EXH. DJL-7
DOCKETS UE-240004/UG-240005
2024 PSE GENERAL RATE CASE
WITNESS: DAVID J. LANDERS

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION, **Complainant,** **v.** **PUGET SOUND ENERGY,** **Respondent.**	**Docket UE-240004** **Docket UG-240005**

SIXTH EXHIBIT (NONCONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF

DAVID J. LANDERS

ON BEHALF OF PUGET SOUND ENERGY

FEBRUARY 15, 2024

PUGET SOUND ENERGY

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I. MAJOR BACKBONE INFRASTRUCTURE PROJECTS

A. Overview

Q. Please briefly describe Puget Sound Energy's ("PSE") major backbone infrastructure projects presented in this case.

A. There are two major backbone infrastructure projects identified through Delivery System Planning and progressing from the Initiation phase to the Planning phase of PSE's project lifecycle process that are expected to be placed in-service between January 1, 2025 and December 31, 2026. These projects are Seabeck Area Reliability and Greenwater Tap Reliability. Other major projects already beyond the Initiation phase are discussed in the Prefiled Direct Testimony of Roque B. Bamba, Exh. RBB-1T.

Q. Please provide a summary of PSE's planned major backbone infrastructure capital investments anticipated to be placed in-service over the rate period presented in this case.

A. Table 1 provides the planned capital investments for major backbone infrastructure projects currently with System Planning that will progress to Project Delivery and are anticipated to be placed in-service between January 1, 2025 and

December 31, 2026. Details of these projects are discussed in the remainder of this exhibit.

Table 1: Planned Major Backbone Infrastructure Project capital investments by year.

Plan	Rate Plan Year 1 2025	Rate Plan Year 2 2026
Seabeck Area Reliability Capital Investment ($ Millions)	2.2	9.8
Greenwater Tap Reliability Capital Investment ($ Millions)	3.8	3.8

Additionally, there is incremental operations and maintenance ("O&M") expense related to construction ("OMRC") associated with the above rate period of about $0.03 million.

B. Seabeck Area Reliability Project

Q. Please describe the Seabeck Area Reliability project.

A. The Seabeck Area Reliability project is located in western Kitsap County. The project includes installing a new underground distribution feeder from the existing Chico substation and converting an existing overhead distribution feeder to underground for approximately five miles. The project will also transfer customers between area feeders to better balance the system and will provide feeder ties to improve operational flexibility.

Q. Was this project presented in PSE's 2022 General Rate Case?

A. No.

Q. What is the timeline for the Seabeck Area Reliability project?

A. System Planning started evaluating project needs in 2017. Since 2020, the team has evaluated solution alternatives, including non-wire alternatives ("NWA") that consist of energy storage and other distributed energy resource options. PSE contracted an industry expert, Guidehouse Consulting, to evaluate technical and economic feasibility of a full NWA or a hybrid solution including both wires and NWA components. This comprehensive evaluation determined a traditional wires solution was best suited to improve reliability for customers in this location. The project is anticipated to be placed in service in 2026.

Q. What is the estimated final cost of the Seabeck Area Reliability project?

A. The expected final cost of the project is $12.0 million without AFUDC.

Q. Describe the system need for the Seabeck Area Reliability project.

A. Assessment of the Seabeck area distribution system indicates a need to address feeder capacity, reliability, and operational flexibility. The distribution system needs are summarized below:

- **Feeder Capacity.** Loading on two feeders in the area, CHI-12 and SIL-15, exceed PSE's distribution planning triggers and they are forecasted to exceed capacity limits within the ten-year planning period**.**
    - CHI-12 is forecasted to surpass 100% capacity limit in 2024.

- CHI-12 has an existing N-1 capacity need in the event of a parallel step-up transformer failure.
- SIL-15 is forecasted to surpass 100% capacity limit in 2026.

- **Feeder Reliability.** Feeders CHI-12 and SIL-15 have CMI, SAIDI, and SAIFI metrics that are significantly above system average. Reliability improvements are needed for both circuits.
- **Operational Need.** Feeders CHI-12 and SIL-15 experience low voltage under peak demand. Voltage improvements at peak system demand are needed for both feeders.
- **Operational Need.** CHI-12 has phase imbalance during peak loading that exceeds allowable limits.

Q. Describe the alternatives evaluated and how a solution was chosen.

A. PSE studied multiple options for meeting the Seabeck area's distribution needs and concerns. Wires alternatives, NWA, and hybrid (combination of wires and non-wires) alternatives were examined. For these three categories of alternatives, the best solutions in each were evaluated in-depth, including the selected alternative. PSE's solution criteria required all identified needs be addressed. The following alternatives were evaluated:

1. **New 115-12kV Distribution Substation.** This alternative would have required approximately 12 miles of new transmission and construction of a new distribution substation along Holly Road. This alternative was rejected as it would eliminate the ability to convert underground and would still be at risk of outage due to downed trees. Other solution alternatives will meet the identified needs at a lower cost.
2. **New 35-12kV Distribution Substation.** This alternative would have required approximately 12 miles of new sub-transmission and construction of a new distribution substation along Holly Road. This alternative was rejected as it would not provide operational flexibility. Other solution alternatives will meet the identified needs at a lower cost.

3. **Third Parallel Step-Up Transformer.** This alternative would have required installing a third 35kV transformer to eliminate N-1 loading needs and would have provided targeted underground conversions of the existing feeder. This alternative was rejected because it does not reduce customer exposure to outage or provide operational flexibility for the area.

4. **Seabeck Hybrid Non-Wires Alternative.** This alternative would have paired targeted distributed energy resources with energy storage and targeted underground conversion on the existing feeder to meet capacity and reliability needs. This alternative was rejected because it does not reduce customer exposure to outages or provide operational flexibility for the area.

5. **Express New Feeder from Chico Substation.** This alternative includes installing a new feeder from the existing Chico substation and includes underground conversion of infrastructure to improve reliability in the region. This alternative was selected because it provides a cost-effective solution that meets all the identified needs of the project. This alternative also supports the long-term planning efforts in the area and improves operational flexibility of the distribution system.

Q. How was equity incorporated into this project?

A. As part of the solution considerations process, PSE evaluates how customer equity is addressed. PSE leverages Customer Benefit Indicators ("CBI") and information established as part of PSE's Clean Energy Implementation Plan ("CEIP") to identify an equity framework to evaluate system projects. The CBI approach was developed through an iterative process that was coordinated with the Equity Advisory Group. These CBIs span the core tenets of energy justice and provide a framework to evaluate the equity benefit of the project.

In study and development since 2017, this project was planned and a solution chosen prior to the advancement of energy equity considerations to the forefront of Delivery System Planning. Although planned prior to development of the

equity considerations utilized today, the Seabeck Reliability project will provide benefits to two distribution circuits fed from the Chico substation and one distribution circuit fed from the Silverdale substation, of which two circuits serve customers that are identified as a high vulnerability population and one circuit identified as medium vulnerability population, based on definitions at time of planning finalization.

The equity benefit of this project improves the CBI of Resilience by making investments in the feeders that will improve reliability. This project also improves the CBI of Enabling Cleaner Energy by allowing additional circuits to be fed from the substation, which provides additional distribution circuit capacity to support future electrification and integration of distributed energy resources.

Project development, design, and permitting will be completed following jurisdictional permitting processes and requirements that include public notices, hearings, comment opportunities, and appropriate communication methods following jurisdictional codes. For construction, the jurisdictional permits will dictate working hours, noise restrictions, and restoration requirements.

Q. What benefits does the Seabeck Area Reliability project provide for customers?

A. This project will provide benefits for reliability, capacity, and operations for the approximately 4,700 customers in the study area. The new feeder will provide an additional source and allow for reduced customer exposure to outages for each

individual feeder. This will also provide additional switching options in the area, which will improve resiliency and reduce outage duration. The underground conversion portion of the project will have significant reliability improvement for an area that has historically seen poor reliability performance.

Q. Describe how PSE has kept management informed during this project.

A. Using PSE's Project Lifecycle Model, management provided review and approval of the planned project. This project was reviewed by management in October 2023 for work to proceed from the Initiation phase to the Planning phase managed by Project Delivery.

Q. Describe the current state of the Seabeck Area Reliability project.

A. The project is currently in the Planning phase of the Project Lifecycle Model. The project is expected to enter the Execution phase in 2025 and be completed in 2026. Current Planning phase activities include permitting and initial (≈ 30%) design of the proposed solution, as well as ordering long lead materials.

C. Greenwater Tap Reliability Project

Q. Please describe the planned Greenwater Tap Reliability project.

A. The Greenwater Tap is a 26-mile long radial 55 kV transmission line originating from the Krain Corner 115 kV substation. The Greenwater Tap serves multiple substations and several rural communities along its route to termination at the Greenwater substation, just past the town of Greenwater along State Highway

410. The project involves multiple phases. Phase 1 will install a new 115/55/35.5kV substation that enables the 115kV transmission line to serve a dual secondary voltage of 55kV and 34.5kV. Phase 2 will then convert the 55kV line to 34.5kV. This voltage conversion will allow for 9.9 miles of underground conversion to improve reliability of the line.

Q. Was this project presented in the 2022 General Rate Case?

A. No.

Q. What is the timeline for the Greenwater Tap Reliability project?

A. System Planning started evaluating project needs in 2019. Since 2020, the team evaluated solution alternatives, including NWA, that consist of energy storage and other distributed energy resources. PSE contracted an industry expert, Guidehouse Consulting, to evaluate technical and economic feasibility of a full NWA or a hybrid solution including both wires and NWA components. This evaluation resulted in determination that a traditional wires solution was best suited to improve reliability for customers in this location. The first phase of the project, which includes installation of a new substation that will convert the 115kV transmission line to a dual secondary voltage of either 55kV or 34.5kV, is scheduled to be placed in service in 2026. This will enable Phase 2 to begin, which is scheduled to be in service in 2028.

Q. What is the estimated final cost of the Greenwater Tap Reliability project?

A. The expected final cost of the project is $13.2 million without AFUDC.

Q. Describe the system need for the Greenwater Tap Reliability project.

A. PSE's assessment of the Greenwater Tap area's transmission and distribution system indicates a need to improve reliability, upgrade obsolete infrastructure, and increase operational flexibility. The system needs and concerns identified for the Greenwater tap are summarized below:

Needs:

- **Transmission Reliability.** The location of the transmission line along Forest Road 3700 Right of Way (FR 3700 ROW) has a strong impact on the reliability of the line. There are numerous tree-related outages that have extended restoration time due to the length of time required to patrol the line and resolve the cause of the outage. The number and duration of the sustained outages from 2015-2019 are 300 percent greater than average for PSE transmission line outages.

- **Land Rights Issues.** PSE lacks sufficient land rights along nine miles of FR 3700 ROW on the Greenwater Tap transmission path.

- **Channel Migration Zone ("CMZ").** Several transmission poles of the Greenwater Tap are at risk of being washed away since they are within the CMZ of the White River.

Concerns:

- **Obsolete Infrastructure.** The Greenwater Tap 55 kV transmission supply is part of the limited remaining footprint of transmission at this voltage level. Long-term, PSE plans include converting the remaining 55 kV voltage level transmission to PSE's current standard voltages. Additionally, spares for the Krain Corner 115 kV/55 kV three phase transformer are almost 60 years old and may not be reliable if called upon, resulting in significant issues in serving load on the 55 kV system.

- **Power Quality.** Customer claims due to Power Quality issues have occurred when the 55kV transmission has contacted 12.47kV distribution and caused equipment failures.

- **Operational Flexibility.** The Greenwater Tap is fed radially from the Krain Corner substation. The alternate source from Electron Heights is being converted to 115kV and will no longer be a viable switching option. Krain Corner currently has a Main-Bus Only configuration and requires de-energizing the Greenwater Tap line for maintenance of substation or line equipment.

- **Storm Resiliency.** The Greenwater Tap serves a remote area at the outer edge of PSE's electric system. This area experiences outages with longer than average durations due to safety, access limitations, and common severe weather conditions.

Q. Describe the alternatives evaluated and how a solution was chosen.

A. PSE studied multiple options for addressing Greenwater Tap needs and concerns. Wires alternatives, NWA, and hybrid (combination of wires and NWA,) were examined. For these three categories of alternatives, the best solutions in each were evaluated in-depth, including the selected alternative. PSE's solution criteria required all identified needs be addressed. The following alternatives were evaluated:

1. **New 115kV Transmission to Greenwater.** This alternative would have required converting the entire 55kV transmission line from Krain Corner to Greenwater substation to 115kV. This alternative was rejected as it would eliminate the ability to convert to underground in areas with risk of outage due to downed trees. Other solution alternatives will meet the identified needs at a lower cost. There was also considerable risk associated with obtaining necessary easements for the entire path.

2. **New 115kV Transmission to Clay Creek, 34.5kV to Greenwater.** This alternative would have required converting the 55kV transmission line from Krain Corner to Clay Creek substation to 115kV. The transmission line from Clay Creek to Greenwater would be converted to 34.5kV. This alternative was rejected as it would be cost prohibitive to convert a large

portion of the line to 115kV. Other solution alternatives will meet the identified needs at a lower cost.

3. **New 34.5kV from Krain Corner to Greenwater.** This alternative would have required installing a new distribution transformer at Krain Corner substation with a new 34.5kV distribution route to Greenwater substation. This alternative was rejected because it would decrease operational flexibility and limit future growth in the region.

4. **Greenwater Tap NWA.** Analysis of the Greenwater tap needs and concerns determined that a fully islanded microgrid would be the only feasible NWA. This alternative would have a solar photovoltaics array with energy storage to meet reliability needs. This alternative was rejected because of the high cost and future limitations to accommodate peak winter loading.

5. **New 115kV Transmission to Enumclaw, 34.5kV to Greenwater.** This alternative involves upgrading the existing 55kV transmission to 115kV and building a new substation in Enumclaw. From the new substation, the existing 55kV line will be converted to 34.5kV to Greenwater substation. This alternative meets all identified needs and concerns and is the most cost-effective solution. This alternative maintains operational flexibility of the system and can accommodate future load growth on the Greenwater tap.

Q. How was equity incorporated into this project?

A. As part of the solution considerations process, PSE evaluates how customer equity is addressed. PSE leverages CBI and information established as part of the CEIP to identify an equity framework to evaluate system projects. The CBI approach was developed through an iterative process that was coordinated with the Equity Advisory Group. These CBIs span the core tenets of energy justice and provide a framework to evaluate the equity benefit of the project.

In study and development since 2018, this project was planned and a solution chosen prior to the advancement of energy equity considerations to the forefront

of Delivery System Planning. Although planned prior to development of the equity considerations utilized today, the Greenwater Tap project will advance energy equity by providing benefits to all substations on the transmission line, including Clay Creek and Greenwater. These substations include two circuits serving customers in highly impacted communities based on definitions at time of planning finalization.

The equity benefit of this project improves the CBI of Resilience by making investments to the line that will improve reliability. This project also improves the CBI of Enabling Cleaner Energy by allowing additional circuits to be fed from the substation, which provides additional distribution circuit capacity to support future electrification and integration of distributed energy resources.

Project development, design, and permitting will be completed following jurisdictional permitting processes and requirements that include public notices, hearings, comment opportunities and appropriate communication methods following jurisdictional codes. For construction, the jurisdictional permits will dictate working hours, noise restrictions, and restoration requirements.

Q. What benefits does the Greenwater Tap Reliability project provide for customers?

A. This project will provide improved electric service reliability for the customers in the study area. In addition to increased resilience to weather events and vegetation, the voltage conversion will remove obsolete infrastructure, allow for

better system access, and improve system flexibility enabling PSE to better respond to system issues. The underground conversion portion of the project will bring significant reliability improvement to an area that has historically seen poor reliability performance.

Q. Describe how PSE has kept management informed during this project.

A. Using PSE's Project Lifecycle Model, management provided review and approval of the planned project. This project was reviewed by management in August 2023 for work to proceed from the Initiation phase to the Planning phase managed by Project Delivery.

Q. Describe the current state of the Greenwater Tap Reliability project.

A. The project is currently in the Planning phase of the Project Lifecycle Model. The first phase of project Execution is expected to be completed in 2026. Current Planning activities include permitting and design of the proposed solution, as well as ordering long lead materials. The second phase of the project is expected to be completed in 2028.

II. CONCLUSION

Q. Does this conclude your testimony?

A. Yes, it does.