BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,

v.

PUGET SOUND ENERGY,

Docket UE-22____
Docket UG-22____

Respondent

PREFILED DIRECT TESTIMONY (CONFIDENTIAL) OF

ZACARIAS C. YANEZ

ON BEHALF OF PUGET SOUND ENERGY

REDACTED VERSION

JANUARY 31, 2022
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I. INTRODUCTION

Q. Please state your name, business address, and position with Puget Sound Energy.

A. My name is Zacarias C. Yanez. My business address is 355 110th Avenue NE, Bellevue, Washington, 98004. I am a Commercial Acquisitions Manager in the Resource Acquisitions team for Puget Sound Energy (“PSE”).

Q. Have you prepared an exhibit describing your education, relevant employment experience, and other professional qualifications?

A. Yes, I have. It is Exh. ZCY-2.

Q. What are your duties as Commercial Acquisitions Manager?

A. As Commercial Acquisitions Manager, my responsibilities include the following:

1. Leading the evaluation and negotiation of mid-term (i.e., three- to five-year) power contracts and acquisitions.

2. Assisting the acquisition of electric resources and long-term (i.e., greater than five years) power contracts.
Q. Please summarize the contents of your testimony.

A. This prefiled direct testimony seeks a finding of prudence and cost recovery for:

1. A three-year (36-month) extension with Public Utility District No. 1 of Douglas County (“Douglas PUD”) of a then-existing agreement (the “Colville Slice Agreement”) with the Confederated Tribes of the Colville Reservation’s (the “Colville Tribe”) five and one-half percent (5.5%) share of the output of the Wells Hydroelectric Project (the “Colville Slice Agreement Extension”).

2. A Slice Agreement with Public Utility District No. 1 of Chelan County (“Chelan PUD”) for a five percent (5%) share of the output of the Rocky Reach and the Rock Island Hydroelectric Projects (the “Chelan Slice Agreement”).

Q. What is PSE’s understanding of the Commission’s prudence standard?

A. In PSE’s 2003 Power Cost Only Rate Case proceeding, Docket UE-031725, the Commission reaffirmed its prudence standard:

The test the Commission applies to measure prudence is what a reasonable board of directors and company management would have decided given what they knew or reasonably should have known to be true at the time they made a decision. This test applies both to the question of need and the appropriateness of the expenditures. The company must establish that it adequately studied the question of whether to purchase these resources and made a reasonable decision, using the data and methods that a reasonable management would have used at the time the decisions were made.¹

In addition to this reasonableness standard, the Commission has cited several specific factors that inform the question of whether a utility’s decision to acquire a new resource was prudent. These factors include the following:

1. First, the utility must determine whether new resources are necessary.\(^2\)

2. Once a need has been identified, the utility must determine how to fill that need in a cost-effective manner. When a utility is considering the purchase of a resource, it must evaluate that resource against the standards of what other purchases are available and against the standard of what it would cost to build the resource itself.\(^3\)

3. The utility must analyze the resource alternatives using current information that adjusts for such factors as end effects, capital costs, impact on the utility’s credit quality, dispatchability, transmission costs, and whatever other factors need specific analysis at the time of a purchase decision.\(^4\)

4. The utility should inform its board of directors and/or management about the purchase decision and its costs. The utility should also involve the board of directors and/or management in the decision process.\(^5\)

5. The utility must keep adequate contemporaneous records that will allow the Commission to evaluate its actions with respect to the decision process. The Commission should be able to follow the utility’s decision process, understand the elements that the utility used, and determine the manner in which the utility valued these elements.\(^6\)

Q. Did PSE’s decisions to enter into the Colville Slice Agreement Extension and the Chelan Slice Agreement meet this prudence standard?

A. Yes. Both the Colville Slice Agreement Extension and the Chelan Slice Agreement are fixed price contracts that allow PSE to: (1) meet a portion of

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\(^3\) Id. at 11.

\(^4\) Id. at 2, 33-37, 46-47.

\(^5\) Id. at 37, 46.

\(^6\) Id. at 2, 37, 46.
the firm resource adequacy-qualifying contract needs anticipated in the 2021 Integrated Resource Plan; (2) acquire a valuable hydroelectric resource at a time when PSE is entering into the compliance period for the Clean Energy Transformation Act (“CETA”);7 and (3) access the region’s valuable and scarce hydroelectric resources. In addition, for both the Colville Slice Agreement Extension and the Chelan Slice Agreement, PSE performed the analyses, decision-making and documentation processes expected by the Commission, as further described in this prefiled direct testimony.

II. EXTENSION OF THE COLVILLE SLICE AGREEMENT EXTENSION IS PRUDENT

A. Background and Key Terms of the Colville Slice Agreement Extension

Q. Please describe the Colville Tribe’s five and one-half percent share of the output of the Wells Hydroelectric Project.


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produces an average of four million megawatt-hours ("MWh") of electricity per year.

On November 1, 2004, Douglas PUD entered into a Settlement Agreement and a Power Sales Contract with the Colville Tribe as part of the FERC licensing proceeding. FERC approved both the Settlement Agreement and the Power Sales Contract on February 11, 2005.

Based on the terms of the Power Sales Contract, the Colville Tribe is entitled to purchase four and one-half percent (4.5%) of the output of the Wells Project through August 31, 2018, and five and one-half percent (5.5%) of the output of the Wells Project beginning September 1, 2018.

Q. Describe the key terms of the Colville Slice Agreement executed by PSE in 2018.

A. The Colville Tribe offered to sell its five and one-half percent (5.5%) of the output of the Wells Project beginning September 1, 2018. In June 2018, PSE and Douglas PUD executed the Colville Slice Agreement for the Colville Tribe’s share of the output of the Wells Project. The Colville Tribe Slice Agreement (i) entitled PSE to five and one-half percent (5.5%) of the output of the Wells Project, (ii) had a fixed monthly price of $____ per month, and (iii) a term of September 1, 2018, through September 30, 2021.
The Commission previously approved the prudence of PSE’s purchase of the Colville Slice Agreement as part of its approval of various new resources in PSE’s general rate case in dockets UE-190529 and UG190530.\(^8\)

Q. **Describe the key terms of the Colville Slice Agreement Extension executed in 2021.**

A. The Colville Slice Agreement Extension is a 36-month contract with a term from October 1, 2021, through September 30, 2024. The Colville Slice Agreement Extension effectively extends the Colville Slice Agreement, which would have otherwise expired on September 30, 2021.

When paired with existing Mid-C transmission rights held by PSE on the transmission system of the Bonneville Power Administration, the Colville Slice Agreement Extension provides PSE with approximately (i) 42.5 MW of dispatchable and flexible capacity, (ii) 370 MWh of storage, and (iii) 226,000 MWh of clean, zero-emission energy to contribute toward PSE’s resource needs.\(^9\)

PSE negotiated a fixed monthly payment of $\[\text{redacted} \] a month—about $\[\text{redacted} \] per MWh assuming historical average water conditions—and an exclusive \[\text{redacted} \] day renegotiation period for a potential future extension.

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\(^8\) See *WUTC v. Puget Sound Energy*, Dockets UE-190529/UG-190530, Order \[\text{redacted} \] ¶¶ 35, 799 and App’x A (July 8, 2020); see also Prefiled Direct Testimony of Paul K. Wetherbee, Exh. PKW-1CT (June 20, 2019), at pp. 34-37.

\(^9\) Based on an average of 80 years of hydrological history.
B. **Need for the Colville Slice Agreement Extension**

Q. Please describe the need for the Colville Slice Agreement Extension.

A. The Colville Slice Agreement Extension is a fixed price contract that allows PSE to meet a portion of the firm resource adequacy-qualifying contract needs identified in the 2021 Integrated Resource Plan. PSE currently relies on up to 1,500 MW of short-term market purchases to meet capacity need. The Colville Slice Agreement Extension will replace approximately 42.5 MW of those short-term market purchases, thereby reducing the risk of uncertain resource availability at times when the market may be constrained.

Additionally, the Colville Slice Agreement Extension allows PSE to retain a valuable hydroelectric resource at a time when PSE is entering into the CETA compliance period. Opportunities to acquire additional hydroelectric power are already scarce, and PSE anticipates that securing clean, emission-free resources—particularly those that offer flexible dispatch—may become even scarcer in the future. The flexibility and emission-free nature of the output of the Wells Project will continue to provide valuable qualitative and quantitative benefits to PSE and its customers over the life of this extension and any potential extensions.

Finally, the Colville Slice Agreement Extension maintains PSE’s access to one of the region’s most valuable and scarce hydroelectric resources. The output of the Wells Project is flexible and allows frequent and rapid changes to generation.

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levels. PSE can use this flexible dispatch to balance its system within each hour and to respond to rapid changes in load or the output of other resources, especially renewable energy resources.

Q. What would have been the risk if PSE had chosen not to enter into the
Colville Slice Agreement Extension?

A. If PSE had not chosen to enter into the Colville Slice Agreement Extension in early 2021, PSE would have risked losing a valuable non-emitting, flexible capacity resource to another party when the Colville Slice Agreement expired in accordance with its terms on September 30, 2021.

As previously described, the Colville Slice Agreement Extension secures a slice of the valuable output of the Wells Project for PSE’s portfolio for an additional three years (through September 30, 2024) and includes an exclusive [redacted]-day negotiation period to further extend the Colville Slice Agreement in the future. The Colville Slice Agreement Extension offers a significant amount of emission-free dispatch capacity at a time when PSE is seeking resources that will help improve reliability and reduce emissions.
C. Comparison of the Colville Slice Agreement Extension to Alternatives

Q. What alternatives did PSE consider in its analysis of the Colville Slice Agreement Extension?

A. PSE had a limited window in which to make a decision about whether it would submit an offer to compete and ultimately execute contracts for the Colville Slice Agreement Extension. In late 2020, Douglas PUD notified PSE that the Colville Tribe would be conducting an auction to sell its share (or “slice”) of the Wells Project after the expiration of the Colville Slice Agreement with PSE on September 30, 2021. In January 2021, PSE further learned that the Colville Tribe (i) had received an offer from a third party to acquire its rights to the output of the Wells Project starting on October 1, 2021, and (ii) had decided not to conduct its planned auction. PSE subsequently made an offer to extend the Colville Slice Agreement for a term of three years, which the Colville Tribe ultimately accepted.

The limited window of opportunity to consider the Colville Slice Agreement Extension concluded prior to PSE issuing its 2021 All-Source Request for Proposals (the “2021 RFP”) on June 30, 2021. This prevented PSE from evaluating the Colville Tribe Agreement Extension as part of its competitive 2021 RFP process. To accommodate the accelerated schedule, PSE compared the Colville Slice Agreement Extension to short-term market purchase alternatives.
Q. Describe PSE’s approach to analyzing the value of the Colville Slice Agreement Extension.

A. PSE analyzed the value of the Colville Slice Agreement Extension by calculating the total portfolio cost differential between:

- The existing PSE electric portfolio without the Colville Slice Agreement Extension; and
- The existing PSE electric portfolio with the Colville Slice Agreement Extension.

PSE grouped the total portfolio benefits as follows:

1. **Avoided Energy Value.** To calculate the expected Avoided Energy Value of the Colville Slice Agreement Extension, PSE used (i) available forward marks over the extension’s term to estimate the future value of the energy, and (ii) assumed output volumes under the Colville Slice Agreement Extension.

2. **Flexibility Value.** The Flexibility Value consists of two components: (i) operational optimization, and (ii) a flexibility credit. PSE forecasted the benefit of operational optimization by modeling the optimal dispatch of PSE’s power portfolio, with and without the Colville Slice Agreement Extension. PSE calculated the flexibility credit by applying a penalty to flexibility violations in the modeling of the optimal dispatch of PSE’s power portfolio model, with and without the Colville Slice Agreement Extension.

3. **Avoided Carbon Emission Value.** PSE modeled two carbon pricing scenarios to model a “floor” and a “cap” for the potential value of avoiding carbon emissions: (i) Scenario 1, “floor,” is a market-based price scenario that used a forecast of California carbon prices as a proxy for the emissions value, and (ii) Scenario 2, “cap,” used the Social Cost of Carbon as a proxy for the emissions value.
PSE calculated these three value streams for 2022 and applied each of the values to the forward energy prices during the term of the Colville Slice Agreement Extension to calculate the projected total value of the Colville Slice Agreement Extension to PSE.

Q. Please describe the model PSE used to perform the analysis of the Colville Slice Agreement Extension.

A. PSE assessed the value of the Colville Slice Agreement Extension using the PLEXOS software by Energy Exemplar. PLEXOS is one of the most sophisticated software platforms in the industry today that uses mathematical optimization combined with advanced handling and visualization to provide a high-performance, robust simulation system for electric power, water, and gas. It is a multi-time-step chronological production simulation model utilizing mixed-integer programming (MIP) to simulate the electric power market and co-optimize energy and ancillary service provisions.

From 2015, PSE has utilized Plexos software to model its electric portfolio in support of energy trading, resource maintenance scheduling, flexibility, and organized market rule analysis within the Western EIM market. PSE’s Plexos model is composed of two zones, namely PSE zone and Mid-Columbia ("Mid-C") market zone. The PSE zone has up-to-date models of existing individual resources, including thermal, variable energy, hydro resources, and power contracts. Mid-C market zone represents the bilateral hub that PSE trades.
Complex hydro and storage modeling capability available in Plexos allow for high fidelity representation of the Mid-C hydro system and hydro constraints and water regulation in the model. The Plexos database and input assumptions for this analysis are consistent with the IRP process, as described on page G-54 of Appendix G in PSE 2021 IRP.

First, the base PSE portfolio model (Base Model) representing current electric system operation was established using the most up-to-date information at the time of the valuation of the Colville Slice Agreement Extension. This includes electric resource retirements and additions, updated contracts, Mid-C energy price forward mark, load forecast, fuel prices, hydro condition, and constraints.

Next, the valuation portfolio model (Contract Model) was prepared by adding the incremental Colville Slice contract on top of the existing Colville contract in the Base Model, including incremental inflow (cfs), incremental storage (acre-feet), and incremental generation capacity (MW). Based on PSE electric operation experience, adding hydro resource generation with storage capability like that provided by the Colville Slice Agreement Extension tends to reduce GHG-emitted resource production, increase operational flexibility, and improve trade efficiency.

Finally, the value of Colville Slice Agreement Extension was assessed by comparing the hourly production cost simulation output between the Contract Model and the Base Model under the same green-house gas assumptions, load serving obligations, and ancillary services requirements (contingency reserve,
regulation, and flexible ramping product). As summarized in the study results below and as shown in Exh. ZCY-3C, the valuation in Plexos recognizes key attributes that the Colville Slice Agreement Extension offers to PSE’s portfolio: energy, storage, flexibility, and avoided carbon emissions.

Q. Please describe the key assumptions PSE used in the analysis of the Colville Slice Agreement Extension.

A. Key assumptions used by PSE in the analysis include: (i) PSE’s existing resource portfolio, (ii) a forecast of forward power prices, (iii) the projected output provided under the Colville Slice Extension Agreement, and (iv) a forecast of forward carbon prices.

Q. Please describe the forecast of forward power prices assumed by PSE for analysis of the Colville Slice Agreement Extension.

A. PSE used the flat monthly forward mark provided by Platts as of February 2, 2021. Platts is a service that provides forward prices based on Intercontinental Exchange settlement data. Next, PSE used the most recent available historical 2020 hourly spot power prices to shape the flat monthly price forward price forecast. This shaping is done by taking the flat 2020 price by month and indexing each hourly price in the month to the average price, then applying the Platts forward mark to this index to develop a realistic hourly power price forecast for the evaluation. Finally, PSE used the power price forecast over the three-year
term of the Colville Slice Agreement Extension to estimate the future value of the
ergy displaced by the extension.

Q. Please describe the projected output assumed by PSE for analysis of the
Colville Slice Agreement Extension.

A. PSE forecasted a monthly volume forecast for the Colville Slice Agreement
Extension based on the average of historical 80-year monthly hydro volumes for
the Wells Project. PSE then created a proxy daily volume by shaping the monthly
Wells Project volume to a daily volume based on recent historical daily output
data from BPA’s Chief Joseph Hydro Project. PSE input the daily volume into the
Plexos model for hourly commitment and dispatch optimization.

Q. Please describe the two scenarios PSE considered when estimating the value
of avoided carbon emissions used by PSE for analysis of the Colville Slice
Agreement Extension.

A. PSE used two scenarios to estimate the value of avoided carbon emissions to
show a range of the value. The scenarios are described below:

(1) Scenario 1 - Market-based cost of carbon. This scenario represents the
potential value PSE could receive if the region develops a carbon market. At the
time PSE was evaluating this resource in February 2021, the Washington
legislature was developing the Climate Commitment Act, SB 5126,\textsuperscript{11} which

\textsuperscript{11} SB 5126 was passed on April 24, 2021 and became effective on July 25, 2021.
included a Cap and Invest Program. While the final details were not known at the
time, PSE believes it was appropriate to model the potential impact of the bill in
its analyses. In addition, this scenario represents the potential value that other
competitors for the Colville Slice contract might price into the bid if they plan to
sell into California, which does have a mature carbon market. PSE used a forecast
based on California carbon auction prices provided by Energy Exemplar, the
developer of the Plexos and Aurora models used in PSE’s 2021 IRP. Since
Washington does not yet have established carbon market, the California carbon
prices were deemed a good proxy for this market-based cost valuation. At the
time of the evaluation, the California market carbon price was $17.60 per ton, and
PSE used this price to project a market-based avoided cost of carbon emissions of

$(2) \text{ Scenario 2 - Social Cost of Carbon. }$ Consistent with the way PSE conducts
portfolio modeling for its Integrated Resource Planning and Request for Proposals
processes, PSE’s analysis of the Colville Slice Agreement Extension included the
social cost of carbon by applying a social cost of carbon adder as fixed cost adder.
By replacing unspecified market purchases with a carbon-free generation
resource, PSE was able to consider the value of avoided carbon emissions
provided by adding the Colville Slice Agreement Extension to PSE’s power
portfolio.
PSE incorporated a social cost of carbon of $76.70 per metric ton of carbon in its analysis. Assuming that the energy from the Colville Slice Agreement Extension replaces Mid-C market purchases, the Colville Slice Agreement Extension results in an avoided social cost of carbon of $\_\_\_\_\_ per MWh.\(^{12}\)

Q. Please summarize the results of the evaluation of the Colville Slice Agreement Extension.

A. Table 1 below presents the results of the valuation of the Colville Slice Agreement Extension.

<table>
<thead>
<tr>
<th>Value Streams</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Value(^{13})</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Flexibility Value</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Avoided Carbon Emissions</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Energy + Flexibility + Avoided Carbon Emissions ($/MWh)</td>
<td>_____</td>
<td>_____</td>
</tr>
<tr>
<td>Annual Estimate Value ($/MWH x Annual MWh)</td>
<td>_____</td>
<td>_____</td>
</tr>
</tbody>
</table>

\(^{12}\) Consistent with the 2021 Integrated Resource Plan, the social cost of carbon is based on the social cost of carbon dioxide in 2007 dollars using the 2.5 percent discount rate, listed in table 2, technical support document: Technical update of the social cost of carbon for regulatory impact analysis under Executive Order No. 12866, published by the interagency working group on social cost of greenhouse gases of the United States government. The calculation assumes that market purchases have a rate of 0.437 metric tons per MWh.

\(^{13}\) As previously discussed, PSE assumed avoided energy prices based on the average forward mark price as of February 2, 2021.
See also the Second Exhibit to the Prefiled Direct Testimony of Zacarias C. Yanez, Exh. ZCY-3C, for a summary of the analyses PSE performed to estimate the value of the Colville Slice Agreement Extension.

D. The Colville Slice Agreement Extension is Used and Useful

Q. Is the Colville Slice Agreement Extension used and useful?

A. Yes. As previously discussed, the Colville Slice Agreement had a term that was slightly longer than three years (i.e., September 1, 2018, through September 30, 2021) and would have expired in accordance with its terms at the end of September 30, 2021. The Colville Slice Agreement Extension extended the non-price terms and conditions of the Colville Slice Agreement for an additional three years (through the end of September 30, 2024) and included an exclusive 30-day renegotiation period for a potential future extension.

Accordingly, PSE has been acquiring output of the Wells Project under the Colville Slice Agreement Extension since October 1, 2021 and will continue to do so through the end of September 30, 2024 (and potentially longer depending on the ability of PSE and the Colville Tribe to reach agreement on potential future extensions).
E. Involvement of PSE Management

Q. Did PSE’s Energy Management Committee approve the Colville Slice Agreement Extension?

A. The PSE Energy Management Committee ("EMC") is composed of five PSE officers and is responsible for approving long-term resource contracts and acquisitions. Please see the Prefiled Direct Testimony of Paul K. Wetherbee, Exh. PKW-1CT for additional discussion of the Energy Management Committee. PSE’s Energy Management Committee approved the Colville Slice Agreement Extension on February 23, 2021. Please see Exh. ZCY-4C, for the presentation to the Energy Management Committee for the Colville Slice Agreement Extension. Please see Exh. ZCY-5C for a copy of the Colville Slice Agreement Extension.

F. Benefits of the Colville Slice Agreement Extension

Q. Please describe PSE’s bid price for the Colville Slice Agreement Extension.

A. After analyzing the benefits of the Colville Slice Agreement Extension, PSE made an offer to extend the Colville Slice Agreement at a price that would be competitive but was less than PSE’s projected avoided energy, flexibility, and avoided carbon emission values associated with the output, thereby resulting in benefits for PSE and its customers. PSE staff negotiated a three-year extension at a cost of $ per year (about $ per MWh based on historical average water conditions).
Q. What are the projected annual costs of the Colville Slice Agreement Extension?

A. Table 2 below summarizes the projected annual costs of the Colville Slice Agreement Extension.

**Table 2. Colville Slice Annual Costs**

<table>
<thead>
<tr>
<th></th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Rate</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of Months Under New Contract</td>
<td>3</td>
<td>12</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Projected Annual Costs</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q. Please describe the cost of the Colville Slice Agreement Extension when compared to the value it adds to PSE power portfolio.

A. Table 3 below compares the annual contract costs of the Colville Slice Agreement Extension to the average projected annual portfolio value in two scenarios for the cost of carbon. In both scenarios, PSE projected that the Colville Slice Agreement Extension would provide annual power portfolio benefits that exceed the annual costs of the Colville Slice Agreement Extension.
Table 3. Summary of Annual Benefits of the Colville Slice Agreement Extension

<table>
<thead>
<tr>
<th></th>
<th>Market Carbon Allowance Scenario</th>
<th>Social Cost of Carbon Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Annual Portfolio Value (Energy + Flexibility + Avoided Carbon)</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Annual Contract Costs</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Expected Annual Benefits</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

III. ACQUISITION OF THE CHELAN SLICE AGREEMENT IS PRUDENT

A. Background and Key Terms of the Chelan Slice Agreement

Q. Please describe the Rocky Reach and Rock Island Hydroelectric projects.

A. The Rocky Reach Hydroelectric Project ("Rocky Reach Project") is an 11-unit, 1,300 MW hydroelectric facility owned and operated by Chelan PUD and located on the Columbia River. The Rocky Reach Project began commercial operation in 1961, and its operating license expires in the year 2052.

The Rock Island Hydroelectric Project ("Rock Island Project") is an 11-unit, 624 MW hydroelectric facility also owned and operated by Chelan PUD and located on the Columbia River. The Rock Island Project began commercial operation in 1932, and its operating license expires in the year 2028.

The Rocky Reach and Rock Island Projects are currently used to serve local load of Chelan PUD in Chelan County, and Chelan PUD sells surplus energy to third parties under existing power purchase agreements. PSE has a long history with
both projects, dating back to the construction of the Rock Island Project. PSE purchases a 25 percent share (approximately 480 MW of capacity) of the output of both the Rocky Reach and Rock Island Projects. PSE’s existing agreement with Chelan PUD expires in accordance with its terms in 2031.

Q. Please describe the key terms of the Chelan Slice Agreement.

A. The Chelan Slice Agreement is a new five-year contract for a share of the output of the Rocky Reach and Rock Island Projects offered by Chelan PUD to PSE through a competitive auction process in 2021. Chelan PUD selected PSE as the winning bidder in March 2021, and PSE and Chelan PUD subsequently executed the Chelan Slice Agreement on March 31, 2021.

The Chelan Slice Agreement has a term that begins on January 1, 2022 and expires on December 31, 2026. The Chelan Slice Agreement entitles PSE to receive a five percent (5%) share of the output of the Rocky Reach and Rock Island Projects. When paired with PSE’s existing transmission rights, the Chelan Slice Agreement provides approximately (i) 95 MW of dispatchable and flexible capacity, (ii) [REDACTED] MWh of storage, and (iii) [REDACTED] MWh of clean, zero-emission power to contribute toward PSE’s resource needs.\textsuperscript{14} PSE negotiated a fixed price of $[REDACTED] for the five-year term, paid in equal monthly amounts of about

\textsuperscript{14} Based on an average of 80 years of hydrological history.
This fixed price represents an hourly price of approximately $\_\_\_\_ per MWh, assuming historical average water conditions.

**B. Need for the Chelan Slice Agreement**

**Q. Please describe the need for the Chelan Slice Agreement.**

**A.** Similar to the Colville Slice Agreement Extension, the Chelan Slice Agreement is a fixed price contract that allows PSE to meet a portion of the firm resource adequacy-qualifying contract needs identified in the 2021 Integrated Resource Plan. PSE currently relies on up to 1,500 MW of short-term market purchases to meet its capacity need. The Chelan Slice Agreement will replace approximately 95 MW of short-term market purchases and reduce the risk of uncertain resource availability.

The Chelan Slice Agreement also allows PSE to acquire a valuable hydroelectric resource at a time when PSE is entering into the CETA compliance period. Finally, the Chelan Slice Agreement increases PSE’s access to some of the region’s most valuable and scarce hydroelectric resources. The flexibility and emission-free nature of the output of the Rocky Reach and Rock Island Projects will provide valuable qualitative and quantitative benefits to PSE and its customers over the life of the Chelan Slice Agreement and any potential extensions.

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Q. What would have been the risk if PSE had chosen not to execute the Chelan Slice Agreement when it was awarded in March 2021?

A. If PSE had not executed the Chelan Slice Agreement in March 2021, PSE would have risked losing the opportunity to acquire a valuable non-emitting, flexible capacity resource to another off-taker through the Chelan PUD’s competitive auction process. In late 2020, Chelan PUD notified PSE that it would be conducting an auction to sell a share, or “slice”, of the Rocky Reach and Rock Island Projects. Chelan PUD holds periodic auctions to sell surplus power from their generation projects. Prior to the auction in March 2021, the last Chelan PUD auction had taken place in 2019. PSE participated in the 2019 auction but was not the winning bidder. PSE chose to participate in the Chelan PUD auction in March 2021, and its offer was selected as the winning bid.

Executing the Chelan Slice Agreement in March 2021 secured this highly valuable hydroelectric resource for PSE’s portfolio through December 31, 2026. The Chelan Slice Agreement offers a significant amount of emission-free dispatch capacity at a time when PSE is seeking resources that will help it improve reliability and reduce emissions.
C. **Comparison of the Chelan Slice Agreement to Alternatives**

Q. **What alternatives did PSE consider in its analysis of the Chelan Slice Agreement?**

A. Chelan PUD marketed the Chelan Slice Agreement through a competitive auction that closed in March 2021. Therefore, PSE had a limited window in which to make a decision about whether to submit an offer to compete for the Chelan Slice Agreement and subsequently enter into the agreement with Chelan PUD.

The limited window of opportunity to consider the Chelan Slice Agreement concluded prior to PSE issuing its 2021 RFP on June 30, 2021. This prevented PSE from evaluating the Chelan Slice Agreement as part of its competitive 2021 RFP process. To accommodate the accelerated schedule, PSE compared the Chelan Slice Agreement to short-term market purchase alternatives.

Q. **Describe PSE’s approach to analyzing the value of the Chelan Slice Agreement.**

A. Similar to the process described above for the analysis of the Colville Slice Agreement Extension, PSE analyzed the value of the Chelan Slice Agreement by calculating the total portfolio cost differential between:

- The existing portfolio without the Chelan Slice Agreement; and
- The existing portfolio with the Chelan Slice Agreement.
Similar to the process described above for the analysis of the Colville Slice Agreement Extension, PSE grouped the total portfolio benefits of the Chelan Slice Agreement based on (1) Avoided Energy Value, (2) Flexibility Value, and (3) Avoided Carbon Emission Value.

PSE calculated these three value streams for 2022 and applied each of the values to the forward energy prices during the term of the Chelan Slice Agreement to calculate the projected total value of the Chelan Slice Agreement to PSE.

Q. Please describe the model PSE used to perform the analysis of the Chelan Slice Agreement.

A. In analyzing the Chelan Slice Agreement, PSE updated the forecasted forward energy prices but otherwise used the same models, assumptions, and methodologies previously described for the Colville Slice Agreement Extension.

Q. Please describe the key assumptions PSE used in the analysis of the Chelan Slice Agreement.

A. Key inputs used by PSE in the analysis include: (i) PSE’s existing resource portfolio, (ii) a forecast of forward power prices, (iii) the projected output provided under the Chelan Slice Agreement, and (iv) a forecast of forward carbon prices.
Q. Please describe the forecast of forward power prices assumed by PSE for analysis of the Chelan Slice Agreement.

A. PSE used the flat monthly forward mark provided by Platts published on March 15, 2021. Platts is a service that provides forward prices based on Intercontinental Exchange settlement data. Next, PSE used the most recent available historical 2020 hourly spot power prices to shape the flat monthly price forward price forecast. This shaping is done by taking the flat 2020 price by month and indexing each hourly price in the month to the average price, then applying the Platts forward mark to this index to develop a realistic hourly power price forecast for the evaluation. Finally, PSE used the power price forecast over the five-year term of the Chelan Slice Agreement to estimate the future value of the energy displaced by the contract.

Q. Please describe the projected output assumed by PSE for analysis of the Chelan Slice Agreement.

A. PSE forecasted a monthly volume forecast for the Chelan Slice Agreement based on the average of historical 80-year monthly hydro volumes for the Rock Island and Rocky Reach Projects. PSE then created a proxy daily volume by shaping the monthly Rocky Reach and Rock Island project volumes to a daily volume based on recent historical daily output data from BPA’s Chief Joseph Hydro Project. PSE input the daily volume into the Plexos model for hourly commitment and dispatch optimization.
Q. Please describe the projected value of avoided carbon emissions used by PSE for analysis of the Chelan Slice Agreement.

A. For the analysis of the Chelan Slice Agreement, PSE used the same projected value of avoided carbon emissions that PSE used for analysis of the Colville Slice Agreement Extension as discussed in Section II.C of this prefilled direct testimony.

Q. Please summarize the results of the evaluation of the Chelan Slice Agreement.

A. Table 4 below present the results of the valuation of the Chelan Slice Agreement.

<table>
<thead>
<tr>
<th>Value Streams</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Value</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Flexibility Value</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Avoided Carbon Emissions</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Energy + Flexibility + Avoided Carbon Emissions ($/MWh)</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Annual Estimate Value ($/MWH x Annual MWh)</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

See also Exh. ZCY-3C for a summary of the analyses PSE performed to estimate the value of Chelan Slice Agreement.
D. **The Chelan Slice Agreement is Used and Useful**

Q. **Is the Chelan Slice Agreement used and useful?**

A. Yes. As previously discussed, the term of the Chelan Slice Agreement began on January 1, 2022 and will expire in accordance with its terms at the end of December 31, 2026. Accordingly, PSE has been acquiring output of the Rocky Reach and Rock Island Projects under the Chelan Slice Agreement since January 1, 2022 and will continue to do so through the end of December 31, 2026.

E. **Involvement of PSE Management**

Q. Did PSE’s Energy Management Committee approve the Chelan Slice Agreement?

A. Yes. PSE’s Energy Management Committee approved the Chelan Slice Agreement on March 25, 2021. Please see Exh. ZCY-4C for the presentation to the Energy Management Committee for the Chelan Slice Agreement. Please see also Exh. ZCY-5C for a copy of the Chelan Slice Agreement.

F. **Benefits of the Chelan Slice Agreement**

Q. Please describe PSE’s bid price for the Chelan Slice Agreement.

A. After analyzing the benefits of the Chelan Slice Agreement, PSE made an offer to enter into the Chelan Slice Agreement at a price that would be competitive but was less than PSE’s projected avoided energy, flexibility, and avoided carbon
emission values associated with the output, thereby resulting in benefits for PSE and its customers. PSE staff submitted a bid for a five-year term at a cost of $\text{\[redacted\]} per year (about $\text{\[redacted\]} per MWh based on historical average water conditions).

Q. What are the projected annual costs of the Chelan Slice Agreement?

A. Table 5 below summarizes the projected annual costs of the Chelan Slice Agreement.

<table>
<thead>
<tr>
<th>Year</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025</th>
<th>2026</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>\text{[redacted]}</td>
<td>\text{[redacted]}</td>
<td>\text{[redacted]}</td>
<td>\text{[redacted]}</td>
<td>\text{[redacted]}</td>
</tr>
</tbody>
</table>

Q. Please describe the cost of the Chelan Slice Agreement when compared to the value it adds to PSE power portfolio.

A. Table 6 below compares the annual contract costs of the Chelan Slice Agreement to the average projected annual power portfolio value in two scenarios for the cost of carbon. In both scenarios, PSE projected that the Chelan Slice Agreement would provide annual power portfolio benefits that exceed the annual costs of the Chelan Slice Agreement.
Table 6. Summary of Annual Benefits of the Chelan Slice Agreement

<table>
<thead>
<tr>
<th></th>
<th>Market Carbon Allowance Scenario</th>
<th>Social Cost of Carbon Scenario</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Annual Portfolio Value (Energy + Flexibility + Avoided Carbon)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Contract Costs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected Annual Benefits</td>
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</tbody>
</table>

IV. CONCLUSION

Q. Please summarize your prefiled direct testimony.

A. When paired with PSE’s Mid-C transmission rights, each of the Colville Slice Agreement Extension and the Chelan Slice Agreement will (i) enhance PSE’s resource portfolio, (ii) help reduce PSE’s reliance on short-term market purchases, and (iii) strengthen its relationships with counterparties for future negotiations. Additionally, each of the Colville Slice Agreement Extension and the Chelan Slice Agreement replaces unspecified short-term market purchases with specific hydroelectric resources and includes benefits such as avoided carbon emissions and flexible capacity. PSE has included these benefits in its evaluation in each of the agreement in the analyses previously described. PSE seeks a determination of prudence and cost recovery for each of the Colville Slice Agreement Extension and the Chelan Slice Agreement.

Q. Does that conclude your prefiled direct testimony?

A. Yes, it does.