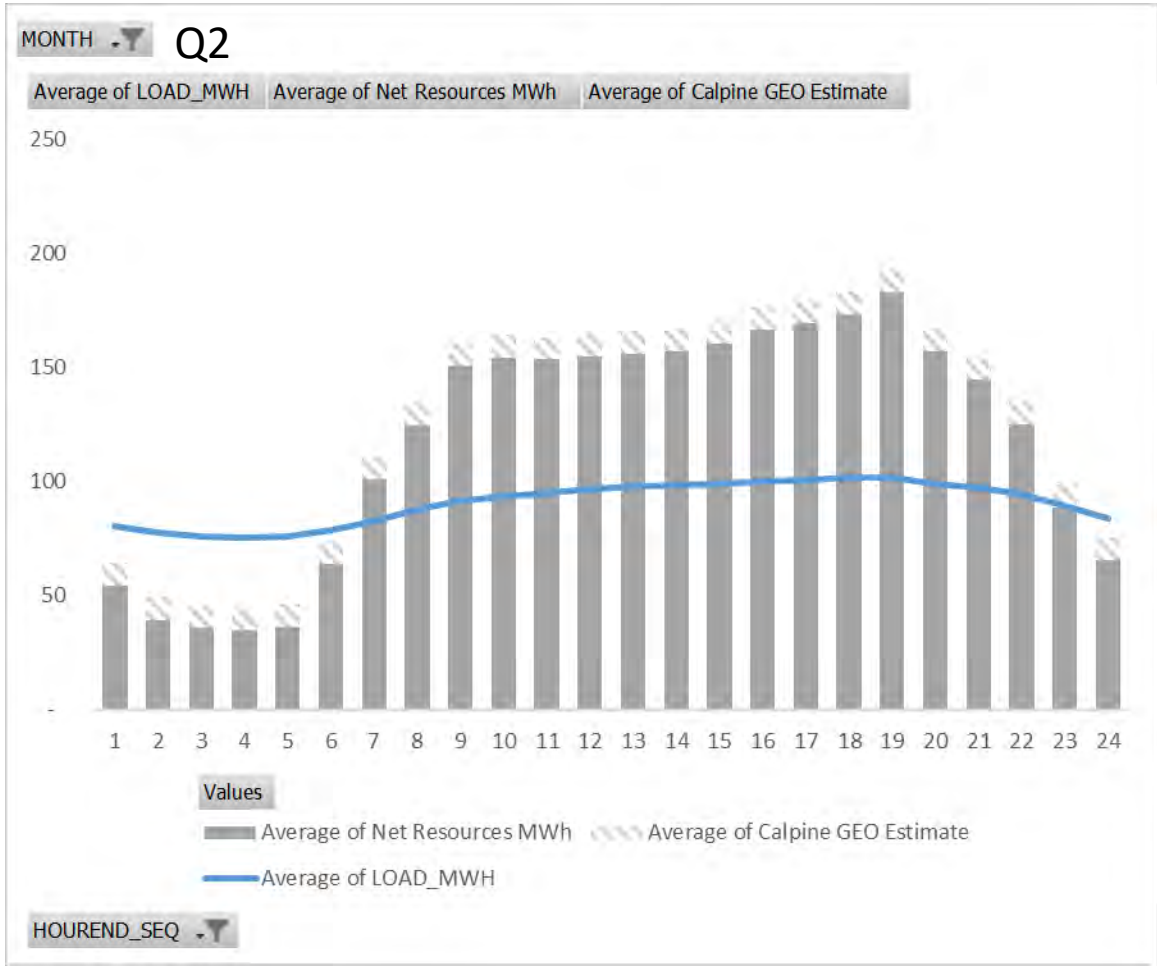


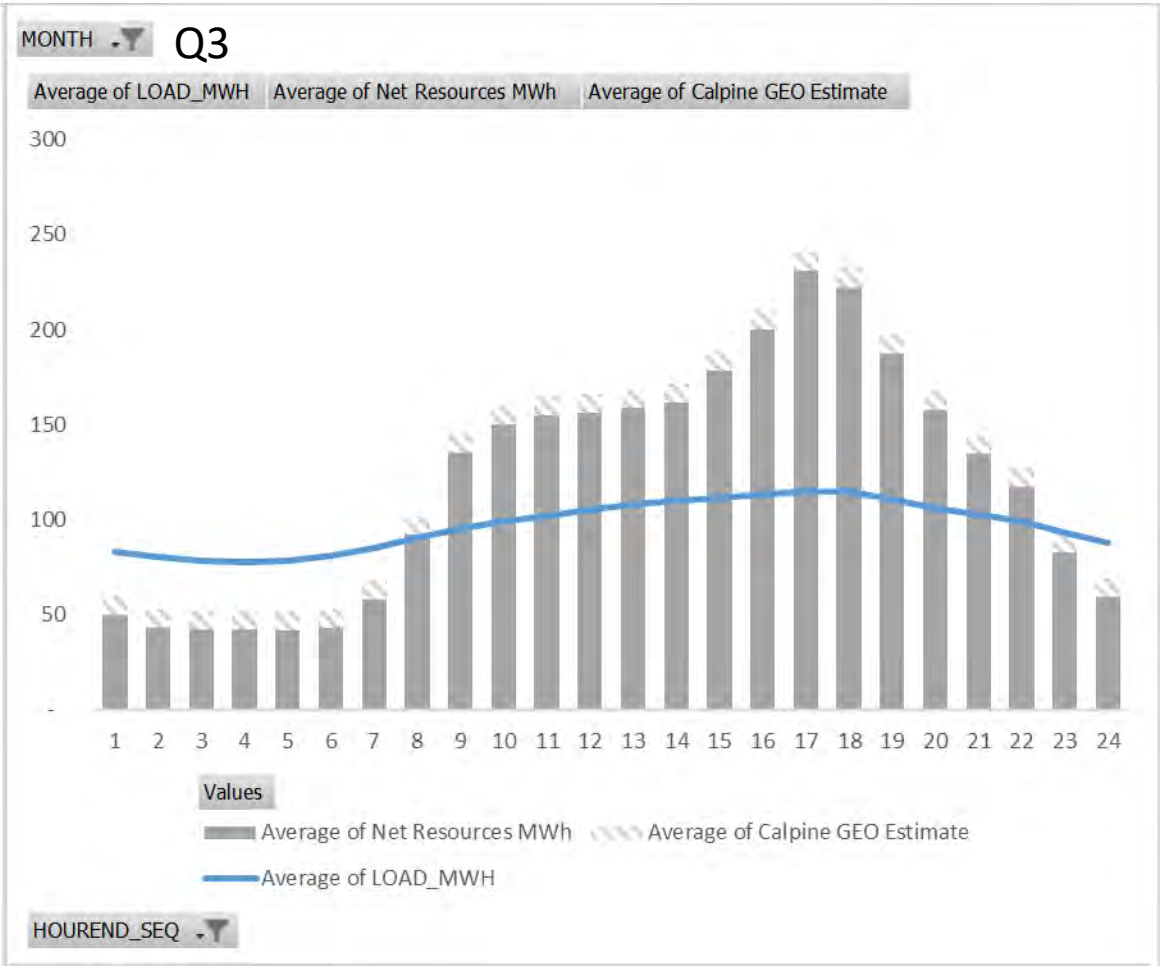
Average Seasonal 24-Hour Balance – Q4/Q1 Winter



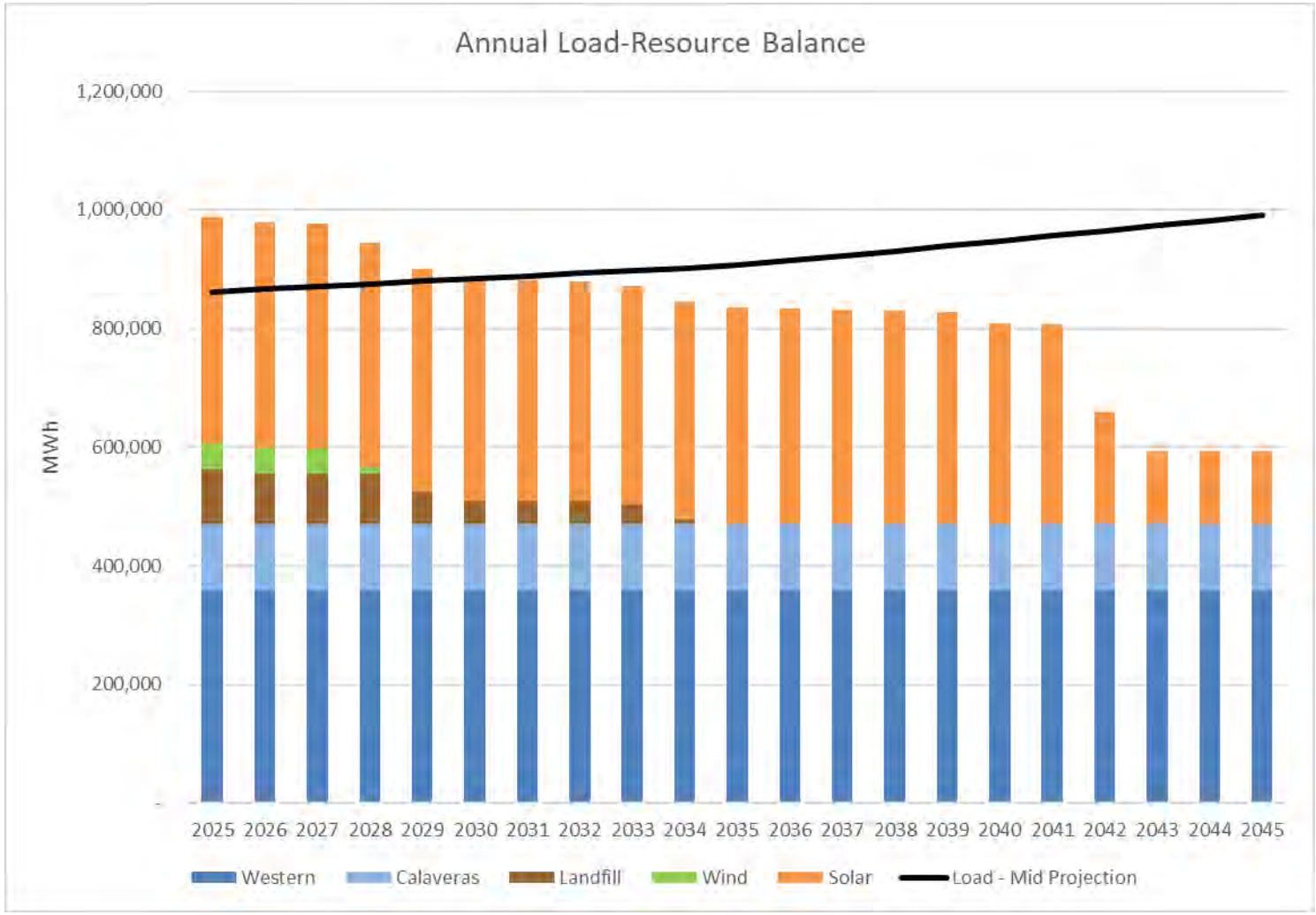


Average Seasonal 24-Hour Balance – Q2/Q3 Summer

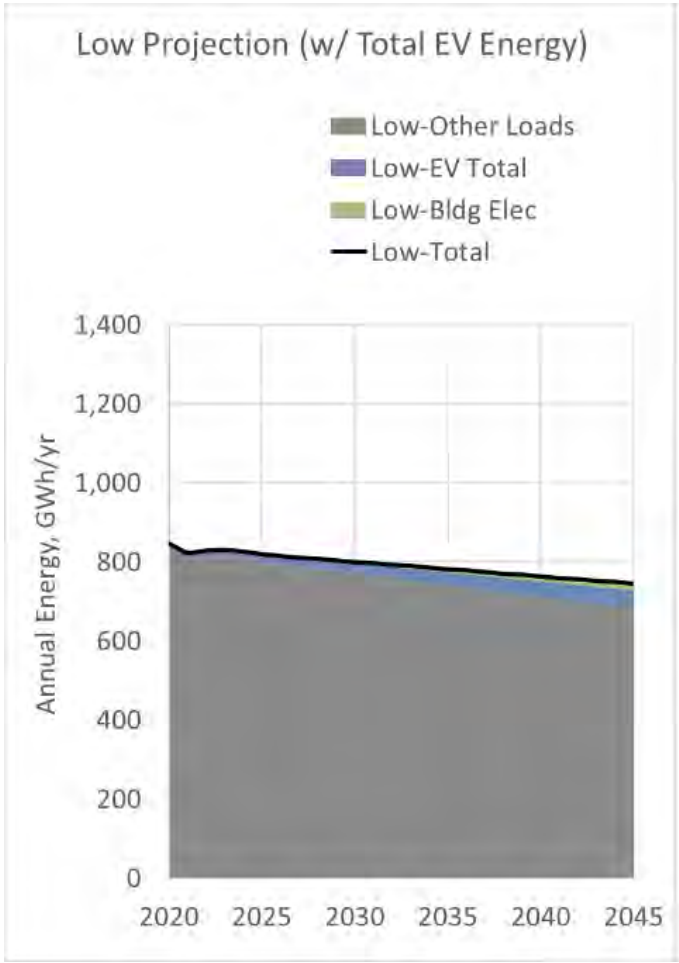


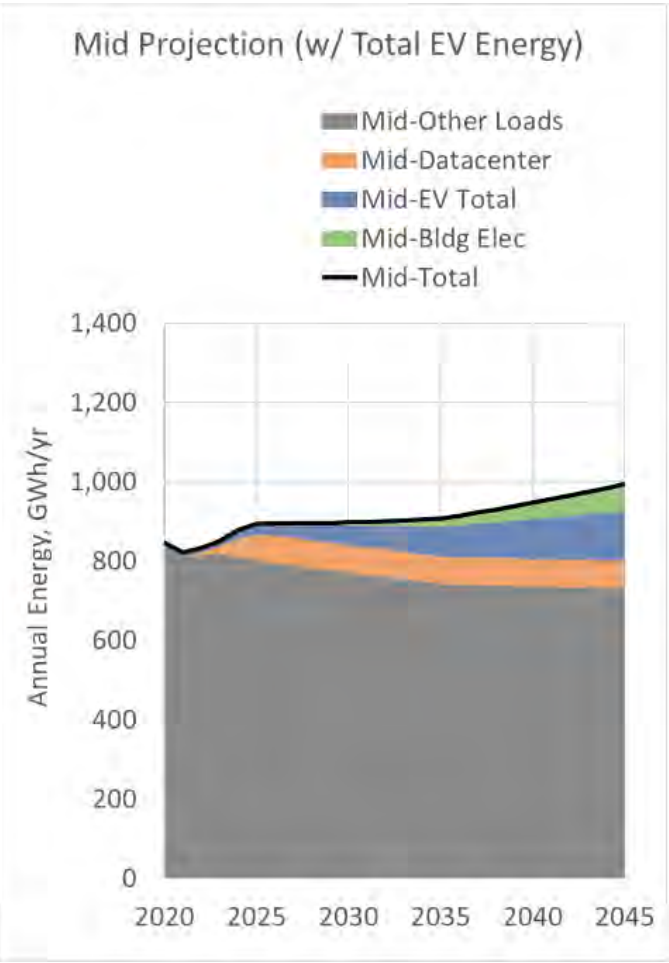


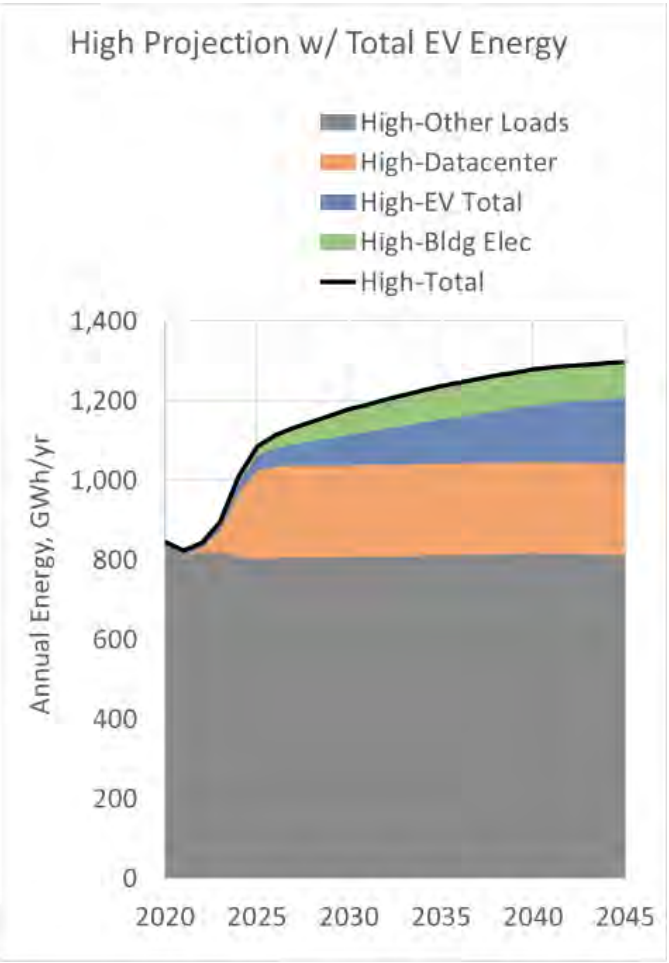
Annual Load-Resource Balance through 2045



Palo Alto Electric Load Projections Through 2045

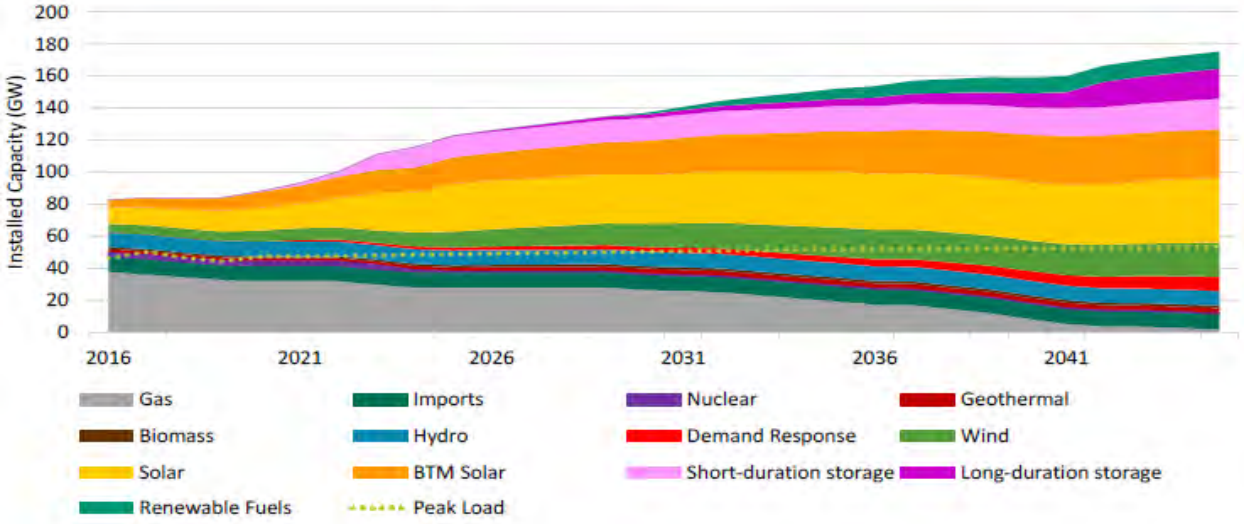


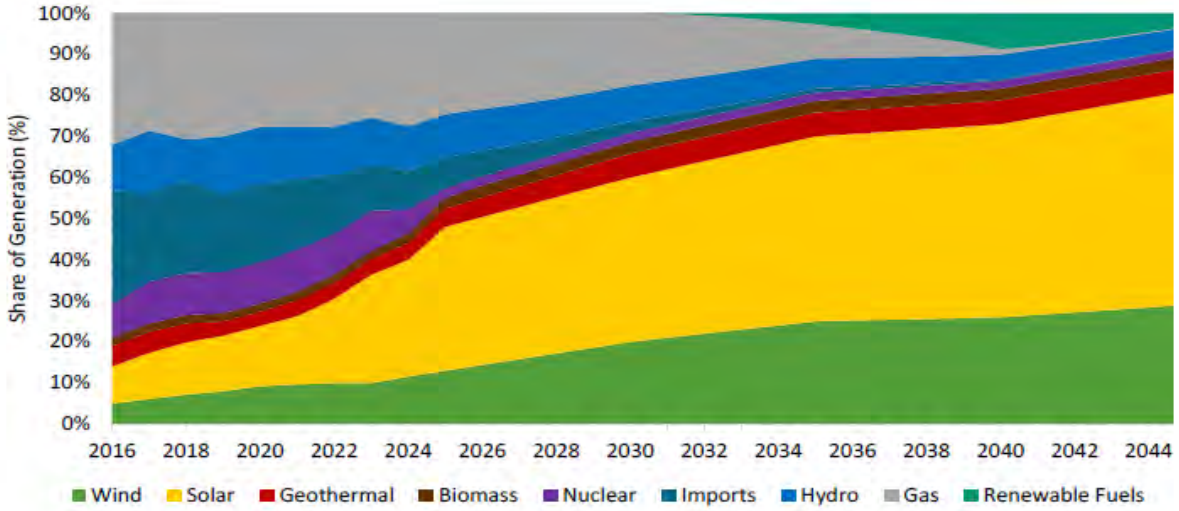




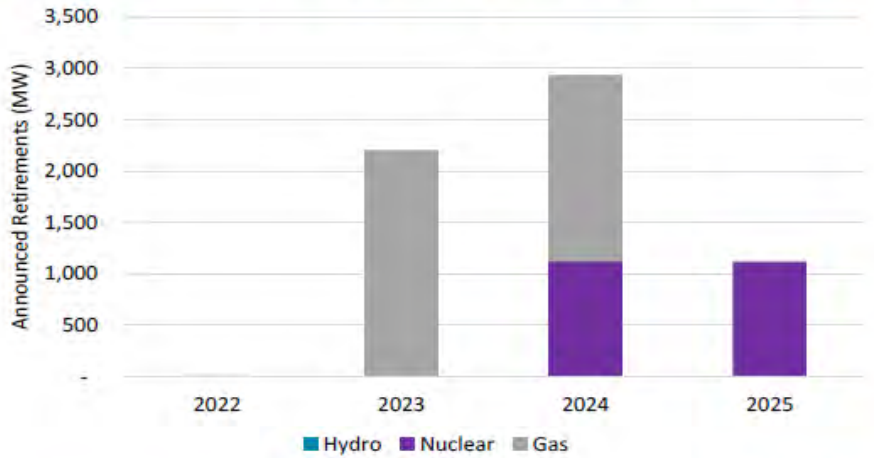
Projection of California Energy Market Dynamics through 2045

CAISO is gaining large quantities of intermittent resources while losing baseload and flexible capacity





- Capacity equal to ~20% of peak load may be retiring over the next 10 years
  - ~6 GW of announced retirements (lower right) Before Diablo Canyon Extension
  - ~25 GW of potential economic and legislative retirements
- Low-cost renewables combined with stakeholder pressure and corporate demand will result in even higher renewable penetration than required by policy
- **Storage deployments are outpaced by the continued addition of intermittent resources and thermal retirements**

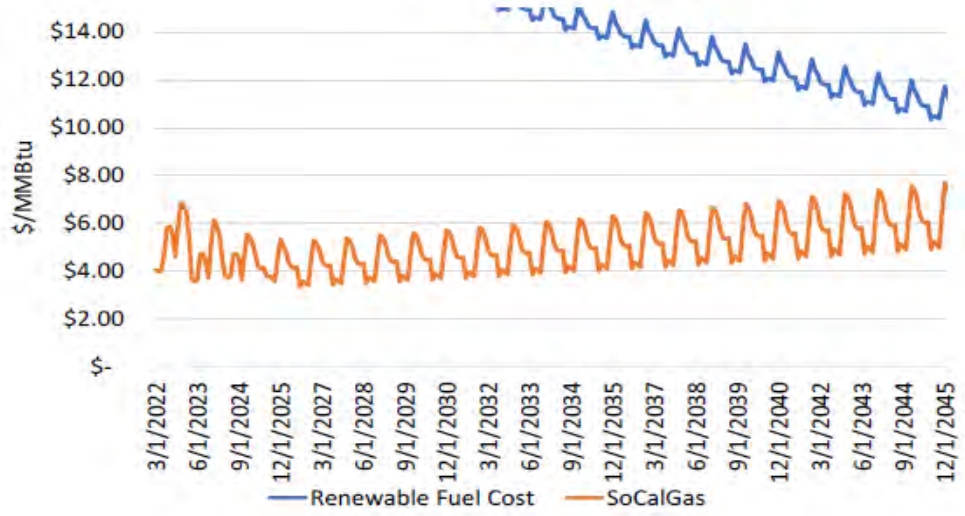


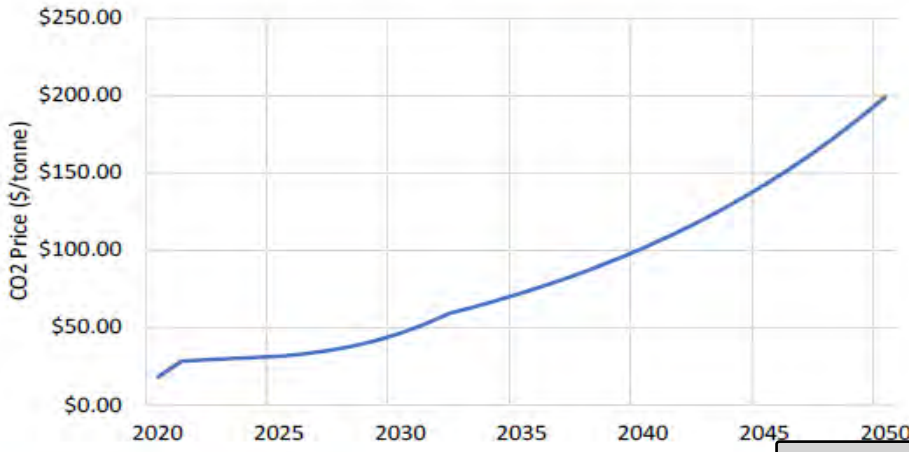
Before Diablo Canyon Extension

Projection of California Energy Market Dynamics through 2045

On-Peak is the New Off-Peak

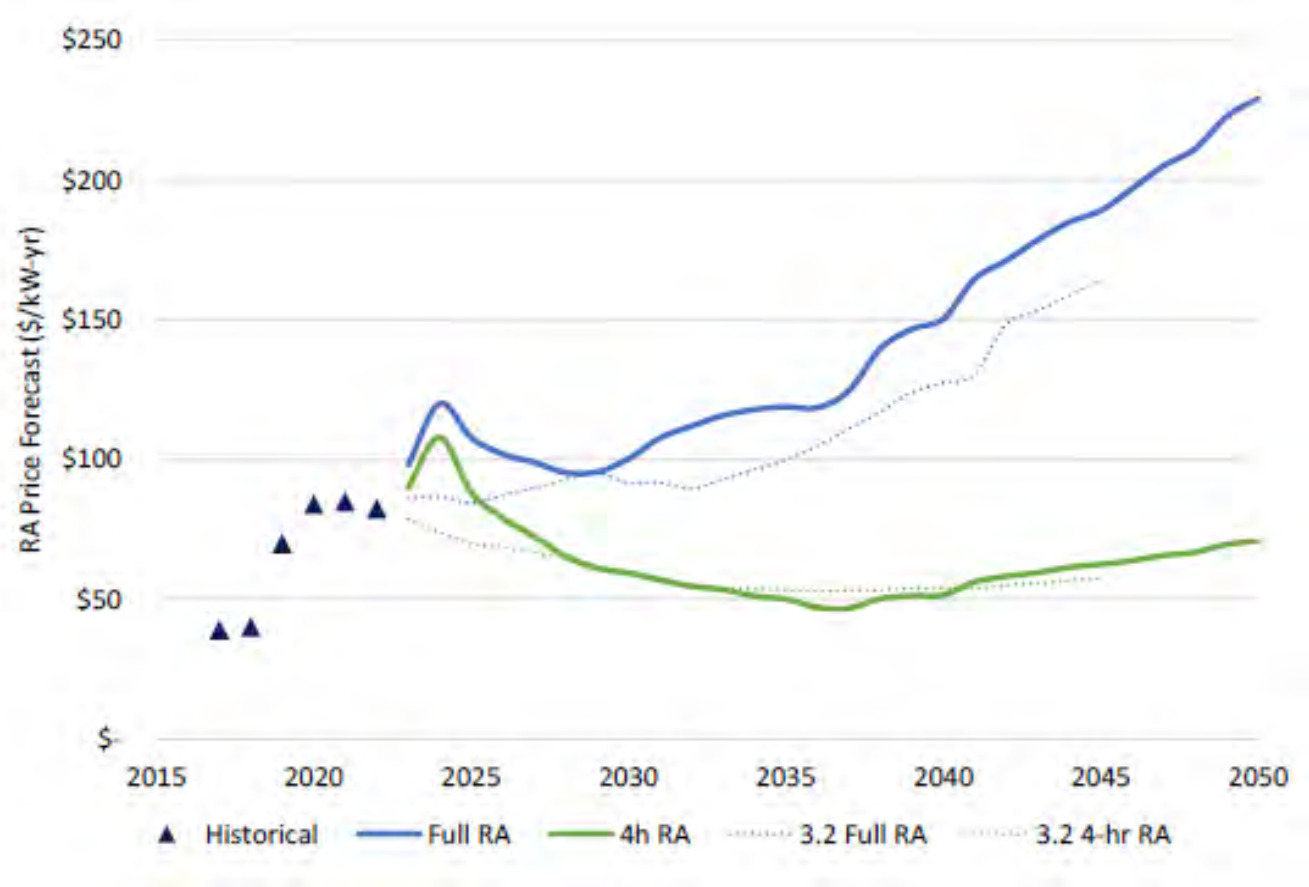
- **On-peak and off-peak power prices are inverting with increasing solar deployment**
  - Power prices are now converging in 2023, several years earlier than previously expected, with solar depressing prices during on-peak hours and curtailment leading to frequent zero/negative on-peak prices
  - Off-peak **renewable** generation is expensive and limited, while off-peak **non-renewable** generation variable cost rises with carbon and gas prices
- **Carbon price forecast has been raised, with recent prices above the price floor and increasing activism toward raising the floor.**
  - High carbon prices and renewable fuels in the mid-2030s will drive marginal power prices up before declining again with declining costs





Projection of California Energy Market Dynamics through 2045

Resource Adequacy Price Forecast



Calpine Geothermal Deal Characteristics and Economics

- Power Purchase Agreement between Calpine and NCPA for 100 MW of Geothermal
  - Project starts at 50 MW in 2025 and increases to 100 MW in 2027
  - Palo Alto share 5 then 10 MW and 43,800 then 87,600 MWh/year
- 12-year term, January 2025 – December 2036
- PPA price of $79/MWh (annual cost to Palo Alto: $6.9M)
- Around-the-clock market energy prices: $62-85/MWh for CY25-CY31 over the past month
- Bucket 1 REC Prices: $14-20/MWh
- Local RA Value: $8-13/kW-mo or $8-11/MWh
- Total Benefits: $84-116/MWh
- Net Value: $5 to $37/MWh

IRP - Preliminary Findings

1. Portfolio fit for a baseload (Geo) resource
   - Given the possibility of new baseload (data center) customer loads, a geothermal resource would be a good fit.
   - More closely aligning the City's loads and resources will reduce portfolio cost uncertainty.
2. As forward market prices inch up, the $79/MWh Geo price looks increasingly attractive, especially given the projections that on-peak prices will drop below off-peak prices.

Next Steps – Geothermal Transaction

1. City of Santa Clara already has Council approval to take the full contract volume
    - Initially Santa Clara will be the 100% off-taker, until other members get their council approvals
    - When other members get approvals, Santa Clara will assign them a share
2. NCPA staff has completed contract negotiations with Calpine – December 2022
3. UAC/Finance/Council approval – February to April 2023
4. Contract starts January 2025 (ends 2036)

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Resource Planner
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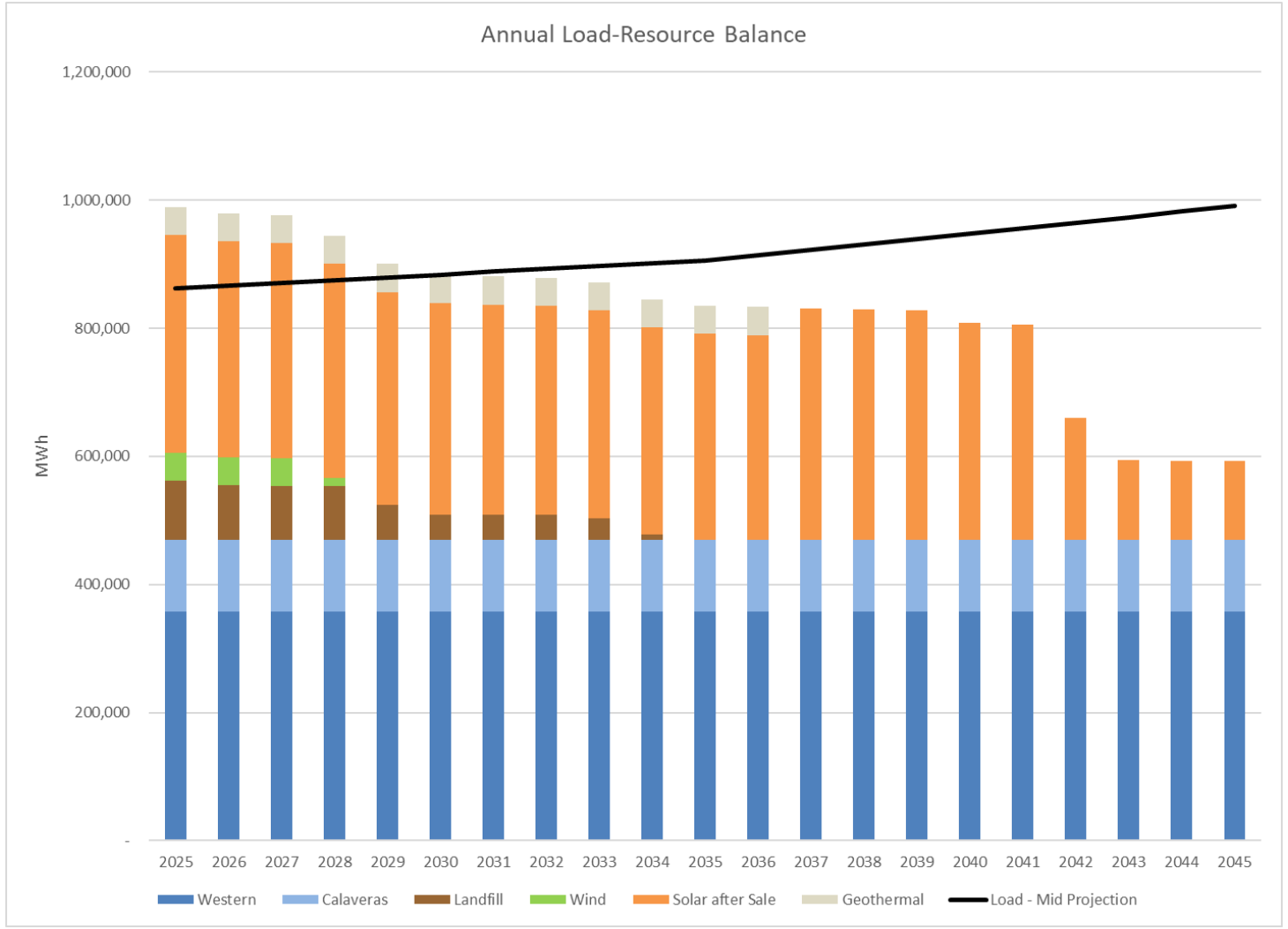
Issuing RFP to Rebalance portfolio via seasonal Buy-Sell transactions; plus Geo purchase

Seeking Transaction of Following Products (to balance out 5-10MW Geo purchase)

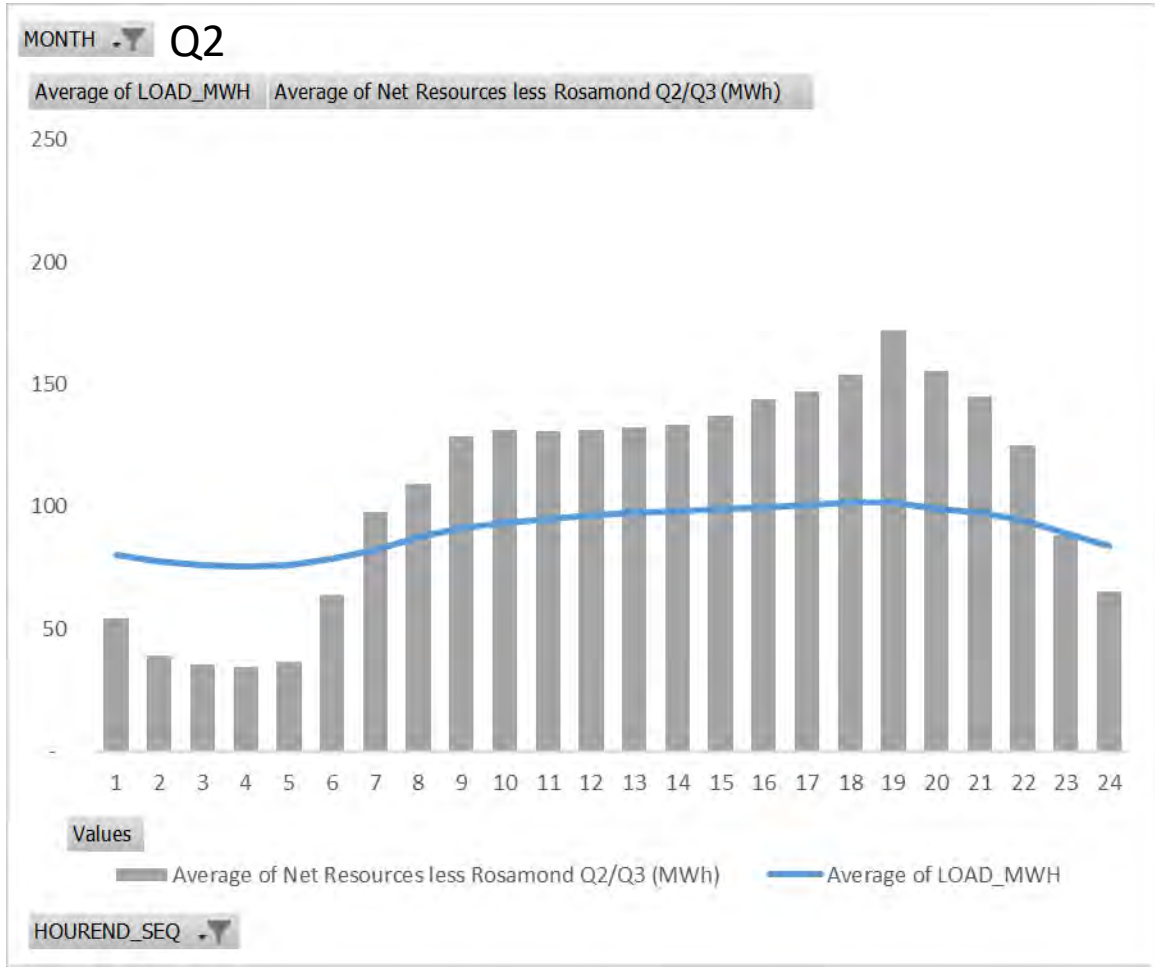
1. Sell 5-10 MW of Geo output during Q2/Q3 period
2. Sell 20 to 40 MW of Solar PV output during Q2/Q3 period

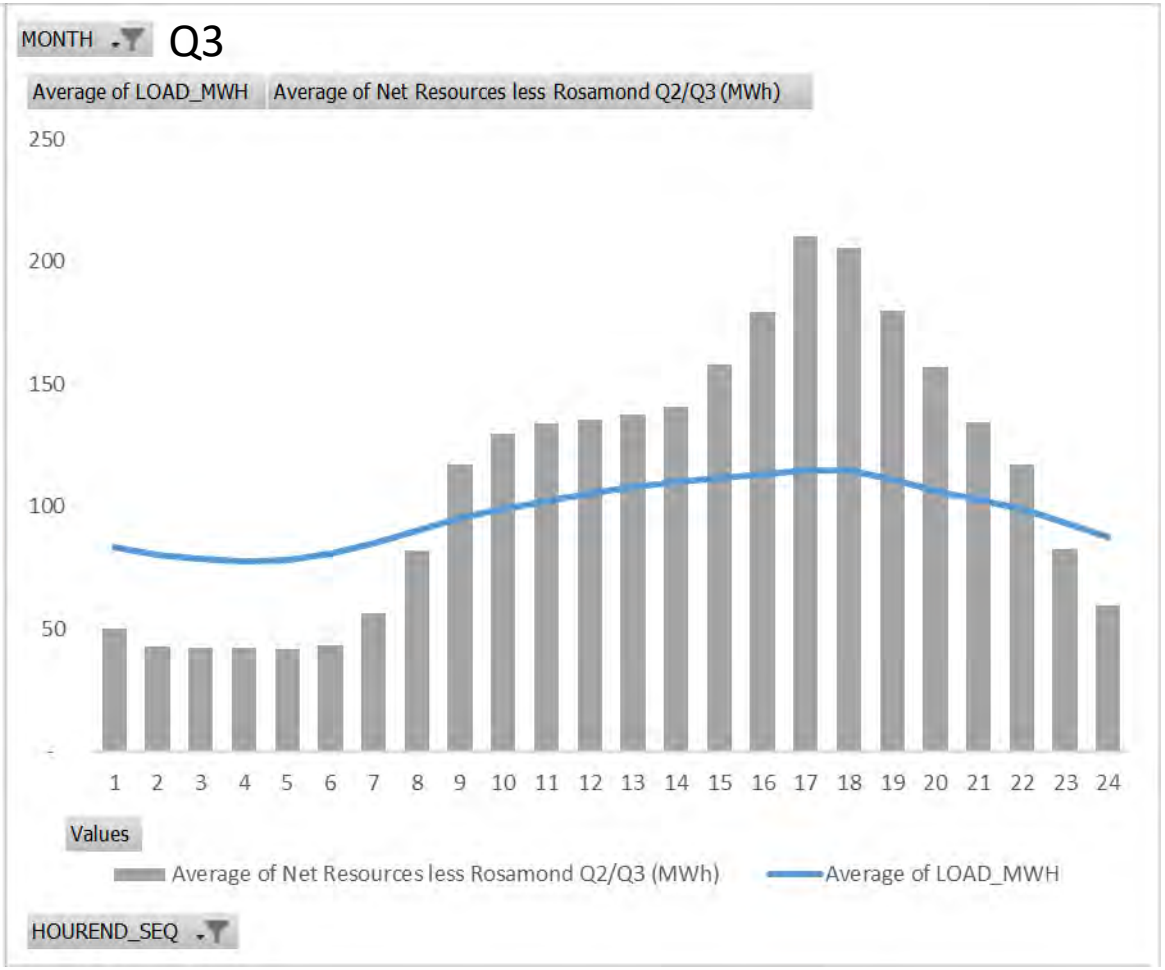
Annual Load-Resource Balance through 2045 (with 10MW Geo + PV Sale)



*** Load projections incluc ~70,000 MWh of data center load expected tc arrive in 2024-25**

Summer Load-Resource Balance after (Geo + PV Sale)





City of Palo Alto (ID # 14974)

Utilities Advisory Commission Staff Report

Meeting Date: 2/1/2023 **Report Type: VII. NEW BUSINESS**

Title: Discussion and Status Update on the One Water Plan

From: Director of Utilities

Lead Department: Utilities

This item is for discussion and no action is requested.

Staff seeks input from the Utilities Advisory Commission (UAC) on progress to date developing the One Water Plan for Palo Alto. Staff will use this input to guide the development of its water supply and conservation options and the process of screening and packaging those options into potential water supply portfolios.

The attached presentation (Attachment A) provides an overview of the One Water Plan, water supply and conservation options, screening process, draft evaluation criteria and community survey results, and water supply portfolio themes. Attachment B provides a detailed list of water supply and conservation options.

Staff plans to return to the UAC during a joint meeting with the Stormwater Management Oversight Committee to present initial results in the second quarter of 2023.

Attachments:

- Attachment A: Presentation
- Attachment B: Supply Options

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One Water Plan Update

Utilities Advisory Commission

February 1, 2023

www.cityofpaloalto.org

Outline

- One Water Plan Overview
- Discussion: One Water Plan Strategic Direction
- Supply & Conservation Options and Screening Process and UAC Ideas for Additional Options
- Evaluation Criteria and Engagement Meetings Results
- Discussion: Portfolio Themes
- Next Steps

One Water Plan: Roadmap in an Uncertain Future

The One Water Plan:

- Is a Key Action in Sustainability and Climate Action Plan
- Is a long-term 20-year (through 2045) Water Supply Plan
- Addresses future uncertainty such as SFPUC supply reliability, droughts, and climate change
- Includes robust and meaningful stakeholder engagement
- Is being completed by an outside consultant Carollo Engineers, a National One Water Thought Leader
- Builds on existing plans/work

What the One Water Plan does not directly address:

- Current ongoing drought
- Short-term emergencies such as earthquakes and wildfires – addressed under separate emergency plans

One Water Plan Project Overview

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Water Conservation Regional Comparison

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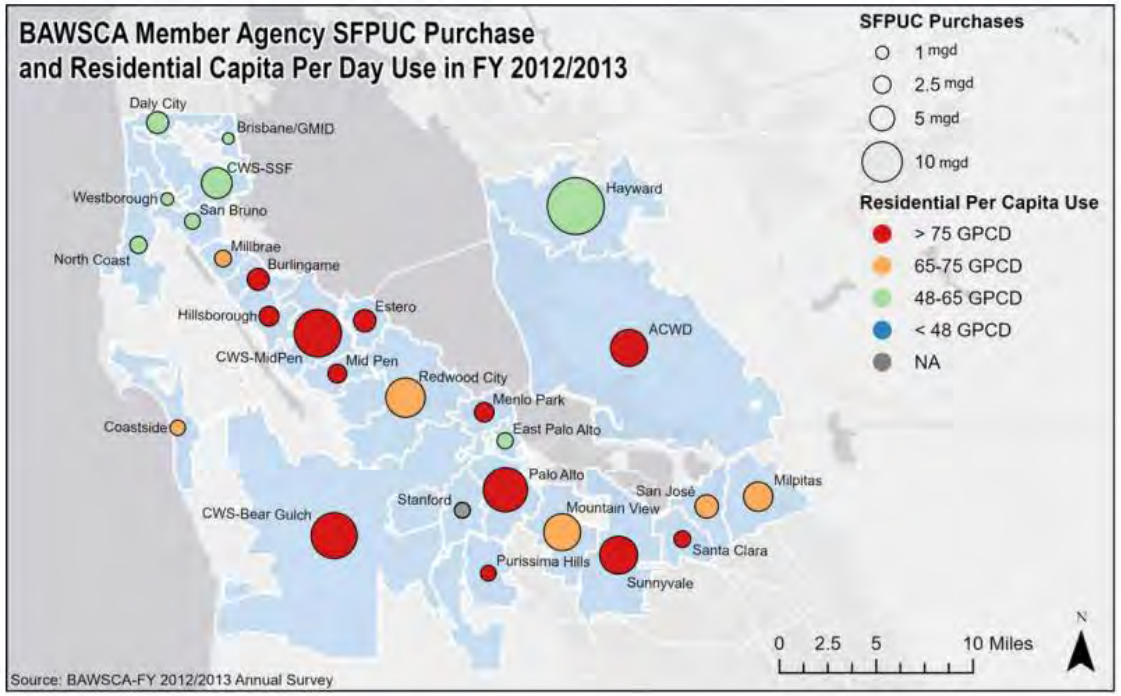
Average Residential Water Use in BAWSCA Region in FY 2012/13 was 71 GPCD



- No agencies using < 48 GPCD
- 9 agencies using 48-65 GPCD
- 12 agencies using > 75 GPCD
- 49 GPCD SF Retail Residential Use (avg.)

24/33

Sources: BAWSCA FY 2020/21 Annual Survey and SFPUC 2020 UWMP

BAWSCA Bay Area Water Supply & Conservation Agency

Water Conservation Regional Comparison

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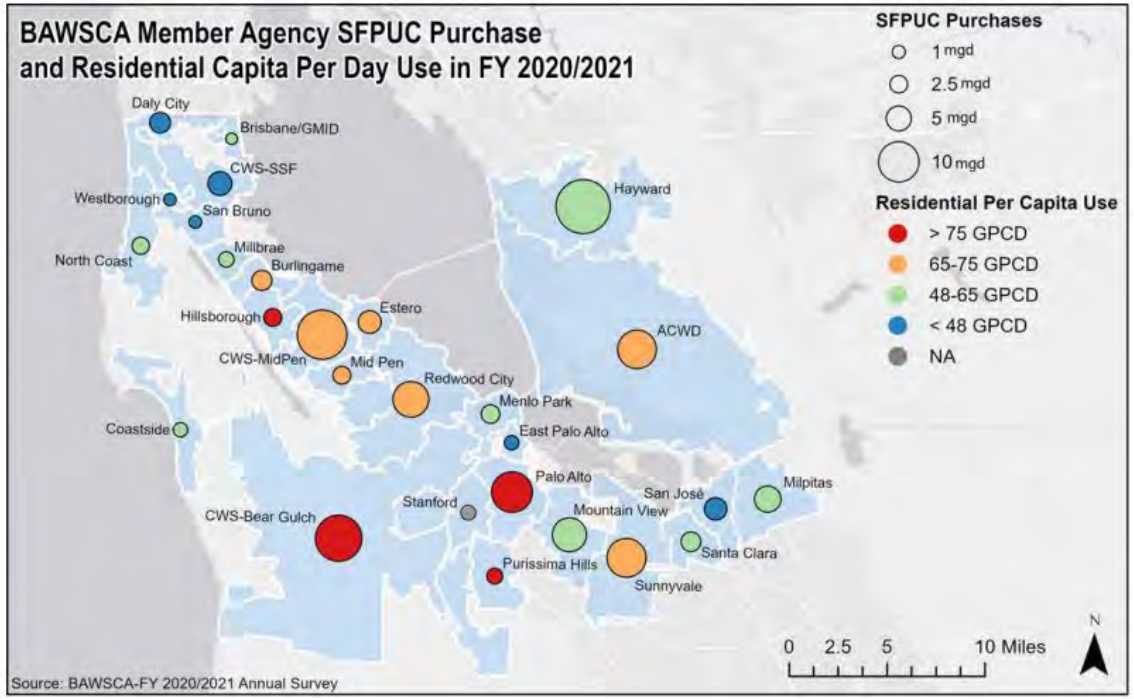
Average Residential Water Use in BAWSCA Region in FY 2020/21 was 66 GPCD



- 9 agencies using < 48 GPCD
- 8 agencies using 48-65 GPCD
- 4 agencies using > 75 GPCD
- 42 GPCD SF Retail Residential Use (avg.)

25/33

Sources: BAWSCA FY 2020/21 Annual Survey and SFPUC 2020 UWMP

BAWSCA Bay Area Water Supply & Conservation Agency

Discussion: Recommended One Water Strategic Direction

1. Prioritize actions that reduce Palo Alto's Water Demand without compromising tree canopy health

2. Develop sustainable, resilient water supply portfolios to meet the remaining demand

Supply and Conservation Option Screening

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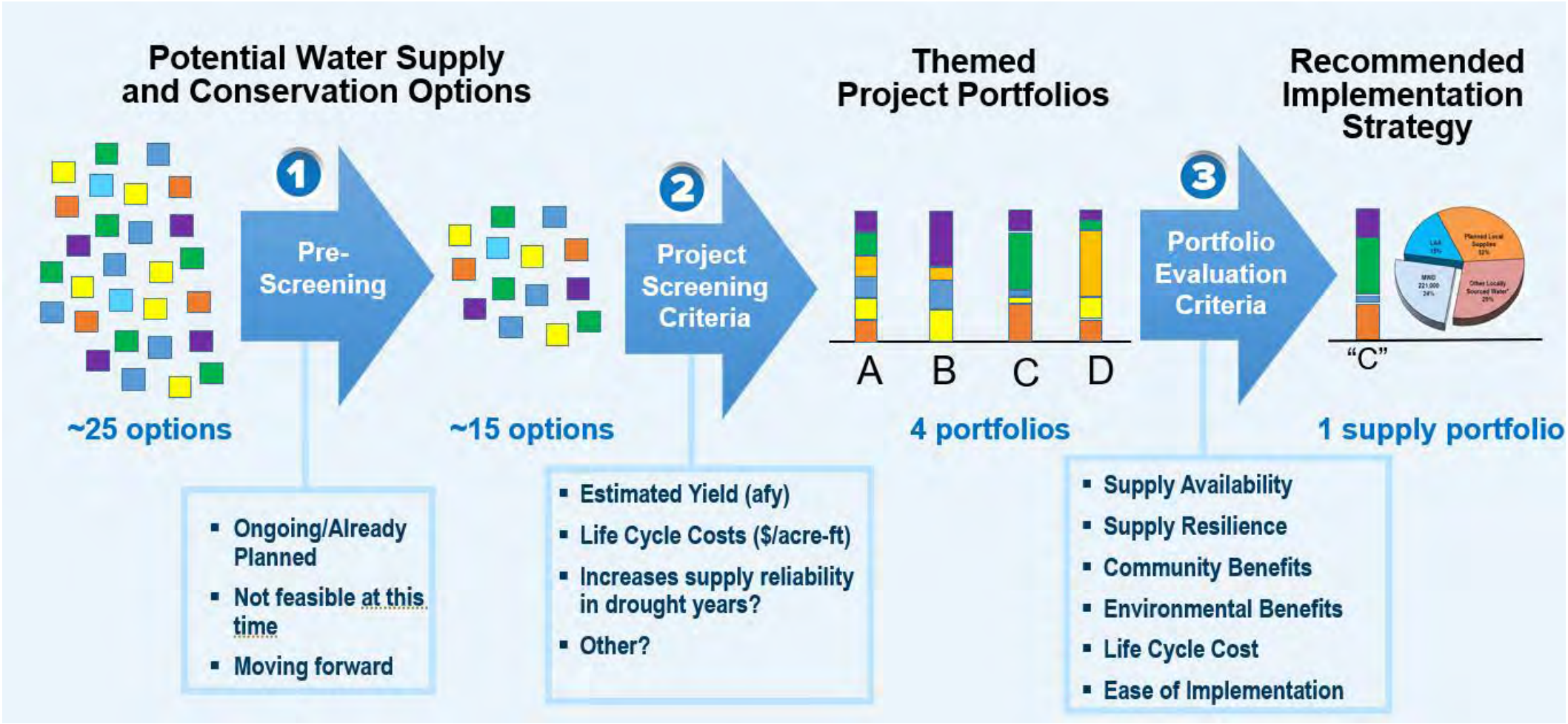

Supply Option Pre-Screening

- Planned/ongoing conservation
- Advanced metering program
- Distribution system water loss reduction
- Non-potable reuse
- SFPUC imported water supply

- Deemed Infeasible in Previous Studies
  - Temporary dewatering sites
  - Interagency transfer agreement
- Excessive Cost or Complexity
  - Blackwater capture and reuse
  - Atmospheric water generators
  - Local surface water reservoir
  - Valley Water treated water (via new pipeline)
- Outside of City Control
  - Indirect potable reuse at Lake Lagunita (groundwater recharge)
  - Regional storage

Supply Option Pre-Screening

- New conservation actions
- Converting emergency supply wells
- City park groundwater irrigation
- Direct potable reuse (via regional facility or City facility)
- Indirect potable reuse via groundwater injection
- Expanded non-potable reuse
- Permanent dewatering (as part of reuse options)
- Graywater capture and reuse
- Stormwater capture (residential/commercial-scale or GSI)
- Multi-source below-ground storage (e.g. stormwater detention)
- Desalination
- **Other ideas from today: _____**

Evaluation Criteria

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Supply Availability

- Normal year reliability
- Dry year reliability

Supply Resilience

- Vulnerability risk score (resilience to uncertainties)

Life Cycle Cost

- $/acre-foot cost of each portfolio

Community Benefits

- Water quality
- Water equity

Environmental Benefits

- Tree canopy health
- Sustainable water supplies
- Watershed health

Ease of Implementation

- Implementation timeline
- Operational complexity
- Alignment with other efforts
- Public acceptance
- Regulatory complexity
- Funding opportunities

Evaluation Criteria Survey – Community Results

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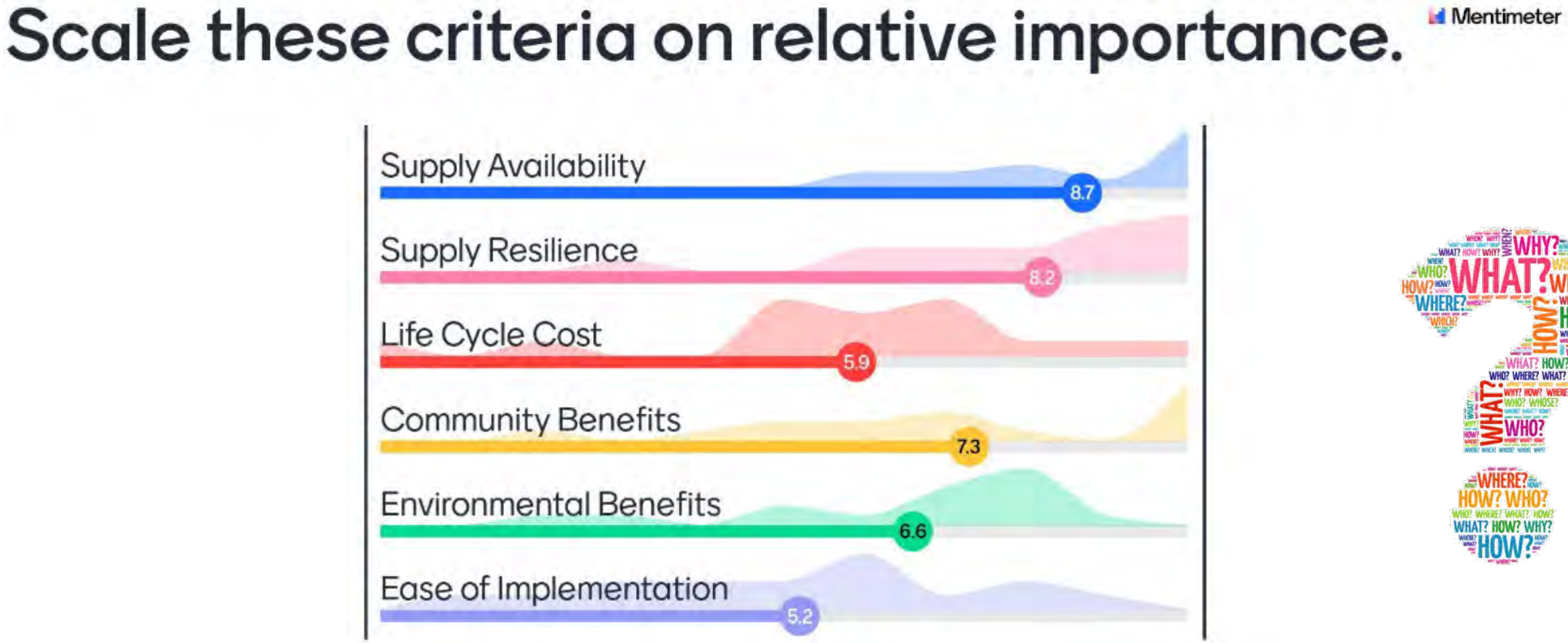

Discussion: Proposed Portfolio Themes

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Requesting your input!

Required

Baseline Portfolio	Minimize Cost	Maximize Local Supplies	Maximize Drought Resilience	Sustainable Water Supplies	Other Themes
Business as usual, only implementing already planned projects and programs. Baseline for Portfolio comparison	What mix of options will have the lowest combined supply cost?	What mix of options further increase the City's local water supplies the most?	What mix of options enable the City to best mitigate the impact of droughts?	What mix of options are renewable, equitable, and protect the environment the most?	

Next Steps

1.	Stakeholder Engagement – Initial Results	**March 2023**
2.	UAC Initial Results/ Stormwater Oversight Committee Joint Meeting	**Q2 2023**
3.	City Council Initial Results – Information Only	**Q2 2023**
4.	UAC Final One Water Plan	**Fall 2023**
5.	City Council Final One Water Plan	**Fall 2023**

Palo Alto One Water Supply Plan
Draft - Supply Options Matrix
November 2022

Category	#	Supply Option	Description
Conservation	1	Planned/Ongoing Conservation	Continuation of ongoing water conservation programs that will continue to meet state efficiency legislation. Includes customer rebate programs for implementing efficiency measures. Includes continuing to implement AMI (advanced metering infrastructure) for water meters to detect and reduce water leaks. Program is ongoing and expected to be complete in 2024-2025.
	2	Enhanced conservation	Conservation efforts that go above and beyond current conservation measures. Could include more aggressive building codes and/or alternatives for serving the needs of Foothills Nature Preserve, including irrigation and filling of Boronda Lake. Includes customer side water loss reduction. Outdoor conservation mechanisms could include incentives for transitioning to native, drought tolerant trees; banning or reducing lawns, while maintaining tree canopy.
Groundwater	3	Converting emergency supply wells	Converting the 8 wells constructed/rehabbed in 2015 from emergency to potable use.
	4	City park groundwater irrigation	Construct new small wells to irrigate city parks.

Palo Alto One Water Supply Plan
Draft - Supply Options Matrix
November 2022

Category	#	Supply Option	Description
Water Reuse	5	Expanded NPR	NPR Phase 3 pipeline extended into the foothills and Los Altos Hills (Northwest County Recycled Water Strategic Plan, Option A2)
	6	Direct potable reuse (City facility)	AWPF constructed near the RWQCP to provide a local DPR source. (Northwest County Recycled Water Strategic Plan, Option D1)
	7	Direct potable reuse (regional facility)	Send water to Valley Water's regional facility (tertiary treated wastewater) in exchange for purified water.
	8	Indirect potable reuse (groundwater injection)	AWPF constructed near the RWQCP to provide a local IPR source. AWPF water would be conveyed to five injection well sites to augment groundwater supply (Northwest County Recycled Water Strategic Plan, Option C1)
	9	Indirect potable reuse (Lake Lagunita groundwater recharge)	Send IPR treated water to Lake Lagunita on Stanford campus to percolate into aquifer to augment groundwater supply.
	10	Graywater Capture and Reuse	On-site use of graywater (relatively clean wastewater from baths, sinks, washing machines, other kitchen appliances) either on a customer-scale or at City facilities.
	11	Blackwater Capture and Reuse	On-site use of blackwater (wastewater from toilets) either on a customer-scale or at City facilities.

Palo Alto One Water Supply Plan
Draft - Supply Options Matrix
November 2022

Category	#	Supply Option	Description
Stormwater Capture and Use	12	Residential or commercial-scale Stormwater/Rainwater Capture	Expand upon current City rain barrel program. Potentially work with larger sites such as schools to implement larger scale rainwater capture.
	13	Green stormwater infrastructure	Increased implementation of green stormwater infrastructure, including bioretention areas, pervious pavement, green roofs, etc. Could include large scale stormwater capture at parks for reuse.
Imported Water	14	SFPUC supply	Water purchased from San Francisco's Regional Water System. 85% of this water comes from Hetch Hetchy and 15% from local watersheds in Alameda and San Mateo Counties.
	15	Valley Water treated water	Extend Valley Water treated water pipeline to connect to SFPUC pipelines and serve Palo Alto at the Page Mill turnout. Water source undefined.
	16	Interagency Transfer Agreement	This would include purchasing additional water from another water agency.
Other	17	Atmospheric water generators (AWGs)	Extract water by condensing humidity from ambient air. This alternative would consider both home and commercial-scale AWGs.
	18	Local storage	This would include building surface storage within the City's boundaries and/or a local watershed.
	19	Regional storage	This would include partnering with other agencies in the region to build or expand surface storage (i.e. Los Vaqueros)

Palo Alto One Water Supply Plan
Draft - Supply Options Matrix
November 2022

Category	#	Supply Option	Description
Other (cont.)	20	Multi-source storage	Storage to store stormwater, recycled water, or dewatering water (from permanent sites) dependent on time of year and water source availability. Would be limited to City-owned facilities.
	21	Regional desalination	Regional or local desalination project utilizing either brackish groundwater or bay intake.
	22	Temporary dewatering sites	Trucking water from temporary dewatering sites (such as basement construction) to City parks for irrigation.
	23	Permanent dewatering sites	Redirect discharge from permanent dewatering sites (Oregon Expressway and City Hall) to RWQCP to increase flows for future potable reuse project.

City of Palo Alto (ID # 14676)

Utilities Advisory Commission Staff Report

Meeting Date: 2/1/2023 **Report Type: VII. NEW BUSINESS**

Title: Staff Recommends the UAC Accept a Verbal Presentation on State Public Policy Actions and Recommend the City Council Approve the 2023 Utilities Legislative Guidelines

From: Director of Utilities

Lead Department: Utilities

Recommendation

Staff recommends that the Utility Advisory Commission:

(1) Accept the staff report regarding state legislation, regulations, and budget items and

(2) Recommend the City Council approve the 2023 guidelines though the following motion: "Staff and the Utilities Advisory Commission recommend the City Council approve the 2023 Utilities Legislative Policy Guidelines"

Discussion

SUMMARY OF 2022 AND PREVIEW OF 2023

State legislation in 2022

CPAU monitored over 50 state bills this session. While 2022 was a busy year for utilities-related legislation, none of the bills signed into law are anticipated to significantly affect Palo Alto's utilities. This is due to three key reasons: (1) Palo Alto is already well positioned to meet new laws as a result of the City's clean energy portfolio and proactive programs, (2) successful advocacy by the California Municipal Utilities Association (CMUA) and the Northern California Power Agency (NCPA) led to the mitigation of any bills potentially harmful to the City's interests, and (3) legislation that started as mandates to utilities ended as mandates to state agencies.

A few of the monitored bills signed into law include:

- SB 1157 (Hertzberg) changes the indoor water use standard (one metric used to calculate overall water efficiency) to reduce usage. Instead of the current 55 gallons per capita day

(gpcd) until 2025, 52.5 gpcd between 2025 and 2030, and 50 gpcd starting in 2030, those numbers will now be 55, 47, and 42 respectively;

- SB 1020 (Laird) sets interim clean energy targets (of 90% by 2035 and 95% by 2040) as the state works to meet its 100% clean energy goal;[1]
- AB 847 (Quirk) requires the development of a high voltage test for foil balloons and for the placement of warning labels regarding the danger of releasing foil balloons that may come into contact with electric lines;
- AB 2204 (Boerner Horvath) establishes the new position of Deputy Secretary for Climate within the state's labor agency – if funded by the Legislature;
- SB 1158 (Becker) requires each publicly owned utility (POU) governing board to review the GHG emissions of its electric utility and allows the board to evaluate, along with subsequent procurement plans, if the utility is making adequate progress in meeting its own GHG emission targets;
- ACR 188 (Holden) is a non-binding resolution that requests the California Independent System Operator (CAISO) produce a report by February 28, 2023 summarizing recent studies on the impacts of expanded regional cooperation.

State and federal budgets

With a surplus of over $97 billion, the 2022-2023 state budget provided funding for a wide variety of climate action-related programs and state agency mandates. These include many directives to the California Energy Commission (CEC) that could affect POUs, including to:

- Develop, by the end of 2023, approaches on how to determine appropriate planning reserve margins for POUs;
- Produce a report, by January 2023, on how POUs handled reliability during the past summer, projecting future reliability challenges, and posing possible solutions to any concerns;
- Implement a new voluntary demand side grid support program for POUs.

For 2023-2024, the state expects a budget deficit of around $24-25 billion. Currently, there is no information available regarding how this new projection might impact the above directives or ongoing energy-related programs. The Governor will release his proposed 2023-2024 budget in mid-January, which will provide more insight.

In August 2022, President Biden signed into law the Inflation Reduction Act, which among many other items, provides funding to reduce carbon emissions, invest in clean energy, and continues funding for residential energy efficiency improvements, including heat pump water heaters.

[1] The clean energy goal is to ultimately supply 100% eligible renewable energy resources or zero-carbon resources to Californians by 2045.

Regarding the latter item, CPAU's Resource Management Division has spent time investigating this credit (and similar credits) as we move forward with the City's heat pump water heater pilot program. Regarding the former items – and related to the state budget - regulatory action is required by the agencies tasked with allocating funds.

One example of the agency action needed: The CEC is expecting to disseminate $10 billion in clean energy funding from the state and federal budgets over the next few years. Broadly, the agency is considering using some of the money on new and current energy efficiency and grid resilience programs and the rest on long-term energy storage, hydrogen programs, building decarbonization programs, and the like. There are no details yet about this spending or how local governments may participate in programs, but we do know that the CEC wants to hire about 100 more staffers to implement new and expanded programs. Through CMUA and NCPA, staff will monitor the development of spending allocations and regulatory action to determine how they might benefit CPAU.

Regulatory activity in 2022

CPAU continued to produce all required reporting to agencies last year and has received positive feedback in doing so. For example, the Wildfire Safety Advisory Board was complementary of our 2022 Wildfire Mitigation Plan, offering no suggestions for improvement. This year, we will submit a revised Plan, pursuant to state law and with an independent evaluation to ensure the City continues to mitigate risk of electric line-ignited wildfires in the best manner possible.

On the water side, staff expects revisions to the State Water Resource Control Board's Lead and Copper Rule, resulting from changes in the federal Environmental Protection Agency's rule. Staff have been tracking potential changes while continuing to comply with the current rule. Staff also continues to monitor other energy and water-related regulatory action through NCPA and CMUA.

State legislation in 2023

This year, as the state and country move closer to making inroads in electrification, staff expects more bills on transmission and resource adequacy. As the state continues to experience very hot summers and wildfires, bills addressing reliability, demand reduction, and electric-line ignited wildfire mitigation are also expected. The focus on clean energy and sustainability remains, especially through the Legislature's Joint Legislative Committee on Climate Change Policies, the Senate's Climate Working Group, and like-minded legislators. Lastly, staff expects

to soon see a bill related to regionalization[2], an issue faced more than once in prior legislative sessions.

2023 is the beginning of a new two-year session, meaning bills that do not pass in 2023 will continue on in 2024, absent a legislative decision to stop their progress. CPAU staff continues to work closely with CMUA, NCPA, and other POUs this year through in-person meetings, virtual meetings, workgroup calls, and workshops.

APPROVAL OF UPDATED LEGISLATIVE GUIDELINES

CPAU has a document in place that guides staff when determining which of the thousands of state bills to monitor, and potentially engage with, each year (Attachment A). The UAC first approved the current legislative guidelines in 2017. They were intended to be perennial, subject to UAC and Council review, and were approved annually. The last UAC approval was on November 3, 2021 with Council approval following on February 7, 2022.[3] While the guidelines have served CPAU reasonably well, there is room for improvement. For example, the current guidelines are action-oriented where action may not be warranted, vague in places, and could benefit from additional clarity about what is most important to the organization.

A case in point: fiscal stability is a Council priority and important to CPAU but is not specifically noted in the current guidelines. Rather, three separate guidelines opaquely refer to fiscal stability: "Where possible, seek funding and program incentives," "Oppose unnecessary, unreasonable, impractical, or costly rates or mandates," and "Advocate for fair cost allocation and support the principle of beneficiary pays." These statements can be clarified to specifically address a range of possible responses to financial policy initiatives, such as: Opposing or supporting legislation, working with other POUs to inform our trade association's advocacy, monitoring regulatory activity, participating in regulatory comments from NCPA or CMUA, and more.

For 2023, staff suggests a different approach (Attachment B). Rather than statements presuming possible actions untethered to specific policy initiatives, (i.e.: "oppose," "advocate") staff suggests the guidelines reflect the values and priorities shared by the City and CPAU. The new draft guidelines do not presume a position or action and as such, allow staff to determine activities[4] based on what is important to CPAU, Council, and the community. While not a

[2] The word refers to possible evolution of CAISO into a regional organization of several western states. This expanded multi-state body rather than a single state operator was initially contemplated in SB 350 (2015).
[3] As noted below, an additional guideline was added by Council in October 2022.
[4] As noted in the draft guidelines, any action taken by CPAU will conform with the City's Advocacy Process Manual.

significant shift from the current guidelines, the phrasing of the 2023 draft guidelines allows for some flexibility while explicitly acknowledging key values and priorities.

Importantly, all the guideline areas from earlier years remain – with one exception. On October 3, 2022, Council added a new workforce-related item. This new 2022 guideline is a result of a recommendation from Council's Sustainability and Climate Action Plan Ad Hoc Committee, reflecting the current and future shortage of skilled labor required to modernize the electric grid. For 2023, staff recommends retaining the added guideline, but with language modifications:

Workforce guideline added in 2022	*Workforce guideline suggested for 2023*
Support government action to expand the workforce in trades and technical disciplines necessary to support building and vehicle electrification and grid modernization.	A skilled workforce is critical. We support government action that provides funding, training, and other resources to increase and maintain utility staffing levels, especially for key areas such as our electric utility while we work to modernize our grid.

The suggested wording for 2023 (1) aligns with the language convention of the draft guidelines, (2) provides specificity to the word "expand" in the current guidelines (funding, training, resources), (3) specifically highlights the electric utility and grid modernization in keeping with Council's original intent, and (4) broadens the 2022 guideline to provide staff the flexibility to advocate for a skilled workforce in areas other than electrification and grid modernization. As per the usual process, once approved by the UAC, the draft 2023 guidelines will appear before Council with an adoption recommendation. Council then has the opportunity to review any changes.

Resource Impact

Approval of this report and the 2023 guidelines has no impact on resources.

Environmental Review

The UAC's review and recommendation on the 2023 Utilities Legislative Policy Guidelines does not meet the California Environmental Quality Act's definition of a project, pursuant to Public Resources Code 21065 and CEQA Guidelines Section 15378(b)(5), because it is an administrative activity which will not cause a direct or indirect physical change in the environment; an environmental review is not required.

Attachments:

- Attachment A: Utilities Legislative Policy Guidelines
- Attachment B: 2023 Utilities Legislative Guidelines

Attachment A

Utilities Legislative Policy Guidelines: 2022 Update

City of Palo Alto Utilities Department (CPAU) staff will use the below guidelines as well as the City's guidelines to help determine any advocacy position or action on Utilities-related issues. Formal advocacy, such as submitting written letters or comments and meeting with policymakers and/or staff, requires the approval of the Utilities Director or his designee.

1. Seek to preserve local government flexibility, discretion, accountability, and oversight of matters impacting utility programs, services, activities, and rates. Oppose action that could hamper or minimize this flexibility or discretion.

2. Where possible, seek funding and program incentives.

3. Advocate for reasonable government action with minimal customer impact that allows for flexibility and implementation feasibility.

4. Advocate for locally-designed conservation or efficiency programs. Support reasonable State conservation or efficiency requirements that consider local populations, environment, and resources.

5. Inform state and federal policymakers about CPAU's current programs, services, goals, and reporting requirements.

6. Oppose unnecessary, unreasonable, impractical, or costly rates or mandates.

7. Collaborate with and support the efforts of regional agencies and associations whose goals align with ours.

8. Advocate for fair cost allocation and support the principle of beneficiary pays.

9. Support efforts to maintain or improve the security and reliability of our infrastructure.

10. Support government action that cost effectively reduces greenhouse gas emissions.

11. Promote locally-designed residential and commercial electrification programs.

12. Support government action allowing CPAU to maintain customer confidentiality.

13. Support government action to expand the workforce in trades and technical disciplines necessary to support building and vehicle electrification and grid modernization.[1]

[1] Added by Council October 2022

Draft – subject to UAC and Council approval

2023 CPAU LEGISLATIVE GUIDELINES

SUMMARY

The City of Palo Alto Utilities Department utilizes the following guidelines when determining whether to monitor or engage in legislation or regulations. These are, in effect, foundational statements informed by City Council policies, community needs, and existing and planned utilities programs. They are evergreen by design and subject to annual review, approval, or modification by the Utilities Advisory Commission and/or the City Council. Any actions taken relating to the guidelines will adhere to the City of Palo Alto's Advocacy Process Manual.

GUIDELINES

1. Clean, renewable, affordable energy is vital. We must invest in infrastructure and programs that support clean energy in an affordable and equitable manner.

2. Adequate supplies of clean, affordable drinking water are imperative. We will work to balance our water resources with the needs of our community, city policies, and precipitation conditions.

3. Utilities safety and reliability are essential. We strive to ensure consistent resources while maintaining our infrastructure in a safe manner.

4. Affordable rates are key. We carefully analyze any proposed government policy that could lead to an increase in rates.

5. Fiscal stability is a cornerstone of our work. We strive to operate and provide affordable programs, leveraging grants and government funding where feasible.

6. As a municipal government with locally elected officials and a public commission, we are self-guided. As such, our local leaders are best positioned to manage our policies, resources, and programs.

7. Collaborating externally increases our reach. We work with associations and stakeholders to combine our resources, share our experiences, and advocate for our community.

8. Preserving customer privacy is important. We intend to continue to meet our customers' expectations in safeguarding their contact and utility usage information.

9. A skilled workforce is critical. We support government action that provides funding, training, and other resources to increase and maintain utility staffing levels, especially for key areas such as our electric utility while we work to modernize our grid.

City of Palo Alto (ID # 14973)

Utilities Advisory Commission Staff Report

Meeting Date: 2/1/2023 **Report Type: INFORMATIONAL REPORTS**

Title: Informational Utilities Quarterly Report Update for Q1 of FY2023

From: Director of Utilities

Lead Department: Utilities

Executive Summary

Linked below for the Utilities Advisory Commission's information is an update on water, gas, electric, wastewater collection and fiber utilities, efficiency programs, legislative/regulatory issues, utility-related capital improvement programs, operations reliability impact measures and a utility financial summary. This updated report (Linked Document) has been prepared to keep the Council and Utilities Advisory Commission apprised of the major issues that are facing the water, gas, electric, wastewater collection and fiber utilities. A separate quarterly report on the financial position is prepared consistent with when the City closes its books.

Items of special interest in this report are summarized below:

COVID-19 Impacts: Behavior changes resulting from COVID-19 continue to impact loads in FY 2022:

- FY 2023 actual electric sales through September 2022 were about 4% lower than projections, while revenues were about 7% higher than projections. The higher sales revenues were due to extra revenue from the Electric Hydro Rate Adjuster. Decreased loads are mostly attributed to the commercial sector. (Section 1.5.1)
- Gas utility demand through September 2022 was 5% lower than forecasted in the FY 2023 Financial Plan. Actual sales revenue was 35% higher than forecasted. The higher revenue was due to increases in the market price of gas commodity which is passed through to customers. (Section 2.5.1)
- Water demand through the end of September 2022 was 10% lower than forecasted and water sales revenues were about 13% lower than forecasted in the FY 2023 financial plan, mostly due to water conservation from customers responding to the drought. Increased water conservation may further impact revenue and reserve levels. (Section 3.5.1)
- Wastewater revenues have not been significantly affected by the pandemic.

Vacancies and Staffing – Appendix B

- The Utilities Department has 48 vacant positions out of 253 authorized positions or a 19% vacancy rate at the end of September 2022

- The highest number of vacancies are in Electric Operations (20 FTEs) and Electric Engineering (9 FTEs)

Electric Utility:
Output from the City's hydroelectric resources is low. Total forecasted hydropower for FY 2022 is 244 GWh, which is 234 GWh (51%) below the long-term average. The current forecast for FY 2023 assumes a small recovery in generation from FY 2022, but is still only projected to provide 56% of generation compared to the long-term average. (Section 1.1.2)

- Sales of renewable energy credits (RECs) for CY 2022 are expected to result in $0.8M in net revenue. (Section 1.1.3)
- A number of construction projects are in the design phase with construction due to begin in 2022. (Section 1.2)
- Electric sales for the first two quarters of FY22 were about 3% lower than projected, and revenue was about 5% lower. (Section 1.5)

Gas Utility:
- Gas prices remain high, and customer bills will be impacted over the winter months. Outreach material will inform the community of these bill impacts and provide energy saving tips and program information. (Section 2.5.2 and 7)
- A gas main replacement project is currently in progress (GS-13001) and the City is in the midst of a two year inspection project to find "cross bores." (Section 2.2)

Water Utility:
- January through March 2022 was the driest on record for the Hetch Hetchy gauge. System storage is below normal but in better shape than most reservoirs in the state. (Section 3.1)
- On November 10, 2022, Governor Newsom's senior Water-Policy Officials, the San Francisco Public Utilities Commission (SFPUC), and the Modesto and Turlock Irrigation Districts reached agreement on a Memorandum of Understanding to provide greater water flows and increased habitat for the Tuolumne River. The Bay Area Water Supply and Conservation Agency (BAWSCA) anticipates that this MOU will become a part of a larger voluntary agreement for the Sacramento-San Joaquin Delta. (Section 3.1)
- Palo Alto launched the One Water Plan with the goal of Council adoption of a One Water supply plan that is a 20-year adaptable roadmap for implementation of water supply and conservation portfolio alternatives. A number of stakeholder engagement meetings have occurred and are scheduled to occur. The UAC will receive an update in February or March of 2023.

On May 24, 2022, Palo Alto's water supplier, the San Francisco Public Utilities Commission adopted a systemwide voluntary water use reduction of 11% compared to baseline water use during FY 2019-2020. For the billing months July 2022 through October 2022, compared with

the same period from July 2019 to October 2019, the Palo Alto community reduced water usage by 10%. (Section 3.1)

- Actual water sales volumes through Q1 of FY 2023 were about 10% lower than forecasted in the FY 2023 financial plan. Staff's preliminary projection of expected revenues and expenses together with transfers from the CIP Reserve, estimates the Operations Reserve will reach approximately target levels by the end of FY 2023. (Section 3.5)
- Construction started on a water main replacement project in April. (Section 3.2)

Wastewater Utility:

- An overview of the status of the Regional Water Quality Control Plant (RWQCP) rehabilitation projects is provided, including an overview of the financing plan for the projects. The first project to begin construction will be the primary sedimentation tank rehabilitation. (Section 4.1)
- A sewer system rehabilitation project (SSR 30) was approved by Council on December 31, 2021. Construction started in March 2022 and is expected to be complete in January 2023. (Section 4.2)
- Actual wastewater sales revenues through Q1 of FY 2023 were around expectation, at about 0.4% higher than forecasted in the FY 2023 Financial Plan. (Section 4.4)

Fiber Utility:

- The City launched the Palo Alto Fiber Market Research Survey and Fiber Deposit program. 3,254 surveys were completed (14.8% response rate) and 703 deposits received as of August 3, 2022. 28.4% of households are either very dissatisfied or somewhat dissatisfied with their current internet services. An additional 14.4% are neither satisfied nor dissatisfied. (Section 5.1)
- On September 19, 2022, City Council and UAC held a joint session to review the internet survey results and evaluated the feasibility of a new City-owned and City-operated ISP business. (Section 5.1)

Customer Programs (Section 6)**:**

- The City in partnership with the Bay Area Water Supply and Conservation Agency (BAWSCA) held three well-attended landscape efficiency workshops in fall 2022. The workshops covered topics on harvesting rainwater, steps to take to design and convert lawns into drought-tolerant landscapes, and available rebates.
- On October 6, 2022 the City launched WaterSmart, an online water management tool to help residents and businesses better understand their water usage and enable them to conserve water and save money.
- Palo Alto had the highest number of SunShares, a solar and battery storage group-buy program, sign ups with 161 registered residents by the November 15, 2022 registration deadline.
- Since the Business Energy Advisor program launched in June 2022, 21 program participation agreements have been sent to customers, 7 agreements have been signed, and 3 site assessments have been completed.

- For residential customer programs, staff is developing contracts for residential building electrification, energy and water efficiency programs which includes single family and multifamily homes as well as income and medically qualified residents.
- The Business Electrification Technical Assessment Program launched in August 2022, offering no-cost assessments to help nonresidential customers identify electrification opportunities and free technical assistance to support them with their building electrification journey. Since the program launched, our partner, CLEAResult, has completed 2 site assessments, assisting large commercial customers with potential HVAC and heat pump water heater projects.
- The City continues to promote its multi-family and workplace EV charger programs.

Communications: A digest of major outreach efforts is provided in Section 7, including outreach related to drought, the public safety power shutoff program in the Foothills, and utility scams.

Legislative and Regulatory: Major legislative and regulatory items are summarized in Section 8.

Attachments:

- Attachment A: Utilities Quarterly Report FY23-Q1
- Attachment B: CY2021 Gas Utility Asset Management Overview

Utilities Quarterly Update

First Quarter of Fiscal Year 2023

Table of Contents

Figures

1 Electric Utility

The City's electric utility serves all residential and non-residential gas demands in Palo Alto at a lower cost than PG&E in surrounding communities. Its electric supply portfolio is 100% carbon neutral. The City maintains and operates an electric distribution system and one small natural gas generator but does not operate any transmission lines or any significant generating capacity on its own. Instead, the City belongs to Northern California Power Agency (NCPA) which operates its Calaveras hydroelectric generating plant and provides power scheduling services for its other generating resources. This carbon free power is supplied through power purchase agreements with various generation operators.

1.1 Electricity Supply and Transmission

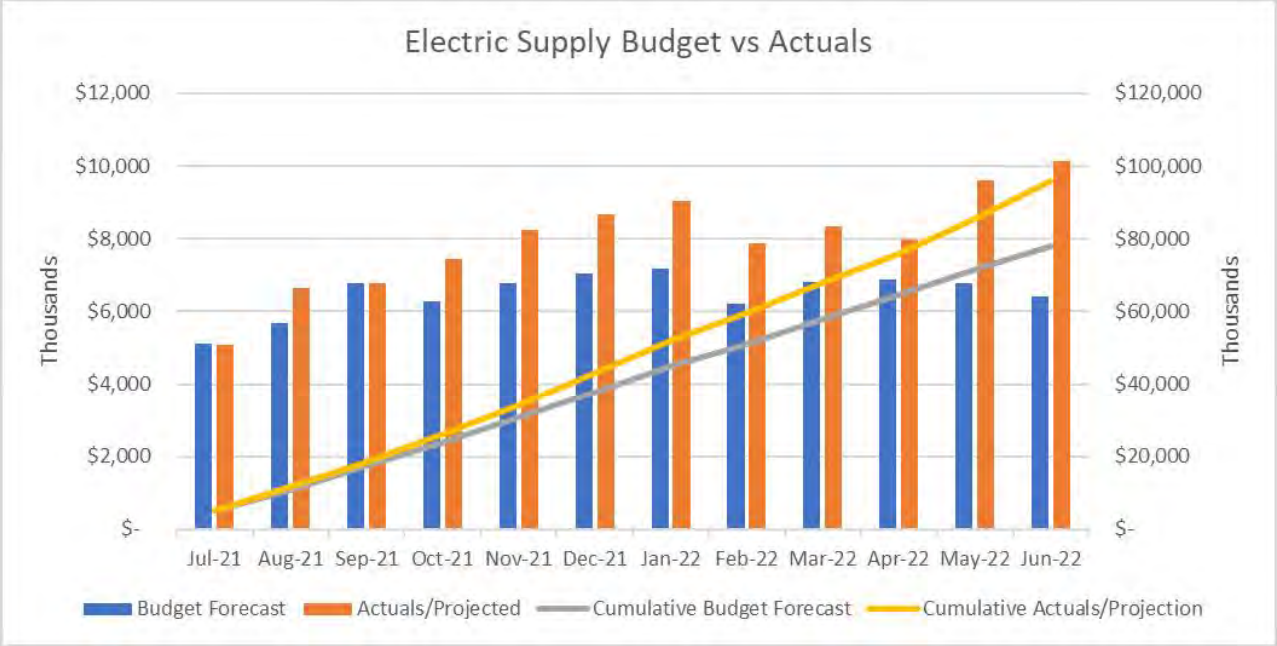
Below is an update on electricity supply and transmission services.

1.1.1 Forecasted Supply Costs (Jim Stack)

The actual net supply cost for FY 2022 was $95.2 M. This represents a $11.9 M (14%) increase over FY 2021 actuals and $17.3 M (22%) over the FY 2022 Adopted Budget amount, with the increase primarily driven by higher than historical forward energy prices, higher resource adequacy requirement levels and market prices, and much lower than historical average hydro generation levels.

The projected net supply cost for FY 2023 is $94.9 M, which is $9.7 M (11%) greater than the Adopted Budget amount, but $0.3 M lower than the actual net supply cost for FY 2022. This increase in cost relative to the Adopted Budget is due to the same factors noted above that explain the deviation in supply cost for FY 2022.

Figure 1: FY 2022 Financial Plan Supply Cost Forecast vs. Actuals



1.1.2 Hydroelectric Conditions (Jim Stack)

The City takes power from two hydroelectric projects, the Calaveras project and the Western Base Resource contract for Federal hydropower from the Central Valley Project.[1] The watershed for Western hydropower is primarily in the northern end of California, while the watershed for the Calaveras project is in the Central Sierras.

For water year 2020 to 2021 (October 2020 to September 2021), total precipitation was just below 50% of average in both watersheds. For water year 2021 to 2022, total precipitation was 63% of average for the Central Sierras watershed and 81% of average for the Northern Sierras watershed. Total actual hydropower for FY 2021 was 295 GWh, which is 183 GWh (38%) below the long-term average. Total actual hydropower for FY 2022 was 230 GWh, which is 250 GWh (52%) below the long-term average.[2] The current forecast for FY 2023 assumes a small recovery in generation from FY 2022, but is still only projected to provide 56% of generation compared to the long-term average.

[1] The Calaveras project is a hydropower project located in Calaveras County that is maintained and operated by the Northern California Power Agency on behalf of the City and other project participants. The City is also one of several public entities with contracts with the Western Area Power Administration for "Base Resource" electricity, which is the hydroelectric power available from the Federal Government's Central Valley Project (operated by the Bureau of Reclamation) after accounting for power used for Central Valley Project operations and power delivered to certain "preference" customers.

[2]The long-term average forecast levels for both Western and Calaveras have been revised downward (about 10% each) in recent years to reflect the impact of climate change. These values may need to be revisited again in the coming years.

Figure 2: Hydro Generation FY 2021-22 Actuals, FY 2023 Projected (GWh)

	FY 2021
Calaveras Actuals/Forecast (GWh)	49
Western Actuals/Forecast (GWh)	246
Total Hydro Forecast (GWh)	295
% of Long-term Average Total	61%

1.1.3 REC Exchange Program (Jim Stack & Eric Wong)

Under the REC Exchange Program, which was approved by Council in August 2020 (Staff Report #11556), staff has so far contracted to sell a total of 184 GWh worth of in-state renewable energy (for $2.77M), and purchased 400 GWh worth of out-of-state renewable energy credits (RECs) costing $2.03M in CY 2022. The overall net revenue (estimated at $0.74M) for CY 2022 will be directed entirely towards the funding of local decarbonization efforts.

Net revenue for the REC Exchange program is projected to be around the same in 2023 than 2022, which were both significantly lower than previous years due to several factors: (a) the poor hydro outlook, which will lead to large out-of-state REC purchase volumes, and (b) a narrowing of the in-state versus out-of-state REC price spread.

1.1.4 Renewable Energy Procurement (Jim Stack)

As discussed in Staff Report #14908 (Packet Pg. 74), staff is currently pursuing an opportunity to enter into a 12-year agreement to procure 10 MW of output from the Calpine Geothermal project, as part of a larger purchase with other Northern California Power Agency (NCPA) members. Staff is also exploring a sale of some energy during Q2 and Q3 from one or more of the City's long-term solar contracts. These combined transactions would more closely balance the City's loads and resources on a daily/monthly basis to better hedge market energy price shifts in the long-term while maintaining the portfolio's annual energy position close to current levels. Staff plans to return to the UAC in the coming months to seek a recommendation to take these agreements to the City Council for approval.

1.2 Capital Improvement Plan Status (Patrick Valath)

The following capital projects are currently in progress or have been recently completed:

- **EL-17001 (East Meadow Circles 4/12kV Conversion):** This project is scheduled to be completed in several phases. Phase 1 design is complete and released for construction. Phase 2 & 3 (of 6) engineering design is currently in progress.
- **EL-11003 (Rebuild Underground 15):** This project is in the preliminary stages of engineering design. Project is delayed due to staffing shortage. This project has been put on hold due to other priorities.
- **EL-10006 (Rebuild Underground 24):** This project is in construction phase and scheduled to be completed in 2022.
- **EL-16000 (Rebuild Underground 26):** This project is in the design phase and to be completed in multiple phases. First design phase is scheduled to be completed in 2022.
- **EL-19004 (Wood Pole Replacement):** This project is in the design phase with expected completion in September 2022 and construction starting 2023. The project is delayed this year because of staffing shortages. CPAU has a contract consultant to work on the design phase of this project.

- **EL-16003 (Substation Physical Security):** This project is scheduled to be completed in several phases. Substation Security lighting contract was awarded in June 2022. The installation will be completed over a 2-year period.
- **EL-17002 (Substation 60kV Breaker Replacement):** Currently working on solicitation to procure a contractor for the next phases.
- **EL-21001 (Foothills Rebuild):** This project will rebuild the approximately 11 miles of overhead line in Foothills Park, as necessary to mitigate the possibility of wildfire due to overhead electric lines. Staff has completed 7,000 feet of substructure work and design to eliminate the corresponding 26 poles and install new underground equipment will be completed by June 2022. Staff has started the design for next phase of the substructure work. Construction is expected to start in July 2022 for the next phase.
- **EL-14005 (Reconfigure Quarry Feeders):** Staff completed the design phase this year. Construction has been delayed due to shortage of staff.
- **EL-02011 (Electric Utility Geographic Information System (GIS)):** The project scope includes maintenance/technical support of the existing GIS system and implementation of the new GIS platform (ESRI). Staff has completed the ESRI ArcGIS Portal, which is a web service for staff to view data and are currently working on final phase of the electric data migration to ESRI's Utility Network model.
- **EL-16002 (Capacitor Bank Installation):** This project is a multi-year effort for the procurement, design and installation of capacitor banks at several substation. Hanson Way and Park Blvd substation work is complete; Two capacitor banks at Hanover remain to be completed and will be completed in 2022. The capacitor banks at Maybell have been installed and will be commissioned in the coming months.

1.3 Rate and Bill Comparisons (Eric Keniston)

For the median consumption level, the annual residential electric bill for FY 2022 was $744, about 45% lower than the annual bill for a PG&E customer with the same consumption and approximately 16% higher than the annual bill for a City of Santa Clara customer. The bill calculations for PG&E customers are based on PG&E Climate Zone X, which includes most surrounding comparison communities.

The figure below presents sample median residential bills for Palo Alto, PG&E, and the City of Santa Clara (Silicon Valley Power) for several usage levels. Rates used to calculate the monthly bills shown below were in effect as of November 1, 2022. The rates for Palo Alto include the current Hydro Rate Adjuster of $0.013/kWh.

Over the next several years low usage customers in PG&E territory are expected to continue to see higher percentage rate increases than high usage customers as PG&E compresses its tiers from the highly exaggerated levels that have been in place since the energy crisis. This is likely to make the bill for the median Palo Alto consumer look even more favorable compared to most PG&E customers. Even with the compressed tiers, bills for high usage Palo Alto consumers are projected to remain substantially lower than the bills for high usage PG&E customers.

Figure 3: Residential Monthly Electric Bill Comparison (Effective 11/1/2022, $/mo.)

Season	Usage (kwh)	Palo Alto	PG&E	Santa Clara
Winter	300	47.24	95.26	39.22
	(Median) 453	78.57	155.65	59.95
	650	121.19	233.40	86.65
	1200	240.18	452.61	161.17
Summer	300	47.24	95.03	39.22

	(Median) 365	59.53	120.68	48.03
	650	121.19	233.16	86.65
	1200	240.18	454.03	161.17

1.4 Reliability (Kenneth Swain)

CPAU tracks electric outages. A summary chart of these outages can be found below.

Figure 4: Electric Outage Reliability, FY 2023-Q1

Outage Reliability	Q1
System Average Interruption Duration Index (SAIDA)	81.69
System Average Interruption Frequency Index (SAIFI)	0.61
Customer Average Interruption Duration Index (CAIDI)	134.77

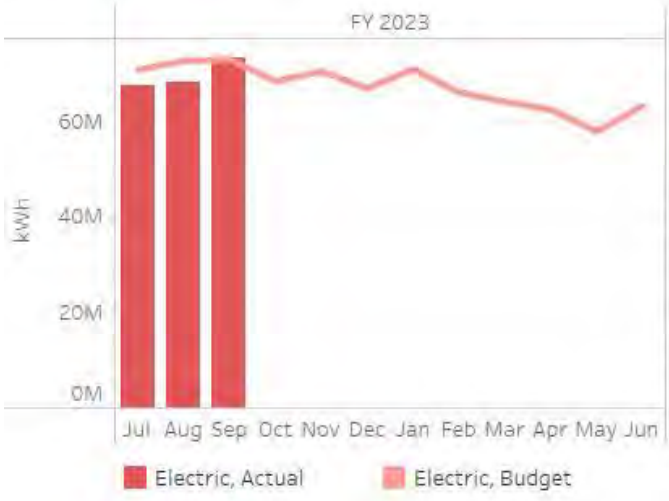
1.5 Financial Health

Below is a summary of the financial position for the electric utility.

1.5.1 Sales Forecasts vs. Actuals (Eric Wong)

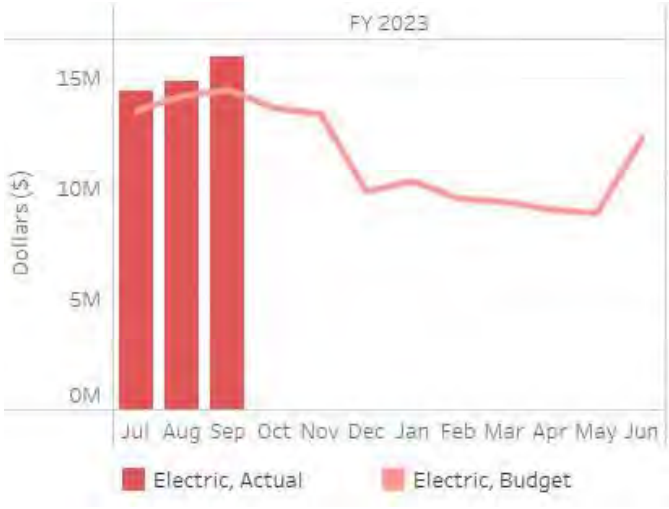
Electric actual sales volumes through Q1 of FY 2023 were about 4% lower than forecasted, while actual sales revenues were about 7% higher than budgeted in the FY 2023 Financial Plan. The higher sales revenues were due to extra revenue from the Electric hydro rate adjuster, which was implemented on April 1, 2022. The commercial sector continues to be impacted from the Covid downturn in Q1 of FY 2023, and it is uncertain when commercial sales will recover.

Figure 5: Electric Sales Volume (kWh), up to FY 2023-Q1



	Budget	Actual	Variance	Variance %
Jul	70,843,075	67,532,107	-3,310,968	-4.7%
Aug	72,647,339	68,060,058	-4,587,281	-6.3%
Sep	73,040,074	73,386,421	346,347	0.5%
Oct	68,469,891			
Nov	70,512,009			
Dec	67,009,286			
Jan	70,935,370			
Feb	66,143,772			
Mar	64,173,286			
Apr	62,524,419			
May	57,946,331			
Jun	63,400,963			

Figure 6: Electric Sales Revenue ($), up to FY 2023-Q1



	Budget	Actual	Variance	Variance %
Jul	13,513,230	14,355,879	842,649	6.2%
Aug	14,158,194	14,807,187	648,993	4.6%
Sep	14,441,943	15,928,532	1,486,589	10.3%
Oct	13,625,567			
Nov	13,352,666			
Dec	9,853,529			
Jan	10,311,382			
Feb	9,534,373			
Mar	9,385,476			
Apr	9,031,965			
May	8,856,182			
Jun	12,309,221			

1.5.2 Financial Position (Eric Keniston)

The Electric Operations Reserves were at the minimum guideline level at the end of FY 2022 and may drop below minimum in FY 2023, depending on ongoing increases to purchase costs created by low hydro conditions (necessitating more expensive market purchases) as well as increasing transmission costs. City Council activated the Hydro Rate Adjuster in April 2022 to help mitigate these rising costs, but staff is currently proposing to Council a further increase to the Hydro Adjuster (from $0.013 to 0.048/kWh effective January 1, 2023) to help keep reserves above minimum in FY 2023.

Through the first quarter of FY 2023, sales and revenues have tracked reasonably well compared to budget, but ongoing purchase cost increases continue to put pressure on reserves. Overall sales continue to be at levels seen during the height of COVID, with sales to the commercial sector not recovering appreciably as COVID restrictions have eased. This lower sales profile, along with projected new capital projects for electrification, may put additional pressure on FY 2024 rates and beyond. Staff will provide preliminary financial forecast projections in January 2023.

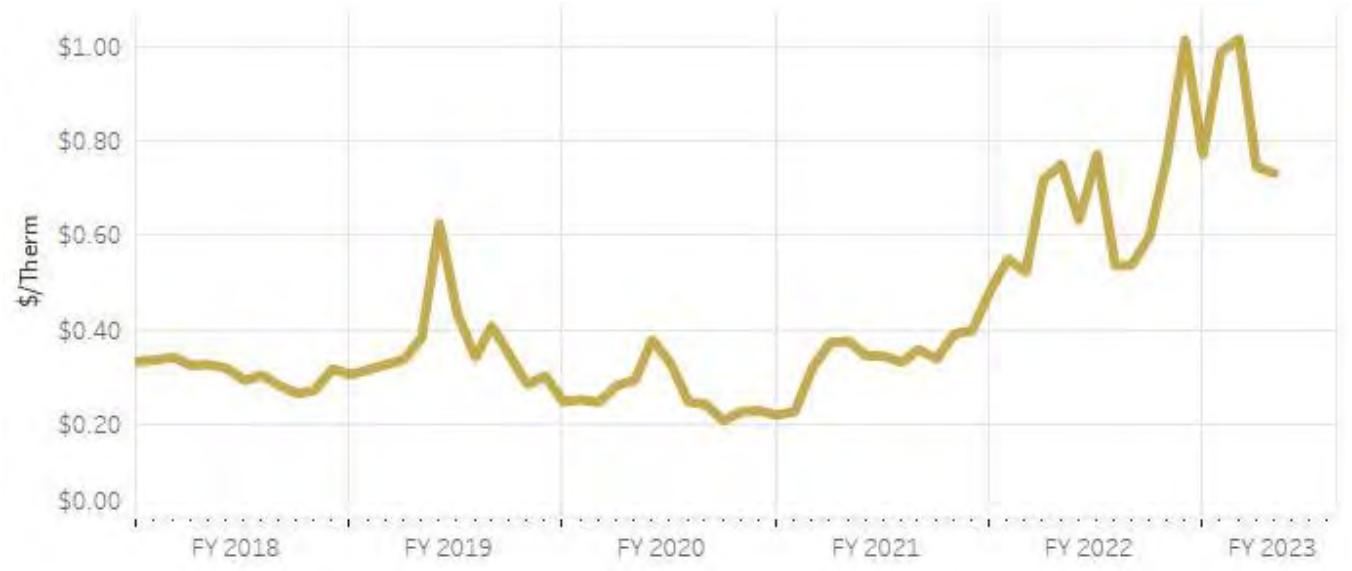
2 Gas Utility

The City's gas utility serves all residential and non-residential gas demand in Palo Alto. The City maintains and operates a system of low-pressure gas lines for delivering gas but does not operate any transmission lines. Costs for the gas utility are split approximately two thirds for the operation, maintenance and one third for the cost of the gas commodity, PG&E gas transmission, compliance with the State's Cap and Trade Program and the City's Carbon Neutral Gas Program.

2.1 Gas Supply and Transmission (Eric Wong)

Gas Commodity prices were relatively high in latter half of FY 2022 and the first half of FY 2023. A combination of flat U.S. natural gas production, below-average U.S. natural gas storage levels, high US liquefied natural gas exports, inflation, supply chain issues, and global geopolitical events have put upward pressure on prices for U.S. natural gas. Prices are expected to stay around $0.6/therm to $0.8/therm throughout the winter season. The communications team published an article in our City website and posted in various social media platforms to inform customers about high gas prices, potential ways to conserve gas usage and encouraged home electrification.

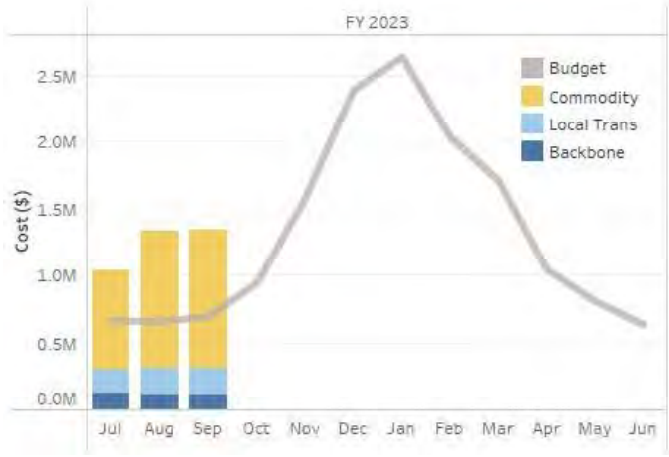
Figure 7: Gas Supply Commodity Rates ($/Therm), FY 2018-23



2.1.1 Actual and Forecasted Supply Costs (Eric Wong)

Gas actual demand through Q1 of FY 2023 were about 14% higher than forecasted, while actual supply and transportation costs were about 84% higher than budgeted in the FY 2023 Financial Plan. Gas commodity prices were much higher than predicted in the FY 2023 financial plan due to reasons mentioned in section 2.1 above.

Figure 8: Gas Supply Costs ($), Actual vs Budget, up to FY 2023-Q1



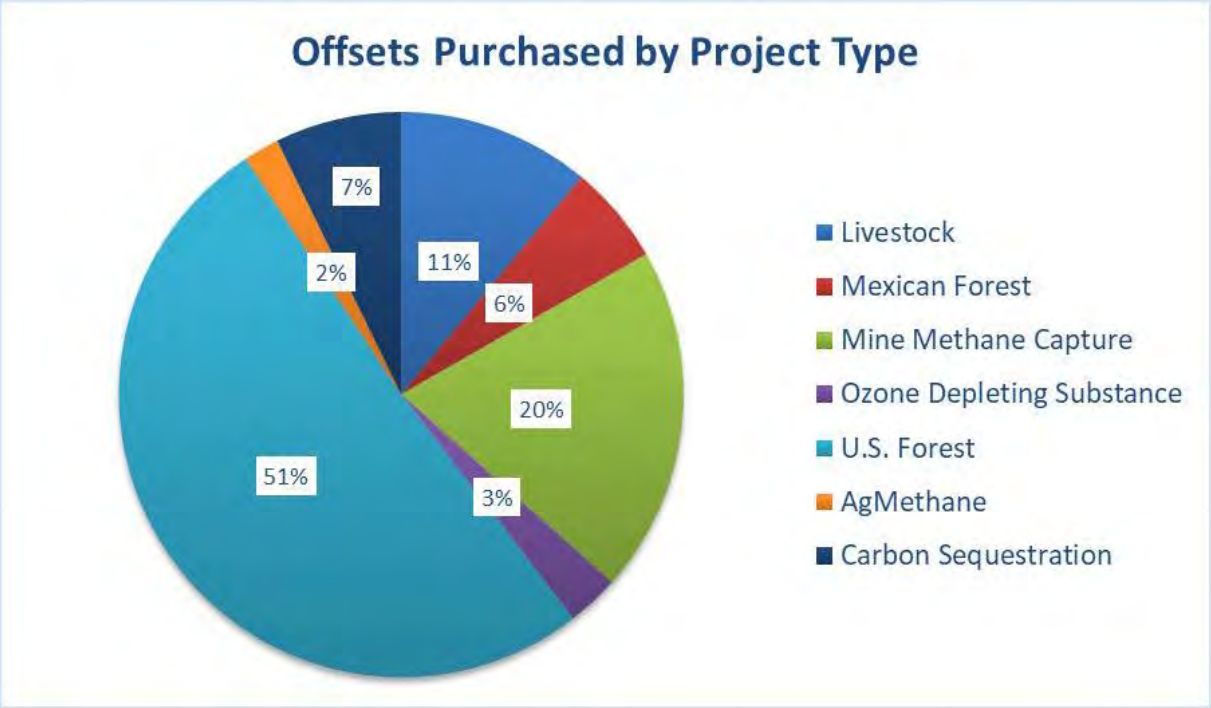
	Budget	Actual	Variance	Variance %
Jul	667,541	1,039,946	372,404	55.8%
Aug	659,409	1,332,201	672,791	102.0%
Sep	696,972	1,348,782	651,810	93.5%
Oct	949,560			
Nov	1,581,034			
Dec	2,387,025			
Jan	2,638,627			
Feb	2,036,749			
Mar	1,712,571			
Apr	1,051,643			
May	812,920			
Jun	638,236			

2.1.2 Carbon Neutral Gas Program (Micah Babbitt)

In December 2020, Council adopted Resolution #9930 maintaining the Carbon Neutral Natural Gas Plan to achieve carbon neutrality for the gas supply portfolio using high-quality carbon offsets with a cost cap of $19 per ton CO_2e.

Offsets are purchased to neutralize emissions equal to those caused by natural gas usage in Palo Alto. Staff purchased 60,000 carbon offsets for FY 2022 in January 2022 from a mixture of forestry and livestock projects at an average purchase price of $12.26 per metric ton, nearly double the price of historical average transaction prices. Staff purchased an additional 60,000 carbon offsets in June 2022 at an average price of $14.51 per ton CO_2e. As a result of the higher offset purchase costs, staff has updated the billing charge for offsets from $0.04/therm to $0.07/therm. The average purchase price of offsets purchased for the program is $7.66 per ton CO_2e. The figure below shows the composition of offset purchases. Staff is evaluating a process change to expedite the approval of new Verified Emission Reduction (carbon offset) counterparties and depending on the timing of this change, will carry out its next offsets purchase in December 2022 or in the beginning of 2023.

Figure 9: Offset Portfolio Composition



The following table provides a description of the projects.

Figure 10: Offset Project Descriptions

Project Name	Project Type	Description
Grotegut Dairy	Livestock	Grotegut Dairy is a 3,900 milk-cow operation in Newton, Wisconsin with a methane capture system.
Green Trees	U.S. Forest	GreenTrees Advanced Carbon Restored Ecosystem is reforestation of agricultural lands into native hardwood forest in Mississippi, Louisiana, Arkansas, and Illinois
San Juan Lachao	Mexican Forest	Protection of forests located in High Biological Value Zones which contain flora and fauna listed in the Mexican Endangered Species List and the International Union for Conservation of Nature's Red List of Threatened Species. Project in San juan Lachao near Palo Alto's Sister City of Oaxaca.
Blandin Forest	U.S. Forest	Blandin Native American Hardwoods Conservation and Carbon Sequestration project in Minnesota.
Pocosin+	U.S. Forest	These projects are all forested land that will not be disturbed by human development. Without this protection, the forests would be converted to grow wheat or corn. Forest conservation plays a vital role in protecting freshwater systems like lakes. The forests around the lakes act as natural water filters and purify the water for all who use it. The projects also support healthy populations of red wolf, bald eagle, black bear, and various bird species.
Refex ODS	Ozone Depleting Substance	The RemTec facility in Bowling Green, Ohio uses an argon arc plasma destruction device to achieve 99.99 percent removal. The majority of refrigerants originated in California, and all were sourced within the United States. The RemTec facility uses an argon arc plasma destruction device to achieve the required destruction and removal efficiency of 99.99 percent. The majority of ODS refrigerants originated in California, and all were sourced within the United States.
Methane Capture	Mine Methane Capture	This project is the first of its kind. Peabody Natural Gas, LLC removed methane from the North Antelope Rochelle Coal Mine before mining. The methane was compressed and transported to a natural gas pipeline and distributed to a national gas grid for use as fuel. Before implementation of the project, all the methane was vented to the atmosphere.
Virginia Conservation Forestry Program	U.S. Forest	The Virginia Conservation Forestry Program - Clifton Farm and Rich Mountain is a 9000+ acre improved forest management project in which the timber and carbon ownership and management rights have been transferred to The Nature Conservancy's Conservation Forestry Program. The program manages for multiple goals to include: Water quality protection, habitat diversity, high value forest products, and carbon sequestration. Co-benefits: Biodiversity, Watershed Protection, Climate Resilience, and Connectivity
Riverview Farm Anaerobic Digester	Livestock	Riverview is a carbon offset project generating emission reductions thought the capture and destruction of methane at a dairy farm in Minnesota. Under the baseline, manure managed in open lagoons led to the fugitive emission of methane to the atmosphere. In the project scenario, this methane is captured by an anaerobic digester and destroyed on site in the production of electricity. Co-benefits include job creation and the improvement of local air and water quality.
Big River / Salmon Creek Forests IFM	U.S. Forest	The Big River and Salmon Creek Forests are located in Mendocino County, CA and cover 16,000 acres of redwood and Douglas-fir forest. This project is a conservation-based forest management project. Co-benefits include the creation of 140 jobs, protection of 37 miles of streams, and improved water quality for local fish and bird species.

2.1.3 Cap and Trade Program (Eric Keniston)

The gas utility has been regulated under California's greenhouse house (GHG) regulations since January 2015 with a GHG emissions cap that declines over time. The gas utility receives carbon allowances equal to the emissions allowed under the cap and is required to auction off a portion of the allowances (55% in 2022, increasing by 5% annually) through the state Cap and Trade Program. To meet its annual GHG compliance obligation, the City must purchase allowances based on actual gas use.

The auction floor price to either purchase or sell allowances increases annually by 5% plus inflation. Historically, allowances have traded at or near the floor price, but the clearing prices for allowances in the auction have increased significantly. The cost of compliance is anticipated to increase from $1.5 million in FY 2022 to $5.6 million in FY 2030, about an 18% increase per year on average, as shown in the following table:

Figure 11: Estimated Cap and Trade Costs

Revenues from the auction sale of gas utility allowances (currently about $1.2 million per year) must be used exclusively for the benefit of the ratepayers in that utility in accordance with California Code of Regulations (CCR Title 17, section 95893). Approved uses are 1) the funding of certain energy efficiency rebates, retrofits, and demand reduction programs, 2) funding for programs with demonstrated GHG reductions, 3) non-volumetric return to ratepayers, either on or off bill, and 4) certain administrative, outreach and educational costs related to items 1-3 above. Council adopted a policy on the use of allowance proceeds (Resolution #9487), generally mirroring the regulations and requiring additional Council approval for rebates. Per the current regulations, the utility must either spend or rebate the funds received in any given year within 10 years (for example, funds received in 2020 must be spent by 2030, etc.).

As of the end of FY 2021, unspent funds related to Cap and Trade revenues were placed in a Cap and Trade reserve, until such time as they can be utilized per the dictates of applicable regulations. There was $6.7 million in this reserve available for use at the end of FY 2022.

2.1.4 Gas Transmission Line Capacity Valuation (Eric Wong)

Palo Alto contracts for capacity on the Redwood pipeline, the path from the California-Oregon border to PG&E's mid-pressure transmission system, at a cost lower than the market value. During the summer months, Palo Alto does not need all of the capacity to serve demand. The excess capacity is monetized by purchasing gas at the California-Oregon border and selling an equal amount of gas at the terminus of the pipeline. The variable cost of transporting the gas is much less than the gas price difference between the two points. The net benefit to the Gas Utility through Q1 of FY 2023 was $169K, or a reduction of about 6.2% of the total gas commodity costs.

2.1.5 Gas Prepay Valuation (Eric Wong)

On September 15, 2014, Council adopted Resolution #9451 authorizing the City's participation in a natural gas purchase from Municipal Gas Acquisition and Supply Corporation (MuniGas) for the City's entire retail gas load for a period of at least 10 years. The MuniGas transaction includes a mechanism for municipal utilities to utilize

their tax-exempt status to achieve a discount on the market price of gas. The program has reduced about $113K, or 4.2% of the total gas commodity costs through Q1 of FY 2023.

2.2 Capital Improvement Plan Status (Silvia Santos)

The following capital projects are currently in progress:

- **GS-14003 - GMR 24A (Gas Main Replacement 24A):** This project will replace approximately 2,450 linear feet of gas main along Shopping Center Way and Orchard Lane in Stanford Shopping Center. The City coordinated the schedule with Simon Property Group Inc. (shopping center's management) for construction work to occur between 6 AM and 3 PM from 1/2/23 to 3/31/23.
- **GS-14003 - GMR 24B (Gas Main Replacement 24B):** This project will include gas pipes on University from Webster to 101 and surrounding streets, as well as Geng Rd and Town & Country Village. Staff is waiting for the federal grant application status which will be available in February 2023.

2.3 Rate and Bill Comparisons (Eric Keniston)

The figure below presents residential bills for Palo Alto and PG&E customers at several usage levels for commodity rates in effect as of a November 2022 (a recent winter period) and October 2022 (a recent summer period). The bill calculations for PG&E customers are based on PG&E Climate Zone X, an area which includes the surrounding communities of Menlo Park, Redwood City, Mountain View, Los Altos and Santa Clara. The annual gas bill for the median residential customer for FY 2022 was $689, about 11% lower than the annual bill for a PG&E customer with the same consumption. PG&E's distribution rates for gas have increased substantially to collect for system improvements for pipeline safety and maintenance.

Figure 12: Residential Natural Gas Bill Comparison ($/month)

Season	Usage (therms)	Palo Alto	PG&E Zone X	% Difference
Winter (November 2022)	30	$ 59.45	$ 72.13	-17.6%
	(Median) 54	97.77	134.32	-27.25%
	80	156.76	208.99	-25.0%
	150	329.66	410.05	-19.6%
Summer (October 2022)	10	27.65	23.64	16.9%
	(Median) 18	40.54	43.87	-7.6%
	30	68.02	77.86	-12.6%
	45	105.29	120.35	-12.5%

2.4 Reliability (Melissa Smart)

The City of Palo Alto tracks all gas service interruptions. A summary chart of these interruptions can be found below. Gas service interruptions are usually due to repairs of broken or damaged gas services and mains. This kind of damage is often caused by excavation by outside parties digging in the City.

Figure 13: Gas Service Interruptions, FY 2023

Gas	Q1
Number of Breaks	9

Total Minutes	643
Customers Affected	20

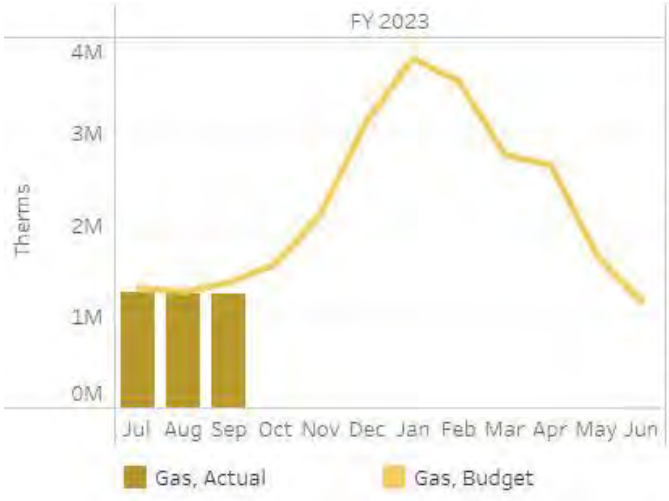
2.5 Financial Health

Below is a summary of the financial position for the gas utility.

2.5.1 Sales Forecasts vs. Actuals (Eric Wong)

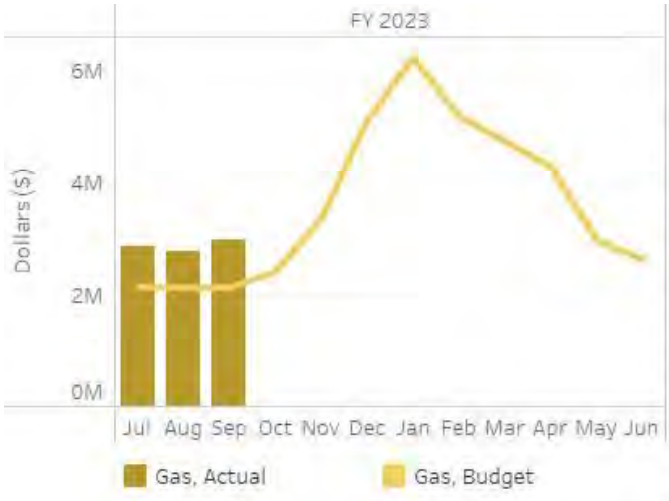
Actual sales volume for Q1 of FY 2023 were about 5% lower than forecasted in the FY 2023 Financial Plan. But actual sales revenue was about 35% higher than forecasted due to high gas market commodity prices. Much of the revenue is pass-through in nature and offsets commensurately higher gas commodity purchase costs.

Figure 14: Gas Sales Volume (Therms), up to FY 2023-Q1



	Budget	Actual	Variance	Variance %
Jul	1,312,955	1,262,859	-50,096	-3.8%
Aug	1,273,056	1,250,771	-22,285	-1.8%
Sep	1,372,999	1,239,006	-133,993	-9.8%
Oct	1,577,927			
Nov	2,140,219			
Dec	3,153,598			
Jan	3,830,945			
Feb	3,575,685			
Mar	2,770,018			
Apr	2,660,158			
May	1,670,754			
Jun	1,162,461			

Figure 15: Gas Sales Revenue ($), up to FY 2023-Q1



	Budget	Actual	Variance	Variance %
Jul	2,158,795	2,880,043	721,248	33.4%
Aug	2,142,170	2,787,192	645,022	30.1%
Sep	2,136,412	2,993,352	856,940	40.1%
Oct	2,420,904			
Nov	3,371,129			
Dec	5,123,807			
Jan	6,241,688			
Feb	5,195,946			
Mar	4,753,158			
Apr	4,296,964			
May	2,984,368			
Jun	2,644,552			

2.5.2 Financial Position (Eric Keniston)

FY 2022 ending Operations Reserves were $11.1 million, and above the minimum reserve level of $7.8 million. Through FY 2023Q1, therm sales were slightly lower than budget by about 5%, but sales revenues were almost

35% higher than budget. Because the gas commodity charge is a pass-through of market costs, increased revenue offsets the increased cost.

3 Water Utility

The Water Utility serves water to virtually all Palo Alto residential and non-residential customers. All potable water in the City is from the San Francisco Public Utilities Commission (SFPUC) Hetch Hetchy Water System. This system delivers high quality water from the Sierra Nevada and uses no pumping to deliver water to Palo Alto. Palo Alto uses a small amount of recycled water for irrigation of the Municipal Golf Course and a few other sites near the Regional Water Quality Control Plant. The City also maintains a system of reservoirs and wells that enable Palo Alto to serve water during an interruption of the Hetch Hetchy system. Costs for the Water Utility are split approximately half for the operation, maintenance and periodic replacement of Palo Alto's water system and half for the costs of the water purchased.

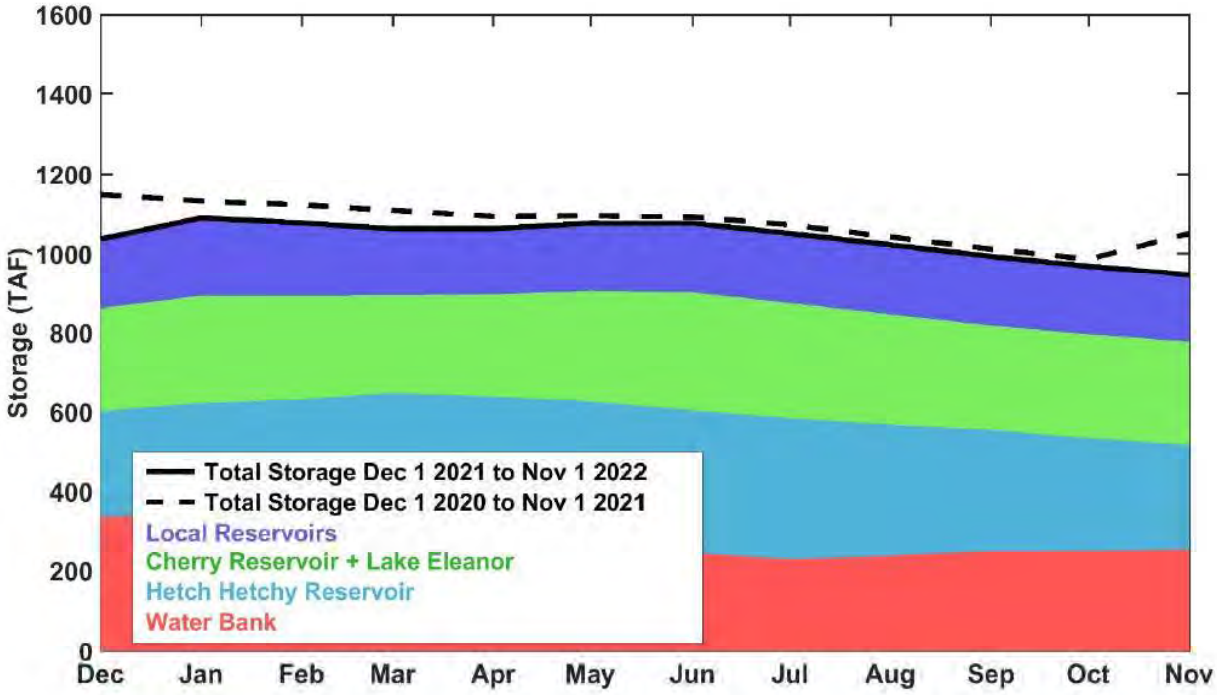
3.1 Water Supply and Transmission (Lisa Bilir)

On November 10, 2022, Governor Newsom's senior Water-Policy Officials, the San Francisco Public Utilities Commission (SFPUC), and the Modesto and Turlock Irrigation Districts reached agreement on a Memorandum of Understanding to provide greater water flows and increased habitat for the Tuolumne River. The Bay Area Water Supply and Conservation Agency (BAWSCA) anticipates that this MOU will become a part of a larger voluntary agreement for the Sacramento-San Joaquin Delta. The agreement includes investments of $64M for habitat restoration. The next step is for the MOU signatories and others to work out the implementation details of a Bay-Delta wide voluntary agreement for evaluation by the State Water Resources Control Board as an alternative to the adopted Bay-Delta Plan.

In August, 2018, Palo Alto's City Council voted to support the State Water Resources Control Board's Bay-Delta Plan to have 40 percent of natural water in the Central Valley to enter the Delta from February to June and associated Southern Delta salinity objectives; and send a letter expressing this policy position to BAWSCA, California State Water Resources Control Board, San Francisco Public Utilities Commission (SFPUC), and other stakeholders.

Storage in the San Francisco Regional Water System is below normal while in better shape than many reservoirs across California. As of October 31, 2022, the Regional Water System total storage operated by the San Francisco Public Utilities Commission (SFPUC) was 64.8% full (normal system storage for this time of year is 79.7%). As of October 31, 2022, Water Bank was 45% full while normal for this time of year would be nearly full. In the figure below, the solid black line shows storage in the Regional Water System for the past 12 months (color bands show contributions to total system storage) and the dashed black line shows total system storage for the previous 12 months. Regional Water System Storage remained fairly steady through September, 2022, but did not pick up in October of 2022 as it did during October 2021 when there was significant precipitation.

Figure 16: Regional Water System Storage



On August 20, 2021 the SFPUC received curtailment orders for Tuolumne River diversions. The curtailments eliminate access to the Water Bank which, as shown in the figure above, provides much of the system storage. From October 2021 through May 2022, the State Board suspended the curtailments and reinstated them on June 8, 2022.

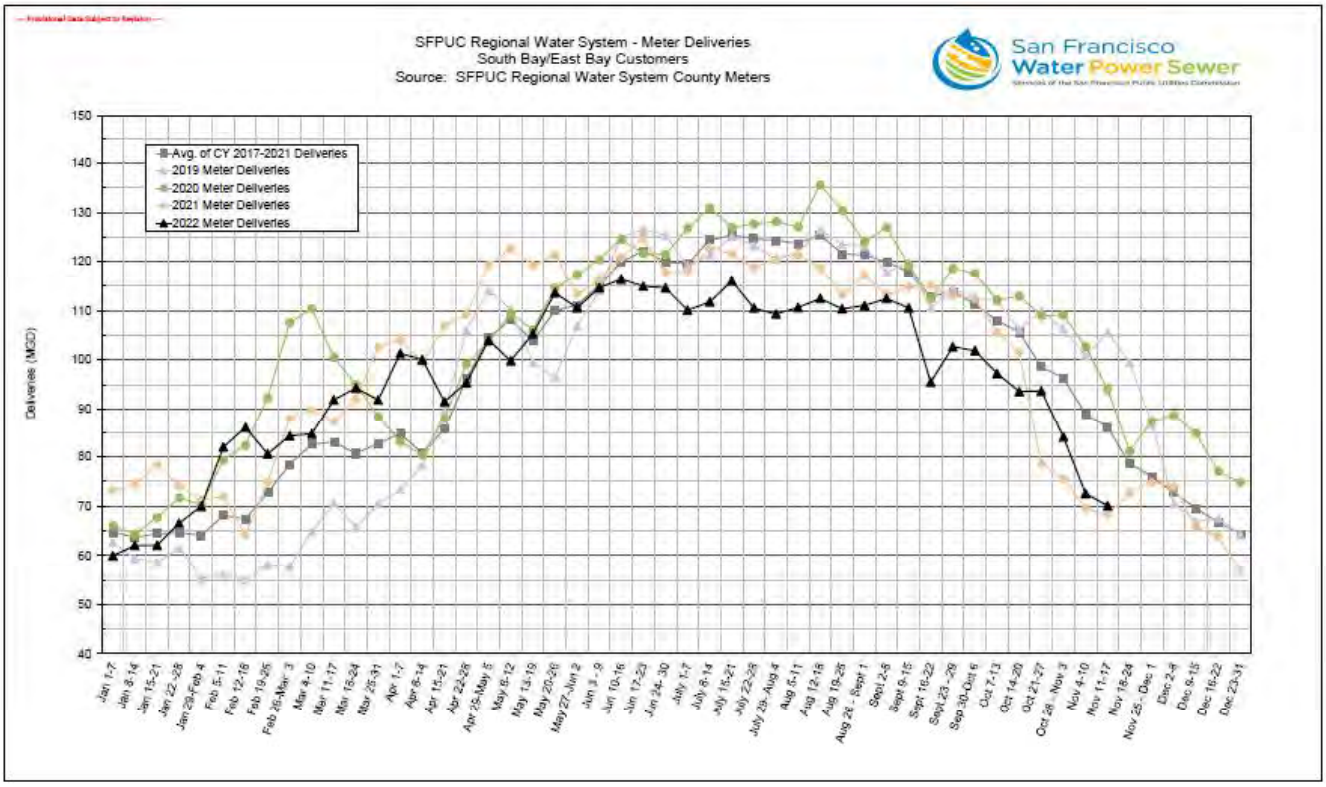
The SFPUC declared a local water shortage emergency by Resolution No. 21-0177 on November 23, 2021 calling for voluntary systemwide 10% water use reductions from FY 2019-2020 levels and increased the systemwide water use reduction to a voluntary systemwide 11% from FY 2019-2020 levels on May 24, 2022 via adoption of Resolution No. 22-0098. SFPUC's increased the systemwide water use reduction in compliance with the State Water Resource Control Board's May 24, 2022 emergency regulation requiring urban water suppliers to implement the demand reduction actions associated with water shortage level of 10% to 20% by June 10, 2022. Each Wholesale Customer has its own requested cutback level; Palo Alto's voluntary water purchase cutback level is 8%. For January – November , 2022, Palo Alto's cumulative monthly water budgets were 4,101,982 CCF while actual total purchases were approximately 4,338,211 CCF or 6% above the budget. This is in part because of the exceptionally dry conditions in January through March 2022. However, for the billing months July 2022 through October 2022, compared with the same period from July 2019 to November 2022 , the Palo Alto community reduced water usage by 10%%.

On May 24, 2022, SFPUC adopted Resolution No. 22-0098 adopting a systemwide voluntary water use reduction of 11% compared to baseline water use during FY 2019-2020. Palo Alto's voluntary water purchase cutback level remains at approximately 8%. SFPUC's cutbacks are currently voluntary, however they could become mandatory in early 2023 if dry conditions continue. Under mandatory water cutbacks, SFPUC may impose excess use charges for water purchases above Palo Alto's water budget.

During drought that require up to 20% cutbacks, water is allocated between San Francisco and the Wholesale Customers collectively based upon the Water Shortage Allocation Plan (or Tier One Plan) that is outlined in Palo Alto's water supply contract with San Francisco. The collective Wholesale Customer share from the Tier One Plan is then allocated among Wholesale Customers based upon a formula in a negotiated and adopted "Tier Two Plan." Palo Alto's current water budget is based upon the results of the current Tier One and Tier Two Plans. In 2022, staff have been participating in a negotiation with the other Wholesale Customers to update the Tier Two Plan. Staff expects to finalize the updated Tier Two Plan in 2023.

The figure below shows water usage for the South Bay/East Bay (including Palo Alto) compared to several benchmarks including 2019. For the South Bay/East Bay region as well as systemwide, summertime peak demand so far has been shaved off below demand levels for each of the past three years.

Figure 17: SFPUC Water Deliveries



Valley Water, the groundwater manager in Santa Clara county, declared a water shortage emergency and adopted a 15% mandatory water use reduction for water retailers its agency serves. Valley Water called for the County, water retailers and cities to restrict ornamental landscape and lawn irrigation with potable water within their service or jurisdictional areas to no more than two days per week. Although Palo Alto purchases all of its potable water from SFPUC, and does not purchase any water from Valley Water, Palo Alto partners with Valley Water on wide variety of water conservation programs. On June 20, 2022, the Palo Alto City Council restricted potable irrigation of ornamental landscapes and lawns to 2 days per week, except to ensure the health of trees and other perennial non-turf plantings. The State Water Resources Control Board also prohibited the use of potable water for the irrigation of "non-functional turf" at commercial, industrial, and institutional sites other than to the extent necessary to ensure the health of trees and other perennial non-turf plantings.

The Palo Alto City Council also implemented the water use restrictions in Stage II of the Water Shortage Contingency Plan which are 1) restaurants and other food service operations shall serve water to customers only upon request and 2) operators of hotels and motels shall provide guests with the option of choosing not to have towels and linens laundered daily. Palo Alto is working with Valley Water on messaging to customers in the county to avoid confusion as much as possible. As such, the wise use of water rather than specific targets will continue to be emphasized. Palo Alto staff is continuing to focus on education and outreach and providing resources to eliminate water waste and achieve efficient water use and completed the process of hiring a Water Waste Coordinator in October. The Water Waste Coordinator is logging and following-up on water waste reports. Palo Alto is kicking off the WaterSmart Customer Portal and Residential Home Water Report Program and also re-engaging with Waterfluence software to target water efficiency for large landscape customers. We continue to promote rebate programs and resources through online outreach, bill inserts, and newsletters.

Palo Alto launched the One Water Plan with the goal of Council adoption of a One Water supply plan that is a 20-year adaptable roadmap for implementation of water supply and conservation portfolio alternatives. In June the City Council approved a contract for this work with Carollo Engineers, Inc. In September, staff conducted stakeholder engagement meetings with community members and city staff focusing on One Water community needs and priorities. Additional stakeholder engagement meetings are planned with city staff, community members, and regional partners in early December to discuss water supply and conservation options and review draft evaluation criteria for the One Water Plan.

3.2 Capital Improvement Plan Status (Silvia Santos)

The following capital projects are currently in progress:

- **WS-14001 - WMR 28 (Water Main Replacement 28):** The project is to replace approximately 18,763 linear feet of water main and 256 water services in the Crescent Park, Barron Park, and Charleston Meadows neighborhoods. Construction of this project started during April 2022 and the anticipated completion date is in November 2023.
- **WS-07000 – California Avenue and Page Mill Road Turnouts:** This project includes work to upgrade California Avenue Turnout and to restrain the pressure reducing valve at Page Mill Road Turnout. The construction is anticipated to start in March 2023 and be completed by June 2023 (before water demand increases during the summer).

3.3 Rate and Bill Comparisons (Lisa Bilir)

The figure below shows the water bills for single-family residential customers compared to what they would be under surrounding communities' rate schedules as of October 2022. CPAU is among the highest monthly bills of the group. Palo Alto's water bills at 9 CCF per month are 17% higher than the comparison group average.

Figure 18: Residential Water Bill Comparison ($/month)

As of October 2022						
Usage CCF/month	Palo Alto	Menlo Park	Redwood City	Mountain View	Santa Clara	Hayward
4	$50.74	62.83	$54.04	$43.47	$29.32	$41.03
(Winter median) 7	76.54	87.32	76.09	67.29	51.31	63.23
(Annual median) 9	98.46	103.65	90.79	83.17	65.97	78.03

(Summer median) 14	153.26	148.02	138.94	122.87	102.62	123.48
25	273.82	257.41	267.39	257.81	183.25	223.47

3.4 Reliability (Melissa Smart)

The City of Palo Alto tracks all water service interruptions. A summary chart of these interruptions can be found below. Water service interruptions are usually due to repairs of broken or damaged water services and mains.

Figure 19: Water Service Interruptions, FY 2023

Water	Q1
Number of Breaks	10
Combined Minutes	1007
Customers Affected	46

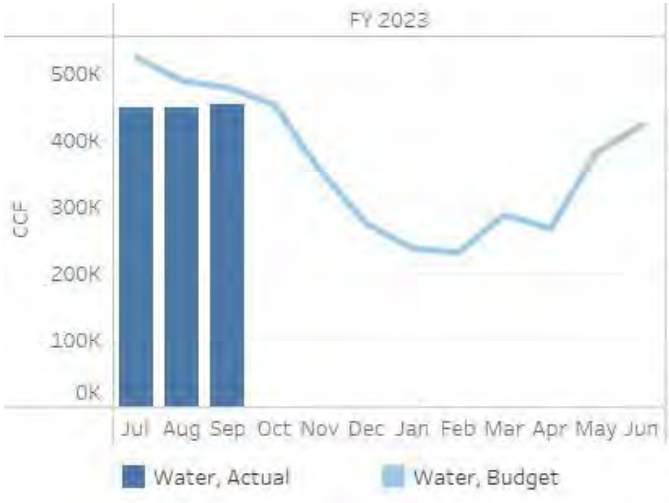
3.5 Financial Health

Below is a summary of the financial position for the water utility.

3.5.1 Sales Forecasts vs. Actuals (Eric Wong)

Actual water sales volumes through Q1 of FY 2023 were about 10% lower than forecasted in the FY 2023 financial plan. Actual water sales revenues were about 13% lower than forecasted during the same period. Despite the dry weather conditions, substantial water conservations were made by the Palo Alto community during Q1 of FY 2023. Staff will continue to promote drought-related and water savings communication through the rest of the FY 2023.

Figure 20: Water Sales Volume (CCF), up to FY 2023-Q1



	Budget	Actual	Variance	Variance %
Jul	525,621	449,495	-76,126	-14.5%
Aug	490,256	449,699	-40,557	-8.3%
Sep	479,291	454,552	-24,739	-5.2%
Oct	454,425			
Nov	354,487			
Dec	275,706			
Jan	237,777			
Feb	232,409			
Mar	288,269			
Apr	268,185			
May	382,762			
Jun	424,508			

Figure 21: Water Sales Revenue ($), up to FY 2023-Q1

	Budget	Actual	Variance	Variance %
Jul	5,702,307	4,505,935	-1,196,372	-21.0%
Aug	5,318,642	4,707,270	-611,372	-11.5%
Sep	5,199,686	4,867,131	-332,555	-6.4%
Oct	4,929,922			
Nov	3,845,724			
Dec	2,991,053			
Jan	2,579,572			
Feb	2,521,336			
Mar	3,127,345			
Apr	2,909,460			
May	4,152,472			
Jun	4,605,362			

3.5.2 Financial Position (Lisa Bilir)

The Water Operations Reserve was filled to the maximum guideline level at the end of FY 2022 as higher bid costs and delays in project schedules resulted in deferred main replacement projects over the past few years. There are additional funds in the Operations Reserve above the maximum guideline level that will continue to be used to cover water utility operational and capital costs in FY 2023. At year end FY 2022 there was approximately $12.2 million in Water CIP Reappropriations and Commitments reserves. The FY 2023 Water Utility CIP includes a main replacement (WMR 28) as well as one-time seismic reservoir upgrades (one upgrade is complete and a second and third are planned in FY 2023 and FY 2026). At year end FY 2022, there was also $10.7 million in the CIP Reserve and $9.07 million in the Rate Stabilization Reserve. Staff's preliminary projection of expected revenues and expenses together with transfers from the CIP Reserve, estimates the Operations Reserve will reach approximately target levels by the end of FY 2023. Staff will continue to monitor drought conditions and respond to calls for voluntary or mandatory conservation. Staff will evaluate and propose reserve transfers between the Rate Stabilization Reserve, CIP Reserve, and Operations Reserve in the annual Financial Plans.

4 Wastewater Utility

The Wastewater Utility includes the system of sewer pipes that collect and transport wastewater to the Regional Water Quality Control Plant (RWQCP) operated by the City of Palo Alto under a partnership agreement with several surrounding communities, as well as Palo Alto's share of the cost of operating the RWQCP. The RWQCP provides treatment and disposal of wastewater for Palo Alto. Costs for the Wastewater Utility are split approximately half for the operation, maintenance and periodic replacement of Palo Alto's sewer collection system and half for the costs of wastewater treatment at the RWQCP.

4.1 Wastewater Treatment Updates and Capital Planning Status (Lisa Bilir)

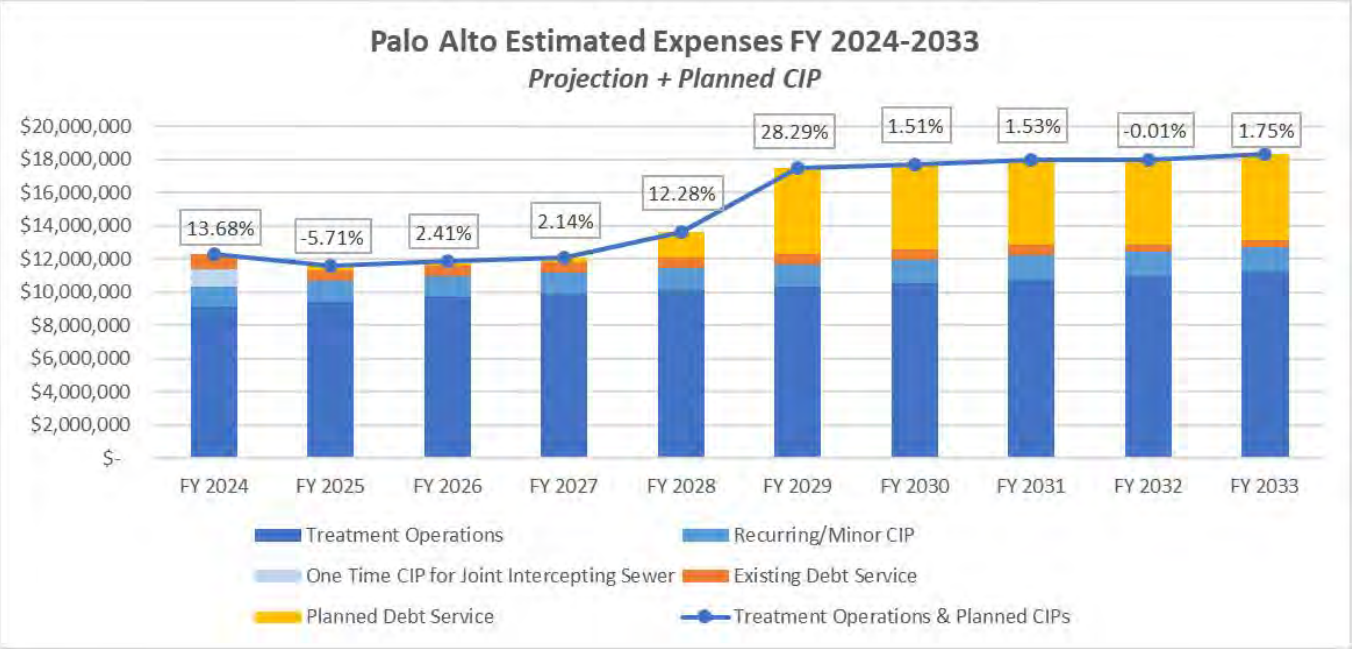
The Regional Water Quality Control Plant is operated by Palo Alto's Public Works Department and provides wastewater treatment to Palo Alto, Mountain View, Stanford, Los Altos, East Palo Alto and Los Altos Hills. The Palo Alto Wastewater Collection Utility pays its share (approximately 32% projected in FY 2024) of the costs for wastewater treatment and disposal. Capital costs for wastewater treatment are a major driver for cost increases for the Wastewater Treatment Utility and by extension for the Wastewater Collection Utility. These costs are projected to increase at approximately 15% per year on average from FY 2023 through FY 2032. The RWQCP is facing the need for major upgrades in coming years, due to aging equipment and changing environmental regulations. Rehabilitation and replacement of plant equipment that has been in use for over 40 years is necessary to ensure the city can continue to provide wastewater treatment operations safely and in compliance with regulatory requirements for the discharge of treated wastewater 24 hours a day.

4.1.1 Treatment Cost Trends (Lisa Bilir)

RWQCP staff project treatment costs paid for by Palo Alto's Wastewater utility to increase by approximately 5.8% annually on average from FY 2023 through FY 2032. A key driver of the increases are capital projects, parts, materials and debt. The treatment capital expenses, including debt service costs, are increasing at an average of about 15% per year from FY 2023 through FY 2032 to keep up with ongoing replacement of aging equipment. Larger increases to capital expenses are expected to begin in FY 2024 in the form of new debt service for major projects to implement the Plant's capital program. The figure below shows Palo Alto's share of each component of estimated treatment costs. Major upcoming capital projects and estimated years for debt service to begin are reflected in the "Planned Debt Service" bar in the figure below and include:

- Joint Interceptor Sewer Rehabilitation (FY 2024)
- 1900 Embarcadero Road Purchase; Primary Sedimentation Tank Rehabilitation (FY 2025)
- Outfall Line Construction, Operation Center and Laboratory (FY 2027)
- Secondary Treatment Upgrades, Headworks Facility (FY 2029)

Figure 22: Palo Alto's Share of Estimated Wastewater Treatment Expenses (Projection and Planned CIP)



The figure shows the ongoing annual CIP reinvestment ("Recurring/Minor CIP" and "Existing Debt Service") as well as treatment operations costs, which make up the majority of the treatment costs but are not growing as quickly as the planned debt service. Factors that are contributing to cost increases for treatment operations are rising salary and benefits costs, allocated charges for centralized city services needed to support wastewater treatment fund operations, increased water and air permitting fees from the Regional Water Quality Control Board and Bay Area Air Quality Management District, commodity rates to operate the facility, and chemical expenses.

4.1.2 Regional Water Quality Control Plant Capital Planning Status (Lisa Bilir)

The Long-Range Facilities Plan, completed in 2012, guides the capital plans for the RWQCP. The RWQCP's current capital work in-progress includes an estimated $359 million in projects. The following table summarizes these ongoing projects and provides their status and costs.

Figure 23: Current RWQCP Capital Work In-Progress (information from RWQCP June 2022 Partners Meeting)

Project	Status	Expense (million $)
Primary Sedimentation Tanks Rehabilitation and Equipment Room Electrical Upgrade	Construction	$19.4
New Outfall Pipeline	90% Redesign	$17.4
Secondary Treatment Upgrades	Awarding Construction	$193
Advanced Water Purification System	90% Design	$56
Technical Services Building/Lab Building, Ops Building Remodel	Advanced Planning	$41.4
Buy 1900 Embarcadero Road	Planning	$6.0
Headworks Facility Replacement	Budgeted	$48.6
Joint Interceptor Sewer Rehabilitation	Design	$5.6
Projects in Progress	Various	$10.6
	Subtotal	**$398**

The largest projects listed above include the Headworks Facility Replacement which involves replacement or rehabilitation of the parts of the facility that pump raw sewage to the main treatment works (the headworks), and rehabilitation of primary sedimentation tanks that separate out primary sludge. Additionally, the RWQCP anticipates regulations to limit nutrient discharges (on total nitrogen) into the San Francisco Bay. The current secondary treatment design cannot remove nitrogen and the Secondary Treatment Upgrades will address this regulatory change as well as address aging mechanical and electrical equipment that must be replaced.

The RWQCP plans to fund these capital projects through a combination of mechanisms including State Revolving Fund loans, and revenue bonds. In addition, Valley Water will be providing $16 million of funding for the Advanced Water Purification System. Additionally, Palo Alto was awarded a $12.8 million grant from the Bureau of Reclamation's WaterSMART: Title XVI WIIN Act Water Reclamation and Reuse Project funding for the Advanced Water Purification System.

4.2 Collection System Capital Improvement Plan Status (Silvia Santos)

The following capital projects are currently in progress:

- **WC-17001 - SSR 30 (Sanitary Sewer Replacement 30):** This project is to replace approximately 10,120 linear feet of wastewater main and 156 sewer laterals in the Ventura, Research Park, Fairmeadow, and Midtown West neighborhoods. The construction started on 3/28/22 and the project is scheduled to be completed in January 2023.
- **WC-19001 - SSR 31 (Sanitary Sewer Replacement 31):** This project is to replace approximately 10,000 linear feet of wastewater main, sewer laterals, and manholes on El Camino Real. The construction is anticipated to start in June or July of 2023. A significant portion of the work will be performed during nighttime due to Caltrans' restriction to close 2 traffic lanes only between 11 PM and 6 AM.

4.3 Rate and Bill Comparisons (Lisa Bilir)

The figure below shows the wastewater monthly bill for residential customers in Palo Alto compared to what they would be under surrounding communities' rate schedules as of November2022. Palo Alto's monthly sewer bill is lower than four of the six neighboring communities. Menlo Park in this table refers to the West Bay Sanitary District. Staff will report on future rate increases once they are adopted by the wastewater utilities.

Figure 24: Residential Wastewater Bill Comparison ($/month)

As of November, 2022						
Palo Alto	Menlo Park	Redwood City	Mountain View	Los Altos	Santa Clara	Hayward
$44.62	$106.67	$89.28	$50.10	$42.05	$46.82	$38.58

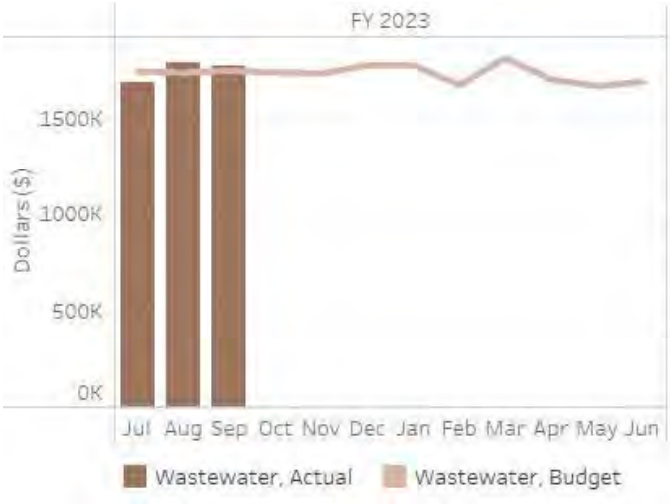
4.4 Financial Health

Below is a summary of the financial position for the wastewater utility.

4.4.1 Sales Forecasts vs. Actuals (Eric Wong)

Actual wastewater sales revenues through Q1 of FY 2023 were around expectation, at about 0.4% higher than forecasted in the FY 2023 Financial Plan.

Figure 25: Wastewater Sales Revenue ($), up to FY 2023-Q1



	Budget	Actual	Variance	Variance %
Jul	1,739,132	1,685,896	-53,236	-3.1%
Aug	1,733,213	1,786,224	53,011	3.1%
Sep	1,743,637	1,763,529	19,892	1.1%
Oct	1,734,767			
Nov	1,728,399			
Dec	1,771,013			
Jan	1,770,711			
Feb	1,669,155			
Mar	1,810,061			
Apr	1,696,732			
May	1,665,374			
Jun	1,684,910			

4.4.2 Financial Position (Lisa Bilir)

The Wastewater Collection Operations Reserve was within the guideline range at year end FY 2022; the CIP Reserve had a balance of approximately $3.2 million at year end FY 2022 and staff will seek Council approval in the FY 2024 Wastewater Collection Financial Plan to access funds in the CIP Reserve if they are needed for CIP projects. The Wastewater Collection Utility CIP Reappropriation and Commitment Reserves totaled $4.6 million at the end of FY 2022. In addition to these funds, the adopted FY 2023 budget included approximately $3.5 million in the CIP program primarily for the Sanitary Sewer Replacement Project 31.

5 Fiber Utility

The City offers a "Dark" fiber service providing a fiber connection from Palo Alto businesses to the downtown Internet Exchange. At the exchange businesses select an internet service provider (ISP) for bandwidth and connection speed.

5.1 Fiber Utility Strategic Planning (Dave Yuan & Josh Wallace)

On September 19, 2022 the Council and UAC held a joint session (Staff Report #13956, Packet Pg. 54)) to discuss the City's fiber backbone network plan and findings from research into providing citywide fiber-to-the-premises (FTTP). During the joint session, the Council and UAC reviewed plans to build the fiber backbone and evaluated the feasibility of expanding the City's current licensing of dark fiber to end users by building out the network to connect to homes and businesses with a citywide FTTP distribution network to offer broadband services.

The City launched the Palo Alto Fiber Market Research Survey and Fiber Deposit program. 3,254 surveys were completed (14.8% response rate) and 703 deposits received as of August 3, 2022. High-level findings from survey results in are provided below:

1. 28.4% of households are either very dissatisfied or somewhat dissatisfied with their current internet services. An additional 14.4% are neither satisfied nor dissatisfied.
2. 53% of households subscribe to internet streaming only and do not subscribe to cable television which is also known as "cutting the cord". An additional 18% of customers would consider canceling cable television and using only internet streaming.
3. Top three reasons to switch from current providers (in priority order) are lower price, faster speed, and higher reliability.

Staff identified several significant competitive risk factors and potential risk mitigation strategies. Risks include market demand for a municipal broadband offering, speed to market to buildout FTTP, and staffing and contract management to build and operate a new City-owned ISP business. Some of the mitigation strategies to address these risks include expansive FTTP customer acquisition and marketing campaign, streamlined permitting, and strong service level agreements with vendors.

Magellan analyzed two financing options to deploy fiber to the entire City. Option 1 is a citywide FTTP buildout funded by fiber reserves and bond financing within five years. Option 2 is an incremental FTTP buildout using fiber reserves without bond financing which could span over 15 – 20 years.

5.2 Capital Improvement Plan Status (Patrick Valath/Dave Yuan)

The Fiber Network Rebuild CIP project is temporarily on hold pending the results of the fiber backbone expansion and FTTP project. As part of the City's wildfire mitigation plan, CPAU will underground approximately 11 miles of electric line in the Foothills area by 2025. CPAU have already completed 1.5 miles of substructure work and have started working on the next 1.5 miles. CPAU is adding spare conduits for fiber as part of the undergrounding project in the foothills.

5.3 Reliability (Dave Yuan)

There were no unplanned fiber outages or events to report in Q1 of FY 2023.

5.4 Financial Health

Below is a summary of the financial position for the fiber utility.

5.4.1 Fiber Sales (Dave Yuan)

Actual fiber revenues for FY 2022 were $3.3 million, which is $0.3 million or 8% below FY 2022 revenue forecast of $3.6 million. Based on the number of new dark fiber applications, staff projects annual fiber revenues will return to pre-pandemic level of $4.5 million by FY 2024. To expand the dark fiber business, CPAU is recruiting for a dedicated Fiber Engineer and Fiber Market Analyst to reduce fulfillment time for new applications.

Actual fiber expenses for FY 2022 were $3.2 million which includes $1.0 million of fiber consulting expenses with Magellan Broadband for engineering design of the fiber backbone and FTTP networks, community engagement, FTTP business models, and grant funding analysis. Funding is shared between Fiber ($2.0M) and Electric ($0.4M). As of Q4 2022, $1.2 million is still remaining under the Magellan contract.

5.4.2 Financial Position (Dave Yuan)

The projected ending FY 2022 Fiber Optic Utility Rate Stabilization Reserve is $34.0 million.

6 Customer Programs (Efficiency and Sustainability)

The City's Utilities Department maintains a number of programs to help customers save money, use energy and water efficiently, and reduce carbon emissions. These programs are funded through a variety of funding sources, some of which are summarized below.

6.1 Customer Programs Updates

Below is a summary of the City's energy and water efficiency programs, as well as programs to encourage building electrification and adoption of electric vehicles.

6.1.1 Energy and Water Efficiency (Scott, Leanna, Brian, Christine, Linda)

Energy & Water Efficiency Workshops (Scott Mellberg, Kevin Carley, Linda Grand)

The City in partnership with the Bay Area Water Supply and Conservation Agency (BAWSCA) held three landscape efficiency workshops in fall 2022. The workshops covered topics on harvesting rainwater, steps to take to design and convert lawns into drought-tolerant landscapes, and available rebates. Attendance was strong, with more than 91 residents total participating in the workshops..

Schedule of CPAU Workshops September - November 2022

Event #	Date	Event
1	9/24/2022	Rain Barrel Workshop
2	10/18/2022	Landscape Design 101
3	11/1/2022	Lawn Conversion 101

Please visit the BAWSCA website for a complete list of available classes and events at: https://bawsca.org/conserve/programs/classes. All past Landscape Class Videos are available online at: https://bawsca.org/conserve/landscaping/videos/. For updates on future events and workshops, please visit http://cityofpaloalto.org/workshops

With collaboration from the City Manager's Office, Planning and Development Services and the Utilities Department, a Making Better Choices in Your Home Workshop was held on Saturday, October 15 from 10 a.m. – 1 p.m. at Mitchell Park Community Center. Over 200 attendees learned about different climate-friendly choices they can make in their home, including displays of heat pump water heaters, and experts answering questions about induction cooktops, electric vehicles, e-bikes, water saving and the advantages of going all electric.

Residential Energy and Water Programs (Scott Mellberg)

The Home Efficiency Genie program continues to provide residents with professional advice and information to improve their home's efficiency and comfort, lower their energy and water usage and get guidance on home electrification options. Even with the Genie returning to in-home comprehensive and diagnostic assessments in the fall of 2021, the virtual option developed during COVID continues to be a service that residents are interested in. The Home Electrification Readiness Assessment (HERA) was also amended to include a virtual version during COVID. Both the in-home and virtual versions continue to help residents assess home electrification upgrades that their home can accommodate and provide actionable next steps. Between July and October of 2022, the Genie performed 20 comprehensive in-home assessments, 19 HERAs and 3 virtual assessments.

CPAU's Residential Energy Assistance Program (REAP) for income-qualified customers continues to reach our most vulnerable population offering energy and water efficiency improvements at no cost to the customer. Residents who are newly qualified for CPAU's Rate Assistance Program (RAP) are notified each month of their eligibility for these free upgrades installed by CPAU's vendor, Synergy. Between July and October of 2022, 5 new REAP customers have taken advantage of the free efficiency upgrades, with projects including building envelope improvements, furnace replacements with high efficiency models, and lighting upgrades to LEDs.

For our multifamily (MF) property owners, CPAU continues to offer the Multi Family Plus (MF+) program which offers free energy efficiency upgrades installed by our vendor, Synergy. These upgrades include lighting upgrades to LEDs and whole building envelope upgrades.

Water Conservation Program (Linda Grand)

CPAU partners with Valley Water to offer a robust portfolio of water conservation programs and rebates for residents and businesses. On July 1, 2022, the City entered into a new cost-sharing agreement with Valley Water which increases rebate amounts for converting turf into drought-tolerant landscapes and includes a new Lawn to Mulch rebate program for commercial customers. As drought conditions continue, CPAU is focusing outreach on reducing outdoor water use and continues to encourage participation in rebates and resources.

On October 6, 2022 the City launched WaterSmart, an online water management tool to help residents and businesses better understand their water usage and enable them to conserve water and save money. The WaterSmart Portal is open to all City of Palo Alto Utilities customers and provides access to water use charts, personalized recommendations for water efficiency, information on available rebates, and more. The WaterSmart system integrates with MyCPAU, the Utilities online account management tool, for a streamlined sign-on experience.

Bay Area SunShares Program (Leanna Huynh)

The 202For the seventh year in a row, the City of Palo Alto is an outreach partner for Bay Area SunShares, a solar and battery storage group-buy program administered by Building Council for Climate Change (BC3). More than 35 Bay Area communities and companies are participating as outreach partners. Palo Alto's participation as an outreach partner helps CPAU customers receive information and discounted prices from vetted contractors. Three solar installers (Solar Technologies, SkyTech Solar, and Infinity Energy) have been vetted and selected through an RFP process. CPAU hosted a free educational workshop in partnership with BC3 on October 12, 2022 with 83 attendees. Palo Alto had the highest number of SunShares sign ups with 161 registered residents by the November 15, 2022 registration deadline. Contracts for installations must be signed by December 15, 2022.

Business Advantage Program (Brian Ward)

As of November 22, 2022, 2022, 2022, the Business Advantage Program (BAP) has installed 75 customers with an additional 21 customer waiting on installs for the GridPoint Energy Management program (GEM). Of the 75 customers, only two have decided to withdraw and return equipment. One customer preferred their old thermostat (NEST) and the other was frustrated using the system and had multiple overrides and could not control employees like old thermostat behavior. The two returned units will be redeployed. The majority of program sign ups continue to come from direct customer sales through face-to-face engagement. GridPoint currently has had personal changes had an issue with its installer and had to replace them with another company. However, the new installer was also let go because of poor customer services and substandard installation work. GridPoint reacquired the old installer but rates for service were much higher. Point and Palo Alto continue to offer free 30-minute customer training sessions on a monthly basis. The primary point is to educate current users on how to properly program and operate the GEM system. Lastly, a second contract amendment was completed, and Wildan Energy Services is the official contract holder.

Commercial & Industrial Energy Efficiency Program (Brian Ward and Christine Tam)

As of October 31, 2022, Enovity has completed 3 projects with 259,000 kWh savings. They have three additional projects in the pipeline and anticipate finishing these projects before the end of the fiscal year with an additional 2,000,000 kWh savings in FY 2023. Key Account Managers have been actively reaching out to engage customers with direct email contacts as well as through the Questline Key Account Newsletter. Lighting continues to be the most popular energy conservation measure. Some companies, however, are reluctant to allocate resources to efficiency upgrades until staffing levels at their sites return to pre-pandemic levels.

Business Customer Rebates, formerly Commercial Advantage Program (Brian and Christine Tam)

The Business Customer Rebate (BCR) program was launched in May this year, with the expansion of business rebates for commercial electrification projects and also increased rebates for electric efficiency savings. This program was rebranded from the Commercial Advantage Program to promote energy efficiency and electrification projects among business customers. Both standard rebates and custom rebates are offered through this program. This program is currently being publicized through business e-newsletters, bill insert, and cross promotion from other CPAU business programs.

Business Energy Advisor (Christine Tam and Shelby Sinkler)

Since the Business Energy Advisor program launched in June 2022, 21 program participation agreements have been sent to customers, 7 agreements have been signed, and 3 site assessments have been completed. There are 4 additional assessments in the pipeline that are anticipated to be complete by the end of this year. CLEAResult has launched a call center campaign to engage more customers, and both CPAU and CLEAResult have continued in-person outreach to small and medium business in Palo Alto. Additional outreach plans include a direct mailer campaign in early 2023, advertisement in the bi-monthly CPAU newsletter to small and medium businesses, and presentations to business organizations in Palo Alto.

6.1.2 Building Electrification (Christine Tam, Lisa Benatar, Shelby Sinkler)

With sustainability continuing to be a Council priority, staff recognizes the need to promote the importance and benefits of building electrification (BE) while removing barriers to voluntary electrification efforts in existing

buildings. Current work covers three areas of activities: public outreach, customer program development and implementation, and strategy and policy development.

For public outreach, staff continues to participate in meetings with Working Group teams developed through the Council's Ad Hoc Committee. These working groups hold periodic updates with the public, including one on June 14, 2022.

For residential customer programs, staff issued a comprehensive RFP in June 2021 for residential building electrification, energy and water efficiency programs which includes single family and multifamily homes as well as income and medically qualified residents. As part of the community engagement process, an Ad Hoc committee of Council members was formed in April 2021, and staff was asked to pause activities related to contract negotiations for the residential programs RFP until the Council Ad Hoc committee and related working groups had the opportunity to provide input on program design and direction. Staff was also asked to wait to proceed with contract negotiations while concerns raised by the Utility's Engineering and Operations Division about potential additional electric load resulting from building and transportation electrification were addressed. These community and staff collaborative efforts resulted in the ongoing development of a turnkey heat pump water heater installation program. Other programs planned include building electrification phone advisory and technical assistance services for both single family and multifamily property owners, and self-service online tools to help residents assess the economics of electrifying their homes. Staff has resumed contract negotiations with the selected vendors since June 2022 and plans to bring the contracts to City Council for approval in the fall of 2022.

For strategy and policy development, Utilities staff is collaborating with Planning & Development Services to propose building electrification requirements for the upcoming building code cycle (2023-2025). The proposed requirements include the following elements:

- All-electric design for new construction projects; this applies to low-rise residential buildings, detached ADUs, multifamily buildings, and nonresidential buildings.
- Addition/alteration projects that meet the "Substantial Remodel" definition will trigger the all-electric requirements. For the purposes of electrification, substantial remodel shall mean the alteration of any structure, including cumulative projects or additions to the existing structure within any three (3) year period, that affects the removal or replacement of 50% of the linear length of the exterior weight-bearing walls of the building, 50% of the wall plate height is raised, and/or 50% of the roof structural framing.
- Prohibit the extension of gas infrastructure in existing buildings to outdoor amenities such as pools, spas, fireplaces and grills in order to minimize the carbon footprint of these equipment.
- Require heat pump water heater when the existing water heater is replaced, or new water heater is added as part of a residential addition or alteration project.

Collectively these proposed requirements will avoid over 3,420 MT CO_2-e per year, about 1% to 1.5% of the remaining emissions reductions needed to achieve the 80x30 goal (about 1.5% to 2% when upstream emissions from fuel use are included).[3] Other proposed Green Building requirements cover EV infrastructure, water efficiency, and embodied carbon limits in the use of concrete for new construction projects. Additional details can

[3] Using 20-year global warming potentials.

be found in the 2022 Reach Codes webpage. Staff will be bringing the proposed Green Building regulations to City Council for the first reading this coming October.

Business Electrification Technical Assistance Program **(BE TAP)**

The BE TAP program officially launched in August 2022, offering no-cost assessments to help nonresidential customers identify electrification opportunities and free technical assistance to support them with their building electrification journey. Since the program launched, our partner, CLEAResult, has completed 2 site assessments, assisting large commercial customers with potential HVAC and heat pump water heater projects. The feasibility study completed for the large HVAC project found an estimated 77,640 kWh and 54,263 therms savings, with a potential incentive of $100,000 for the customer. The next steps for this program include completing additional project feasibility studies and other electrification assessments in the pipeline. We plan to continue outreach efforts through the call campaign, e-newsletters, and in-person communication.

6.1.3 Electric Vehicles (Hiromi Kelty, Shiva Swaminathan and Connie Chu)

Palo Alto continues to facilitate the installation of EV charging infrastructure throughout the City to support mass EV adoption, with equitable access for multifamily and income-qualified residents, as well as workplaces, public parking lots and retail areas. Correspondingly, cross-departmental work is progressing on proposals for fleet electrification and permit streamlining.

Financial Overview

FY 2022 EV expenses to date is $0.54M, of which $0.465M was for the first installment of the CALeVIP program. No direct customer rebates have been paid to date. Revenues for the year is $1.59M, lower than anticipated a year ago due to declining market prices for LCFS credits. Total LCFS revenues received to date is $10.1 million.

Summary of All EV Programs for Multi-family (MF) Properties and Workplaces

- **Mission:** The EV team's mission is to facilitate the installation of EV chargers to support increased EV adoption with a priority on MF properties. To reach 80 by 30 S/CAP goals, it is imperative that there is enough charging infrastructure for residents, commuters and visitors. For residents, the priority is to close the MF EV access gap, as only 13% of EVs in Palo Alto are registered at MF buildings, while MF makes up 42% of households.
- **Goal of EV Programs:** Expand EV charging accessibility to 10% of MF households (about 1,100 homes) by 2025.
- **Why:** This is an equity issue. Most middle-income and low to moderate-income residents in Palo Alto live in MF housing. EVs provide significant lifetime household savings, and yet those who most need those savings have the hardest time gaining EV charging access due to the challenges associated with installing chargers at MF properties. Private industry is not adequately serving this market, whereas the City is well positioned to support this hard to reach, slower to move, customer segment, making meaningful use of available City funding sources for EV promotion.
- **Target Customer Segment:** MF property owners, HOA's, nonprofits, owners of small medium businesses and buildings, as well large C&I customers.
- **What CPAU can provide:**
    - Trusted, neutral advisory services (rather than vendor sales services) with a direct connection to internal City staff to facilitate problems.
    - Technical assistance (site evaluation, including electrical capacity, business case development, project design, obtaining bids, preparing permit packages)
    - Incentives (both for charging equipment and distribution upgrades)

- **Strategy:** Facilitate development of shared Level 2 chargers in multi-family buildings as well as, as many Level 1 chargers as can be installed. Size electrical infrastructure to enable the building owner to add more EV charging ports in the future.

Aggregated Results to-Date for All EV Programs Targeting Multi-family (MF) Properties and Workplaces

- **Program Commencement:** December 2017 (multi-family rebates), October 2019 (multi-family/nonprofit technical assistance), December 2019 (workplace charging rebates)
- **Leads:** Over 130 sites have enrolled in the programs, of which 86 are multi-family properties representing over 3400 units
- **Results:** When the active projects are completed, the City will have:
    - Facilitated access to EV charging for over 1500 multi-family housing units. Without accessible charging facilities these residents are unlikely to consider an EV.
    - Access to EV charging for employees of several non-profits and workplaces.
- **Marketing Strategy:** Of Palo Alto's 803 multi-family (MF) buildings, focus on the largest 5% (44 sites) which represent 32% of total MF units (about 3800 households). Also, partner with affordable housing providers which represent over 1600 low-income households at 35 sites of which 5 properties have 100 units or more. Outreach consists of direct outreach to property owners via call campaigns, with marketing done by the 3rd party program provider, CLEAResult.

Updates by EV Program

- **EV Technical Assistance Program (EVTAP)**

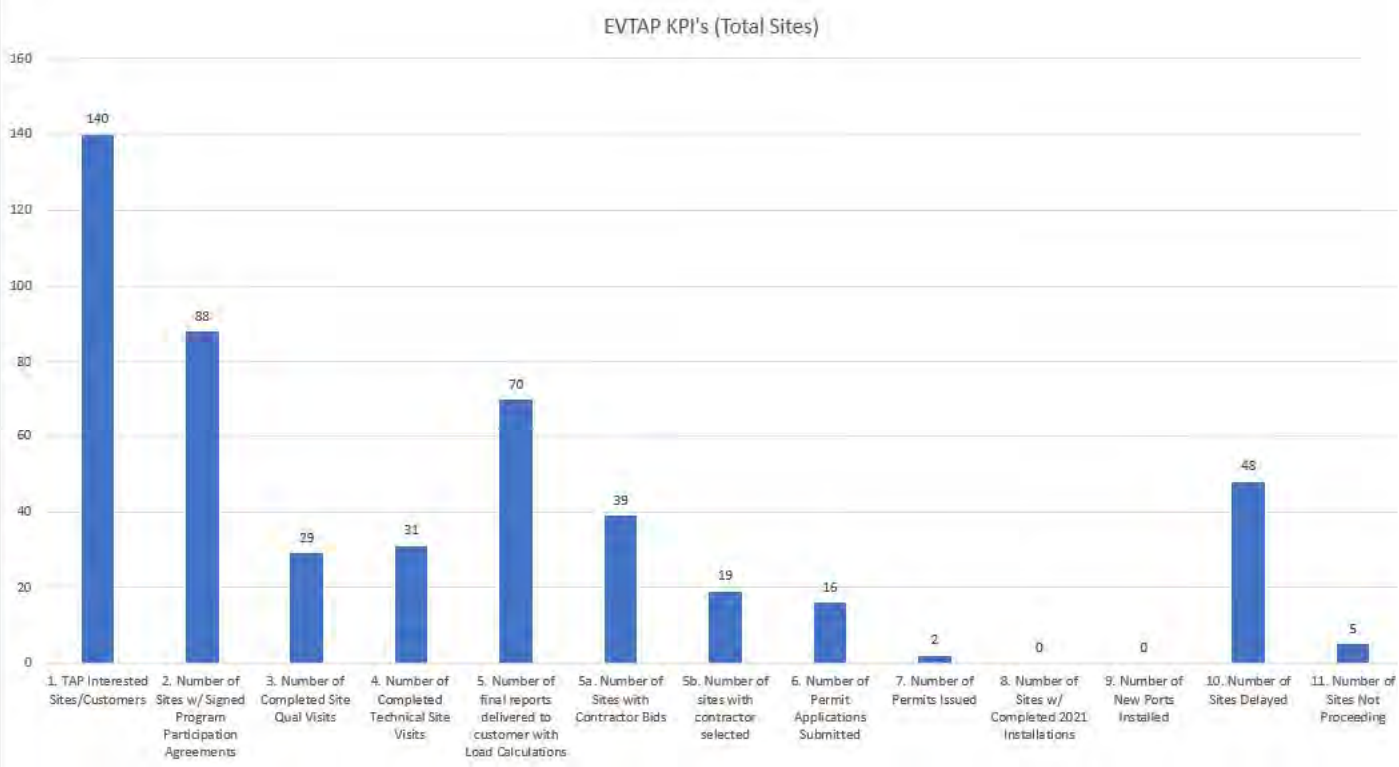
  Goal: Facilitate the installation of 180-360 ports @ 60-90 sites (By 2024)

  Offer technical assistance for the installation of EV chargers at Non-Profit and MF properties, involving a series of site visits, technical evaluations and engineering reviews, that culminate in the landlord receiving contractor bids and then assistance submitting a building permit, applying for incentives and project management of the installation. Projects expected to take up to 2 years or more to reach completion.

  As of the end of September 2022:

    - 0 installations complete
    - 16 Permit Applications Submitted
    - 88 sites enrolled and working through the program
    - Potential for over 300 Level 2 ports and 60 Level 1 ports

Figure 26: EV Technical Assistance Program (EVTAP), Cumulative Progress Report (November 2019 - September 2022)



- **EV Charger Rebate Program**

  Goal: Incentivize the installation of EV chargers at Non-Profits and Multifamily properties. CPAU currently offers up to $8,000 per port for up to 10 ports.

  As of the end of November 2022:

  - FY22 - 32 ports installed
  - Since the launch of this program in 2017, CPAU has facilitated the installations of 94 new EV charging ports/connectors at 14 sites. The breakdown of the installation sites: 6 MF and 8 non-profits (including 3 schools). Avg. cost of each port: $10k and projects have averaged 12 months to complete.

- **California Electric Vehicle Infrastructure Project (CALeVIP)**

  Goal: Facilitate and Incentivize the installation of EV chargers at commercial sites.

  As of November 2022, a total of $1.9M (out of $2M) has been reserved by 11 site owners through CALeVIP, a commercial EV charging, matching grant program sponsored by the California Energy Commission (CEC). The proposed installations could lead to the installation of 115 Level 2 ports and 14 DC Fast Chargers.

  - 0 installations completed
  - 11 sites enrolled and working through the program (1 hotel, 7 office sites, 2 retailers and 1 multi-unit dwelling)
  - 8 Permit Applications Submitted
  - 5 Permits Issued
  - Potential for 179 Level 2 ports and 12 DC Fast Chargers

- **California Clean Fuel Rewards (CCFR)**

  Goal: Incentivize the purchase of new EVs

Since the launch of the CCFR program in November 2020, Palo Alto residents have earned 1,906 rebates valued at $2M. This translates to over 7%% of Palo Alto households purchasing an EV taking advantage of this program. To date, Palo Alto has contributed $1.3M towards this state program. The most popular EV continues to be the Tesla Model Y and Model 3 and the most popular plug-in hybrid continues to be the Toyota Prius Prime.

Due to higher-than-expected participation levels statewide and lower than expected Low Carbon Fuel Standard (LCFS) credits prices, the California Air Resources Board paused the program at the end of August 2022.

November 2020 – November 2022:

- 1,906 Rebates paid to Palo Alto residents for EV Purchases

- **EV Awareness and Outreach**

Goal: Raise awareness, answer questions and encourage residents to consider transitioning to electrified modes of transportation, including electric cars, e-Bikes and other modes of clean transportation. CPAU is offering a wide array of EV classes and events, partnering with multiple vendors and organizations. Through the end of November 2022, CPAU has been involved in 18 EV education and outreach events and expects to offer over 2 dozen workshops and events during calendar year 2022. There is a high level on interest and many of the online webinars regularly attract over 100 highly engaged participants. CPAU is in the process of putting together a full schedule of events and workshop for CY2023.

January – November 2022:

- 32 EV education and outreach events completed

Figure 27: Schedule of CPAU Workshops and Events, July - September 2022

Event #	Date	Event
1	7/19/2022	EV 102 Workshop
2	8/8/2022	EV 101 Workshop
3	8/17/2022	EV 101 Workshop
4	9/1/2022	EV 101 Workshop
5	9/11/2022	Neighborhood EV Expo @ Palo Alto Adult School
6	9/18/2022	Neighborhood EV Expo @ Universal Unitarian Church
7	9/21/2022	Bilingual Financial Incentives Workshop
8	9/24/2022	Neighborhood EV Expo @ Green House Tour

Visit http://www.cityofpaloalto.org/workshops for information on upcoming classes.

- **City-Owned EV Chargers**

Goal: Install EV Charging Infrastructure for the public as well as City-fleet.

As of the End of November 2022:

- 124 - City-Owned Ports
- 120 - Publicly accessible EV Charging ports
- Newest chargers: 6 ports at renovated Junior Museum on 1451 Middlefield Rd.

- **Transformer Upgrade Rebate Program**

  Goal: Provide discounts to defray the cost of utility distribution system upgrades triggered by EV applications, costs that would otherwise be borne by the customers. With this program we are offering up to $100K for MF & non-profits and up to $10K for Single Family Homes

  As the End of November 2022:

  Through EVTAP we are learning that many older properties in Palo Alto, especially multifamily buildings, have limited electric capacity to accommodate EV chargers and building electrification. The EV team is working closely with Engineering and is conducting a pre-screening of transformer loading for all commercial EV projects enrolled in EVTAP.

For residential customer programs, staff issued a comprehensive RFP in June 2021 for residential building electrification, energy and water efficiency programs which includes single family and multifamily homes as well as income and medically qualified residents. As part of the community engagement process, an Ad Hoc committee of Council members was formed in April 2021, and staff was asked to pause activities related to contract negotiations for the residential programs RFP until the Council Ad Hoc committee and related working groups had the opportunity to provide input on program design and direction. Staff was also asked to wait to proceed with contract negotiations while concerns raised by the Utility's Engineering and Operations Division about potential additional electric load resulting from building and transportation electrification were addressed. These community and staff collaborative efforts resulted in the ongoing development of a turnkey heat pump water heater installation program. Other programs planned include building electrification phone advisory and technical assistance services for both single family and multifamily property owners, and self-service online tools to help residents assess the economics of electrifying their homes. Staff has resumed contract negotiations with the selected vendors since June 2022 and plans to bring the contracts to City Council for approval in the fall of 2022.

For strategy and policy development, Utilities staff is collaborating with Planning & Development Services to propose building electrification requirements for the upcoming building code cycle (2023-2025). The proposed requirements include the following elements:

- All-electric design for new construction projects; this applies to low-rise residential buildings, detached ADUs, multifamily buildings, and nonresidential buildings.
- Addition/alteration projects that meet the "Substantial Remodel" definition will trigger the all-electric requirements. For the purposes of electrification, substantial remodel shall mean the alteration of any structure, including cumulative projects or additions to the existing structure within any three (3) year period, that affects the removal or replacement of 50% of the linear length of the exterior weight-bearing walls of the building, 50% of the wall plate height is raised, and/or 50% of the roof structural framing.
- Prohibit the extension of gas infrastructure in existing buildings to outdoor amenities such as pools, spas, fireplaces and grills in order to minimize the carbon footprint of these equipment.
- Require heat pump water heater when the existing water heater is replaced, or new water heater is added as part of a residential addition or alteration project.

Collectively these proposed requirements will avoid over 3,420 MT CO_2-e per year, about 1% to 1.5% of the remaining emissions reductions needed to achieve the 80x30 goal (about 1.5% to 2% when upstream emissions

from fuel use are included).[5] Other proposed Green Building requirements cover EV infrastructure, water efficiency, and embodied carbon limits in the use of concrete for new construction projects. Additional details can be found in the . Staff will be bringing the proposed Green Building regulations to City Council for the first reading this coming October.

6.2 Funding Sources for Emissions Reductions

Energy efficiency and water efficiency programs have traditionally been funded by electric, gas, and water rate revenues. To fund emissions reduction programs, the City has developed multiple alternative funding sources

6.2.1 Low Carbon Fuel Standard (LCFS) Program (Shiva Swaminathan)

LCFS base credits are allocated by the California Air Resources Board (CARB) to CPAU, based on the number EVs registered in Palo Alto, the estimated miles travelled and the difference in carbon intensity of transportation fuels and electricity. Credits are also allocated based on CNG dispensed and electricity dispensed at city owned EV chargers. The sales proceeds of these credits are the source of funds for CPAU's customer programs related to EVs. In CY2022, Palo Alto received ~15,000 credits and is expected to result in a revenue of about $0.9M. LCFS credit prices have declined substantially in in 2022 compared to 2021, down from ~$130/credit to $60/credit.

6.2.2 Cap and Trade Program, Revenue from Allocated Allowances (Eric Keniston)

The Global Warming Solutions Act of 2006, also known as Assembly Bill (AB) 32, authorized CARB to develop regulations to lower the state's greenhouse gas (GHG) emissions to 1990 levels by 2020. CARB developed a cap-and-trade program as one of the strategies to achieve the 2020 goal. Under the cap-and-trade program, an overall limit on GHG emissions from capped sectors is established and facilities subject to the cap are able to trade permits (allowances) to emit GHGs. Senate Bill 32 (2016) expanded upon AB 32 by requiring a 40% reduction in GHG emissions below the 1990 levels by 2030.

In 2012, CARB's cap-and-trade program commenced and certain covered entities, such as electricity generators and other stationary sources of GHGs, had a compliance obligation under the new program. The City of Palo Alto Utilities' (CPAU's) electric utility does not own or operate fossil fuel-based electricity generation covered by the cap-and-trade regulations. CPAU also received free allowances from CARB to mitigate the costs of reducing its GHG emissions. Since CPAU's electric utility is carbon neutral and typically has no need to use the allowances for compliance, it must sell them into the cap-and-trade auction.

Allowance revenues, estimated to come in at around $3 million in 2022 and onward, can be used for several approved purposes, including: a) purchases or investment in renewable resources (outside Palo Alto or locally) for the electric portfolio; b) investment in energy efficiency programs for the electric portfolio and retail customers; c) investment in other carbon reduction activities, including those required to achieve a carbon-neutral electric portfolio; and d) rebates to electric retail ratepayers.

As of 2021 reporting, some allowances have been utilized to purchase renewable resources while others have been earmarked for future electrification programs (about $1.2 million). Staff is investigating using more of these funds for investments in emissions reduction programs.

6.2.3 Electric Public Benefit Funds (Eric Keniston)

Locally owned municipal utilities like CPAU must collect Public Benefit funds from their electric utility customers 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. CPAU currently has an Electric Public Benefit surcharge of 2.85% of the electric utility bill for all customers. A portion of this fund can be used for building electrification pilot programs and projects.

6.3 Innovation and Pilot Programs (Lena Perkins)

CPAU's Program for Emerging Technologies, or PET, (www.cityofpaloalto.org/UTLInnovation) provides the opportunity for local businesses and organizations to submit proposals for innovative and impactful products to CPAU for review as a prospective partner. The goal is to find and nurture creative products and services that will improve customer value, save natural resources, or reduce carbon emissions. From the program's inception in June 2012 through today, the program has received a total of 104 applications. The figure below summarizes the status of all applications through FY 2022.

So far this year, only a single academic collaboration has reached the threshold of value, quality, and relevance to be considered a good fit for a pilot project. CPAU is currently in discussions with some applicants about revising their projects and is also evaluating potential regional collaborations with promising early-stage companies. In order to provide more clarity for applicants and better focus the applications on CPAU's priorities, staff is also revised the program's guidelines to highlight what makes a compelling project pitch for CPAU. These updated program priorities and guidelines were released this year and presented to the UAC. Pending other priorities and sufficient resources, staff will work with local universities and accelerators to solicit high-quality applications closely aligned with CPAU's highest priorities in calendar year 2022.

6.3.1 Academic Collaborations (Lena Perkins)

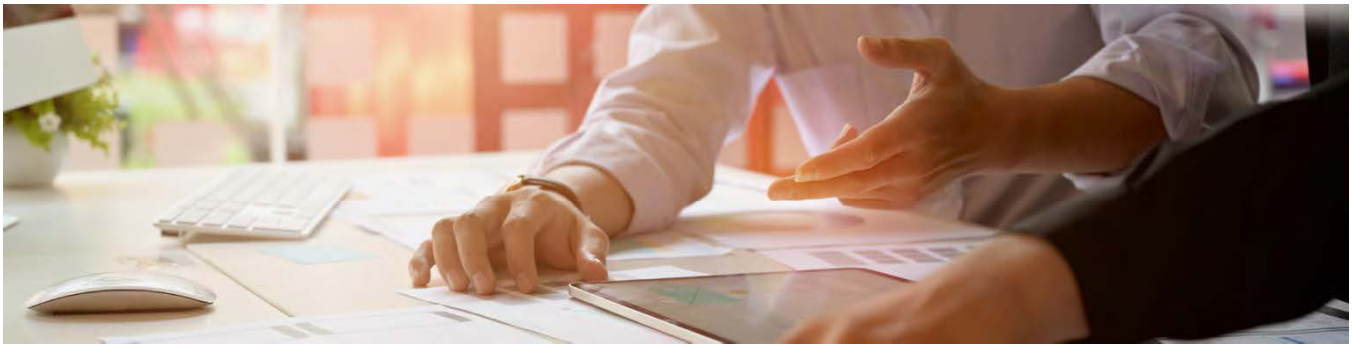
CPAU staff is working with Keola Iskandar, a Stanford Fellow, for the summer to assess energy resiliency options for residential units in collaboration with Office of Emergency Services. The study builds on techno-economic models to compare the cost of different backup energy systems and the level of electric reliability these technologies may provide during an outage. The final report will be presented at the November 2022 UAC meeting

6.3.2 Completed Projects (Lena Perkins)

In FY 2022 CPAU has received eight applications, declined three and is reviewing five others. Staff is also in discussions with a few start-ups and will consider asking them to apply for collaborations.

Figure 28: Status to date of all applications to the Program for Emerging Technologies

Deadline	Total Received	Under Review	Declined/Closed	Active	Completed
FY 2013	13	0	11	0	2
FY 2014	15	0	11	0	4
FY 2015	15	0	11	0	4
FY 2016	14	0	9	0	5
FY 2017	10	0	7	0	3
FY 2018	10	0	9	0	1
FY 2019	9	0	5	0	4
FY 2020	8	0	3	0	5
FY 2021	2	0	1	0	1
FY 2022	8	5	3	0	0
TOTAL	104	5	70	0	29



7 Communications (Catherine Elvert)

This section summarizes communications highlights, updates on major campaigns and noteworthy events. Copies of ads and bill inserts are available online at http://cityofpaloalto.org/UTLbillinsert.

Water Supply and Drought: Staff have been proactive about communicating the current situation of water supply conditions and ever-changing water shortage emergency declarations. As a result of the continued dry conditions, CPAU continues a robust outreach campaign about water supply conditions, water use restrictions, and resources for water use efficiency. Staff are working with the Bay Area Water Supply and Conservation Agency (BAWSCA) and Valley Water to coordinate public education events. Updates are available at cityofpaloalto.org/water

Business and Key Account Customer Surveys: CPAU regularly conducts customer satisfaction surveys and this fall is currently conducting a survey of our commercial, other non-residential, and Key Account customers. This survey aims to measure customer satisfaction levels and opinions, as well as identify opportunities to improve the services and programs we provide to all of our customers.

Gas Safety Outreach: Throughout the year, CPAU delivers a variety of outreach materials to the community about utility safety. An important element of our public awareness program is the annual distribution of our gas safety awareness brochure. Per Federal Department of Transportation regulations, we directly mail this information to all customers, non-customers living near a gas pipeline, public officials, emergency responders, excavators, contractors, and locators working in Palo Alto. Gas safety brochures were delivered in November. If interested in additional details about gas safety or this outreach, please visit cityofpaloalto.org/safeutility

Gas Safety Awareness Surveys: It is important to assess the effectiveness of our outreach for gas safety to guide our actions, and it is also required for public awareness per the Federal Department of Transportation. A primary way most utilities, including CPAU, do this is by contacting stakeholders through a randomized phone or email survey to ask questions about gas safety. Questions address items such calling USA 811 before digging, who to call and what to do in case of a gas leak, among others. During the month of November, we will engage with a contractor to conduct these stakeholder awareness surveys.

Mayors Climate Protection Award: The City was recognized earlier this year with an honorable mention for the 2020 Mayors Climate Protection Awards. The award highlighted our Multifamily Gas Furnace to Heat Pump Retrofit Pilot Program, which will reduce the City's greenhouse gas emissions and serves as

a case study for future electrification projects in multifamily buildings. The Conference of Mayors made the announcement at their Annual Meeting in Reno, Nevada on June 3. Mayor Pat Burt and City staff received the award plaque in a special order of the day ceremony at the September 27 Council meeting.

8 Legislative and Regulatory Activity

8.1 State legislation (Heather Dauler)

At the time of this writing, the legislature is not in session. In January, at the same meeting where the UAC receives this quarterly update, staff will present information about 2022 bills that passed and what is expected in 2023. Also, in January, we will know if Governor Newsom did in fact call a special legislative session in December to delve into gas prices and oil company profits, and whether any proceedings also included discussions related to electric vehicles or energy prices.

Fiscally, the state is not entering the new year in the surplus position expected and in fact, may end up with a $25 billion deficit or more depending on a possible recession. While the state has many billions in reserves to weather a downturn, the loss of surplus may mean less money for some of the Governor's clean energy priorities. We will know more mid-January, when the Governor publishes his proposed budget.

8.2 State regulatory proceedings (Heather Dauler)

Below are issues currently before state regulatory bodies that CPAU is monitoring, primarily through our work with CMUA and NCPA.

8.2.1 Energy Commission

The CEC implemented the voluntary Demand Side Grid Support Program and held a workshop related to offshore wind.

8.2.2 State Water Resources Control Board

The Water Board held a second comment period for its Water Loss Control Standards rulemaking. Board staff is working on guidance for new federal Lead & Copper Rule Standards.

8.2.3 Air Resources Board

CARB is poised to adopt an updated Scoping Plan, the State's strategy for fighting climate change.

8.2.4 Natural Resources Agency

The Wildfire Safety Advisory Board released its advisory comments to all POU Wildfire Mitigation Plans received in July 2022. The Board was complementary of CPAU's Plan. Staff is currently working on our 2023 Plan.

Appendices

9 Appendix A: Energy Risk Management Program

This appendix provides a quarterly update on the City's Energy Risk Management Program.

9.1 Overview of Hedging Programs (Karla Dailey)

The City's Utilities Department maintains a hedging program for its Electric and Gas Utilities. In the Gas Utility the program protects against short-term (intra-month) price spikes caused by weather or major incidents on the Western gas system. However, the City does not hedge its gas supply more than one month in advance, choosing instead to protect the Gas Utility's financial position by passing gas supply costs through to customers via a charge that varies monthly based on gas market prices. As a result, the Gas Utility's only market exposure is the amount by which gas demand deviates from forecasts within the month. This exposure is relatively small and can be managed using Gas Utility Operating Reserves. A risk assessment is performed each year as part of the Gas Utility financial planning process to ensure adequate reserves to cover all risks. The most recent Gas Utility Financial Plan was adopted June 21, 2021 (Staff Report #12240).

The City has entered into long-term contracts for its Electric Utility to ensure that the City has carbon free electricity supplies equal to 100% of Palo Alto's annual electric demand. However, the output from these generating sources does not match Palo Alto's electric load. In the summer, the City has a surplus of carbon free energy and it has a deficit in the winter. This exposes the City to market risk, and staff maintains a hedging program to protect against this risk. In addition, hydroelectric generators make up approximately half the City's energy supply. During dry years these resources do not generate as much energy, creating an additional market exposure that must be hedged. Unlike the gas hedging program, which is operated by City staff, the electric hedging program is operated by the Northern California Power Agency (NCPA), a joint powers agency the City formed in partnership with several other California publicly owned electric utilities, with oversight by City staff.

9.2 Overview of Energy Risk Management Program (Karla Dailey)

The hedging programs described above are conducted in accordance with the City's Energy Risk Management Program, which includes a set of Program Policies adopted by the City Council, Guidelines adopted by the City's Utilities Risk Oversight Coordinating Committee (UROCC), and Procedures approved by the Utilities Director. In addition, for the electric hedging program, NCPA maintains its own Risk Management Program. The City is able to provide policy level oversight of this program through its seat on the NCPA Risk Oversight Committee, which is held by the City's Risk Manager.

Per the Energy Risk Management Policies, the City Council must receive quarterly reports on the City's forward contract purchases, market exposure, credit exposure, counterparty credit ratings, transaction compliance, and other relevant data.

9.3 Forward Deals (Eric Wong)

Below is a table of forward Electric Resource Adequacy deals made in Q1 of FY 2023. Palo Alto did not transact any Electric energy and Gas commodity deal in Q1 of FY 2023.

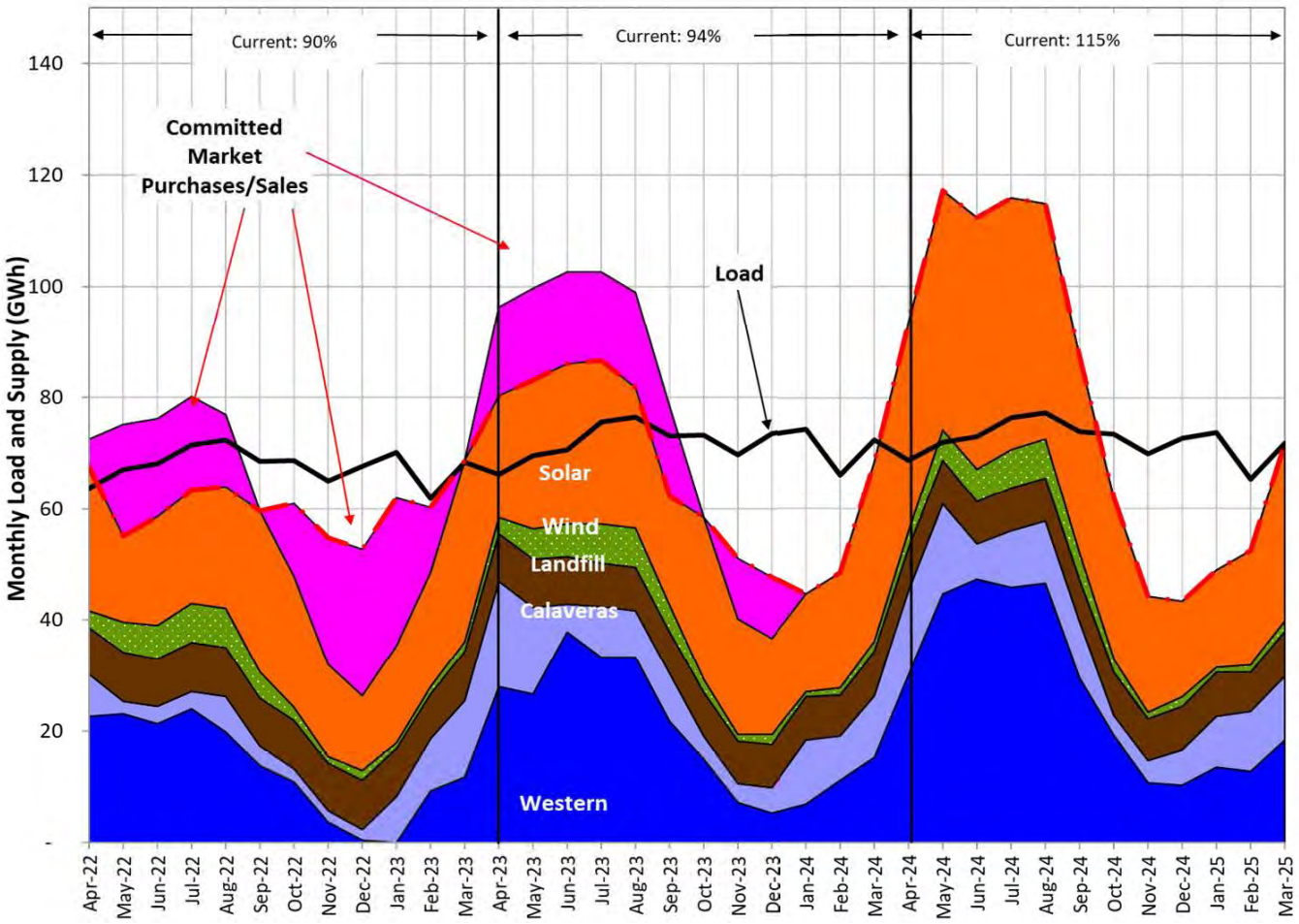
Figure 29: Electric Resource Adequacy Contracts

Delivery Month	Deal Type	Avg Capacity (MW/Mo.)	Avg Price ($/kW/Mo.)	Amount ($)
Jan - Dec '22	Sale	9.45	7.25	823,000

9.4 Market Exposure (Jim Stack and Micah Babbitt)

The chart below shows the City's market exposure and committed and planned purchases and sales to cover exposed positions.

Figure 30: Electric Load Resource Balance, April 2022 - March 2025



9.5 Transaction Compliance (Karla Dailey)

There are no transaction exceptions or violations to report.

10 Appendix B: Staffing and Vacancies (Dave Yuan)

As of Q3 FY 2022, the Utilities Department has 45 vacant positions out of 248 authorized positions or a 18% vacancy rate. Below is a breakdown of the vacancies by division. The Electric and Fiber Engineering and Operations (E&O) division continues to have the highest number and hardest positions to fill. Electric Engineering and Operations has a total of 30 vacancies or 33% vacancy percentage. As part of the FY 2022 midyear budget adjustments, four new positions (Electric Project Engineer (3 FTEs) and Utilities Program Services Manager (1 FTE)) were added to accelerate S/CAP initiatives. These positions are required to increase capacity in project management, build in-house resources, and design and implement infrastructure upgrades such as increasing capacity in the electric distribution grid for electrification of single-family residences. Some of the critical and difficult-to-fill positions include lineperson/cable splicer, compliance technician, engineer, and engineer estimators. CPAU will continue to seek third party contracts for some of the difficult-to-fill positions until the positions are filled and staff is trained.

Figure 31: Utilities Vacancies and Position Movements by Division, up to Q3 FY 2022

Division	Authorized FTE	Vacant FTEs	Active Recruitments	Vacancy %
Administration	18.5	2	0	11%
Customer Service & Support	23	0	0	0%
Electric Engineering	21	9	9	43%
Electric Operations	67	21	9	31%
Resource Management Division	23.5	2	2	9%
WGW Engineering	25	3	2	12%
WGW Operations	70	8	3	11%
Grand Total	**248**	45	**25**	**18%**

Movement by Calendar Year	CY 2021	CY2022
Hires	15	7
Promotions	19	8
Retirements	8	2
Separations	11	10

11 Appendix C: Gas Utility Annual Infrastructure Maintenance and Replacement Report (Silvia Santos)

In each Quarterly Update the Utilities Department will provide a detailed overview of a single utility's investment and maintenance activity. An update on the water utility was scheduled for this report, it is presented as Attachment B.

Gas Utility Asset Management Overview

Executive Summary

- The City provides safe and reliable natural gas service to residents and businesses;
- The City meets or exceeds federal regulatory requirements (examples: Accelerated leak survey program & Cathodic Protection maintenance requirements);
- Gas Main Replacement program continues to replace PVC and corroded steel pipeline material to increase safety and minimize greenhouse gas emissions;
- Completed the installation of 20,170 LF of gas main, 126 new gas services, and 62 gas service reconnected on the Gas Main Replacement 23 project;
- Annually inspects and maintains gas distribution assets;
- Implement Advanced Metering Infrastructure (AMI) and Meter Data Management (MDM) by September of 2022. Project awarded to Sensus.

Asset Management Goals

What are our goals?

-Create and utilize a calibrated hydraulic gas system model to prioritize future pipeline replacement projects.

-Minimize gas service interruption during planned repairs, tie-ins, and installation by following gas handling procedures.

-Continue with CIP replacements to reduce maintenance costs and minimize greenhouse gas emissions, while extending the gas system life.

-Increase routine maintenance on aging pipelines to maximize asset life and keep replacement costs down.

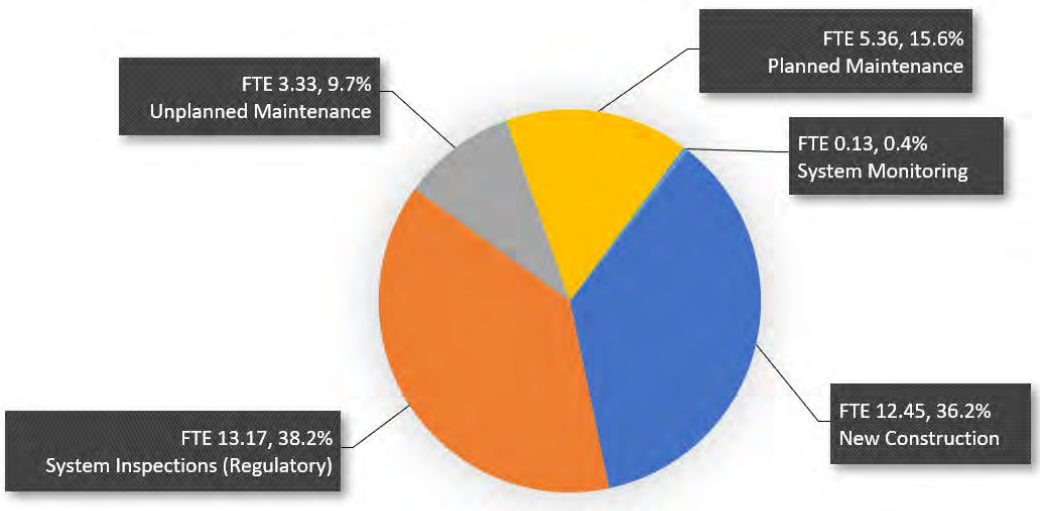
Infrastructure Planning

Key infrastructure replacement efforts in the next five years include:

- Apply for federal grant funding opportunities for the replacement of PVC and corroded steel pipelines;
- Replace PVC and corroded steel pipelines, with polyethylene pipe, for gas mains and services;
- Maintain and inspect gas assets for regulatory compliance;
- Replace inoperable large-diameter emergency valves;
- Implement a calibrated hydraulic gas system model;
- Transition to an ESRI-based Geographical Information System (GIS);
- Upgrade utility fleet, equipment, and tools.

System Operations and Maintenance

Figure 1: FTE (Full-time equivalent) Breakdown by Maintenance Category



TOTAL FTE: 34.4

- **Staff assigned to New Construction:**
  - Perform gas main and service upgrades at various locations.
  - Support Capital Improvement Projects (CIP) and install bollards for meter protection.
  - Replace new gas services, valves, and meters for Development Services projects.
- **Staff assigned to System Monitoring:**
  - Monitor and manage the system continuously to ensure it is operating safely and maintaining adequate pressure throughout the city. A 24/7 On-call staff responds to emergency alerts sent by the SCADA software.
- **Staff assigned to System Inspections:**
  - **Valve Exercise:** Regularly exercise valves to meet regulatory requirements and ensure proper operation.
  - **City Gate Stations:** Annual inspection of the 4 gas receiving stations.
  - **Cathodic Protection:** Take monthly pipe-to-soil reads to monitor cathodic protection levels on steel pipelines.
  - **Mobile and Walk Leak Survey:** Perform annual mobile leak survey of the entire gas system and biennial walking leak surveys to detect underground gas leaks and check for atmospheric corrosion on aboveground pipelines.
  - **Patrolling:** Perform quarterly inspections of gas pipeline bridge spans and railroad crossings.
- **Staff assigned to Planned Maintenance:**
  - Repair and replacement of gas distribution system pipeline, leaks, and valves.
  - Installation of bollards for meter protection.
  - Support on Gas Main Replacement projects.
- **Staff assigned to Unplanned Maintenance:**
  - Respond to emergencies.
  - Repair and replace infrastructure requiring immediate attention.

GAS MAINTENANCE ONGOING

Table 1: Status of Gas System Operation and Maintenance Programs

System Operation or Maintenance Program	Status Green = good Yellow = room for improvement	Comments
Emergency Valve Inspection and Exercise		Annual maintenance and exercise are performed on schedule as part of compliance. Valves are exercised, greased, and cleaned to ensure the valve nut is accessible and operable. Emergency valve lids are coated in yellow and are brass tagged for identification.
Non-Emergency Valve Inspection and Exercise		Inspected and exercised once every 5 years per City's goal for maintenance. Valves are exercised, greased, and cleaned to ensure the valve nut is accessible and operable. Operations is planning to have a program to locate and expose paved valve cover lids.

System Monitoring		Continuous system monitoring and alerts via SCADA. Gas Operations staff handles the monitoring of the gas system and ar adequately trained to operate the system. On-call staff responds to emergency alerts after-hours. System updates are done regularly.
City Gate Station Maintenance		Annual maintenance is performed on the 4 City gate stations' regulators along with visual inspection of aboveground piping and fences. Every station has dual runs with two regulators per run fo redundancy, a working regulator, and a backup (monitoring) regulator, which are alternated each year.
Gas Supply Monitoring		Monthly gas meter revenue reports are generated for each station from PG&E's monitoring module. The City's SCADA technician monitors and reviews the reports. Whenever a discrepancy is detected, the SCADA technician requests maintenance and repair from PG&E. Staff propose installation of City flow meters and gas quality monitoring equipment for each station, which would allow City to validate PG&E's billed gas volumes and gas quality.
Pressure Monitoring		There are currently 10 pressure monitoring points around the Cit of Palo Alto, one at each of the 4 City gate stations and 6 in the outer ends of the City. The pressure monitoring points in the City are being well maintained by Operations. Additional pressure transducers for pressure monitoring stations throughout the system would improve system monitoring and expedite response in emergencies.
Large Commercial Gas Meter Maintenance (Includes VA Hospital)		Large commercial gas meters include rotary, ultrasonic, and turbine meter types. These meters are maintained biennial and replaced once every 10 years. In 2021, only visual inspections were done for the meters. Maintenance that includes calibration and checking of oil levels fell behind in 2021 due to a shortage of staff. Staff is aiming to catch up on maintenance in 2021.
Gas Curb Meter Maintenance		The 3-year inspection and maintenance cycle is on schedule. The City's curb meters are replaced once every 10 years. Curb meters that cannot be retrofitted will be replaced as part of the new AMI project with Sensus.
Residential and Commercial Gas Meter Maintenance		Meters are inspected and maintained every two years. Maintenance includes repainting as needed, leak survey, and aboveground visual assessment of the gas meter set.
Gas Inspection Along Bridges		The City has 28 gas main bridge crossings that require maintenance. Visual inspection (pipeline markers, pipeline support condition, wrap condition, etc.) and leak surveys are performed quarterly each year. Recoating of Ross Road gas main was completed in 2021. One crossing (Foothill Expressway) was abandoned in 2021 and future projects will abandon more.
Unplanned Maintenance		No backlogs of leaks or assets in need of repair. The City maintain an emergency on-call program to respond to and control gas leak

		or other system emergencies after hours. In order to remain in compliance, the staff is pulled to respond to emergency situations, resulting in delays in planned work. Currently experiencing long lead times for material.
Cathodic Protection Maintenance and Monitoring		24-hour rectifier monitoring and alerts via Elecsys. Elecsys provides our Cathodic operators with the troubleshooting and software support for their system. Rectifiers and galvanic anodes are regularly inspected and are in good condition. Anodes are replaced as needed and require more frequent replacement during the ongoing drought. Operations is currently using Paradigm software to generate annual DOT reports. Paradigm will need a software update from the manufacturer (Fera) for compatibility with the current operating system. An apprenticeship program for the cathodic protection crew is suggested to ensure a sufficient supply of trained staff.

Table 2: Condition of Gas System Assets

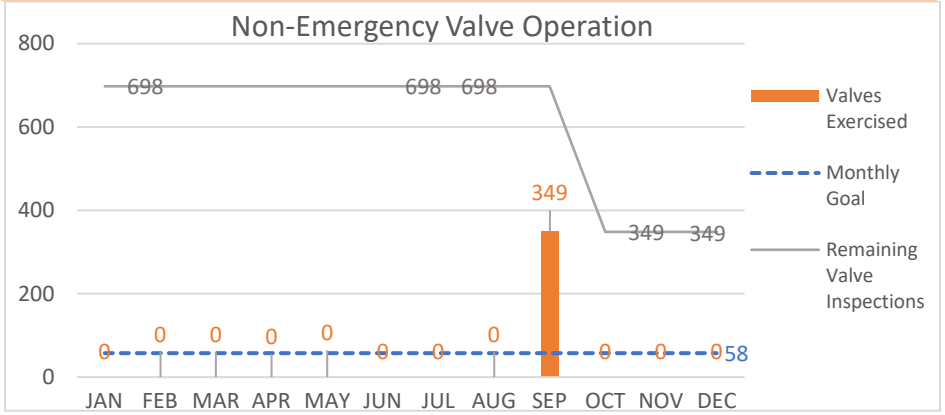
Asset Class	Quantity	Maintenance	Asset Condition
Gas Receiving Stations (City Gate Station)	4	Annual maintenance 1 station undergoes maintenance each quarter.	Standard maintenance is performed by the City's meter technicians. • Visual inspection and regulator alternating is performed annually • Paint is inspected quarterly and replaced as needed • Equipment and parts are maintained quarterly and are in good condition. • Station enclosure and safety headers are adequate and in good condition. • Station regulators are rebuilt once every three years.
Pressure Monitoring Stations	6 system testing points and 4 Gate Stations	Annual calibration and maintenance	• The pressure monitoring points in the City are maintained regularly by Operations. • The pressure monitoring systems in all 4 City gate gas stations were updated in 2016 when the stations were rebuilt. • 5 of the 6 pressure monitoring points at the outer ends of the City are over 20 years old. They should be upgraded from conduit to fiber optic and additional pressure monitoring stations should be added.
Cathodic Protection	577 test stations	Annual maintenance	• 158 test stations, on average, are read monthly throughout the year to meet and exceed the yearly maintenance regulation.

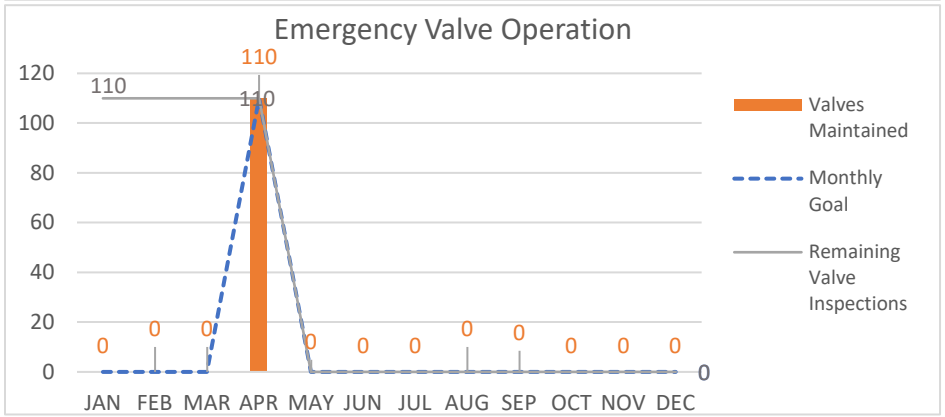
Rectifier and Galvanic	42 Rectifiers & 10 Galvanic systems	Monthly maintenance	• Rectifier systems are in good condition and are being monitored through Elecsys for power interruptions or low readings. • Anode-based systems are suggested for an upgrade to rectifiers due to poor performance during the ongoing drought.
Meter Regulators	Gas Meter Audit Project	Once every two years for the entire system	• Operations replaces regulators every 20 years as needed as part of the gas meter replacement maintenance. • The City is planning to establish a program to replace large orifice regulators with properly sized regulators.
Gas Meters	~24600		• Maintenance of curb meters and residential meters is in good standing. • Maintenance for large commercial gas meters is aiming to catch up in 2021 with recent full staffing. • The City is implementing Advanced Metering Infrastructure (AMI) with Sensus to transition to smart meters. Currently in alpha stage 2021.
Risers	~17395	Atmospheric Survey Maintenance The survey is performed every two years.	Risers are in good condition. They are inspected during the biennial leak survey.
EFV (Excess Flow Valve)	~8370		No routine maintenance is required for the EFVs in the system. The City is planning to perform an EFV trip-test when replacing gas meters.
Gas Valves	110 Emergency Valves ~3500 regular valves	Annual emergency valve maintenance Regular valve maintenance is performed once every 5 years	Maintenance of emergency gas valves and regular valves is in good standing. Maintenance activities include exercising valves, greasing valves, cleaning the valve boxes, and ensuring valve nut is accessible.
Gas Main and Services	~210 miles of main ~17,395 services	Mobile and Walking Leak Survey	• Ongoing Gas Main Replacement program continues as planned, prioritizing leak-prone seismically susceptible PVC and corrosion-prone steel pipelines. • The single Gas Service Replacement project replaced the majority of ABS and tenite gas services in the City. The only remaining ABS and tenite services are on streets with active street-cutting moratoriums. These remaining services will be replaced by City crews as their moratoriums expire. • Once ready, the calibrated hydraulic gas system model will be used to prioritize future pipeline replacement projects.

SCADA Software	NA	Quarterly updates for the system and everyday troubleshooting for the 4 City gate stations	The City's SCADA system is structured for Electrical Utilities but also handles all needed functions for the gas system. Quarterly patches and updates ensure the system is in proper working order. Several gas operations staff are trained to monitor the SCADA system but are not trained to perform repairs, which are handled by the City's SCADA tech or third-party contractors.

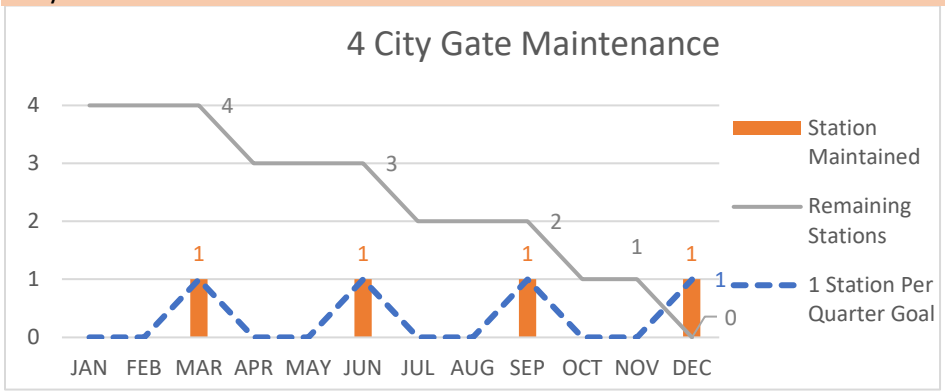
FIGURE 2: 2021 Gas Maintenance and Inspection Charts

Gas Valves

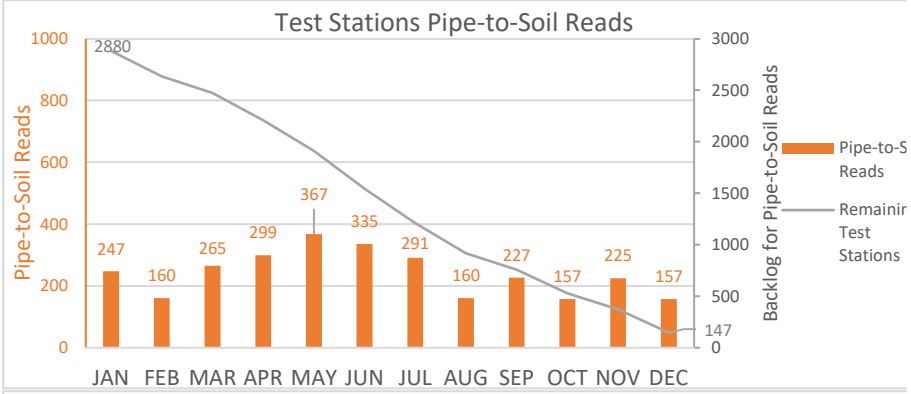


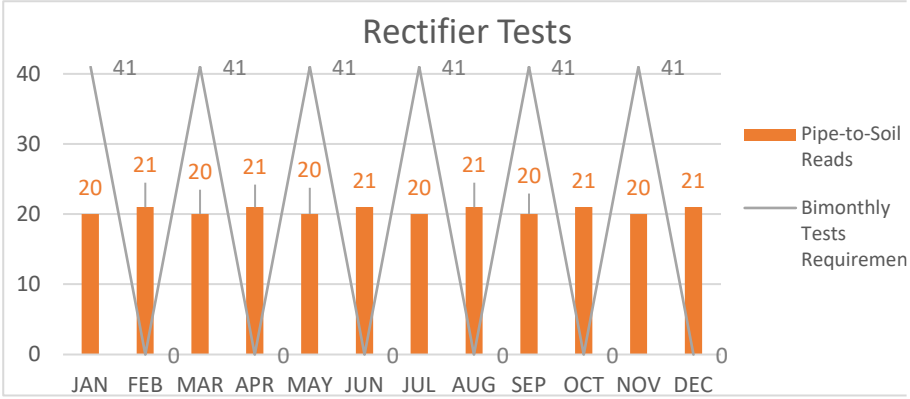


City Gate Maintenance

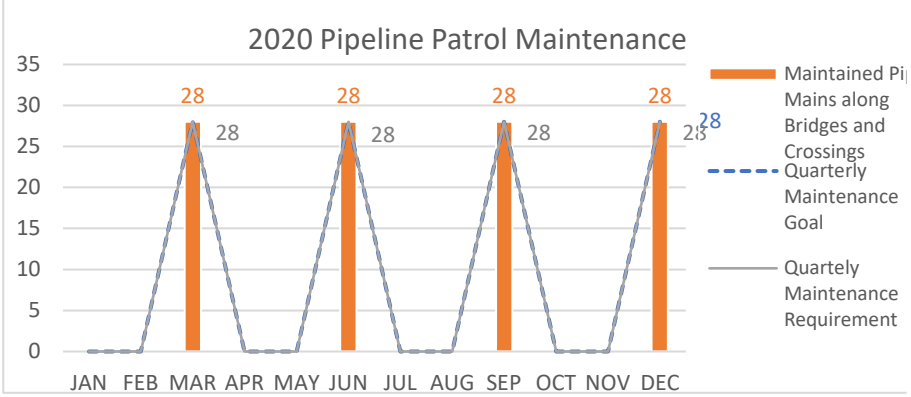


Cathodic Protection





Pipeline Patrol Maintenance



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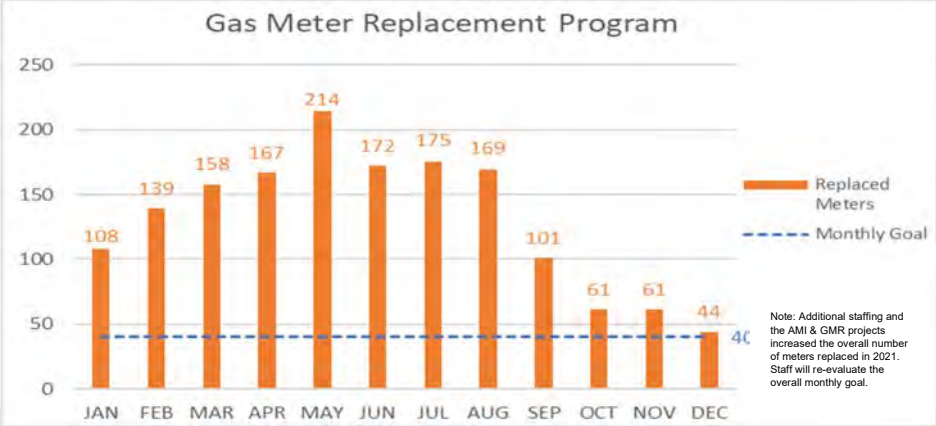
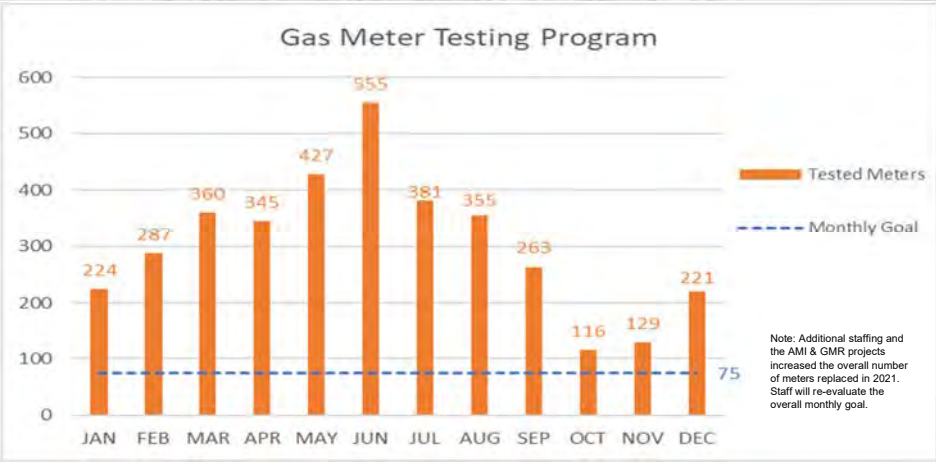
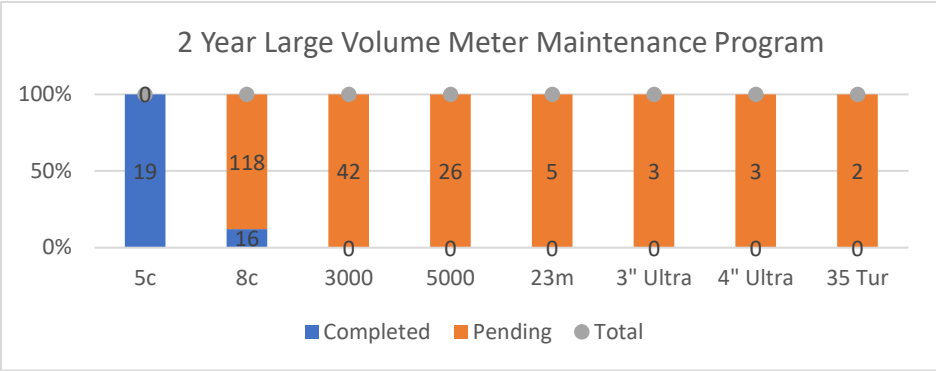
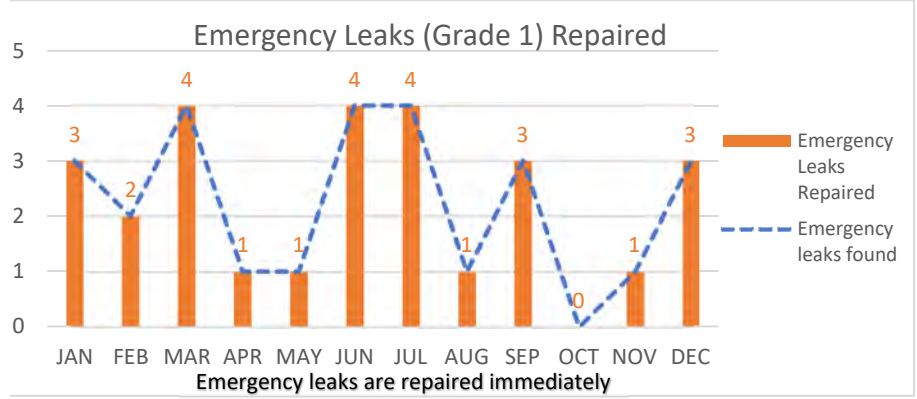
Gas Meters



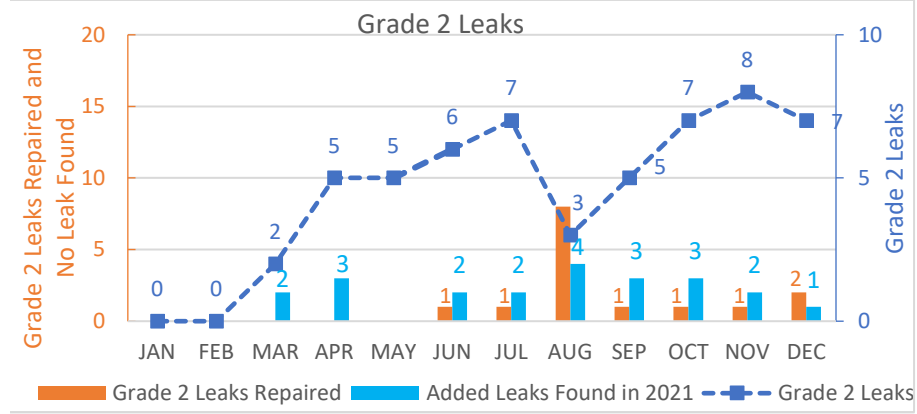


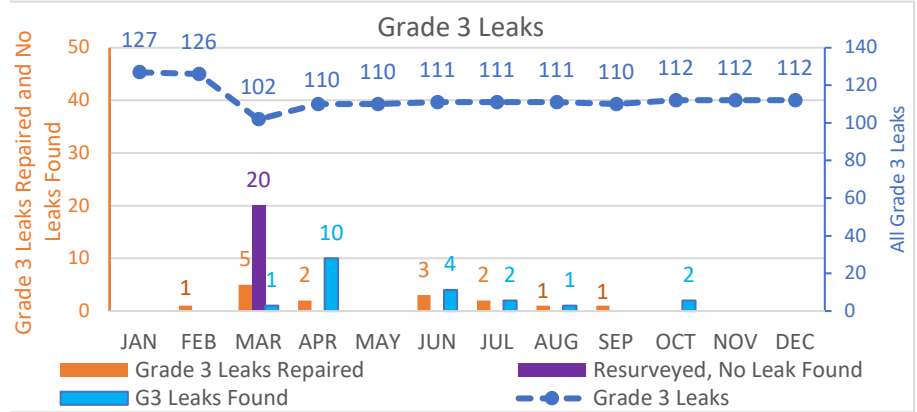


Unplanned Maintenance



Planned Maintenance (Monitored Leaks with planned repairs)





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