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:

- 12-07-2022 - UAC 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