PUD #1 of Jefferson County

Water, Sewer and Electric Rate Study & Pole Attachment Fee Update

FINAL REPORT
November 2021

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November 23, 2021

Kevin Streett, General Manager
Jefferson County PUD #1
310 Four Corners Road
Port Townsend, WA 98368

Subject: Water, Sewer and Electric Rate Study & Pole Attachment Fee Update

Dear Kevin:

FCS GROUP is pleased to submit this report summarizing the results of the cost-of-service study for Jefferson Public Utility District's (PUD) electric and water utilities, as well as the evaluation of sewer rates on a standalone basis. The report also provides the results of the update for the electric utility's pole attachment fees. The methodology to arrive at these results is detailed in the report. The rate increases are projected to meet each utility's annual operating and maintenance expenditures, fund planned capital improvement projects, and achieve the PUD's financial policies.

It has been a pleasure to work with you and the other staff on this effort. Please let me know if you have any questions or need additional information on this report. I can be reached at (425) 336-4157.

Yours very truly,

Angie Sanchez Virnoche
Vice President & Principal

Sergey Tarasov
Project Manager

Matt Hobson
Technical Advisor

Paul Quinn
Project Consultant

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GLOSSARY OF TERMS

- A&G – administrative & general
- AWWA – American Water Works Association
- BPA – Bonneville Power Administration
- cgal – hundred gallons
- CIAC – contribution in aid of construction
- CIP – capital improvement plan
- CP – coincident peak
- DWSRF – Drinking Water State Revolving Fund
- ENR – Engineering News Record
- FERC – Federal Energy Regulatory Commission
- FFY – federal fiscal year
- HLH – heavy load hours
- kVAR – kilovolt-ampere reactive
- kVARh – kilovolt-ampere reactive hour
- kW – kilowatt
- kWh – kilowatt hour
- LLH – light load hours
- LOC – line of credit
- LUD – local utility district
- NCP – non-coincident peak
- NT – network integration transmission
- M&S – meters & services
- O&M – operating & maintenance
- PSE – Puget Sound Energy
- PUD – public utility district
- RCW – Revised Code of Washington
- RUS – Rural Utilities Service
- SCD – scheduling, system control, and dispatch service
- TIER – times interest earned ratio
- W - watt
- WECC – Western Electricity Coordinating Council

Section I. INTRODUCTION

In 2020, Public Utility District #1 of Jefferson County (PUD) contracted with FCS GROUP to complete a comprehensive rate study for the PUD's water, sewer and electric utilities as well as update the electric pole attachment fees. The results of this study establish a blueprint for achieving strong financial performance in the future while delivering efficient and effective services to the PUD's customers. The scope of the project included the following key elements:

- Assess revenue needs for a multi-year period that includes adequate funding for operations and maintenance, debt service, and other program activities.
- Forecast long-term capital needs and incorporate these needs into a long-term funding forecast.
- Use industry standard methodologies to establish a defensible basis for assigning "cost shares" and establishing "equity" for utility customers.
- Develop and recommend rate structures that generate sufficient revenue to meet the utility's financial obligations on a standalone basis.
- Update electric pole attachment fees following the 2019 Washington State Court of Appeals ruling.

The methodology, key factors, conclusions, and recommendations for each of the key task areas of the study are summarized in this report.

Section II. Rate Study Methodology

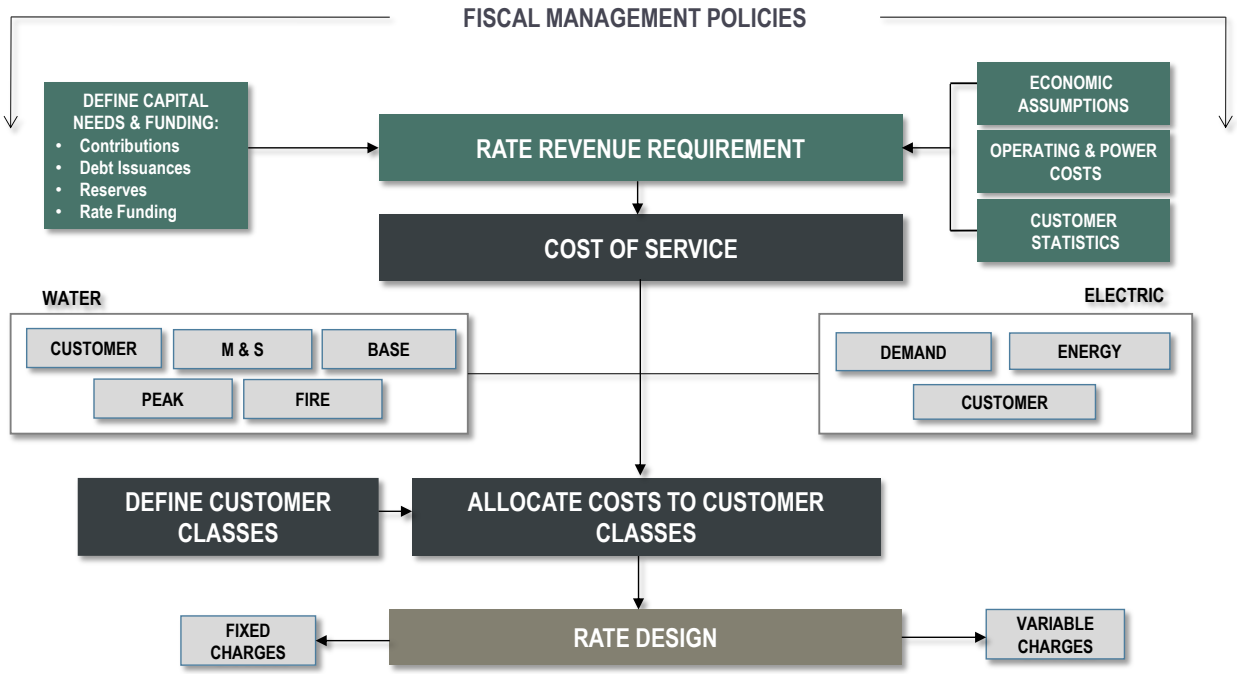
OVERVIEW

The methods used to establish user rates are based on principles that are generally accepted and widely followed throughout the utility industry. These principles are designed to produce rates that equitably recover costs from each class of customer by setting the appropriate level of revenue to be collected from ratepayers and establishing a rate structure to equitably collect those revenues.

Exhibit 2.1 illustrates the key components included as part of the rate study:

- ***Revenue Requirement Analysis***. This analysis identifies the overall needs to fully fund each utility system on a self-supporting basis, considering operating and maintenance expenditures, capital/equipment funding needs, debt requirements and fiscal policy objectives. The analysis was performed for the electric and water utilities. The PUD's sewer utility is part of the water utility; therefore, sewer revenues and expenses were included in the water analysis.
- ***Cost of Service Analysis***. This analysis equitably distributes costs to customer classes of service based on their proportional demand and use of the system.
- ***Rate Design Analysis***. This analysis includes the development of rates that generate sufficient revenue to support the revenue requirement analysis and addresses the PUD's policy goals and objectives.

Exhibit 2.1: Rate Study Process Overview



FISCAL POLICIES

The foundation for evaluating utility revenue needs consists of a set of fiscal policies. These policies, which can address a variety of topics including cash management, capital funding strategy, financial performance, and rate equity, are intended to promote long-term financial viability for the PUD's utilities.

Reserves

Reserves are a key component of any utility financial strategy, as they provide the flexibility to manage variations in costs and revenues that could otherwise have an adverse impact on ratepayers. When evaluating fund reserve levels and objectives, it is important to recognize that the value of reserves lies in their potential use. A reserve strategy that deliberately avoids any use of reserves negates their purpose. Fluctuation of reserve levels may indicate that the system is working, while lack of variation over many years strongly suggests that the reserves are, in fact, unnecessary. For the purpose of financial planning for the PUD's utilities, resources are separated into the following reserve categories:

- ***Operating Reserve***. An operating reserve is designed to provide a liquidity cushion; it protects the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses. Like other types of reserves, operating reserves also serve another purpose: they can help smooth rate increases over time. Target funding levels for an operating reserve are generally expressed as a certain number of days of operating and maintenance (O&M) expenses, with the minimum day requirement varying with the expected revenue volatility of the utility.

  The current operating reserve target for all of the PUD's utilities is set at 90 days of O&M expenses. This includes the power purchase costs from Bonneville Power Administration (BPA) for the electric utility. It is assumed that any operating funds above the minimum balance are available for capital purposes.

- ***Construction Reserve***. A construction reserve is an amount of cash set aside in case of an emergency should a piece of equipment or a portion of the utility's infrastructure fail unexpectedly. The reserve can also be used for other unanticipated capital needs including capital project cost overruns. Industry practices range from maintaining a balance equal to 1.00 to 2.00 percent of fixed assets, an amount equal to a 5-year rolling average of CIP costs, or an amount determined sufficient to fund equipment failure (other than catastrophic failure). The final target level should balance industry practice with the risk level of the PUD.

  The PUD implemented a reserve target beginning in 2020 for all utilities. The reserve target is equal to 50.00 percent of the estimated cost of capital improvement needs. The PUD's plan is to build-up to this target over several years, starting with a 2020 combined transfer of $100,000 for the electric and water utilities.

- ***Debt Reserve***. Bond covenants often establish reserve requirements as a means of protecting against the risk of nonpayment. A common reserve requirement is one year's debt service payment. The balance held in reserve for a particular debt instrument may be used to make the final payment on that debt instrument. The PUD must continue to fully fund such reserves as required by bond covenant or loan agreement. Since the debt reserve provides a static reserve against inability to pay, it is unnecessary to maintain operating reserves against debt repayment.

A debt reserve equal to one year's debt service is assumed for any new revenue bonds projected as part of this study.

System Reinvestment (Rate Funded Capital)

A utility's infrastructure (e.g., substations, distribution poles, transmission/distribution pipes, etc.) is a critical element of serving the PUD's customers. Establishing a financial plan for the eventual replacement of these assets ensures system reliability and integrity. This practice is known as system reinvestment funding. In the absence of a formal asset management plan, target system reinvestment funding levels are commonly linked to annual depreciation expense. Depreciation expense is a measure of the decline in asset value associated with routine use of the system.

Particularly for utilities that do not already have an explicit system reinvestment policy in place, implementing a funding level based on full depreciation expense could significantly impact rates. A common alternative benchmark is annual depreciation expense net of debt principal payments on outstanding debt. This approach recognizes that customers are still paying for certain assets through the debt component of their rate and intends to avoid simultaneously charging customers for an asset and its future replacement. The specific benchmark used to set system reinvestment funding targets is a matter of policy that must balance various objectives including managing rate impacts, keeping long-term costs down, and promoting "generational equity" (i.e. not excessively burdening current customers with paying for facilities that will serve a larger group of customers in the future).

The PUD does not have a formal policy regarding system reinvestment funding. This study utilizes cash flow after O&M and annual debt service to pay for capital in place of a formal system reinvestment policy. Equating annual cash flow to annual depreciation expense indicates that the PUD's electric utility is able to generate cash flow of at least 100.00 percent of annual depreciation by the end of the study period. The PUD's water utility is not able to reach this goal during the study period generating cash flow up to 51.00 percent of annual depreciation.

Debt Management

Debt financing is a viable tool for capital funding. Compared with pay-as-you-go funding, debt smooths out the rate impact of a capital program by spreading costs over time. It also creates intergenerational equity – also referred to as "pay-as-you-use" because future customers who use the assets are the ones paying for them. However, debt should not be relied on too heavily as it carries the risk of default. Debt also reduces budget flexibility – cash-funded capital projects can be delayed if there is a revenue shortfall, but once the utility has issued debt, the debt service needs to be paid in good times or bad. While debt is a useful part of the capital funding toolbox, it needs to be monitored to ensure that the system does not become too heavily dependent on it. To evaluate the PUD's debt level, two measurements are utilized: debt service coverage and times interest earned ratio (TIER).

- ***Debt Service Coverage***. Debt service coverage is typically a requirement associated with revenue bonds and some State loans and is a financial measure assessing the ability to repay debt.

  A typical minimum coverage requirement for utility revenue bonds is 1.25. If the PUD issues debt, the coverage requirements essentially require that the PUD collect enough revenue to meet operating expenses and not only pay debt service but collect an additional 25.00 percent above the bonded debt service. The extra revenue is a cushion that assures bondholders that the PUD has the financial resources to meet its debt service obligations. The PUD also measures debt service coverage excluding certain non-operating revenues. This is called operating debt service

coverage. Revenues excluded include interest income, contribution in aid of construction (CIAC), and revenues from timber sales. The PUD's existing target for debt service coverage is 1.25, while their target for operating debt service coverage is 1.10. For the electric utility these are assessed on the average of the best two years from the past three. This study assumes 1.25 as the minimum target for debt service coverage and 1.10 for operating debt service coverage. It is important to note, that any new revenue bonds assumed for the water utility are assumed to only have a minimum debt service coverage of 1.25 – no operating debt service coverage is assumed. It is also assumed that this type of debt would be assessed only using one year of financials, instead of an averaging approach used for the electric utility. Achieving a bonded debt service coverage level greater than the minimum required level is a positive signal to bond rating agencies and can result in more favorable terms when the PUD enters the market for revenue bonds.

- ***Times Interest Earned Ratio (TIER)***: The times interest earned ratio or TIER is a metric used to evaluate the level of financial resources available to the utility to meet interest expenses associated with long-term debt. The ratio measures the total margins and interest expenses against interest expenses each year. A ratio exceeding 1.00 indicates that the utility has sufficient cash resources to meet its annual interest expenses. A ratio below 1.00 each year indicates a deficiency in financial capacity to meet these obligations. The PUD also measures annual financial performance based on an operating TIER which excludes non-operating revenues such as interest earnings, CIAC, and revenues from timber sales. The PUD's electric utility financial policies include a minimum TIER target of 1.25 and a minimum operating TIER target of 1.10. This study assumes the same minimum targets as used by the PUD and no targets for the water utility.

REVENUE REQUIREMENT

A revenue requirement analysis forms the basis for a long-range financial plan and multi-year rate revenue management strategy. It also enables the PUD to set utility rate structures which fully recover the total cost of operating their utilities: capital/equipment improvement and replacement, operations, maintenance, power, general administration, fiscal policy attainment, cash reserve management, and debt repayment. Linking rate levels to a financial plan such as this helps enable sound financial performance for the PUD's utilities. It also establishes a clear and reasonable relationship between the costs imposed on utility customers and the costs incurred to provide service.

A revenue requirement analysis includes the following core elements to form a complete portrayal of each utility's financial obligations.

- ***Fiscal Policy Analysis***. Identifies formal and informal fiscal policies of the PUD to ensure fiscal sustainability and consistent financial management. Policies considered include reserve levels, capital/system replacement funding and debt management.
- ***Capital Funding Plan***. Defines a strategy for funding the PUD's capital improvement/equipment replacement program, including an analysis of available resources from rate revenues, debt financing, and any special resources that may be readily available (e.g., contributions, grants).
- ***Operating Forecast***. Identifies future annual non-capital costs associated with the operation, maintenance, and administration of the system.
- ***Sufficiency Testing***. Evaluates the sufficiency of revenues in meeting all financial obligations, including any coverage requirements associated with long-term debt.

- ***Strategy Development***. Designs a forward-looking strategy for adjusting rates to fully fund all financial obligations on a periodic or annual basis over the forecast period.

COST OF SERVICE

The purpose of a cost-of-service analysis is to provide a rational basis for distributing the costs of providing utility service to each customer class of service in proportion to the demands they place on the system. Detailed cost allocations, along with appropriate customer class designations, help to sharpen the degree of equity that can be achieved in the resulting rate structure design. The key analytical steps of the cost-of-service analysis are as follows:

- ***Functional Cost Allocation***. Apportions the annual revenue requirement to the major functions of service required to deliver utility service.
- ***Cost Classification***. Within each function of service, costs are further broken down into cost categories with similar relationship to a measurable cost-defining service characteristic. Costs directly attributed to specific customers can be directly assigned to those customers or classes of customers.
- ***Customer Class Designation***. Identifies the customer classes that will be evaluated as part of the study. Existing as well as new or revised customer classes or class definitions may be considered. It is appropriate to group customers that exhibit similar usage characteristics and service requirements.
- ***Customer Cost Allocation***. Allocates the costs from the functional cost allocation and classification to different customer classes based on their unique demands for each service as defined by system planning documents, industry standards, and recorded user history (billing data). The results identify shifts in cost recovery by customer class from that experienced under the existing rate structure.

RATE DESIGN

The principal consideration of rate design is for the rate structure to generate sufficient revenues for each system which are reasonably commensurate with the cost of providing service. The specific activities of the utility are analyzed in order to identify variable costs and fixed costs within the system. For example, the cost of meter reading services is a relatively fixed cost regardless of the amount of usage a customer requires and can be recovered from a fixed monthly charge. Conversely, the cost of energy can vary widely from customer to customer and is typically recovered through a variable charge. Aligning fixed and variable costs with a fixed and variable rate structure ensures a rational relationship between how costs are incurred by the PUD and how those costs are recovered through the PUD's rates. Additionally, while all costs must be recovered through rates, the pricing structure is often largely dictated by the objectives of the operation. Utilities may choose to incorporate incentives into the rate design to encourage a desired behavior (e.g., conservation). These considerations can have the effect of improving rate structure alignment with the desired goals and objectives such as cost recovery, equity, and sustainability.

Section III. Electric Utility

In 2008, a ballot measure was approved allowing the PUD to pursue the acquisition of the electric assets located in the County that were owned by Puget Sound Energy (PSE). After two years of negotiations, the PUD purchased the assets for $103 million. During this transition, the PUD was able to come to an agreement with Bonneville Power Authority (BPA) for its power needs. The PUD officially took control of the existing PSE assets in April of 2013. This marked the first time in 65 years that a public electric entity in Washington took control of a private system. Today, the PUD serves approximately 20,000 customers throughout the County.

REVENUE REQUIREMENT

The revenue requirement evaluates the amount of revenue that a utility's rates must generate to meet its various financial obligations. This analysis has two main purposes – it serves as a means of evaluating the utility's fiscal health and adequacy of current rate levels, and it sets the revenue basis for near-term and long-term rate planning. The analysis is defined as the net difference between total revenue needs and the revenue generated through non-rate sources. Hence, the revenue requirement analysis involves defining and forecasting both needs and resources.

Operating Forecast

The purpose of the operating forecast is to determine whether the existing rates and charges are sufficient to recover the costs the utility incurs to operate and maintain the electric system. The operating forecast was developed for the 2020 to 2030 time period, with a rate setting implementation focus period of 2021 through 2024. The budgeted expenses in 2020 and 2021 formed the starting point for the forecast. The operating forecast also includes future projections for load, revenues, operating expenses, debt service, and financial reserve requirements. The following sections describes each component of the operating forecast.

Load Forecast

The load forecast is a critical piece of the rate study process as it is used for three primary purposes:

- Determines the amount of power that is required to be purchased from Bonneville Power Administration and non-federal sources to meet customer needs;
- Used to calculate projected rate revenues that will be received from individual customer classes of service; and
- Establishes customer class-specific load projections, which are used in the cost-of-service analysis.

Different approaches were used to develop the customer class load profiles for the PUD. A regression analysis was performed using the 2017 to 2019 customer data to determine the relationship between energy usage and heating degree days. This analysis demonstrated a strong correlation between usage and heating degree days for Residential, General Service, Small Demand General Service, and Primary School customers. The amount of heating degree days by month was analyzed for the past ten years to determine the likely ranges during a typical year. A weather normalized load forecast

was developed using the regression analysis and applying the 60th percentile of long-term heating degree trends. For Large Demand General Service, Primary General Service, Irrigation, and the PUD's own usage, energy consumption is set equal to 2019 usage plus growth. Load for the PUD's wholesale customer is assumed equal to their 2018 actual consumption. Load for the Lighting customers is based on the bulb types and the amount of daylight hours by month. Losses are added to the forecast retail sales by class to estimate the total system retail load requirements.

Financial Reserves

- ***Operating Reserve***. An operating reserve is designed to provide a liquidity cushion; it protects the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses and can help smooth rate increases over time. The study assumes a target of 90 days of operating, maintenance, and power expenses. The PUD maintains a line of credit (LOC) of $5.0 million. It is assumed that the LOC can be used to meet the operating reserve targets for any utility. The minimum reserve target is equivalent to approximately $7.2 million to $9.3 million per year.

  Based on direction from the auditor, the PUD had to reallocate reserve balances from the water to the electric utility. With this change in cash accounting, the water utility indicated a shortfall in 2020. To alleviate the immediate impact to the water utility, the electric utility lent the water utility $5.0 million in 2020. It is assumed that the interfund loan will be repaid back over a 10-year period with annual interest of 2.00 percent.

- ***Construction Reserve.*** A construction reserve is designed to fund emergency or unanticipated capital needs. These needs may occur when an asset fails unexpectedly or a project experiences cost overruns. The PUD instituted a construction reserve in 2020 to be phased-in overtime with the minimum target equal to a half year of average capital spending. This minimum target is equal to $2.4 million. This analysis assumes the PUD would hit that target by 2025.

Operating Revenues

- ***Retail Rate Revenue.*** Revenues at present rates were forecasted into the future utilizing the load forecast discussed above, and the 2020 rates by class of service.
- ***Customer & Load Growth.*** Based on discussions with PUD staff, load growth for all customer classes is set equal to customer growth. Customer growth is set at 0.00 percent for all classes except residential, which assumed a 0.98 percent growth rate per year.
- ***Non-Rate Revenue.*** Consists primarily of late charges, rent from electric property, fiber sales, revenue from timber sales, and other miscellaneous revenues.
- ***Interest Earnings.*** The rate used to calculate annual interest earnings on unused fund balances during the study period is 1.50 percent and is based on feedback from PUD staff.

Operating and Maintenance (O&M) Expenses

- ***General Cost Inflation.*** 2.00 percent per year; based on the rounded ten-year average of the consumer price index.
- ***Construction Cost Inflation***. 3.00 percent per year; based on the rounded ten-year average of the Engineering News-Record (ENR) construction cost index.
- ***Labor Cost Inflation.*** 3.25 percent per year; based on discussions with PUD staff.
- ***Benefit Cost Inflation.*** 6.00 percent per year; based on discussions with PUD staff.

- ***Taxes.*** State excise and privilege taxes are assessed on PUD revenues. The State excise tax rate is 3.8734 percent of revenues. The State privilege tax rate is 2.14 percent of revenues. The State business and occupation tax is 1.75 percent.

Purchased Power

As with most electric utilities, the largest expense that the PUD's electric utility incurs is for power supply and transmission. The PUD receives all of its power supply needs from BPA. Given the magnitude and importance of power costs, all purchased power costs have been projected on a monthly basis for the study period using the load forecast. The following assumptions were incorporated into the power forecast:

- ***BPA Billing Determinants.*** BPA's published federal fiscal year (FFY) 2020 rates and billing determinants were used as a baseline for the power cost forecast. Future power and transmission cost increases are assumed at 5.00 percent every other year starting in FFY 2022.

Debt Service

- ***Existing Debt.*** The electric utility's existing debt consists of two Rural Utilities Service (RUS) loans. Annual debt service for all existing debt is $6.0 million for all periods of the analysis.
- ***New Debt.*** No new debt is projected as part of this forecast.

Other Financial Policies

As discussed in Section II Rate Study Methodology, the following financial policy targets are included in the revenue requirement. For descriptions of these policies and targets, please refer to Section II.

- ***Debt Service Coverage.*** The minimum debt service coverage ratio target is 1.25 for annual debt service associated with existing debt and 1.10 for the operating debt service coverage calculation.
- ***Times Interest Earned Ratio (TIER).*** The minimum annual TIER ratio is 1.25 and 1.10 for the operating TIER ratio.

System Reinvestment (Rate Funded Capital)

System reinvestment funding ensures system integrity through ongoing repair and replacement. As discussed in Section II Rate Study Methodology, the PUD does not have a formal policy regarding system reinvestment. The study utilizes remaining cash flow after O&M and annual debt service to pay for capital in place of a dedicated funding component for annual system reinvestment. Equating annual cash flow to annual depreciation expense indicates that the PUD is maintaining annual cash flow of at least 100.00 percent of annual depreciation throughout the majority of the study period.

Capital Funding Plan

The electric utility's original capital plan anticipates $72.3 million in capital costs from 2020 to 2030. The capital plan is detailed by project through 2023. Starting in 2024, a placeholder is utilized based on historical averages and discussion with PUD staff. Major projects within the 2021 to 2024 rate setting period include Meter Replacement, Facilities Upgrade Construction, and various transmission and distribution replacement projects.

Exhibit 3.1 provides a summary of the funding sources for the capital funding expenditures from 2020 to 2030. Based on this funding plan, the PUD will finance 100.00 percent of the capital plan with cash from rates and existing reserves.

Exhibit 3.1
Capital Funding Summary

Capital Funding Summary	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Capital Project Costs	$ 6,876,000	$ 6,210,900	$ 6,106,010	$ 5,763,589	$ 6,175,667	$ 6,360,937	$ 6,551,765	$ 6,748,318	$ 6,950,767	$ 7,159,290	$ 7,374,069	$72,277,312
Funding Sources												
Cash/Reserves	$ 6,876,000	$ 6,210,900	$ 6,106,010	$ 5,763,589	$ 6,175,667	$ 6,360,937	$ 6,551,765	$ 6,748,318	$ 6,950,767	$ 7,159,290	$ 7,374,069	**$72,277,312**
Debt Proceeds	-	-	-	-	-	-	-	-	-	-	-	-
Total Funding Sources	$ 6,876,000	$ 6,210,900	$ 6,106,010	$ 5,763,589	$ 6,175,667	$ 6,360,937	$ 6,551,765	$ 6,748,318	$ 6,950,767	$ 7,159,290	$ 7,374,069	$72,277,312

Summary of Revenue Requirement

The operating forecast components come together to form the multi-year projection. The analysis compares the overall revenue available to the electric system to the expenses and evaluates the sufficiency of current rates on an annual basis. **Exhibit 3.2** through **Exhibit 3.7** illustrate a summary of the revenue requirement findings.

Exhibit 3.2
Electric System Revenue Requirement Summary Before Increases

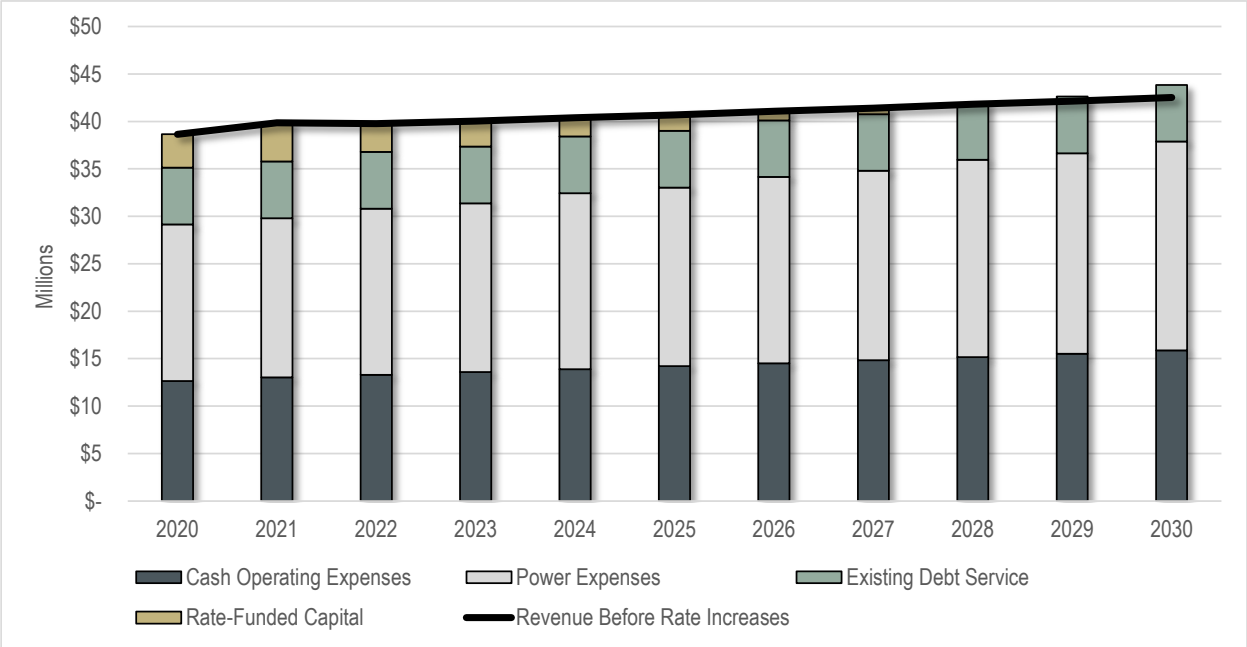


Exhibit 3.3
Electric System Combined Operating & Construction Reserve Summary Before Increases

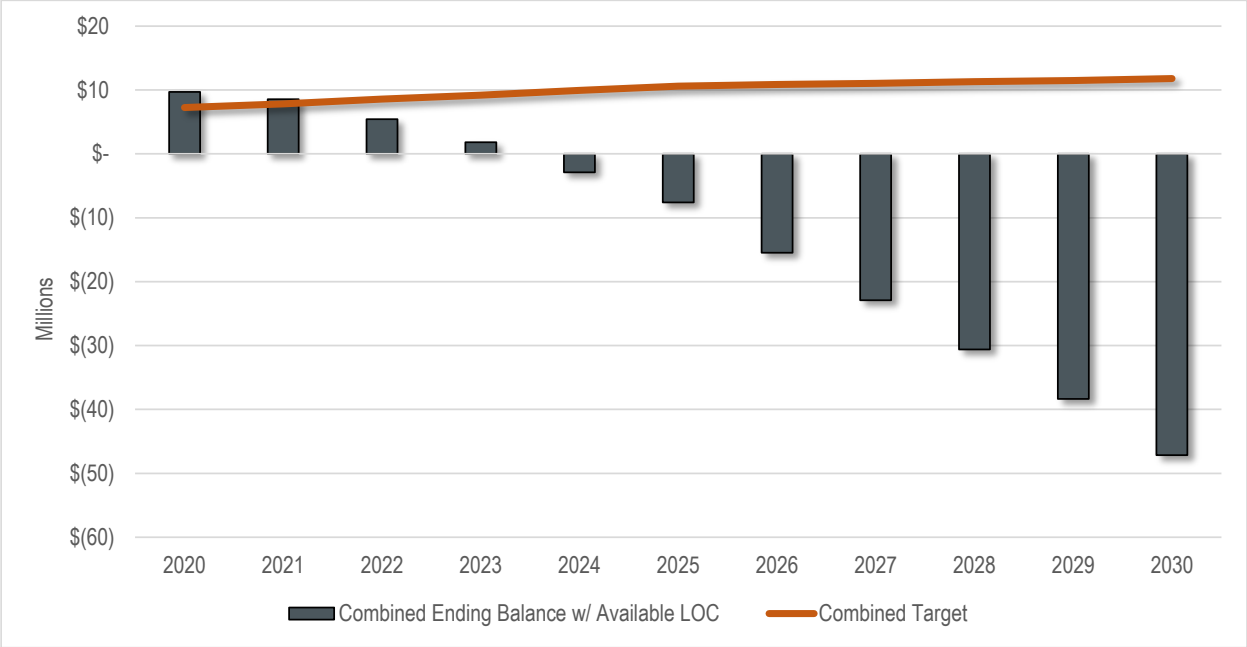


Exhibit 3.4
Debt Service Coverage Ratio: Minimum Target and Forecast Before Increases

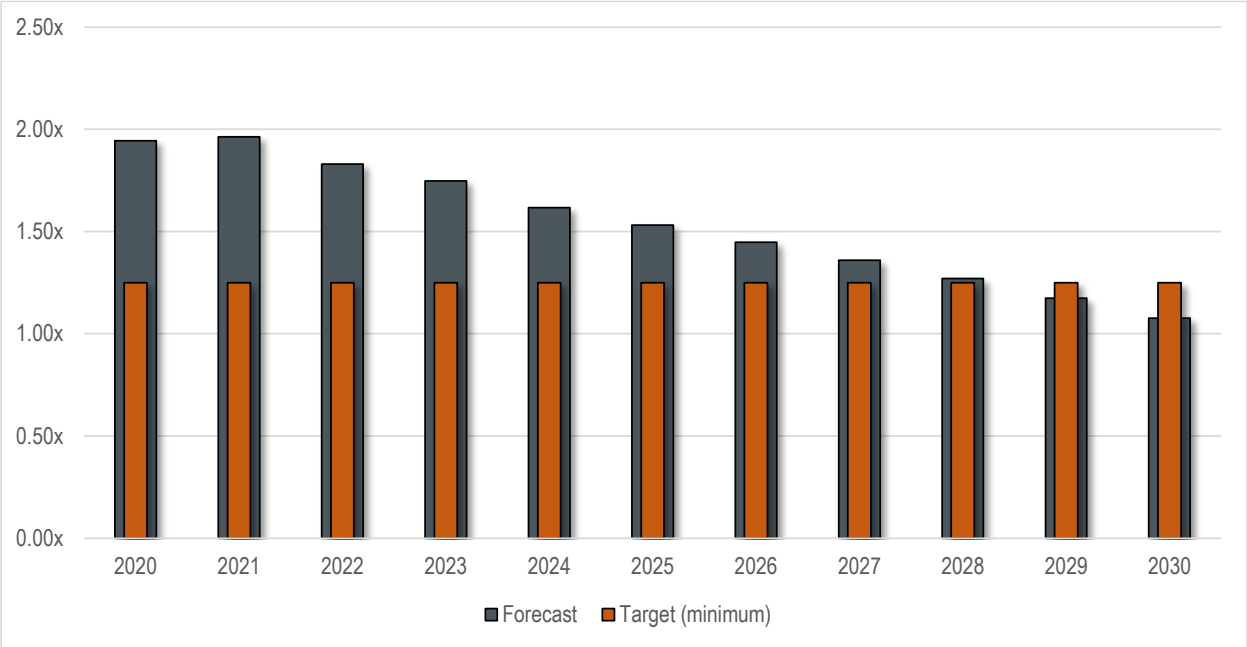


Exhibit 3.5
Operating Debt Service Coverage: Minimum Target and Forecast Before Increases

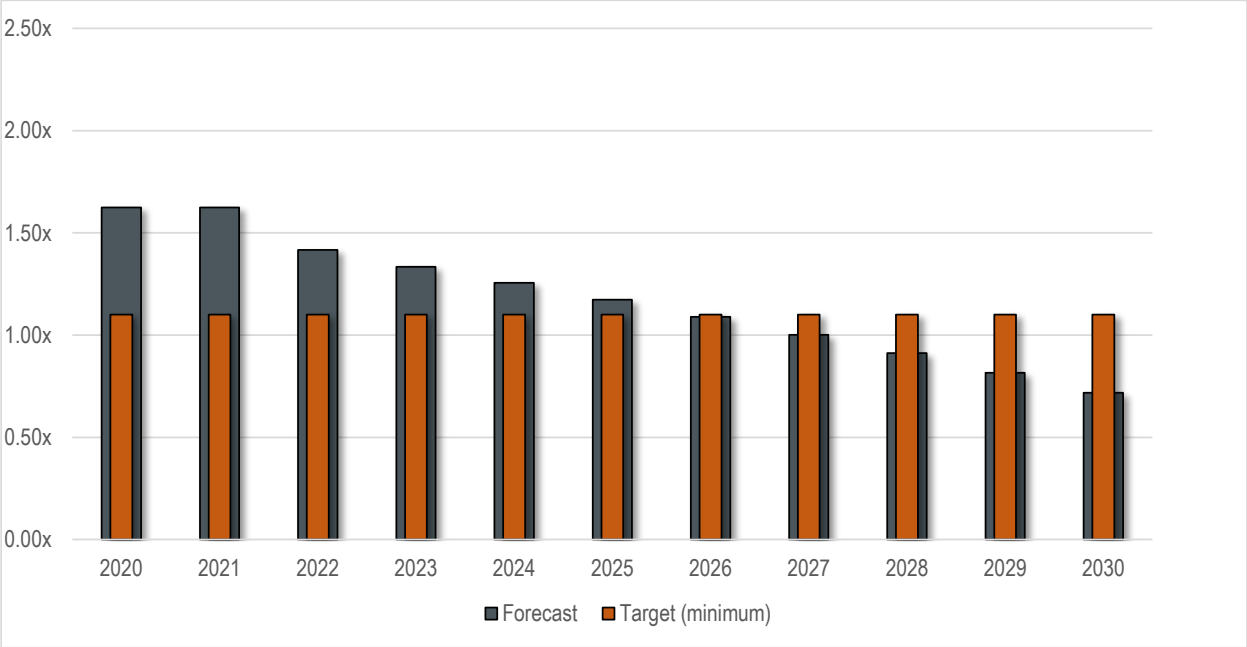


Exhibit 3.6
Times Interest Earned Ratio (TIER): Minimum Target and Forecast Before Increases

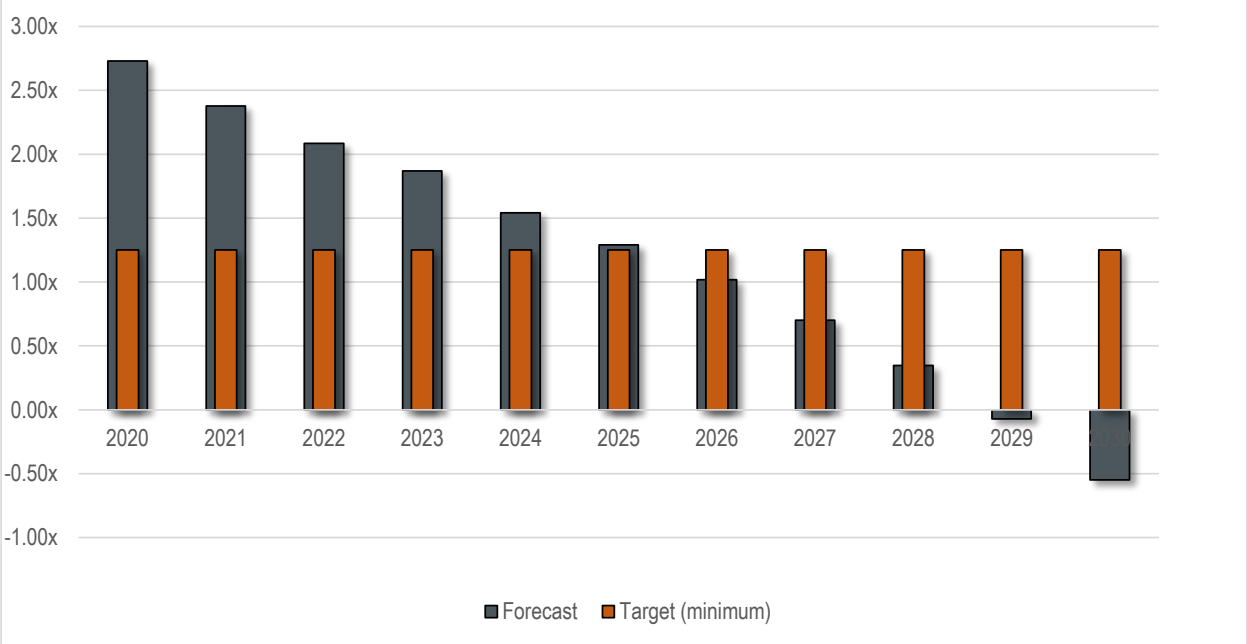
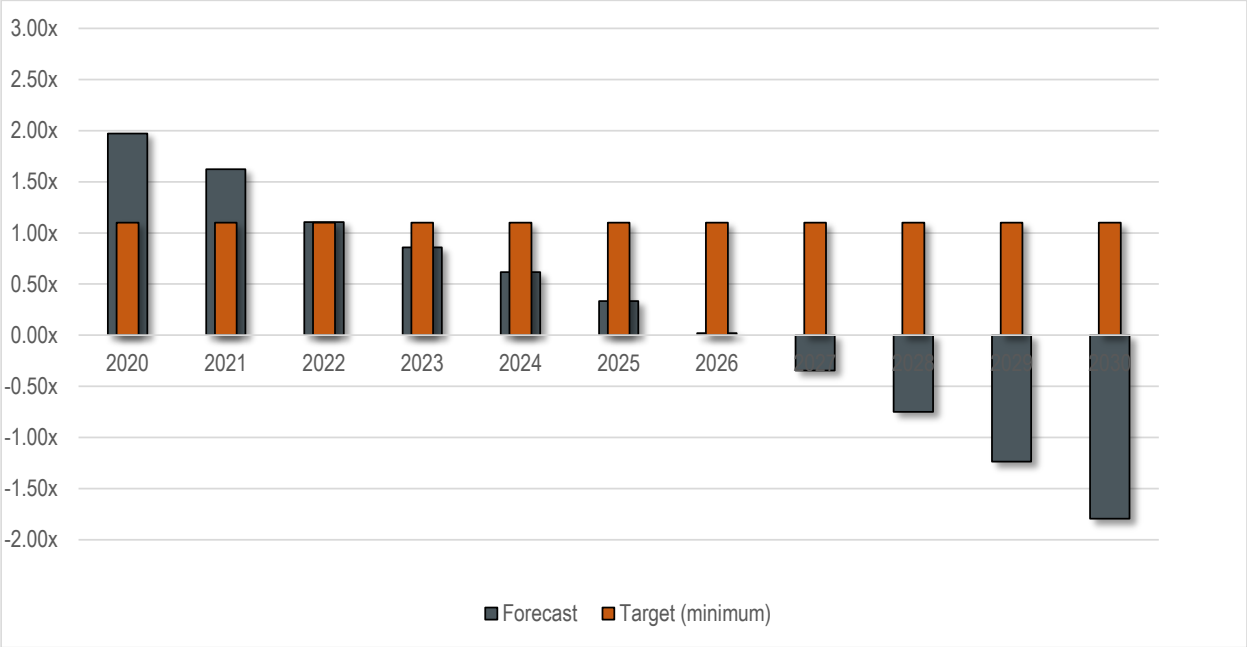


Exhibit 3.7
Operating TIER: Minimum Target and Forecast Before Increases



Key observations of the revenue requirement before rate increases include:

- As identified in **Exhibit 3.2** revenues at existing rates are sufficient to meet cash operating expenses (including power), existing debt, and partial rate funded system reinvestment funding from 2019 to 2027. Beginning in 2028, rate revenues are not expected to keep pace with the utility's operating expenses or system reinvestment funding.
- Combined operating and construction fund balances, as expressed in **Exhibit 3.3,** drop below target levels starting in 2022 and go negative starting 2024.
- Debt service coverage goes below minimum target levels starting in 2029 as illustrated in **Exhibit 3.4**.
- Operating debt service coverage goes below minimum target levels starting in 2026 as illustrated in **Exhibit 3.5**.
- TIER goes below minimum target levels starting in 2026 as illustrated in **Exhibit 3.6**.
- Operating TIER goes below minimum target levels starting in 2023 as illustrated in **Exhibit 3.7**.

Key observation of the revenue requirement after rate increases include:

- To meet the projected financial obligations and financial policy targets, including capital projects, annual rate revenue adjustments are needed from 2021 to 2027. The rate setting implementation focus period indicates a need for rate adjustments of 4.00 percent in 2021, followed by 4.25 percent in 2022 through 2024. Looking beyond the rate setting implementation period, additional increases are forecasted at 2.00 percent from 2025 through 2027 with a potential for no rate adjustments in 2028 through 2030. With these rate revenue adjustments:
  - » Operating reserves, with available LOC amounts, achieve the PUD's target of 90 days of operating expenses from 2020 to 2021, in 2025, and from 2027 to 2030. From 2022 to 2024 and in 2026, the PUD is not able to meet the operating reserve target, falling to a minimum of

81 days of operating expenses. The projected operating fund balance resulting from the revenue increases is illustrated in **Exhibit 3.8**.

- Debt service coverage ratio requirements of 1.25 are exceeded each year of the forecast as expressed in **Exhibit 3.9**. The debt service coverage ratio is projected to remain above 1.75 throughout the forecast.
- Operating debt service coverage requirements of 1.10 are exceeded in every period of the forecast, staying above 1.50 in all periods as illustrated in **Exhibit 3.10**.
- The minimum TIER ratio target of 1.25 is met in each year of the forecast as illustrated in **Exhibit 3.11**. The TIER is projected to remain above 2.25 throughout the forecast period.
- The minimum operating TIER ratio target of 1.10 is met in each year of the forecast as illustrate in **Exhibit 3.12**. The operating TIER is projected to remain above 1.25 in all periods of the forecast.

Exhibit 3.8
Electric System Combined Operating & Construction Reserve Summary After Increases

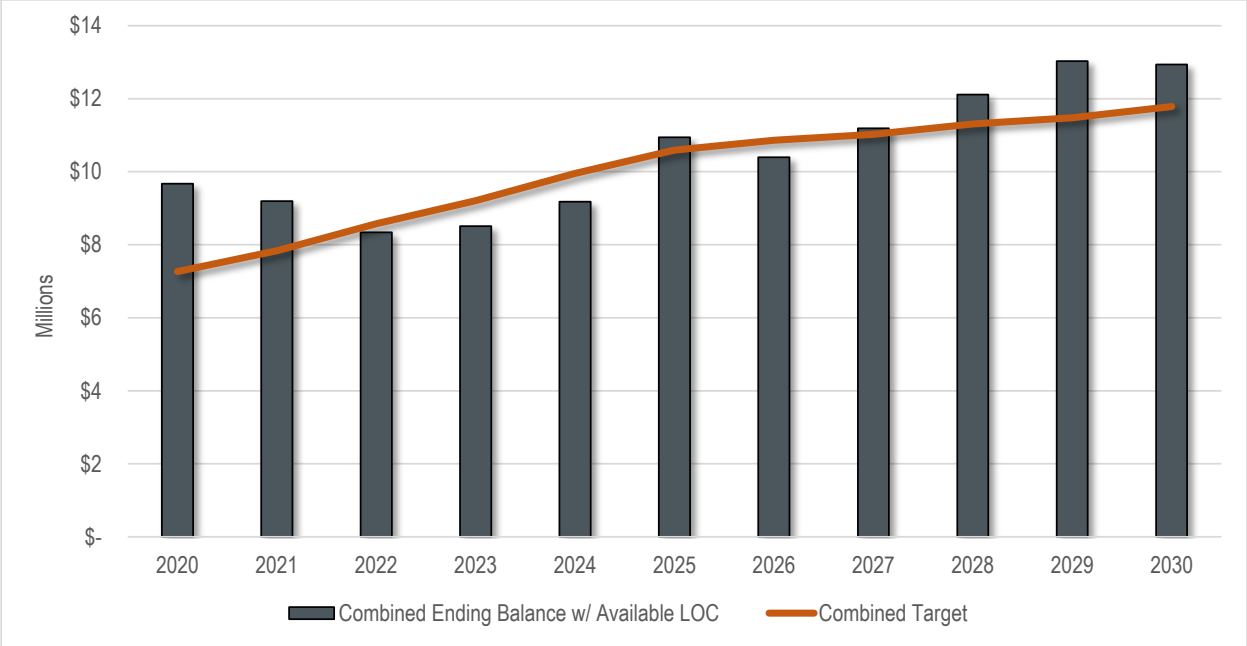


Exhibit 3.9
Debt Service Coverage Ratio: Minimum Target and Forecast After Increases

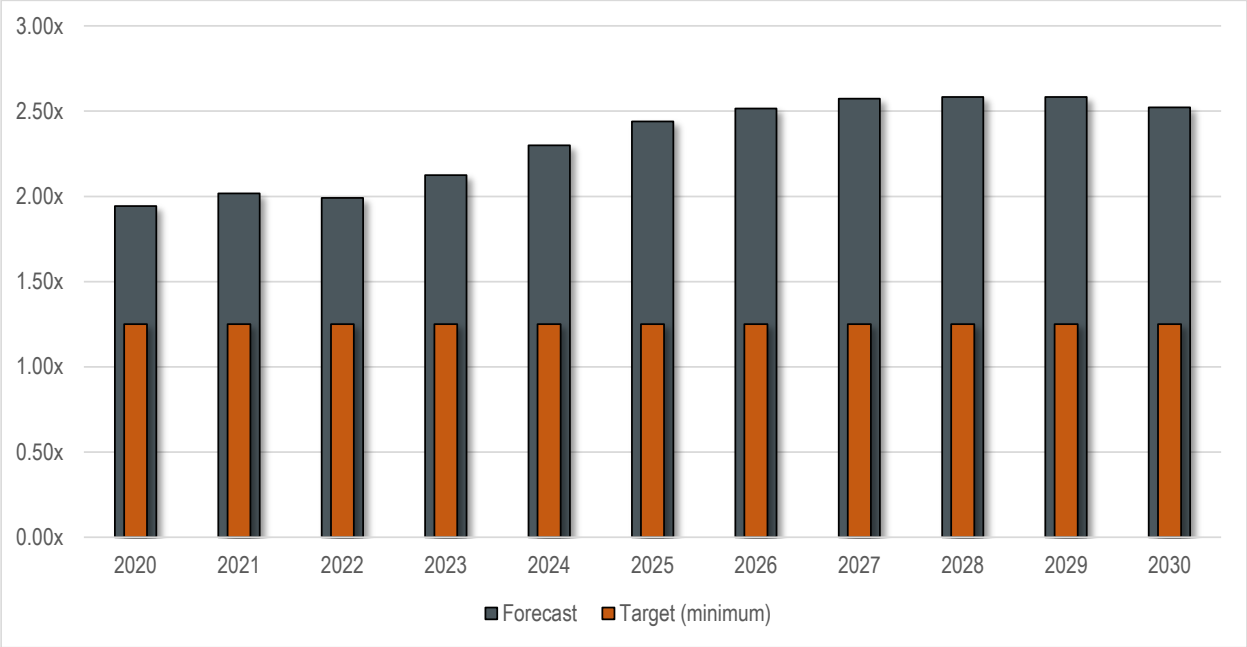


Exhibit 3.10
Operating Debt Service Coverage Ratio: Minimum Target and Forecast After Increases

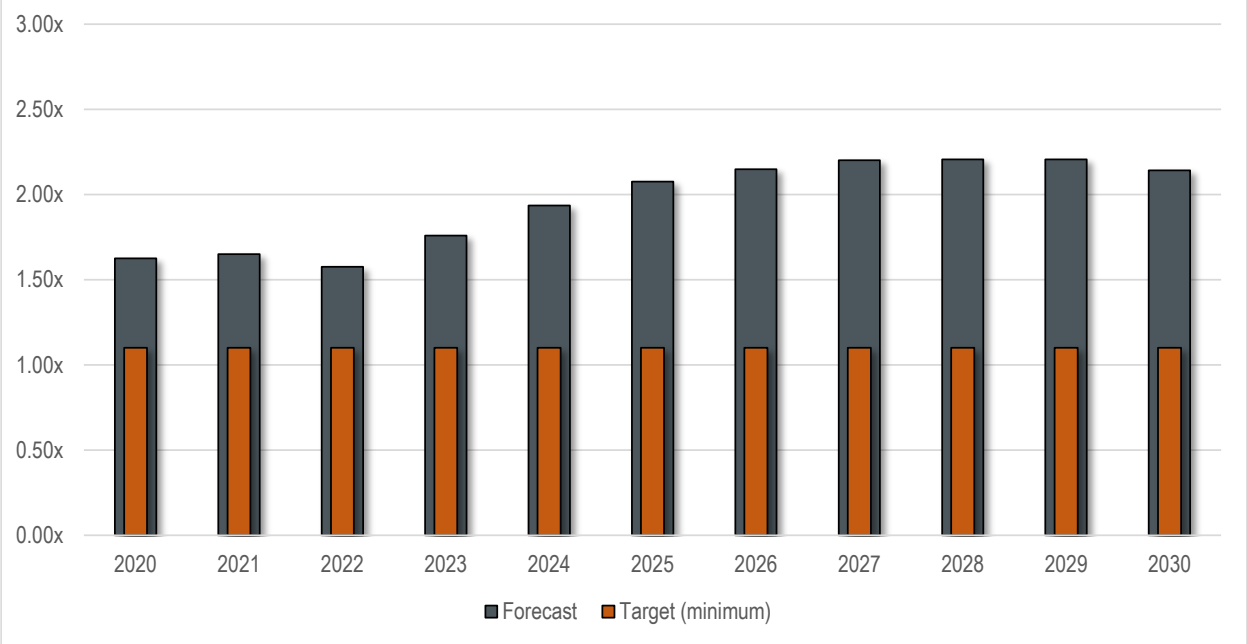


Exhibit 3.11
Times Interest Earned Ratio (TIER): Minimum Target and Forecast After Increases

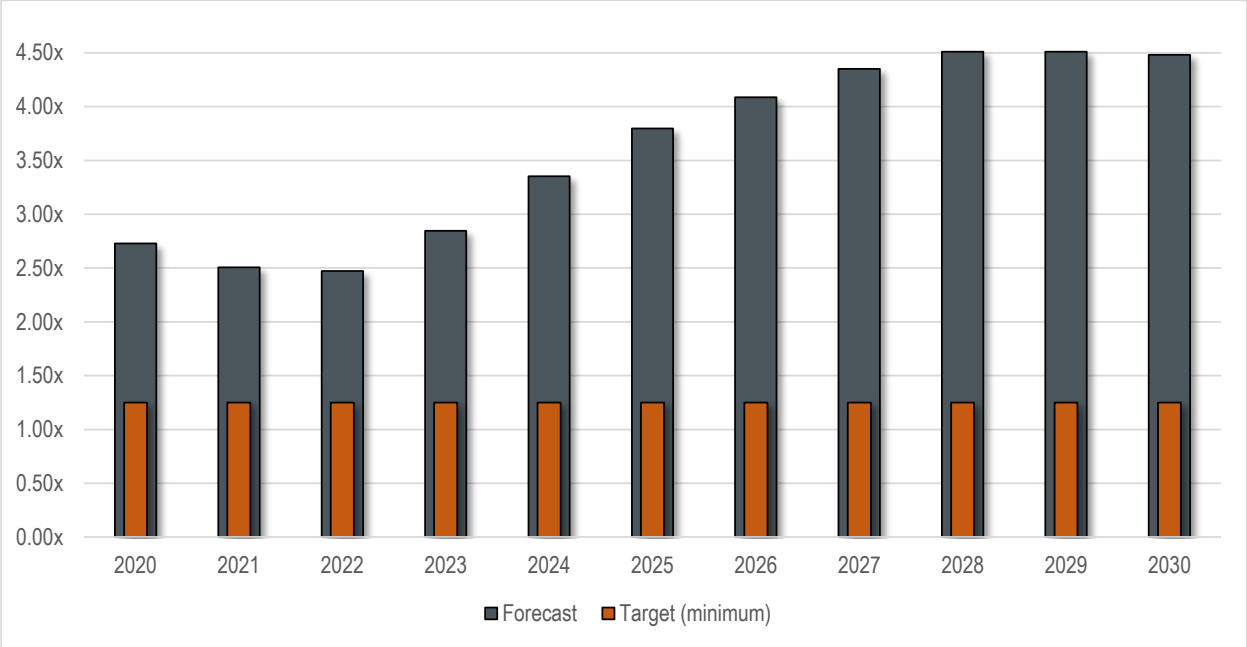
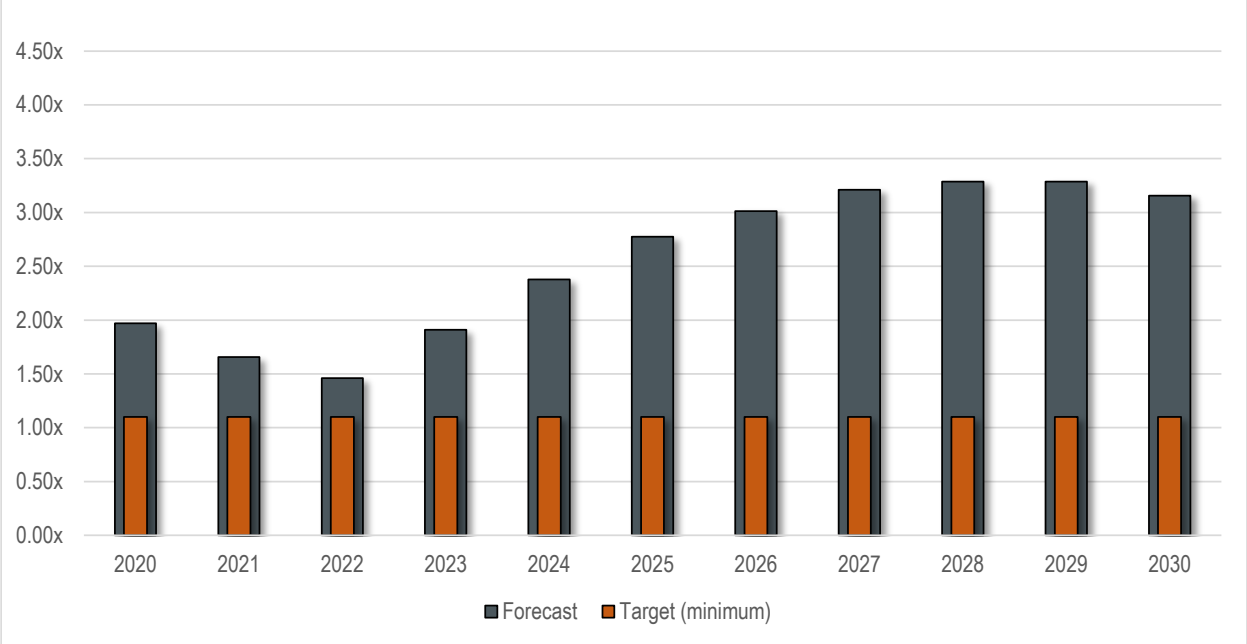


Exhibit 3.12
Operating TIER: Minimum Target and Forecast After Increases



COST OF SERVICE ANALYSIS

As discussed in Section II Rate Study Methodology, a cost-of-service analysis determines the equitable allocation of costs to customers given their service needs and characteristics. The study consists of the following fundamental steps to allocate the revenue requirement to each customer class and helps inform the development of final rates:

1. Functional Cost Allocation
2. Cost Classification
3. Customer Class Designation
4. Customer Cost Allocation

It should be noted that the power and administrative costs associated with the PUD's wholesale customer were identified and removed in order to evaluate the cost to serve the remaining electric customers.

The procedure applied, and the assumptions used to complete these steps of the cost-of-service process are discussed in detail in the remainder of this section.

Functional Cost Allocation

The first step of the cost-of-service analysis is to functionalize both plant assets and expenses into major functions of service. Using Federal Energy Regulatory Commission (FERC) Uniform System of Accounts, plant assets and expenses were grouped into the following functions of service:

- ***Power.*** Costs associated with the procurement of power. Includes delivery of power to the bulk transmission system.
- ***Transmission.*** Costs associated with movement of purchased power from point of origin to the PUD's service area.
- ***Distribution.*** Costs associated with delivering electricity from substations to customers served by the PUD. These costs may include station equipment, poles, towers, fixtures, overhead and underground lines, transformers, meters and services, customer related minimum system needs as well as costs directly attributed to individual customers or classes of customer.
- ***Customer.*** Costs associated with having a customer on the system. These costs vary with the addition or deletion of customers, and do not vary with amount of usage of electricity. Some examples include meter reading, customer billing and accounting services.

By utilizing FERC Uniform System of Accounts, plant assets and expenses align directly with functions of service. General plant and general operating expenses, such as administrative and general (A&G) costs are functionalized based on all other plant and expenses that they support – as all other expenses. The following exceptions are accounted for in the functionalization process:

- Staff time associated with the BPA contract that is booked into load dispatching is allocated to the power function. The remaining costs are allocated to the distribution function.
- Staff time associated with the BPA contract that is booked into administrative & general salaries is allocated to the power function. The remaining costs in this line item are allocated as all other expenses.
- Property insurance is allocated as plant in service before depreciation.
- Maintenance of general plant is allocated as general plant assets.

A detailed description of plant and expense allocations for the test year are summarized in **Exhibit 3.13** and **Exhibit 3.14**.

Exhibit 3.13
Functional Allocation Summary of System Assets (2018)

Functionalization of Plant Assets	Power	Transmission	Distribution	Customer	Total
Plant In Service					
Intangible Plant	$ -	$ 1,530	$ 14,939	$ -	**$ 16,470**
Transmission Plant	-	9,034,072	-	-	**9,034,072**
Distribution Plant	-	-	88,190,033	-	**88,190,033**
General Plant	-	409,523	3,997,740	-	**4,407,263**
Total Plant in Service	**$ -**	**$ 9,445,125**	**$ 92,202,712**	**$ -**	**$ 101,647,837**
Depreciation	**$ -**	**$ (5,385,359)**	**$ (39,964,986)**	**$ -**	**$ (45,350,345)**
Net Plant in Service	**$ -**	**$ 4,059,766**	**$ 52,237,726**	**$ -**	**$ 56,297,492**

Exhibit 3.14
Functional Allocation Summary of Test Year Revenue Requirement (2021)

Revenue Requirement	Power	Transmission	Distribution	Customer	Total
Purchased Power	$ 13,805,553	$ -	$ -	$ -	**$ 13,805,553**
Transmission	-	55,984	-	-	**55,984**
Distribution - Operations	12,128	-	2,032,302	-	**2,044,430**
Distribution - Maintenance	-	-	3,757,580	-	**3,757,580**
Customer Accounts	-	-	-	1,476,803	**1,476,803**
Customer Service & Information	-	-	-	27,816	**27,816**
Administrative & General	5,118	34,476	2,640,316	661,080	**3,340,990**
Taxes & Other	1,047,305	35,703	900,967	159,534	**2,143,510**
Existing Debt Service	-	554,985	5,417,729	-	**5,972,714**
Net Cash Flow	-	499,204	4,873,194	-	**5,372,397**
Total Expenses	**$ 14,870,105**	**$ 1,180,351**	**$ 19,622,087**	**$ 2,325,233**	**$ 37,997,776**
less: Non-Rate Revenue	-	(174,231)	(1,957,607)	(60,370)	**(2,192,209)**
Total Revenue Requirement	**$ 14,870,105**	**$ 1,006,120**	**$ 17,664,480**	**$ 2,264,863**	**$ 35,805,567**

Cost Classification

Once costs are functionalized, the next step of the cost-of-service analysis is to classify, or combine, costs within each function of service into cost categories with similar relationships to measurable cost-defined service characteristics. The objective of this step of the analysis is to classify costs based on cost causation or the cost drivers. For electric utilities, cost drivers are organized into four broad categories:

- ***Demand.*** Costs predicated upon the maximum rate of use required at one point in time. Demand may be coincident or non-coincident to the system peak.
- ***Energy.*** Costs that vary with the total (average) consumption of electricity over a specified period.
- ***Customer.*** Costs associated with providing service to customers, regardless of the level of electrical consumption.
- ***Direct.*** Costs directly attributed to benefitting or being incurred for a specific customer or class of customers.

The general approach to classification is to first assign the utility's plant in service to the cost drivers. The test period expenses are then based on the related plant account or directly assigned to one of the cost drivers.

Cost Classification of Plant in Service Assets

Each functional component of plant in service infrastructure is classified as follows:

- ***Intangible (FERC 301 to 302).*** The PUD's intangible assets are classified following the total plant in service for transmission and distribution assets. The classification for the transmission and distribution plant assets is described below.
- ***Transmission (FERC 350 to 359.1).*** Transmission systems generally are configured as an integrated network, where power may flow over several paths to points on the utility's system. Transmission systems are designed to transmit power from a single point of integration to a single point of delivery. Because the utility's transmission assets are sized based on maximum load conditions, transmission assets are classified to support demand-related costs.
- ***Distribution (FERC 360.1 to 373.1)***. Distribution facilities reduce high voltage energy from the transmission system and deliver it to the retail loads. Most distribution expenses are attributed to meeting peak demands and/or are a function of the number of customers served. The classification of distribution costs for the PUD is as follows:
  - » Land/land rights and structures improvements are allocated as 100.00 percent primary demand.
  - » Substation costs are typically classified as demand-related on the basis that substations are typically built to serve a local peak of a certain size – 100.00 percent primary demand.
  - » Poles, conductors, devices and transformers are split between demand and customer classifications. The allocation between these two classifications is generally based on two different approaches.
    - The "minimum system" or "minimum size" approach allocates the standard costs or replacement cost of the minimally sized system (e.g., pole, conductor, transformer) as a customer-related cost on the basis that the utility would incur at least this level of cost to stand "ready to serve" its customers, regardless of the size of the load being served. Actual costs in excess of this amount, presumably driven by the utility's need to size these facilities to meet a peak load, are classified as being demand related. If applicable these costs are split between primary and secondary.
    - The second approach, known as the "minimum intercept" method, is more theoretical compared to the minimum system approach. The minimum intercept method identifies a hypothetical zero load cost of distribution assets and assigns this cost as the customer-related portion. The remaining costs are assigned as demand to meet peak load requirements.
    - Selecting an approach to classify distribution-related costs is dependent on multiple factors including the reliability of asset costs and inventory data. Generally, the minimum intercept method produces more accurate results; however, it does require more data and, depending on the accuracy of available data, the analysis may generate unreliable results.
    - Based on a review and testing of PUD data, the distribution assets are classified as follows:

- Poles, towers, and fixtures (minimum size): 57.89 percent customer and 42.11 percent primary demand;
- Overhead conductors (minimum size): 9.42 percent customer, 45.29 percent primary demand, and 45.29 percent secondary demand;
- Underground conductors (minimum size): 41.78 percent customer, 29.11 percent primary demand, and 29.11 percent secondary demand; and
- Transformers (minimum size): 56.72 percent customer and 43.28 percent secondary demand.

» Meters and service drops are typically classified as customer-related, since these costs are primarily related to the number of customers served – 100.00 percent customer meters & services.

» Street lighting and signals are directly assigned to the customer(s) benefiting from these assets or facilities – 100.00 percent direct assignment.

- ***General Plant (FERC 389.1 to 398.1).*** General plant assets are classified and allocated as all other plant assets.
- ***Depreciation***. The cost classification for depreciation of plant assets is based on the cost classification of each service function.

Exhibit 3.15 summarizes the cost classification process of plant in service (fixed assets) by function of service.

Exhibit 3.15
Cost Classification Summary of Plant in Service

Cost Classification of Electric Assets	Generation		Transmission	Distribution					Direct Assignment	Total
	Demand	Energy	Demand	Demand		Customer				
	Coincident	Total	Coincident	Primary	Secondary	Account	Accounting	Meters/Service		
Plant In Service										
Intangible Plant	$ -	$ -	$ 1,530	$ 5,312	$ 3,328	$ 4,529	$ -	$ 1,770	$ -	**$ 16,470**
Transmission Plant	-	-	9,034,072	-	-	-	-	-	-	**9,034,072**
Distribution Plant	-	-	-	31,237,046	19,567,494	26,631,857	-	10,410,903	342,733	**88,190,033**
General Plant	-	-	409,523	1,421,530	890,474	1,211,958	-	473,778	-	**4,407,263**
Total Plant in Service	**$ -**	**$ -**	**$ 9,445,125**	**$ 32,663,889**	**$ 20,461,295**	**$ 27,848,344**	**$ -**	**$ 10,886,451**	**$ 342,733**	**$ 101,647,837**
Depreciation	**$ -**	**$ -**	**$ (5,385,359)**	**$ (14,158,948)**	**$ (8,869,441)**	**$ (12,071,535)**	**$ -**	**$ (4,718,994)**	**$ (146,069)**	**$ (45,350,345)**
Net Plant in Service	**$ -**	**$ -**	**$ 4,059,766**	**$ 18,504,941**	**$ 11,591,855**	**$ 15,776,810**	**$ -**	**$ 6,167,457**	**$ 196,664**	**$ 56,297,492**

Cost Classification of Revenue Requirement

Like the plant in service infrastructure, the revenue requirement components are classified to key cost drivers. The results of the plant in service classification facilitate the revenue requirement classification process. A summary of the classification approach for the key expenses by function is provided below:

- ***Power Supply***. Power supply expenses are driven by the need to meet a utility's energy and demand requirements. Power supply expenses are classified based on cost causation. Power costs have been classified to demand and energy as shown in **Exhibit 3.16**.

Exhibit 3.16
Cost Classification of Test Year Power Supply (2021)

Description	Demand	Energy	Total
Power:			
Customer Charge	$ -	$ 11,294,596	**$ 11,294,596**
Load Shaping Charge - HLH	-	(206,269)	**(206,269)**
Load Shaping Charge - LLH	-	220,291	**220,291**
Demand Charge	675,566	-	**675,566**
Financial Reserve Policy Surcharge	-	217,162	**217,162**
Load Shaping True-Up	-	12,788	**12,788**
Transmission:			
Base Charge	$ 1,016,662	$ -	**$ 1,016,662**
Ancillary Services:			
SCD NT Long Term Firm Charge	$ 209,532	$ -	**$ 209,532**
Regulatory & Frequency Response	-	158,653	**158,653**
Spin Reserve Requirement	-	94,729	**94,729**
Supplemental Reserve Requirement	-	82,702	**82,702**
Peak Dues	-	16,189	**16,189**
WECC Dues	-	12,951	**12,951**
Total	**$ 1,901,761**	**$ 11,903,793**	**$ 13,805,553**
As a Percent	*13.78%*	*86.22%*	*100.00%*

- ***Distribution Operations and Maintenance***. Annual expenses related to the operation and maintenance of the utility's distribution network are classified based on the cost classification of the distribution plant after accounting for those costs that are directly assigned to specific customer classes (see **Exhibit 3.15**) as well as the following exceptions:
  - » Substation operation, maintenance, and equipment expenses are classified 100.00 percent as primary demand;
  - » Operating and maintenance related expenses for overhead lines are based on the minimum systems approach for the existing overhead line assets (9.42 percent customer, 45.29 percent primary demand, and 45.29 percent secondary demand);
  - » Operating and maintenance related expenses for underground lines are based on minimum systems approach for the existing underground line assets (41.78 percent customer, 29.11 percent primary demand, and 29.11 percent secondary demand);
  - » Meter & customer installation expenses are classified 100.00 percent as customers weighted for factors associated with the cost of metering infrastructure;
  - » Street lighting and signal expenses are assigned directly to the Street Lighting customer class; and,
  - » Maintenance of line transformers is allocated based on the minimum systems approach for the existing transformer assets (56.72 percent customer and 43.28 percent secondary demand).
- ***Customer Accounts.*** Annual expenses related to customer accounts are classified 100.00 percent as customer, weighted based on the meter and service costs for each class as well as the following exceptions:
  - » Customer records and collections is classified as customer, weighted based on the accounting requirements for each class;

  - » Low-income support is direct assigned to the residential customers who receive a discounted rate.
- ***Customer Service and Information.*** Customer assistance expenses are classified 100.00 percent as customer, weighted based on the accounting requirements for each class.
- ***Administrative and General.*** Annual expenses related to administrative and general support are classified following all other expenses, excluding expenses related to power supply, taxes, and direct assignment.
- ***Other.*** Miscellaneous expenses are classified following all other expenses, excluding expenses related to power supply, taxes, and direct assignment as well following the annual revenue requirement.
- ***Taxes.*** Annual expenses related to taxes are classified following the annual revenue requirement, net of tax expenses.
- ***Debt Service.*** Annual debt service is classified as the plant in service before depreciation and direct assignments.
- ***Non-Rate Revenue.*** Other revenue sources are allocated as the plant-in-service before depreciation, with a few exceptions:
  - » Rent from electric property is classified based on the minimum systems approach for existing pole assets (57.89 percent customer and 42.11 percent primary demand); and
  - » Fiber sales is classified based on the corresponding fiber operating costs (based on distribution asset classification).
- ***Net Cash Flow.*** Net cash flow in the test year is classified as the plant in service before depreciation and direct assignments.

Exhibit 3.17 and **Exhibit 3.18** provide summaries of the cost classification of the revenue requirement.

Exhibit 3.17
Cost Classification of Test Period Revenue Requirement (2021)

Cost Classification of Revenue Requirement	Generation		Transmission	Distribution					Direct Assignment	Total
	Demand	Energy	Demand	Demand		Customer				
	Coincident	Total	Coincident	Primary	Secondary	Account	Accounting	Meters/Service		
Purchased Power	$ 1,901,761	$ 11,903,793	-	-	-	-	-	-	-	$ 13,805,553
Transmission	-	-	55,984	-	-	-	-	-	-	55,984
Distribution - Operations	1,671	10,457	-	721,940	549,603	290,835	-	432,063	37,861	2,044,430
Distribution - Maintenance	-	-	-	1,549,546	1,411,924	740,433	-	48,850	6,827	3,757,580
Customer Accounts	-	-	-	-	-	-	883,851	514,684	78,268	1,476,803
Customer Service & Information	-	-	-	-	-	-	27,816	-	-	27,816
Administrative & General	705	4,413	34,476	1,040,069	890,014	485,864	422,536	462,913	-	3,340,990
Taxes & Other	144,270	903,036	35,703	344,382	277,106	193,008	101,968	144,037	-	2,143,510
Existing Debt Service	-	-	554,985	1,926,455	1,206,769	1,642,443	-	642,062	-	5,972,714
Net Cash Flow	-	-	499,204	1,732,827	1,085,477	1,477,361	-	577,529	-	5,372,397
Total Expenses	**$ 2,048,406**	**$ 12,821,699**	**$ 1,180,351**	**$ 7,315,219**	**$ 5,420,892**	**$ 4,829,944**	**$ 1,436,171**	**$ 2,822,138**	**$ 122,956**	**$ 37,997,776**
less: Non-Rate Revenue	-	-	(174,231)	(710,193)	(415,042)	(621,931)	-	(210,441)	(60,370)	**(2,192,209)**
Total Revenue Requirement	**$ 2,048,406**	**$ 12,821,699**	**$ 1,006,120**	**$ 6,605,027**	**$ 5,005,850**	**$ 4,208,013**	**$ 1,436,171**	**$ 2,611,696**	**$ 62,586**	**$ 35,805,567**

Exhibit 3.18
Cost Classification Summary of Test Period Revenue Requirement

Cost Classification of Revenue Requirement	Demand	Energy	Customer	Direct Assignment	Total
Purchased Power	$ 1,901,761	$ 11,903,793	-	-	$ 13,805,553
Transmission	55,984	-	-	-	55,984
Distribution - Operations	1,273,214	10,457	722,897	37,861	2,044,430
Distribution - Maintenance	2,961,470	-	789,283	6,827	3,757,580
Customer Accounts	-	-	1,398,535	78,268	1,476,803
Customer Service & Information	-	-	27,816	-	27,816
Administrative & General	1,965,264	4,413	1,371,313	-	3,340,990
Taxes & Other	801,461	903,036	439,013	-	2,143,510
Existing Debt Service	3,688,208	-	2,284,505	-	5,972,714
Net Cash Flow	3,317,507	-	2,054,890	-	5,372,397
Total Expenses	**$ 15,964,869**	**$ 12,821,699**	**$ 9,088,253**	**$ 122,956**	**$ 37,997,776**
less: Non-Rate Revenue	(1,299,467)	-	(832,372)	(60,370)	(2,192,209)
Total Revenue Requirement	**$ 14,665,402**	**$ 12,821,699**	**$ 8,255,880**	**$ 62,586**	**$ 35,805,567**
As a Percent	*40.96%*	*35.81%*	*23.06%*	*0.17%*	*100.00%*
As a Percent Less Direct Assignment	*41.00%*	*35.81%*	*23.19%*	*0.00%*	*100.00%*

The classification of the revenue requirement indicates that total demand costs, combined throughout all functions, represent 41.03 percent of the revenue requirement. Energy costs and customer costs comprise 35.87 percent and 23.10 percent of the revenue requirement, respectively.

Customer Class Designation

The electric utility currently has the following classes of service:

- Residential
- Residential - Discount
- General Service
- Small Demand General Service
- Large Demand General Service
- Primary General Service
- Irrigation/Drainage
- Interruptible Primary Schools
- Lighting

Customer Cost Allocation

Once the customer classes are defined, the functional classification costs pools (shown in **Exhibit 3.18**) are then allocated to these customer classes based on the service requirements each class places on the system. In order to complete this task, the analysis first develops allocation factors that identifies customer characteristics including number of accounts, energy usage (kWh), and demand (kW). The allocation factors are intended to equitably allocate total costs to those benefiting from the service. For this study, the costs are allocated based on the following:

Demand

- ***Non-Coincident Peak Primary.*** Non-coincident peak loads are those peak loads that occur within a certain time frame regardless of the timing of the peaks of other loads or the system peak. The allocation basis for these costs is the maximum of the 12-monthly non-coincident peaks (kW) at primary distribution system delivery.
- ***Non-Coincident Peak Secondary***. Maximum of the 12-monthly non-coincident peaks (kW) at delivery to the secondary distribution system (e.g., meter including losses).
- ***Coincident Peak.*** This peak refers to the customer's contribution to the utility's monthly system peaks. The allocation basis developed for these costs is the sum of the 12-monthly coincident peaks at input calculated in the load data.

Energy

- ***Total Energy.*** Total metered kilowatt-hours (kWh).
- ***Heavy Load Hour (HLH) Energy.*** Total metered kilowatt-hours (kWh) during heavy load hour periods as defined by BPA.
- ***Light Load Hours (LLH) Energy.*** Total metered kilowatt-hours (kWh) during light load hour periods as defined by BPA.

Customer

- ***Customer.*** Actual number of customer accounts by customer class.
- ***Weighted Accounting.*** This weighting factor is used to determine the differences in the level of effort in providing customer meter reading, accounting, and billing services for different classes of service.
- ***Weighted Meters and Services.*** This weighting factor is used for determining the differences in the cost of meters and service drops for different classes of service. These weighting factors are typically associated with the actual replacement costs of these utility assets.

Direct Assignment

- *Direct Assignment*: Direct assignment of costs/revenues to a specific customer class.

Exhibit 3.19 summarizes the allocation factors used to distribute costs to the classes of service.

Exhibit 3.19
Summary of Class-Based Allocation Factors

Customer Allocation Factors	Demand			Energy			Customer		
	NCP Primary	NCP Secondary	CP 12 Months	kWh	HLH	LLH	Customer Accounts	Weighted Accounting	Weighted Meters/Svcs
Residential	69.93%	75.68%	66.78%	66.55%	66.53%	66.59%	84.33%	79.59%	80.16%
Residential - Discount	2.54%	2.75%	2.30%	2.29%	2.29%	2.29%	2.94%	2.77%	2.79%
General Service	11.01%	11.92%	13.35%	14.45%	14.45%	14.43%	11.20%	15.74%	15.43%
Small Demand General Service	5.48%	5.93%	6.61%	6.88%	6.89%	6.87%	0.37%	0.70%	1.22%
Large Demand General Service	3.23%	3.50%	3.82%	4.72%	4.72%	4.71%	0.04%	0.07%	0.13%
Primary General Service	4.75%	0.00%	4.43%	3.49%	3.49%	3.48%	0.05%	0.10%	0.18%
Irrigation/Drainage	0.05%	0.05%	0.01%	0.01%	0.01%	0.01%	0.01%	0.01%	0.03%
Interruptible Primary Schools	2.85%	0.00%	2.59%	1.45%	1.45%	1.45%	0.02%	0.04%	0.06%
Lighting	0.16%	0.18%	0.11%	0.17%	0.17%	0.17%	1.03%	0.98%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Cost of Service Summary

The cost-of-service results are calculated by applying the allocation factors to the classified cost pools. **Exhibit 3.20** shows a comparison of the current rate revenue distribution between classes of service and the results of the cost-of-service analysis.

Exhibit 3.20
Cost of Service Summary

Class of Service	2021		Difference	
	Existing	COSA	$	%
Residential	$ 23,413,686	$ 25,714,395	$ 2,300,709	9.83%
Residential - Discount	524,046	981,601	457,555	87.31%
General Service	4,957,838	4,677,396	(280,442)	-5.66%
Small Demand General Service	2,204,691	1,800,784	(403,907)	-18.32%
Large Demand General Service	1,426,288	1,115,588	(310,700)	-21.78%
Primary General Service	1,246,917	904,690	(342,227)	-27.45%
Irrigation/Drainage	1,844	8,017	6,173	334.81%
Interruptible Primary Schools	446,817	455,914	9,096	2.04%
Lighting	206,303	147,182	(59,120)	-28.66%
Total	**$ 34,428,430**	**$ 35,805,567**	**$ 1,377,137**	**4.00%**

Given the need to make a host of assumptions to complete a cost-of-service analysis, the range of reasonableness for class-specific results is typically considered to be plus or minus 5.00 percent, relative to the system average. Because costs fluctuate year to year, the needed increases by different classes of service can also fluctuate and interclass rate changes are not suggested unless the class specific revenue difference is outside of the 5.00 percent threshold. Based on these guidelines, the cost-of-service comparison indicates that interclass adjustments are warranted, as shown by the change in revenue distribution:

- The Interruptible Primary School class of service is within cost-of-service;
- The Residential, Residential – Discount, and Irrigation/Drainage classes of service need to increase at a higher rate than the average adjustment; and
- All other classes need to increase at a lower rate than the average adjustment.

Based on feedback from PUD staff and the Board, a multi-year strategy was developed to transition the classes of service towards cost-of-service. **Exhibit 3.21** details the annual changes to rate revenue by customer class through 2024. While this strategy does not get every class within the range of reasonableness by 2024, it does help move classes towards cost-of-service.

Exhibit 3.21
Cost of Service Phase-In Strategy

Class of Service	2021	2022	2023	2024
Residential	4.18%	4.43%	4.42%	4.41%
Residential - Discount	4.18%	4.43%	4.42%	4.41%
General Service	3.75%	4.00%	4.00%	4.00%
Small Demand General Service	3.75%	4.00%	4.00%	4.00%
Large Demand General Service	3.75%	4.00%	4.00%	4.00%
Primary General Service	3.75%	4.00%	4.00%	4.00%
Irrigation/Drainage	6.00%	6.25%	6.25%	6.25%
Interruptible Primary Schools	0.00%	0.00%	0.00%	0.00%
Lighting	3.75%	4.00%	4.00%	4.00%
Total	**4.00%**	**4.25%**	**4.25%**	**4.25%**

RATE DESIGN

Overview

The principal objective of the rate design stage of the analysis is to implement a rate structure that collects the appropriate level of revenue and is both cost-based as well as aligns with the utility's goals and objectives. Rate design is typically the final step in a rate study process. There are many different rate structure options, but ultimately rates should reflect the type of costs the utility incurs – customer, demand, energy – and generate the required levels of revenue. This section will review the existing and proposed rates for the electric utility.

Existing Rates

For most classes, the existing electric rates are composed of a monthly basic charge, energy charge(s) assessed on a per kilowatt hour (kWh) basis, and for some classes a demand charge assessed on a per kilowatt (kW) basis. Exceptions from this rate structure include:

- Energy charges for residential customers are assessed on a tiered basis. The first 600 kWh of energy consumed is charged at one rate while energy above 600 kWh in a month is charged at a higher rate;
- Residential, General Service, Irrigation, and Lighting customers are not assessed a demand charge;
- Small Demand General Service, Large Demand General Service, Primary General Service, and Interruptible Primary Schools are assessed a charge per kVAR hours.
- Interruptible Primary Schools are assessed an additional kW charge (critical demand rate) for any loads greater than 0.6 watts per square foot if the PUD requests an interruption between 7:00am & 10:00am.
- Lighting accounts are only assessed monthly basic charges.

Exhibit 3.22 provides a summary of existing rates as of January 2020.

Exhibit 3.22
Existing Electric Rates

Class of Service	Basic Charge ($/acct./mo.)		Energy Charge ($/kWh)			Demand	Reactive Power
	Single Phase	Three Phase	All kWh	First 600	600+	Charge ($/kW)	($/kVARh)
Residential	$ 18.50	$ 27.00		$ 0.0882	$ 0.1070		
Residential - Discount	(21.00)	(12.50)		0.0882	0.1070		
General Service	18.50	34.00	0.1007				
Small Demand General Service		60.00	0.0852			5.50	0.00283
Large Demand General Service		110.00	0.0757			9.00	0.02810
Primary General Service		300.00	0.0747			8.50	0.00106
Irrigation/Drainage		30.00	0.0687				
Interruptible Primary Schools		300.00	0.0681			5.50	0.00300
Lighting	15.00						

Note: Interruptible Primary School's critical demand rate is $4.00/kW | Lighting charge reflects bulb less than 100 Watts - other rates available

Proposed Rates

Cost of Service Unit Costs

The results of the cost-of-service analysis provide cost-based unit costs that were utilized to develop the proposed rate structure. **Exhibit 3.23** provides a summary of the 2021 cost-based unit costs.

Exhibit 3.23
2021 Cost-Based Unit Costs

Class of Service	Demand $/kW	Energy $/kWh	Customer $/mo.
Residential	$ 7.38	$ 0.0422	$ 33.02
Residential - Discount	7.69	0.0422	44.04
General Service	8.66	0.0422	39.96
Small Demand General Service	13.23	0.0422	63.88
Large Demand General Service	14.07	0.0422	63.88
Primary General Service	9.97	0.0408	63.88
Irrigation/Drainage	68.51	0.0422	58.28
Interruptible Primary Schools	12.88	0.0408	63.88
Lighting	23.87	0.0422	35.35

Based on feedback from PUD staff, the following rate design adjustments are proposed:

- ***Residential Tiers.*** A third tier is added for usage above 1,600 kWh. This results in a three-tier structure:
  - Tier 1: 0 – 600kWh
  - Tier 2: 600 – 1,600kWh
  - Tier 3: 1,600+ kWh
- ***Basic Charges.*** Basic monthly charges for Residential customers will be adjusted by $2.50 each year going forward. General Service customers will receive a $3.00 increase each year. Irrigation/Drainage customers will receive a $5.00 adjustment each year. Primary General Service and Interruptible Primary Schools basic charges will increase at the same rate on an annual basis. All other customer classes will see their basic charge increase by their overall class percentage increase.
- ***Interruptible Primary Schools Energy Rate.*** Since this class's basic charges are increasing but receives no overall revenue adjustment, their energy rates will decline slightly over time.

- ***Residential and General Service Energy Rates.*** Since these customer groups will see their basic charges increase more than their overall increase, the energy rate increase will be less than each class's overall increase. In the first year, Residential energy rates will remain unchanged in the first two tiers. In subsequent years all tiered rates will increase by the same percentage.
- ***Lighting.*** Basic monthly charges will be adjusted each year of the forecast based on the average annual rate revenue adjustment for the electric utility. A discount lighting rate will also be created for customers that own and replace their own infrastructure.
- ***Reactive Power.*** Once new meters are installed the reactive power charge will be replaced with a power factor adjustment.

Exhibit 3.24 details the proposed customer, energy, demand, and reactive power rates for electric utility customers for the 2021 to 2024 rate setting implementation focus period.

Exhibit 3.24
Projected Electric Utility Rates

Basic Charge - $ / Month	Existing	Proposed			
		2021	2022	2023	2024
Residential					
Single Phase	$ 18.50	$ 21.00	$ 23.50	$ 26.00	$ 28.50
Three Phase	27.00	30.65	34.30	37.95	41.59
Discount	(21.00)	(23.84)	(26.68)	(29.51)	(32.35)
General Service					
Single Phase	$ 18.50	$ 21.50	$ 24.50	$ 27.50	$ 30.50
Three Phase	34.00	39.51	45.03	50.54	56.05
Demand General Service & Irrigation					
Small Demand General Service	$ 60.00	$ 62.25	$ 64.74	$ 67.33	$ 70.02
Large Demand General Service	110.00	114.13	118.69	123.44	128.38
Primary General Service	300.00	311.25	323.70	336.65	350.11
Irrigation	30.00	35.00	40.00	45.00	50.00
Interruptible Primary Schools	300.00	311.25	323.70	336.65	350.11
Lighting - $ / Bulb					
<100W	$ 15.00	$ 15.56	$ 16.19	$ 16.83	$ 17.51
100W - 200W	17.25	17.90	18.61	19.36	20.13
>200W	19.50	20.23	21.04	21.88	22.76
Discounted Lighting - $ / Bulb					
<100W	$ 15.00	$ 9.96	$ 10.36	$ 10.78	$ 11.21
100W - 200W	17.25	12.30	12.79	13.30	13.83
>200W	19.50	14.63	15.22	15.83	16.46

Energy Charge - $ / kWh	Existing	Proposed 2021	2022	2023	2024
Residential					
Tier 1	$ 0.0882	$ 0.0882	$ 0.0908	$ 0.0936	$ 0.0966
Tier 2	0.1070	0.1070	0.1102	0.1136	0.1172
Tier 3	n/a	0.1218	0.1254	0.1293	0.1334
All Other Classes					
General Service	$ 0.1007	$ 0.1029	$ 0.1055	$ 0.1082	$ 0.1112
Small Demand General Service	0.0852	0.0884	0.0919	0.0956	0.0994
Large Demand General Service	0.0757	0.0785	0.0817	0.0849	0.0883
Primary General Service	0.0747	0.0775	0.0806	0.0838	0.0872
Irrigation	0.0687	0.0695	0.0710	0.0729	0.0752
Interruptible Primary Schools	0.0681	0.0680	0.0679	0.0677	0.0676
Lighting	n/a	n/a	n/a	n/a	n/a

Demand Charge - $ / kW	Existing	Proposed 2021	2022	2023	2024
Residential	n/a	n/a	n/a	n/a	n/a
General Service	n/a	n/a	n/a	n/a	n/a
Small Demand General Service	$ 5.50	$ 5.71	$ 5.93	$ 6.17	$ 6.42
Large Demand General Service	9.00	9.34	9.71	10.10	10.50
Primary General Service	8.50	8.82	9.17	9.54	9.92
Irrigation	n/a	n/a	n/a	n/a	n/a
Interruptible Primary Schools	5.50	5.50	5.50	5.50	5.50
Lighting	n/a	n/a	n/a	n/a	n/a

Reactive Power Charge - $ / kVARh	Existing	Proposed 2021	2022	2023	2024
Residential	n/a	n/a	n/a	n/a	n/a
General Service	n/a	n/a	n/a	n/a	n/a
Small Demand General Service	$ 0.00283	$ 0.00294	$ 0.00305	$ 0.00318	$ 0.00330
Large Demand General Service	0.00281	0.00292	0.00303	0.00315	0.00328
Primary General Service	0.00106	0.00110	0.00114	0.00119	0.00124
Irrigation	n/a	n/a	n/a	n/a	n/a
Interruptible Primary Schools	0.00300	0.00300	0.00300	0.00300	0.00300
Lighting	n/a	n/a	n/a	n/a	n/a

Note: kVARh charge will switch to a power factor charge once new meters have been installed

SUMMARY

The analysis described above concludes the electric utility revenue requirement and cost of service study. The study followed the methodology described in Section II, which included three key steps:

- ***Revenue Requirement Analysis:*** Determines the amount of revenue that utility rates must generate to meet the PUD's various financial obligations. This analysis has two main purposes – it serves as a means of evaluating the electric utility's fiscal health and adequacy of current rate levels, and it sets the revenue basis for near-term and long-term rate planning. Based on the results of this analysis, annual rate revenue increases ranging from 4.00 percent to 4.25 percent are needed from 2021 to 2024 effective July in 2021 and April for all other rate adjustments. These revenue adjustments are designed to meet the utility's annual operating expenses, capital

improvement program, operating reserve goals, and financial performance targets related to debt service coverage, and times interest earned ratios (TIER).

- ***Cost of Service Analysis:*** The second step in the study determines the equitable allocation of the revenue requirement to customers given their service needs and characteristics. Costs are functionalized, classified, and then assigned to the PUD's customer classes. These "cost shares" are then compared with each customer class's rate revenue at existing rates to identify potential changes to improve cost equity. Through discussions with PUD staff and the Board, a multi-year rate revenue strategy was designed to start transitioning individual customer classes towards cost-of-service through 2024.
- ***Rate Design:*** The final step in the study process aligns the PUD's existing rate structure to generate sufficient revenue from each customer class based on the results of the first two steps. As part of this process an additional energy tier is added for the Residential class. As part of this process a discount lighting rate is also developed for customers that own and replace their own infrastructure.

The PUD Board was engaged throughout the rate study process to present study findings and to receive direction and feedback on recommendations. The presentations to the PUD Board are summarized below:

- July 2020: Rate setting fundamentals
- August 2020: Draft results of revenue requirement
- September 2020: Updated draft results of revenue requirement, incorporating Board direction
- November 2020: Draft results of cost-of-service analysis
- December 2020: Updated draft results of cost-of-service analysis, incorporating Board direction
- February 2021: Review of draft rate design
- April 2021: Recommendations for cost-of-service phase-in strategy and rate design
- May 2021: Recommendations for cost-of-service phase-in strategy and rate design, incorporating Board direction

In June 2021, the PUD Board approved the four-year rate schedule as described above under the condition that they re-evaluate the increases on an annual basis. During their re-evaluations, the Board may elect to change the rate increase described in this report. We recommend that the PUD regularly monitor the financial status of the electric utility, adjusting the rate strategy as needed to maintain equitable rates that are adequate to meet the PUD's financial needs.

Section IV. Water Utility

The PUD purchased their first utility, the Gardiner water system in 1981. Today the PUD owns and maintains nine separate Group A water systems and four separate Group B water systems. The PUD serves its customers using 24 pumps as well as approximately 800,000 feet of transmission and distribution pipes. Currently, the PUD serves about 4,750 accounts. Their mission is to deliver citizens of Jefferson County reliable services in a cost effective, sustainable, and customer driven manner.

REVENUE REQUIREMENT

The revenue requirement evaluates the amount of revenue that a utility's rates must generate to meet its various financial obligations. This analysis has two main purposes – it serves as a means of evaluating the utility's fiscal health and adequacy of current rate levels, and it sets the revenue basis for near-term and long-term rate planning. The analysis is defined as the net difference between total revenue needs and the revenue generated through non-rate sources. Hence, the revenue requirement analysis involves defining and forecasting both needs and resources.

Operating Forecast

The purpose of the operating forecast is to determine whether the existing rates and charges are sufficient to recover the costs the utility incurs to operate and maintain the water system. The operating forecast was developed for the 2020 to 2030 time period, with a rate setting implementation focus period of 2021 through 2024. The budgeted expenses in 2020 and 2021 formed the starting point for the forecast. The operating forecast also includes future projections for revenues, operating expenses, debt service, and financial reserve requirements. The following sections describes each component of the operating forecast.

Financial Reserves

- ***Operating Reserve***. An operating reserve is designed to provide a liquidity cushion; it protects the utility from the risk of short-term variation in the timing of revenue collection or payment of expenses and can help smooth rate increases over time. The study assumes a target of 90 days of operating and maintenance expenses. The PUD maintains a line of credit (LOC) of $5.0 million. It is assumed that the available funds from this LOC can be used to meet the operating reserve target. The minimum reserve target is equivalent to approximately $0.7 million to $1.1 million per year.

  As discussed in Section II. Electric Utility, based on direction form the auditor, the PUD had to reallocate reserve balances from the water to the electric utility. With this change in cash accounting, the water utility indicated a shortfall in 2020. To alleviate the immediate impact to the water utility, the electric utility lent the water utility $5.0 million in 2020. It is assumed that the interfund loan will be repaid back over a 10-year period with annual interest of 2.00 percent.
- ***Construction Reserve.*** A construction reserve is designed to fund emergency or unanticipated capital needs. These needs may occur when an asset fails unexpectedly or a project experiences cost overruns. The PUD instituted a construction reserve in 2020 to be phased-in overtime with

the minimum target equal to a half year of average capital spending. This minimum target is equal to $0.4 million. This analysis assumes the PUD would achieve that target by 2025.

Operating Revenues

- ***Retail Rate Revenue.*** Based on actual detailed customer records and usage statistics from the PUD's billing system. Usage data from 2019 is used to project future revenues by applying annual growth to accounts and water consumption and multiplying by the 2020 rates by class of service.
- ***Customer & Demand Growth.*** Based on discussions with PUD staff, customer and demand growth for all customer classes is set at 0.00 percent.
- ***Non-Rate Revenue.*** Consists primarily of LUD charges for the repayment of debt service, revenues from timber sales, and other miscellaneous revenues.
- ***Sewer Revenue.*** It is assumed the Sewer utility is part of the water utility based on the PUD's existing financial tracking practices and discussion with the Board. Annual revenue adjustments generally follow the water rate strategy. The 2021 rates are adjusted up by a $7.00 fixed charge. The standard and Kala Point rates are assumed to be consolidated by 2022. Overall revenues are escalated with the same overall water rate increase starting in 2023.
- ***Interest Earnings.*** The rate used to calculate annual interest earnings on unused fund balances during the study period is 1.50 percent and is based on feedback from PUD staff.

Operating and Maintenance (O&M) Expenses

- ***General Cost Inflation.*** 2.00 percent per year; based on the rounded ten-year average of the consumer price index.
- ***Construction Cost Inflation***. 3.00 percent per year; based on the rounded ten-year average of the Engineering News-Record (ENR) construction cost index.
- ***Labor Cost Inflation.*** 3.50 percent per year; based on discussions with PUD staff.
- ***Benefit Cost Inflation.*** 6.00 percent per year; based on discussions with PUD staff.
- ***Taxes.*** State excise and privilege taxes are assessed on PUD revenues. The State excise tax rate is 5.029. The State business and occupation tax is 1.75 percent.

Debt Service

- ***Existing Debt.*** The utility's existing debt consists of ten different loan obligations. Annual debt service for all existing debt is $0.9 million decreasing to $0.3 million by 2030.
- ***New Debt.*** Two different types of debt are projected as part of this forecast:
  - ***Revenue Bonds.*** Three separate revenue bond issuances are assumed within the 10-year forecast. These three issues total approximately $9.9 million and occur in 2024, 2026, & 2029. It is assumed this type of debt will have an interest rate of 5.00 percent, a term length of 20 years, issuance costs equal to 1.25 percent of total debt issued, a debt service coverage obligation of 1.25, and a dedicated debt reserve requirement equal to one year of debt service.
  - ***Drinking Water State Revolving Fund (DWSRF) Loans.*** One loan issuance is assumed during the forecast. The total issuance amount is approximately $1.5 million and occurs in 2022. It is assumed this type of debt will have an interest rate of 2.55 percent and a term

length of 20 years. No debt service coverage or debt reserve requirement is assumed for this type of debt.

Other Financial Policies

As discussed in Section II Rate Study Methodology, the following financial policy targets are included in the revenue requirement. For descriptions of these policies and targets, please refer to Section II.

- ***Debt Service Coverage.*** The minimum debt service coverage ratio target is 1.25 for annual debt service associated with all new revenue bond obligations. It is assumed that no existing debt obligations have a minimum debt service coverage requirement.

System Reinvestment (Rate Funded Capital)

System reinvestment funding ensures system integrity through ongoing repair and replacement. As discussed in Section II Rate Study Methodology, the PUD does not have a formal policy regarding system reinvestment. The study utilizes remaining cash flow after O&M and annual debt service to pay for capital in place of a dedicated funding component for annual system reinvestment. Equating annual cash flow to annual depreciation expense indicates that the PUD is not able to maintain annual cash flow of at least 100.00 percent of annual depreciation through the forecast period, achieving 51.00 percent by 2030.

Capital Funding Plan

The water utility original capital plan anticipated $14.9 million in capital costs from 2020 to 2030. **Exhibit 4.1** provides a summary of the funding sources for the capital funding expenditures from 2020 to 2030. Based on this funding plan, the PUD would finance approximately 76.00 percent of the capital plan with new debt proceeds. It should be noted that the $5.0 million loan from the electric utility is used for both operating and capital needs in the front end of the financial plan. Any amounts used for capital purposes are captured in the "Cash/Reserves" category in **Exhibit 4.1**.

Exhibit 4.1
Capital Funding Summary

Capital Funding Summary	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	Total
Capital Project Costs	**$ 900,190**	**$ 734,527**	**$2,088,264**	**$ 485,342**	**$ 428,413**	**$ 817,450**	**$ 693,337**	**$ 642,235**	**$ 724,277**	**$4,032,174**	**$3,316,678**	**$14,862,888**
Funding Sources												
Cash/Reserves	$ 529,190	$ 481,588	$ 349,806	$ 433,134	$ -	$ -	$ -	$ -	$ 490,732	$ -	$ 10,995	**$ 2,295,446**
Grants/LUD Funding	321,000	201,250	201,250	-	-	-	-	-	-	-	-	**723,500**
System Development Charges	50,000	51,690	51,948	52,208	-	-	-	31,435	233,546	-	107,856	**578,682**
Debt Proceeds	-	-	1,485,260	-	428,413	817,450	693,337	610,800	-	4,032,174	3,197,826	**11,265,260**
Total Funding Sources	**$ 900,190**	**$ 734,527**	**$2,088,264**	**$ 485,342**	**$ 428,413**	**$ 817,450**	**$ 693,337**	**$ 642,235**	**$ 724,278**	**$4,032,174**	**$3,316,677**	**$14,862,888**

Summary of Revenue Requirement

The operating forecast components come together to form the multi-year projection. The analysis compares the overall revenue available to the water system to the expenses and evaluates the sufficiency of current rates on an annual basis. **Exhibit 4.2** through **Exhibit 4.4** illustrates a summary of the revenue requirement findings.

Exhibit 4.2
Water System Revenue Requirement Summary Before Increases

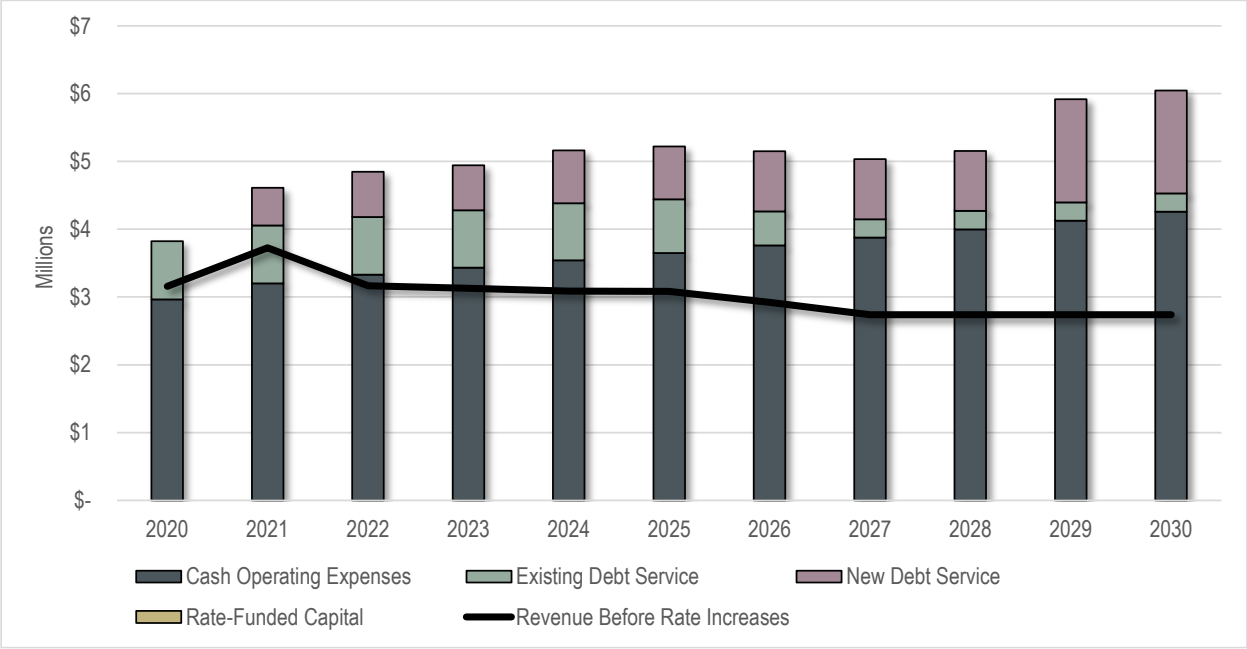


Exhibit 4.3
Water System Combined Operating & Construction Reserve Summary Before Increases

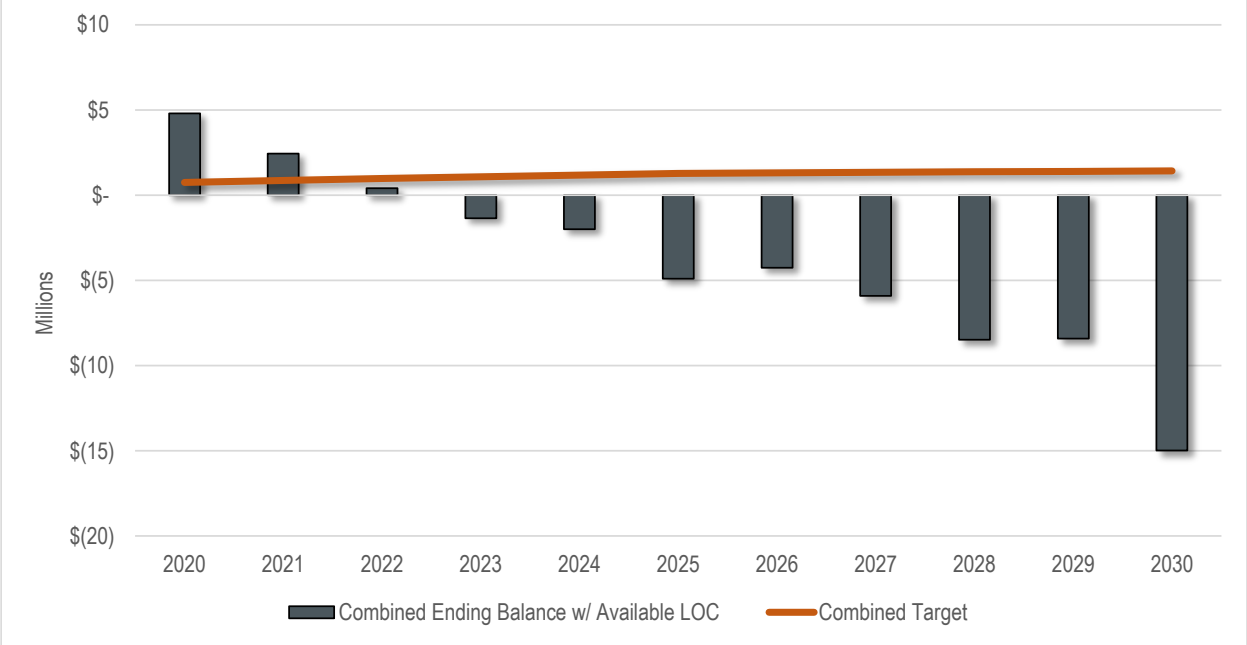
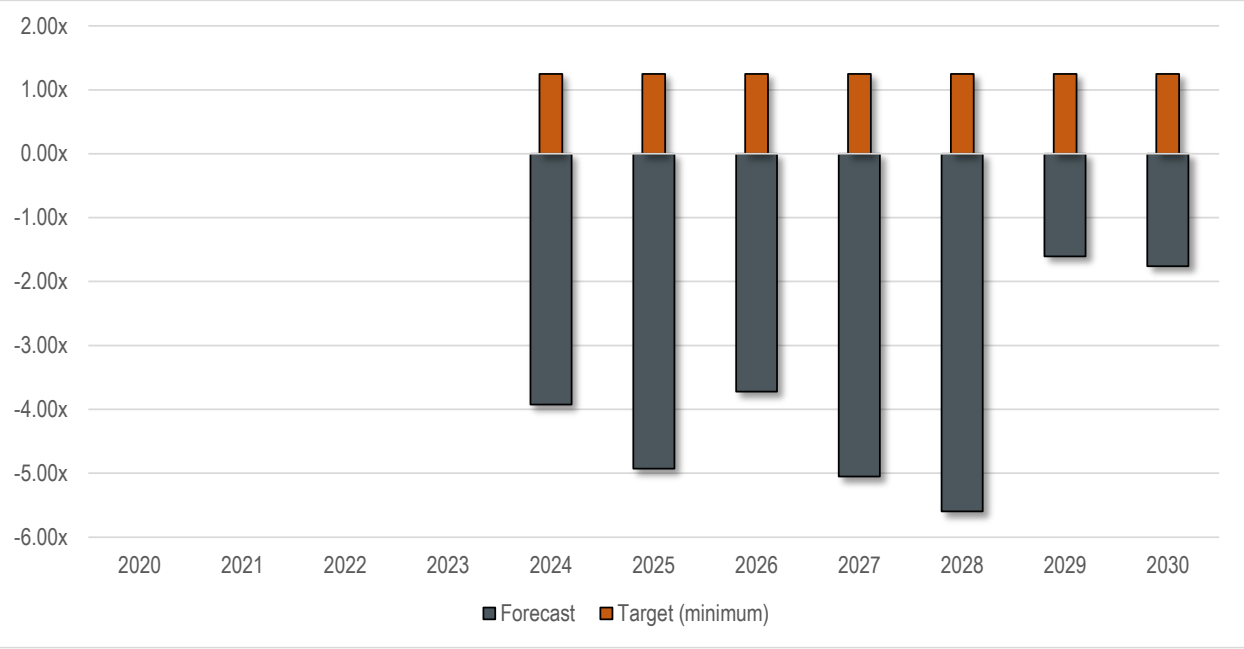


Exhibit 4.4
Debt Service Coverage Ratio: Minimum Target and Forecast Before Increases



Key observations of the revenue requirement before rate increases include:

- As identified in **Exhibit 4.2** revenues at existing rates are not sufficient to meet all expense obligations starting at the beginning of the forecast. This means the water utility is operating at a deficit and will be required to draw from existing reserves to pay for their operating obligations.
- Combined operating and construction fund balances as expressed in **Exhibit 4.3** drop below target levels starting in 2022 and go negative starting in 2023.
- There is no debt service coverage requirement on the existing debt obligations. The financial plan forecasts a need for new debt, the majority of which is assumed to be revenue bonds. Once revenue bonds are issued in 2024, existing rates are not able to meet minimum debt service coverage requirements of 1.25.

Key observation of the revenue requirement after rate increases include:

- In order to meet the projected financial obligations and financial policy targets, including capital projects, annual rate adjustments are needed from 2021 to 2030. Based on this analysis, the rate setting implementation focus period indicate a need of approximately 16.00 percent annual increases from 2021 to 2023 and 6.75 percent in 2024. Looking beyond the rate setting implementation period, additional increases are forecasted at 6.75 percent per year from 2025 through 2030. With these rate revenue adjustments:
  - The water utility is able to meet both the operating reserve and construction reserve targets in all periods of the forecast. This is illustrated in **Exhibit 4.5**. It is important to note that from 2023 to 2029 the water utility is not able to meet its operating reserve target without help from the LOC.
  - Debt service coverage requirements of 1.25 are exceeded each year of the forecast as illustrated in **Exhibit 4.6**. The debt service coverage ratio is projected to remain above 2.25 throughout the forecast.

Exhibit 4.5
Water System Combined Operating & Construction Reserve Summary After Increases

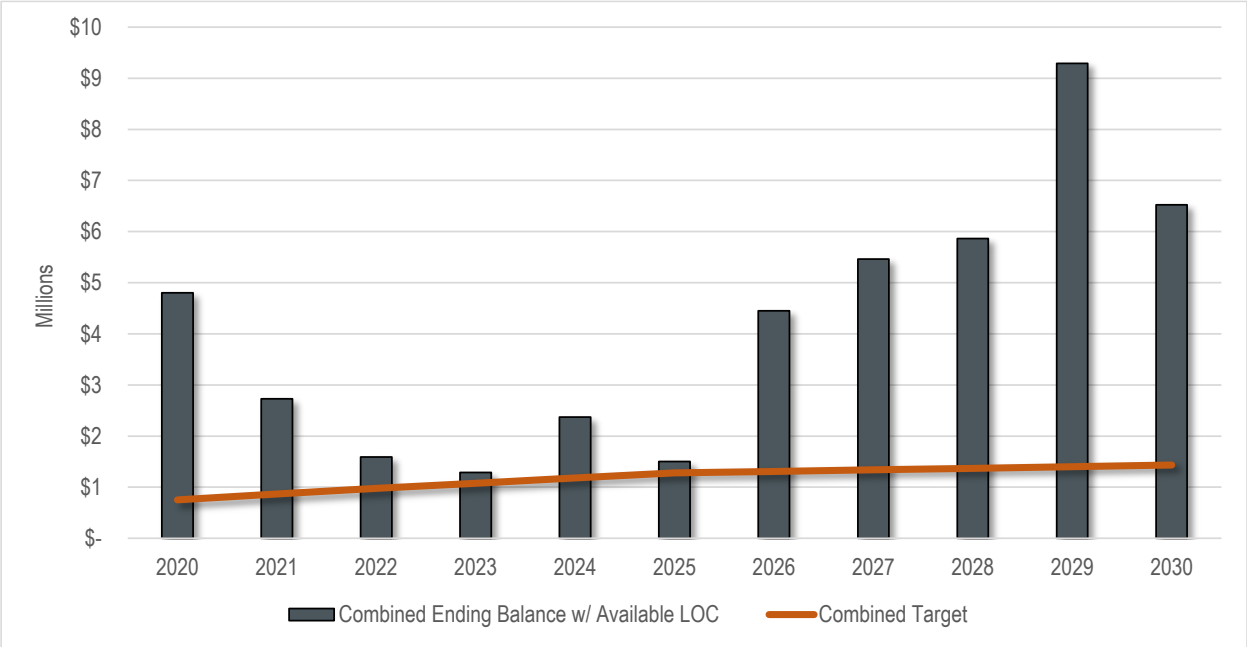
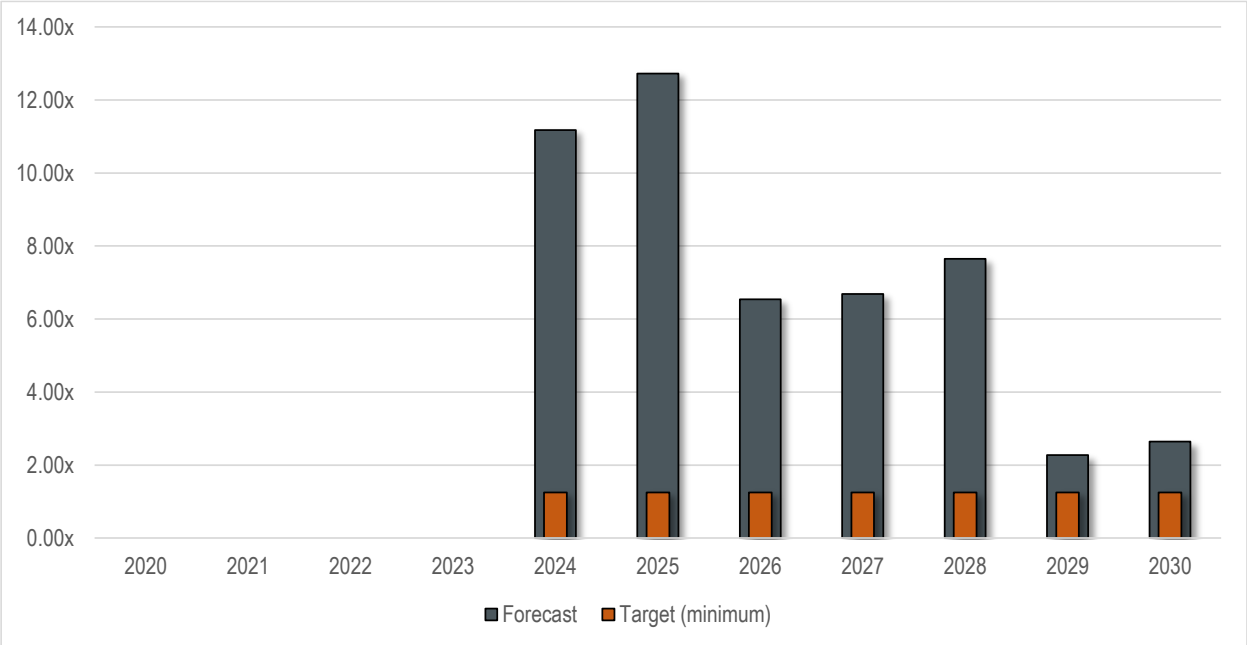


Exhibit 4.6
Debt Service Coverage Ratio: Minimum Target and Forecast



COST OF SERVICE ANALYSIS

As discussed in Section II Rate Study Methodology, a cost-of-service analysis determines the equitable allocation of costs to customers given their service needs and characteristics. The study consists of the following fundamental steps to allocate the revenue requirement to each customer class and helps inform the development of final rates:

1. Cost Classification
2. Customer Class Designation
3. Customer Cost Allocation

The procedure applied, and the assumptions used to complete these steps of the cost-of-service process are discussed in detail in the remainder of this section.

Cost Classification

The first step of the cost-of-service analysis is to classify both plant assets and expenses into cost categories with similar relationships to measurable cost-defined service characteristics. Using industry standard practices assets and operating costs are allocated categories according to known or assumed cost causation. The cost categories used for the PUD's water utility are:

- ***Customer.*** Costs associated with establishing, maintaining, and serving water customers. These tend to include administrative, billing, and customer service costs. These costs are generally uniform by customer regardless of their meter size or demand placed on the water system.
- ***Meters & Services.*** Costs associated with the installation, maintenance, and repairs of meters and services.
- ***Base.*** Costs related to average water use and are essentially correlated with year-round water consumption.
- ***Peak.*** Costs related to peak demand service typically associated with the ability of the system to provide capacity to customers with higher-than-average volume, which usually occurs during the summer months.
- ***Fire.*** Costs associated with the ability of the system to provide adequate capacity and water flow corresponding to minimum fire safety standards required to serve its customer demographic. These are mostly incremental costs related to providing storage, distribution capacity, and hydrants for fire protection.

Exhibit 4.7
Cost Classification Summary of System Assets (2018)

Cost Classification of Plant Assets	Customer	Meters & Services	Base	Peak	Fire Protection	As All Others	Total
Plant In Service							
Supply/ Treatment	$ -	$ -	$ 1,989,772	$ 2,633,931	$ -	$ -	**$ 4,623,703**
Storage	-	-	805,400	755,830	418,510	-	**1,979,739**
Pumping	-	-	504,262	667,510	310,403	-	**1,482,175**
Transmission & Distribution	8,363,156	-	33,321	3,253,073	1,083,187	-	**12,732,737**
Hydrants	-	-	-	-	1,077,112	-	**1,077,112**
Meters & Services	-	1,166,726	-	-	-	-	**1,166,726**
General Plant	-	-	-	-	-	762,412	**762,412**
Total	**$ 8,363,156**	**$ 1,166,726**	**$ 3,332,754**	**$ 7,310,343**	**$ 2,889,211**	**$ 762,412**	**$ 23,824,603**
Allocation of "As All Others"	276,477	38,571	110,177	241,672	95,514	(762,412)	**-**
Total	**$ 8,639,634**	**$ 1,205,297**	**$ 3,442,932**	**$ 7,552,015**	**$ 2,984,726**	**$ -**	**$ 23,824,603**
As a Percent	*36.26%*	*5.06%*	*14.45%*	*31.70%*	*12.53%*	*0.00%*	*100.00%*

The allocation basis (shown in **Exhibit 4.7**) used for the cost categories is as follows:

- ***Supply/Treatment.*** Assets are allocated based on the weighted average peak demand ratio (average day demand to maximum day demand) for all nine systems identified in the draft 2018 Water System Plan. These assets are allocated 43.03 percent to base and 56.97 percent to peak.

- ***Storage.*** Assets are allocated based on a storage analysis that categorizes storage into operating, equalizing, standby and fire suppression. The storge analysis is based on the sum of all storage components from the nine water systems as shown in the draft 2018 Water System Plan. Assets are allocated 40.68 percent to base, 38.18 percent to peak, and 21.14 percent to fire.
- ***Pumping.*** Assets are allocated based on a pumping analysis that evaluates each pump of the system and identifies the purpose of the pump as meeting average, peak, fire requirements, or a combination of those categories. This analysis comes from a combination of the draft 2018 Water System Plan and conversations with PUD staff. Pumping assets are allocated 34.02 percent to base, 45.04 percent to peak, and 20.94 percent to fire.
- ***Transmission & Distribution.*** Distribution assets are allocated based on a pipe analysis of the transmission and distribution system. This analysis uses the minimum systems approach as defined by the American Water Works Association (AWWA), and breaks down the system into customer, peak, and fire protection. The AWWA approach allocates the replacement cost of the minimally sized system (e.g., smallest diameter of pipe) as a customer-related cost on the basis that the utility would incur at least this level of cost to stand "ready to serve" its customers, regardless of the size of the customer being served. Actual costs in excess of this amount, are presumably driven by the utility's need to size these facilities to meet peak-use requirements and provide fire flow. This approach further allocates the remaining costs of the system between the peak and fire protection categories by assuming that in order to provide peaking capacity, the system would need a minimum of a 6" pipe. Actual costs in excess of the customer and peaking costs are allocated to the fire protection category. Based on discussion with PUD staff, it is assumed that the transmission system is composed of half of the 14-inch pipes. These assets are allocated based on the peak demand ratio. Under this approach the allocation of transmission and distribution assets is 65.68 percent customer, 0.26 percent base, 25.55 percent peak, and 8.51 percent fire protection.
- ***Hydrants.*** Assets are allocated 100.00 percent to fire protection.
- ***Meters & Services.*** Assets are allocated 100.00 percent to the meters and services category.
- ***General Plant.*** Assets are allocated as all other plant assets and allocated in proportion to the assets defined above.

The annual test period revenue requirement is also grouped by cost category. The process includes assigning each budget line-item account to the water categories. Many of the revenue requirement line items are allocated based on the plant in service allocation summarized in **Exhibit 4.**7 – 36.26 percent customer, 5.06 meters and services, 14.45 percent to base, 31.70 percent to peak, and 12.53 percent to fire protection. The following summarizes the key cost allocation assumptions.

- ***Power Production Expense.*** Costs in this activity are allocated 100.00 percent to the base category.
- ***Cost of Purchased Power.*** The costs associated with providing water service are allocated 100.00 percent to the base category. Costs associated with providing sewer services are allocated to the as all other category, which is later re-allocated to all other categories based on the proportional split of the other operating costs.
- ***Distribution Expense – Operations.*** Operating supervision & engineering and contractual services – water testing expenses are allocated as the plant in service. Chemical costs are allocated 100.00 percent to the base category. For salaries and wages, the PUD provided a list of costs by employee and each employee was allocated across the water categories by job

responsibility. The resulting allocation is 20.42 percent to customer, 4.69 percent to meters and services, 26.15 percent to base, 41.69 percent to peak, and 7.05 percent to fire protection.

- ***Distribution Expense – Maintenance.*** Cost in this activity associated with providing water service are allocated as the plant in service. Sewer related costs are allocated as all other category and re-allocated later in the analysis based on the proportional split of all other operating expenses.
- ***Customer Accounts Expense.*** Costs in this activity are allocated 100.00 percent to the customer category.
- ***Administrative & General Expense.*** Except for property insurance and general advertising expenses, costs in this activity are allocated 100.00 percent to the as all other category. This category is intended to capture costs that support all other cost categories. Operating costs included in the as all other cost category are re-allocated in proportion to all other operating expenses. Examples of expenses that are allocated to the as all other category include director salaries, outside services, and commissioner salaries. Property insurance is allocated as the plant in service. General advertising expenses are allocated 100.00 percent to customer.
- ***Taxes.*** Allocated 100.00 percent to the tax category. Costs included in this category are re-allocated at the very end of the cost classification analysis in proportion to all other revenue requirement line items.
- ***Existing Debt Service.*** Allocated as the plant in service.
- ***New Debt Service.*** Allocated as the plant in service.
- ***Loan Repayment to the Electric Utility.*** Allocated 100.00 percent to the as all other category, which is re-allocated in proportion to all other revenue requirement line items.
- ***Non-Rate Revenues.*** Except for LUD revenues for debt service, these revenues are 100.00 percent allocated to the as all other category, which is re-allocated in proportion to all other revenue requirement line items. The LUD revenues for debt service are allocated as the plant in service.
- ***Net Cash Flow.*** Allocated as the plant in service.

The revenue requirement is calculated by taking the total expenses, including debt service, deducting non-rate revenues and adding cash flow that is generated if revenues after rate increases exceed operating and debt expenditures. A summary of the allocated revenue requirement by cost category is shown in **Exhibit 4.8**.

Exhibit 4.8
Cost Classification Summary of Test Year Revenue Requirement (2021)

Cost Classification of Revenue Requirement	Customer	Meters & Services	Base	Peak	Fire Protection	As All Others	Taxes	Total
Operating Expenses	$ 532,193	$ 56,303	$ 493,874	$ 463,593	$ 98,340	$ 1,445,029	$ 124,955	$ 3,214,287
Allocation of "As All Others"	467,696	49,480	434,021	407,410	86,422	(1,445,029)	-	-
Total	**$ 999,889**	**$ 105,783**	**$ 927,896**	**$ 871,003**	**$ 184,762**	**$ -**	**$ 124,955**	**$ 3,214,287**
Existing Debt Service	$ 310,258	$ 43,283	$ 123,639	$ 271,201	$ 107,185	$ -	$ -	$ 855,566
New Debt Service	-	-	-	-	-	-	-	-
Loan Repayment to Electric	-	-	-	-	-	556,633	-	556,633
Total Expenses	**$ 1,310,147**	**$ 149,066**	**$ 1,051,535**	**$ 1,142,203**	**$ 291,946**	**$ 556,633**	**$ 124,955**	**$ 4,626,485**
Non-Rate Revenues	$ (129,721)	$ (18,097)	$ (51,695)	$ (113,391)	$ (44,815)	$ (887,717)	$ -	$ (1,245,436)
Net Cash Flow	(166,051)	(23,165)	(66,172)	(145,147)	(57,365)	-	-	(457,900)
Total Revenue Requirement	**$ 1,014,375**	**$ 107,803**	**$ 933,668**	**$ 883,665**	**$ 189,766**	**$ (331,085)**	**$ 124,955**	**$ 2,923,149**
Allocation of "As All Others" & "Taxes"	(66,818)	(7,101)	(61,502)	(58,208)	(12,500)	331,085	(124,955)	-
Total Revenue Requirement	**$ 947,557**	**$ 100,702**	**$ 872,166**	**$ 825,457**	**$ 177,266**	**$ -**	**$ -**	**$ 2,923,149**
As a Percent	*32.42%*	*3.44%*	*29.84%*	*28.24%*	*6.06%*	*0.00%*	*0.00%*	*100.00%*

Customer Class Designation

The water utility currently has the following classes of service:

- Residential
- Residential – Discount
- Commercial

These classes were evaluated as part of the cost-of-service analysis. Kala Point customers are evaluated in the Residential class. No new classes were identified for evaluation.

Customer Cost Allocation

Once the customer classes are defined, the functional classification costs pools (shown in **Exhibit 4.7**) are then allocated to these customer classes based on the service requirements each class places on the system. In order to complete this task, the analysis first develops allocation factors that identified customer characteristics including number of accounts, demand (gallons), peak demand ratio, and fire flow requirements. The allocation factors are intended to equitably allocate total costs to those benefiting from the service. For this study, the costs are allocated based on the following:

- **Customer.** Total number of customer accounts.
- **Meters & Services.** Number of meter service equivalents.
- **Base.** Total annual water usage.
- **Peak.** The ratio between each class's peak month use to their average total use, multiplied by their total use.
- **Fire Protection.** The number of accounts and their associated fire flow in gallons per minute and duration requirements. Fire requirements come from the draft 2018 Water System Plan and discussions with PUD staff.

Exhibit 4.8 summarizes the allocation factors used to distribute costs to the classes of service.

Exhibit 4.9
Summary of Class-Based Allocation Factors

Customer Allocation Factors	Customer	Meters & Services	Base	Peak	Fire Protection
Residential	90.29%	86.78%	73.49%	72.60%	75.57%
Residential - Discount	3.22%	3.12%	2.32%	2.02%	2.70%
Commercial	6.49%	10.10%	24.20%	25.38%	21.74%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

Cost of Service Summary

The cost-of-service results are calculated by applying the allocation factors to the classified cost pools. **Exhibit 4.10** shows a comparison of the current rate revenue distribution between classes of service and the results of the cost-of-service analysis.

Exhibit 4.10
Cost of Service Summary

Class of Service	2021		Difference	
	Existing	COSA	$	%
Residential	$ 2,030,249	$ 2,317,075	$ 286,827	14.13%
Residential - Discount	38,449	75,293	36,844	95.82%
Commercial	450,535	530,781	80,245	17.81%
Total	**$ 2,519,233**	**$ 2,923,149**	**$ 403,915**	**16.03%**

Given the need to make a host of assumptions to complete a cost-of-service analysis, the range of reasonableness for class-specific results is typically considered to be plus or minus 5.00 percent, relative to the system average. Because costs fluctuate year to year, the needed increases by different classes of service can also fluctuate and interclass rate changes are not suggested unless the class specific revenue difference is outside of the 5.00 percent threshold. Based on these guidelines, the cost-of-service comparison indicates that interclass adjustments are not warranted, as shown by the change in revenue distribution:

- Residential and Commercial customers are within cost-of-service;
- Residential – Discount customers are not within cost-of-service, however this is intentional and is driven by PUD policy; and

As classes are already within the cost-of-service range, proposed rate adjustments would be distributed across the board – all customer classes would receive the same percentage adjustment.

RATE DESIGN

Overview

The principal objective of the rate design stage of the analysis is to implement a rate structure that collects the appropriate level of revenue and is both cost-based as well as aligns with the utility's goals and objectives. Rate design is typically the final step in a rate study process. Establishing rates is a blend of "Art" and "Science" and especially so when it comes to the rate levels and structures. Several variables must be balanced to arrive at optimal rates and include revenue stability and efficiency of use. This section will review the existing and proposed rates for the water utility.

Existing Rates

The existing water rate structure is composed of a fixed monthly base fee and a variable consumption charged billed per hundred gallons (cgals) of water use. Exceptions and further details of this rate structure include:

- Kala Point village and condo customers are assessed a fixed charge and a fixed consumption amount for the usage charge.
- Residential customers pay the same fixed monthly base fee regardless of meter size, while the Commercial fixed charge varies depending on meter size.
- Commercial customers are charged one rate for all usage while the Residential customers are billed based on a four-tier inclining block structure. The tier structure is as follows:
  - Tier 1: 0 – 5,000 gallons
  - Tier 2: 5,001 – 10,000 gallons
  - Tier 3: 10,001 – 30,000 gallons
  - Tier 4: 30,001+ gallons
- The Kala Point customers who pay a consumption rate are assessed the same four tier structure, but their rates are slightly different than the Residential rates.

Exhibit 4.11 provides a summary of the existing rates as of January 2020.

Exhibit 4.11
Existing Water Rates

Class of Service	Base Fee ($/meter/mo.)	Consumptive Rates ($/cgal) 0 - 5,000 gals	5,001 - 10,000 gals	10,001 - 30,000 gals	30,001+ gals
Residential	$ 25.65	$ 0.29	$ 0.40	$ 0.54	$ 1.00
Residential Discount	10.00	0.29	0.40	0.54	1.00
Kala Point					
Village	$ 400.40	n/a	n/a	n/a	n/a
Condos	28.60	n/a	n/a	n/a	n/a
KPB2	171.60	0.25	0.35	0.47	1.00
KPB4	63.90	0.25	0.35	0.47	1.00
Commercial					
5/8"	$ 25.65	$ 0.40	$ 0.40	$ 0.40	$ 0.40
1"	61.40	0.40	0.40	0.40	0.40
1/5"	120.00	0.40	0.40	0.40	0.40
2"	191.29	0.40	0.40	0.40	0.40
3"	357.00	0.40	0.40	0.40	0.40
4"	593.80	0.40	0.40	0.40	0.40
6"	1,184.50	0.40	0.40	0.40	0.40
8"	1,894.00	0.40	0.40	0.40	0.40

Proposed Rates

The analysis in this financial plan indicates a need for approximately 16.00 percent annual increases from 2021 through 2023 and a 6.75 percent increase in 2024. These rates are applied across-the-board to all classes, however, based on feedback from PUD staff and Board, there are a few structural changes made:

- ***2021 Base Fee.*** The entire rate increase in 2021 is collected through the base fees. This results in the 2021 base fee for a 5/8" meter increasing by $7.00, scaling with meter size. Subsequent increases for the base fee follow the overall system rate adjustment.
- ***Residential Base Fee.*** Currently all Residential customers pay a single base fee. Going forward, the base fee will be determined by the size of the customer's meter. These charges are aligned with the meter fees paid by Commercial customers. One exception is made for customers required to upsize to meet fire flow standards for fire sprinklers. In these instances, customers will be assessed the base fee associated with potable service only.
- ***Kala Point.*** The Kala Point consumption rates are aligned with the Residential rates over a two-year period (2021 – 2022).
- ***Capital Surcharge.*** A capital surcharge of $5.00 will be introduced in 2022 for all customers. This surcharge increases to $7.00 in 2024.

Exhibit 4.12 details the proposed base fee, consumption rates, and capital surcharge for water utility customers for the 2021 to 2024 rate period.

Exhibit 4.12
Projected Water Utility Rates

Description	2021	2022	2023	2024
Monthly Base Fees - $/meter/month				
Residential				
5/8"	$ 32.65	$ 34.80	$ 40.83	$ 42.61
1"	78.16	83.30	97.74	102.00
1.5"	152.75	162.80	191.02	199.36
Residential - Discount				
5/8"	$ 12.73	$ 13.57	$ 15.92	$ 16.61
Kala Point				
Village	$ 509.67	$ 543.20	$ 637.35	$ 665.19
Condos	36.41	38.80	45.53	47.51
KPB2	218.43	232.80	273.15	285.08
KPB4	81.34	86.69	101.72	106.16
Commercial				
5/8"	$ 32.65	$ 34.80	$ 40.83	$ 42.61
1"	78.16	83.30	97.74	102.00
1.5"	152.75	162.80	191.02	199.36
2"	243.49	259.51	304.49	317.79
3"	454.43	484.32	568.27	593.09
4"	755.85	805.58	945.21	986.49
6"	1,507.76	1,606.95	1,885.48	1,967.83
8"	2,410.88	2,569.49	3,014.86	3,146.53
Monthly Capital Surcharge - $/account/month				
Standard - $ / account	$ -	$ 5.00	$ 5.00	$ 7.00
Discount - $ / account	-	1.95	1.95	2.73

Consumptive Rates ($ / cgal)	2021	2022	2023	2024
Residential				
Tier 1 (0-5,000)	$ 0.29	$ 0.31	$ 0.36	$ 0.38
Tier 2 (5,001-10,000)	0.40	0.43	0.50	0.52
Tier 3 (10,000-30,000)	0.54	0.58	0.68	0.70
Tier 4 (30,001+)	1.00	1.07	1.25	1.31
Kala Point				
Tier 1 (0-5,000)	$ 0.27	$ 0.31	$ 0.36	$ 0.38
Tier 2 (5,001-10,000)	0.38	0.43	0.50	0.52
Tier 3 (10,000-30,000)	0.51	0.58	0.68	0.70
Tier 4 (30,001+)	1.00	1.07	1.25	1.31
Commercial	0.40	0.43	0.50	0.52

SUMMARY

The analysis described above concludes the water utility revenue requirement and cost of service study. The study followed the methodology described in Section II, which included three key steps:

- ***Revenue Requirement Analysis:*** Determines the amount of revenue that utility rates must generate to meet the PUD's various financial obligations. This analysis has two main purposes – it serves as a means of evaluating the water utility's fiscal health and adequacy of current rate

levels, and it sets the revenue basis for near-term and long-term rate planning. Based on the results of this analysis, annual rate revenue increases ranging from approximately 16.00 percent to 6.75 percent are needed from 2021 to 2024. The 2021 increase is effective in June, all other increases are effective in January. These revenue adjustments are designed to meet the utility's annual operating expenses, capital improvement program, operating reserve goals, and financial performance targets related to debt service coverage.

- ***Cost of Service Analysis:*** The second step in the study determines the equitable allocation of the revenue requirement to customers given their service needs and characteristics. Costs were classified and then assigned to the PUD's customer classes. These "cost shares" are then compared with each customer class's rate revenue at existing rates to identify potential changes to improve cost equity. The analysis indicates that existing customer classes are within cost-of-service.
- ***Rate Design:*** The final step in the study process aligns the PUD's existing rate structure to generate sufficient revenue from each customer class based on the results of the first two steps. As part of this process base fees are expanded to capture different meter sizes for Residential customers, the Kala Point consumption rates are aligned with their Residential counterparts, and a capital surcharge is added to all customers.

The PUD Board was engaged throughout the revenue requirement study process to present study findings and to receive direction and feedback on recommendations. The presentations to the PUD Board are summarized below:

- July 2020: Rate setting fundamentals
- August 2020: Draft results of revenue requirement
- September 2020: Updated draft results of revenue requirement, incorporating Board direction
- November 2020: Draft results of cost-of-service analysis
- December 2020: Updated draft results of cost-of-service analysis, incorporating Board direction
- February 2021: Review of draft rate design
- April 2021: Recommendations for cost-of-service phase-in strategy and rate design

In April 2021, the PUD Board approved the four-year rate schedule as described above under the condition that they re-evaluate the increases each year. During their re-evaluations, the Board may elect to change the rate increase described in this report. We recommend that the PUD regularly monitor the financial status of the water utility, adjusting the rate strategy as needed to maintain equitable rates that are adequate to meet the PUD's financial needs.

Section V. Sewer Utility

In addition to providing electric, water, and broadband services, the PUD also provides sewer services to certain areas of Jefferson County. Specifically, the PUD manages and maintains 16 community drain fields and on-site septic systems for members of the community. Of the 16 systems, 13 are both owned and managed by the PUD, while the other three are owned by the community and just managed by the PUD. The PUD provides sewer services to approximately 350 customers.

From a financial reporting perspective, the sewer utility is included in the water utility. Rates are assessed on a fixed basis to all accounts through a monthly Standard rate of $30.80. A reduced rate is available for low income customers of $21.56 per month and customers within the Kala Point system of $20.00 per month.

As part of the overall rate study, the PUD wanted to evaluate if the differentials between the Standard rate and the Kala Point rate are still appropriate or if changes are warranted. Since the rate assessed to each customer is a function of the revenue requirement necessary to pay for Sewer specific expenses, the overall needs had to be identified first through a revenue requirement analysis before the rate differential could be determined.

REVENUE REQUIREMENT

As discussed in the electric and water sections of the report, the revenue requirement evaluates the amount of revenue that a utility's rates must generate to meet its various financial obligations. This analysis has two main purposes – it serves as a means of evaluating the utility's fiscal health and adequacy of current rate levels, and it sets the revenue basis for near-term and long-term rate planning. The analysis is defined as the net difference between total revenue needs and the revenue generated through non-rate sources. Hence, the revenue requirement analysis involves defining and forecasting both needs and resources.

Operating Forecast

The purpose of the operating forecast is to determine whether the existing rates and charges are sufficient to recover the costs the utility incurs to operate and maintain the sewer system. The operating forecast was developed for the 2020 to 2030 time period. As the sewer utility is included in the water utility, the water system's operating forecast was utilized for consistency purposes. The 2020 and 2021 water budgets formed the starting point for the forecast. An analysis was performed to determine what share of each line-item the sewer utility is responsible for. The following sections describe the components of the operating forecast in more detail as well as any modifications that were included in the sewer analysis.

Operating Revenues

- ***Retail Rate Revenue.*** Based on actual detailed customer records from the PUD's billing system. Data from 2019 is used to project future revenues.
- ***Customer Growth.*** Based on discussions with PUD staff, customer growth for all systems is set a 0.00 percent.

- ***Other Revenues.*** No other revenues are allocated to the sewer utility.

Operating and Maintenance (O&M) Expenses

Exhibit 5.1 summarizes the total allocation of the 2021 water operating expense budget to the sewer utility.

Exhibit 5.1
Allocation of 2021 Budgeted Water Operating Expenses to Sewer Utility

Accounting Unit	2021 Budget	Sewer Allocation	% of Total
Power Production Expense	$ 650	$ -	0.00%
Cost of Purchased Power Expense	200,000	**40,000**	20.00%
Distribution Expense - Operations	1,097,128	**16,481**	1.50%
Distribution Expense - Maintenance	467,077	**151,337**	32.40%
Customer Accounts Expense	226,874	**14,364**	6.33%
Customer Service and Information Expense	-	**-**	0.00%
Administrative & General Expense	1,106,543	**96,692**	8.74%
Taxes	111,413	**3,501**	3.14%
Total	**$ 3,209,685**	**$ 322,375**	**10.04%**

The allocation basis used for the activities is as follows:

- ***Power Production Expense.*** No costs in this activity are allocated to the sewer utility.
- ***Cost of Purchased Power.*** Sewer related sub-activities of "purchased power – sewer" and "purchased power – sewer Beckett Point" are allocated 100.00 percent to the sewer utility. No other line items included in this activity are allocated to the sewer utility.
- ***Distribution Expense – Operations.*** The "salaries and wages – employees" sub activity is allocated 1.53 percent to sewer. The "contractual services – water testing" is allocated 2.41 percent to sewer. Both line-item allocations are based on the 2020 budgeted amounts to sewer versus the total budget for this line-item. No other line item in this activity is allocated to sewer.
- ***Distribution Expense – Maintenance.*** The "materials and supplies" sub activity is allocated 0.22 percent to sewer, "miscellaneous expenses" sub activity is allocated 0.44 percent to sewer, and "maintenance of general plant" sub activity is allocated 0.02 percent to sewer. These three line-item allocations are based on the 2020 budgeted amounts to sewer versus the total budget for these line-items. The "maintenance of sewer plant – general", "maintenance of sewer plant – Beckett Point", and "maintenance of sewer plant – Kala Point" sub activities are allocated 100.00 percent to the sewer utility. No other line item from this activity is allocated to sewer.

  Based on the timing of the completion of the sewer utility analysis, the 2020 budget figures for "maintenance of sewer plant – general", "maintenance of sewer plant – Beckett Point", and "maintenance of sewer plant – Kala Point" were updated with actual performance for those sub activities.
- ***Customer Accounts Expense.*** The "customer records and collection" and "uncollectible accounts expense" sub activities are allocated at 6.72 percent to sewer. These are allocated based on the proportion of sewer accounts to total water and sewer accounts. The "low-income support" sub activity is allocated at 1.94 percent to sewer based on the proportion of sewer low-income discounts compared to the total low-income discounts provided to both water and sewer. No other line item from this activity is allocated to sewer.

- ***Customer Service and Information Expense.*** No costs in this activity are allocated to the sewer utility.
- ***Administrative and General.*** All line items in this activity are allocated 9.41 percent to the sewer utility and is based on how all other operating expenses are allocated with the following exceptions:
  - » The "office supplies and expenses" sub activity is allocated 0.56 percent to the sewer utility based on the 2020 budgeted amounts to sewer versus the total budget for this line-item.
  - » The "property insurance" sub activity is allocated 14.39 percent to sewer based on the split of the original cost of water and sewer assets.
  - » Rents sub activity is not allocated to the sewer utility.
- ***Taxes.*** Allocated 3.14 percent to sewer based on the expected taxes owed on rate revenues collected from sewer rates.

The 2021 budgeted amounts are then escalated to project expenses in future years. The following escalation factors are used in the analysis:

- ***General Cost Inflation.*** 2.00 percent per year; based on the rounded ten-year average of the consumer price index.
- ***Construction Cost Inflation***. 3.00 percent per year; based on the rounded ten-year average of the Engineering News-Record (ENR) construction cost index.
- ***Labor Cost Inflation.*** 3.50 percent per year; based on discussions with PUD staff.
- ***Benefit Cost Inflation.*** 6.00 percent per year; based on discussions with PUD staff.
- ***Taxes.*** State excise taxes are assessed on PUD revenues. The State excise tax rate is 3.852.

Debt Service

- ***Existing Debt.*** None of the water utility's existing debt obligations are related to the sewer utility – 0.00 percent of existing debt service is allocated to sewer.

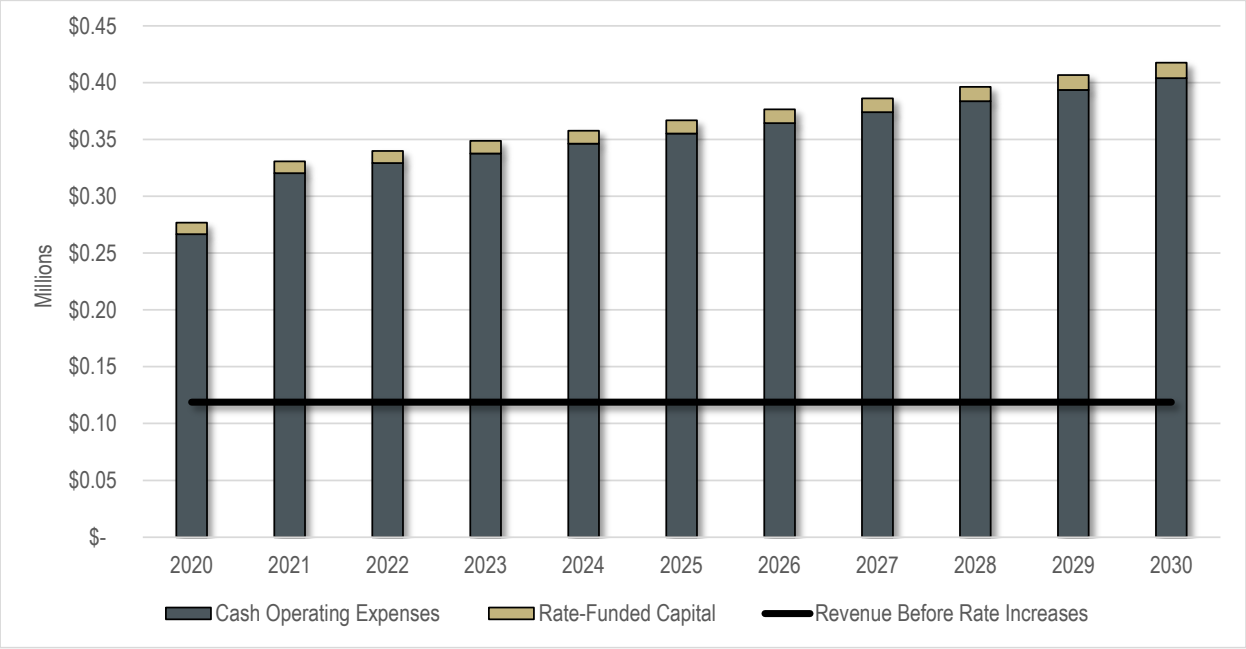
System Reinvestment (Rate Funded Capital) & Capital Funding Plan

System reinvestment funding ensures system integrity through ongoing repair and replacement. As discussed in Section II Rate Study Methodology, the PUD does not have a formal policy regarding system reinvestment. This study assumes the sewer utility would need to generate enough cash from rates to pay for all of their capital expenditures. Capital expenditures are assumed at $10,000 per year in 2020 dollars.

Summary of Revenue Requirement

The operating forecast components come together to form the multi-year projection. The analysis compares the overall revenue available to the sewer system at current rate levels to the expense and evaluates the sufficiency of current rates on an annual basis. **Exhibit 5.2** illustrates a summary of the revenue requirement findings.

Exhibit 5.2
Sewer System Revenue Requirement Summary Before Increases



Key observations of the revenue requirement before rate adjustments include:

- As identified in **Exhibit 5.2** revenues at existing rates are currently not sufficient to meet all expense obligations;
- Since the sewer utility is currently tracked within the water utility, the revenue deficiency is being subsidized by the water utility.

SEWER SYSTEM COST ALLOCATION

As discussed in the introduction of this Section, the PUD currently assesses a standard rate for service on a monthly basis and offers a discounted rate for low income customers and Kala Point customers. Before validating the rate differentials between existing rates, the PUD reviewed all the systems, and the services provided, and modified the rates to be evaluated.

Based on the review, the following system rates were evaluated:

- ***Kala Point***. Contains all customers in the Kala Point system. This system is currently under the Kala Point rate.
- ***Beckett Point***. Contains all customers in the Beckett Point system. This system is currently under the standard rate.
- ***Standard***. Contains all other systems and customers, including low income qualifying customers.

The basis for separating the three systems was tied to the services provided to each system:

- The PUD provides the following services to all systems:
  - » Maintain roads to drain fields and pump facilities
  - » Annual inspection
  - » Monthly monitoring

  - » Bi-annual moving of drain field(s)
  - » Replacement of or repair of grinder pumps
  - » Any other state and local permitting or regulation requirements
- The PUD provides the following services to Kala Point and Beckett Point only:
  - » Replacement of lids and risers
  - » Pump on-site septic tanks on
  - » Fill reports with County and pay for third-party report company for Kala Point

The following section details the analytical steps taken to allocate costs to the three systems.

Cost Allocation

Costs are allocated to the three rate areas using a series of allocation factors. The following summarizes the key cost allocation assumptions:

- ***Cost of Purchased Power.*** The "purchase power – sewer" sub activity is allocated 53.88 percent to standard and 46.12 percent to Kala Point based on the number of customer accounts. The "purchased power – sewer Beckett Point" sub activity is allocated 100.00 percent to Beckett Point.
- ***Distribution Expense – Operations.*** All expenditures for this activity are allocated 100.00 percent as all other expenses. This category is re-allocated to the three rate systems based on all other operating expenditures.
- ***Distribution Expense – Maintenance.*** The "maintenance of sewer plant – general" sub activity is allocated 100.00 percent to Standard. The "maintenance of sewer plant – Beckett Point" sub activity is allocated 100.00 percent to Beckett Point. The "maintenance of sewer plant – Kala Point" sub activity is allocated 100.00 percent to Kala Point. All other expenditures for this activity are allocated 100.00 percent as all other expenses, which are re-allocated to the three rate systems based on all other operating and maintenance expenditures.

  The cost for "maintenance of sewer plant – general", "maintenance of sewer plant – Beckett Point" and "maintenance of sewer plant – Kala Point" sub activities were established utilizing 2018, 2019 and 2020 actual labor costs and discussion with PUD staff. The PUD tracks workorder and labor data for Beckett Point and Kala Point individually, while time spent on all other standard systems includes administrative time. Based on discussion with PUD staff, approximately two hours each day, or 25.00 percent of time (2 out of 8 daily business hours), is spent on the daily basis performing administrative tasks. The remainder of maintenance time is spent on direct system activities. Based on this assumption, 25.00 percent of costs included in the "maintenance of sewer plant – general" was removed and reallocated to the three systems proportionally for the 2018 through 2020 historical time period.

  To account for fluctuations in time spent between systems from year to year, a 3-year average was developed between the systems. The average was used to separate the share of labor costs associated with each system by applying it to total labor costs for all systems in the test year and forecast periods.
- ***Customer Accounts Expense.*** Allocated 39.15 percent to standard, 27.32 percent to Beckett Point, and 33.52 percent to Kala Point based on the number of customer accounts.

- ***Administrative & General Expense.*** Allocated 100.00 percent as all other expenses, which is re-allocated to the three rate systems based on all other operating expenditures.
- ***Taxes.*** Allocated 100.00 percent as taxes, which is re-allocated to the three rate systems based on all other operating expenditures.
- ***Rate Funded Capital.*** Allocated 39.15 percent to standard, 27.32 percent to Beckett Point, and 33.52 percent to Kala Point based on the number of customer accounts.

A summary of the allocated revenue requirement by rate system is shown in **Exhibit 5.3**.

Exhibit 5.3
Allocation of Test Year Revenue Requirement (2021) by Rate Area

Description	Rate System					Total
	Standard	Beckett Pt.	Kala Pt.	As All Other	Taxes	
Cost of Purchased Power	$ 16,163	$ 10,000	$ 13,837	$ -	$ -	**$ 40,000**
Distribution Expense - Operations	-	-	-	14,596	-	**14,596**
Distribution Expense - Maintenance	58,594	64,967	27,214	562	-	**151,337**
Customer Accounts Expense	5,624	3,925	4,815	-	-	**14,364**
Administrative & General Expense	-	-	-	96,692	-	**96,692**
Taxes	-	-	-	-	3,501	**3,501**
Total O&M & Tax Expenses	**$ 80,381**	**$ 78,892**	**$ 45,867**	**$ 111,850**	**$ 3,501**	**$ 320,491**
Allocation of "As All Others"	43,827	43,015	25,008	(111,850)	-	-
Total O&M & Tax Expenses	**$ 124,208**	**$ 121,907**	**$ 70,875**	**$ -**	**$ 3,501**	**$ 320,491**
Rate Funded Capital	4,033	2,814	3,453	-	-	10,300
Total Revenue Requirement	**$ 128,241**	**$ 124,721**	**$ 74,328**	**$ -**	**$ 3,501**	**$ 330,791**
Allocation of "Taxes"	1,372	1,334	795	-	(3,501)	-
Total Revenue Requirement	**$ 129,612**	**$ 126,056**	**$ 75,123**	**$ -**	**$ -**	**$ 330,791**
As a Percent	*39.18%*	*38.11%*	*22.71%*	*0.00%*	*0.00%*	*100.00%*

Based on the allocations above the analysis indicates that 39.18 percent of costs are associated with the Standard systems, 38.11 percent is associated the Beckett Point system and 22.71 percent is associated with the Kala Point system. Dividing the overall 2021 revenue requirement by total billing units by month results in an average rate of $70.58 per billing unit.

RATE DESIGN

Overview

The principal objective of the rate design stage of the analysis is to implement a rate structure that collects the appropriate level of revenue and is both cost-based as well as aligns with the utility's goals and objectives. Rate design is typically the final step in a rate study process. Establishing rates is a blend of "Art" and "Science" and especially so when it comes to the rate levels and structures. Several variables must be balanced to arrive at optimal rates and include revenue stability and efficiency of use. This section will review the existing and proposed rates for the sewer utility.

Existing Rates

The existing sewer rate structure consists of a fixed monthly base fee, no variable charge is assessed. **Exhibit 5.4** provides a summary of the existing rates as of January 2020.

Exhibit 5.4
Existing Sewer Rates

Description	Base Fee ($/unit/mo.)
Standard	$ 30.80
Kala Point	20.00

Note: Beckett Point customers charged under the standard rate

Proposed Rates

Cost Allocation Unit Costs

The results of the cost allocation analysis provide cost-based rates on a per billing unit basis. These were utilized to develop the proposed rate structure. **Exhibit 5.5** provides a summary of the 2021 cost-based rates.

Exhibit 5.5
2021 Cost-Based Rates

Description	Base Fee ($/unit/mo.)
Standard	$ 74.62
Beckett Point	104.00
Kala Point	43.23

Based on feedback from PUD staff and Board, a five-year phase-in was developed to adjust all three rate areas to their cost-based rate. This would eliminate the sewer utility's dependency on the water utility. In other words, the sewer utility will become self-sufficient after the five-year phase-in is completed. **Exhibit 5.6** summarizes the rate adjustments needed by system over the five-year rate-setting period as well as the total sewer system adjustments.

Exhibit 5.6
Five-Year Rate Adjustments

Description	Rate Adjustments				
	2021	2022	2023	2024	2025
Standard	33.76%	25.24%	20.15%	16.77%	14.36%
Beckett Point	54.91%	35.44%	26.17%	20.74%	17.18%
Kala Point	27.98%	21.86%	17.94%	15.21%	13.20%
System Total	**38.44%**	**27.77%**	**21.73%**	**17.85%**	**15.15%**

Exhibit 5.7 provides the proposed base fees, by rate system, incorporating the rate adjustments shown in **Exhibit 5.6**.

Exhibit 5.6
Five-Year Rate Adjustments

Description	Base Fee ($/unit/month)				
	2021	2022	2023	2024	2025
Standard	$ 41.20	$ 51.59	$ 61.99	$ 72.39	$ 82.78
Beckett Point	47.71	64.62	81.53	98.44	115.36
Kala Point	25.60	31.19	36.79	42.38	47.98

SUMMARY

The analysis described above concludes the sewer utility revenue requirement and cost allocation study. The study can be summarized in three key steps:

- ***Revenue Requirement Analysis:*** Determines the amount of revenue that utility rates must generate to meet the PUD's various financial obligations. This analysis has two main purposes – it serves as a means of evaluating the sewer utility's fiscal health and adequacy of current rate levels, and it sets the revenue basis for near-term and long-term rate planning. Budgeted water utility costs were allocated to the sewer utility based on a number of characteristics of the system, including historical work orders, labor data, and data from the detailed customer statistics. Based on the results of this analysis, the sewer utility currently operates at an approximate $205,000 deficit and relies on subsidies from the water utility. The Board is comfortable with the current subsidy but would like the sewer utility to become self sufficient at some point in the future. The rate increases proposed would allow the sewer utility to become self sufficient over a five year period.
- ***Cost Allocation Analysis:*** The second step in the study determines the equitable allocation of the revenue requirement to the three sewer systems. The revenue requirement is allocated to each system based on a number of characteristics of the system including historical work orders, labor data, and data from the detailed customer statistics. This analysis provides cost-based rates by rate system.
- ***Rate Design.*** The final step in the study process aligns the PUD's existing rate structure with the cost-based unit rates by system as well as eliminates the subsidy from the water utility over time. Based on discussion with PUD staff and Board, a five-year phase-in was developed to move existing rates towards the cost-based unit rates and eliminate the subsidy. This process also creates a rate specific to the Beckett Point customers, who are currently charged under the standard sewer rate.

The PUD Board was engaged throughout the revenue requirement study process to present study findings and to receive direction and feedback on recommendations. The presentations to the PUD Board are summarized below:

- July 2020: Rate setting fundamentals
- July 2021: Draft results of sewer revenue requirement & cost allocation analysis
- August 2021: Recommendations for cost allocation phase-in strategy and rate design

Section VI. Pole Attachment Fees

As part of this rate study, Jefferson PUD asked FCS GROUP to conduct an update of the electric utility's pole attachment fee. The following section summarizes the key assumptions, methodologies, and results of the pole attachment fee analysis. The current rate is $12.45 per attachment and is based on a pole attachment study completed in 2014.

LEGAL FRAMEWORK

The Revised Code of Washington (RCW) 54.04.045 establishes the methodology for setting a "just and reasonable" pole attachment rate.

- (3a) One component of the rate shall consist of the additional cost of procuring and maintaining pole attachments, but may not exceed the actual capital and operating expenses of a locally regulated utility attributable to that portion of the pole, duct, or conduit used for pole attachment, include a share of the required support and clearance space, in proportion to the space used for the pole attachment, as compared to all other uses made of the subject facilities and uses that remain available to the owner or owners of the subject facilities;
- (3b) The other component of the rate shall consist of the additional costs of procuring and maintaining pole attachments but may not exceed the actual capital and operating expenses of a locally regulated utility attributable to that share, expressed in feet, of the required support and clearance space, divided equally among the locally regulated utility and all attaching licensees, in addition to the space used for the pole attachment, which sum is divided by the height of the pole.
- (3c) The just and reasonable rate shall be computed by adding one-half of the rate component resulting from (a) of this subsection to one-half of the rate component resulting from (b) of this subsection.
- (4) For the purpose of establishing a rate under subsection (3)(a) of this section, the locally regulated utility may establish a rate according to the cable formula set forth by the federal communications commission by rule as it existed on June 12, 2008, or such subsequent date as may be provided by the federal communications commission by rule, consistent with the purposes of this section.

Over the last several years, the interpretation of these rate formulas has been part of an ongoing lawsuit involving Pacific County PUD and Comcast of Washington. A ruling was finalized in 2019 detailing the appropriate methodology of calculations 3(a) and 3(b). This approach is used for the calculation of Jefferson PUD's pole attachment fee. These two methods are described in the following section.

METHODOLOGY

The methodology used to develop the pole attachment rate follows the 2019 Washington Court of Appeals ruling from Public Utility District No. 2 of Pacific County vs. Comcast of Washington IV, Inc. Two calculations are used to determine the pole attachment fee – 3(a) & 3(b). The pole attachment rate is the average of both methods.

The key difference between these two methods are summarized below:

3(a) Method

In 2019, the Court's ruling revised this attachment method. This memo will not address the reasons or history of this revision, rather it will detail the latest methodology as described in the ruling.

The revised Telecom formula is summarized below:

Rate = Space Factor x Cost, where:

$$\text{Space Factor} = \frac{\text{Attachment Space}}{\text{Average Pole Height}} + \frac{\left(\frac{\text{Attachment Space}}{\text{Usable Space}}\right) * \text{Common Space}}{\text{Average Pole Height}}$$

$$\text{Cost} = \text{Gross Cost of Bare Pole x Carrying Charge}$$

3(b) Method

The 3(b) formula is summarized below:

Rate = Assignable Space Factor x Cost + Common Space Factor x Cost, where:

$$\text{Assignable Space Factor} = \left(\frac{\text{Attachment Space}}{\text{Assignable Space}}\right)\left(\frac{\text{Assignable Space}}{\text{Average Pole Height}}\right)$$

$$\text{Common Space Factor} = \left(\frac{\text{Common Space}}{\text{Average Pole Height}}\right)\left(\frac{1}{\text{Attaching Entities}}\right)$$

$$\text{Cost} = \text{Gross Cost of Bare Pole x Carrying Charge}$$

ASSUMPTIONS

Carrying Charge

The carrying charge calculation is based on actual operating expenses and plant-in-service information from December 31, 2019. It is a representation of annual expenses allocated to the PUD's pole investment, as expressed as a percent of the cost of a bare pole. The carrying charge formula uses gross plant investment information. A summary of the carrying charge components is detailed in **Exhibit 6.1**.

Exhibit 6.1
Carrying Charge Calculation

Carrying Charge	Calculation
Administration Element	
General and Administrative Expense	$ 2,540,211
Divided by: Gross Electric Plant in Service:	103,046,476
Administration Carrying Charge	**2.47%**
Operations and Maintenance Element	
Maintenance of Overhead Lines	$ 1,776,334
Operations of Overhead Lines	69,419
Total	**$ 1,845,753**
Divided by Gross Overhead Pole Investment	40,677,444
Maintenance Carrying Charge	**4.54%**
Depreciation Element	
Gross Pole Investment	$ 14,586,777
Multiplied by Pole Depreciation Rate	2.93%
Divided by Gross Pole Investment	$ 14,586,777
Depreciation Carrying Charge	**2.93%**
Taxes Element	
Tax Expense	$ 2,198,268
Divided by Gross Electric Plant in Service:	103,046,476
Taxes Carrying Charge	**2.13%**
Cost of Capital	
Rate of Return	**2.88%**
Total Carrying Charge	**14.94%**

Cost of Bare Pole

Pole costs are based on 2019 plant-in-service information. Similar to the carrying charge calculation, the cost of a bare pole is based on the gross pole investment. The calculation excludes a presumed 15.00 percent of the pole investment cost as an adjustment for the cost of cross-arms and other appurtenances, which are not used by communication attachments. Pole inventory data was provided by the PUD for 2019. **Exhibit 6.2** summarizes the bare pole cost assumptions and calculation.

Exhibit 6.2
Cost of Bare Pole Assumptions and Calculation

Gross Cost of Bare Pole	Calculation
Overhead Pole Investment	$ 14,586,777
Less: Adjustment for Cross-Arms Investment	(2,188,017)
Gross Bare Pole Cost	**$ 12,398,760**
Divided by: Poles	11,020
Gross Bare Pole Cost per Pole	**$ 1,125.11**

Space Factor Assumptions

- Space Occupied by One Attachment. One foot.
- Average Height of Pole. 41.44 feet; based on pole inventory data provided by the PUD.
  - » Underground and ground clearance space is assumed to be 24.00 feet.
  - » Safety clearance space is presumed at 3.33 feet.

Rate of Return

The rate of return used in the carrying charge calculation is based on the average effective cost of debt for 2018 and 2019. The effective cost of debt is determined by dividing annual interest expense by the total outstanding long-term debt held by the PUD. Interest and debt figures were found in the PUD's annual financial statements. **Exhibit 6.3** details this calculation.

Exhibit 6.3
Effective Cost of Debt

Effective Cost of Debt	2018	2019	Average
Interest Expense	$ 2,857,608	$ 2,782,563	**$ 2,820,086**
Divided by: Outstanding Long-Term Debt	99,749,818	96,344,983	**98,047,401**
Effective Cost of Debt	**2.86%**	**2.89%**	**2.88%**

SUMMARY

The methodology used for 3(a) generates a pole attachment rate of $11.92, while 3(b) generates a rate of $55.87. The calculated pole attachment rate is the average of both methods or $33.89. The formula used to update the PUD's pole attachment rate is consistent with RCW 54.04.045 and with the recent 2019 Washington Court of Appeals ruling from Public Utility District No. 2 of Pacific County vs. Comcast of Washington IV, Inc. Based on the results of the study, the calculated pole attachment rate is $21.44 higher than the current rate of $12.45. We recommend any change to the existing rate be reviewed by the PUD's legal counsel prior to implementation.

Section VII. SUMMARY

STUDY OBJECTIVES

The PUD contracted with FCS GROUP to complete a comprehensive rate study for the water, sewer, and electric utilities, as well as complete a pole attachment fee update. The results of this study establish a blueprint for achieving strong financial performance in the future while delivering efficient and effective services for the PUD's customers.

ELECTRIC UTILITY

Annual rate increases of 4.00 percent in 2021 followed by 4.25 percent from 2022 to 2024 are recommended to ensure the PUD can continue to fully fund its operations, repay debt service obligations, and fund their capital program. The first rate adjustment is assumed to be implemented in July with all subsequent adjustments to be implemented in April. These rate adjustments, along with the existing LOC, would also allow the utility to meet its cash reserve targets in most periods of the forecast as well as meet minimum debt service coverage and TIER requirements.

WATER UTILITY

Annual rate increases of 16.00 percent from 2021 to 2023 followed by a 6.75 percent rate increase in 2024 are suggested to ensure the utility can fund its operating and capital expense obligations as well as debt service from new debt issued. It is assumed that the water utility will receive a $5.0 million loan from the electric utility in 2020. This loan will be used for both operating and capital needs.

SEWER UTILITY

A five-year phase-in strategy was developed that allows the rates for the three systems, Standard, Becket Point, and Kala Point, to move towards a cost-based approach. This phase-in strategy also allows the sewer utility to become self-sufficient. The annual overall rate adjustments proposed from this phase-in plan range from 15.15 percent to 38.44 percent depending on the year.

SUMMARY

We recommend that the PUD revisit the rate study with each budget cycle to review if revenue and expense projections are reasonable when compared to actual experience. The PUD should use the study findings as a living document, continuously comparing the study outcomes to actual revenues and expenses. Any significant or unexpected changes will require adjustments to the rate strategy proposed.