



San Francisco  
Water Power Sewer

# San Francisco Public Utilities Commission Power Cost of Service Study

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*Prepared By:*



NAVIGANT



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## **EXECUTIVE SUMMARY**

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In June 2015 the City retained a consulting team consisting of a joint venture between NBS, Navigant, and Urban Analytics to conduct an independent rate study for the San Francisco Public Utilities Commission's (SFPUC's) electric utility. The consulting team and SFPUC staff worked cooperatively in developing study results and recommended electric rate alternatives.

This rate study included three main components: identifying revenue requirements, conducting a cost of service analysis (COSA), and designing rates to meet the SFPUC's needs. The test year was identified as Fiscal Year (FY) 2013/14, as it was the most recent year for which audited financial data was available when this study began. These three main components are discussed in Sections 1 through 4; more detailed data for each component is provided in Appendices A through D.

### **Revenue Requirements**

Under current rates, the SFPUC's electric utility will run a structural deficit in FY 2016/17, which indicates that a rate increase is needed. This deficit would continue through FY 2024/25 if no rate increases are implemented. For FY 2016/17 through FY 2020/21, the projected net annual revenue requirement (that is, total annual expenses less non-rate revenues) averages approximately \$131 million, increasing to a maximum of \$150 million in FY 2020/21.

Average annual rate increases of 5.5, 5.5, 5.0, 5.0, and 5.0 percent for 5 consecutive years are needed to fund all Operations & Maintenance (O&M) and Capital Improvement Program (CIP) expenses, including debt service on future planned debt.

### **Cost of Service Analysis**

The COSA identified that for test year FY 2013/14, the SFPUC did not collect sufficient overall retail revenues to recover its net revenue requirement. The under-recovery was lessened because some tariff classes provided revenues greater than their allocated share.

The reclassification of all existing customers into 13 customer classes was an additional result of COSA, in order to better align cost of service with customer class of service.

During the COSA, several recommendations were identified that will assist in the development of future studies. SFPUC should undertake the expansion and completion of interval metering on remaining electric customers and should require new customers to install interval demand recording electric meters. This project should resolve most issues in quantifying each customer's cost responsibility share of future electric revenue requirements. SFPUC should begin recording and tracking electric revenues and costs based on the electric industry adopted Uniform System of Accounts employed by regulatory agencies. This system would allow SFPUC to do cost benchmarking to a group of comparable electric utilities.

### **Rate Design**

Rate design considerations made by Navigant included the twin goals of meeting charter requirements such that 1) retail rates will be set in order to sufficiently recover the cost of operation, maintenance, and repair of the electric utility, and 2) retail rates will be set based upon the cost of providing service. An additional goal was incorporated such that rates will not be increased in amounts to induce "rate shock" by SFPUC customers.

Three approaches to rate design were considered in this analysis. These included 1) the base case, 2) a 5-year full cost of service scenario, and 3) a hybrid approach.

It is suggested that the SFPUC adopt a hybrid approach to rate design. This would mean instituting rate adjustments as may be currently envisioned by management in FY 2016/17 and FY 2017/18 (base case). For the subsequent 3 years, from FY 2018/19 to FY 2020/21, the hybrid approach incorporates variable rate adjustments for General Fund related customer classes (GUSE), combined with potentially decreased rates for Standard or Enterprise customers. Appendix D includes complete rate tables reflecting these scenarios.

## Additional Recommendations

It is suggested for future updates, that SFPUC staff consider separating customers' costs (such as meter reading and billing) so that they can flow through the COSA model.

The SFPUC's existing reserves policies are at a low level compared to similar utilities. This analysis recommends modifying existing reserve policies and gradually increasing rates over the next 5 years to move toward the following target reserve fund balances:

- ✓ **Increase Existing Operating Reserve Fund** – Target reserve equal to 25 percent (or 3 months) of the annual operating expenses for the utility, which represents a 10 percent increase to current Operating Reserve Fund levels. This includes both Hetch Hetchy Operations Fund (HHP5TAAAAAA) and Hetch Hetchy Programmatic Fund (HHP5TAAAAAP). This reserve is intended to maintain financial viability by providing a “cash cushion” for normal operations in the event of any short-term fluctuation in revenues and/or expenditures.
- ✓ **Create A New Capital Rehabilitation and Replacement Reserve Fund** – Funds set aside annually in this reserve are used for ongoing and future system repair, rehabilitation, and replacement. The minimum reserve target of three percent of the utility's net assets, and represents approximately \$22 million by FY 2019/20 and \$30.5 million by FY 2024/25 (in 2015 dollars). This is a starting point for addressing long-term needs and may require gradually increasing this reserve to more than three percent over time.
- ✓ **Create A New Rate Stabilization Reserve Fund** – This reserve is intended to provide a cash cushion to address short-term fluctuations in revenues and/or expenditures that would otherwise have a direct impact on power rates. Since it would serve a similar function as the \$4 million annual budget appropriation line item intended to cover unanticipated costs for power purchases, it could replace the \$4 million appropriation. A recommended target reserve balance of 20 percent of estimated rate revenue represents \$28.4 million in FY 2019/20 and \$31.3 million by FY 2024/25. Again, this reserve fund can be built over time.
- ✓ **Create A New Debt Reserve Fund** – A target balance equal to current annual debt reserve requirements should be held in reserve. Even though additional bonds will be issued over the next 10 years to fund capital improvement expenditures, per SFPUC direction, future debt issues assume that there will be no reserve requirement.

However, for the 5-year period covered by this study, revenues are projected to be insufficient to fund any additional reserves, and, as such, are not drivers of the revenue requirement for that period.

## SECTION 1. PURPOSE AND OVERVIEW OF THE STUDY

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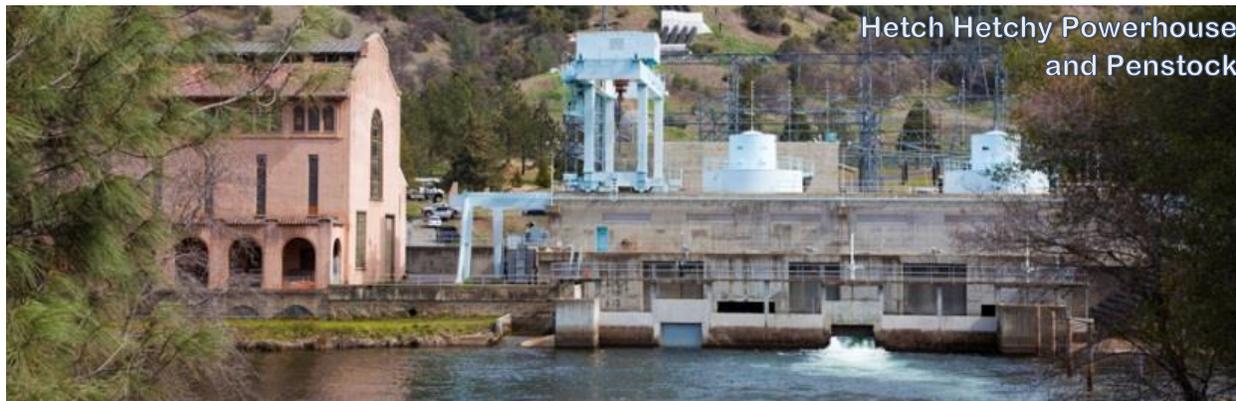
### Background

The SFPUC is a department of the City & County of San Francisco responsible for the maintenance, operation and development of three utility enterprises: the Water Enterprise, the Wastewater Enterprise and the Hetch Hetchy Water and Power Enterprise (Hetch Hetchy Water and Power). The Water Enterprise provides drinking water to retail customers in the City, to certain retail customers outside of the City, and to wholesale customers in three other Bay Area counties. The Wastewater Enterprise provides sanitary waste and stormwater collection, treatment and disposal services to residential, commercial, and industrial customers in the City and three municipal sewer service providers serving residents and businesses in northern San Mateo County.

Hetch Hetchy Water and Power operates and maintains the Hetch Hetchy Water and Power Project, including the O’Shaughnessy Dam, the Hetch Hetchy Reservoir, the Canyon and Mountain Tunnels, the Kirkwood, Moccasin and Holm Powerhouses, Cherry Lake and its dam, Lake Eleanor and its dam, the related water storage and transportation and hydroelectric generating facilities down to and including the Moccasin Powerhouse, all located in Yosemite National Park, Stanislaus National Forest and Tuolumne County, the rights to which were granted to the City by the Raker Act of 1913 (the Raker Act), related transmission facilities down to the City of Newark, California (Newark), and the related water storage and transportation facilities from Hetch Hetchy Valley to a connection with the facilities of the Water Enterprise (collectively, the Hetch Hetchy Project). The Power Enterprise provides hydroelectric, solar and other power, serving City municipal customers, the Modesto Irrigation District (MID) and the Turlock Irrigation District (TID and, collectively, the Districts), and other public agencies and retail customers, and provides pedestrian and streetlight services. The Power Enterprise also operates and maintains the natural gas and electric utilities systems on Treasure Island/Yerba Buena Island pursuant to an agreement with Treasure Island Development Authority.

For financial purposes, Hetch Hetchy Water and Power is comprised of two component funds: Hetch Hetchy Water and Hetch Hetchy Power (Power Enterprise). All power sales revenues are allocated to the Power Enterprise. Operating and capital costs of Hetch Hetchy Water and Power benefitting solely the Power Enterprise and 55 percent of combined operating and capital costs that benefit both Hetch Hetchy Water and the Power Enterprise are allocated to the Power Enterprise. Operating and capital costs benefitting solely Hetch Hetchy Water and 45 percent of combined operating capital costs benefitting both Hetch Hetchy Water and the Power Enterprise are allocated to the SFPUC’s Water Enterprise.

A map of the Hetch Hetchy power system is included in Appendix G - Hetch Hetchy Power System, at the end of this report.



## Purpose

Section 8B of the Charter of the City and County of San Francisco addresses requirements of the SFPUC including those specific to rate setting. As stated in the Charter:

*In setting retail rates, fees and charges the Commission shall:*

- 1. Establish rates, fees and charges at levels sufficient to improve or maintain financial condition and bond ratings at or above levels equivalent to highly rated utilities of each enterprise under its jurisdiction, meet requirements and covenants under all bond resolutions and indentures, (including, without limitation, increases necessary to pay for the retail water customers' share of the debt service on bonds and operating expenses of any state financing authority such as the Regional Water System Financing Authority), and provide sufficient resources for the continued financial health (including appropriate reserves), operation, maintenance and repair of each enterprise, consistent with good utility practice;*
- 2. Retain an independent rate consultant to conduct rate and cost of service studies for each utility at least every five years;*
- 3. Set retail rates, fees and charges based on the cost of service;*
- 4. Conduct all studies mandated by applicable state and federal law to consider implementing connection fees for water and clean water facilities servicing new development;*
- 5. Conduct studies of rate-based conservation incentives and/or lifeline rates and similar rate structures to provide assistance to low income users, and take the results of such studies into account when establishing rates, fees and charges, in accordance with applicable state and federal laws;*
- 6. Adopt annually a rolling 5-year forecast of rates, fees and other charges; and*
- 7. Establish a Rate Fairness Board consisting of seven members: the City Administrator or his or her designee; the Controller or his or her designee; the Director of the Mayor's Office of Public Finance or his or her designee; two residential City retail customers, consisting of one appointed by the Mayor and one by the Board of Supervisors; and two City retail business customers, consisting of a large business customer appointed by the Mayor and a small business customer appointed by the Board of Supervisors.*

Pursuant to paragraph 2 of the above citation, the City retained a consulting team consisting of a joint venture between NBS, Navigant, and Urban Analytics in June 2015 to conduct an independent rate study for the SFPUC's electric utility. NBS, Navigant, and SFPUC staff worked cooperatively in developing study results and recommended electric rate alternatives. In addition to documenting the rate study, this report is also intended to meet the SFPUC's objective of maintaining transparent communications between the SFPUC, Rate Fairness Board, and customers.

The electric rates developed in this study were developed based on industry standards, and do not fall under the requirements of Proposition 218 (property related fees and charges)<sup>1</sup>. However, they may be subject to the requirements of Proposition 26, which reclassifies certain fees and charges as taxes<sup>2</sup>. NBS recommends the SFPUC obtain legal guidance on the application of Proposition 26 to its electric rates.

## Electric Rates History

Currently, the retail electric rates charged by the Power Enterprise are set consistent with the following SFPUC Resolutions:

- Resolution 89-0355, adopted on November 14, 1989
- Resolution 11-0012, adopted on February 11, 2011
- Resolution 11-0203, adopted on December 13, 2011
- Resolution 14-0089, adopted on May 27, 2014

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<sup>1</sup> Proposition 218 added Articles XIII C and XIII D to the California Constitution.

<sup>2</sup> Proposition 26 added Article XIII C, section 1(e) to the California Constitution.

Resolution 89-0355 established two categories of rate schedules. The first set of rate schedules was established for Water Enterprise, Wastewater Enterprise, San Francisco International Airport, Port of San Francisco, certain enumerated municipal activities<sup>3</sup> and retail customers not governed by special contracts (referred to as the standard rate). Resolution 89-0355 established that the standard rate would be set equal to the PG&E tariff for equivalent service, and allows for rate adjustments consistent with changes to PG&E's rates. In FY 2015/16, standard rates are still set according to this resolution.

Resolution 89-0355 established a second set of rate schedules for other City departments and public agencies (referred to as the General Fund rate). The General Fund rate was set at the then-established cost of service of \$0.02921 per kilowatt hour (kWh). In 1999, the Power Enterprise retained an independent consultant to perform a General Fund Electric Rate Study. This study determined that General Fund rates were below cost of service and proposed a phased, three-step set of rate increases to move General Fund rates to cost of service. The first step, implemented effective July 1, 1999, resulted in General Fund rates ranging from \$0 to \$0.03125 per kWh. The second and third step increases were never implemented. In 2001, as a result of the California energy crisis, General Fund rates were increased to \$0.0375 per kWh. In 2004, the Board of Supervisors passed Resolution 431-04 which set policy that General Fund appropriations for power be sufficient to fund rates that "reflect the same cost of service principles outlined in the City Charter." This policy was not implemented.

In 2011, in accordance with Charter Section 8B, the Power Enterprise engaged a consultant to conduct an independent analysis of rates and cost of service for retail electric service. This study determined that the Power Enterprise's average cost of service was \$0.09 per kWh. This study also found that the rate subsidy provided to General Fund customers effectively added \$0.02 per kWh to the cost of all other customers. As a result of these findings, SFPUC resolution 11-0203 established municipal rates which authorized increases in General Fund rates of \$0.005 per kWh each year from FY 2012/13 through FY 2015/16. In FY 2013/14, the General Fund agreed to increase rates by \$0.01 per kWh for FY 2014/15 and FY 2015/16. As a result of these increases, the median General Fund rate for FY 2015/16 is \$0.0675 per kWh. The budget adopted for FY 2016/17 and FY 2017/18 envisions only a ½ cent per kWh increase to General Fund rates per year.

Also a result of the 2011 rate study, the SFPUC resolution 11-0012, established rates for residential customers (standard, low-income, and medical necessity) and small-commercial customers for FY 2012/13 through FY 2015/16.

## Overview of the Study

**Key Issues Addressed** – As part of the effort to meet the City Charter requirements summarized above, the specific elements addressed in this study include:

- **Revenue Requirement** – The Power Enterprise 10-Year Financial and Capital Plans were closely examined and adjusted to best reflect annual operating and longer-term capital improvement costs. Net revenue requirements for the test year of FY 2013/14 provided the basis for the subsequent cost of service and rate design tasks. The adopted budget for FY 2016/17 and FY 2017/18 as well as the adopted 10-year financial plan covering FY 2016/17 through FY 2025/26 were used to develop the revenue requirement and, subsequently, the rate increases recommended to meet projected revenue requirements for FY 2016/17 through FY 2020/21.
- **Cost of Service Analysis** – The COSA examined how costs are allocated to each customer class, as well as evaluating the adequacy of existing classes and whether the SFPUC should consider modifying and/or creating new customer classes. The results of this analysis provided the basis for rate design alternatives and, ultimately, the rate recommendation.
- **Overall Rate Design** – Revenue sufficiency, fairness, and equity were critical considerations in evaluating the overall rate design, including the amount of revenue collected from individual

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<sup>3</sup> Includes Convention Facilities Management (Bill Graham Auditorium, Brooks Hall and Moscone Center), Candlestick Park, Yacht Harbor, Parking Authority, and Public Works Department (Street Repairs, Bridges, Tunnels, Underpasses, Traffic Engineering, and Street Environmental Services).

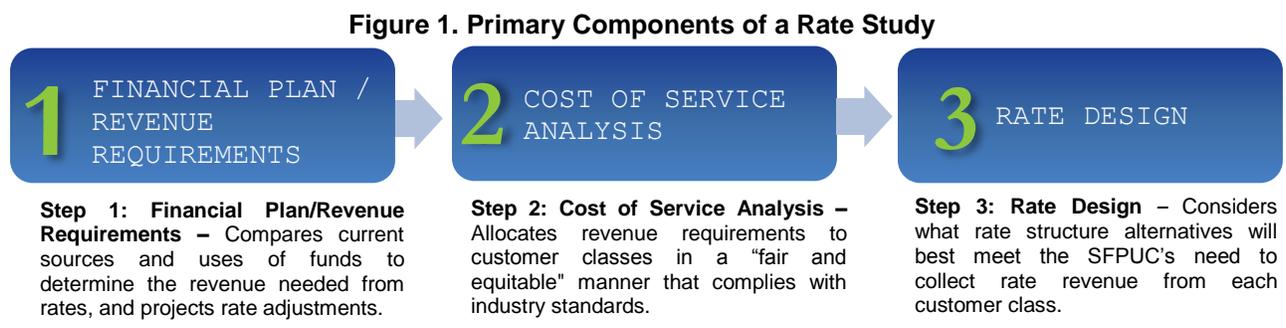
customer classes. The consulting team worked with SFPUC staff to evaluate various alternatives prior to arriving at the recommended rates.

**Industry Trends** – This study identified emerging trends in the electric utility industry. Urban Analytics reviewed pricing approaches and rate structures used by selected utilities in California that are similar to the SFPUC.

**Recommendations** – NBS and Navigant recommend the SFPUC adopt the electric rates summarized below in this report and incorporate changes to financial policies and operating practices to inform future COSA studies.

## Rate Study Methodology

**Components of the Rate Study Methodology** – As mentioned in the previous section (Overview of the Study), a comprehensive utility rate study typically encompasses three major components: (1) the utility's financial plan and overall revenue requirements, (2) the cost of service for each customer class, and (3) rate structure design. These three components were used in this study, and are summarized in **Figure 1**.



These three components reflect industry standard cost of service methodologies which are used by organizations such as: (i) National Association of Regulatory Commissioners (NARUC) – *Electric Utility Cost Allocation Manual*, and (ii) American Public Power Association (APPA) *Modern Retail Rate Design – Practical Approaches to Good Rates for Community Owned Electric Systems*. These components are also contained in the writings of rate and regulatory experts such as Alfred Kahn (*The Economics of Regulations: Principles and Institutions*) and Charles F. Phillips (*The Regulations of Public Utilities*). Each of these referenced documents addresses general requirements for revenue sufficiency, equity, and fairness. These three steps were performed in the order displayed in Figure 1.

NBS projected revenues, expenditures, and net revenue requirements, while Navigant performed cost of service rate analyses and evaluated rate design alternatives. As a result of this analysis and further review by SFPUC staff, the recommended new electric rates were developed. Rate increases – or more accurately, increases in the total revenue collected from electric rates<sup>4</sup> – are recommended. The following sections present an overview of the study methodologies, assumptions, and data used along with the financial plans and rates developed.

### Key Financial Assumptions

Following are the key assumptions used in developing the revenue requirements:

- **Funding of Capital Projects** – The SFPUC maintains a 10-year forecast for all capital improvement project expenditures. Projects and funding sources from the 10-year forecast were incorporated into the analysis.

<sup>4</sup> Increases in individual rates (and customer bills) in the first year may not match the annual percentage rate increase because cost of service adjustments typically result in rate adjustments in some classes being different than in other classes.

- **Reserve Targets** – Recommendations for reserve targets include increasing current O&M reserves and establishing two new reserve funds: one for capital rehabilitation and replacement (R&R) and one for rate stabilization. All recommended target reserve levels reflect general industry practices for utility reserve fund management:

- ✓ O&M Reserve target levels – 90-days of O&M expenses.
- ✓ Capital R&R Reserve levels – 3 percent of net assets.
- ✓ Rate Stabilization Reserve target levels – 20 percent of estimated annual rate revenue.

However, for the 5-year period covered by this study, revenues are projected to be insufficient to fund any additional reserves, and, as such, are not drivers of the revenue requirement for that period.

- **Inflation and Growth Projections** – Ranges of inflation and growth factors were used as appropriate for more detailed cost projections; based on input from SFPUC staff and existing financial plans and budgets, some line items had different inflation rates from year-to-year.

- ✓ Annual customer growth at 0.5 percent for most existing customers, with larger increases modelled for redevelopment areas in line with the Power Enterprise Business Plan.
- ✓ General costs (such as professional and contractual services, allocations of City overhead costs, fuel, and vehicle maintenance) are inflated between 0 and 3 percent annually.
- ✓ Operating expenses are inflated at a rate of approximately 0 to 4 percent annually<sup>5</sup>, and include chemicals purchased, energy, and internal transfers.
- ✓ Energy cost inflation: costs such as transmission and distribution charges and ISO charges are estimated at 4 percent annually.
- ✓ Labor costs are inflated at 0 to 3 percent annually, and include retirement and benefits.
- ✓ Revenues – No inflation is added to non-rate revenue items, such as charges for service, lease or rental income, and interest earned.

- **Other Assumptions** –

- ✓ Actual financial data were used for FY 2013/14 and FY 2014/15. The Commission-adopted 2-year budget was used for FY 2016/17 and FY 2017/18, while the FY 2015/16 approved 10-Year Financial Plan was used for FY 2018/19 and beyond.
- ✓ Hetch Hetchy operations are split between the Power and Water Enterprises.
  - Some expenditures are shared between Water and Power (called “Joint” activities). Based on contractual agreement, Joint costs are allocated 55 percent to Power and 45 percent to Water, and we have followed this division.
  - All Hetch Hetchy Water activities and Water’s share of Joint activities have been excluded from this analysis.
- ✓ Rate increases are effective July 1, annually.

### Rate Design Criteria

Several criteria are typically considered in setting utility rates and developing sound rate structures. The fundamentals of this process have been documented in a number of rate-setting manuals. For example, the foundation for evaluating rate structures is generally credited to James C. Bonbright in the *Principles of Public Utility Rates*<sup>6</sup>, which outlines pricing policies, theories, and economic concepts along with

<sup>5</sup> Consistent with the SFPUC 10-year adopted budget, FY 2016/17 operating costs are inflated at 0 percent, FY 2017/18 operating costs are inflated at 1 percent, and at 3 percent each year thereafter.

<sup>6</sup> James C. Bonbright; Albert L. Danielsen and David R. Kamerschen, *Principles of Public Utility Rates*, (Arlington, VA: Public Utilities Report, Inc., Second Edition, 1988), p. 383-384.

various rate designs. The following is a simplified list of some of the broader attributes of a sound rate structure:

- Rates should be easy to understand from the customer's perspective.
- Rates should be easy to administer from the utility's perspective.
- Rates should promote the efficient allocation of the resource.
- Rates should be equitable and non-discriminating (that is, cost based).
- There should be continuity in the rate making philosophy over time.
- Other utility policies should be considered (for example, encouraging conservation and economic development).
- Rates should provide month-to-month and year-to-year revenue stability.

Furthermore, the City Charter (Section 8B.125) establishes a number of goals and objectives for setting retail utility rates. A summary of the major goals and objectives is included below:

- Provide sufficient revenues for the operation, maintenance and repair of the enterprise consistent with good utility practice
- Provide sufficient revenues to improve or maintain the financial condition and bond rating at or above levels equivalent to highly-rated utilities of each enterprise
- Meet requirements and covenants under all bond indentures
- Set rates based on cost of service
- Investigate and develop capacity fees for new development
- Investigate and develop rate-based conservation incentives
- Investigate and develop affordability programs for low-income customers

This study addresses a 10-year period (FY 2015/16 through FY 2024/25), to coincide with the SFPUC's 10-year budgets and capital plans. The FY 2013/14 test year was selected because it is the most recent year with complete audited financial data for a COSA. The next three sections discuss the revenue requirements, COSA, and rate design.

## SECTION 2. REVENUE REQUIREMENTS ANALYSIS

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### Power Utility Revenue Requirements

It is important for municipal utilities to maintain sufficient revenues in order to cover operating costs, handle emergencies, fund working capital, fund reserves, maintain a good credit rating, and generally follow sound financial management practices. Rate increases are governed by the need to meet operating and capital costs, ensure adequate debt coverage, and maintain reserve funds. The current state of the SFPUC's electric utility, with regard to these objectives, follows:

- **Meeting Net Revenue Requirements under a Cash Basis:** Under current rates, the SFPUC's electric utility will run a structural deficit in FY 2016/17, which indicates that a rate increase is needed. This deficit would continue through FY 2024/25 if no rate increases are implemented. For FY 2016/17 through FY 2020/21, the projected net annual revenue requirement (that is, total annual expenses, less non-rate revenues) averages approximately \$131 million, increasing to a maximum of \$150 million in FY 2020/21. Annual rate increases of 5.5, 5.5, 5.0, 5.0, and 5.0 percent for 5 consecutive years are needed to fund all O&M and CIP expenses.
- **Building and Maintaining Reserve Funds:** The SFPUC should maintain sufficient reserves. Current reserve policies are well below industry practice for large electric utilities. This analysis recommends modifying existing reserve policies and gradually increasing rates over the next 5 years to reach the following target reserve fund balances:
  - ✓ **Operating Reserve** is intended to promote financial viability in the event of any short-term fluctuation in revenues and/or expenditures. Fluctuations might be caused by weather patterns, the natural inflow and outflow of cash during billing cycles, variability in demand-based revenue streams, and—more so in periods of economic distress—changes or trends in age of receivables. Typical industry practice is to maintain 90 days (or 25 percent) of the Utility's budgeted annual operating expenses. Current SFPUC policy is to maintain at least 15 percent of budgeted annual revenues or expenditures. NBS uses the higher reserve limit in this analysis.
  - ✓ **Capital R&R Reserve** should typically be equal to a minimum of 3 percent of net depreciable capital assets, which equates to a 33-year replacement cycle for capital assets. This target serves simply as a starting point for addressing long-term capital repair and replacement needs.
  - ✓ **Power Rate Stabilization Fund** is intended to provide a cash cushion to address short-term fluctuations in revenues and/or expenditures that would otherwise have a direct impact on power rates. This fund could replace the existing \$4 million annual budget appropriation line item designated to cover unanticipated costs for power purchases. A recommended target reserve balance of 20 percent of estimated rate revenue represents \$23 million in FY 2020/21. Again, this reserve fund can be built over time.
  - ✓ **Debt Reserve** is the reserve requirement for current debt service payments. Per current SFPUC practice, future debt issues assume no reserve requirement.

The difference between annual rate increases needed to maintain the current reserve fund target balances and the recommended reserve fund target balances was closely evaluated. Annual rate increases needed to meet revenue requirements with lower reserve fund target balances would be slightly lower than the recommended annual rate increases presented in this report. However, the difference is relatively small and contributing to reserve funds is not a significant contributing factor when determining annual rate increases needed to meet revenue requirements. Further discussion on recommended reserve funds can be found in Appendix B - Electric Rate Study and Reserve Recommendations.

- **Capital Funding:** The SFPUC maintains a comprehensive 10-year capital improvement program. Capital funding sources include debt issuance, rate revenue, and non-rate revenue sources.

## Test Year Revenue Requirements

Beginning with the test year, the net revenue requirement is calculated as the gross revenue requirement less other revenue credits. The revenue requirement calculation for test year FY 2013/14 is shown in **Figure 2** below.

The gross revenue requirement is the sum of operating expenses, rate funded capital improvement programs, and debt service. For FY 2013/14, operating expenses account for 70 percent of the gross revenue requirement, capital improvement programs represent 28 percent of the gross revenue requirement, and debt service costs comprise 2 percent of the gross revenue requirement. As can be observed from Figure 2, the two largest components of SFPUC Total Operating Expenses are personnel costs and light, heat, and power, accounting for \$58.9 million or approximately 80 percent of the \$73.9 million FY 2013/14 revenue requirement. The total gross revenue requirement during FY 2013/14 was \$105.6 million.

Other revenue amounts are applied as a “credit” to the gross revenue requirement to yield the net revenue requirement, which can be used to determine electric service rates for general fund, municipal, and other retail customers. In FY 2013/14 other revenues included:

- ✓ Cap and Trade Auction Revenues
- ✓ Wholesale Electric Sales
- ✓ System Impact Mitigation Payments
- ✓ Trans Bay Cable Payments
- ✓ Operating Grants (Federal and State)
- ✓ Interest and Investment Income
- ✓ Rents
- ✓ Other Non-Operating Revenues

The sum of other revenues during FY 2013/14 was \$9.7 million, which gave a net revenue requirement of \$95.9 million. SFPUC wholesale sales revenue is primarily obtained from MID and TID. These revenues and their corresponding kWh energy usage are excluded from retail sales allocators used to assign the SFPUC revenue requirement to the retail rate classes. The SFPUC supplies energy surplus from Hetch Hetchy generation to MID and TID under the Raker Act of 1913. The energy sold to MID and TID is to be sold at cost to meet those district’s municipal and pumping requirements.

The results of the COSA identifies the surplus or under recovery of revenues for the utility as a whole. As shown in Figure 2, for the FY 2013/14 test year, the SFPUC power utility had a total under-recovery of \$6.3 million.

**Figure 2. FY 2013/14 Revenue Requirement**

SFPUC Recorded Fiscal Year 2013/14 Electric Revenue Requirement	FY2013/14	% of Total Gross Revenue Requirement	% of Operating Expenses
Total Personnel Costs (PSAF)	\$33,152,996		44.9%
Total Contractual Services	\$4,019,860		5.4%
Total Light, Heat and Power	\$25,700,247		34.8%
Total Materials and Supplies (M&S)	\$2,057,658		2.8%
Total Services of Other Departments (SOD)	\$4,443,755		6.0%
Total Other Operating Expense (OOE)	\$343,941		0.5%
Total General and Administrative Expenses (GAE)	\$4,155,988		5.6%
Total Operating Expenses (TOE)	\$73,874,445	70.0%	100.00%
Capital Improvement Programs Rate Revenue Financed (CIPRRF)	\$29,305,123	27.8%	
Total Debt Service (DS)	\$2,387,529	2.3%	
<b>Total SFPUC Gross Revenue Requirement (GRR)</b>	<b>\$105,567,096</b>	100.00%	
Other Revenues [Credit] (OR)	(\$9,698,570)		
<b>SFPUC Net Revenue Requirement (NRR)</b>	<b>\$95,868,527</b>		
Total SFPUC Electric Sales Revenues (ESR)	\$89,600,301		
Revenue (+) Surplus, (-) Under recovery	(\$6,268,226)		
FY2013/14 kWh Sales	971,002,807		
Average Under-Recovery of Electric Revenue \$ / kWh	(\$0.0065)		

**Figure 3** and **Figure 4** summarize the sources and uses of funds, net revenue requirements, and recommended annual percent increases in total rate revenue for the next 5 years. As this figure shows, the electric utility is projected to have a deficit through FY 2017/18 after rate increases, with surpluses in FY 2018/19 and FY 2019/20. A deficit is projected again in FY 2020/21. These surpluses are intended to build up reserves to the target reserve fund balances.

**Figure 3. Power Revenue Requirements**

Summary of Sources and Uses of Funds and Net Revenue Requirements	Test Year	Actual	Projected Actual
	FY 2013/14	FY 2014/15	FY 2015/16
<b>Sources of Power Funds</b>			
Rate Revenue Under Prevailing Rates	\$ 90,003,139	\$ 97,831,344	\$ 105,637,401
Non-Rate Revenues <sup>1</sup>	8,136,537	13,943,258	29,489,345
Capital/Programmatic Projects Funding	3,169,798	3,418,000	3,700,000
Interest Earnings	1,041,607	1,231,424	1,028,888
<b>Total Sources of Power Funds</b>	<b>\$ 102,351,081</b>	<b>\$ 116,424,026</b>	<b>\$ 139,855,634</b>
<b>Uses of Power Funds</b>			
Power Operating Expenses	\$ 75,707,380	\$ 81,156,381	\$ 96,497,113
Debt Service	2,387,529	2,367,830	2,404,148
Direct Funding Source Capital Expenses	3,169,798	3,418,000	3,700,000
Rate-Funded Capital Expenses	28,448,054	27,098,078	27,212,662
<b>Total Use of Funds</b>	<b>\$ 109,712,761</b>	<b>\$ 114,040,290</b>	<b>\$ 129,813,923</b>
<b>Surplus (Deficiency) before Rate Increase</b>	<b>\$ (7,361,680)</b>	<b>\$ 2,383,736</b>	<b>\$ 10,041,710</b>
<b>Net Revenue Requirement<sup>2</sup></b>	<b>\$ 97,364,819</b>	<b>\$ 95,447,608</b>	<b>\$ 95,595,690</b>
<b>Projected Annual Rate Increase</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>
<i>Cumulative Rate Increases</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
Additional Revenue from Rate Increases	\$ -	\$ -	\$ -
<b>Surplus (Deficiency) after Rate Increase</b>	<b>\$ (7,361,680)</b>	<b>\$ 2,383,736</b>	<b>\$ 10,041,710</b>

**Figure 4. Power Revenue Requirements**

Summary of Sources and Uses of Funds and Net Revenue Requirements	Budget	Budget	Projected		
	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
<b>Sources of Power Funds</b>					
Rate Revenue Under Prevailing Rates	\$108,357,771	\$ 109,717,841	\$ 112,695,463	\$ 114,009,736	\$ 116,398,513
Non-Rate Revenues <sup>1</sup>	23,995,110	24,521,755	25,103,141	25,020,622	24,863,472
Capital/Programmatic Projects Funding	5,124,500	5,490,200	6,004,200	6,214,200	3,300,000
Interest Earnings	108,667	71,679	62,420	82,628	99,092
<b>Total Sources of Power Funds</b>	<b>\$137,586,048</b>	<b>\$ 139,801,475</b>	<b>\$ 143,865,224</b>	<b>\$ 145,327,187</b>	<b>\$ 144,661,077</b>
<b>Uses of Power Funds</b>					
Power Operating Expenses	\$ 102,076,660	\$ 104,762,307	\$ 109,732,170	\$ 114,375,180	\$ 119,497,155
Debt Service	6,366,710	9,674,737	11,598,354	13,768,486	34,995,099
Direct Funding Source Capital Expenses	5,124,500	5,490,200	6,004,200	6,214,200	3,300,000
Rate-Funded Capital Expenses	41,620,800	35,962,550	24,880,550	24,900,550	20,877,883
<b>Total Use of Funds</b>	<b>\$ 155,188,669</b>	<b>\$ 155,889,794</b>	<b>\$ 152,215,274</b>	<b>\$ 159,258,416</b>	<b>\$ 178,670,137</b>
<b>Surplus (Deficiency) before Rate Increase</b>	<b>\$ (17,602,621)</b>	<b>\$ (16,088,320)</b>	<b>\$ (8,350,050)</b>	<b>\$ (13,931,229)</b>	<b>\$ (34,009,060)</b>
<b>Net Revenue Requirement<sup>2</sup></b>	<b>\$ 125,960,392</b>	<b>\$ 125,806,161</b>	<b>\$ 121,045,513</b>	<b>\$ 127,940,966</b>	<b>\$ 150,407,573</b>
<b>Projected Annual Rate Increase</b>	<b>5.50%</b>	<b>5.50%</b>	<b>5.00%</b>	<b>5.00%</b>	<b>5.00%</b>
<i>Cumulative Rate Increases</i>	<i>5.50%</i>	<i>11.30%</i>	<i>16.87%</i>	<i>22.71%</i>	<i>28.85%</i>
Additional Revenue from Rate Increases	\$ 5,959,677	\$ 12,384,816	\$ 18,898,911	\$ 25,941,220	\$ 33,602,972
<b>Surplus (Deficiency) after Rate Increase</b>	<b>\$ (11,642,944)</b>	<b>\$ (3,703,504)</b>	<b>\$ 10,548,860</b>	<b>\$ 12,009,991</b>	<b>\$ (406,088)</b>

1. Non-Rate Revenues include: wholesale revenue, rental income, Federal & State grants and other contract-based revenues.

2. Total Use of Funds less non-rate revenues, cap./prog. funding, and interest earnings. This is the annual amount needed from rates.

Figure 5 and Figure 6 summarize the projected reserve fund balances and reserve targets for the next 5 years. Figure 7 is a graphical representation of the projected reserve fund balances, current reserve targets, and proposed reserve targets for the next 10 years.

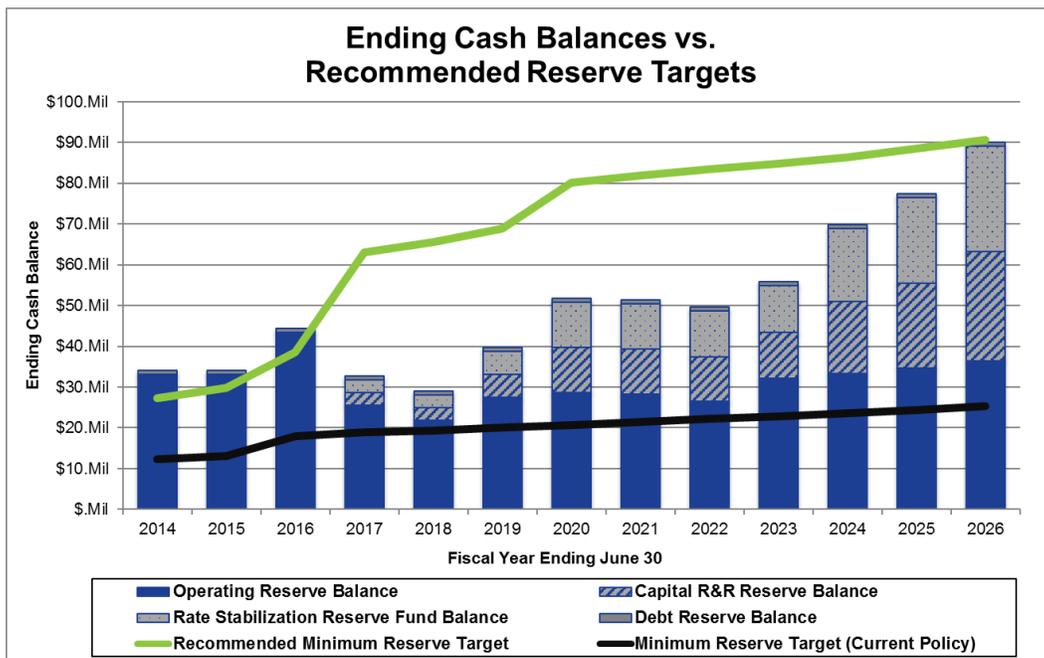
Figure 5. Recommended Power Reserve Targets

Beginning Reserve Fund Balances and Recommended Reserve Targets	Test Year	Actual	Projected Actual
	FY 2013/14	FY 2014/15	FY 2015/16
<b>Hetch Hetchy Operating Fund</b> <i>Recommended Minimum Target</i>	\$ 33,075,546 18,927,000	\$ 33,162,145 20,289,000	\$ 43,466,856 24,124,000
<b>Capital Rehabilitation &amp; Replacement Reserve</b> <i>Recommended Minimum Target</i>	\$ - 7,408,900	\$ - 8,517,400	\$ - 10,789,100
<b>Power Rate Stabilization Reserve Fund</b> <i>Recommended Minimum Target</i>	\$ - -	\$ - -	\$ - -
<b>Total Ending Balance</b>	<b>\$ 33,075,546</b>	<b>\$ 33,162,145</b>	<b>\$ 43,466,856</b>
<i>Total Recommended Target</i>	<i>\$ 26,335,900</i>	<i>\$ 28,806,400</i>	<i>\$ 34,913,100</i>
<i>Total Minimum Target</i>	<i>\$ 11,356,107</i>	<i>\$ 12,173,457</i>	<i>\$ 14,474,567</i>

Figure 6. Recommended Power Reserve Targets, continued

Beginning Reserve Fund Balances and Recommended Reserve Targets	Budget	Budget	Projected		
	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
<b>Hetch Hetchy Operating Fund</b> <i>Recommended Minimum Target</i>	\$ 25,519,000 25,519,000	\$ 21,815,496 26,191,000	\$ 27,433,000 27,433,000	\$ 28,594,000 28,594,000	\$ 28,187,912 29,874,000
<b>Capital Rehabilitation &amp; Replacement Reserve</b> <i>Recommended Minimum Target</i>	\$ 3,152,456 12,206,200	\$ 3,152,456 13,943,200	\$ 5,618,134 15,369,200	\$ 11,042,630 25,096,600	\$ 11,042,630 25,137,000
<b>Power Rate Stabilization Reserve Fund</b> <i>Recommended Minimum Target</i>	\$ - 21,671,554	\$ 3,152,456 21,943,568	\$ 3,160,337 22,539,093	\$ 5,633,916 22,801,947	\$ 11,072,496 23,279,703
<b>Total Ending Balance</b>	<b>\$ 28,671,456</b>	<b>\$ 28,120,408</b>	<b>\$ 36,211,471</b>	<b>\$ 45,270,546</b>	<b>\$ 50,303,038</b>
<i>Total Recommended Target</i>	<i>\$ 59,396,754</i>	<i>\$ 62,077,768</i>	<i>\$ 65,341,293</i>	<i>\$ 76,492,547</i>	<i>\$ 78,290,703</i>
<i>Total Minimum Target</i>	<i>\$ 15,311,499</i>	<i>\$ 15,714,346</i>	<i>\$ 16,459,825</i>	<i>\$ 17,156,277</i>	<i>\$ 17,924,573</i>

Figure 7. Projected Power Reserve Balances



A summary of the power utility’s proposed 10-year financial plan is included in Appendix A – Electric Rate Study Summary Tables. These tables include revenue requirements, reserve funds, revenue sources, and proposed rate increases for the 10-year period.

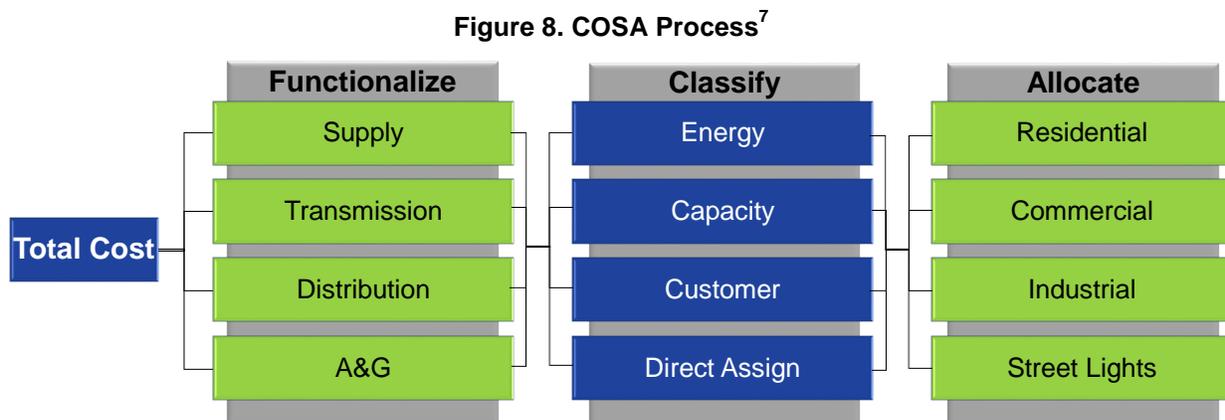
## SECTION 3. COST OF SERVICE ANALYSIS AND COST ALLOCATION

### Introduction

This section of the report discusses the COSA prepared for the SFPUC using FY 2013/14 recorded revenues, costs and available utility load data. A COSA is an engineering-economic study that apportions the revenue and expenses associated with providing electric service to designated groups of customers. COSA is concerned with the equitable allocation of the revenue requirement to the tariff customer classes. A COSA shows whether current rate revenues recover the costs of serving electric customers. The COSA results should be used as a guide in determining the appropriate electric rates in tariff schedules. It is recognized throughout the electric utility industry that COSA provides a reasonable method to compare tariff class rate revenues to their respective service costs.

The SFPUC can implement electric rates that consider rate setting criteria other than cost of service. Other criteria that may be considered are customers' ability to pay, ease of administration, and implementing rate increases over time. The SFPUC will consider management recommendations in accordance with the adopted Rates Policy and Ratepayer Assurance Policy to provide affordable utility services. The SFPUC will comply and set rates to: meet all applicable State and Federal laws; San Francisco Charter, ordinances, Contract commitments; Bond covenants; and asset management best practices.

The cost of service study prepared for the SFPUC was performed in three steps. **Figure 8** highlights the COSA process.



As Figure 8 shows, the first step *functionalized* the revenue requirement—that is, it assigned cost data to the functional activities of an electric system (for example, supply, transmission, distribution, customer and direct assignment). Functionalization was determined using SFPUC's recorded FY 2013/14 utility costs and by identifying the utility-specific revenue requirement amounts by function. The functions are defined as follows:

- **Supply:** Supply includes SFPUC Hetch Hetchy generating facilities, PG&E storage agreement, and purchased power.
- **Transmission:** Transmission service is a necessary cost incurred to deliver the power supply output from generating facilities to the utility's service area. These services also include costs for ancillary services such as load shaping and regulation.
- **Distribution:** Distribution services include all services required to deliver energy from the point of interconnection between the transmission system and the end user.
- **Administrative and General (A&G):** A&G related costs include employee salaries and benefits not charged to a particular function (that is, Supply, Transmission, or Distribution). This functional

<sup>7</sup> See Figure 11 for identification of recommended Power Customer Classes.

category includes outside services, employee pensions and regulatory costs. NBS and Navigant were provided a copy of an SFPUC “Indirect Cost Study” dated November 2014 prepared by the consulting firm Carollo in joint venture with Patricia McGovern Engineers. That Indirect Cost Study was used to assign all A&G costs to the other major functions of the Power Enterprise operations

- **Streetlights:** Streetlights and traffic signals are services provided by the SFPUC. Streetlights and traffic signals contribute to the safety and security of pedestrians and motorists that work, live and travel throughout City of San Francisco. Detailed FY 2013/14 utility cost data for this function were acquired from SFPUC accounting records. The costs of streetlight replacement are directly assigned to this function.
- **City Programs:** The city programs include GoSolarSF and community benefits; these costs are partially funded through the state-mandated Public Goods Charge, which covers renewable energy, energy efficiency, and low-income programs. Public Goods-related costs are bundled into the proposed rates in the rate design section, and are not separately allocated to customer classes in the cost of service model.

The second step in performing a COSA is *classification*. At this step, the functionalized expenses of the test year revenue requirement are classified as demand, energy, customer, or direct costs to specific customers or customer classes. Classification determines what units’ rates should be based on; for example, customer-related costs would go into a fixed monthly service charge, while energy-related costs would be charged to a customer based on total kWh energy usage. Demand-, energy-, and customer-related costs are defined as follows:

- **Demand-Related Costs:** Demand-related costs are those that vary with the maximum demand, or the maximum rates of electricity flow to customer classes. Customer and system demands can be measured in kilowatts (kW) in 15-, 30-, or 60-minute periods.
- **Energy-Related Costs:** Energy-related costs are those that vary with the total amount of electricity consumed by a customer.
- **Customer-Related Costs:** Customer-related costs are those that vary with the number of customers. They do not vary with SFPUC system output levels. There are two types of customer related costs: actual and weighted. Actual customer costs vary proportionally with the addition or deletion of a customer, regardless of the size or usage characteristics of the customer. In contrast, weighted customer costs reflect a disproportionate cost attributable to the addition or deletion of a customer. The weighting factors were developed consistent with approaches accepted state public utility commissions.

The third step in performing a COSA is the *allocation* of the functionalized and classified revenue requirement to the customer or tariff classes based on proportionate share of total load, energy or customer responsibility. The allocation factors typically used in a COSA are:

- **Demand (Fixed) Allocation Factors:** Coincident peak demand allocation method was used to allocate demand-related power supply and transmission costs. Coincident peak demand measures the customer class load at the total system peak. SFPUC’s FY 2013/14 System Coincident Peak (CP) demand of 139 MW occurred on September 19, 2013, at 12:00 pm. SFPUC demand losses were provided to Navigant so that all class allocators would be at a common voltage level of service. The demand losses between Primary to Transmission were 1.0266 percent. The demand losses between Secondary to Transmission were 1.05108 percent. SFPUC customers taking delivery at Transmission voltage had no additional demand losses added to their metered values.

The distribution demand (fixed) costs are allocated to customer class using non-coincident peak (NCP) demand. NCP demand refers to individual customer peak demands regardless of the time of occurrence. Allocating distribution fixed costs using NCP is a recognized and accepted method used in the electric utility industry. Navigant worked with SFPUC staff to determine the NCP demands for the retail electric customers served at the distribution function. Customers that receive services at transmission voltage should not be allocated distribution-related revenue requirement costs.

- **Energy (Variable) Allocation Factors:** Energy costs vary directly with consumption. Accordingly, energy allocation factors are based on energy sales for each class adjusted for system energy losses. The adjustment for losses reflects that customers are served at different voltage levels and often have different loss responsibilities. Energy losses were provided to Navigant by SFPUC staff. The losses between primary and transmission were 1.0266 percent. The losses between secondary to transmission were 1.05108 percent. SFPUC customers receiving service at transmission voltage had no additional energy losses to their metered values.
- **Direct Costs:** These costs are directly assigned to a single customer or customer group. Examples of direct costs are dedicated substations, streetlights, and traffic signals. Only customers benefitting from these facilities are responsible for the associated costs.

## Recommendations

Based on Navigant’s COSA, the following recommendations are presented for the development of future studies:

- SFPUC should undertake the expansion and completion of interval metering on remaining electric customers and should require new customers to install interval demand recording electric meters. This project should resolve most issues in quantifying each customer’s cost responsibility share of future electric revenue requirements.
- SFPUC should begin recording and tracking electric revenues and costs based on the electric industry adopted Uniform System of Accounts which regulatory agencies employ. This system would allow SFPUC to do cost benchmarking to a proxy group of comparable electric utilities.

## SFPUC Fiscal Year 2013/14 Cost of Service Analysis

### Review of Revenue Requirement

As described in the previous section, the revenue requirement analysis identified the net revenue requirement for the Power Enterprise during the test year FY 2013/14. In the test year, the SFPUC power utility had a total under-recovery of \$6.3 million (see **Figure 2.** FY 2013/14 Revenue Requirement).

### Functionalization of Costs

The NBS team worked with SFPUC staff to functionalize the components of the FY 2013/14 revenue requirement as supply, transmission, distribution, streetlights, and city programs. Navigant and SFPUC staff then reviewed and classified each functionalized component as demand or energy. Lastly, Navigant applied established and accepted allocation methodologies, based on the concept of cost-causation, to develop a reasonable assignment of the FY 2013/14 gross revenue requirement to SFPUC customer classes.

**Figure 9** summarizes the FY 2013/14 revenue requirement into the major functions. The majority of the gross revenue requirement is based on the sum of supply and transmission functions, which totaled \$70.6 million or about 67 percent of the total gross revenue requirement. Distribution functions (Distribution – Primary and Distribution- Secondary) totaled \$21.2 million or about 20 percent, while street lighting totaled \$13.6 million or 13 percent.

**Figure 9. FY 2013/14 Gross Revenue Requirement by Function**

Power Enterprise - Functions	Total	Percent of Total Gross Revenue Requirement
Supply	\$47,678,590	45.2%
Transmission	\$22,933,442	21.7%
Distribution Primary	\$16,434,429	15.6%
Distribution Secondary	\$4,884,272	4.6%
Street Lighting	<u>\$13,636,362</u>	<u>12.9%</u>
<b>Total SFPUC Gross Revenue Requirement</b>	<b><u>\$105,567,096</u></b>	<b><u>100.0%</u></b>

**Classification of Functionalized Costs as Demand or Energy**

Once the SFPUC functionalized gross revenue requirement was determined, the next step was to classify the detailed functional dollars as either demand, or energy (see **Figure 10**). The combination of functionalized and classified components of SFPUC’s Revenue Requirement provides a standard and recognized basis for allocation of costs to Tariff customer classes.

**Figure 10. FY 2013/14 Gross Revenue Requirement – Demand or Energy**

Power Enterprise - Functions	Classified As:		
	Demand	Energy	Total
Supply	\$41,114,366	\$6,564,224	\$47,678,590
Transmission	\$16,607,958	\$6,325,485	\$22,933,442
Distribution Primary	\$13,307,923	\$3,126,506	\$16,434,429
Distribution Secondary	\$1,757,766	\$3,126,506	\$4,884,272
Street Lighting	<u>\$13,636,362</u>	<u>\$0</u>	<u>\$13,636,362</u>
<b>Total SFPUC Gross Revenue Requirement</b>	<b><u>\$86,424,375</u></b>	<b><u>\$19,142,722</u></b>	<b><u>\$105,567,096</u></b>
	<b><u>81.9%</u></b>	<b><u>18.1%</u></b>	<b><u>100.0%</u></b>

SFPUC’s FY 2013/14 gross revenue requirement classified as demand or fixed equals \$86.4 million, or about 82 percent out of the total of \$105.6 million. Demand-related costs do not vary based on energy (kWh) sold. The remaining gross revenue requirement of \$19.1 million, or 18 percent of total costs, was classified as energy. Energy-related costs should be allocated based on energy consumed by tariff customers, adjusted for losses, and based on voltage level.

Following the methodology in SFPUC’s November 2014 Indirect Cost Study, customer-related costs in the financial statements were allocated to existing expense line items, so there was no specific customer cost classification separately identified in the COSA model. It is suggested in future updates, that SFPUC staff consider separating customers’ costs (such as meter reading and billing) so that they can flow through the COSA model.

## Allocation of Functionalized & Classified Costs to Customer Classes

The next step is to allocate the individual line items of the Revenue Requirement to SFPUC customer classes. The COSA determines the cost responsibility of each customer class and the necessary adjustments to recover those shares of the revenue requirement.

Navigant and SFPUC staff reviewed customer billing data and created a reclassification with 13 customer classes, as listed in **Figure 11**.

**Figure 11. Recommended Power Customer Classes**

Customer Class	Customer Class Name	Voltage Level	Customer Description
E20T1	Large TOU General Service, Transmission 1	Transmission	Service to customers with demand >1000 kW
E20T2	Large TOU General Service, Transmission 2	Transmission	Service to customers with demand >1000 kW
E20P	Large TOU General Service, Primary	Primary	Service to customers with demand >1000 kW
E20S	Large TOU General Service, Secondary	Secondary	Service to customers w demand >1000 kW
E19P	Medium TOU General Service, Primary	Primary	Medium General Demand – Metered TOU
E19S	Medium TOU General Service, Secondary	Secondary	Medium General Demand – Metered TOU
A10P	Medium General Service, Primary	Primary	Medium General Demand – Metered Service
A10S	Medium General Service, Secondary	Secondary	Medium General Demand – Metered Service
EM1TB	Residential Master Metered Service	Secondary	Residential to Master Meter
E1TB	Residential Service	Secondary	Residential
A1P	Small General Service, Polyphase Meter	Secondary	Small General Service
A1S	Small General Service, Single-Phase Meter	Secondary	Small General Service
LS	Lighting	Secondary	Lighting

These reclassified cost of service categories were created based upon communication with SFPUC staff, review of service characteristics of “like” customers being grouped into similar categories, and review of current PG&E service schedules. In general, the E20 customers were distinguished between voltage level and an average billing demand of kW over 1,000 per month. The E19 customers were again distinguished by voltage level and a kW billing demand between 500 and 999 kW. A10 customers were distinguished by voltage level and billing demand between 75 and 499 kW, whereas A1 small commercial customers have demands less than 75 kW. Schedules associated with residential service are classified as EM1TB and E1TB.

The COSA allocation factors were developed from SFPUC hourly operational and billing data. SFPUC provided Navigant with historical customer energy kWh consumption at meter, and NCP (kW) and CP (kW) load data by month for some customers for the FY 2013/14.

SFPUC had limited amounts of load research information for many of the customers because many customers do not have installed demand recording meters and some customers are unmetered. As a result, Navigant and SFPUC staff relied on their professional experience to supplement the SFPUC’s customer load data. SFPUC should undertake to expand and complete interval metering on remaining electric customers and should require any new customer have installed interval demand recording electric meters. Once all SFPUC customers have been installed with interval demand meters, and data is collected for 12 months, then there should be no issue in quantifying each retail customers’ cost responsibility share of SFPUC future revenue requirement for electric service.

The COSA allocation methodology reflects standard and accepted electric utility industry methods for allocating costs to tariff classes based on the principle of cost-causation. **Figure 12** identifies the COSA allocation factors available in the model. Some of the allocation factors will be used as billing determinants in the rate design—for example, number of customers and total demand and energy by customer class.

**Figure 12. Cost Allocation Factors**

AF #	ALLOCATION FACTORS	Allocator or Number Is Used in COSA For:
1	COINCIDENT PEAK (September 2013) WITH LOSSES	Supply and Transmission Fixed Costs and Other Revenue from Cap & Trade and Trans Bay Cable
2	NON-COINCIDENT PEAK WITH LOSSES (PRIMARY + SECONDARY)	Distribution Fixed Primary & Secondary
3	NON-COINCIDENT PEAK WITH LOSSES (SECONDARY ONLY)	Distribution Fixed Secondary Only
4	NCP BILLING DEMAND AT METER (PRIMARY + SECONDARY)	Available for Rate Design
5	NCP BILLING DEMAND AT METER (SECONDARY ONLY)	Available for Rate Design
6	RETAIL REVENUE ALLOCATOR (ELECTRIC SALES REVENUES)	SFPUC Retail Sales Revenues and for Other Revenues Credits, excluding Wholesale Sales Revenue
7	NUMBER OF CUSTOMERS TOTAL (EOY NOT WEIGHTED)	Rate Design
8	ENERGY WITH LOSSES (TRANSMISSION + PRIMARY + SECONDARY)	Supply and Transmission Variable Costs
9	ENERGY WITH LOSSES (PRIMARY + SECONDARY)	Distribution Variable Primary & Secondary
10	ENERGY WITH LOSSES (SECONDARY ONLY)	Distribution Variable Secondary Only
11	ENERGY AT METER (TRANSMISSION + PRIMARY + SECONDARY)	Available for Rate Design Denominator for Supply & Transmission Energy Component
12	ENERGY AT METER (PRIMARY + SECONDARY)	Available for Rate Design Denominator Distribution Primary & Secondary Energy Component
13	ENERGY AT METER (SECONDARY ONLY)	Rate Design Denominator Distribution Secondary Only Energy Component
14	LABOR ALLOCATOR SUPPLY	Instead Used SFPUC November 2014 Indirect Cost Study
15	LABOR ALLOCATOR TRANSMISSION	
16	LABOR ALLOCATOR DISTRIBUTION (PRIMARY + SECONDARY)	
17	LABOR ALLOCATOR DISTRIBUTION (SECONDARY ONLY)	
18	LABOR ALLOCATOR STREET LIGHTING	
19	LABOR ALLOCATOR CITY PROGRAMS	
20	AVERAGE & EXCESS AT INPUT LEVEL	Alternative to Coincident Peak Allocator
21	TBD	TBD
22	DIRECT TO STREETLIGHTING	100% Direct Assignment to Street Lighting
23	DIRECT TO CITY PROGRAMS	Available for 100% Direct Assignment to City Programs
24	WT NUMBER OF CUSTOMERS PRISEC	Distribution Customer Primary & Secondary
25	WT NUMBER OF CUSTOMERS SEC	Distribution Customer Secondary Only
26	WT NUMBER OF CUSTOMERS (ALL)	A&G Customer Costs
27	COINCIDENT PEAK AT METER	Available for Rate Design
28	SUPPLY & TRANSMISSION REVENUE REQUIREMENT	Allocation of Wholesale Sales Revenues As a Revenue Credit
29	TBD	TBD
30	NCP_TOTAL_FY2013-14	Rate Design

Using SFPUC personnel costs as an input to the COSA model, allocation factor numbers 14 through 19 were developed, which could be used to assign Administrative and General expense to tariff classes. In a SFPUC November 2014 Indirect Cost Study the allocation of General, Common, Administrative and General, and Bureau overhead costs to Water, Wastewater, and Power operations were provided, so the labor allocators were not used in the COSA model. In the future, SFPUC can use the COSA labor allocation approach when it updates future Power Enterprise revenue requirements.

It is customary in performing COSA that supply and transmission fixed (demand-related) revenue requirement amounts are allocated to tariff classes using a demand allocator identified as the Coincident Peak (CP) and adjusted for system demand losses by voltage level. Coincident peak demand refers to the demand placed upon the system by each customer class at the time of the system maximum peak and is generally related to meeting the power supply and transmission peak requirements. SFPUC

identified that its FY 2013/14 system coincident peak of 139,319 kW occurred on September 19, 2013 at 12:00 pm (Allocator Factor #1).

Generally, when allocating distribution-related fixed (demand-related) costs, the utility's non-coincident peak (NCP) demand is used. The NCP demand refers to the individual customer peak demand regardless of the time of occurrence. It reflects the sum of individual customers' maximum electrical demand which the utility distribution network must stand ready to serve. The NCP allocator is used to allocate distribution fixed costs because customer class peaks are typically the main drivers to capacity requirements (and consequently costs) for the distribution electric network. SFPUC staff was able to distinguish Distribution Revenue Requirement by cost specific items from the SFPUC accounting system, and between primary and secondary voltage levels (Allocation Factors #2 and #3). As a result, several NCP allocators were developed so that distribution secondary revenue requirement dollars were not allocated to customers taking delivery of utility service at either transmission or primary voltage.

The revenue requirement line items that are classified as variable or energy-related should be allocated based on the derived energy allocation by voltage level (Allocation Factors #8, #9 and #10).

See **Figure 13** for a summary of SFPUC Power Enterprise customer classes by voltage level for all customers, including General Fund customers currently paying subsidized GUSE rates.

**Figure 13. FY 2013/14 Power Enterprise Customer Classes**

Customer Class	EOY Number of Customers	kWh Sales at Meter	Max Non-Coincident Peak (NCP) Demand (kW) at Meter	September 19, 2013 Coincident Peak Demand (kW) at Meter
Large Demand TOU Service: (E20 Transmission)	4	351,662,537	58,035	47,004
Large Demand TOU Service: (E20 Primary)	28	233,740,812	69,439	36,007
Large Demand TOU Service: (E20 Secondary)	7	45,500,794	12,352	7,756
Medium General Demand TOU Service: (E19 Primary)	30	57,714,673	21,277	7,763
Medium General Demand TOU Service: (E19 Secondary)	35	52,743,685	13,893	8,829
Medium Commercial Service: (A10 Primary)	19	19,195,845	10,046	3,131
Medium Commercial Service: (A10 Secondary)	431	134,125,281	45,158	22,355
Residential Master Metered: (EM1TB) (Secondary)	29	8,969,722	2,838	1,341
Residential Service: (E1TB) (Secondary)	375	1,989,531	416	277
Commercial Service: (A1 Polyphase) (Secondary)	211	7,160,297	1,668	816
Commercial Service: (A1 Polyphase) (Secondary)	918	27,664,206	6,075	3,989
City Street Lights Service (Secondary)	17	30,535,424	7,105	46
<b>Total SFPUC</b>	<b>2,104</b>	<b>971,002,807</b>	<b>248,302</b>	<b>139,313</b>

**Figure 14** shows the customer class FY 2013/14 values for several of the major allocation factors used in the COSA. The E20 Transmission tariff customers accounted for 36 percent of the total energy sold to all retail customers. In addition, E20 Transmission customers represented 33 percent of SFPUC's highest system peak hour during FY 2013/14, which occurred on September 19, 2013. Because E20 Transmission customers take utility delivery from SFPUC at the higher transmission-level voltage, those customers are not allocated any of the distribution-related components of the revenue requirement.

**Figure 14. FY 2013/14 Power Enterprise Customer Class Allocation**

Customer Class	FY Energy (kWh) Including Voltage Losses	Max Non-Coincident Peak (NCP) Demand (kW) Including Voltage Losses	September 19, 2013 Coincident Peak Demand (kW) Including Voltage Losses
Large Demand TOU Service: (E20 Transmission)	35.5%	(1)	33.0%
Large Demand TOU Service: (E20 Primary)	23.9%	35.9%	25.6%
Large Demand TOU Service: (E20 Secondary)	4.8%	6.6%	5.7%
Medium General Demand TOU Service: (E19 Primary)	5.9%	11.0%	5.5%
Medium General Demand TOU Service: (E19 Secondary)	5.6%	7.4%	6.5%
Medium Commercial Service: (A10 Primary)	2.0%	5.2%	2.2%
Medium Commercial Service: (A10 Secondary)	14.2%	24.2%	16.5%
Residential Master Metered: (EM1TB) (Secondary)	1.0%	1.5%	1.0%
Residential Service: (E1TB) (Secondary)	0.2%	0.2%	0.2%
Commercial Service: (A1 Polyphase) (Secondary)	0.8%	0.9%	0.6%
Commercial Service: (A1 Polyphase) (Secondary)	2.9%	3.3%	2.9%
City Street Lights Service (Secondary) (2)	<u>3.2%</u>	<u>3.8%</u>	<u>0.0%</u>
<b>Total SFPUC</b>	<b>100.0%</b>	<b>100.0%</b>	<b>100.0%</b>

(1) In the COSA NCP allocator is used to allocate Distribution related components of Demand or Fixed Revenue Requirement. Transmission customers should not be allocated any SFPUC Distribution Revenue Requirement.

(2) City Street Lights Service (Secondary) Coincident Peak Demand from September 19, 2013 was 0.03% because traffic signals were contributing to the system coincident peak. The value is displayed as 0.0% due to rounding.

**Figure 15** presents FY 2013/14 net revenue requirement compared to revenue from retail energy sales and quantifies the over (under) SFPUC net revenue requirement by tariff class. The COSA has identified and quantified that for FY 2013/14, the SFPUC did not collect sufficient retail revenues to recover its net revenue requirement. The under recovery was lessened because some tariff classes provided revenues greater than their allocated share.

**Figure 15. FY 2013/14 Over (Under) Recovery of Net Revenue Requirement**

Customer Class	FY2013/14 Net Revenue Requirement	FY2013/14 Revenues from Retail Energy Sales	FY Electric Sales Revenue by Tariff Class (1)	Over (Under) Recovery of SFPUC Net Revenue Requirement
Large Demand TOU Service: (E20 Transmission)	\$20,062,761	\$42,198,325	47.1%	\$22,135,564
Large Demand TOU Service: (E20 Primary)	\$21,436,152	\$19,706,100	22.0%	(\$1,730,052)
Large Demand TOU Service: (E20 Secondary)	\$5,261,603	\$3,125,164	3.5%	(\$2,136,439)
Medium General Demand TOU Service: (E19 Primary)	\$5,135,923	\$5,731,667	6.4%	\$595,744
Medium General Demand TOU Service: (E19 Secondary)	\$5,979,195	\$4,320,616	4.8%	(\$1,658,579)
Medium Commercial Service: (A10 Primary)	\$2,141,287	\$957,549	1.1%	(\$1,183,738)
Medium Commercial Service: (A10 Secondary)	\$16,119,852	\$8,896,807	9.9%	(\$7,223,045)
Residential Master Metered: (EM1TB) (Secondary)	\$996,988	\$783,364	0.9%	(\$213,624)
Residential Service: (E1TB) (Secondary)	\$194,538	\$161,833	0.2%	(\$32,705)
Commercial Service: (A1 Polyphase) (Secondary)	\$622,567	\$1,404,950	1.6%	\$782,383
Commercial Service: (A1 Polyphase) (Secondary)	\$2,796,844	\$1,638,062	1.8%	(\$1,158,783)
City Street Lights Service (Secondary)	\$15,120,816	\$675,865	0.8%	(\$14,444,951)
<b>Total SFPUC</b>	<b>\$95,868,527</b>	<b>\$89,600,301</b>	<b>100.0%</b>	<b>(\$6,268,226)</b>

(1) Fiscal Year 2013/14 Electric Revenues were obtained from SFPUC Billing Records. The Sales Revenues are based on the existing specific rates billed to each customer. Customers paying GUSE rates are billed at different rates than standard customers within the same customer class.

Figure 16 presents the FY 2013/14 net revenue requirement by Tariff Class in dollars per kWh, compared to the average retail revenues collected during that recorded time period.

**Figure 16. FY 2013/14 Net Revenue Requirement Compared to Revenues Collected**

Customer Class	FY2013/14 Net Revenue Requirement per kWh of Sales	FY2013/14 Revenues Collected from Retail Energy Sales per kWh
Large Demand TOU Service: (E20 Transmission)	\$0.0571	\$0.1200
Large Demand TOU Service: (E20 Primary)	\$0.0917	\$0.0843
Large Demand TOU Service: (E20 Secondary)	\$0.1156	\$0.0687
Medium General Demand TOU Service: (E19 Primary)	\$0.0890	\$0.0993
Medium General Demand TOU Service: (E19 Secondary)	\$0.1134	\$0.0819
Medium Commercial Service: (A10 Primary)	\$0.1115	\$0.0499
Medium Commercial Service: (A10 Secondary)	\$0.1202	\$0.0663
Residential Master Metered: (EM1TB) (Secondary)	\$0.1112	\$0.0873
Residential Service: (E1TB) (Secondary)	\$0.0978	\$0.0813
Commercial Service: (A1 Polyphase) (Secondary)	\$0.0869	\$0.1962
Commercial Service: (A1 Polyphase) (Secondary)	\$0.1011	\$0.0592
City Street Lights Service (Secondary)	\$0.4952	\$0.0221
<b>Total SFPUC</b>	<b>\$0.0987</b>	<b>\$0.0923</b>

The COSA model prepared and delivered to SFPUC will allow staff to update the revenue requirement for a future Power Enterprise test year. Provided that updated allocation factors corresponding to the new test year are compiled, SFPUC can produce a study quantifying the unbundled costs of electric service associated with supply, transmission, and distribution by tariff class. Further details regarding the COSA are included in Appendix C.

## SECTION 4. RATE DESIGN

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### Overview

Navigant consulted with SFPUC staff to develop rate design model options and alternatives. Rate design followed the requirements of Charter Section 8B.125, which requires the SFPUC to “set retail rates, fees, and charges based on the cost of service.” In addition, the rate model and associated alternatives attempt to follow the *Principles of Public Utility Rates* via James Bonbright’s published work including:

- Rates should be easy to understand from the customer’s perspective.
- Rates should be easy to administer from the utility’s perspective.
- Rates should be equitable and non-discriminating or cost based
- There should be continuity in the rate making philosophy over time.

In contemplation of Section 8B of the San Francisco Charter, and in review of the Electric Rates History discussed in Section 1 of this Report, rate design considerations made by Navigant included the twin goals of meeting charter requirements such that 1) retail rates will be set in order to sufficiently recover the cost of operation, maintenance, and repair of the electric utility, and 2) retail rates will be set based upon the cost of providing service. An additional goal was incorporated such that rates will not be increased in amounts to induce “rate shock” by SFPUC customers.

These goals are challenged by known constraints elaborated in the Electric Rates History discussion including that the General Fund (GUSE 1 through 6) rate schedules were not to be increased by more than ½ cent per kWh per year, and that standard rate tariffs need to maintain rates at or below PG&E equivalent rates. As the 5-year rate period was assessed a conservative projection of PG&E rate adjustments in the “out” years was made and will be discussed in further detail later in this section of the Report.

Three approaches to rate design were considered in this analysis. These included the 1) base case, 2) a 5-year full cost of service scenario, and 3) a hybrid approach. As discussed further in the Recommendation section, it is suggested that the SFPUC adopt the **base case** scenario of rate adjustments for the next 2 FYs (FY 2016/17 and FY 2017/18). After this period of time, it is highly recommended that more aggressive rate adjustments are employed for the General Fund series of rate classes, with possible reductions in rates for Standard or Enterprise rate schedules. Thus the **hybrid** approach would be employed.

With the reclassification of customer classes as outlined in the Cost of Service model, most General Fund rate categories were “reclassified” into their more appropriate customer classes based on cost of service characteristics. Such a reclassification is encouraged in order to more appropriately align cost of service with customer class of service. This approach would allow SFPUC to retract from a segmented and subsidized GUSE class of service that is subsidized at the detriment of Enterprise classes of service.

### Electric Utility Rate Model Analysis

Below provides information on conceptual rate design and model development as it was incorporated by Navigant in preparation of the SFPUC rate study. Figures and Appendices discussed herein represent the base case scenario unless otherwise indicated.

#### Revenue Requirement and Cost of Service Model Incorporation

Navigant worked closely with SFPUC and NBS staff to prepare the revenue requirement model. As outlined in Section 2 of this report, NBS modeled 20 years of sources and uses of funds, beginning in FY 2013-14. The cost of service results outlined and discussed in Section 3 were incorporated with the revenue requirement to provide a basis for rate design based on cost of service principles. Navigant’s rate analysis focused on the FYs 2016-17 through 2020-21. The gross revenue requirement by customer class for the rate study test period can be found in **Figure 17**.

**Figure 17. Gross Revenue Requirement & Cost Allocation**

Customer Class		% of Gross Revenue Requirement	FY2016-2017	FY2017-2018	FY2018-2019	FY2019-2020	FY2020-2021
E1TB	Residential Service	0.44%	\$ 677,073	\$ 680,132	\$ 664,100	\$ 694,828	\$ 779,520
EM1TB	Residential Master Meter (EM1TB)	1.03%	\$ 1,595,909	\$ 1,603,119	\$ 1,565,331	\$ 1,637,761	\$ 1,837,384
A1S	Small Commercial Service, Singlephase	2.89%	\$ 4,483,795	\$ 4,504,052	\$ 4,397,886	\$ 4,601,380	\$ 5,162,234
A1P	Small Commercial Service, Polyphase	0.67%	\$ 1,033,787	\$ 1,038,458	\$ 1,013,980	\$ 1,060,898	\$ 1,190,209
A10S	Medium Commercial Service, Secondary	16.56%	\$ 25,703,238	\$ 25,819,362	\$ 25,210,767	\$ 26,377,293	\$ 29,592,373
A10P	Medium Commercial Service, Primary	2.20%	\$ 3,410,645	\$ 3,426,054	\$ 3,345,298	\$ 3,500,088	\$ 3,926,707
E19S	Medium General TOU Service, Secondary	6.21%	\$ 9,636,039	\$ 9,679,574	\$ 9,451,414	\$ 9,888,740	\$ 11,094,060
E19P	Medium General TOU Service, Primary	5.39%	\$ 8,367,441	\$ 8,405,244	\$ 8,207,122	\$ 8,586,873	\$ 9,633,511
E20S	Large General TOU Service, Secondary	5.44%	\$ 8,448,178	\$ 8,486,346	\$ 8,286,312	\$ 8,669,727	\$ 9,726,464
E20P	Large General TOU Service, Primary	22.62%	\$ 35,096,184	\$ 35,254,745	\$ 34,423,746	\$ 36,016,564	\$ 40,406,558
E20T1	Large Demand TOU Service (E20 Transmission 1)	21.68%	\$ 33,640,695	\$ 33,792,680	\$ 32,996,144	\$ 34,522,906	\$ 38,730,841
E20T2	Large Demand TOU Service (E20 Transmission 2)	1.08%	\$ 1,670,781	\$ 1,678,329	\$ 1,638,769	\$ 1,714,596	\$ 1,923,585
LS2	General Lighting	13.81%	\$ 21,424,905	\$ 21,521,700	\$ 21,014,407	\$ 21,986,763	\$ 24,666,689
<b>Total</b>		<b>100.00%</b>	<b>\$ 155,188,669</b>	<b>\$ 155,889,794</b>	<b>\$ 152,215,274</b>	<b>\$ 159,258,416</b>	<b>\$ 178,670,137</b>

Currently, the SFPUC does not categorize GUSE customers into the customer classes shown in the above table. For this analysis, a review of all GUSE customers was performed and given their service characteristics, were grouped into one of the above classes. Customers should be allocated cost proportionately to their electric utility requirements. For example, all residential customers can and should be grouped together because they have similar requirements for service. Hence, for cost allocation purposes, a GUSE residential customer should be considered the same as other residential customers that are billed the base enterprise PG&E rate schedule. Similarly, GUSE customers that have characteristics of a small commercial customer should be grouped with other small commercial customers. The same goes for medium commercial and large commercial customers by secondary or primary service requirements.

**Figure 18** shows GUSE customers grouped into their respective customer classes. The number of customers and the amount of energy come from the FY 2013/14 test year COSA.

**Figure 18. General Fund (GUSE) Customer Class Grouping**

<b>Customer Class</b>	<b>Number of Customers</b>	<b>Sum of Total Energy (kWh)</b>
<b>RS: Residential (E1TB)</b>	<b>375</b>	<b>1,989,531</b>
Standard	369	1,880,188
S3: General Fund (GUSE)	6	109,343
<b>RM: Multifamily Residential (EM1TB)</b>	<b>29</b>	<b>8,969,722</b>
Standard	29	8,969,722
<b>CSS: Small Commercial, Single-Phase (A1)</b>	<b>918</b>	<b>27,664,206</b>
Standard	351	1,909,425
S3: General Fund (GUSE)	532	23,717,329
S1: Libraries (GUSE2)	27	1,873,786
S5: SF General Hospital (GUSE4)	5	158,119
S6: Public Buildings & Streetlights (GUSE6)	3	5,547
<b>CSP: Small Commercial, Polyphase (A1P)</b>	<b>211</b>	<b>7,160,297</b>
Standard	211	7,160,297
<b>CMS: Medium Commercial, Secondary (A10S)</b>	<b>431</b>	<b>134,125,281</b>
Standard	112	20,809,693
S3: General Fund (GUSE)	308	105,641,575
S1: Libraries (GUSE2)	5	859,476
S2: Convention Center (GUSE3)	2	381,600
S5: SF General Hospital (GUSE4)	3	6,426,937
S4: Laguna Honda Hospital (GUSE5)	1	6,000
<b>CMP: Medium Commercial, Primary (A10P)</b>	<b>19</b>	<b>19,195,845</b>
Standard	4	1,000,186
S3: General Fund (GUSE)	14	16,021,003
S5: SF General Hospital (GUSE4)	1	2,174,656
<b>TOUS: Medium Time-of-Use, Secondary (E19S)</b>	<b>35</b>	<b>52,743,685</b>
Standard	25	19,989,262
S3: General Fund (GUSE)	8	27,716,133
S6: Public Buildings & Streetlights (GUSE6)	2	5,038,290
<b>TOUP: Medium Time-of-Use, Primary (E19P)</b>	<b>30</b>	<b>57,714,673</b>
Standard	19	30,278,360
S3: General Fund (GUSE)	11	27,436,313
<b>CLS: Large Commercial, Secondary (E20S)</b>	<b>7</b>	<b>45,500,794</b>
Standard	2	8,595,090
S3: General Fund (GUSE)	2	15,163,110
S1: Libraries (GUSE2)	1	5,913,857
S2: Convention Center (GUSE3)	1	7,256,531
S6: Public Buildings & Streetlights (GUSE6)	1	8,572,206
<b>CLP: Large Commercial, Primary (E20P)</b>	<b>28</b>	<b>233,740,812</b>
Standard	12	103,000,314
S3: General Fund (GUSE)	12	63,089,814
S2: Convention Center (GUSE3)	2	21,148,017
S5: SF General Hospital (GUSE4)	1	32,317,381
S4: Laguna Honda Hospital (GUSE5)	1	14,185,286
<b>L: Lighting</b>	<b>17</b>	<b>30,535,424</b>
Standard	5	2,734,846
S3: General Fund (GUSE)	3	194,340
S6: Public Buildings & Streetlights (GUSE6)	9	27,606,238
<b>CLT2: Airport (E20T1)</b>	<b>1</b>	<b>329,986,762</b>
Standard	1	329,986,762
<b>CLT1: Transmission (E20T2)</b>	<b>3</b>	<b>21,675,775</b>
Standard	3	21,675,775
<b>Grand Total</b>	<b>2,104</b>	<b>971,002,807</b>

## **Billing Determinant Unit Development**

During the revenue requirement and COSA, SFPUC billing determinants were developed. By and large, these billing determinants fell out of the FY 2013-14 cost of service study and identified the number of customers, energy consumed, and kilowatt demand by season and by customer class. Where required, further distinction in the rate model required kWh and kW breakdown by billing tier and time-of-use period. Appendix D1 provides the summarized billing determinant structure for the 5-year forecast period.

Navigant worked with SFPUC staff in determining the level of breakdown by tier structure, and by time-of-use period where applicable. Navigant reviewed representative PG&E load profile data to arrive at demand interval spread and data directly from SFPUC meter data files. In general load growth was assumed to cap a 0.5 percent annually except in specific circumstances (for example, residential customer and load growth).

## **Beginning Year Rates Schedule**

In order to begin comparing rates and cost there is a need to develop a “Beginning Year Rates Schedule” that establishes rates for each and every billing component on the rate tariff. This includes all the associated billing determinant information developed as mentioned above. This table calculates rates that would otherwise be applied if there were no rate adjustments for the particular year in evaluation. In essence, this table tests current year rates compared to projected and anticipated costs. An example of the Beginning Year Rate Table can be seen in Appendix D2.

## **Beginning Year Cost of Service Percent Recovery**

The Beginning Year Cost of Service Percent Recovery table shows how SFPUC is doing compared to its projected test year electric utility Revenue Requirement. The initial COS percent recovery is calculated by taking the gross revenue requirement from Figure 17 and allocating it proportionate to energy consumed for both standard rate schedules and various General Fund (GUSE) schedules. This is done because, in theory, the cost of providing service to a standard customer should be generally equivalent to respectively reclassified GUSE customers.

Then, revenue from other various other non-retail rate revenue sources is subtracted from the gross revenue requirement to arrive at a net revenue requirement. From here the existing or base rate revenue is applied from the beginning year rates schedule as calculated in Appendix D2. Net Operating Revenue is the difference between Net Revenue Requirement and Existing or Beginning Year Base Rate Revenue. The result indicates either a 100 percent COS recovery or an under recovery of costs by rate schedule. For FY 2016/17, when current rates are applied at assumed billing determinant consumption levels, there is an 84.6 percent cost recovery for the utility.

## **Recommended Rates Table**

From here the rate model begins assessing possible new rates for the test year. The Residential class is provided as an example for discussion purposes. The model provides two options for rate determination: either a full COS-based assessment or an optional modified retail rate review. Under the second option, you are able to modify any rate line item by any percentage adjustment. In the base case analysis (or current methodology) it was determined that all standard rates would be adjusted by no more than 3.0 percent in order to maintain competitiveness with PG&E. In addition, all General Fund rates received no more than a ½ cent increase per year. As an example of how the rate model works, **Figure 19**, indicates Residential rates are adjusted by 3.0 percent, with an increase in revenue from \$656,708 to \$676,413.

**Figure 19. Recommended Rates Table – Residential (FY 2016/17)**

Service Category	Share of Revenue Collected Under Existing Rates	Option 2 Percent Rate Increase	Revenue Under Selected Rate Option (Select 1 or 2)	Rates Before Rate Changes	Option 1: Full COS Recovery Rates	Option 2: Proposed Rates From Rate Table Summary	Calculated Percent Increase/Decrease
<b>E1TB Residential Service - Standard</b>			<b>2</b>				
Customer Charge/Per Month	4.9%	103.0%	\$33,342	\$2.97	NA	\$3.06	3.0%
Summer Energy Charge/Per KWH:							
Tier 1	20.7%	103.0%	\$139,946	\$0.11705	NA	\$0.12056	3.0%
Tier 2	10.5%	103.0%	\$71,315	\$0.13306	NA	\$0.13705	3.0%
Tier 3	13.3%	103.0%	\$89,838	\$0.27238	NA	\$0.28055	3.0%
	NA		NA	NA	NA	NA	NA
Summer Sub-Total	44.5%		\$ 301,098				
Winter Energy Charge/Per KWH:							
Tier 1	24.8%	103.0%	\$167,997	\$0.11705	NA	\$0.12056	3.0%
Tier 2	12.2%	103.0%	\$82,756	\$0.13306	NA	\$0.13705	3.0%
Tier 3	13.5%	103.0%	\$91,219	\$0.27238	NA	\$0.28055	3.0%
	NA		NA	NA	NA	NA	NA
Winter Sub-Total	50.6%		\$ 341,973				
Class Average Rate			\$ 0.1564				
<b>Total Revenue</b>	<b>100.0%</b>		<b>\$ 676,413</b>				<b>3.0%</b>

As discussed previously in this section, all General Fund (GUSE) rate schedules were constrained to no more than a ½ cent per kWh rate adjustment through the 5-year test period for the base case, or current method, application for rate design. **Figure 20** outlines the results of GUSE rate changes from FY 2016/17 through FY 2020/21.

**Figure 20. GUSE Customer Rates Table (Base Case)**

GUSE Customer Class	FY 2015/16	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21	Average
<b>GUSE 1 General Activities</b>							
Percent Rate Adjustment		7.4%	6.9%	6.5%	6.1%	5.7%	6.5%
Energy Charge/Per KWH	\$0.0675	\$0.0725	\$0.0775	\$0.0825	\$0.0875	\$0.0925	
<b>GUSE 2 Libraries</b>							
Percent Rate Adjustment		4.9%	4.7%	4.5%	4.3%	4.1%	4.5%
Energy Charge/Per KWH	\$0.1013	\$0.1063	\$0.1113	\$0.1163	\$0.1213	\$0.1263	
<b>GUSE 3 Convention Centers</b>							
Percent Rate Adjustment		5.7%	5.4%	5.2%	4.9%	4.7%	5.2%
Energy Charge/Per KWH	\$0.0870	\$0.0920	\$0.0970	\$0.1020	\$0.1070	\$0.1120	
<b>GUSE 4 SF General Hospital</b>							
Percent Rate Adjustment		13.5%	11.9%	10.6%	9.6%	8.8%	10.9%
Energy Charge/Per KWH	\$0.0370	\$0.0420	\$0.0470	\$0.0520	\$0.0570	\$0.0620	
<b>GUSE 5 Laguna Honda Hospital</b>							
Percent Rate Adjustment		11.1%	10.0%	9.1%	8.3%	7.7%	9.3%
Energy Charge/Per KWH	\$0.0449	\$0.0499	\$0.0549	\$0.0599	\$0.0649	\$0.0699	
<b>GUSE 6 Public Buildings &amp; Streetlights</b>							
Percent Rate Adjustment		16.7%	14.3%	12.5%	11.1%	10.0%	12.9%
Energy Charge/Per KWH	\$0.0300	\$0.0350	\$0.0400	\$0.0450	\$0.0500	\$0.0550	
<b>Rate increase for all GUSE rates</b>		<b>\$0.0050</b>	<b>\$0.0050</b>	<b>\$0.0050</b>	<b>\$0.0050</b>	<b>\$0.0050</b>	

## Recommended Rates Cost of Service Percent Recovery

Finally, the new projected revenue is compared against the projected test year electric utility revenue requirement. The net revenue requirement for FY 2016/17 of \$127,864,479 is compared to a total base case new proposed revenue of \$112,796,753 which raises the overall COS percent recovery from 84.6 percent to 88.2 percent.

## 5-Year Rate Summary

A 5-Year Rate Summary is provided for review in Appendix D3a that outlines the projected rates for each class of service and rate component in side-by-side fashion for each FY, beginning in FY 2016/17 through FY 2020/21 for the base case scenario. Further, the percentage adjustments for these corresponding rates are provided in Appendix D3b again in a side-by-side fashion for comparability.

## Unbundled Rates Table

Finally, an Unbundled Rates table has been created in the base case scenario. The Unbundled Rates table is calculated by first arriving at the class average rate as determined in the Recommended Rates table. Then, through the cost of service study, various allocation factors for supply, transmission, and distribution were determined by rate class. The class average rate for each FY for 2016-17 through 2020-21 is then distributed by the unbundled rate allocation factors. Appendix D4 outlines the Unbundled Rates for the base case scenario.

## Alternative Rate Model Scenarios

In addition to the base case scenario that was elaborated in the above discussion, Navigant prepared alternative rate scenarios for consideration and to facilitate discussion. These two scenarios are the Full Cost of Service in 5 years, and a Hybrid Scenario.

### Full Cost of Service in 5 Years

As part of discussion with SFPUC staff, it was determined to perform an evaluation where various rate classes were adjusted either up or down in order to attain full cost recover in 5 years at the conclusion of FY 2020/21. In doing so most of the Enterprise or Standard customer classes were adjusted down since they are generally overpaying vis-à-vis the cost of providing service to them. Comparatively, the GUSE customers were adjusted up because of the implicit subsidy that has been in existence for some time. With this analysis a Compound Annual Growth Rate was used to determine the respective adjustments for each class of service that would be uniformly applied for each of the 5 FYs beginning in FY 2016/17 through FY 2020/21.

- The results of this analysis indicate fairly significant adjustments that would be required in order to attain 100 percent cost of service in 5 years. Most of the GUSE associated rate schedules would require large adjustments with the largest being associated with GUSE 6 Public Buildings and Street Lighting.
- Most of the Standard rates would see a reduction of some sort but not more than 10 percent except for Transmission 2 level customers.

**Figure 21** provides detail on the required rate adjustments necessary in order to get to 100 percent cost of service by FY 2020/21.

**Figure 21. 5-Year COS Plan Rates Adjustment**

Service Category		Calculated Percent Increase/ Decrease
E1TB	Residential Service - Standard	-1.1%
E1TB	Residential Service - GUSE 1 General Activities	16.3%
EM1TB	Residential Master Meter Service - Standard	13.4%
A1S	Small Commercial Service, Singlephase - Standard	-5.2%
A1S	Small Commercial Service, Singlephase - GUSE 1 General Activities	16.4%
A1S	Small Commercial Service, Singlephase - GUSE 2 Libraries	7.3%
A1S	Small Commercial Service, Singlephase - GUSE 4 SF General Hospital	31.2%
A1S	Small Commercial Service, Singlephase - GUSE 6 Public Buildings & Streetlights	36.9%
A1P	Small Commercial Service, Polyphase	-6.5%
A10S	Medium Commercial Service, Secondary - Standard	-2.7%
A10S	Medium Commercial Service, Secondary - GUSE 1 General Activities	21.6%
A10S	Medium Commercial Service, Secondary - GUSE 2 Libraries	12.1%
A10S	Medium Commercial Service, Secondary - GUSE 3 Convention Centers	15.5%
A10S	Medium Commercial Service, Secondary - GUSE 4 SF General Hospital	37.1%
A10S	Medium Commercial Service, Secondary - GUSE 5 Laguna Honda Hospital	31.9%
A-10	Medium Commercial Service: (A10 Primary)	-6.5%
A-10	Medium Commercial Service: (A10 Primary) - GUSE 1	20.1%
A-10	Med Comm. Svc: (A10 Primary) - GUSE 4 SF General Hospital	35.4%
E-19	Medium General Demand TOU Service: (E19 Secondary)	-1.8%
E-19	Medium General Demand TOU Service: (E19 Secondary) - GUSE 1	20.3%
E-19	Med Gen Dem TOU Svc: (E19 Second) - GUSE 6 Public Bldgs & St Lights	41.5%
E-19	Medium General Demand TOU Service: (E19 Primary)	-6.1%
E-19	Medium General Demand TOU Service: (E19 Primary) - GUSE 1	14.5%
E-20	Large Demand TOU Service: (E20 Secondary)	-3.9%
E-20	Large Demand TOU Service: (E20 Secondary) - GUSE 1	20.9%
E-20	Large Demand TOU Service: (E20 Secondary) - GUSE 2	11.4%
E-20	Large Demand TOU Service: (E20 Secondary) - GUSE 3	14.9%
E-20	Large Dem TOU Svc: (E20 Second) - GUSE 6 Public Bldgs & St Lights	42.1%
E-20	Large Demand TOU Service: (E20 Primary)	-3.4%
E-20	Large Demand TOU Service: (E20 Primary) - GUSE 1	13.6%
E-20	Large Demand TOU Service: (E20 Primary) - GUSE 3	8.0%
E-20	Large Demand TOU Service: (E20 Primary) - GUSE 4	28.1%
E-20	Large Demand TOU Service: (E20 Primary) - GUSE 5	23.3%
E-20	Large Demand TOU Service: (E20 Transmission 1)	-7.0%
E-20	Large Demand TOU Service: (E20 Transmission 2)	-17.2%
L	General Lighting	38.0%
L	Lighting - GUSE 1 General Act.	62.6%
L	Lighting - GUSE 6 Public Bldgs & St Lights	91.3%

## Hybrid Scenario

In addition to the full cost of service approach over the next 5 years, Navigant discussed options with SFPUC staff on a hybrid approach between the base case scenario and full cost of service scenario. In this approach, the base case in rate adjustments is employed in FYs 2016-17 and 2017-18. Beginning in FY 2018/19, more aggressive rate adjustments for GUSE related customer classes would be instituted—somewhat along the lines of the full 5-year cost of service scenario described above. Further, consideration for rate *reductions* could be contemplated for Standard rate classifications—again, along the lines mentioned above in the 5-year COSA. Two considerations need to be addressed in adoption of the hybrid approach:

- Standard rate classes need to remain competitive with PG&E since those rate schedules are based off of existing PG&E rate schedules. Initially, SFPUC rates would reflect the base case scenario where rates are adjusted up by 3 percent in FY 2016/17 and in FY 2017/18. Then rates would be reduced by the same 3 percent for the remaining 3-year period (FY 2018/19 thru FY 2020/21). Although the up-then-down optic may seem odd, the utility needs to remain financially viable in FY 2016/17 and FY 2017/18 and not increasing these rates, at a minimum, to meet commensurate PG&E adjustments, would negatively impact financial results.
- The various GUSE-related rate schedules are significantly less expensive than PG&E, and there is ability to raise these rates without approaching comparable PG&E rates. This Hybrid approach would increase GUSE rates by the current methodology, and base case scenario, of a ½ cent per kWh for FY 2016/17 and FY 2017/18. Then these rates would be increased by an average of 3 cents per kWh for the remaining 3-year period in order to reach 80 percent cost recovery by FY 2020/21.

Using this approach, the SFPUC electric utility would reach an 88 percent cost recovery in FY 2016/17; a 93 percent cost recovery by FY 2017/18; 102 percent COS by FY 2018/19; 104 percent COS recovery in FY 2019/20; and 101 percent cost recovery in FY 2020/21. **Figure 22** displays the results of the approach.

**Figure 22. GUSE Customer Rates: Hybrid Scenario**

Revenue Requirement & Rate Summary	Gross Revenue Requirement	Other Non-Rate Revenue	Net Revenue Requirement	Revenue Based on New Rates	Over (Under) Collection	COS Percent Recovery
<b>FY 2016-17 Total</b>	<b>\$ 155,188,669</b>	<b>\$ (27,324,190)</b>	<b>\$ 127,864,479</b>	<b>\$ 112,796,753</b>	<b>\$ (15,067,727)</b>	<b>88%</b>
Standard Rates	\$ 70,368,321	\$ (16,045,769)	\$ 54,322,552	\$ 84,701,882	\$ 30,379,329	156%
GUSE Rates	\$ 84,820,348	\$ (11,381,256)	\$ 73,439,092	\$ 28,094,871	\$ (45,344,222)	38%
<b>FY 2017-18 Total</b>	<b>\$ 155,889,794</b>	<b>\$ (28,616,913)</b>	<b>\$ 127,272,882</b>	<b>\$ 118,758,204</b>	<b>\$ (8,514,678)</b>	<b>93%</b>
Standard Rates	\$ 71,179,541	\$ (16,783,524)	\$ 54,396,017	\$ 88,416,182	\$ 34,020,165	163%
GUSE Rates	\$ 84,710,254	\$ (11,833,389)	\$ 72,876,865	\$ 30,342,022	\$ (42,534,843)	42%
<b>FY 2018-19 Total</b>	<b>\$ 152,215,274</b>	<b>\$ (30,178,234)</b>	<b>\$ 122,037,040</b>	<b>\$ 124,458,067</b>	<b>\$ 2,421,027</b>	<b>102%</b>
Standard Rates	\$ 70,067,376	\$ (17,809,214)	\$ 52,258,163	\$ 87,069,827	\$ 34,811,664	167%
GUSE Rates	\$ 82,147,898	\$ (12,369,021)	\$ 69,778,877	\$ 37,388,240	\$ (32,390,637)	54%
<b>FY 2019-20 Total</b>	<b>\$ 159,258,416</b>	<b>\$ (30,719,106)</b>	<b>\$ 128,539,310</b>	<b>\$ 133,982,483</b>	<b>\$ 5,443,173</b>	<b>104%</b>
Standard Rates	\$ 73,946,329	\$ (18,243,007)	\$ 55,703,322	\$ 85,772,127	\$ 30,068,805	154%
GUSE Rates	\$ 85,312,087	\$ (12,476,099)	\$ 72,835,988	\$ 48,210,356	\$ (24,625,632)	66%
<b>FY 2020-21 Total</b>	<b>\$ 178,670,137</b>	<b>\$ (28,054,862)</b>	<b>\$ 150,615,274</b>	<b>\$ 151,529,692</b>	<b>\$ 914,418</b>	<b>101%</b>
Standard Rates	\$ 83,720,730	\$ (16,769,771)	\$ 66,950,960	\$ 84,580,285	\$ 17,629,325	126%
GUSE Rates	\$ 94,949,406	\$ (11,285,092)	\$ 83,664,315	\$ 66,949,407	\$ (16,714,907)	80%

Sample bills are provided in Appendix H, showing the customer impacts for FY 2016/17 for the proposed hybrid rates.

## Additional Rates

In addition to the standard rates previously discussed, it is recommended that the SFPUC create or continue specialized rate classes that address SFPUC policy objectives. These include:

1. **Net energy metering (NEM)**, which provides customers who have solar panels or other renewable energy installed behind the meter to receive a bill credit for generation that they supply to the grid. A net energy metering rate incentivizes development of local renewable energy supplies and provides a price mechanism for customers to be rewarded for their generation, while maintaining predictable revenue streams for the power utility. For inter-organizational consistency, the SFPUC should consider utilizing the NEM rate developed as part of the CleanPowerSF program, which has already identified the value of customer energy generation to the SFPUC and developed credit amounts in accordance with regulatory requirements.
2. **Electric vehicle rates** provide a reduced rate for customers who own electric vehicles and charge them at their home. They can apply to a separate meter usable only for electric vehicle charging, or can be a modification of the rate for a customer with a single meter who owns an electric vehicle. As the SFPUC currently has a limited number of residential retail customers, it could implement an experimental structure that allowed both options and evaluated the effectiveness of the program in meeting customer and SFPUC needs.
3. **Low income and medical necessity rates** provide a reduced rate to customers in recognition of financial hardship or high energy needs for medical equipment. The SFPUC currently offers modified versions of its retail residential R1 rate for low income and medical necessity customers, and should consider doing so in order to better serve these customers.

## Observations and Recommendation

To conclude the Rate Design section of this Report, certain observations are offered that SFPUC staff, management, and elected officials should consider in review of rate design options. Additionally, Navigant concludes rate design with a recommendation for consideration.

### Observations

The role that the SFPUC plays is a critical component to the vibrancy and sustainability of life for residents and business within the City and County of San Francisco. As more options for energy supply become available in the electric utility industry, such as distributed solar, storage, community choice aggregation, and the changing landscape of vertically integrated electric utilities, strategic vision is required for continued success and financial stability for the utility. Many competing positions can complicate this vision including the need to bring in new development with competitive rates. Some general observations pertaining to this study are:

- All effort should be made to meet cost of service obligations by each rate class as soon as practicable.
- Consolidation of GUSE rate classes over a shorter period of time is encouraged. This is in line with the roll-up, or reclassification of individual GUSE customers, as envisioned in the Cost of Service Study. This will also impart simplicity in billing, reduce the number of rate schedules, and correctly charge customers for the cost they incur on the system for providing electric utility service.
- In addition to the above observation, this goal provides correct pricing signals for individual customer groups.
- At a minimum, consideration should be given to consolidate GUSE schedules 3, 4, and 5 since they are somewhat akin to private operations.
- Rate adjustments in the base case were capped at 3.0 percent in order to maintain competitiveness with PG&E in the base case scenario. This cap in addition to the ½ cent cap for GUSE customers actually puts the overall revenue adjustment at less than 5.5 percent in FY 2016/17 and comes in at 4.6 percent. The other 4 years come in at 4.5 percent, 4.4, 4.3, and 4.2 percent.

- Maintaining no more than a ½ cent increase for all GUSE associated rate schedules will not send correct pricing signals to these customer groups and the ability to obtain full cost of service within a reasonable amount of time will not be achieved.
- Establish a policy that reflects sufficient recovery of cost through rates that encourages contribution to reserves at a level that provides a healthy margin, along with any associated debt service reserve ratio requirement.
- Cost of service over, and under collection, to any particular customer group, should be considered in associated with any potential challenge to SFPUC rates on Proposition 26 standards.

### **Recommendation**

After review of all three of the scenarios studied in this analysis (base case, 100 percent COS in 5 years, and the Hybrid approach), it is recommended that SFPUC adopt a *Hybrid* approach to rate design as discussed earlier. This would institute rate adjustments as may be currently envisioned by management in FY 2016/17 and FY 2017/18, but then incorporate variable rate adjustments for GUSE related customer classes, combined with potentially lower rates for Standard customer classes.

## SECTION 5. INDUSTRY TRENDS

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Urban Analytics performed an industry trend analysis reviewing pricing approaches and rate structures used by other utilities.

The utilities surveyed to date include:

- Sacramento Municipal Utilities District (SMUD)
- City of Palo Alto Utility (CPAU)
- Silicon Valley Power (SVP) (utility district of the City of Santa Clara)
- Alameda Municipal Power (AMP)
- (to be added) Pacific Gas and Electric (PG&E)
- (to be added) Sonoma Clean Power (SCP) (CCA of the County of Sonoma)

Pricing Methodologies were evaluated for the following items:

- Cost relationships between generation, transmission and distribution cost impacts
- To and from customer-sited distribution generation to mitigate cross-class-subsidies
- Electric Vehicles
- Low-Income Rates
- Medical Necessity
- Economic Revitalization Zone
- Strategies to fund energy efficiency programs and other ancillary services, including similar services to those offered by SFPUC
- Survey of Industry hedging alternatives and opportunities over the next 5 and 10 years

Rate Structures were evaluated for the following items:

- Customer Charges
- Residential Demand Charges
- Business Development Rate-setting
- EV rates with TOU and 2nd EV Meter
- Standby Charge
- Net Metering Rates
- High Voltage Discounts
- TOU Pricing
- Power Factor cost recovery
- Rate Unbundling
- Cost Recovery (Fixed vs. Variable)

Further discussion for each of the points listed above is included in Appendix F.

## SECTION 6. RECOMMENDATIONS AND NEXT STEPS

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### Consultant Recommendations

NBS and Navigant recommends the SFPUC take the following actions for the electric rates:

- **Approve and Accept This Study Report:** The Commission should formally approve and adopt this report and its recommendations. This will provide documentation of the rate study analyses and the basis for analyzing potential changes to future rates.
- **Adopt Reserve Fund Targets:** The Commission should adopt the consultant proposed electric reserve fund targets described in Section 2 of this report. The SFPUC should periodically evaluate reserve fund levels and make it a long-term goal to maintain these levels for the Operating, Capital, and Rate Stabilization Reserves.
- **Complete Interval Metering for Electric Customers:** The SFPUC should undertake the expansion and completion of interval metering on remaining electric customers and should require new customers to install interval demand recording electric meters. This project should resolve most issues in quantifying each customer's cost responsibility share of future electric revenue requirements.
- **Track Revenues Based on Uniform System of Accounts:** The SFPUC should begin recording and tracking electric revenues and costs based on the electric industry adopted Uniform System of Accounts which regulatory agencies employ. This system would allow SFPUC to do cost benchmarking to a proxy group of comparable electric utilities.
- **Establish Proposed Customer Classes:** It is suggested that the SFPUC, based on the recommendations in the COSA section of this report, adopt the customer classes proposed in this report. For customer classes that are not already listed in the SFPUC's tariff book, the SFPUC should create tariff schedules to facilitate customer acquisition.
- **Complete a Review by a Qualified Attorney:** This rate study presents options and a recommendation on proposed new rates. Prior to adoption, these rates should be reviewed by SFPUC legal counsel with respect to compliance with Proposition 26 and related State laws, as well as legal assistance developing acceptable language for new resolutions to implement these rates.
- **Implement Recommended Levels of Rate Increases and Recommended Rates:** According to the analysis presented in this report, the Commission should implement the Recommended Rates for the next 5 years, using the Hybrid Scenario reflected in Figure 22. These rate adjustments are structured based on industry standards and are necessary to ensure the following objectives are met:
  - Power rates reflect the cost of providing electric service to each customer class.
  - The financial health of the SFPUC's electric utility is maintained.
- **Establish Specialized Rates to Achieve Policy Objectives:** The SFPUC should establish net energy metering rates and electric vehicle rates to promote environmentally-friendly practices for its retail customers. In addition, the SFPUC should maintain its existing low income and medical necessity rates.

### Next Steps

**Annually Review Rates and Revenue** – Any time an Agency adopts new utility rates or rate structures, those new rates should be closely monitored over the next several years to ensure the revenue generated is sufficient to meet the annual revenue requirements. Changing economic conditions and demand patterns underscore the need for this review, as well as potential and unseen changing revenue requirements, particularly those related to environmental regulations that can significantly affect capital improvements and repair and replacement costs.

## Principal Assumptions and Considerations

In preparing this report and the recommendations included herein, NBS and Navigant have relied on principal assumptions and considerations with regard to financial matters, number of customer accounts, and other conditions and events that may occur in the future. This information and assumptions, including the SFPUC's budgets and customer account information provided by SFPUC staff, were furnished by sources we believe to be reliable, although NBS and Navigant have not independently verified this data.

While we believe NBS' and Navigant's use of such information and assumptions is reasonable for the purpose of this report and its recommendations, some assumptions will invariably not materialize as stated herein or may vary significantly due to unanticipated events and circumstances. Therefore, the actual results can be expected to vary from those projected to the extent that actual future conditions differ from those assumed by us or provided to us by others.

*(Note: The attached Technical Appendices provide more detailed information on the analysis of the electric revenue requirements, cost of service, and rate design analyses that have been summarized in this report.)*

*(Note: Final Delivery for COSA model will be two Excel spreadsheet files provided on CD-ROM to SFPUC that comprise FY 2013/14 COSA Model. The first Excel spreadsheet is the COSA Model, File Name: **3-8-16\_SFPUC\_COSA Model Update & Appendix Cv4.xls**. The second Excel spreadsheet contains the supporting reclassification of SFPUC customers to a proposed grouping into one of the 13 customer classes identified in Figure 11, File Name: **FY2013\_14 Customers and Allocation Factors Upd.xlsx**.)*

## TECHNICAL APPENDICES

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### APPENDIX A – REVENUE REQUIREMENTS ANALYSIS

#### Detailed tables included in Appendix A:

- 10-Year Financial Plan Summary
- Graphical representation of 10-Year Financial Plans
- Exhibit 1, Operating Expenses
- Exhibit 2, Capital Improvement Plan Expenditures
- Exhibit 3, Existing Debt Obligations
- Current Rates

Appendix A provided under separate cover (and hyperlink displayed below).

<https://infrastructure.sfwater.org/fds/fds.aspx?lib=SFPUC&doc=1028735&data=396062975>

# APPENDIX B – RESERVE FUND RECOMMENDATIONS

## MEMORANDUM

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**TO:** ERIC SANDLER, CFO & AGM – BUSINESS SERVICES  
AMY JAVELOSA-RIO, RATES ADMINISTRATOR  
SAN FRANCISCO PUBLIC UTILITIES COMMISSION

**FROM:** GREG CLUMPNER, NBS DIRECTOR  
CARMEN NARAYANAN, NBS CONSULTANT

**SUBJECT:** ELECTRIC RATE STUDY – RESERVE RECOMMENDATIONS

**DATE:** DECEMBER 4, 2015

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### PURPOSE

This memorandum summarizes reserve fund balances as related to the Power Rate Study that NBS and Navigant are performing for the San Francisco Public Utilities Commission (SFPUC or Utility). The information focuses on current reserve policies, NBS policy recommendations, comparisons between the recommendations and the SFPUC's existing policies, and effects on annual revenue requirements.

### PURPOSE

This memorandum summarizes reserve fund balances as related to the Power Rate Study that NBS and Navigant are performing for the San Francisco Public Utilities Commission (SFPUC or Utility). The information focuses on current reserve policies, NBS policy recommendations, comparisons between the recommendations and the SFPUC's existing policies, and effects on annual revenue requirements.

### OVERVIEW

Maintaining reasonable reserves ensures adequate funding for operational and capital improvement expenditures in a manner that is fiscally sustainable and compliant with standard industry cost of service principles. While industry standards are an important benchmark for reserve fund policies, the SFPUC should design their policies to represent the priorities and best interests of the utility and its customers. While NBS has provided what are generally considered best management practices, we suggest the SFPUC consider our recommendation and refine it to best apply to its financial management process.

### CURRENT RESERVE FUND POLICIES

The current policies were created by SFPUC Resolution Number 10-0027. The resolution stipulates that the SFPUC shall adopt budgets and establish rates that provide adequate ratepayer protection in the form of unreserved, undesignated fund balance reserves for each utility operating fund under its jurisdiction. Specifically, bond indenture requirements will be met by all proposed operating budgets, capital plans and rates. Current reserve policy also stipulates that Operating Fund Balance Reserves must meet one or more of the following:

- ✓ At least 15% of annual revenues.
- ✓ At least 15% of annual expenditures.
- ✓ Indenture Basis debt service coverage of at least 1.25.

## RECOMMENDED RESERVE FUND POLICIES

NBS recommends that the SFPUC increase overall target reserve levels to better meet industry standards, remain competitive in the bond market, ensure revenue stability, and reduce fluctuations in rate revenue requirements. Recommended reserve funds include the following:

- ✓ **Increase Existing Operating Reserve Fund** – Target reserve equal to 25% (or 3 months) of the annual operating expenses for the utility, which represents a 10% increase to current Operating Reserve Fund levels. This includes both Hetch Hetchy Operations Fund (HHP5TAAAAAA) and Hetch Hetchy Programmatic Fund (HHP5TAAAAAP). This reserve is intended to maintain financial viability by providing a “cash cushion” for normal operations in the event of any short-term fluctuation in revenues and/or expenditures.
- ✓ **Create A New Capital Rehabilitation and Replacement Reserve Fund** – Funds set aside annually in this reserve are used for ongoing and future system repair, rehabilitation, and replacement. The minimum reserve target of three percent of the Utility’s net assets represents approximately \$22 million by FY 2019/20 and \$30.5 million by FY 2024/25 (in 2015 dollars). This is a starting point for addressing long-term needs and may require gradually increasing this reserve to more than three percent over time.
- ✓ **Create A New Rate Stabilization Reserve Fund** – This reserve is intended to provide a cash cushion to address short-term fluctuations in revenues and/or expenditures. Since it would serve a similar function as the \$4 million annual budget appropriation line item intended to cover unanticipated costs for power purchases, it could replace the \$4 million appropriation. A recommended target reserve balance of 20% of estimated rate revenue represents \$28.4 million in FY 2019/20 and \$31.3 million by FY 2024/25. Again, this reserve fund can be built over time.
- ✓ **Create A New Debt Reserve Fund** – A target balance equal to current annual debt reserve requirements should be held in reserve. Even though additional bonds will be issued over the next 10 years to fund capital improvement expenditures, per SFPUC direction, future debt issues assume that there will be no reserve requirement.
- ✓ **Maintain The Existing Debt Coverage Ratio** – The current target coverage ratio is 1.25 or greater. A higher coverage ratio strengthens the SFPUC’s credit rating, which can help secure lower interest rates for future debt-funded capital projects and reduce annual debt service payments.

The table at the end of this memo summarizes the recommended reserve funds and target balances, including the projected fund balances outlined in the Electric Rates Study Revenue Requirements Model.

## IMPACTS ON REVENUE REQUIREMENTS

Reserve fund policies impact the annual rate increases needed to meet revenue requirements, which consist of total operating expenses, existing and future debt service payments, and rate-funded capital expenses, less non-rate revenue. Reserve funds are used to meet these revenue requirements only when annual rate revenue is insufficient. The rate increases needed to satisfy the existing and recommended reserve targets are shown below:

Rate Increases Required to...	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
...Meet Existing Reserve Policy	3.5%	3.5%	3.5%	3.5%	3.5%
...Meet Recommended Reserve Policy	5.5%	5.5%	5.0%	5.0%	5.0%

The table(s) below presents recommended reserve funds and target balances; it also includes projected fund balances as outlined in the Electric Rates Study Revenue Requirements Model. The final line item represents the Minimum Target Balance, which is calculated based on current SFPUC Reserve Fund Policies.

Beginning Reserve Fund Balances and Recommended Reserve Targets	Test Year	Actual	Projected Actual
	FY 2013/14	FY 2014/15	FY 2015/16
<b>Hetch Hetchy Operating Fund</b>	\$ 33,075,546	\$ 33,162,145	\$ 43,466,856
<i>Recommended Minimum Target</i>	<i>18,927,000</i>	<i>20,289,000</i>	<i>24,124,000</i>
<b>Capital Rehabilitation &amp; Replacement Reserve</b>	\$ -	\$ -	\$ -
<i>Recommended Minimum Target</i>	<i>7,408,900</i>	<i>8,517,400</i>	<i>10,789,100</i>
<b>Power Rate Stabilization Reserve Fund</b>	\$ -	\$ -	\$ -
<i>Recommended Minimum Target</i>	<i>-</i>	<i>-</i>	<i>-</i>
<b>Total Ending Balance</b>	<b>\$ 33,075,546</b>	<b>\$ 33,162,145</b>	<b>\$ 43,466,856</b>
<i>Total Recommended Target</i>	<i>\$ 26,335,900</i>	<i>\$ 28,806,400</i>	<i>\$ 34,913,100</i>
<i>Total Minimum Target</i>	<i>\$ 11,356,107</i>	<i>\$ 12,173,457</i>	<i>\$ 14,474,567</i>

Beginning Reserve Fund Balances and Recommended Reserve Targets	Budget	Budget	Projected		
	FY 2016/17	FY 2017/18	FY 2018/19	FY 2019/20	FY 2020/21
<b>Hetch Hetchy Operating Fund</b>	\$ 25,519,000	\$ 21,815,496	\$ 27,433,000	\$ 28,594,000	\$ 28,187,912
<i>Recommended Minimum Target</i>	<i>25,519,000</i>	<i>26,191,000</i>	<i>27,433,000</i>	<i>28,594,000</i>	<i>29,874,000</i>
<b>Capital Rehabilitation &amp; Replacement Reserve</b>	\$ 3,152,456	\$ 3,152,456	\$ 5,618,134	\$ 11,042,630	\$ 11,042,630
<i>Recommended Minimum Target</i>	<i>12,206,200</i>	<i>13,943,200</i>	<i>15,369,200</i>	<i>25,096,600</i>	<i>25,137,000</i>
<b>Power Rate Stabilization Reserve Fund</b>	\$ -	\$ 3,152,456	\$ 3,160,337	\$ 5,633,916	\$ 11,072,496
<i>Recommended Minimum Target</i>	<i>21,671,554</i>	<i>21,943,568</i>	<i>22,539,093</i>	<i>22,801,947</i>	<i>23,279,703</i>
<b>Total Ending Balance</b>	<b>\$ 28,671,456</b>	<b>\$ 28,120,408</b>	<b>\$ 36,211,471</b>	<b>\$ 45,270,546</b>	<b>\$ 50,303,038</b>
<i>Total Recommended Target</i>	<i>\$ 59,396,754</i>	<i>\$ 62,077,768</i>	<i>\$ 65,341,293</i>	<i>\$ 76,492,547</i>	<i>\$ 78,290,703</i>
<i>Total Minimum Target</i>	<i>\$ 15,311,499</i>	<i>\$ 15,714,346</i>	<i>\$ 16,459,825</i>	<i>\$ 17,156,277</i>	<i>\$ 17,924,573</i>

## APPENDIX C – COST OF SERVICE ANALYSIS

### Detailed tables included in Appendix C:

- Cover Page
- Main Menu
- Control Sheet
- List of Allocators
- Input & Assumptions
- Slide Jan 29<sup>th</sup> Base Case Only
- Slide for Customer Reclassification
- SFPUC FY 2013-14 COSA Model
- Accumulation Detail
- Revenue Requirements Combined
- Unit Costs – Detail
- SFPUC Energy
- Summary of Fiscal Year
- Average & Excess Allocation Factors

Appendix C provided under separate cover (and hyperlink displayed below).

<https://infrastructure.sfwater.org/fds/fds.aspx?lib=SFPUC&doc=1028736&data=396063360>

## APPENDIX D – RATE DESIGN ANALYSIS

### Detailed tables included in Appendix D:

- Billing Units for Computing Electric Base Rate Revenues
- Beginning Year Rates Table
- Rates Table Summary, in dollars
- Rates Table Summary, in percentages
- Unbundled Rates Table Summary

Appendix D provided under separate cover (and hyperlink displayed below).

<https://infrastructure.sfwater.org/fds/fds.aspx?lib=SFPUC&doc=1028737&data=396063745>

# APPENDIX E – MISCELLANEOUS FEES

## TECHNICAL MEMORANDUM

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**TO:** ERIC SANDLER, CFO & AGM – BUSINESS SERVICES  
AMY JAVELOSA-RIO, RATES ADMINISTRATOR  
SAN FRANCISCO PUBLIC UTILITIES COMMISSION

**FROM:** GREG CLUMPNER, NBS DIRECTOR  
CARMEN NARAYANAN, NBS CONSULTANT

**SUBJECT:** ELECTRIC RATE COMPARISON AND RECOMMENDATIONS

**DATE:** FEBRUARY 26, 2016

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### PURPOSE

This memorandum summarizes the comparison of electrical utilities miscellaneous charges as related to the Electric Utility Rate Study which NBS and Navigant are performing for the San Francisco Public Utilities Commission (SFPUC). The information focuses on SFPUC’s requested comparisons of current fees charged for specific miscellaneous charges and NBS policy recommendations. This memorandum is not intended to provide a cost of service analysis of miscellaneous fees, not is it to recommend specific fees that SFPUC should charge.

### OVERVIEW

This survey functions as an overview of fees charged for similar services by comparable agencies. While this is not a fee study and does not take into consideration actual service costs, it looks at market pricing by comparing SFPUC’s fees to other agencies.

### CURRENT FEES

The current fees were established with resolutions 10-0018, 11-0021, 14-0089, and 15-0112, as approved by the Public Utilities Commission. The specific compared fees are from schedule M-1: Miscellaneous Charges and are compared with the following utilities:

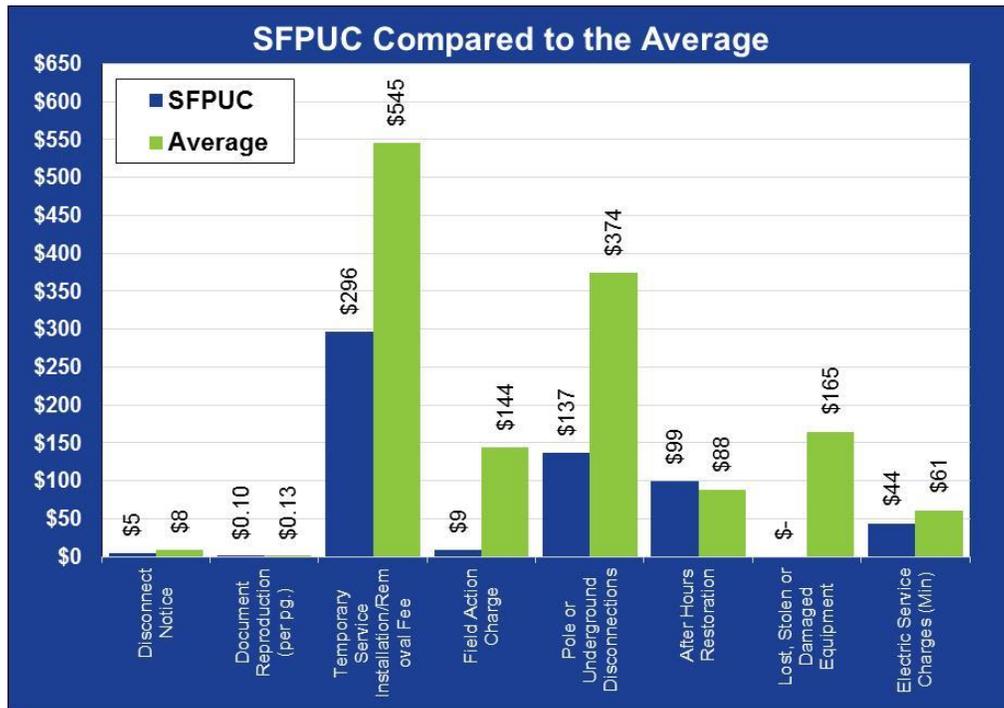
Comparison Utilities	
No.	Fee Comparisons of:
1	Alameda - Alameda Municipal Power
2	Modesto Irrigation District
3	Palo Alto - Power Utilities
4	Sacramento Municipal Utility District
5	Santa Clara - Silicon Valley Power

The SFPUC fees addressed in this comparison are listed below, along with fees for the similar utilities<sup>8</sup>. Each individual fee is further compared and represented graphically in the remainder of this report.

Fee No.	Fee Description	SFPUC Current Fee Amount (1)	Alameda - Alameda Municipal Power (2)	Modesto (4)	Palo Alto - Power Utilities (5)	Sacramento Municipal Utility District (6)	Santa Clara - Silicon Valley Power (7)
	<b>POWER RATE SCHEDULE: Schedule M-1: Miscellaneous Charges</b>						
1.	Disconnect Notice Charge	\$5.00	\$5.00	No Comparison	No Comparison	\$15.00	No Comparison
2.	Document Reproduction Charge (Per Page)	\$0.10	\$ 0.10 (3)	No Comparison	No Comparison	No Comparison	Public - \$0.20 Employees - \$0.05
3.	Temporary Service Installation and Removal Fee	\$296.00	\$270.00	Underground - \$510 Overhead - \$1,038	Underground - \$675 Overhead - \$840	\$1,000.00	\$518.93
4.	Field Action Charge (Meter Disconnect/Reconnection)	\$9.00	\$45.00	\$235 / \$360	Residential - \$450; Residential: Rear Easement - \$940 Multi-Family, Comm, Ind. - \$720	Reconnection During Business Hours - \$25 Truck Reconnect - \$55 Crew Charge per Field Call - \$100	\$100.86
5.	Pole or Underground Disconnections (Requiring Line Crew)	\$137.00	\$125.00	\$235.00	No Comparison	\$1,000.00	No Comparison
6.	After Hours Restoration Charge (10:00pm-8:00am M-F, weekends and Holidays)	\$99.00	\$90.00	\$75.00	No Comparison	No Comparison	No Comparison
7.	Lost, Stolen or Damaged SFPUC Equipment Charge	Actual Cost	Actual Cost	Meter Charges (Single/Three Phase) - \$160/\$255 S.T.E.P. Device - \$150 Special Ring - \$12.50 Padlock - \$9.50	No Comparison	Meter - \$180 Meter Ring - \$15	No Comparison
8.	Customer - Requested Electric Service Charges (Minimum)	\$44.00	\$40.00	\$100 per Trip	No Comparison	No Comparison	\$59 per hour

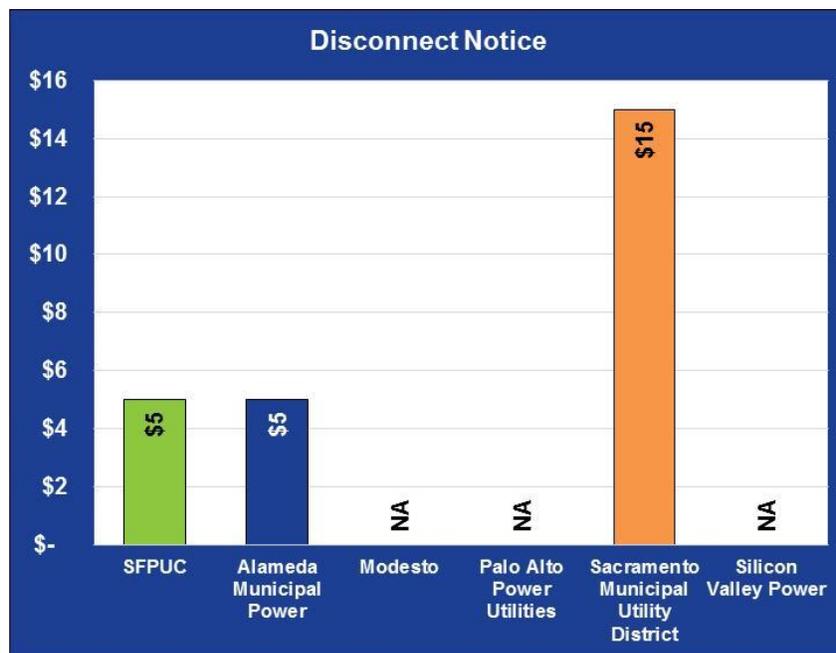
<sup>8</sup> Sources for all miscellaneous fees are included at the end of this technical memorandum.

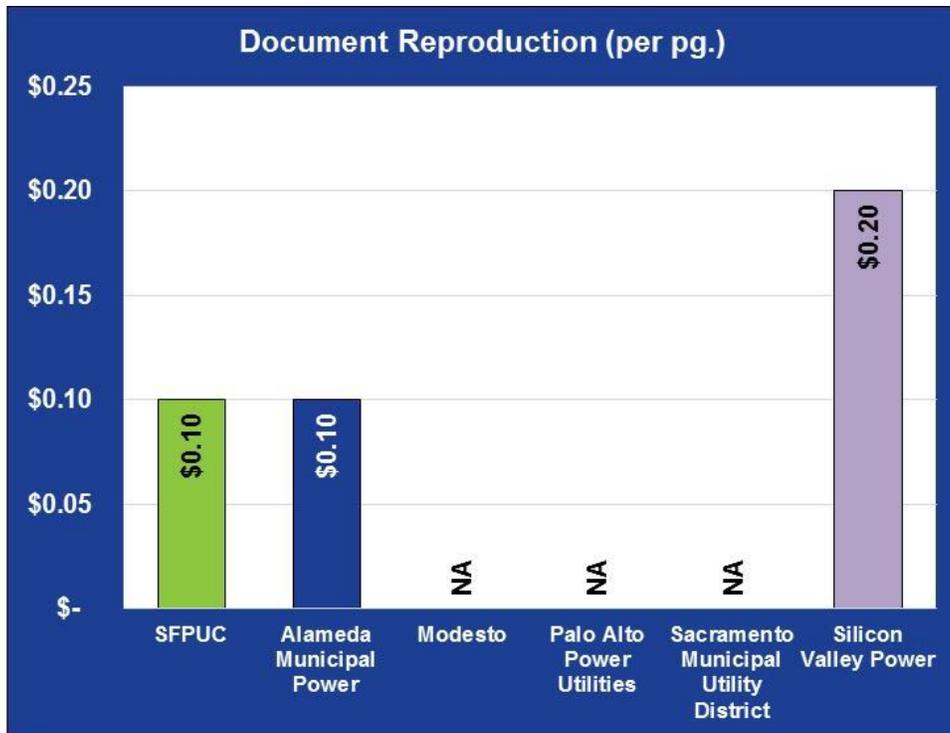
The graph below compares SFPUC's fees to the average (utilities which did not have fees were removed from the average; all Actual Cost fees were removed as the dollar amount could not be determined).



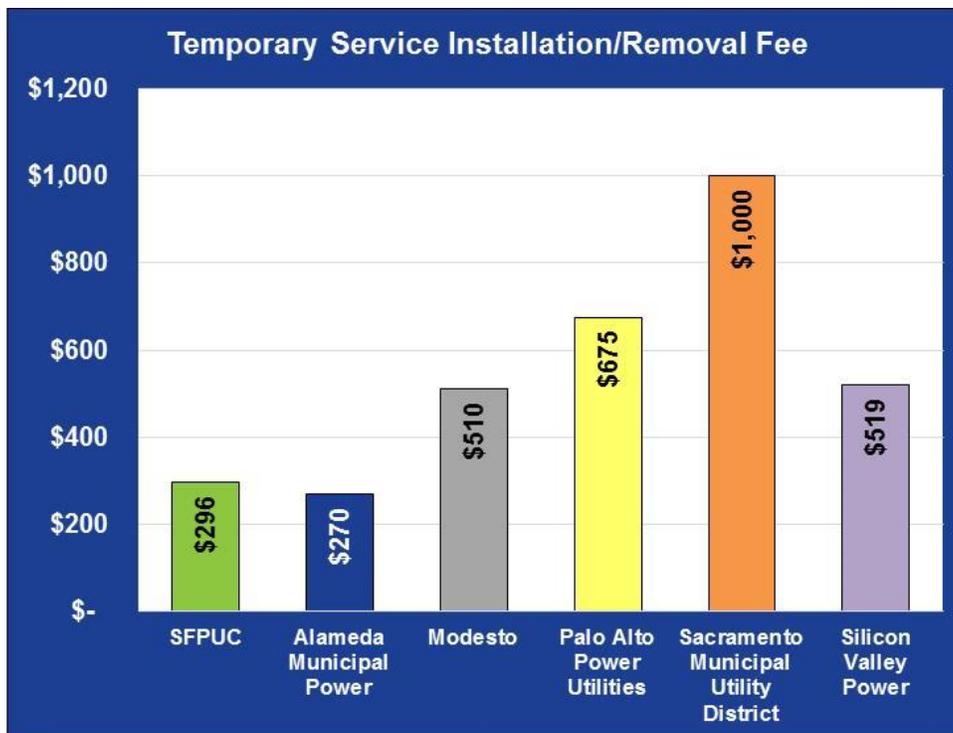
**Disconnect Notice Charge** – SFPUC charges \$5 and this is the same as the Alameda Municipal Power charge, while the Sacramento Municipal Utility District charges \$15. The other comparison utilities did not have a fee. See the graph below.

**Document Reproduction Charge (Per Page)** – varies between \$0.10 - \$0.20 cents per page. Silicon Valley Power charge a high of \$0.20 per page. See the graph below.

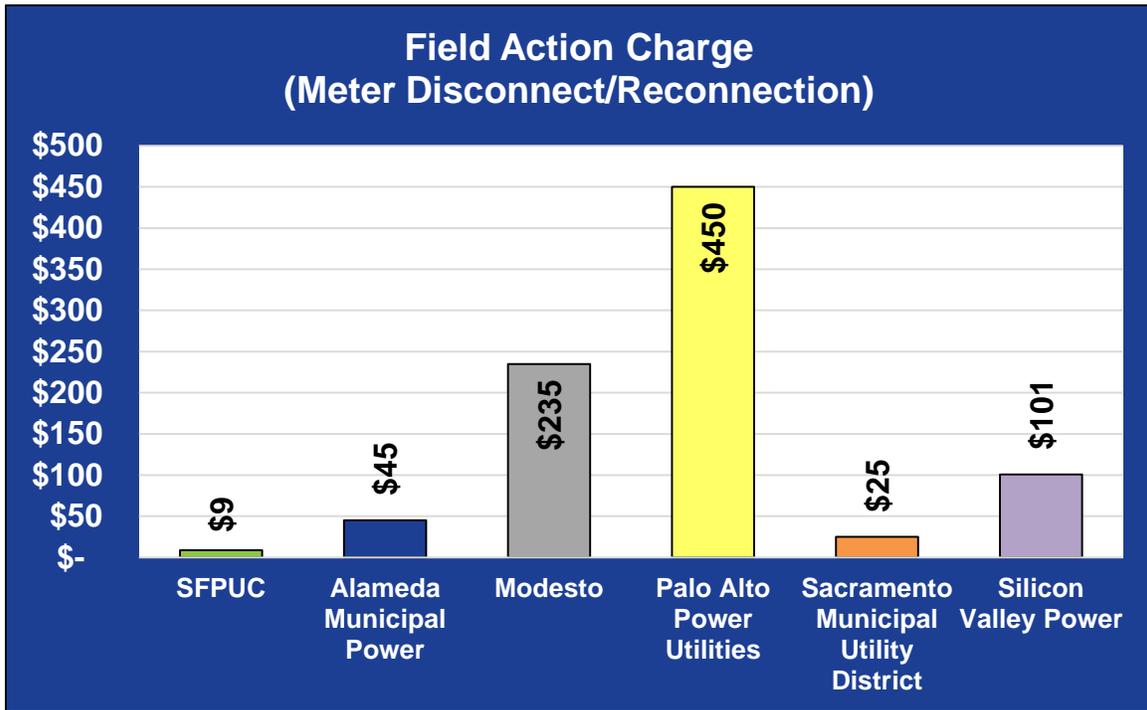




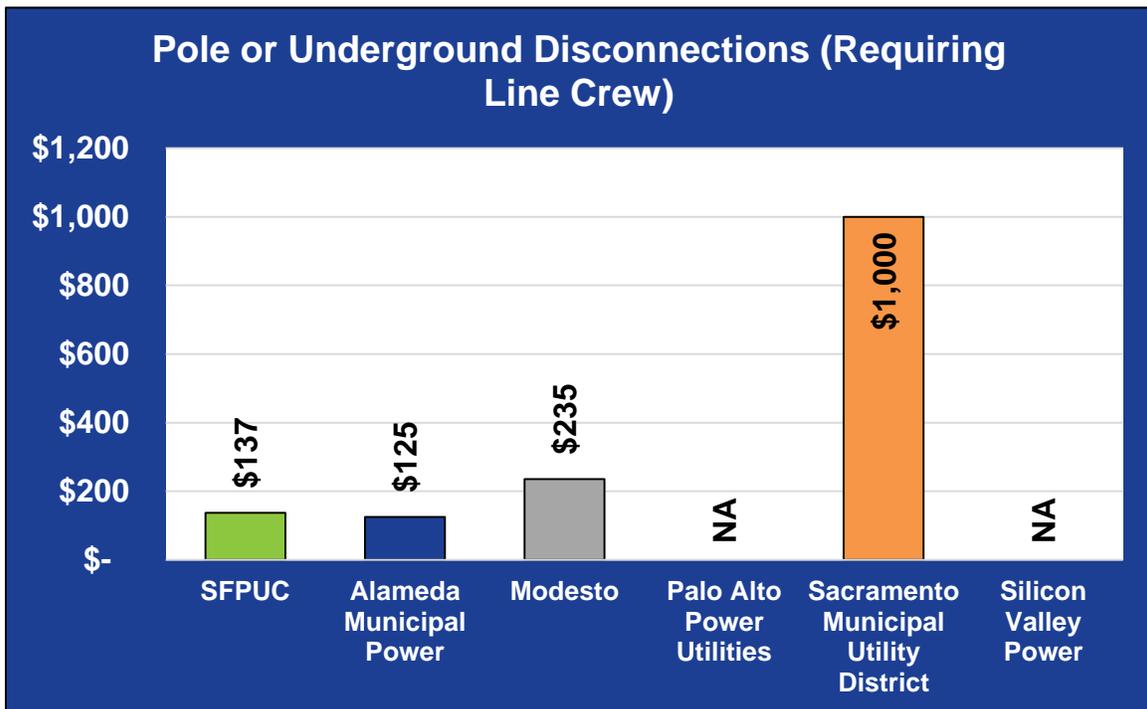
**Temporary Service Installation and Removal Fee** – there is a wide range of fees from a low of \$270, charged by Alameda Municipal Power, to \$1,000 which is charged by Sacramento Municipal Utility District. The average of all five comparisons is \$595. See the graph below.



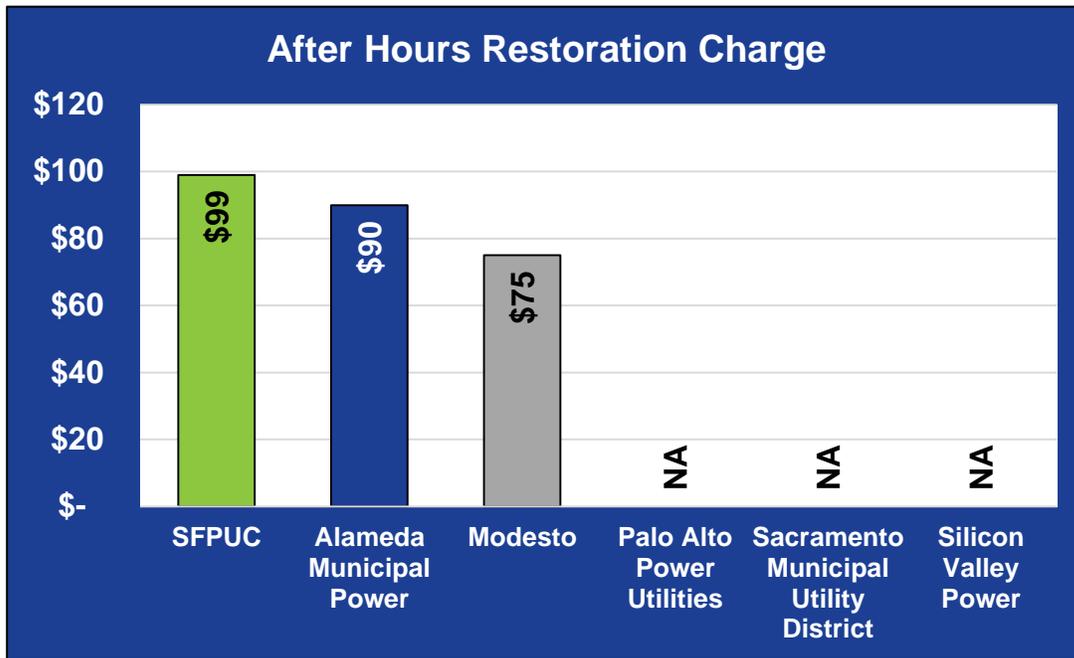
**Field Action Charge (Meter Disconnect/Reconnection) Fee** – varies with SFPUC being the lowest at \$9 and Palo Alto Power Utilities topping the chart at \$450. See the graph below.



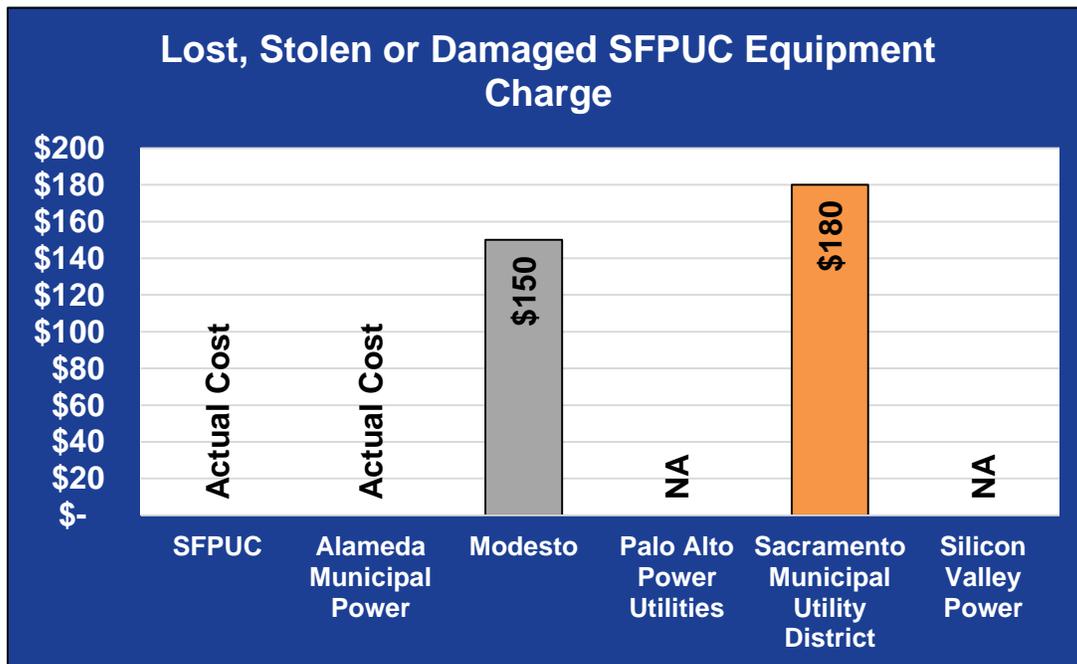
**Pole or Underground Disconnections (Requiring Line Crew)** – the lowest fee is charged by Alameda Municipal Power (\$125) and the highest fee is charged by Sacramento Municipal Utility District (\$1,000). See the graph below.



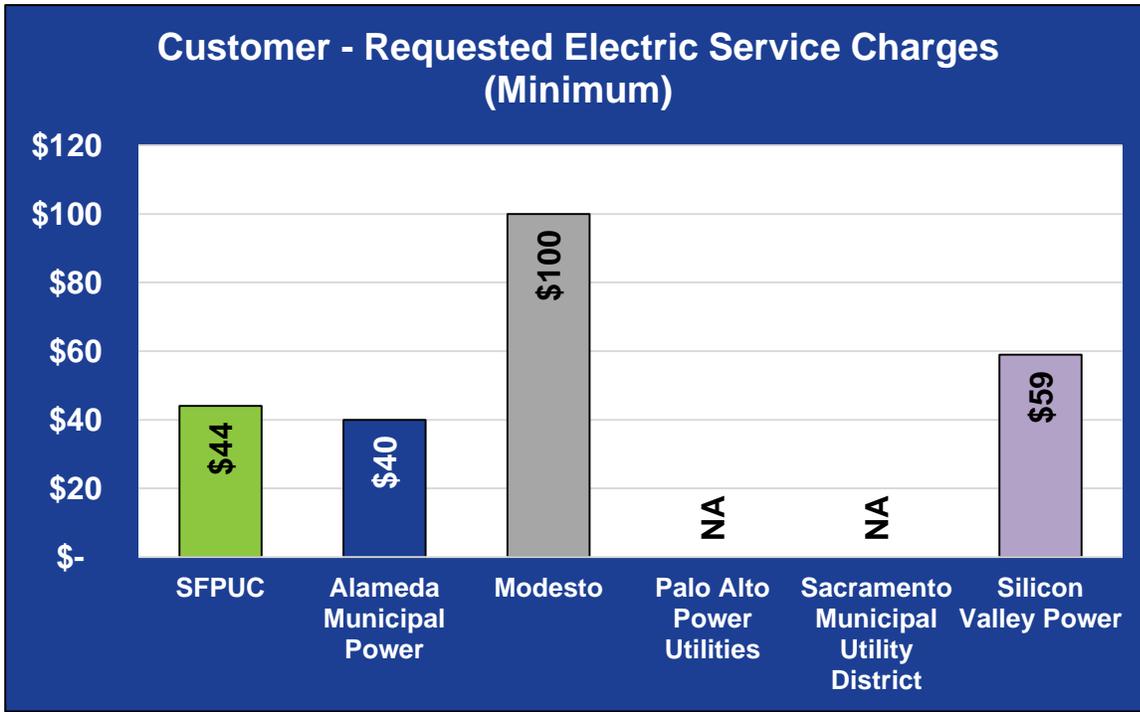
**After Hours Restoration Charge** – there were only two comparable fees of which Modesto was the lowest at \$75 and SFPUC came in the highest at \$99. See the graph below.



**Lost, Stolen, or Damaged SFPUC Equipment Charge** – Three other utilities compared in this analysis include a similar fee; however, one agency, like SFPUC, charges the Actual Cost. See the graph below.



**Customer-Requested Electric Service Charge (Minimum)** – Two agencies included in this comparative analysis have no charge for this specific fee. Alameda Municipal Power charged the least at \$40 while Modesto charge the most at \$100. See the graph below.



## FINDINGS & RECOMMENDATIONS

Findings regarding specific fees are as follows:

- ✓ **Disconnect Notice Charge** – This fee should ensure full cost recovery for time spent by Customer Service staff issue such notices.
- ✓ **Document Reproduction Charge (Per Page) Fee** – SFPUC’s existing rate as it is similar to other utilities.
- ✓ **Temporary Service Installation and Removal Fee** – The SFPUC fee could be increased due to the significant difference other utilities are charging for the same service. We note that several utilities separate this service into two categories – underground and overhead – and charge separately for each service.
- ✓ **Field Action Charge** – SFPUC’s fee for this service is the lowest of all comparison utilities and therefore could be raised to cover the full cost of service.
- ✓ **Pole or Underground Disconnections (Requiring Line Crew) Fee** – SFPUC’s charge of \$137 is the second lowest of the comparison utilities; Sacramento Municipal Utility District is charging \$1,000. This implies there is not a full cost recovery for this service and the fee could be raised to cover actual cost of service.
- ✓ **After Hours Restoration Charge** – This charge is the highest of the comparison utilities but it is only 10% higher than the next closest.

- ✓ **Lost, Stolen, or Damaged SFPUC Equipment Charge** – SFPUC’s charge is set to Actual Cost; two other utilities have a flat fee, which does not seem to a logical approach.
- ✓ **Customer–Requested Electric Service Charges (Minimum)** – SFPUC is currently charging \$44, while other utilities are charging \$100 per trip or \$59 per hour. Raising the fee or basing it on the time spent at the site would be more equitable and a better cost-basis for this service.

In general, the public is demanding more precise and equitable accounting of all rates and fees in California, and often a greater voice regarding when and how they are imposed. Based on this very limited research, which included five similar utilities, NBS recommends the SFPUC consider adjusting certain fees to better recover actual costs. If that is not possible or practical, adjustments that better meet market standards should be made. Periodic adjustments should also be made to keep pace with inflation and ensure better cost recovery; SFPUC’s Master Fee Schedule should become a living document that:

- Provides clarity and transparency to the public and staff regarding fees imposed by the SFPUC.
- Fees should be adjusted on an annual basis to keep pace with inflation. This could be done using either a Consumer Price Index adjustment or a percentage of Labor Cost increase.

## DATA SOURCES

SFPUC Current Fee Amount (1)	1	Source: <a href="http://sfwater.org/modules/showdocument.aspx?documentid=7743">http://sfwater.org/modules/showdocument.aspx?documentid=7743</a> . Last viewed on 1/18/2016.
Alameda - Alameda Municipal Power (2, 3)	2	Source: <a href="http://media.alamedamp.com/assets/pdf/Rules_Regulations_111615.pdf">http://media.alamedamp.com/assets/pdf/Rules_Regulations_111615.pdf</a> , Source file: <i>Alameda Municipal Power Rules Regulations 11.16.15.pdf</i> ; Pg. 76.
	3	City of Alameda Master Fee Schedule has per page copy costs of \$0.10. Source: <a href="http://alamedaca.gov/sites/default/files/department-files/2014-08-14/master_fee_schedule_fy_14-15_revised.pdf">http://alamedaca.gov/sites/default/files/department-files/2014-08-14/master_fee_schedule_fy_14-15_revised.pdf</a> . Last viewed 1/19/2016. Source file: <i>Alameda Master Fee Schedule FY 14-15 Revised.pdf</i> ; pg. 4, 43, 44.
Modesto (4)	4	Data provided by Client. Source file: <i>appendixa.pdf</i>
Palo Alto - Power Utilities (5)	5	Source: <a href="http://www.cityofpaloalto.org/civicax/filebank/documents/8083">http://www.cityofpaloalto.org/civicax/filebank/documents/8083</a> . Last viewed on 1/19/2016. Source file: <i>Palo Alto Utilities Rates E-15 effective 07-01-2012.pdf</i>
Sacramento Municipal Utility District (6)	6	Data provided by Client. Source file: <i>Fees-Deposits-Schedule.pdf</i>
Santa Clara - Silicon Valley Power (7)	7	Source: <a href="http://santaclaraca.gov/home/showdocument?id=14905">http://santaclaraca.gov/home/showdocument?id=14905</a> . Last visited 1/19/2016. Source file: <i>Santa Clara Muni Fee Schedule_FY2015-16 Adopted_REVISED.pdf</i> .

## APPENDIX F – INDUSTRY TRENDS

SFPUC Electric Rate Study

Industry Trends Analysis

Prepared by: Urban Analytics

The San Francisco Public Utilities Commission (“SFPUC” and “Commission”) has requested an analysis of industry trends as part of its 2015 Electric Rate Study, with a focus on the implementation of specific pricing methodologies and rate structuring practices identified by the Commission. The following analysis presents the results of a survey of these methodologies and practices across six utilities in Northern California: one large investor-owned utility, one large publicly-owned utility, three municipally-owned utilities and one recently-formed Community Choice Aggregation provider.

The utilities surveyed are:

- Sacramento Municipal Utilities District (SMUD)
- City of Palo Alto Utility (CPAU)
- Silicon Valley Power (SVP) (utility district of the City of Santa Clara)
- Alameda Municipal Power (AMP)
- Pacific Gas and Electric (PG&E)
- Sonoma Clean Power (SCP) (Community Choice Aggregation of the County of Sonoma)

Information obtained from each utility in each of the topic areas is presented below.

### Findings Regarding Specific Pricing Methodologies:

- Cost relationships between generation, transmission and distribution cost impacts
  - Those surveyed did not disclose such cost relationships in available documents. Unbundled rates, where available, may provide an indication of relative costs.
- To and from customer-sited distribution generation to mitigate cross-class-subsidies
  - Information on this topic was not readily available from the surveyed utilities.
- Electric Vehicles (EV)
  - SMUD began offering a rate credit of 1.5 cents/kWh this year for EV charging at night; the amount is based on an analysis of the cost of serving an expected EV load.
  - CPAU and SVP offer no EV rate. CPAU encourages EV users to switch to a smart meter and opt for Time-of-Use pricing.
  - AMP provides a rate discount for EV based on size of vehicle ranging from \$9 to \$21 per vehicle per month.
  - PG&E has a pilot EV charging proposal pending before the CPUC requesting \$222 million (\$187 in capital and \$35 million expense) to install 7,530 charging stations at 290 locations over 36 months. PG&E also offers residential EV charging TOU rates that vary with season and daily peak, part-peak and off peak. See also TOU with 2<sup>nd</sup> meter below.
  - SCP together with the Sonoma County Transportation Authority plans a 2017 launch for an EV to grid integration program with a goal of 10,000 EVs by 2020 and managed charging to support further renewable resource integration on the distribution and CAISO grids. This project is currently under development.
  - SCP offers residential EV TOU rates with seasonal and daily peak, part-peak and off peak variation. SCP has also awarded 4 grants to schools for on-site EV charging.
- Low-Income Rates
  - All offer discounts to income-qualified customers: CPAU, SVP and AMP offer 25% discount, SMUD offers 44% plus discount on fixed charge. CPAU and SVP unbundle the Public Benefit charge in rates and identify it as source of low-income and other discounts;

their Low-Income Rate is not applied through a separate rate schedule. AMP and SMUD have separate rate schedules for Low-Income Rates. CPAU requires applicants to also apply for their Energy Assistance Program and get an energy audit; CPAU qualifies SSI, TANF and Food Stamp recipients automatically, although they must still apply for the Low-Income Rate program. PG&E administers the comprehensive California Alternate Rates for Energy (CARE) program. SCP honors existing CARE qualifying participation and refers new low income customers to PG&E's CARE program for new enrollment.

- Medical Necessity
  - Similar to Low-Income Rates - all offer discounts to those with qualifying medical needs: CPAU and SVP offer 25% discount, SMUD offers 44% plus discount on fixed charge, AMP offers 10% discount and allows only one of the two discounts (Low-Income or Medical) to be used. CPAU and SVP unbundle the Public Benefit charge in rates and identify it as source of low-income and other discounts; their Medical Rates are not applied through separate rate schedules. AMP and SMUD have separate rate schedules for Medical Rates. PG&E offers a baseline supplement (daily lowest priced Tier 1 energy) to qualifying customers. SCP honors medical necessity baseline allowance customers from PG&E and offers the same supplement to new qualifying customers. These customers are also exempt from PG&E's Power Charge Indifference Adjustment (PCIA) costs paid by all other SCP customers.
- Economic Revitalization Zone
  - SMUD offers an extensive business incentive discount program for both new jobs and job retention, with extra benefits in areas of high unemployment/poverty; SMUD notes that their program is similar to one offered by PG&E.
  - AMP had a business incentive program but has cancelled it.
  - PG&E offers eligible businesses either a 12% or 30% discount for five years on electricity within "Enhanced Rate Areas" based on 2013 unemployment levels.
  - SCP, CPAU and SVP offer no business incentives.
- Strategies to fund energy efficiency programs and other ancillary services, including similar services to those offered by SFPUC
  - All offer one or more rebate program for energy-efficient appliances. SMUD offers a residential loan program for purchase of specified energy-efficient equipment. CPAU offers a subsidized residential energy audit. AMP offered a solar rebate program that is now closed. PG&E offers a broad range of programs with ratepayer funding from either the public goods charge (paid by both bundled and unbundled customers) or Electric Program Investment Charge funding administered jointly by PG&E and the California Energy Commission (CEC). PG&E's adopted total program budget for 2013-2015 is \$1.7 billion.
- Survey of Industry hedging alternatives and opportunities over the next 5 and 10 years
  - CPAU is working on a Hydro Rate Adjuster for 2017 that could adjust rates up in dry years and down in wet years, should their existing Hydro Stabilization Reserve be inadequate; also monitoring EV usage and concerned about carbon allowances paid to CPAU from state Cap-and-Trade program expiring in 2020.
  - SVP uses commodity forward contracts for gas and electric
  - Others have Rate Stabilization Funds, described below.

## Findings Regarding Specific Rate Structuring Practices:

- Customer Charges
  - SMUD adds a System Infrastructure Fixed Charge, a Solar Surcharge and a Hydro Generation Adjustment (paid into a rate stabilization fund) to all bills. Target pricing strategy is 18% below PG&E on system average, and at least 10% below PG&E by

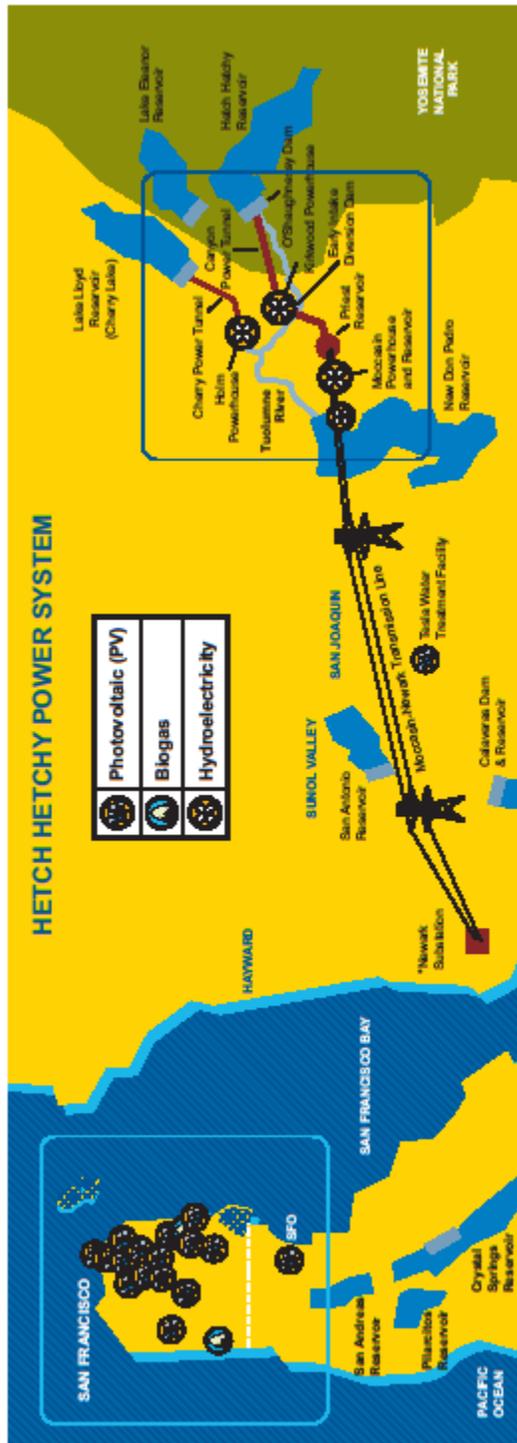
- customer class. Pricing Policy: "Equitable allocation of costs across and within customer classes".
- CPAU is preparing a cost of service study that was scheduled for completion 12/2015.
  - AMP has an Energy Resource Surcharge and a State Solar Photovoltaic Program charge for most users (some exceptions), and a city-imposed Utility Users Tax on all bills except those to public agencies. Commercial rates include a per-customer or per-meter fixed charge.
  - SVP and SCP: no customer charges (beyond rates) disclosed.
  - PG&E: residential – no customer charge, minimum energy charge \$.32854 per meter/per day (CARE customers pay discounted min energy charge), residential Time of Use (TOU) customers pay separate additional meter charge in addition to a minimum energy charge. Commercial charge is \$4.59959/per meter/per day, other per meter/per day rates varies depending on smart or analog meter, and others rates vary based on single phase and polyphase service; industrial - \$39.42505/day for secondary firm service, \$49.28131/day primary firm, \$65.70842 transmission firm.
- Residential Demand Charges
    - No separate rates reported for high-demand residential users. CPAU and SVP have separate demand schedules for commercial users. PG&E has separate demand charges for commercial and industrial customers.
  - Business Development Rate-setting
    - SMUD notes that its existing program is underused (2 applicants/year on average), and is planning on adding 10 NAICS codes to the 4 already eligible. Economic Development Rate (EDR) discount off standard rate is 5% in year 1, 3% year 2, 1% year 3 and 0 year 4 and 5 (must make a 5-year commitment and have a maximum demand of at least 300kW on one meter for 3 consecutive months). Proposing to add a business retention component (retain 50 full-time equivalent jobs within 2 years of signing SMUD agreement), and a tiered job requirement in areas of high unemployment/poverty.
    - PG&E offers eligible businesses either a 12% or 30% discount for five years on electricity within "Enhanced Rate Areas" based on 2013 unemployment levels.
    - AMP cancelled an earlier business development rate.
    - CPAU, SVP, and SCP have no business development rates.
  - Electric Vehicle (EV) rates with Time-of-Use (TOU) and 2nd EV Meter
    - SMUD: EV owners are to be moved into a new single TOU rate in 2016. Will use a cost-based EV credit, avoiding a 2nd meter. Credit to incentivize EV charging at night; widespread EV use may overload local transformers. Have about 2,300 EV customers as of 2/2015, planning for 140,000 by 2030.
    - CPAU and SVP have no special programs for EV; CPAU has a pilot TOU program.
    - AMP provides an EV discount (see above), no second meter required. Requires charging be done in off-peak hours.
    - PG&E has a residential and commercial submetering pilot program with EV charging billed a separate program rate. Program to expire September, 2016.
    - SCP offers EV TOU rates without separate meters.
  - Standby Charge
    - SMUD standby charge for commercial users has separate rates for Secondary, Primary and Subtransmission Voltage Service per kWh of contract capacity. Net Metering customers not subject to standby charge for that portion of load.
    - CPAU has unbundled standby rates for users in two commercial rate classes with separate summer & winter rates.
    - AMP has standby charge of \$15.00 / kWh /month of contract capacity, plus \$1.00 / kVar of reactive demand (possibly a power factor cost recovery)
    - SVP and SCP have no published standby charge.

- PG&E charges full bundled rates plus charges (reservation charge in \$/kW applied to 85% of reservation capacity + energy charge + customer charge + TOU meter charge) based on size of onsite resource and set by voltage level. Exemptions from capacity reservation charges offered to TOU and Net Energy Metering customers with resources under 1MW.
- Net Metering Rates
  - SMUD offers net metering for qualified on-site generator; opt-in to receive annual payout for excess generation calculated by dividing net commodity budget by forecasted energy sales; program capped at 5% of aggregate customer peak demand.
  - CPAU offers credit for excess on-site solar generation at CPAU retail rates every 12 months; customer elects to be paid or apply it to bill.
  - SVP provides a monthly net metering statement showing credit, with annual true-up where customer is paid for excess electricity at a rate adopted by City Council.
  - AMP excess generation payout set at \$0.05555 per kWh currently, adjusted annually. Excess calculated on 12-month basis. Limit on generating capacity of facility of 1 MW.
  - PG&E offers net energy metering payments until July, 2017 for all renewables, storage and load aggregation resources. Several rate options by resource type and facilities size are offered.
  - SCP offers the ProFit program for RPS compliant resources under 1 MW only. All resource types potentially eligible. SCP pays \$95-\$130/MWh with 10-20 year contracts required
- High Voltage Discounts
  - CPAU: Primary voltage discount is 2.5% for 2kV and up.
  - SVP: Primary voltage discount of \$0.97 per kWh of billing demand.
  - AMP offers a primary voltage discount of 3%.
  - SMUD, SCP and PG&E: none identified.
- Time-of-Use (TOU) Pricing
  - SMUD revising residential rate structure from 2 optional TOU rate options to 1 in 2016 after testing three TOU rate designs. Existing tiered residential pricing to be replaced by TOU in 2018. Commercial and industrial customers are already on TOU rates.
  - CPAU has an opt-in pilot TOU program offered as an overlay to existing residential rate schedule. TOU adjustment made to regular residential bill based on time of day and season (winter & summer). Limited to 150 meters, expires 12/2017.
  - SVP has optional TOU pricing, but it requires smart meters now being installed for residences by SVP citywide; commercial users may request (and pay for) installation. Peak and off-peak rates in two tiers based on kWh for both residential and commercial (single tier for users above 4,000 kWh). No seasonal differences in TOU rates.
  - AMP has no TOU offering for any class.
  - PG&E: new residential rate structure will move from current 4 Tiered rates to all TOU rates over the 2015-2019 time period. PG&E currently offers residential TOU and EV TOU rates, various commercial and industrial TOU rates that vary by season and daily peak/part-peak/off peak periods.
  - SCP offers commercial TOU option.
- Power Factor cost recovery
  - SMUD commercial rate calculated per excess kVar X kWh. Also offers a Power Factor Waiver contract calculated per excess kVar.
  - CPAU adds a charge of 0.25% for every 1% of power factor below than 95%.
  - SVP adds a charge of 0.1% for every 1% the power factor is less than 85%, subject to demand levels.
  - AMP's power factor adjustment is currently set at zero.
  - PG&E has a power factor adjustment for industrial customers of \$.00005/MWh/%.
  - SCP has no published power factor adjustment.
- Rate Unbundling

- SMUD and SVP rate schedules are not unbundled.
  - CPAU rates are unbundled by Commodity (Generation + Transmission), Distribution and Public Benefits.
  - AMP rates are unbundled by Generation, Distribution and Public Purpose.
  - PG&E: majority of customers are Bundled Total Rate customers. Unbundled rates apply to Direct Access and CCA customers and standby rates. Unbundling of PG&E's Total Rate (different for primary, secondary and transmission voltage levels) components are shown as: 1) Generation (by seasonal/daily peak part peak and offpeak), 2) Distribution (by seasonal/daily peak part peak and offpeak), 3) Transmission, 4) Transmission Rate Adjustments, 5) Reliability Services, 6) Public Purpose Programs, 7) Nuclear Decommissioning, 8) Competition Transition Charges, 9) Energy Cost Recovery Amount 10) DWR Bonds, 11) New System Generation Charge, and 11) California Climate Credit. CCA and Direct Access Customers pay all non-bypassable charges (all rate components except generation), PG&E's delivery (T&D and service costs) plus a Power Charge Indifference Adjustment and franchise fees.
  - SCP's rates are unbundled into Generation, PG&E Delivery Costs, PG&E's PCIA and PG&E's Franchise Fee components.
- Cost Recovery (Fixed vs. Variable)
    - SMUD customers pay a System Infrastructure Fixed Charge in addition to surcharges for solar and rate stabilization. No further disclosure of fixed vs. variable cost recovery.
    - CPAU, SVP, AMP, and SCP: no available disclosure of fixed vs. variable cost recovery
    - PG&E's fixed and variable cost recovery information is included in voluminous filings and prefiled testimony documents in three year General Rate Case cycles. PG&E's most recent pending GRC is for Test Year 2017. GRC's have two Phases: Phase 1 addresses cost recovery and revenue requirements and Phase 2 addresses rate design using results from the Phase 1 final decision.
- Voluntary Green Pricing
    - SMUD: Greenergy program: \$3 - \$6/month opt-in for renewable sourcing, \$10/month opt-in for carbon-footprint reduction. SolarShares program offers a buy-in to energy generated from an SMUD solar farm, with credit for solar energy produced.
    - CPAU program is Palo Alto Green: CPAU purchases renewable energy certificates from solar power sources. Commercial users may buy blocks of renewable electricity (residential users buy carbon offsets tied to their natural gas use).
    - SVP program is Santa Clara Green Power: SVP purchases renewable energy certificates from wind and solar facilities equal to 100% of customer's bill. For residential, commercial and industrial users. Cost is 1.5 cents / kWh.
    - AMP purchases renewable energy credits on behalf of participating customers at a cost to customer of 1.5 cents / kWh per month.
    - PG&E: Solar Choice Program (PG&E's Green Tariff Shared Renewables Program) offers various rates to residential, commercial and industrial customers. The rate offerings are calculated as a total premium above the otherwise applicable rate. The premium rate is applied on a \$/kWh basis to either 50% or 100% of customer usage. Additional charges and credits apply to program participants.
    - SCP offers two options to all customer classes: CleanStart (36% renewable resource) and EverGreen (100% renewable resource) based on 2014 CEC data detailed power content label information.
- Public Goods Charges
    - SMUD Solar Surcharge applied to all users.
    - CPAU City facilities customers pay a public benefits charge, which is used on energy efficiency programs. Also, website notes that 1% of electric revenues are spent on undergrounding each year, not separately charged on bills.
    - SVP Public Benefits charge is calculated as the sum of the fixed customer charge plus the energy charge, times 0.0285.
    - AMP Public Purpose charges are broken out in the rate schedules.

- All PG&E customers pay PG&E's Public Purpose Programs charge.
- SCP customers pay PG&E's Public Purpose Programs charge.
- Climate Credits for Residential
  - CPAU gets \$3 - \$5M /year in allocated carbon allowances from state cap-and-trade program used in energy efficiency programs; not broken out on bills.
  - SMUD, SVP and AMP – none disclosed.
  - PG&E pays residential customers a flat \$28.14 bill credit per household, per semi-annual payment in April-October bill cycles.
- Rate Stabilization Fund
  - SMUD: Hydro Rate Stabilization Fund: 5% of budgeted retail revenue; Hydro Generation Adjustment applied to all usage to mitigate higher energy costs in dry years; excess in Rate Stabilization Fund is returned to users.
  - CPAU maintains several rate stabilization funds: Hydro Rate Stabilization Fund, Electric Supply Rate Stabilization Fund and Electric Distribution Rate Stabilization Reserve.
  - SVP and AMP both maintain a Rate Stabilization Fund.
  - PG&E has no rate stabilization fund.
  - SCP is considering establishing a reserve fund to protect against future PG&E PCIA charge increases. PG&E's PCIA doubled in the last CPUC decision in December 2015.

# APPENDIX G – HETCH HETCHY POWER SYSTEM



\*Hetch Hetchy energy enters the electricity grid at the Newark Substation.  
 The San Francisco Public Utilities Commission is the exclusive power provider on Treasure Island and in the redeveloped Hunter's Point Shipyard.



HYDROELECTRIC GENERATION		Approximate Hydroelectric Capacity: 380.5 MW	
Project	Units	Unit 1	Unit 2
North Point Weather Facility	1,987	32.5 MW	82.5 MW
Chimney Rock Powerhouse	1,987	39.5 MW	39.5 MW
Mission Bay Powerhouse	1,987	50 MW	50 MW

SMALL HYDROELECTRIC GENERATION		Total Small Hydroelectric Capacity: 3.8 MW	
Project	Units	Unit 1	Unit 2
Mission Bay Powerhouse	1,987	3.8 MW	3.8 MW

BIOGAS GENERATION		Total Biogas Capacity: 3.1 MW	
Project	Units	Unit 1	Unit 2
Chimney Rock Powerhouse	1,987	1.1 MW	1.1 MW
Mission Bay Powerhouse	1,987	2.0 MW	2.0 MW

PHOTOVOLTAIC (PV) GENERATION		Total Solar Capacity: 7.9 MW	
Project	Units	Unit 1	Unit 2
Mission Bay Powerhouse	1,987	3.8 MW	3.8 MW
Chimney Rock Powerhouse	1,987	4.1 MW	4.1 MW

Sourced from the California Energy Commission.

# APPENDIX H – BILL COMPARISONS

## Residential Bill Comparisons

<b>SFPUC Bill: Consultant Recommendation</b>			
Tariff Class: R1			
<b>Summer Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Service Charge		\$3.03/month	\$3.03
Energy Charges			
Tier 1 (first 229 kWh)	229.0 kWh	\$0.11939/kWh	\$27.34
Tier 2 (next 68 kWh)	68.0 kWh	\$0.13572/kWh	\$9.23
Tier 3 (all other kWh)	137.6 kWh	\$0.27783/kWh	\$38.23
CEC Charge		\$0.00029/kWh	\$0.13
Public Goods Charge		\$0.00519/kWh	\$2.26
			<b>\$80.22</b>
<b>Winter Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Service Charge		\$3.03/month	\$3.03
Energy Charges			
Tier 1 (first 278 kWh)	278.0 kWh	\$0.11939/kWh	\$33.19
Tier 2 (next 83 kWh)	83.0 kWh	\$0.13572/kWh	\$11.26
Tier 3 (all other kWh)	73.6 kWh	\$0.27783/kWh	\$20.45
CEC Charge		\$0.00029/kWh	\$0.13
Public Goods Charge		\$0.00519/kWh	\$2.26
			<b>\$70.32</b>
<b>Annual Average Monthly Bill</b>			<b>\$75.27</b>

<b>PG&amp;E Bill</b>			
Tariff Class: E-1 Basic Quantities		<i>as of March 1, 2016</i>	
<b>Summer Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Baseline Quantity	7.0 kWh/day		
Energy Charges			
Tier 1 (Baseline)	210.0 kWh	\$0.18212/kWh	\$38.25
Tier 2 (101-130% of baseline)	63.0 kWh	\$0.25444/kWh	\$16.03
Tier 3 (131-200% of baseline)	147.0 kWh	\$0.25444/kWh	\$37.40
Tier 4 (201-300% of baseline)	14.6 kWh	\$0.37442/kWh	\$5.47
Tier 5 (Over 300% of baseline)	0.0 kWh	\$0.37442/kWh	\$0.00
California Climate Credit		(28.14)/6 months	(\$4.69)
			<b>\$92.46</b>
<b>Winter Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Baseline Quantity	8.5 kWh/day		
Energy Charges			
Tier 1 (Baseline)	255.0 kWh	\$0.18212/kWh	\$46.44
Tier 2 (101-130% of baseline)	76.5 kWh	\$0.25444/kWh	\$19.46
Tier 3 (131-200% of baseline)	103.1 kWh	\$0.25444/kWh	\$26.23
Tier 4 (201-300% of baseline)	0.0 kWh	\$0.37442/kWh	\$0.00
Tier 5 (Over 300% of baseline)	0.0 kWh	\$0.37442/kWh	\$0.00
California Climate Credit		(28.14)/6 months	(\$4.69)
			<b>\$87.44</b>
<b>Annual Average Monthly Bill</b>			<b>\$89.95</b>

## Commercial Bill Comparisons

<b>SFPUC Bill: Consultant Recommendation</b>			
Tariff Class: C1 Polyphase			
<b>Summer Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Service Charge		\$22.65/month	\$22.65
Energy Charge	3,600.0 kWh	\$0.20466/kWh	\$736.78
CEC Charge		\$0.00029/kWh	\$1.04
Public Goods Charge		\$0.00519/kWh	\$18.68
			<b>\$779.15</b>
<b>Winter Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Service Charge		\$22.65/month	\$22.65
Energy Charge	3,600.0 kWh	\$0.14647/kWh	\$527.29
CEC Charge		\$0.00029/kWh	\$1.04
Public Goods Charge		\$0.00519/kWh	\$18.68
			<b>\$569.66</b>
<b>Annual Average Monthly Bill</b>			<b>\$674.41</b>
<b>PG&amp;E Bill</b>			
Tariff Class: A-1 Polyphase		<i>as of March 1, 2016</i>	
<b>Summer Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Service Charge		\$0.65706/day	\$19.71
Energy Charge	3,600.0 kWh	\$0.24274/kWh	\$873.86
			<b>\$893.57</b>
<b>Winter Bill</b>	<b>Usage</b>	<b>Rates</b>	<b>Bill</b>
Service Charge		\$0.65706/day	\$19.71
Energy Charge	3,600.0 kWh	\$0.18773/kWh	\$675.83
			<b>\$695.54</b>
<b>Annual Average Monthly Bill</b>			<b>\$794.56</b>