DOCKETED	
Docket Number:	18-IRP-01
Project Title:	Integrated Resource Plan
TN #:	256080
Document Title:	SFPUC IRP
Description:	SFPUC IRP, Attachment A: SFPUC Resolution 23-0214, Attachment B: SFPUC Procurement Plan To ensure compliance with the California Renewable Portfolio Standard (RPS)
Filer:	Mallory Albright
Organization:	San Francisco Public Utilities Commission
Submitter Role:	Public Agency
Submission Date:	4/30/2024 3:28:50 PM
Docketed Date:	4/30/2024

San Francisco Public Utilities Commission
Hetch Hetchy Power
Updated Integrated Resource Plan

Approved by the SFPUC Commission – November 28, 2023
By Resolution 23-0214

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

October 2023

Table of Contents

1.0 Executive Summary

This is the Updated Integrated Resource Plan (IRP or Updated IRP) of Hetch Hetchy Power, the local publicly owned electric utility (POU) operated by the San Francisco Public Utilities Commission (SFPUC), which is a department of the City and County of San Francisco.[1] The SFPUC is governed by a five-member commission.

California Energy Commission (CEC) Guidelines require each POU to submit an Updated IRP as well as supporting documentation that shows how the POU plans to meet California's environmental and policy requirements and goals and explains the methodologies used in developing the Updated IRP.[2]

This IRP updates the San Francisco Public Utilities Commission's Hetch Hetchy Power 2018 Integrated Resource Plan Filing (2018 IRP). In this document, Hetch Hetchy Power summarizes its 20-year forecasts of retail sales and power supply and the analysis performed to identify options for maintaining a clean, reliable and affordable power supply for Hetch Hetchy customers.

The IRP serves as a roadmap to guide San Francisco's decisions about power resources needed to meet our customers' future electricity demand. This long-term energy resource plan will assist the SFPUC in continuing to provide affordable, reliable electricity to our Hetch Hetchy Power customers in a constantly changing business and regulatory environment

Integrated resource planning is a process undertaken by a utility to determine future electricity resource needs necessary for meeting forecasted demand under various conditions, with an adequate reserve to provide for system reliability and integrity. Key steps include:

- Forecasting future electrical loads;
- Identifying potential electricity resource options to meet future load; and
- Determining an optimal resource plan within the framework of key parameters and metrics that meet Hetch Hetchy Power's goals, federal, state and local regulatory requirements, and the overall objectives of the Updated IRP planning process.

The conditions and circumstances in which utilities must make decisions about how to meet customers' future electric energy needs are ever-changing. Decisions are influenced by the utility's existing generation portfolio, the costs and availability of different resource alternatives, and by changes in regulations, commodity prices, technology advancements, and economic conditions at large.

Hetch Hetchy Power's 2018 IRP focused on several scenarios for investment and operation in the Hetch Hetchy hydroelectric system, examining the economic tradeoffs between making all necessary investment in the hydroelectric system to maintain generation levels and alternatives involving more selective investment. The 2018 IRP ultimately did not identify a preferred scenario but concluded that its results would be used as inputs to the SFPUC's broader organizational needs, taking into account the interaction between the SFPUC's water and power operations.

[1] The SFPUC also operates CleanPowerSF, San Francisco's Community Choice Aggregation program, and provides water and wastewater services.

[2] California Energy Commission Guidelines, Publicly Owned Utility Integrated Resource Plan Submission and Review Guidelines (CEC Guidelines), Revised Second Edition, October 2018, Ch. 2, Section E.2., pp. 5-6.

This IRP forecasts Hetch Hetchy Power's retail electric demand and hydroelectric generation through the 2045 planning horizon using several demand and generation scenarios. Based on this IRP's analysis, Hetch Hetchy Power will need additional energy supply to serve our retail sales demand starting in calendar year 2033, due to load growth and hydrological variability. Hetch Hetchy Power could acquire this new energy supply through short- or long-term energy market purchases, such as a new renewable energy power purchase agreement (PPA).

The IRP analyzes the addition of up to 150 megawatts (MW) of new renewable power supply to augment Hetch Hetchy Power's energy portfolio starting in calendar year 2033, supplemented with short-term renewable energy market purchases to cover demand in dry years. Adding new long-term renewable energy supplies to the portfolio would reduce Hetch Hetchy Power's energy market exposure risk while maintaining its compliance with state and local regulatory and policy requirements.

In addition to identifying a need to procure new supplies of renewable energy, this Updated IRP identifies the need to procure long-term sources of Local Resource Adequacy capacity from within a California Independent System Operator (CAISO) Local Reliability Area to support Hetch Hetchy Power's compliance with CAISO Reliability Requirements. Local Resource Adequacy requirements are expected to increase as Hetch Hetchy Power's retail sales grow over the planning horizon. This IRP recommends that Hetch Hetchy Power conduct additional analysis in 2024 to identify specific resource options for cost-effectively meeting its projected Local Resource Adequacy capacity obligations over the coming decade.

The SFPUC Commission approved this IRP at its November 28, 2023 meeting by Resolution 23-0214.[3]

2.0 Background

2.1 About the SFPUC

The SFPUC, a department of the City and County of San Francisco (the City), provides water and wastewater services to San Francisco, along with power to San Francisco's municipal departments and commercial and residential customers within the city. The SFPUC's Power Enterprise operates two electric utility services, Hetch Hetchy Power, San Francisco's locally owned public utility, and CleanPowerSF, San Francisco's community choice aggregation program.[4]

The Hetch Hetchy Water and Power System and the CleanPowerSF program are part of San Francisco's clean energy backbone. Today, Hetch Hetchy Power's energy portfolio has a zero greenhouse gas (GHG) emissions profile, it does not produce any harmful radioactive byproducts, or leave behind any waste.

The majority of the power generated by Hetch Hetchy Power comes from three hydroelectric facilities located in the Sierra Nevada Mountains. These three facilities are operated to meet SFPUC's water needs first, with power then generated from the system used to meet Hetch Hetchy Power's retail customer demand. Currently, Hetch Hetchy Power has approximately 381 MW of hydroelectric generation capacity and 8 MW of in-city solar for a system with a peak load of about 150 MW.

[3] See Attachment A (SFPUC Resolution 23-0214 [adopting the IRP].)

[4] This IRP is focused solely on Hetch Hetchy Power. The SFPUC prepares a separate IRP for CleanPowerSF, which is subject to different requirements and regulatory oversight from the California Public Utilities Commission.

The overall goal of Hetch Hetchy Power's IRP is to maintain highly reliable electric service for its customers at affordable costs, while taking into consideration environmental impacts and system risks to ensure that near-term decisions made are robust. Just as importantly, Hetch Hetchy Power wants to retain flexibility in its resource portfolio so that the utility is well positioned to respond to future regulations and technologies. In developing this IRP, Hetch Hetchy Power has undergone an analytical process to evaluate generation resource alternatives and to establish a resource procurement plan that satisfies the SFPUC's resource planning goals.

2.2 Hetch Hetchy Power

Hetch Hetchy Power's customer base primarily consists of City government agencies and tenants on City property (including the Port of San Francisco and San Francisco International Airport). Hetch Hetchy Power also serves some retail customers including those at the Treasure and Yerba Buena Islands, Candlestick/Hunters Point, and Mission Rock projects.

Hetch Hetchy Power receives its energy from three powerhouses located along the Hetch Hetchy system (Holm, Kirkwood, and Moccasin) with a combined capacity of 381 MW, 4 MW of small-scale hydroelectric generation at Moccasin Low-head, along with 8 MW of in-city solar. This system generates approximately 1,250,000 megawatt-hours (MWh)/year, assuming normal hydrologic conditions to serve approximately 930,000 MWh of retail sales (as of 2022). Surplus Hetch Hetchy Power generation is sold to CAISO wholesale energy markets, CleanPowerSF, and other qualifying third parties.

2.2.1 Hydroelectric System

The Hetch Hetchy Power System is composed of three gravity-driven hydroelectric powerhouses (Table 2-1):

- Moccasin Powerhouse and a nearby small in-line hydroelectric unit rely on water flowing downhill from the Hetch Hetchy Reservoir;
- Kirkwood Powerhouse, like Moccasin, is also supplied by water from the Hetch Hetchy Reservoir; and
- Holm Powerhouse relies on water flowing from Cherry Lake.

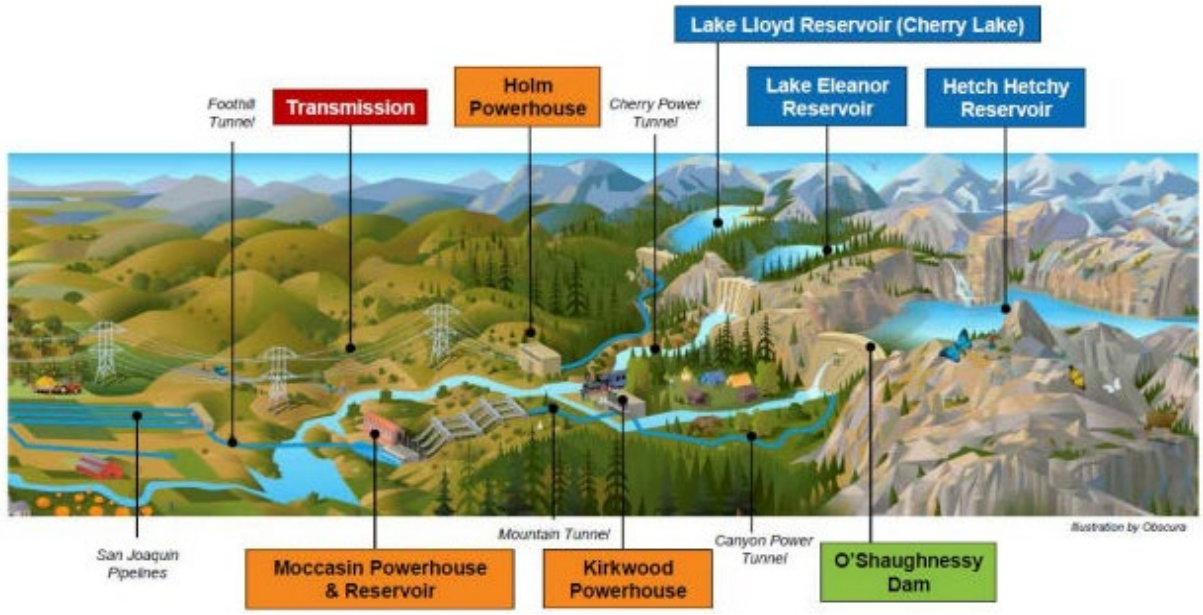
TABLE 2-1. SFPUC HYDRO GENERATION

HETCH HETCHY HYDRO		
Powerhouse	**Capacity**	**Units**
Holm PH	165 MW	2
Kirkwood PH	116 MW	3
Mocassin PH	100 MW	2

Figure 2-1 is an illustration of the Hetch Hetchy Water and Power System. This system is operated on a water first basis, with power produced principally as a byproduct of moving water through the system. The water is delivered through a gravity-based system and via aqueduct to the Bay Area. It can store as much as 117 billion gallons for the Hetch Hetchy Regional Water System.

The Hetch Hetchy Water and Power System comprises of three reservoirs, Hetch Hetchy, Lake Eleonor, and Cherry Lake. Water flows through to the Holm Powerhouse and Kirkwood Powerhouse and then to the Moccasin Powerhouse. From there, the water reaches the San Joaquin Pipelines, which deliver the water for local distribution to retail water customers in San Francisco and wholesale through 26 water agencies in Alameda, Santa Clara, and San Mateo counties. The System provides water to approximately 2.7 million customers.

FIGURE 2-1. HETCH HETCHY POWER SYSTEM



2.2.2 Solar Energy Generation Sources

In addition to the hydro generation, approximately 8 MW of in-city solar projects, including the Sunset Reservoir Solar project (5 MW), supports Hetch Hetchy Power electric service within the City.

2.3 Hetch Hetchy Power's IRP Process

Integrated resource planning is a process undertaken by a utility to determine future resource requirements necessary for meeting forecasted annual peak and energy demand, with an adequate reserve to provide for system reliability and integrity. This IRP is also used to assess and evaluate Hetch Hetchy Power's progress towards achieving its environmental and policy requirements and goals.

Through the evaluation of supply and demand alternatives, the IRP process can be used to develop strategies for procurement decisions. The best resource plans create a reasonable balance between fiscal responsibility and environmental stewardship, and present reasonable risks and associated costs to customers.

FIGURE 2-2. FIVE-STEP IRP DEVELOPMENT APPROACH

Following the process outlined on Figure 2-2, the Hetch Hetchy Power IRP was developed with a focus on energy supply sufficiency and environmental and economic performance. The IRP utilizes economic analysis to assess various scenarios and sensitivities to arrive at an economically optimal generation resource plan. Through the evaluation of supply and demand alternatives, the IRP has identified generation resource options that satisfy the core principles of system reliability, fiscal responsibility, and environmental stewardship while providing a reasonable degree of flexibility to respond to future economic, regulatory and technological changes.

3.0 Resource Procurement Plan

3.1 Planning Horizon

A fundamental purpose of the IRP is to identify how Hetch Hetchy Power will meet its 2030 GHG targets. The CEC Guidelines specify that the minimum planning horizon for a POU's IRP cover through at least 2030 and encourages but does not require POUs to address the post-2030 period.[5] The planning horizon for Hetch Hetchy Power's Updated IRP is 2024-2045 to support Hetch Hetchy Power's alignment with California's 100% zero-carbon goal.[6]

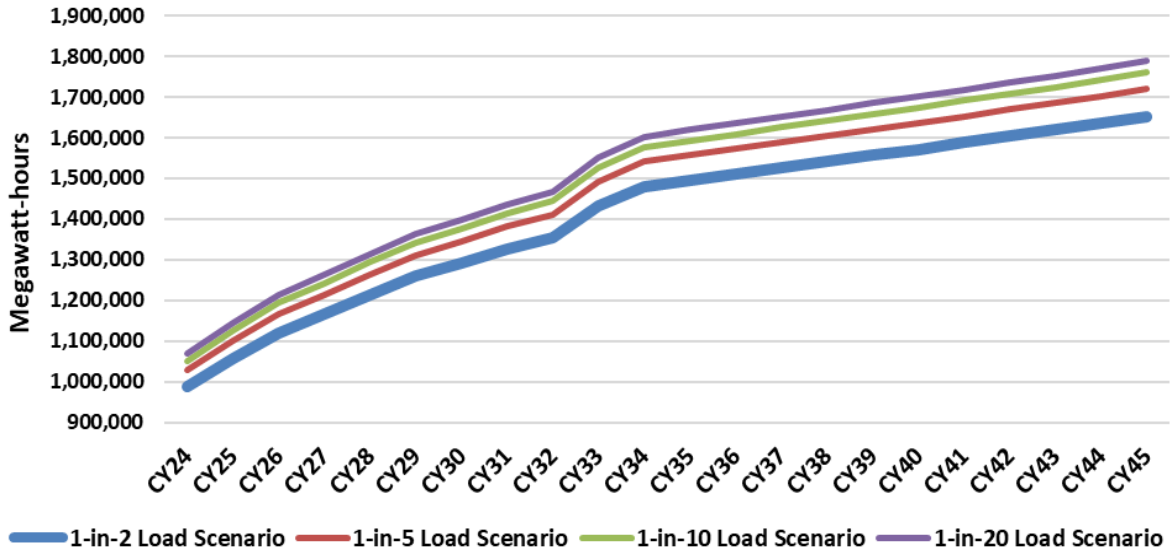
[5] CEC Guidelines, Ch. 2, Section A, p. 4.
[6] Public Utilities Code § 454.53(a).

3.2 Demand Forecast

This IRP utilizes Hetch Hetchy Power's long-term load forecast submitted to the CEC for its most recent Integrated Energy Policy Report (IEPR).[7] However, because the planning horizon for this IRP extends beyond the IEPR forecasting window (to 2034), the forecast assumes a modest 1% annual increase in load and customer count from 2035 to 2045. [8]

This IRP analyzes energy resource options for four system or distribution area load forecast scenarios. The Base Case load forecast is a 1-in-2 scenario that has a 50% chance of occurring. The other three scenarios forecast peak demand under high-temperature conditions. These scenarios, referred to as 1-in-5, 1-in-10, and 1-in-20, forecast peak demand under temperature conditions that have a 20, 10, and 5% chance of occurring, respectively. The annual energy for each of the load forecast scenarios are illustrated below in Figure 3-1.[9]

FIGURE 3-1. HETCH HETCHY LOAD FORECAST SCENARIOS, 2024-2045



Data for Figures provided in this report can be found in Hetch Hetchy Power Supporting Information.

As can be seen in Figure 3-1, Hetch Hetchy Power is forecasting significant growth in electric energy usage over the planning horizon, with the 1-in-2 Load Scenario growing by an average of 5% per year over the 2024-2034 period. The load forecast takes into consideration various factors including real estate development trends in our service territory and major load changes among key customers including the San Francisco International Airport (Airport), and the San Francisco Municipal Transportation Agency (SFMTA). Airport loads are expected to grow 3.6% annually over the planning horizon due to load growth from new terminals and associated facilities, and other projects from the

[7] Hetch Hetchy Power's (City and County of San Francisco) 2023 IEPR load forecast is available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=250844&DocumentContentId=85743 [accessed on March 19, 2024]

[8] Hetch Hetchy Power's (City and County of San Francisco) 2023 IEPR load forecast is available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=250844&DocumentContentId=85743 [accessed on March 19, 2024]

[9] The SFPUC concurently submits Supplemental Information which includes data for each Figure in the IRP.

Airport's Master Plan.[10] The SFMTA's growth is due to a combination of factors including the new Central Subway extension and compliance with the Innovative Clean Transit Rule, the California Air Resources Board (CARB) regulations that require public transit agencies to shift their bus fleets to either all electric or fuel cell zero emission buses.[11]

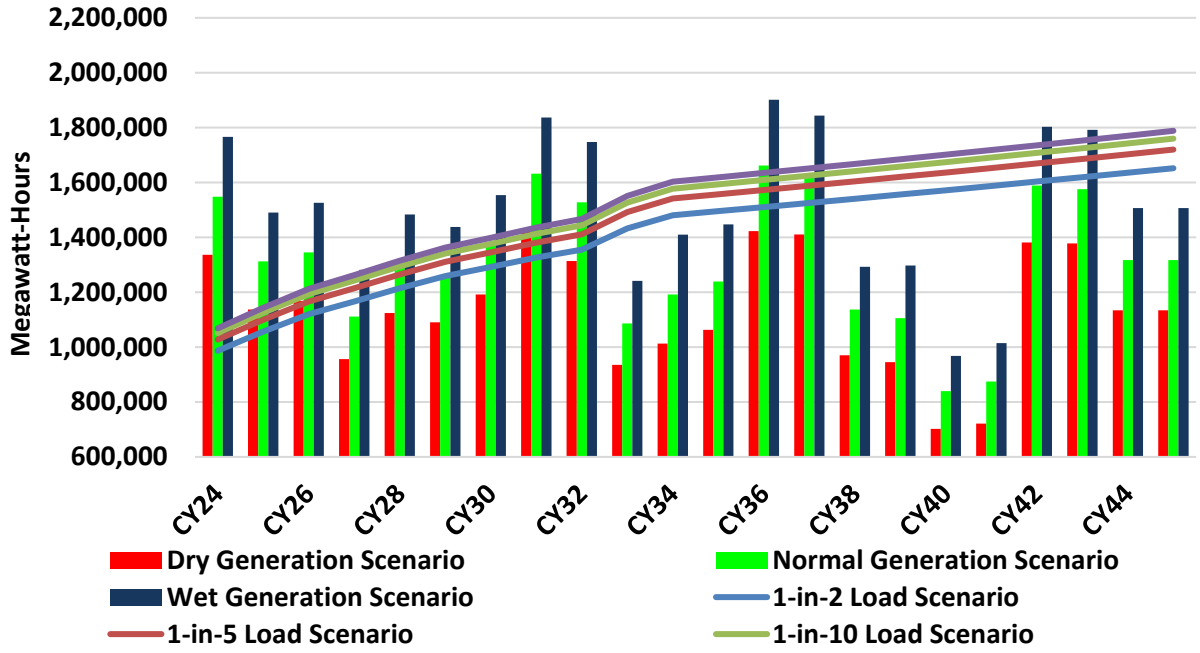
Hetch Hetchy Power's forecasted load growth also includes non-municipal electric load. This load growth is associated with large redevelopment projects and related demand in the southeastern area of San Francisco, as well as "infill" projects throughout the city, particularly new affordable housing projects. Current redevelopment area customers include Hunters Point, Treasure Island/Yerba Buena Island, Transbay Transit Center, Alice Griffith, Candlestick, Pier 70, Mission Rock, University of California San Francisco, and HOPE SF (Potrero and Sunnydale).

Due to the growth of residential units being built in San Francisco, and served by Hetch Hetchy Power, a modest residential customer growth factor of 4% per year was used. Due to uncertainty regarding redevelopment efforts beyond 2034, the load forecast in this IRP assumes a 1% annual increase in load and customer count for the 2034-2045 period.

3.3 Scenarios and Sensitivity Analysis

This IRP analyzed the four load forecast scenarios noted above and three hydroelectric generation scenarios, illustrated in Figure 3-2.

Figure 3-2. LOAD FORECAST AND HYDROELECTRIC GENERATION SCENARIOS



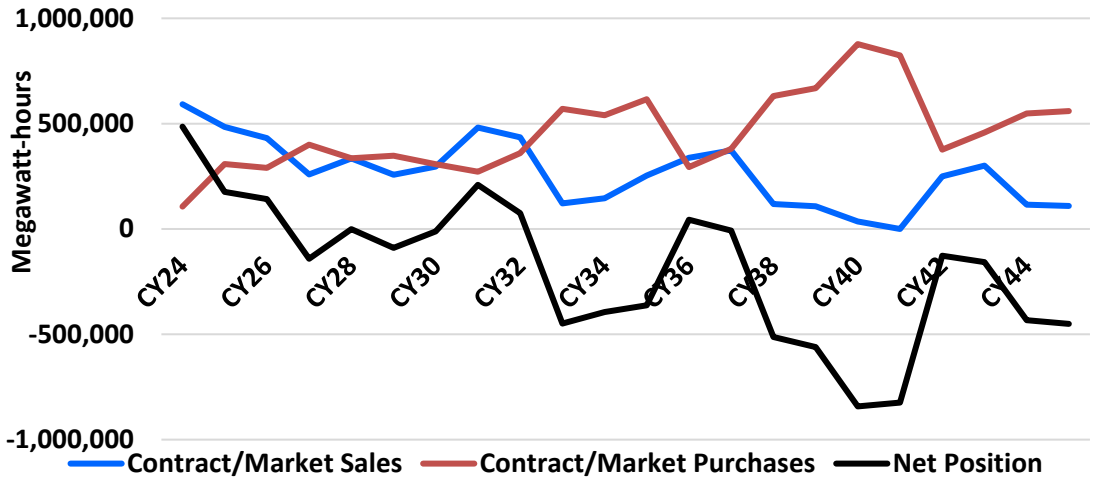
The IRP assumes the continued operation of all of Hetch Hetchy Power's hydroelectric generation through 2045. As these units currently constitute 99% or more of Hetch Hetchy Power's annual generation, Hetch Hetchy Power's in-city solar and biogas generation were not separately modeled, but are included in the Supporting Tables. The hydroelectric generation forecast includes three

[10] Airport Commission Resolution No. 23-0263, November 7, 2023.
[11] Innovative Clean Transit Regulations 13 C.C.R. §§ 2023-2023.11.

hydrologic scenarios: an "Average Normal", an "Average Wet", and an "Average Dry" scenario. These scenarios were developed using historical system performance over 20 years.

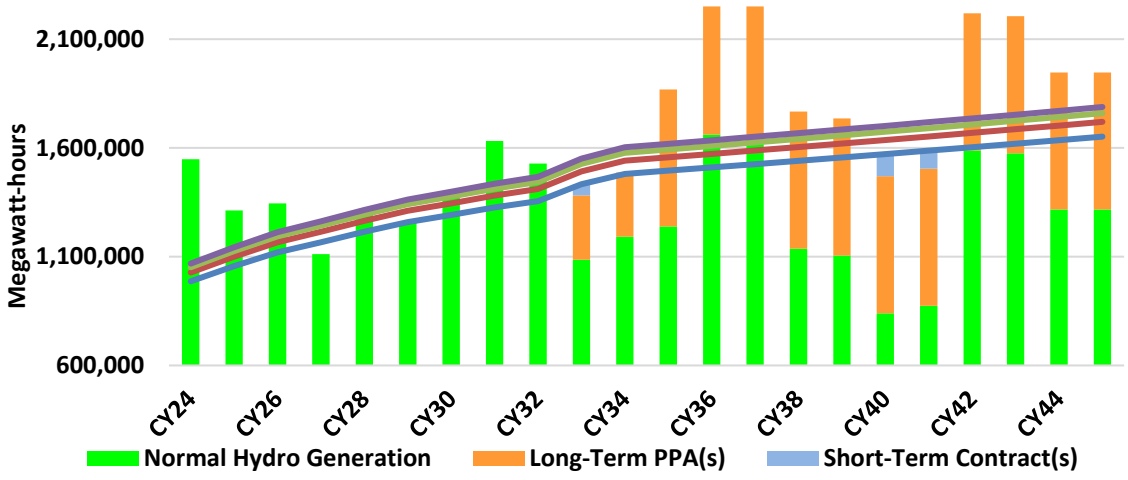
As can be seen in Figure 3-3, over the next several years Hetch Hetchy Power is forecasted to be long in generation and a net seller of power. Hetch Hetchy Power's generation is forecasted to be sufficient to meet the Base Case load forecast supplemented by short-term market purchases until 2033. As Hetch Hetchy Power's retail sales are forecasted to grow over the next decade, it will need to identify additional sources of energy to meet demand on a regular basis beginning in 2033.

FIGURE 3-3. MARKET SALES AND PURCHSAES UNDER BASE CASE LOAD FORECAST AND NORMAL HYDROELECTRIC GENERATION



To address this forecasted energy need, the IRP analyzed adding new renewable power supplies to augment the Hetch Hetchy Power energy portfolio on a long-term basis beginning in calendar year 2033. Our analysis assumed this renewable power supply would be procured principally through long-term PPAs supplemented with short-term renewable energy purchases to cover demand in dry years when the long-term PPA(s) and hydroelectric generation may be insufficient. This is illustrated in Figure 3-4.

FIGURE 3-4. ANNUAL SUPPLY AND DEMAND BALANCE, 2024-2045



The IRP's evaluation of Hetch Hetchy Power's energy portfolio examined different renewable energy resource types, including solar, onshore wind, offshore wind, and geothermal. Figure 3-5 below shows monthly generation profiles (percent of annual energy produced by month) for the renewable energy resources analyzed.

FIGURE 3-5. MONTHLY GENERATION PROFILE BY RENEWABLE RESOURCE

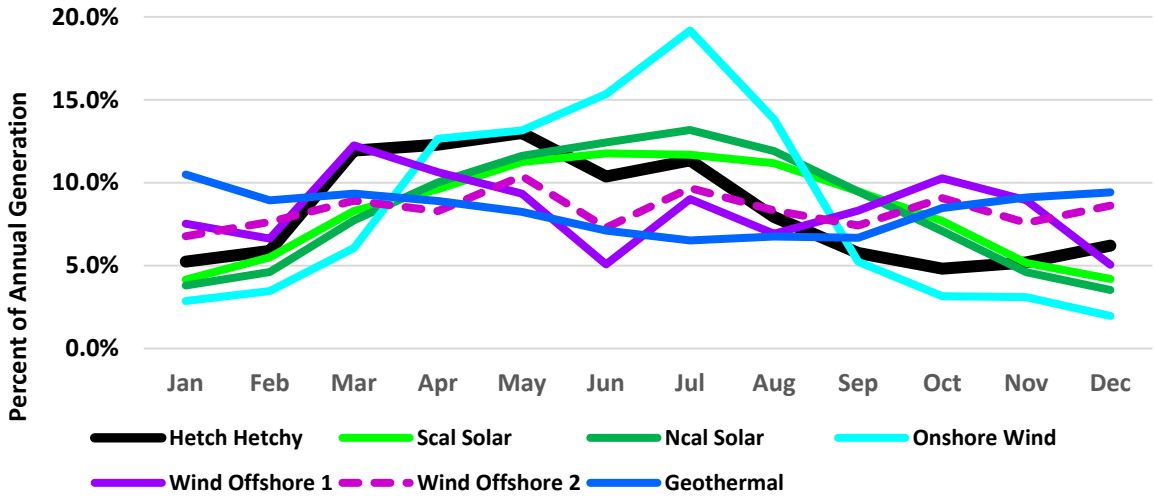


Figure 3-5 illustrates the seasonal variation in renewable generation resources. For example, the black line represents Hetch Hetchy hydroelectric generation, showing that more hydroelectric energy is produced during the months of February through July. The figure also shows that geothermal resources are steady through the year with fall and winter months being a bit more productive than spring and summer months. Solar resources produce significantly more energy during the summer months when days are longer. The figure also illustrates the different seasonal energy production characteristics of onshore and offshore wind, with onshore wind generating significantly more energy in the summer months than the winter months and offshore wind generating more consistently across the seasons.

FIGURE 3-6. RENEWABLE RESOURCE PROJECTED LEVELIZED COST OF ENERGY

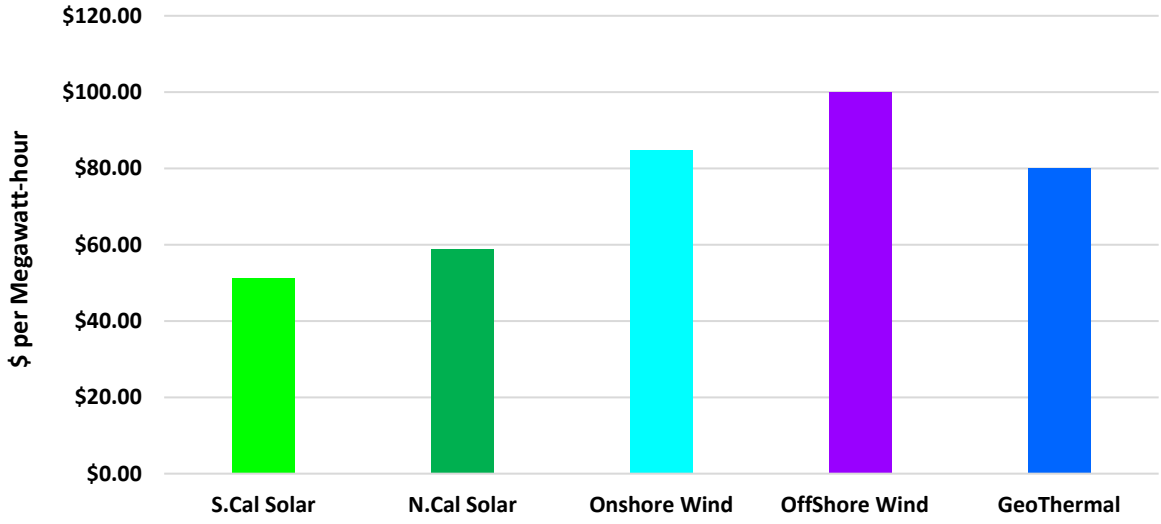


Figure 3.6 summarizes the indicative renewable resource cost of energy used in this analysis. These cost estimates are based on publicly available renewable energy project cost data.[12] As the figure illustrates, the cost of energy produced by different renewable energy resource types varies, driven by the capital intensity of the technology, operation and maintenance costs, and the expected energy productivity of the renewable resource, among other factors.

To address Hetch Hetchy Power's forecasted energy need, the IRP analysis examined a combination of new renewable resources that would support portfolio diversification while meeting Hetch Hetchy Power's projected load growth and environmental objectives. Specifically, the IRP analyzed four renewable resource scenarios, involving the addition of new renewable energy supplies to the Hetch Hetchy Power portfolio beginning in 2033. These are summarized in Table 3-1.

TABLE 3-1. HETCH HETCHY POWER NEW RENEWABLE RESOURCE SCENARIOS

Renewable Resources	Installed Capacity (MW)	Delivery Start Date	Scenarios ("X" = Resource Included)			
			A	B	C	D
So. California Solar	100	1/1/2033	X			X
Nor. California Solar	100	1/1/2033		X	X	
Onshore Wind	25	1/1/2035		X		
Offshore Wind 1 (Morro Bay)	25	1/1/2035			X	
Offshore Wind 2 (Humboldt)	25	1/1/2035	X			
Geothermal	25-50	1/1/2035	X	X	X	X

The combination of resources in each scenario is intended to deliver approximately 425-700 gigawatt-hours per year in additional energy supply from renewable energy resources that have complimentary seasonal production characteristics. Scenarios A, B, and C include 25 MW of geothermal combined with different combinations of solar and wind while Scenario D includes 50 MW of geothermal and 100 MW of solar. All of the technologies modeled, with the exception of offshore wind, are commercially available in California today. The scenarios anticipate that offshore wind will become commercially available in California in the coming decade.

Using calendar year 2035 as an example, the IRP modeled the monthly energy balance in the Hetch Hetchy Power portfolio using the Base Case load forecast, normal hydroelectric generation, and each of the renewable resource scenarios noted above.

[12] Lazard's Levelized Cost of Energy Analysis – Version 16.0, Renewable resource Levelized Cost of Energy (LCOE) are nominal $/MWh and based on Lazard's LCOE+ 2023 Report, available at: https://www.lazard.com/media/2ozoovyg/lazards-lcoeplus-april-2023.pdf [accessed on March 19, 2024]. The LCOEs used here are on the high end of Lazard's subsidized cost range for each technology type.

FIGURE 3-7. ENERGY PORTFORLIO IN 2035 WITHOUT NEW RENEWABLE RESOURCES

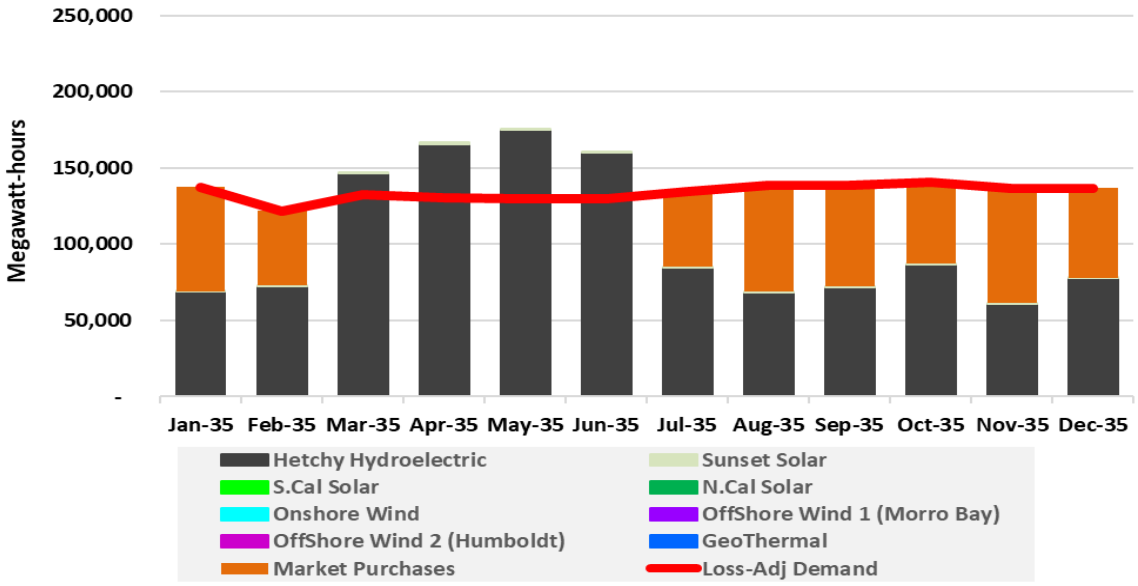
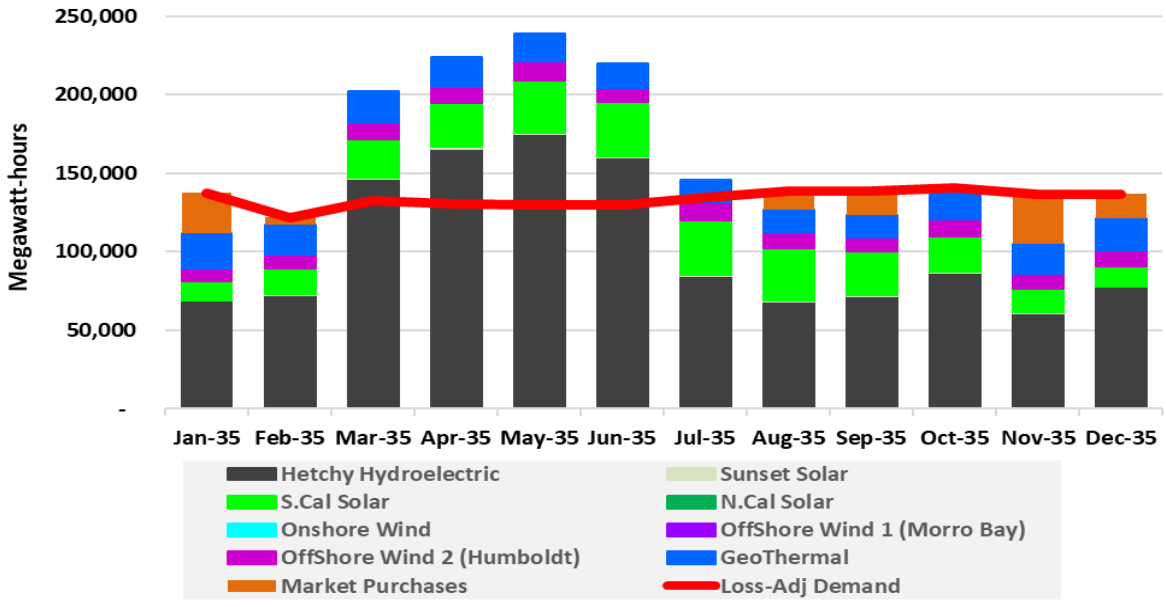


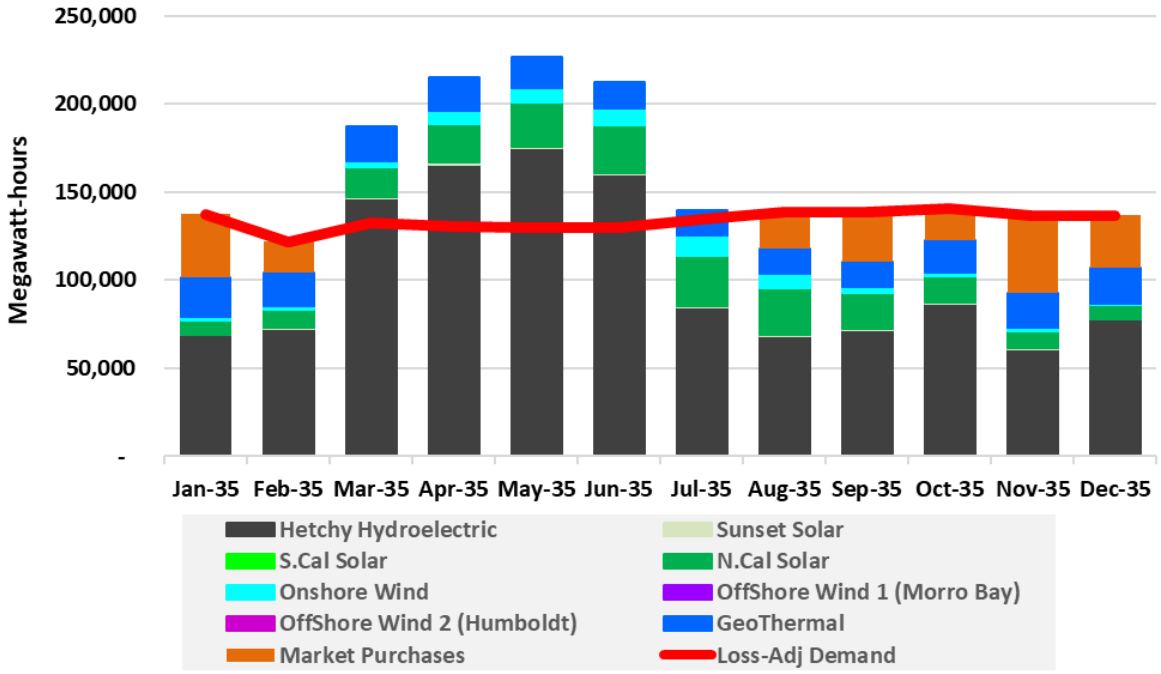
Figure 3-7 above shows the forecasted Hetch Hetchy Power portfolio before adding new renewable resources. The forecasted Hetch Hetchy generation (represented by the black bars) is representative of a "normal" generation year, with about 1,250,000 MWh of energy produced. Hetch Hetchy Power's line loss-adjusted retail sales in 2035 is forecasted to be approximately 1,600,000 MWh, or about 360,000 MWh more than the forecasted portfolio supply. The area of the bars below the red line (loss-adjusted monthly demand) is used to serve retail customer demand while the area above the redline represents excess energy that may be sold to a third party or into the CAISO energy market. The orange bar segments represent energy that must be purchased in the market to serve customer retail sales (i.e., an open position in the energy portfolio).

FIGURE 3-8. ENERGY PORTFORLIO IN 2035, RENEWABLE RESOURCE SCENARIO A



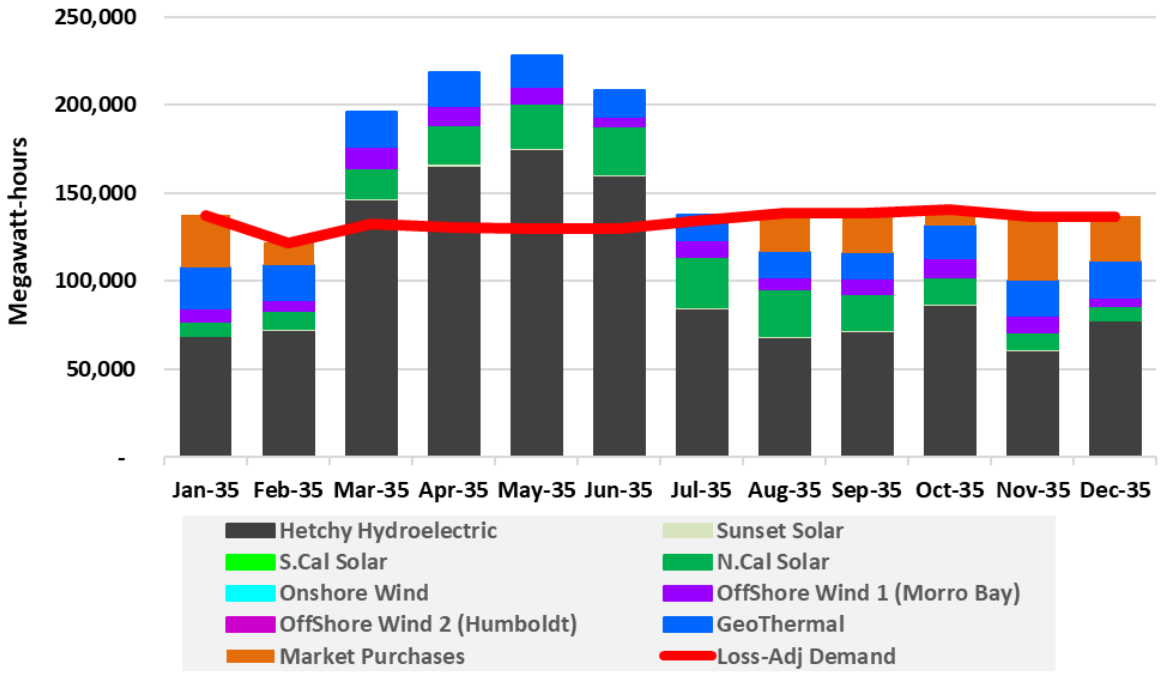
The results of Scenario A are presented in Figure 3-8 above for calendar year 2035. The addition of 100 MW of Southern California Solar, 25 MW of Offshore Wind (Humboldt) and 25 MW of Geothermal would generate approximately 630,000 MWh per year and would help close much of Hetch Hetchy Power's open energy position (assuming normal hydroelectric generation) in the summer, fall, and winter months. In total, the Hetch Hetchy Power portfolio under Scenario A is projected to generate approximately 1,870,000 MWh to supply 1,600,000 MWh of line loss-adjusted demand in 2035. The portfolio is forecast to have an open position in some months (principally January, August, September, November, and December), which could be met through short-term market purchases. The portfolio would also have excess generation in the spring months that could be sold into the wholesale electricity market to help offset the cost of these purchases.

FIGURE 3-9. ENERGY PORTFORLIO IN 2035, RENEWABLE RESOURCE SCENARIO B



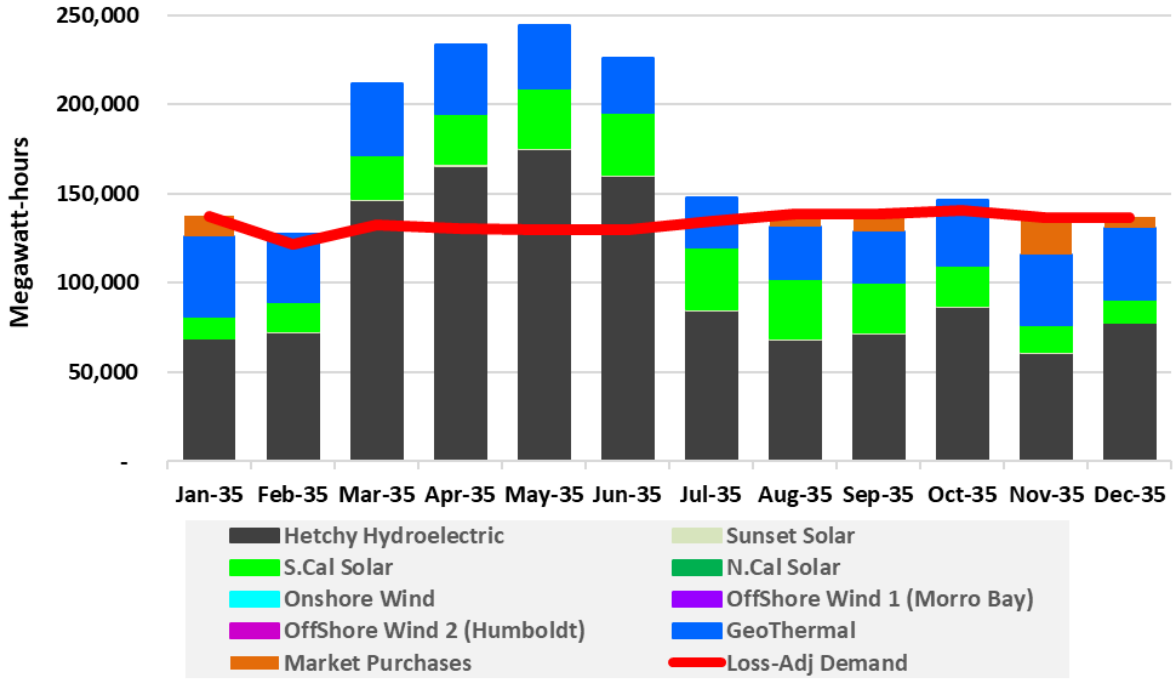
The results of Scenario B are presented in Figure 3-9. The addition of 100 MW of Northern California Solar, 25 MW of Onshore Wind, and 25 MW of Geothermal would generate approximately 493,000 MWh per year and would reduce Hetch Hetchy Power's open energy position (assuming normal hydroelectric generation) in the summer, fall, and winter months, but only close the open position in July. Scenario B generates less energy than Scenario A due to the lower productivity of solar in northern versus southern California and onshore versus offshore wind. In total, Scenario B is projected to generate approximately 1,730,000 MWh to supply 1,600,000 MWh of line loss-adjusted demand in 2035. Figure 3-9 shows that the portfolio is forecast to continue have an open position in most months, although it is greatly reduced. Like the other scenarios, some or all of this remaining open position could be met through short-term market purchases. The portfolio would also have excess generation in the spring months that could be sold into the wholesale electricity market to help offset the cost of these purchases.

FIGURE 3-10. ENERGY PORTFORLIO IN 2035, RENEWABLE RESOURCE SCENARIO C



The results of Scenario C are presented in Figure 3-10. The addition of 100 MW of Northern California Solar, 25 MW of Offshore Wind located in Morro Bay, and 25 MW of Geothermal would generate approximately 535,000 MWh per year and would reduce Hetch Hetchy Power's open energy position (assuming normal hydroelectric generation) in the summer, fall, and winter months, but only close the open position from March - July. Scenario B generates less energy than Scenario A due to the lower productivity of solar in northern versus southern California, but more than Scenario B due to the higher productivity of offshore versus onshore wind. In total, Scenario C is projected to generate approximately 1,773,000 MWh to supply 1,600,000 MWh of line loss-adjusted demand in 2035. Figure 3-10 shows that the portfolio is forecast to continue have an open position in most months, although it is greatly reduced, especially for October and February. Like Scenario A, some or all of this remaining open position could be met through short-term market purchases. The portfolio would also have excess generation in the spring months that could be sold into the wholesale electricity market to help offset the cost of these purchases.

FIGURE 3-11. ENERGY PORTFORLIO IN 2035, RENEWABLE RESOURCE SCENARIO D



The results of Scenario D are presented in Figure 3-11. The addition of 100 MW of Southern California Solar and 50 MW of Geothermal would generate approximately 725,000 MWh per year and would greatly reduce Hetch Hetchy Power's open energy position (assuming normal hydroelectric generation) in all months, with only small open positions projected to remain in September, November, and January. Scenario D generates the most energy of the scenarios analyzed due to the higher productivity of Southern California Solar and Geothermal resources for each megawatt of capacity installed. In total, Scenario D would be projected to generate approximately 1,964,000 MWh to supply 1,600,000 MWh of line loss-adjusted demand in 2035. Figure 3-11 shows that the consistent productivity of the Geothermal resource across the months makes the most significant contribution to Hetch Hetchy Power's forecasted energy requirements. Like the other scenarios, the relatively small remaining open position in Scenario D could be met through short-term market purchases. The steadier generating characteristics of geothermal coupled with its higher overall energy productivity means that Scenario D would also generate the most excess energy in a normal hydroelectric year. Also like the other scenarios, that excess energy could be sold into the wholesale electricity market to help offset the cost of the purchases.

A summary of key results for each of the new renewable resource scenarios compared to a "Do Nothing" scenario in 2035 are presented in Table 3-2 below. The table identifies the amount of annual energy that would be generated by each of the 150 MW renewable resource scenarios analyzed. The results show that for the projected loss-adjusted demand, each of the new renewable resource scenarios would reduce Hetch Hetchy Power's short-term market purchases compared to the "Do Nothing" scenario. It also shows that each of the new renewable resource scenarios would increase short-term market sales, relative to the "Do Nothing" scenario.

TABLE 3-2. SUMMARY OF NEW RENEWABLE RESOURCE SCENARIO RESULTS FOR 2035

Scenario	Line-Loss Adjusted Demand (MWh)	New Renewable Energy Procured (MWh/year)	Short-term Market Purchases (MWh)	Short-term Market Sales (MWh)	Portfolio Net Market Cost ($Million)
Do Nothing	1,607,346	-	490,135	127,576	45.3
A		630,874	105,737	374,052	40.5
B		492,679	194,248	324,367	42.7
C		534,803	159,677	331,921	44.0
D		725,339	55,124	417,904	37.6

The resulting Portfolio Net Market Cost column represents the net cost of spot market energy purchases and sales to serve the Hetch Hetchy Power energy portfolio with the assumed energy resources. Each of the scenarios include modelled Hetch Hetchy hydroelectric generation, which for 2035 was forecasted to generate 1,238,815 MWh. In the "Do Nothing" scenario, the Hetch Hetchy Power portfolio would incur approximately $45.3 million in net costs to serve customer energy demand (includes both spot market purchases and sales of excess Hetch Hetchy generation). By comparison, each of the new renewable energy scenarios are projected to reduce the portfolio net cost, with Scenarios D and A reducing costs the most. This is the result of forecasted new renewable energy costs being comparable to, or less costly than the spot market, and reducing Hetch Hetchy Power's open position for energy during the late summer, fall, and winter months, when forecasted spot power prices are high.

3.4 RPS Planning Requirements

California's Renewable Portfolio Standard (RPS) program requires POUs to supply 60% of their annual retail sales with RPS-eligible renewable resources by December 31, 2030 and sets interim targets of 44% by December 31, 2024 and 52% by December 31, 2027.[13] Hetch Hetchy Power also owns the resources that meet more than 65% of our RPS procurement requirements through 2030, satisfying the requirements of Public Utilities Code (PUC) Section 399.13(b)(1). The alternative RPS procurement requirements of PUC Section 399.30(j) applies to Hetch Hetchy Power because we receive more than 67% of our electricity supply from qualifying Hetch Hetchy generation, which is in-state, locally owned hydroelectric generation that does not meet the requirements of Public Resources Code Section 25741.[14] PUC Section 399.30(j) requires Hetch Hetchy Power to meet our demand with generation from either Hetch Hetchy system or with RPS-eligible supplies.[15]

[13] Public Utilities Code § 399.30(c)(2).

[14] "Qualifying hydroelectric generation" includes all of the generation from the Holm, Kirkwood, and Moccasin Powerhouses except the Moccasin low-head (LH) generating unit which is RPS-eligible under Public Resources Code Section 25741. The calculation of Hetch Hetchy Power receiving 67% of its electric supply from its qualifying hydroelectric generation is determined at the start of each multi-year compliance period set by the CEC based on the average of the previous twenty years of Hetch Hetchy qualifying hydro generation, once eligibility is established, it remains in effect until the start of the subsequent compliance period when Hetch Hetchy Power must re-qualify. Hetch Hetchy Power anticipates qualifying through 2030.

[15] Portfolio Content Category 1 (PCC 1) is renewable energy that is procured at the same time as the REC (hence bundled) from an in-state California resource or resource that can directly deliver the renewable energy to California.

Since SFPUC adopted Hetch Hetchy Power's RPS Procurement Plan through Resolution 12-0217 in 2012, Hetch Hetchy Power has met the SFPUC's requirement of supplying 100% of its annual retail sales with either qualifying hydroelectric or RPS-eligible generation.[16] The SFPUC remains committed to continuing to supply 100% of Hetch Hetchy Power's retail sales with either qualifying hydroelectric or RPS-eligible generation, and this IRP provides a roadmap to do so over its 2024-2045 planning horizon.

TABLE 3-2. HETCH HETCHY POWER RPS PROCUREMENT OUTLOOK (SELECTED YEARS, MWh)

	2025	2030	2035	2040	2045
Retail Sales Forecast	1,059,016	1,294,326	1,497,485	1,573,767	1,653,939
Total Existing Generation					
Hydroelectric Generation[17]	892,109	934,348	842,394	571,197	895,566
RPS-eligible Generation	428,545	447,966	404,679	277,041	429,670
Total Generation	1,320,654	1,382,314	1,247,073	848,238	1,325,236
Net Results (Retail Sales – Total Generation)	261,638	87,988	(250,412)	(725,529)	(328,703)
RPS-eligible Generation Target	-	-	(250,412)	(725,529)	(328,703)

Table 3-2 summarizes Hetch Hetchy Power's RPS procurement needs for selected years over the IRP's planning horizon. Hetch Hetchy will exceed the mandated RPS requirements for the three remaining compliance periods in this decade.[18] Although hydroelectric generation forecasts are uncertain, the IRP shows that additional RPS-eligible renewable procurement will be required to maintain Hetch Hetchy Power's RPS compliance requirements, especially in years with below normal hydroelectric generation (like 2040 in the forecast presented above). Each of the new renewable resource scenarios modeled in this Updated IRP would ensure that Hetch Hetchy Power meets its RPS compliance obligations in all years of the planning horizon for this IRP with the exception of 2040 and 2041, when low modelled hydroelectric generation would require some supplemental short-term renewable energy purchases.

3.5 Energy Efficiency and Demand Response

Hetch Hetchy Power has an annual budget of approximately $2 million for the development of distributed energy resources projects at locations throughout San Francisco including implementation of energy efficiency, rooftop solar, battery storage, and electrification projects.

3.5.1 Commercial, Industrial, and Agricultural Energy Efficiency Programs

Hetch Hetchy Power's energy efficiency programs are generally tailored to each customer (almost all of which are other City departments), because most of these customers are large and have varied property characteristics. These programs include:

[16] The RPS Plan is included as Attachment B. Hetch Hetchy Power plans to prepare an updated RPS Procurement Plan in 2024/25.

[17] Hydroelectric Generation includes generation from the Holm and Moccasin Powerhouses. Generation from the Kirkwood Powerhouse is reported in the RPS-eligible generation line.

[18] January 1, 2021, to December 31, 2024, inclusive; January 1, 2025, to December 31, 2027, inclusive; January 1, 2028, to December 31, 2030, inclusive; Public Utilities Code § 399.30(b)(4-6).

- General Fund Program: This program provides complete retrofit services and customized incentives to targeted municipal customers. The program focuses on City agencies that are funded primarily through local tax receipts, fees, and federal/state-funded programs. These customers are considered hard-to-reach (due to limited access to capital and engineering, as well as insufficient price signals).
- Civic Center Sustainability District: Through a partnership with the Clinton Global Initiative, this program demonstrates green, renewable, and energy efficient technologies as a national model for sustainability in historic districts. For energy efficiency projects, the program provides free energy audits, design, construction management, construction services, and full funding to buildings in the City's Civic Center historic district.
- Energy Benchmarking Program: San Francisco requires owners of non-residential buildings over 10,000 square feet to annually benchmark and disclose the energy performance of their buildings.[19] In Fiscal Year 2021-2022, Power Enterprise released its tenth annual report benchmarking the energy performance of San Francisco's municipal buildings.
- Upgrade for Savings: Hetch Hetchy Power offers customized cash incentives and technical support to help customers make significant upgrades to energy-efficient equipment, systems, and operational practices.
- Blueprint for Savings: This new construction energy efficiency program offers design assistance and cash payments to building owners and design teams planning to construct highly energy efficient buildings 50,000 square feet or larger.

3.5.2 Residential Energy Efficiency Programs

Hetch Hetchy Power primarily serves municipal loads. Hetch Hetchy Power provides distribution service to the former military installations at Treasure Island and Hunters Point, both of which are in the process of being redeveloped into residential/commercial uses. Additional energy efficiency activities for this new residential use are limited as these new units are being built to the latest code and energy efficiency standards. New programs are under development to serve these customers.
Since the inception of these programs, they have resulted in energy efficiency savings of over 50,000 MWh of electricity (about 5% of current retail sales) and 2 million therms of natural gas use each year. In addition to these efficiency savings, Hetch Hetchy Power has installed approximately 3.2 MW of roof-top solar at customer sites. The energy savings and peak load reduction associated with existing programs and completed measures are reflected in Hetch Hetchy Power's load forecast. Energy efficiency savings reflected in Hetch Hetchy Power's load forecast is consistent with estimates of achievable energy efficiency developed in Hetch Hetchy Power's report to the CEC required under Public Utilities Code section 9505(b).

Hetch Hetchy Power is not currently offering a demand response program, but may consider such programs in the future.[20]

3.6 Transportation Electrification

The IRP's load forecast accounts for anticipated growth in Hetch Hetchy Power's demand due to transportation electrification from both public and private customers.

Hetch Hetchy Power provides 100% renewable and GHG-free electric energy to SFMTA. The SFMTA operates the nation's largest fleet of electric public transit including approximately 278 electric trolley buses, 200 light-rail vehicles, and 40 cable cars. SFMTA's electric transportation related

[19] Environment Code § 2002: Energy Performance Evaluation and Reporting Required.
[20] CEC Guidelines, Ch.2, Section F, 3.c., p. 9.

energy usage is approximately 65,000 MWh/year.[21] SFMTA aims to transform six bus yards and fleets to accommodate a 100% battery-electric bus operation by 2040.

SFMTA is also leading "The Building Progress Program," which is a $2+ billion multi-year capital program, including planning, maintenance campaigns, and major modernization projects, to modernize and rebuild transportation facilities owned and operated by the SFMTA. In 2018, the SFMTA Board of Directors approved a resolution committing to transitioning to an all-electric bus fleet.[22] In 2021, and pursuant to the City's Climate Action Plan and CARB's Innovative Clean Transit regulation (ICT), the SFMTA Board of Directors adopted the Zero Emission Bus Rollout Plan to achieve 100% zero emission fleet by 2040.[23] The Building Progress Program's core goals are to (1) modernize SFMTA facilities in order to meet the needs of everyone who travels in San Francisco, (2) improve the transportation system's resiliency to climate change and seismic events, and (3) make SFMTA a better neighbor in the parts of the city that currently host SFMTA facilities.[24]

In June 2023, the SFMTA was awarded a Federal Transit Administration Bus and Bus Facilities grant for Battery Electric Bus (BEB) chargers to be designed and installed at the Woods Bus Facility (12 BEB chargers) and the Islais Creek Bus Facility (six BEB chargers). The project will improve service reliability, state of good repair, and air quality for residents living in and around San Francisco and is a critical step in advancing San Francisco's Zero Emission Bus Rollout Plan.

Hetch Hetchy Power also provides electric energy for several other CARB classified transportation uses, including on-shore power for some ships docked at the Port of San Francisco that would otherwise be powered by the ship's diesel generators.[25] On-shore power has been a growing demand for Hetch Hetchy Power and that anticipated growth has been incorporated into the IRP's load forecast.

Hetch Hetchy Power also offers financial and technical incentives to customers to pursue electrification. EV Charge SF helps developers in San Francisco comply with the City's EV Readiness Ordinance, which requires a specific percentage of parking spaces in new buildings and existing buildings with major alterations be "turnkey" ready for EV charger installation. Under EV Charge SF, Hetch Hetchy Power provides developers financial incentives for installing certain EV charging equipment and adding charging outlets and conduit, in addition to optional planning tools and technical assistance.[26] In addition, Hetch Hetchy Power is in the process of offering additional electric mobility incentive programs targeted at disadvantaged communities, which will be announced in 2024.

In Hetch Hetchy Power's recent rates study and adoption, a standalone EV charging rate was created for residential or commercial customers who want to have a dedicated meter for their EV charging. At the time of the rate study, no customers were eligible for this rate, but Hetch Hetchy Power will

[21] Hetch Hetchy Power is exploring the use of a green tariff offering for transportation-related energy usage.
[22] Resolution No. 210316-038, March 16, 2021
[23] Resolution No. 210316-038, March 16. 2021
[24] Battery-Electric Bus Program, see https://www.sfmta.com/projects/battery-electric-bus-program [accessed on March 19, 2024]; Zero-Emission Bus Rollout Plan https://www.sfmta.com/sites/default/files/reports-anddocuments/2022/07/sfmta_rollout_plan_final_2022.pdf [accessed on March 19, 2024]
[25] CARB Low Carbon Fuel Standard (LCFS).
[26] For more information about the EV Charge SF program, see: https://sfpuc.org/programs/clean-energy/ev-charge-sf [accessed on March 19, 2024]

gather and analyze the data as customers become eligible over the coming years. Hetch Hetchy Power customers may find more information on our clean power services, EV rates, and electrification programs at our SFPUC.org website.[27]

Hetch Hetchy Power adopted electrical rates to support the electric vehicle grid integration strategies it established. Hetch Hetchy Power splits its existing tiered residential rate to a gas-and-electric and an all-electric rate schedule. The all-electric schedule has wider/larger tiers and customers with EVs should be able to charge more cost effectively than before. "Hetch Hetchy Power Premium" surcharge allows customers to opt-in for energy that meets the requirements for the State's Low Carbon Fuel Standard program. In this way, Hetch Hetchy Power ensures that its customers can access this incentive, which can help offset their costs from installing and operating all-electric transportation.

3.7 Energy Storage

Public Utilities Code, Chapter 7.7 (commencing with Public Utilities Code Section 2835), enacted as Assembly Bill (AB) 2514, required California's retail power providers to evaluate the potential to procure viable and cost-effective energy storage systems.[28] In response to AB 2514, the SFPUC determined in Resolution No. 14-0147 that it had no near-term need for energy storage services apart from the potential use of energy storage to fulfill Local Resource Adequacy Capacity requirements, which was not cost-effective in 2014.[29] The SFPUC also decided to continue to evaluate energy storage as a utility-scale procurement option going forward and to identify pilot energy storage projects.

Since the SFPUC's adoption of Resolution No. 14-0147, Hetch Hetchy Power has begun developing small-scale energy storage demonstration projects in San Francisco for local energy supply resiliency efforts and to maximize use of on-site solar energy production. Hetch Hetchy Power now has one active solar plus battery system installed and operational. A second project is going into construction in early 2024 and a third project in the design phase.

The cost effectiveness of utility-scale energy storage has been bolstered by recent trends in California's power markets, including significant increases Resource Adequacy capacity prices and the increasing price volatility in CAISO energy markets. [30] Increasing occurrences of overgeneration and congestion on the transmission system in the CAISO has resulted in increased curtailment of as-available renewable resources. Figure 3-12 below illustrates recent trends in wind and solar resource curtailment in the CAISO, showing that the amount of curtailment of wind and solar resources in the CAISO has significantly increased each year, from 187,000 MWh in 2015 to 1,432,660 MWh in 2022. Through April 30, 2023, the total curtailment of solar and wind year was already 1,566,228 MWh, with over 672,000 MWh of curtailment of solar alone in April 2023.

---

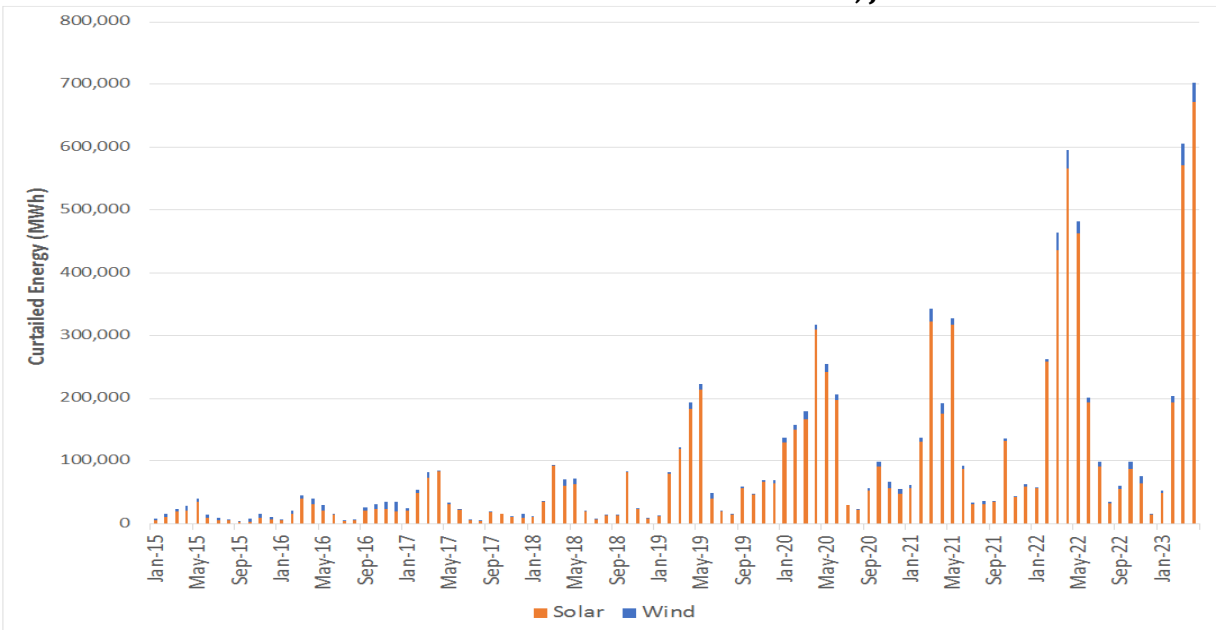
[27] For more information on our services and programs, see https://sfpuc.org/programs/clean-energy/we-give-100; For more information on Hetch Hetchy Power rates, see: https://sfpuc.org/accounts-services/water-power-sewer-rates/rates [accessed on March 19, 2024]

[28] Public Utilities Code § 2835 *et seq.*

[29] Resolution No. 14-0147, September 23, 2014

[30] Resource Adequacy capacity resources that garnered $3.63 kW-month in 2019 have risen to prices as high as the mid-$40 kW-month for summer 2023; See CalCCA's report on California's Constrained Resource Adequacy Market: Ratepayers Left Standing in a Game of Musical Chairs, see https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwij-63jo4GFAxW5FjQIHbULDj0QFnoECBsQAQ&url=https%3A%2F%2Fcal-cca.org%2Fwp-content%2Fuploads%2F2023%2F07%2FCalCCA-Stack-Analysis-2023-2026-updated-6_23_23.pdf&usg=AOvVaw35_zm0ursUfdy6_MFVI7-A&opi=89978449 [accessed on March 19, 2024]

FIGURE 3-12. WIND AND SOLAR CURTAILMENT BY MONTH, JAN 2015 – APRIL 2023



Source: CAISO energy production and curtailment data (May 2023)

Overgeneration and increased occurrences of negative pricing in the CAISO energy market has also required changes to the operations of Hetch Hetchy hydroelectric generation in recent years especially during the months of March, April, and May, which coincide with spring runoff and increasing solar generation on the CAISO system. Utility scale energy storage could increase utilization of Hetch Hetchy hydroelectric generation during these periods, allowing energy that might be generated into a negative price (increasing Hetch Hetchy Power's costs) or otherwise reduced or not generated at all to be generated and stored and then discharged during more valuable hours of the day.

Ultimately, the value of energy storage to Hetch Hetchy Power will vary depending on a number of factors including the location of the storage asset and its operating characteristics. As discussed further below, energy storage installed in certain locations could also support Hetch Hetchy Power's compliance with CAISO reliability requirements. Although this IRP does not recommend a procurement target for energy storage at this time, Hetch Hetchy Power plans to engage project developers and conduct further analysis of energy storage opportunities and cost-effectiveness in 2024 and will include the results of this analysis in subsequent updates to its IRP.

4.0 System and Local Reliability

Resource Adequacy (RA) plays an important role in the California electricity market to ensure the reliability of the grid. The RA program is designed to meet reliability requirements by requiring load-serving entities, including POUs, to procure sufficient RA capacity resources to meet their forecasted peak demand plus a reserve margin or a buffer to cover extraordinary levels of demand or power plant or transmission outages that may reduce available generation at certain times.

Hetch Hetchy Power currently possesses more generation than it has demand. Currently, Hetch Hetchy Power has 380 MW of nameplate hydroelectric generation capacity for a system with a peak load of approximately 150 MW. However, as detailed above, Hetch Hetchy Power is forecasting its

customer demand to increase over the planning horizon, which will require additional generation capacity to continue to meet its peak demand plus a 15% planning reserve margin. [31]

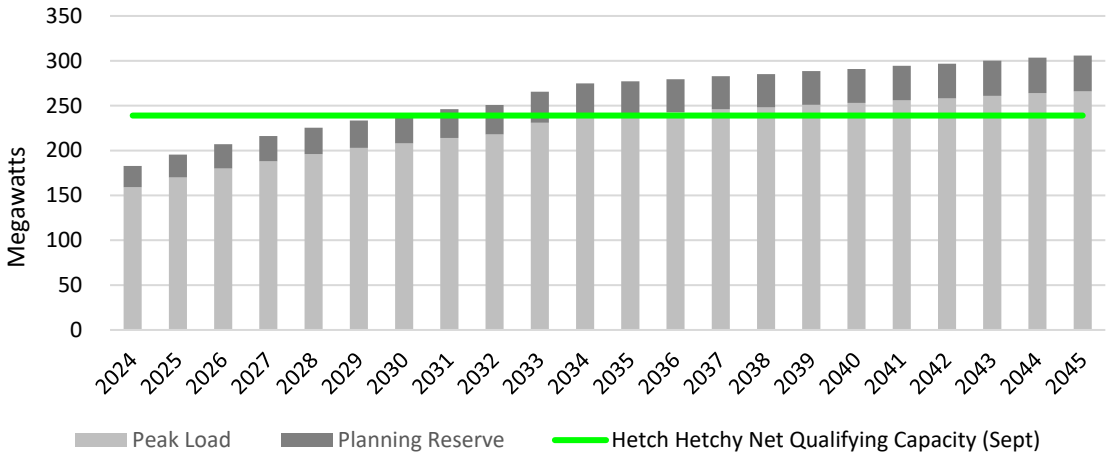
The RA program currently features three capacity requirement types: "System", "Local," and "Flexible" RA capacity. Each of these is addressed below.

4.1 System Resource Adequacy

Overall, Hetch Hetchy Power is required to meet a System RA requirement of 15% above its forecasted monthly peak demand.[32] The System RA requirement ensures that Hetch Hetchy Power and the California electric system has sufficient electric generating capacity to serve peak demand.

As a participant in the CAISO electricity market, Hetch Hetchy Power can provide System RA from resources located anywhere on the electric system as long as it can meet CAISO deliverability requirements to serve the monthly peak load. Hetch Hetchy Power currently has some excess System RA capacity relative to its 2023 maximum monthly RA capacity obligation of approximately 176 MW (153 MW peak demand + 15% reserve margin). [33] As can be seen in Figure 4-1 below, this excess capacity can accommodate the forecasted increase in Hetch Hetchy Power retail customer demand over the next several years.

FIGURE 4-1. HETCH HETCHY POWER'S FORECASTED ANNUAL RA REQUIREMENT AND EXISTING NET QUALIFYING CAPACITY, 2024-2045



[31] As noted in Section 3.2 above, this IRP utilizes Hetch Hetchy Power's long-term load forecast submitted to the CEC for its most recent Integrated Energy Policy Report (IEPR). However, because the planning horizon for this Updated IRP extends beyond the IEPR forecasting window (to 2034), this forecast assumes a modest 1% annual increase in load and customer count from 2035 to 2045.

[32] Peak demand is calculated based on an average peak demand, also known as a 1-in-2 peak or 50/50 load forecast, meaning that there is a 50% chance forecasted peak demand would be higher, and a 50% chance that peak demand would be lower than the adopted figure. Hetch Hetchy Power's 15% planning reserve margin is set by its governing board consistent with Public Utilities Code Section 380.

[33] The NQC of the Hetch Hetchy hydroelectric system is 307 MW in all months except for September when it is 239 MW. This figure is lower than the total 380 MW nameplate capacity of the hydroelectric system because it is based on the amount of dependable capacity.

[33] Capacity requirements in the local capacity zones are higher because planning requirements are based on a 1-in-10 peak load rather than on a 1-in-2 peak load.

However, beginning in 2030, Hetch Hetchy Power will require additional RA capacity to meet its system peak load and planning reserve margin in September, when the Hetch Hetchy hydroelectric system has a Net Qualifying Capacity (NQC) of 239 MW. This change can be seen clearly in Figures 4-2 and 4-3 below.

FIGURE 4-2. HETCH HETCHY POWER'S FORECASTED MONTHLY RA REQUIREMENT AND EXISTING NET QUALIFYING CAPACITY, 2025

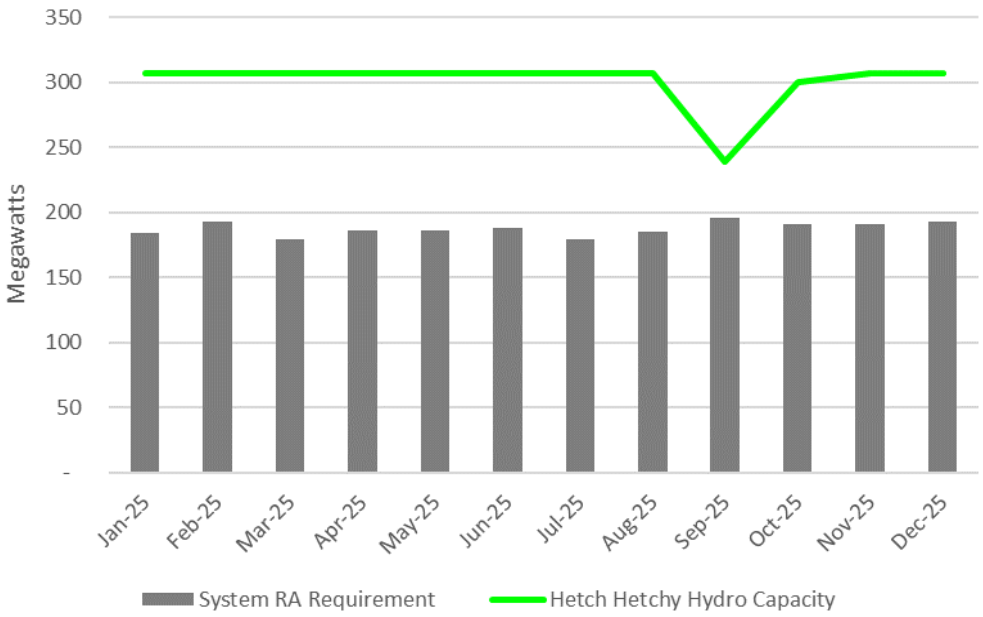
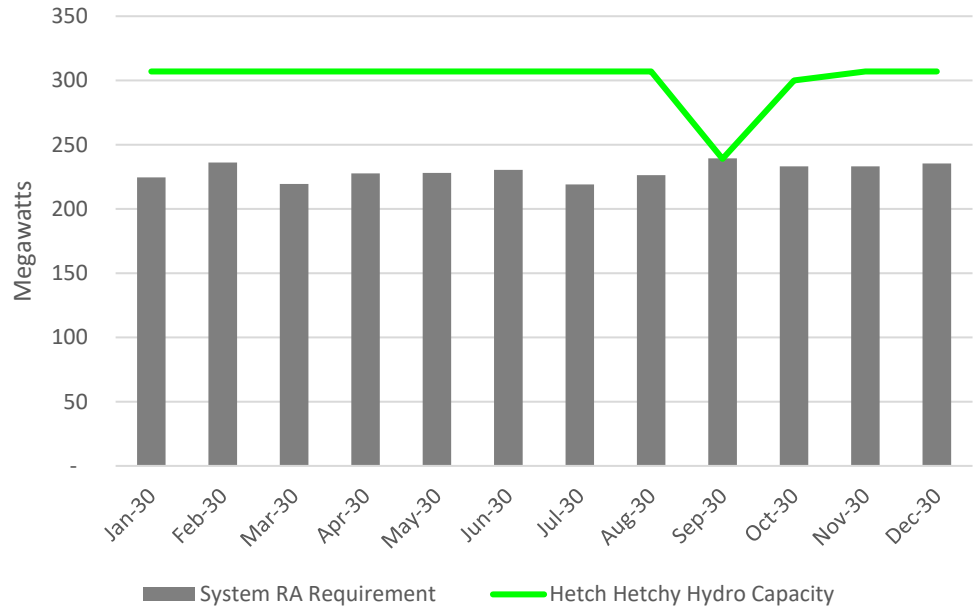


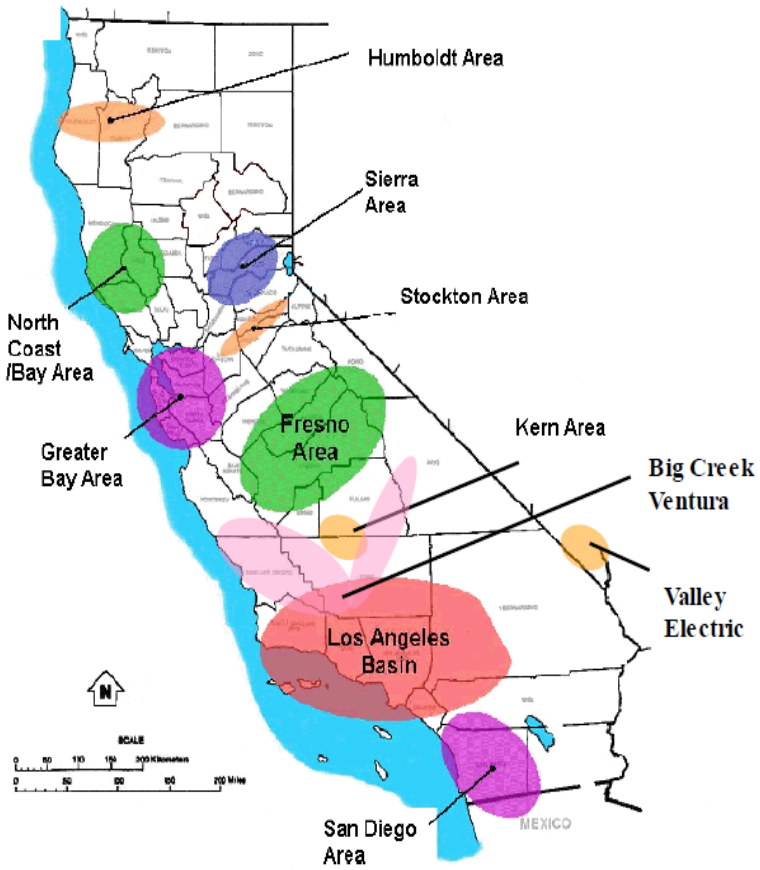
FIGURE 4-3. HETCH HETCHY POWER'S FORECASTED RA REQUIREMENT AND EXISTING NET QUALIFYING CAPACITY, 2030



4.2 Local Resource Adequacy

California's RA program also requires load serving entities to provide RA capacity that is located within certain "local" transmission constrained zones, such as the San Francisco Greater Bay Area. This Local RA requirement factors in operating contingencies such as the loss of local generation or transmission lines that would impact the local area's electric reliability. These transmission-constrained zones, or CAISO Local Reliability Areas, are illustrated in Figure 4-4.

FIGURE 4-4. CAISO LOCAL RELIABILITY AREAS



The CAISO assigns Hetch Hetchy Power's Local RA requirements based on its proportionate share of the Local RA needs for the Pacific Gas and Electric Co. (PG&E) transmission access charge (TAC) area. Hetch Hetchy Power's Local RA requirement is typically about 50% of its System RA requirement. In 2023, Hetch Hetchy Power's Local RA requirement was 82 MW, which is expected to grow proportionately with growth in Hetch Hetchy Power's peak load over the planning horizon.

Hetch Hetchy Power does not currently own sufficient Local RA capacity resources within the PG&E TAC to meet this Local RA requirement. Hetch Hetchy Power has historically purchased Local RA capacity resources from third parties. The procurement of new Local RA capacity resources should be prioritized in the near term to support Hetch Hetchy Power's RA program obligations and contribute to statewide electric reliability. Procurement of standalone energy storage and/or energy storage paired with wind or solar generation located within a CAISO-designated Local Reliability Area could supply the Local RA capacity that Hetch Hetchy Power is projected to require over the planning horizon.

4.3 Flexible Resource Adequacy

As California adds more wind and solar resources to the electric grid to meet the state's RPS targets, additional flexible capacity will be needed to meet fluctuations in wind and solar generation and maintain the reliability of the grid. As a participant in the CAISO, Hetch Hetchy Power is required to provide Flexible RA capacity based on its contributions to the CAISO's flexible capacity needs. The CAISO determines each participating Load Serving Entity's (LSE) Flexible RA obligation based on its customers' demand requirements and the flexibility of the generation resources they schedule in the CAISO system.[34]

Hetch Hetchy Power receives its monthly Flexible RA obligation from the CAISO each year. Currently, Hetch Hetchy Power does not have a generation asset that provides Flexible RA, but it procures Flexible RA from third parties. Like Local RA capacity, the procurement of new Flexible RA capacity resources should be prioritized in the near term to support Hetch Hetchy Power's RA program obligations and contribute to statewide electric reliability. Long-term procurement of energy storage resources could supply Hetch Hetchy Power with the Flexible RA capacity that it is projected to require over the planning horizon.

4.4 Ability to Meet Peak Demand

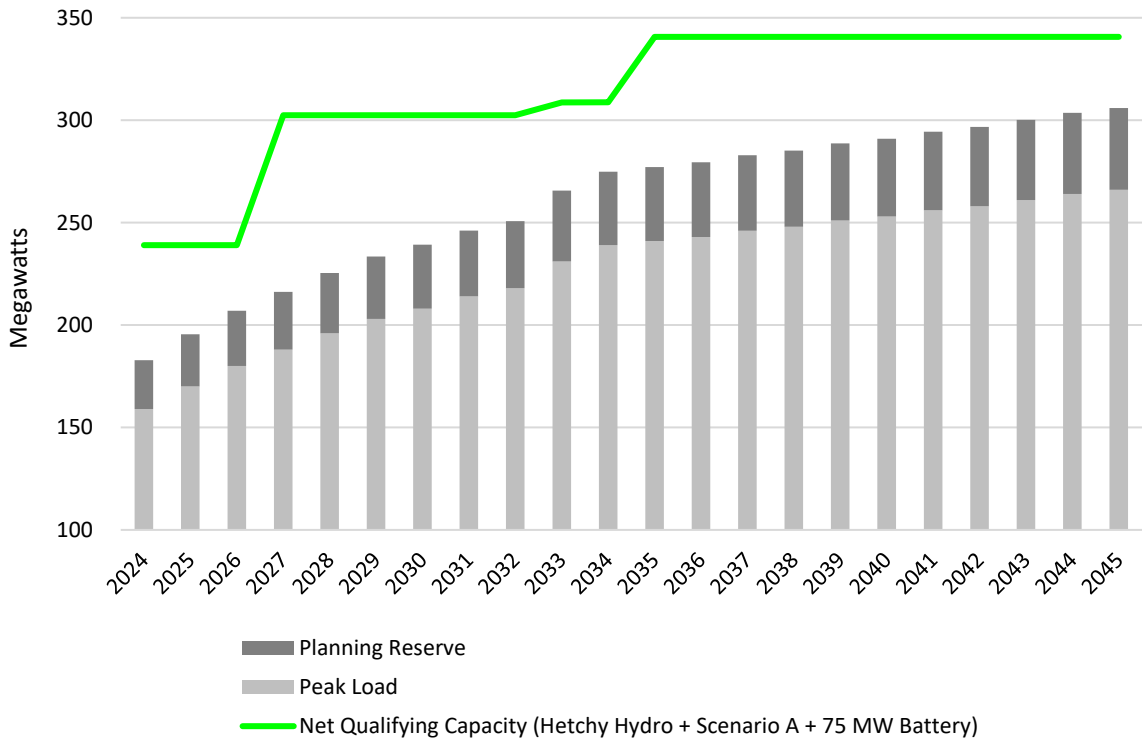
While California's RPS requirements mandate that an increasing portion of California's energy needs to come from renewable resources, this requirement does not necessarily ensure that new renewable resources coming online are matching the demand of California's electric grid, particularly given the variability of such renewable resources as wind and solar.

This is not an issue, currently, for Hetch Hetchy Power whose resource mix contains a minimal amount of variable renewable energy resources. Solar represents less than 1% of Hetch Hetchy Power's generation today. Additionally, the remaining 99% of Hetch Hetchy Power generation is hydroelectric energy that is typically available to meet peak demand. However, as detailed above, Hetch Hetchy Power's demand is forecasted to grow over this IRP's planning horizon, requiring additional renewable generation and possibly energy storage capacity to reliably serve customer load and contribute to statewide electric reliability. This is especially true for months when Hetch Hetchy hydroelectric generation may not be available to serve the forecasted load growth over the planning horizon.

The renewable energy procurement scenarios analyzed in Section 3.0 identify how different combinations of new renewable energy resources would contribute to Hetch Hetchy Power's monthly energy requirements. The analysis conducted for this IRP update found that Hetch Hetchy Power will need to procure approximately 150 MW or 425,000-700,000 MWh per year of additional renewables to meet forecasted load growth over the planning horizon. Figure 4-5 below illustrates how the addition of new renewable resources under Scenario A combined with 75 MW (nameplate) of 4-hour battery storage capacity would increase Hetch Hetchy Power's RA capacity supply relative to its forecasted annual RA requirement and support its contributions to meeting peak demand.

[34] Each LSE's Flexible RA capacity requirement is determined using a formula that measures each LSE's contribution to the CAISO's flexibility needs. LSEs are allocated a share of the CAISO's total Flexible RA capacity requirement based upon their contribution from load and renewables.

FIGURE 4-5. HETCH HETCHY POWER'S FORECASTED ANNUAL RA REQUIREMENT AND NET QUALIFYING CAPACITY WITH NEW RENEWABLE RESOURCES (SCENARIO A)



5.0 Greenhouse Gas Emissions

A goal of this IRP update is to provide a roadmap that Hetch Hetchy Power can use to continue to reliably serve its customers with 100% renewable and/or GHG-free electric energy well into the future. Fulfilling this goal will also help Hetch Hetchy Power meet its state RPS requirements and achieve the GHG-reduction targets set by the CARB.

In 2022, Senate Bill (SB) 1020 created new policy goals for zero carbon and renewable energy.[35] Specifically, SB 1020 set the following targets for zero carbon and renewable electricity used to serve all end-use customers in California: 90% by December 31, 2035, 95% by December 31, 2040, 100% by December 31, 2045.[36] Under this IRP, Hetch Hetchy Power plans to continue to provide 100% renewable and/or zero-GHG energy to its customers throughout the 2045 planning period.

In its 2022 Scoping Plan Update, CARB identified GHG reduction targets for each sector of the economy as well as suggested measures to achieve these reductions. For California's electric sector, the California Public Utilities Commission (CPUC) recommended a GHG emissions target of 38 million

[35] Clean Energy, Jobs, and Affordability Act of 2022 (Senate Bill 1020, Laird, Chapter 361, Statutes of 2022) (Public Utilities Code § 454.53(a).)
[36] Public Utilities Code § 454.53(a)

metric tons (MMT) by 2030.[37], CARB's 2022 Scoping Plan Update adopted a target GHG emissions reduction range of 30 to 38MMT by 2030, consistent with the GHG-reduction targets the CPUC adopted for load serving entities under its jurisdiction.[38] CARB also assigned an individual GHG emissions target to each load serving entity. Hetch Hetchy Power's share of this GHG emissions target for 2030 is 12,000 to 15,000 metric tons, which is about 0.041% of the statewide total. [39]

TABLE 5-1. HETCH HETCHY POWER'S FORECASTED 2030 GHG EMISSIONS COMPARED TO CARB'S 2030 TARGETS[40]

	METRIC TONS / Year
IRP Forecast	0
CARB 2030 GHG Target (low-end range)	12,000
CARB 2030 GHG Target (high-end range)	15,000

Hetch Hetchy Power plans to continue to provide clean and renewable electricity supplies with minimal GHG emissions across the IRP's planning horizon. As detailed in the sections above, while Hetch Hetchy Power's hydroelectric supplies are forecasted to be sufficient to serve its projected load growth in the near term, it will need to procure additional renewable energy supplies as soon as a 2033 to maintain its high environmental standards and to meet California's goals through 2045. This plan identifies options to do so and Hetch Hetchy Power will continue to evaluate the most cost-effective new resource options for its ratepayers.

6.0 Retail Rates

Hetch Hetchy Power's electric rates are governed by San Francisco Charter Section 8B.125 which requires the SFPUC to exercise prudent financial stewardship of SFPUC assets by establishing "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… and provide sufficient resources for the continued financial health (including appropriate reserves), operation, maintenance and repair of each enterprise, consistent with good utility practice."[41]

---

[37] CPUC Decision 22-02-004 "Decision Adopting 2021 Preferred System Plan," pp. 105-107; CPUC Rulemaking 20-05-003, "Administrative Law Judge's Ruling Finalizing Load Forecasts and Greenhouse Gas Emissions Benchmarks for 2022 Integrated Resource Plan Filings," (June 15, 2022), p. 15 (¶ 2).

[38] CARB "Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets: 2023 Update", September 2023, p. 3, available at: https://ww2.arb.ca.gov/sites/default/files/2023-09/sb350-final-report-2023.pdf [accessed March 19, 2024]

[39] CARB "Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets: 2023 Update", September 2023, p. 4, available at: https://ww2.arb.ca.gov/sites/default/files/2023-09/sb350-final-report-2023.pdf [accessed March 19. 2024]

[40] CARB "Senate Bill 350 Integrated Resource Planning Electricity Sector Greenhouse Gas Planning Targets: 2023 Update", September 2023, p. 4, available at: https://ww2.arb.ca.gov/sites/default/files/2023-09/sb350-final-report-2023.pdf [accessed March 19. 2024]

[41] San Francisco Charter, Section 8B.125(1)

To meet these requirements most effectively, the SFPUC utilizes financial policies that foster financial sustainability and prudent stewardship of resources. The primary purpose of these policies is to ensure that each enterprise under the SFPUC's oversight retains sufficient funds for future infrastructure needs, replacement of aging facilities, bond reserves, and various operating expenses in a manner that mitigates unexpected rate changes. These financial policies include:

- Debt Service Coverage Policy: requires each SFPUC enterprise to adopt budgets, rates, and financial plans that generate net revenues such that Indenture Coverage shall equal a minimum of 1.35x annual debt service and Current Coverage shall equal a minimum of 1.10x annual debt service;
- Capital Financing Policy: requires that a minimum ranging between 15% and 30%of each enterprise's capital budget be revenue-funded (or "pay-as-you-go" funded) over a 10-year planning period.
- Fund Balance Reserve Policy: requires that Hetch Hetchy Power's Fund Balance Reserve maintain a minimum amount of 90 days or 25% of annual Operations and Maintenance Expenses (including programmatic projects, excluding debt service and revenue-funded capital) over a 10-year planning period.
- Ratepayer Assurance Policy: reinforces SFPUC's commitment to developing rates and charges that are affordable, predictable, easy to understand, based on cost of service, and that generate sufficient revenue for full cost recovery.

San Francisco Charter Section 8B.125 further requires the SFPUC to conduct an independent cost of service and rates study at least once every five years for Hetch Hetchy Power.[42] The most recent study was completed in 2022 and the SFPUC adopted new cost of service based electricity rates for Hetch Hetchy Power that were implemented beginning in Fiscal Year 2022-2023. The 2022 Hetch Hetchy Power Rates Study was completed before this Updated IRP was conducted, so the rates study did not take into account or project the cost of service impacts of the IRP scenarios analyzed herein. However, the SFPUC maintains rolling, 10-year financial plans for Hetch Hetchy Power and will incorporate new energy resource procurement into subsequent 10-year financial plans and cost of service rate studies.

This IRP does not forecast any significant additional renewable procurement to be required for Hetch Hetchy Power until 2033, when projected load growth begins to require new renewable energy resources to supplement existing resources on a regular basis. Therefore, it is prudent to continue to monitor projected load growth, Hetch Hetchy Power net energy and capacity needs, and renewable energy costs and incorporate refinements to the analysis performed in this IRP in future iterations of Hetch Hetchy Power financial plans and cost of service studies.

7.0 Transmission and Distribution Systems

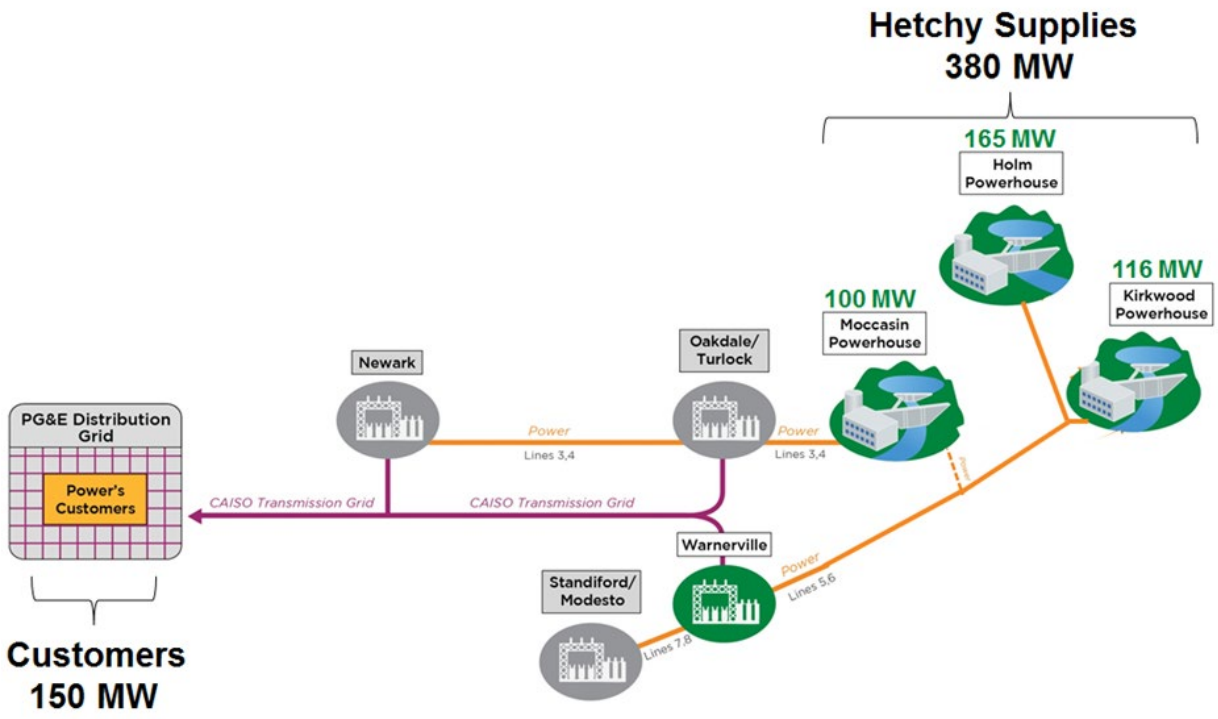
7.1 Bulk Transmission

Electricity generated by the Hetch Hetchy system is transmitted through SFPUC-owned and operated transmission lines, consisting of approximately 110 miles of 115 kilovolt (kV) and 50 miles of 230 kV transmission lines and four substations.

[42] San Francisco Charter Section 8B.125(2)

An overview of Hetch Hetchy Power's transmission topology is shown below:

FIGURE 7-1. HETCH HETCHY TRANSMISSION SYSTEM IN 2023



Hetch Hetchy Power's transmission system faces minimal transmission congestion/constraints to serve Hetch Hetchy Power load because of the high load carrying capacity of Hetch Hetchy Power's transmission lines.

Hetch Hetchy Power's transmission facilities connect into the CAISO-operated transmission system and PG&E's distribution system to deliver power to most Hetch Hetchy Power customers located in San Francisco and the Peninsula. San Francisco is working diligently with PG&E to create or upgrade interconnection points at transmission level voltages to serve San Francisco loads independent of the PG&E system. As a result, San Francisco has recently completed the interconnection of the Bay Corridor Transmission and Distribution Project that interconnects at 230 kV through a distribution substation that will deliver energy to customers connected at 12,470 volts. This will provide an alternative energy source for the local distribution grid, alleviating the constraints of having a single energy provider and improving reliability for the overall distribution network system.

The SFPUC is evaluating options that could reduce congestion on our transmission system and facilitate the interconnection and/or transmittal of energy, including renewable generation, in the east-west corridor between the City of Oakdale and Newark.

7.2 Local Distribution

PG&E's distribution system serves most of Hetch Hetchy Power's current electric demand under a Federal Energy Regulation Commission (FERC) regulated Wholesale Distribution Tariff. The SFPUC participates in proceedings before both the CPUC and FERC that effects PG&E's rates and services;

ensuring that not only Hetch Hetchy Power customers but also all of San Francisco's residents and businesses receive reliable and reasonably priced service. Hetch Hetchy Power is also the power provider for new neighborhoods under Redevelopment in San Francisco, neighborhoods such as Hunters Point ("The Shipyard") and Treasure Island. As these Redevelopment areas are completed, Hetch Hetchy Power will operate and maintain the local utility facilities that serve those end customers.

8.0 Localized Air Pollutants and Disadvantaged Communities

Hetch Hetchy Power's generation from its Hetch Hetchy powerhouses is GHG-free and creates no localized air pollution. In most years, Hetch Hetchy Power sells GHG-free energy that is surplus to its retail customer needs to other load serving entities which helps reduce GHG emissions and other pollutants that may otherwise be generated from fossil-fueled power plants.

San Francisco successfully collaborated with state energy agencies to close San Francisco's two large in-city pollution-emitting power plants located in the Hunters Point and Potrero areas of San Francisco. With the closure of these plants in 2006 and 2011, there are no large-scale fossil-fueled power plants located within San Francisco, and substantial clean-up and redevelopment of these areas is underway or being planned.

There are 12 census districts within San Francisco that are classified as disadvantaged communities with a CalEnviroScreen score in the 76th to 100th percentile ranking or lacking an overall score but with a pollution burden score in the top 25%. Seven of these are in the Hunters Point area of San Francisco, four are around the Moscone Center/South of Market Street/Civic Center area and the twelfth is located on Treasure Island. Hetch Hetchy Power is the electric utility for both the Hunters Point and Treasure Island redevelopment projects and delivers GHG-free electricity to those customers with no generation of localized air pollutants.

The SFPUC recently decided to stop the operation of the Southeast Cogeneration Plant (2.0 MW) located in the Bayview/Hunters Point area of San Francisco. For the past two decades, this plant took methane (also known as biogas) generated as a by-product of the SFPUC's processing of sewage biosolids waste and used it as a fuel to generate electric power. In combusting methane and converting it to electric energy, the Southeast Cogeneration Plant reduced the release of GHG emissions into the atmosphere, but also created localized (non-GHG) emissions, primarily nitrogen oxide (NOx).[43]

As a part of a $2.7 billion project upgrading a major portion of the Southeast Wastewater Treatment Plant, the SFPUC will be replacing the Southeast Cogeneration Plant with a new Biogas Utilization Facility, forecasted to come on-line in 2027. The SFPUC has opted to change the end use for its methane/biogas by-product to renewable natural gas (RNG) and will no longer produce electric power in the Southeast Wastewater Treatment Plant. This new Biogas Utilization Facility will provide 100% beneficial use of the biogas, by treating and upgrading the biogas to natural gas quality, compressing and injecting the biogas into an existing natural gas pipeline.

[43] The CEC classifies these types of plants as having zero-GHG emissions under the CEC's GHG Emissions Performance Standards requirements, established by Senate Bill 1368 (Perata, Chapter 598, Statutes of 2006).

This change in biogas end use from electrical power to RNG will reduce on-site air emissions (such as GHGs and NOx) into the surrounding Bayview-Hunters Point neighborhood by eliminating the cogeneration facility and the combustion of biogas in Southeast Wastewater Treatment Plant. In addition, the generation of RNG is in line with the City's sustainability policies as it displaces the use of fossil fuels and improves local air quality.

8.1 Programs to Support Affordability in Disadvantaged Communities

Hetch Hetchy Power seeks to meet and exceed the goals set by the SFPUC's Environmental Justice policy. [44]

Among its programs, the Community Assistance Program (CAP) provides a 30% discount on electricity bills for income-qualified residential Hetch Hetchy Power customers. Customers may contact the SFPUC's Call Center to apply or apply on-line. Customers may also obtain a mail-in application in one of nine languages on the SFPUC's website.[45]

Hetch Hetchy Power is beginning a review of its CAP program, and is in the beginning stages of soliciting support from consultants experienced in evaluating affordability and arrearage management. As part of this study, Hetch Hetchy Power will evaluate its CAP discount program to determine whether it is sufficient for meeting its customers' affordability needs. Efforts are expected to conclude in late 2024.

Hetch Hetchy Power also offers a program called GoSolarSF which for over the last 15 years has provided incentives for Hetch Hetchy Power customers to install roof-top solar. While GoSolarSF's rebates to non-profits, businesses, and residential and low-income customers throughout San Francisco became fully subscribed in 2020, the program continues to offer rebates to low-income homeowners located in Disadvantaged Communities qualifying through the State's Disadvantaged Community-Single Affordable Solar Home program.[46]

Hetch Hetchy Power is in the process of developing new programs to support low income and disadvantaged communities within its service territory to support energy affordability, electrification, and climate resiliency.

[44] In Resolution 09-0170, adopted October 13, 2009, the SFPUC "affirms and commits to the goals of environmental justice to prevent, mitigate, and lessen disproportionate environmental impacts of its activities on communities in all SFPUC service areas and to ensure that public benefits are shared across all communities."

[45] For more information see: www.sfpuc.org/30offpower [accessed on March 19, 2024]

[46] For more information see: https://sfpuc.org/accounts-services/sign-up-for-savings/gosolarsf [accessed on March 19, 2024]

San Francisco Public Utilities Commission
Hetch Hetchy Power
Updated Integrated Resource Plan

Attachment A: SFPUC Resolution 23-0214

San Francisco Water Power Sewer

Services of the San Francisco Public Utilities Commission

PUBLIC UTILITIES COMMISSION

City and County of San Francisco

RESOLUTION NO. **23-0214**

WHEREAS, Public Utilities Code Section 9621, requires that all of California's large publicly owned electric utilities, including the SFPUC's Hetch Hetchy Power program, prepare an Integrated Resource Plan (IRP) and have a plan to update the IRP at least once every five years; and

WHEREAS, The goal of an IRP is to assist electric utilities to analyze and assess how best to meet their future energy demands at least cost, while ensuring reliable service and accomplishing other public purpose goals such as reducing emissions of greenhouse gases and other pollutants; and

WHEREAS, In November 2018 this Commission adopted Resolution No. 18-0187, approving Hetch Hetchy Power's IRP, and committing to update the IRP at least once every five years, consistent with the requirements of Public Utilities Code Section 9621; and

WHEREAS, Staff has prepared, consistent with Public Utilities Code Section 9621 and California Energy Commission guidelines, an Updated IRP for Hetch Hetchy Power; and

WHEREAS, The Updated IRP forecasts Hetch Hetchy Power's retail electric demand and hydroelectric operations under four retail sales forecasts and three hydroelectric generation scenarios based on "normal", "dry" and "wet" hydrologic conditions over a 2024 to 2045 planning horizon and analyzes these supply and demand forecasts to identify Hetch Hetchy Power's net energy balance (i.e., generation supply shortfall or excess) across the planning period; and

WHEREAS, Hetch Hetchy Power is projected to need additional energy supply to serve future demand beginning in calendar 2033, due to customer load growth and hydrological variability; and

WHEREAS, The Updated IRP analyzed the addition of up to 150 megawatts of new renewable power supply to augment the Hetch Hetchy Power energy portfolio starting in calendar year 2033. Adding renewable energy power purchases to the portfolio would reduce Hetch Hetchy Power's energy market exposure risk while maintaining its compliance with state and local regulatory and policy requirements; and

WHEREAS, The Updated IRP projects that between 2024 and 2045 Hetch Hetchy Power can, with the addition of new renewable power purchases to supplement hydroelectric generation, accomplish the following: continue to provide 100% clean and renewable electric energy to serve all of its customer needs; exceed the greenhouse gas-reduction goals set for Hetch Hetchy Power by the California Air Resources Board; meet its compliance obligation under California's Renewable Portfolio Standards program; and provide reliable electric service to meet its customer needs; and

WHEREAS, Hetch Hetchy Power developed an Updated IRP, the results of which were presented to the Commission at its November 28, 2023, meeting; and

WHEREAS, This action does not constitute a "project" under California Environmental Quality Act Guidelines section 15378 because the Updated Integrated Resource Plan does not involve commitment to any specific project which may result in a potentially significant physical impact on the environment; now, therefore, be it

RESOLVED, That the Commission approves Hetch Hetchy Power's Updated IRP in substantially the form of the attached Draft San Francisco Public Utilities Commission Hetch Hetchy Power Updated Integrated Resource Plan; and be it

FURTHER RESOLVED, That the Commission authorizes the General Manager, or the General Manager's designee, to file the Approved San Francisco Public Utilities Commission Hetch Hetchy Power Updated Integrated Resource Plan with the California Energy Commission on or before April 30, 2024, with any non-material changes or modifications to the exhibits, as may be acceptable to the General Manager.

I hereby certify that the foregoing resolution was adopted by the Public Utilities Commission at its meeting of November 28, 2023.

Secretary, Public Utilities Commission

San Francisco Public Utilities Commission
Hetch Hetchy Power
Updated Integrated Resource Plan

Attachment B: SFPUC Procurement Plan To ensure compliance with the California Renewable Portfolio Standard (RPS)

Services of the San Francisco
Public Utilities Commission

San Francisco Public Utilities Commission
PROCUREMENT PLAN
To ensure compliance with the
California Renewable Portfolio Standard (RPS)
(Adopted by Resolution 12-0217)

1. PURPOSE AND SCOPE

The California Renewable Energy Resources Act (the Act), effective December 10, 2011, amended California's Renewable Portfolio Standard (RPS),[1] which establishes requirements for electric utilities' use of renewable energy resources (RPS-eligible supplies)[2] to serve their retail customers. The RPS, with certain exceptions, requires the San Francisco Public Utilities Commission (SFPUC) to meet 100% of its retail sales on an annual basis with generation from errher the Hetch Hetchy system or with RPS-eligible supplies.[3]

On December 13, 2011 in Resolution 11-0202, the SFPUC adopted an Enforcement Program to ensure the SFPUC will meet its RPS requirements. The Enforcement Program directs SFPUC staff to prepare a Procurement Plan for the Commission's adoption which identifies the SFPUC's requirements under the RPS and establishes a forecasting and procurement process to meet those needs.

The scope of this Procurement Plan is strictly limited to ensuring that the SFPUC is able to meet its RPS requirements in a cost-effective manner while maintaining reliable service and minimizing financial risk. The RPS and the Procurement Plan neither determine nor otherwise limit City or SFPUC policies and programs for renewable energy.

The Act amended the RPS to make its requirements mandatory for publicly owned utilities. The Procurement Plan covers the SFPUC's requirements under the RPS as of January 1, 2011.

---

[1] The Act is also referred to by its bill number as either SB2 orSBXl-2. The Act made a number of changes to state law, including the California Public Utilities Code Section 399.11 et seq.

[2] RPS-eligible supplies are generated by facilities certified as renewable by the california Energy Commission for purposes of complying with the RPS legislation. These resources include generation from wind, solar, geothermal, small hydro, wave, tidal, biomass, and/or the Renewable Energy Credits (RECs) associated with them.

[3] Public Utilities Code Section 399.30(k).

The Procurement Plan consists of:

- The SFPUC's RPS requirements under the RPS (Sections 2 and 3) including exceptions (Section 4).

- The Procurement Process, Guidelines and Authority (Section 5). The Procurement Plan directs the General Manager to develop forecasts to ensure the SFPUC timely meets the requirements of the RPS. If the forecasts identify a need to procure additional RPS-eligible supplies, the Procurement Plan authorizes the General Manager to procure these supplies up to certain limits.

- The reporting and public notice requirements required by the RPS and the SFPUC's Enforcement Program (Section 6).

Attachment B to the Procurement Pian includes forecasts of the SFPUC's RPS requirements for the SFPUC's adopted budget (covering Fiscal Year (FY) 2012-13 and FY 2013-14), and the ten-year financial forecast and Capital Improvement Plan through 2022. For consistency, forecasts of the SFPUC's RPS requirements utilize the same forecasts that are used to prepare the budget and long-term plans. Attachment B also reports on the SFPUC's requirements for calendar years 2011 and 2012.

The Procurement Pian Forecasts will be updated as needed. The next update is expected to occur in conjunction with the development of the SFPUC's next two-year budget (covering FY2014-15 and FY2015-16) to ensure that the costs of any expected RPS requirements, including known forecasting uncertainties, are incorporated into the Commission's adopted budgets and longer-term financial forecasts. Updates outside of the regular budget process will be done as necessary to reflect any material changes in the SFPUC's expected requirements under the RPS.

2. THE SFPUC’s RPS REQUIREMENTS

Statutory Requirement

Under the RPS, the SFPUC is required to meet 100% of its retail sales with either Hetch Hetchy generation or with RPS-eligible supplies, pursuant to Section 399.30(k) of the Public Utilities Code, which states that:

> A local publicly owned electric utility in a city and county that only receives greater than 67 percent of its electricity sources from hydroelectric generation located within the state that it owns and operates, and that does not meet the definition of a renewable electrical generation facility pursuant to Section 257 41 of the Public Resources Code, shall be required to procure eligible renewable energy resources, including renewable energy credits, to meet only the electricity demands unsatisfied by its hydroelectric generation in any given year, in order to satisfy its renewable energy procurement requirements.

Generation from the Hetch Hetchy system has never fallen below 67% of the SFPUC's retail sales in the last 90 years of recorded data.

Pursuant to Section 399.30(k), the SFPUC's RPS-eligible supplies used to meet its RPS requirements may include either the RPS-eligible renewable energy together with its associated RE Cs, or the purchase of RPS-eligible RECs.[4]

Calendar Year Reguirement

The Procurement Plan establishes a calendar year obligation for determining the SFPUC's requirements under the RPS.[5]

The RPS applies only to the SFPUC's Retail Sales

The SFPUC's RPS requirements are limited to the electricity supplies used to meet the SFPUC's retail sales. The SFPUC's retail sales currently include sales to municipal customers, tenants on City property such as at the Airport and Port, and other retail • customers. Retail sales also include service to Hunters Point, Treasure Island, Trans Bay Joint Powers Authority, as well as service to redevelopment or other areas for which the SFPUC provides electric service.[6]

The Procurement Plan does not apply to the SFPUC's electricity supplies or retail sales for its Community Choice Aggregation (CCA) program, CleanPowerSF.[7]

The SFPUC's wholesale sales of electricity, such as the SFPUC's sales to the Modesto and Turlock Irrigation Districts (MID and TID or the Districts), to the Norris-Riverbank Redevelopment Agency, and other sales to third parties through wholesale market transactions, are not covered by the RPS.

Hetch Hetchv Resources Available to Serve Retail Load

Available Hetch Hetchy generation includes generation, calculated on annual basis, from any of the Hetch Hetchy facilities operated by the SFPUC. This includes net withdrawals (withdrawals less deposits during the calendar year) of Hetch Hetchy generation associated with the operation of the Deferred Delivery Account (DDA). This calculation excludes any sale of Hetch Hetchy generation made on a specified basis[8] such as current sales of Hetch Hetchy generation under long term contracts to the Districts and deposits to the MID Deferral Account (MDA).

---

[4] The RPS establishes three different types of RECs associated with the generation of renewable energy categorized as Portfolio Content Category 1, 2, or 3 depending upon their source and characteristics (informally referred to as Buckets 1, 2, and 3). The SFPUC, under the RPS, is allowed to procure any combination of renewable energy or RECs from any of these three categories to meet its RPS requirements pursuant to Section 399.30(k).

[5] This includes a "true-up" period where any shortfalls could be made up after the end of the SFPUC's calendar year obligation but before the SFPUC flies its compliance reports to the CEC.

[6] The General Manager may update this list as necessary to reflect the addition of new customer classes or any reclassification of load between wholesale and retail as appropriate.

[7] Regulations for RPS requirements for CCAs are determined by the California Public Utilities Commission (CPUC) although CCAs, such as CleanPowerSF, may adopt RPS goals that exceed what Is required by the CPUC.

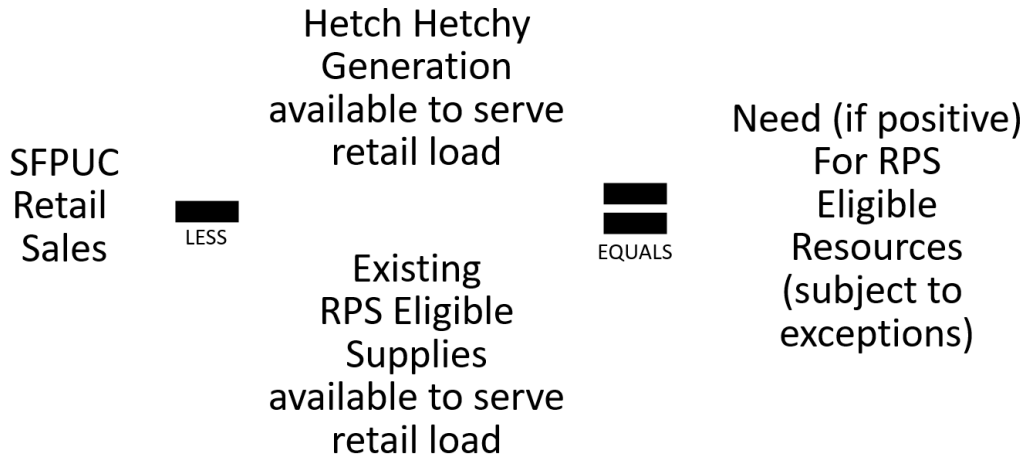
[8] A "specified sale" occurs when the electric generation being sold can be tracked back to a specific generating source through such means as contracts or other written sales agreements or that the REC associated with the generation Is also specifically transferred with Its underlying generation.

RPS-Eligible Supplies Available to Serve Retail Load

RPS-eligible supplies are those renewable resources that meet the requirements of Section 399.12(e) of the Public Utilities Code. The SFPUC's RPS-eligible resources currently include in-City solar facilities such as the Sunset Reservoir Photovoltaic (PV) Project, the biomethane-fueled cogeneration facility at the Southeast Wastewater Treatment Facility, and the Moccasin low-head hydroelectric facility[9] [10] [11]. Under the RPS, generation from RPS-eligible supplies will be tracked through the issuance of renewable energy credits (RECs) that verify renewable energy was generated.[12] These RPS-eligible supplies will be available to serve SFPUC retail load unless the associated REC has been unbundled and transferred to another party.

3. DETERMINATION OF NEED FOR ADDITIONAL RPS-ELIGIBLE SUPPLIES (IF ANY)

Any shortfall between the SFPUC's retail sales and its available Hetch Hetchy and RPS eligible generation results in a requirement (need) for additional RPS-eligible supplies, as follows:



[9] Some Hetch Hetchy generation Is also RPS-eligible. Hetch Hetchy generation that Is RPS-eligible will be counted only once (as either RPS-eligible generation or as Hetch Hetchy generation) for determining the SFPUC's yearly RPS requirements.

[10] The SFPUC has submitted applications to the CEC to certify all of its RPS-eligible resources including the Kirkwood units which are eligible under the Act as water conveyance facilities. Due to back logs in the CEC certification process, the certifications may take several months to complete. For purposes of the Procurement Plan Forecasts, generation from the Kirkwood Units Is not counted as RPS-eligible. If needed, the forecasts will be updated when the CEC certifications of the Kirkwood units are completed.

[11] This list will be updated as necessary to reflect the addition/deletion of new RPS-eligible sources. For example, the Oceanside cogeneration plant is currently not counted as a RPS-eligible supply since its generation is used to serve on-site load and is not used by Power Enterprise to serve its retail sales as a POU. Similarly, the load served by the plant is not included in the SFPUC's retail sales.

[12] RECs will be tracked through the Western Regional Energy Generating Information System (WREGJS), a multi-state organization developed by the CEC that tracks and records renewable electric generation throughout the Western United States. The CEC is requiring all POUs to use WREGIS to track their renewable energy generation. The Commission authorized the establishment of a WREGIS account for the SFPUC for this purpose in Resolution 11-0151. WREGIS ensures that RECs are tied to actual renewable generation which is counted and credited only once by the entity that holds the REC.

In addition, any SFPUC purchases of resource-specific supplies from third parties that are not RPS-eligible but are used to meet the SFPUC's retail sales must be matched with an equivalent volume of RPS-eligible supplies[13].

Carry Forward and Excess Procurement Provisions

In the event that the SFPUC's Hetch Hetchy generation and RPS-eligible supplies are more than the amount required to meet the RPS requirements for a given calendar year, the associated RECs may be carried forward for use in future years or sold. RECs initially may be used to meet the SFPUC's requirements for up to 36 months after the underlying renewable energy is generated[14] and (subject to certain restrictions) excess procurement of RPS-eligible supplies above what the SFPUC needs to meet its RPS requirements may be carried forward beyond the 36 month limit and applied to meet future RPS requirements.[15] Should there be more RECs than are foreseeably needed to ensure the SFPUC meets the requirements of the RPS,[16] surplus RECs may be sold.

4. EXCEPTIONS

Cap on Annual RPS Compliance Comparable to Other Utilities

The CEC's draft regulations implementing the RPS do not require the SFPUC to procure more renewable energy as a percentage of its retail sales than California's other electric utilities. The Procurement Plan sets an upper limit on the amount of RPS-eligible energy the SFPUC is required to procure in any given calendar year of 20% for calendar years 2011 through 2016, 25% for calendar years 2017 through 2020 and 33% for calendar years 2021 and beyond based on the CEC's draft regulations. These requirements also apply for any calendar year the SFPUC does not meet 67% of its retail sales from its Hatch Hetchy generation.

Cost Limitation Provision

The Risk Management budget will include reserves to fund additional RPS-eligible resources (based on Procurement Plan forecasts) that may be needed to address potential shortfalls under known uncertainties such as dry-year forecasts.

Under this cost limitation, the SFPUC is not required to purchase additional RPS-eligible supplies that are needed to meet the requirements of the RPS if the cost of those supplies would exceed the funding available in the SFPUC's adopted budget for Risk Management expenditures by Power Enterprise, subject to maintaining prudent reserves for other non-RPS procurement cost contingencies through the remainder of the budget cycle in which the procurement occurs.

Additionally, the SFPUC is not required to purchase additional RPS-eligible supplies that are needed to meet the requirements of the RPS if the cost of those supplies would exceed $100/MWh above the market cost of a comparable volume of energy that is not RPS-eligible.[17]

---

[14] Public Utilities Code Section 399.21(a)(6).
[15] Public Utilities Code 399.30(d)(l) and 399.13(a)(4)(B).
[16] These estimates will also be developed as part of the RPS forecasts prepared according to this plan.
[17] This limitation does not apply to the costs of the SFPUC's existing RPS-eligible supplies.

Deferral Authority

The SFPUC may defer timely compliance with the requirements of the RPS if the Commission determines that the SFPUC meets the requirements of Sections 399.30(d)(2) and 399.15(b) of the Public Utilities Code. These provisions allow POUs to defer compliance due to events beyond their control such as inadequate transmission capacity, permitting/interconnection issues, insufficient supply of renewable energy resources, or unanticipated curtailments.

5. EXCEPTIONS PROCESS FOR MEETING THE RPS REQUIREMENTS

The Procurement Plan establishes the following process, guidelines and authority for obtaining necessary RPS-eligible supplies that may be required.

Preparation of Forecasts for Determining the Need for Additional RPS-Eligible Supplies

The SFPUC shall prepare and update forecasts in a timely manner as needed for a calendar year, budget cycle, and longer time frame to determine the SFPUC's forecasled obligations under the RPS. Each forecast shall include, at a minimum, the following elements:

a. Forecasts of retail sales, Hetch Hetchy generation, existing SFPUC RPSeligible supplies, and wholesale sales;
b. A calculation of the amount of any additional RPS eligible supplies the SFPUC may need to acquire in order to ensure compliance with the RPS;
c. Identification of known uncertainties in the forecasts, primarily fluctuations in Hetch Hetchy generation due to hydrologic conditions, water needs and/or extended generator outages;
d. An evaluation of market conditions including strategies for mitigating cost and risk exposure given known forecasting uncertainties; and
e. Any other information that is useful in assisting the Commission to evaluate its needs under the RPS.

The forecasts will be coordinated and consistent with the forecasts developed as part of the SFPUC's budget cycle and long-term financial and Capital Investment Plan.

Procurement of Additional RPS-Eligible Supplies

When forecasts show a long-term, recurring need for additional RPS supplies, the General Manager shall recommend procurement actions to the Commission for its approval. To meet forecasted short term (under two years), non-recurring needs and to meet shortfalls resulting from forecasting uncertainties, the General Manager is authorized to procure the RPS-eligible supplies[18] that are needed, subject to the following requirements:

a. The supplies are acquired through short-term market transactions;
b. The procurement process follows the SFPUC's procurement and risk management practices to minimize costs and risk exposure;
c. Reliable service is maintained;
d. Within the two-year budget cycle, the total volume procured is limited to the greater of;
    (i) A cost limit of $500,000; or
    (ii) 5% of retail sales.

[18] Purchases may include either the purchase of RPS-eligible renewable energy with its associated REC, or the purchase of RPS-eligible RECs.

e. The total cost of procurement is within the cost limitation provisions of this Procurement Plan.

In procuring these additional RPS-eligible supplies, the General Manager shall seek to minimize the SFPUC's cost of meeting the RPS requirements, but may pay a reasonable premium to purchase RPS-eligible supplies that are located within California.

Should the SFPUC own more RECs than are foreseeably needed to ensure the SFPUC meets its RPS requirements, the General Manager may sell surplus RECs.

Procurement of RPS-eligible supplies that does not meet these requirements or is otherwise beyond these limits is subject to Commission approval.

6. REPORTING AND PUBLIC NOTICE

The General Manager shall provide reports to the Commission and the public on any material variance from the adopted Procurement Plan on a quarterly basis. The report shall explain any material variances, and to the extent the variances show a trend toward non-compliance with the adopted Procurement Plan, the report shall recommend corrective actions to ensure compliance.

The General Manager will report to the public and the California Energy Commission using the format and reporting protocols specified by the California Energy Commission.

The Commission will provide notice to the public as required by the Brown Act,[19] and to the California Energy Commission as required under Public Utilities Code Section 399.30(f)(2) and (f)(3)[20] whenever it is deliberating in public on this Procurement Plan. The Commission may modify this Procurement Plan as needed.

[19] Government Code Section 54950 et seq. The Brown Act governs the public meetings of government agencies and provides among other provisions; notice requirements, distribution of meeting agenda, public meetings, and opportunity to comment. The SFPUC already follows the Brown Act in its public meetings.

[20] These provisions require respectively that "contemporaneously with the posting of the notice of a public meeting to consider the ... procurement plan", the POU shall notify the CEC of the date, time, and location of the meeting in order to enable the CEC to post the information on its website and that any information provided publicly to the Commission shall also be provided to the CEC for posting on its website. Both requirements can be met "by provid[ing] the URL that links to the documents or information regarding other manners of access to the documents."