MEMORANDUM

TO: **UTILITIES ADVISORY COMMISSION**

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FROM: **UTILITIES DEPARTMENT**

DATE: **June 3, 2015**

SUBJECT: **Staff Recommendation that the Utilities Advisory Commission Recommend that the City Council Adopt a Resolution Approving Design Guidelines for the 2015 Electric Cost of Service Analysis**

REQUEST

Staff requests that the Utilities Advisory Commission (UAC) recommend that the Council adopt a resolution (Attachment A) approving the Design Guidelines for the 2015 Electric Cost of Service Analysis (Attachment B).

EXECUTIVE SUMMARY

Electric rates were last adjusted when a 10% rate increase went into effect on July 1, 2009. Staff intends to complete an electric rate cost of service analysis (COSA) in FY 2016 in advance of a rate adjustment that staff projects will be necessary on July 1, 2016. The primary goal of the COSA will be to review the allocation of costs to customer classes and the electric rate design to ensure customers are charged according to the cost to serve them. However, the COSA will also include a review of the rate design issues created by increasing numbers of local solar installations, higher electric vehicle penetration, and the potential for building electrification. This report discusses the existing rate design, gives an overview of the issues to be addressed in the COSA analysis, and sets forth short-term (Phase One) and long-term (Phase Two) work plans for addressing various types of rate design issues. The attached guidelines are only intended to address the Phase One work plan, which must be completed in time to support the July 1, 2016 rate change. Staff will return for further discussion of the Phase Two work plan and will recommend additional rate design guidelines at that time to guide Phase Two rate design activities.

BACKGROUND

Traditionally, utilities use a COSA to allocate costs among customer classes and to design rates. COSAs gained a more important role for California publicly-owned utilities after the passage of Proposition 26 (2010). Proposition 26 added provisions to the State Constitution essentially defining every local government fee or charge as a tax, requiring voter approval, unless one of seven exceptions applies. Municipal electric rates that do not exceed the reasonable costs to

the local government of providing electric service are one exception from the constitutional definition of a tax, and its voter approval requirements. Although Proposition 26 is not retroactive, it will apply to the City's electric rates once they are increased next via Council adoption. The FY 2016 Electric Utility Financial Plan (Staff Report 5681) projected the need for a 6% rate increase on July 1, 2016.

The current rates, which were last changed on July 1, 2009, are based on a COSA performed in 2007. The fundamental structure of the City's current rates has remained the same since the early 1980s, though the commodity, distribution, and public benefits portions of the rates were "unbundled," or separated out, during California's deregulation of the electric market in the late 1990s. Like many utilities, Palo Alto had declining block rates (rates that decreased with increasing consumption) for all customers until the late 1970s, at which point the City switched to the current system. For residents, the current system includes inclining block rates (rates that increase with consumption, more commonly called tiered rates), and for the more diverse non-residential customer classes, flat seasonal rates with demand charges for larger customers. As Palo Alto transitioned to its current rate design, fixed charges for both types of customers were switched to minimum charges and eventually eliminated. The main driver for these changes was to encourage conservation.

DISCUSSION

The following sections provide a review of the current rate structure and a discussion of rate design issues affecting the utility in the short term and in the long term. They also include a work plan and a proposed set of rate design guidelines to guide the COSA.

Summary of Existing Rate Structure

Table 1, below, summarizes the number of customers on each electric rate schedule and the percentage of the City's sales volume they represent. Currently the electric rate for separately-metered residential customers (Rate Schedule E-1) has three tiers, with rates that increase when customer use exceeds roughly 300 kilowatt-hours (kWh) per month and again when the customer exceeds roughly 600 kWh. Non-residential customers' rates are flat (not tiered) and are higher during the summer. Larger non-residential customers are billed based on their peak demand (the highest fifteen minutes of consumption in the month, measured in kilowatts, or kW) in addition to their monthly energy use. These demand charges are higher in the summer than in the winter, just like the energy charges. None of the major rate schedules include fixed or minimum charges.

Table 1: Existing Electric Rate Schedules

Rate	Applicability	Description	Number of customers[(1)]	Share of sales[(1)]
E-1	Separately-metered residential customers	Three tiered rate No fixed or minimum charge	25,341	16%
E-2	Small non-residential customers and master metered multi-family customers	Flat energy charge that varies seasonally No fixed or minimum charge	3,073	7%
E-4	Demand-metered non-residential customers, peak demand <1000 kW	Flat energy and demand charges that vary seasonally No fixed or minimum charge	736	32%
E-7	Demand-metered non-residential customers , peak demand >1000 kW	Flat energy and demand charges that vary seasonally No fixed or minimum charge	66	42%
E-18	City-owned facilities	Flat energy charge that varies seasonally No fixed or minimum charge	123	3%

(1) FY 2014

The City also has a number of optional, pilot, and special use rate schedules. Both the E-4 and E-7 customer classes have optional time-of-use (TOU) rate schedules. There is a pilot residential (E-1) TOU rate schedule as well, though it is limited to the small group of customers participating in the pilot program. The E-14 rate establishes charges for street and highway lighting, and the E-16 rate deals with unmetered electrical equipment such as billboards, wireless antennas, and traffic cameras. There are also generation-related rates, such as the E-3 rate and E-NSE rate. The E-3 rate establishes wholesale energy purchase prices for certain types of customer-owned generating facilities. The City designed this schedule to comply with the Public Utility Regulatory Policies Act (PURPA). The E-NSE rate establishes the City's purchase price for surplus generation from customer-owned net-metered solar systems. Lastly, the voluntary PaloAltoGreen rate is still available for certain commercial customers who want it for sustainability reporting purposes.

Rate Design Issues, Short-Term and Long-Term

Staff has identified a variety of rate design issues to address in coming years. Some of the issues are more relevant to the long-term operation of the utility (five to ten years from now), and others are relevant to its operation over the next three to five years.

The **short-term** rate design issues include:

- **The need to update the City's electric COSA.** Since the current COSA was completed over 8 years ago, an updated COSA is needed before implementing any changes to existing rates.
- **Drought-related hydroelectric resource variability.** This variability could potentially be managed using a hydro rate adjustment mechanism.
- **Customer interest in electric water heating and space heating.** The City's Carbon Neutral Portfolio has led some customers to consider electrifying the space and water

heating systems in their homes, or replacing gas-using appliances with electric ones. The electric rate structure has an impact on these decisions.

- **More electric vehicles and plug-in hybrids are on the market.** Replacing gasoline or diesel fueled vehicles with electric vehicles is another form of electrification and, again, the electric rate structure can have an impact on these customer choices.
- **The City's net energy metering (NEM) tariff for solar customers may reach capacity within the next one to three years.** The City should have new rules and rates ready for customers who install solar systems after the NEM cap is reached, and should consider the impact of existing and proposed rate designs on the economics of solar.

The **long-term** rate design issues include:

- **Advanced metering.** This technology would enable wider applicability of TOU rate structures and charges based on customer peak demand. The utility will need to evaluate whether to apply these rate structures more widely.
- **Long-term potential for customer disconnection from the electric grid.** As building technology advances and energy storage and distributed generation technologies become cheaper, it may become feasible for customers to disconnect from the distribution system. The utility should begin considering how to monitor these trends and how pricing strategies might need to be adapted.
- **Changing utility rate design.** The largest utilities are considering a shift to residential TOU rate or even real-time varying rates. They are also considering the rate design issues raised by distributed solar, electric vehicles, building electrification, and other developing technologies. The City attempts to maintain some consistency with the rate designs in nearby communities, so the responses of larger utilities to these trends are worth monitoring.
- **New carbon reduction targets.** More vehicle and building electrification will be required to achieve some of the targets being considered by the State and the City. This will have cost and rate implications for the electric utility. The utility should begin evaluating those long term impacts.

To address the issues listed above, staff is proposing a two phase work plan. Phase One involves completing a COSA that addresses only the short-term rate design issues. Staff forecasts a need to increase rates 6% on July 1, 2016 to preserve the financial position of the electric utility, so that date will drive the work plan for Phase One. Longer-term rate design issues will be addressed in Phase Two since these issues are not critical to address prior to July 1, 2016, but preliminary analysis and some stakeholder discussions can begin in 2015 and 2016. Many of the Phase Two projects do not have specific deadlines for completion because they are driven by other planning efforts, such as the Sustainability and Climate Action Plan (S/CAP) and the City's advanced metering planning efforts. Table 2, below, shows the issues to be addressed in each phase of the work plan. Note that the guidelines proposed for adoption only address the Phase One work plan. Staff will return to the UAC and Council with additional guidelines for any Phase Two rate design work.

Table 2: Electric Rate Design Work Plan

Phase One Work Plan (to be completed by July 1, 2016)
▪ Before the spring 2016 financial forecasting and budget adoption process, develop an electric COSA that addresses the rate design issues discussed in the Design Guidelines for the 2015 Electric Utility COSA (Attachment B). ▪ As part of the spring 2016 financial forecasting and budget adoption process, bring completed COSA and new proposed rate schedules to the UAC and Council for review and adoption. ▪ Develop rules and rates governing solar customers once the NEM program reaches capacity. ▪ Examine projected impacts of the current residential tiered rate design on customers with electric heating and electric vehicles, and explore pilot programs, rebates, or other methods for addressing those impacts, as needed. ▪ Complete a connection fee study to evaluate existing fees and address rules related to transformer upgrades.
Phase Two Work Plan (to begin in 2015, completion dates to be determined)
▪ As the City establishes new sustainability goals as part of the S/CAP and continues to analyze future trends in energy use, identify the impact of these on electric rate design and the electric utility's financial position and develop appropriate responses. ▪ As the CustomerConnect advanced metering pilot program progresses, and as a long-term plan is developed regarding advanced metering and other smart grid technologies, evaluate TOU rate structures and other rate designs those technologies could enable. ▪ Monitor electric rate trends at the State level and among other publicly owned utilities. ▪ Consider the use of fixed charges to recover certain types of costs. ▪ Begin assessing the impact of distributed generation, storage, grid-interactive appliances, and electric vehicles on the distribution system and identify the rate designs that would send appropriate and cost-based price signals to customers using these technologies. ▪ Develop a framework for monitoring the utility's cost recovery and competitiveness in light of customer self-provision of power and disconnection from the electric grid. ▪ Evaluate the long-term rate impact to the electric utility of new electric vehicle and building electrification loads, as well as new highly efficient building code standards that are currently in development.

Rate Design Guidelines

In the past, the UAC and Council have expressed concern about having limited ability to make changes to proposed rate structures once a COSA is completed. Staff agrees, and has committed to having policy discussions with the UAC and Council prior to embarking on a COSA. Staff is proposing a set of rate design guidelines for Phase One (Attachment B) to guide its work over the next year. Separate rate design guidelines will be developed for Phase Two. The guidelines for the Phase One COSA are summarized below and discussed in more detail in subsequent sections:

Guideline 1. Rates must be based on the cost of service.

Guideline 2. Energy charges should be structured similarly to the way they are currently structured, if feasible.

Guideline 3. All existing rates should be reviewed for inclusion in the COSA or for retirement.
Guideline 4. The COSA should consider the impact of rate designs on electric vehicle and electric heating customers.
Guideline 5. The COSA should consider the need for a minimum charge.
Guideline 6. A hydroelectric rate adjustment mechanism should be evaluated.
Guideline 7. The effect of rate design on current and future solar customers should be considered.
Guideline 8. A study of connection fees should be completed.
Guideline 9. The effect of proposed rate design changes on low income customers should be considered.

Guideline 1: Rates to be based on the cost of service

The goal of a COSA is to identify the costs associated with serving each customer class and the rates required to recover those costs. Historically, electric utilities have been able to make some adjustments to COSA-recommended rates to achieve environmental or social objectives. After Prop. 26, such rates cannot be structured solely to achieve policy objectives unless they are also cost-based, absent voter approval. The COSA has become an important tool for demonstrating that utility rates are based on the cost of service. As a result, this guideline must be the overriding one for the COSA.

Guideline 2: Use existing rate design for energy charges

For Phase One, staff recommends against considering major modifications to the structure of energy charges (such as shifting customers to flat rates, TOU rates, or real-time pricing) for this COSA. The City has not installed the necessary metering technology to implement advanced rate designs like TOU in the short term, and does not expect to do so for several years. The installation of advanced metering may take place within the next several years, and that would be the appropriate time to consider major changes to existing rate structures. This is anticipated in Phase Two of the work plan. If feasible, the COSA should continue the current structure for energy charges, including:

- A tiered energy rate for residential customers
- A uniform energy rate (possibly with seasonal variation) for non-residential customers
- A demand and energy rate for large non-residential users, possibly with seasonal variation

Although staff anticipates retaining the existing structure for energy charges, minor adjustments, as discussed in subsequent guidelines, may be advisable (e.g. adding a minimum charge).

Guideline 3: Evaluation of all existing rate schedules for continuation, consolidation, or retirement

Staff recommends evaluating all existing rate schedules to determine whether they should be continued or retired. The main focus of this review will be the customer class definitions for non-residential customers. Staff will ask a consultant to evaluate whether the boundaries between small (E-2), medium (E-4), large (E-7), and City-owned (E-18) non-residential

customers should be redefined and whether some of the rate schedules should be consolidated.

Guideline 4: Impact on electric vehicle and electric heating customers

Residential customers represent a fairly uniform customer class when compared to non-residential customers. Electric vehicles are becoming more available, however, and some customers are considering greater use of electricity in their homes by replacing natural gas fueled water and space heaters with efficient heat pump water and space heaters. These customers are likely to have significantly different load profiles from the average residential customer. Staff recommends evaluating whether the cost to serve these customers differs from other residential customers substantially. If so, adjusting the pricing structure applicable to these customers may be appropriate.

Guideline 5: Minimum Charge

The electric utility incurs costs for billing, metering, and system maintenance for each customer connected to its distribution system, regardless of whether that customer uses energy. Many utilities use a fixed or minimum service charge to recover some or all of those costs. More California utilities are adopting these charges in recent years because the rapidly decreasing cost of rooftop solar and energy storage has enabled some customers to completely eliminate their electric bills through the use of NEM. These customers still use the distribution system when their solar system is not generating, and also incur costs for customer service, billing, meter reading, and maintenance of meters and service drops. A fixed or minimum charge recovers those costs.

Fixed and minimum charges can be designed to recover similar costs, but differ in the way they operate:

- A **fixed service charge** is applied each month in addition to the consumption charge. Revenue generated from a fixed charge allows the consumption rate to be reduced. Fixed charges are useful for reducing revenue variability for utilities with high load variability due to weather or other factors.
- A **minimum charge** applies only if a customer's consumption charge falls below a specified amount. For example, if the utility had a rate of $0.10/kWh, a customer using 30 kWh would pay $3 (30 kWh x $0.10/kWh) in the absence of a minimum charge. With a $5 minimum charge, a customer using 30 kWh would pay $5. If the customer used 100 kWh, the customer's bill would be $10 (100 kWh x $0.10/kWh), and the minimum charge would not apply. A minimum charge generally does not generate as much revenue as a fixed charge, and may not generate much revenue at all unless there are substantial numbers of customers with little or no energy consumption. However, it can be useful for ensuring that very low users or solar customers contribute to the cost of operating the utility.

For this COSA staff recommends considering a minimum charge as a way of ensuring that all customer groups contribute their share of the utility's operating costs. This is consistent with

the approach currently being implemented by PG&E and other investor-owned utilities, as well as a number of publicly-owned utilities throughout California. Many of these utilities are considering eventually implementing fixed charges rather than minimum charges. Staff recommends considering a fixed charge in the Phase Two work plan, but only evaluating the addition of a minimum charge in the Phase One COSA work.

Staff estimates that a minimum charge, if adopted, would be between $5 and $7 per month. Staff estimates that such a charge would affect less than 1% of all non-solar customers. It would affect slightly more customers on the rate assistance program, since these customers tend to use less energy on average. Even so, it would still only affect 1% to 3% of these customers, and they would still have lower bills than customers in the rest of the state.

As part of the COSA, staff will evaluate how this charge (and other aspects of the rate design) would affect the economics of solar in Palo Alto.

Guideline 6: Hydroelectric rate adjustment mechanism

Hydroelectric resources make up roughly 50% of the City's electric supply portfolio. The output of these resources varies with annual rainfall, but their costs are largely fixed. When rain and snow is plentiful and hydroelectric resources generate more than usual, the City does not need to buy as much electricity in the markets (or can sell surplus electricity) and its costs decrease. During a dry year the opposite happens. Costs increase because the City must buy more energy in the markets to replace the hydroelectric generation. This variability can result in as much as $11 million to $13 million in additional costs in a dry year or cost savings in a wet year. The City maintains reserves to help manage these changes in cost in the short term, but the costs must be passed through in the rates eventually. Some agencies use a rate adjustment mechanism to make these rate impacts more transparent by passing on the costs and savings to customers as they occur. These rate adjusters provide a temporary rebate in a wet year or impose a temporary adder in a dry year. In addition to transparency, they have the added benefit of reducing the reserves needed to manage cost variability. Staff recommends evaluating a hydroelectric rate adjustment mechanism during development of the COSA. This would be done in parallel with the Phase One COSA and would involve additional discussions with the UAC and Council. If a hydro rate adjuster were recommended for adoption as part of this process, it would then be incorporated into the COSA.

Guideline 7: Rate design and solar customers

As a result of Senate Bill (SB) 1 (2006), investor-owned utilities and publicly-owned utilities like the City were required to offer NEM to customers who installed solar systems. Under NEM, solar customers who generate surplus energy in the summer receive a credit that can be used to offset their bill in the winter. SB 1 required utilities to offer this program until installed solar capacity reaches 5% of the utility's peak load. The City, like many other utilities, will likely reach that point within the next one to three years. Investor-owned utilities are currently working with the California Public Utilities Commission (CPUC) to define rules for solar customers after the NEM cap is reached. Staff is monitoring this effort and also working on its own analysis specific to Palo Alto to develop a successor to the existing NEM rules.

For some customers, NEM can result in the elimination of the total electric bill on an annual basis, or even a small net surplus. One criticism leveled at NEM is that it is unsustainable and inequitable. Solar customers continue to use the distribution system during the night and winter, but customers with large systems do not contribute to the upkeep of the system because they pay no electric bill (or a very small bill). Solar advocates counter that existing rate structures may not properly account for the value that solar systems provide to the distribution system. Efforts are being made at the State level to balance these considerations in future rate design, and staff will do the same in this COSA. Discussions about post-NEM rules for solar customers will take place in parallel with the COSA and will involve additional discussions with the UAC and Council. The COSA will also evaluate the impact of any recommended rate design on the economics of solar systems.

Guideline 8: Connection fee study

The City currently charges customers a one-time fee to connect to the distribution system. The City charges a flat fee for a 200 ampere capacity connection, but requires a customized estimate for higher capacity connections. Fees for higher capacity connections can be substantially more expensive, especially if the new connection triggers the need for a residential transformer upgrade. These higher capacity connections, previously rare, are becoming more common as electric vehicle penetration increases and some customers begin to install electric space and water heaters. As part of the COSA, staff will re-evaluate its policies and fees for new and upgraded customer connections.

Guideline 9: Impact on low income customers

Changes in rate design can have different impacts on customers who use different amounts of electricity. Low-income customers have lower electricity usage than other customers, on average. Staff intends to evaluate the impact of any recommended rate design changes on low-income consumers and may recommend mitigation of those impacts if necessary.

NEXT STEPS

After receiving the UAC's recommendation, staff will take the COSA design guidelines to the Finance Committee, followed by consideration by the City Council. The COSA is expected to be completed by the spring of 2016 so that updated rates can be adopted as part of the FY 2017 budget process to be effective on July 1, 2016.

RESOURCE IMPACT

The work associated with this project will be absorbed using existing staff and contract budgets. The new rates adopted as a result will be designed to generate adequate sales revenue to fund the electric utility's operations in FY 2017. For FY 2017, the utility is projected to need roughly 6% more sales revenue ($8.8 million) than is generated by current rates, mainly due to increased costs associated with renewable projects. In addition, if the drought continues through FY 2017, additional revenue (as much as $10 million to $15 million) may be needed to fund higher market purchase costs resulting from low output of hydroelectric resources. As part of the COSA, staff will evaluate a hydroelectric rate adjustment mechanism that could add a

temporary charge to customer bills to generate additional revenue under a drought scenario. For more detail on these projections see the proposed FY 2016 Electric Utility Financial Plan (Staff Report 5681).

POLICY IMPLICATIONS

The process of adopting these design guidelines provides the UAC and Council an opportunity to provide policy guidance to staff before work begins on the COSA. Once a COSA is complete, it can be difficult to modify the resulting rate design without reviewing and possibly amending the analysis.

The analysis performed as part of this COSA will support other policy initiatives, including the Local Solar Plan (Staff Report 4608) and the S/CAP. The analysis of the hydroelectric rate adjustment mechanism is part of the Long-term Electric Acquisition Plan (LEAP) Implementation Plan (Staff Report 1317).

ENVIRONMENTAL REVIEW

Adoption of the Design Guidelines for the 2015 Electric Cost of Service Analysis does not meet the definition of a project, pursuant to Section 21065 of the California Environmental Quality Act, thus no environmental review is required.

ATTACHMENT

A. Proposed Design Guidelines for the 2015 Electric Cost of Service Analysis

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REVIEWED BY: **JANE RATCHYE,** Assistant Director, Resource Management

APPROVED BY:

VALERIE O. FONG
Director of Utilities

Attachment A

Design Guidelines for the 2015 (Phase One) Electric Utility Cost of Service Analysis

1. Rates must be based on the cost to serve customers. This is the overriding principle for the cost of service analysis (COSA); all other rate design considerations are subsidiary to this basic premise.

2. For this cost of service study, and to the extent feasible, energy charges should be based on existing rate structures. This includes:
    a. A tiered rate design structure for residents
    b. A flat general service rate for small non-residential users
    c. A flat demand and energy rate for large non-residential users

3. The COSA should involve a review of all existing rate schedules for inclusion in the COSA or retirement.

4. The COSA should take into account the impact of rate designs on electric vehicles and electric heating customers, and should investigate:
    a. the extent to which these customers have different load profiles from other residential customers; and
    b. the extent to which existing rate designs should be adjusted for these differing load profiles

5. The COSA should evaluate the need for a minimum charge.

6. A hydroelectric rate adjustment mechanism should be evaluated.

7. The COSA should evaluate the impact of rate designs on the economics of local solar for current and future customers and should be coordinated with an analysis of long-term solar policies to be put into effect after the existing net energy metering tariff reaches capacity.

8. A connection fee study should be performed and policies regarding residential transformer upgrades should be reviewed, either as part of the COSA or as part of a parallel analysis. The COSA methodology should be coordinated with any potential connection fee changes or policy changes.

9. The impact of any proposed changes on low income customers should be evaluated