

**EXH. DRK-20
DOCKETS UE-22 ___/UG-22 ___
2022 PSE GENERAL RATE CASE
WITNESS: DAN'L R. KOCH**

**BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION**

**WASHINGTON UTILITIES AND
TRANSPORTATION COMMISSION,**

Complainant,

v.

PUGET SOUND ENERGY,

Respondent.

**Docket UE-22 ___
Docket UG-22 ___**

**NINETEENTH EXHIBIT (NONCONFIDENTIAL) TO THE
PREFILED DIRECT TESTIMONY OF**

DAN'L R. KOCH

ON BEHALF OF PUGET SOUND ENERGY

JANUARY 31, 2022



Energize Eastside

Corporate Spending Authorization (CSA)
Application Request – Updated October 2021

Officer Sponsor: Dan Koch
Completed By: Ryan Wieder, Dave Jenness, and Brad Strauch

I. Project Overview – Energize Eastside

The Energize Eastside project entails installing a new 230 kV source in the center of the “Eastside” area, with the most efficient place being in Bellevue, adjacent to the existing Lakeside switching station. This undertaking is complex and requires substantial coordination with other proposed projects on the Eastside in order to ensure cost efficiency and system integrity. As a result, the projects referenced below were included for planning and project management purposes.

Table 1	Initiation	Planning	Design	Execution	Close Out
TAL (Talbot Hill) Substation	2009- 2013	9/3/13 Amendment 12/17/14	1/9/15	Phase I Const. 6/10/16 Phase II Const. 3/19/18	Phase I 10/15/16 Phase II 3/19/18
TAL – RIC (Richards Creek) 230 kV*	2009- 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 90%	Contractor Selected NTP Issued 9/8/21	
SAM (Sammamish) – RIC 230 kV**	2009- 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 90%		
RIC New Substation***	2009- 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 90%	Civil Construction (PCR 10) 3/31/20	
ROS (Rose Hill) Substation 115 kV Re-alignment 230 kV Conversion	2009- 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 60%	Phase I Const. 6/10/16	
SAM Substation – add 230 kV line bays.	2009- 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 30%		
TAL – PCR (Paccar) Reconductor and uprate.	2009 – 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 90%		

*Includes RIC – LAK 115 kV tie and line relocations for LAK – PHA, LAK – GOO, SHU-LAK & TAL-LTN.

**Includes Willows Creek Wetland Mitigation adjacent to SAM substation.

***Includes Richards Creek stream realignment and mitigation adjacent to RIC substation

Problem Statement: The growth on the Eastside means demand for electricity was forecasted to outgrow our ability to provide reliable service in winter 2017-2018 and the summer of 2018. Federal regulations require PSE to have sufficient infrastructure to meet foreseeable demand requirements. As a contingency to the 230 kV project, PSE has developed a plan for load shedding (intentional rolling blackouts) to meet federal requirements. Load shedding is now part of PSE’s Corrective Action Plans (CAPs). This could impact more than 130,000 customers, at a cost of tens of millions of dollars to the local



economy. Forecasted summer system peak loads, which determined the level of project need, have been surpassed multiple times starting in 2017 and as recently as 2021.

Future Vision:	Provide reliable service to customers on the Eastside and remove intentional load shedding from current CAPs. Add capacity to existing transmission system to meet current demand and to accommodate future growth.
Proposed Solution:	<p>Add a new 230 kV source on the Eastside.</p> <ul style="list-style-type: none"> Construct a new 230 -115 kV Substation at the Richards Creek site (adjacent to Lakeside substation) in Bellevue. The substation will be known as Richards Creek (RIC). Rebuild the existing 16-mile Sammamish – Talbot Hill 115 kV transmission lines to operate at 230 kV in the existing corridor to provide power to the new RIC substation. <i>Scope change from previous CSA:</i> In 2017, the plan to operate one line at 230 kV and the other at 115 kV (built to 230 kV standards) was changed to operate both lines between Talbot Hill and RIC at 230 kV. This was based on further analysis of potential OPL pipeline interaction with the upgraded transmission lines. As a safety measure, on February 1, 2021, the PSE Officer Steering Committee agreed with the project team’s recommendation¹ to change the project scope to include operating both circuits between RIC and Talbot Hill substations at 230 kV. The DNV GL report analyzing pipeline interaction can be found at this link: LINK to Interference Analysis Report. Operating both lines between RIC and TAL at equivalent voltages is a condition of the Bellevue and Renton Conditional Use Permits. Operating both lines at 230 kV from RIC to Sammamish was decided on February 1, 2021. This was based on operational need and the likelihood that permit conditions would dictate the operation of the lines at the same voltage in order to have the lowest interaction with the OPL pipelines. 115 to 230 kV conversions at SAM, TAL, and ROS substations. Double Bus Double Breaker (DBDB) installation at TAL and system protection upgrades for the BPA-TAL 230 kV interties (Current Limiting Reactors and Relays). Due to existing system potential fault conditions between the BPA and PSE substations. Line relocations in the immediate LAK/RIC Sub area for LAK – PHA, LAK – GOO, SHU-LAK and north of TAL, re-route TAL-LAK to TAL-LTN. Rebuild and uprate of TAL-PCR 115 kV to operate up to 100 deg. C. This depends on final system configuration and number of transformers installed at RIC. In 2019, an engineering only assessment (<i>i.e.</i>, no physical changes to equipment or facilities) allowed this line to be uprated. This “paper uprate” was sufficient to defer completion of the TAL-PAC rebuild project as it eliminated near term overloads that could occur during planning contingencies.
Alternatives Evaluated:	Various types of non-wire and wire solutions and routes were studied (LINK to Eastside Transmission Solution Report); LINK to E3 Alternatives Report ; and LINK to Strategen Report
Primary ISP Alignment:	Customer
Type of Project:	Risk Mitigation
OCM Considerations:	Impacted Users (Internal):

¹ [<LINK 2-1-21 Energize Eastside Officers Meeting Notes>](#)



< 100 < 500 > 500
 Impacted Customers (External):
 None < 100K Electric or < 1K Gas > 100K Electric or >1K Gas
 Internal Organizational Impact:
 1 Dept or less 2-5 Dept > 5 Dept / Business Platform / Enterprise

Project Complexity & Duration:

<input type="checkbox"/> Straightforward, well understood	<input type="checkbox"/> < 6 months
<input type="checkbox"/> Complex and well understood	<input type="checkbox"/> < 12 months
<input checked="" type="checkbox"/> Complex and not well articulated	<input checked="" type="checkbox"/> > 12 months

II. Phase Gate Change Summary

- a. On September 3, 2013, a CSA was approved to enter the Planning Phase.
- b. December 17, 2014, a CSA amendment was approved to extend the planning phase of the project to May 2015.
- c. On January 9 2015, a CSA was approved for the work at Talbot substation to enter the Design Phase.
- d. On January 27, 2015, a CSA amendment was approved to update the schedule and lifetime cost estimate.
- e. May 27, 2015, a CSA amendment #2 was approved to extend the planning phase to Q1 2016.
- f. On June 10, 2016, a CSA was approved for the Energize Eastside 230 kV project to incorporate Talbot substation construction into the overall budget and scope and approval for the T-line project to enter the Planning Phase. This CSA was also used to document Phase I construction at ROS.
- g. CSA UPDATE March 19, 2018: In December 2017, the project team decided that a single CSA will be used to document the status of each component project throughout the project lifecycle rather than separate CSAs. The Energize Eastside program includes seven major components listed above in table 1. Project components will be phased depending on permitting and system outage availability. This CSA will be submitted each time one or more project components is requesting a phase-gate advancement or amendment. The rolling blackout plan has been developed and table-top exercises were conducted. This plan was communicated to external stakeholders. The cost for this is being charged to the Energize Eastside project.
- h. On June 24, 2018, a CSA amendment was approved that refined and updated the schedule and lifetime cost estimate.
- i. On March 31, 2020, Richards Creek PCR #10 was approved to move forward with the civil construction components of the RIC substation in 2020 and substation assembly in 2021.
- j. October 7th, 2021, realized Richards Creek PCR #11 which increased the lifetime capital budget by about \$2.8M was reviewed and approved in August 2020 but a clerical error caused it not to be routed via DocuSign at the time. Additional changes related construction costs and contaminated soil remediation to the RIC scope are documented in PCR #12.
- k. In October 2021, the reduction of total cost at completion for the Transmission Lines was documented in PCR #10. Reductions in lifetime costs are attributed to further refined scope of outside services, better defined material costs, reduced internal labor, reduction of contingency, and associated indirect costs (e.g., overheads).
- l. Rose Hill (ROS) PCR #1 documents the increase in lifetime cost at completion for the Rose Hill substation. This is attributed to operational and permitting requirements that stipulate both SAM-RIC lines be energized at equivalent voltages (230 kV). Since both existing 115 kV lines will be converted to 230 kV, the ROS substation will need to be converted to a 230 kV to 12.5 kV substation.
- m. This CSA captures the move to the execution phase for the South Transmission Lines (TAL-RIC).



TAL – LAK (RIC) – SAM # 1 & 2 rebuild to 230 kV

- Scope:**
1. Rebuild both the TAL – LAK – SAM # 1 and #2 lines to 230 kV standards on steel poles; sixteen miles in length; connecting with the new RIC substation in Bellevue. The “Willow 1” route was selected as the final route to design and permit which is all within existing TAL – LAK – SAM easement corridor.
 2. Perform 115 kV alignment adjustments for multiple transmission lines due to space conflicts with new 230 kV alignment and NESC clearance requirements. These include:
 - a. LAK – PHA
 - b. TAL-LTN #1
 - c. SHU-LAK
 - d. LAK-GOO
 3. Build a new 115 kV line between the new Richards Creek substation and the existing Lakside substation.
 4. Rebuild existing PSE Network fiber within an optical ground wire and associated splice locations.
 5. Perform wetland mitigation at Willows Creek. This is a City of Redmond permitting requirement for the 230 kV project as well as a the SAM-JUA 115 kV project that is in the design phase. As appropriate, costs associated with this work will be allocated to Energize Eastside.

Budget: The lifetime budget for the TAL-LAK (RIC)-SAM transmission lines is \$201,666,254. This is a decrease of \$12,044,164 from the 2020 CSA and is attributed to refined scope of outside services, better defined material costs, reduced internal labor and associated indirect costs (e.g., overheads). This change is documented in PCR #10.

Schedule: The design phase began 8/8/2017 after Phase 2 of the DEIS was released. The final EIS was issued on March 1, 2018. Partial Construction of the TAL – RIC lines is planned for 2021, specifically in the Renton and King County. The Newcastle, remaining south Bellevue sections (I-90), and the remaining Renton sections are expected to be completed in 2022. Construction of the RIC – SAM lines are planned in 2023. Both are dependent upon permitting.

Risk Profile: The primary risks come from permitting and system outage availability. Conditional Use permit appeals are highly likely which may delay construction permits and the start of construction for up to a year. A thorough risk assessment was prepared with the assistance of a consultant. The Bellevue Conditional Use Permit was appealed to King County Superior Court and King County Court of Appeals. Both appeals were denied. The Newcastle CUP is still pending. A thorough risk assessment was prepared with the assistance of a consultant. [LINK to Risk Summary](#)

Talbot Hill Substation 230 kV conversion and bus improvements:

Scope: To improve the 230 kV bus at Talbot Hill from two independent north and south main buses to a configuration that is more reliable, removes contingencies and is more flexible allowing switching and breaker maintenance that does not result in a 230 kV line path being broken. This will be achieved by upgrading the 230 kV bus at Talbot Hill substation to a double breaker double bus configuration (DBDB).



1. Phase 1 work includes items 1 - 3: Updating protection to provide standard zones of protection and faster clearing times to improve the power quality impacts to a large industrial customer base.
2. To make provisions for the connection of the new 230 kV lines at Talbot Hill. Building a double bus double breaker 230 kV bus design allows connection of the new line wherever it physically fits best and provides additional substation operational flexibility.
3. In 2017, through further analysis of pipeline interaction with the transmission line, as a safety measure PSE decided, with the Officer Steering Committee's concurrence (see footnote 1 above), to change the project scope to include converting both transmission lines between Sammamish and Talbot Hill substations from 115 kV to 230 kV rather than just one. Operating the lines at equivalent voltages was later required by Conditional Use Permits issued by Bellevue and Renton. This added the need for one additional 230 kV bay at TAL. The DNV GL report analyzing pipeline interaction can be found at the link below. [LINK to Interference Analysis Report.](#) [LINK to Bellevue CUP Conditions.](#) [LINK to Renton CUP.](#)
4. 2018 Phase II (South half) work includes:
 - a. New foundations for the south half of the substation (south bus), transformers, breakers, switches, drilled pier foundations for DE towers, in the south half of the yard, one RIC - TAL, BER - TAL, BPA Maple Valley - TAL #1 and BPA - Maple Valley #2.
 - b. New drainage in 230 kV yard for south half.
 - c. New conduit, cable trench, and cable for all 230 kV equipment.
 - d. Reroute PSE Network Fiber.
 - e. Replace existing 230 kV ground grid on south side.
 - f. Finish substation driveway entry which is the last 25 feet toward the ROW gate on the road. The gate is already in PSE's possession. The road frontage work was deferred using fee in lieu payed to the city.
5. BPA Intertie: Equipment installations are currently being scoped to address the current limiting reactor (CLR) and bus-tie relay issues on BPA's side of the 230 kV intertie.
 - a. **Current Limiting Reactors:** The scope prior to 4Q 2017 had been to upgrade the CLR equipment on the BPA Maple Valley Substation property, and to upgrade the bus-tie relays inside the BPA Maple Valley Substation. The option for the CLRs was deemed to be cost prohibitive and not feasible from a schedule standpoint. A grounding study outside TAL was prepared to determine the CLR solution specifications.

These new CLRs must be installed prior to closing in the high side bus, which would allow for energizing the Energize Eastside transmission lines and receiving the full system benefits of the new 230 kV lines from RIC. This work has been completed.

- b. **Bus-tie relay issue:** This was brought to the team's attention after BPA reviewed PSE's plan to upgrade the relay packages within PSE's Talbot Hill substation. That upgrade will require BPA to upgrade their equipment as well. The scope is being developed and BPA has requested a cost share that is under negotiation for the upgrade of their equipment. Transfer Voltage mitigation on the Seattle Public Utility water mains is also required. Costs for this mitigation will be shared by BPA and PSE.



Budget:	The lifetime budget for the Talbot Hill Substation 230 kV conversion and bus improvements is \$28,055,441
Schedule:	Phase I construction was completed in 2016. Phase II construction was completed in 2019. The CLRs were installed in summer of 2020. The transfer voltage mitigation is expected to be completed in 2022.
Risk Profile:	Equipment replacements on the BPA side may require multiple outages on their system which will need to be scheduled once the scope and work agreements are finalized.

Richards Creek Substation (New 230 – 115 kV Substation):

Scope:	<ul style="list-style-type: none">• Build a new 230 kV substation (Richards Creek). Install one 325 MVA 230-115 kV transformer, 230 kV bus work and 230 kV circuit breakers in a breaker and a half configuration.• Three 230 kV terminals will be required initially for two lines and one transformer.• Yard space allocation for a future 230 kV line and one additional 230-115 kV future transformer (future space allocation only).• Loop in a 230 kV line to provide two sources of 230 kV power.• Install fiber optic communication cable to support the protection, security and communications needs of the substation.• Perform Richards Creek stream realignment and restoration/mitigation at the new Richards Creek substation site as part of the City of Bellevue permitting requirements.
Budget:	The lifetime budget for the Richards Creek Substation construction is \$34,421,698. This is an increase of \$8,317,740 from the 2020 CSA and is attributed to unforeseen contaminated soils at the site, construction civil bids being higher than the engineers estimate, excessive storm and ground water management, and higher than expected costs for the transformer isolation foundations. These changes are documented in RIC PCRs #11 and #12.
Schedule:	RIC Completion is on the critical path with TAL – RIC 230 kV rebuild. Civil work started in September of 2020. The remainder of the station is scheduled to be constructed simultaneously with the south transmission line rebuild, once permitting is completed.
Risk Profile:	The primary risks come from permitting and system outage availability.



Rose Hill substation 115 kV to 230 kV conversion:

Scope:

Prior to 2016, ROS Substation was fed by two 115 kV taps (one span) that were connected to both SAM-LAK #1 and #2 with an automatic transfer dead bus scheme. The SAM-TAL transmission project (*i.e.*, Energize Eastside) scope prior to Dec. 2016 was to rebuild SAM-TAL #2 to 230 kV and #1 to 115 kV.

In 2016, PSE performed work to make substation upgrades, as well as re-configure the high-side yard of Rose Hill substation for a future 115 kV loop off the easternmost Energize Eastside line (SAM-RIC #1 115 kV). PSE elected to perform the work in 2016 as it was outage-dependent, labor-intensive, improved operational flexibility and reliability for customers, and favorable to perform in advance of the subsequent transmission phases of the project. Additionally, this substation services PSE critical operational infrastructure.

Based on permitting activities for those portions of Energize Eastside south of RIC and including RIC, it is anticipated that it will be necessary to operate both of the SAM-RIC/LAK lines at 230 kV as required by permit conditions and as the best approach to minimize AC interaction with the existing OPL pipelines that are in the corridor. The substation design requirements for 230 kV are different than 115 kV. As such, the equipment and layout installed in 2016 is not compatible with 230 kV and will require a re-build of the substation with 230 kV compatible equipment concurrently with the 115 kV transmission lines converting to 230 kV.

The Phase I - 2016 scope included:

1. Replacing nine (9) old lattice structures and foundations
2. Replacing three (3) Dead end Towers
 - a. One line for Sammamish's future 115kV line (north side of loop)
 - b. One line for Lakeside's future 115kV line (south side of loop)
 - c. One to connect to the existing 12.5kV yard
3. Installed two (2) 115 kV disconnect switches; two (2) single phase CVTs; and new bus supports
4. Installed a 350 Ah battery enclosure and battery
5. Installed new Relays inside the control house

Currently (post 2016 rebuild) Rose Hill substation is an existing distribution substation currently built out with one 115 kV to 12.5 kV transformer, space for another bank, and 6 distribution feeders. As of April 2021, the 115 kV lines are still connected to both SAM-LAK #1 and #2 with an automatic transfer dead bus scheme.

Currently the 115 kV and 12.5 kV yards are split with an internal PSE control center parking lot between them. The proposed 230 kV conversion will replace the entire high side of the substation for a 230 kV loop which includes rebuilding to current double bank 230 kV standards. The internal fence line will change to accommodate the 230 kV and 12.5 kV in the same yard instead of being split as well as continue to maintain accommodations for the future bank as well as providing a new PSE parking lot.

Scope of work includes:

1. Remove existing 115 kV-12.5 kV equipment
2. New scope includes
 - a. (1) 230 kV – 12.5 kV transformer bank



- b. (1) 12.5 kV Neutral Reactor
- c. (1) Metalclad switchgear
- d. (1) Load break switch
- e. (3) 230 kV Breakers
- f. (7) 230 kV Switches
- g. (1) Enclosed 12.5 kV Capacitor Bank
- h. (1) MPAC
- i. (4) 230 kV rated dead end structures
- j. (2) Single Phase CVTs

Budget:	The current lifetime budget for the Rose Hill substation is \$12,609,742. This is an increase of \$7,511,014 from the 2020 CSA and is attributed to operational (DNV's AC Interference Analysis) and permitting requirements that stipulate both SAM-RIC lines be energized at equivalent voltages (230 kV). Since both existing 115 kV lines will be converted to 230 kV, the ROS substation will need to be converted to a 230 kV to 12.5 kV substation. This change is documented in ROS PCR #1.
Schedule:	ROS 230 kV is to be constructed simultaneously as the SAM-RIC transmission line rebuild, once permitting is completed. Due to outage limitations and the nature of the conversion work (to 230 kV feed), it is only practical to perform the substation rebuild with a finish-to-finish schedule tie to the 230 kV transmission line rebuild project. Design 75%.
Risk Profile:	The primary risks come from permitting and system outage availability. Conditional Use permit appeals are highly likely which may delay construction permits and the start of construction for up to a year. A thorough risk assessment was prepared with the assistance of a consultant.



Sammamish Substation:

Scope:	<p>Portions of the scope are still under technical review at this time. Other projects such as Sammamish – Juanita 115 kV line, Technical Field Services (TFS) replacements, and the planning group’s finalization of the ultimate buildout of the Sammamish substation will have an impact on the final scope, as well as schedule.</p> <p>Known scope needs to connect the new 230 kV lines associated with Energize Eastside include:</p> <ol style="list-style-type: none"> 1. Install 2-230 kV circuit breaker bays at Sammamish substation to terminate the end of the new 230 kV transmission lines. 2. Install two new dead end towers. 3. Install two new 3000A-230 kV breakers. 4. Install three new 3000A vertical break disconnects.
Budget:	The lifetime budget for the Sammamish substation is \$5,318,604.
Schedule:	SAM is to be constructed simultaneously as the SAM-RIC transmission line rebuild, once permitting is completed. Schedule may be impacted by changes in scope as planning and SAM-JUA teams finalize their needs. Coordination with that project will be necessary. Design 30%.
Risk Profile:	The primary risks come from permitting and system outage availability. Conditional Use permit appeals are likely, which may delay construction permits and the start of construction for up to a year. A thorough risk assessment was prepared with the assistance of a consultant.



TAL – PCR Reconductor and Uprate:

Justification: The need for re-conductoring the Talbot Hill – Paccar 115 kV line was identified in the Eastside Transmission Solutions Study of the King County Area as it would eliminate significant near term risks of overloads identified during planning studies. Some of the contingencies were related to line outages associated with construction of Energize Eastside. For coordination efficiencies, this scope of work was incorporated into the overall Energize Eastside program cost estimates and CSA phase gate governance.

The line itself is a combination of Narcissus, Tern, and Bittern conductor and is being limited to operating at the highest allowable temperature of 50 degrees Celsius. A re-conductor of the line and replacement of the structures would increase the capacity and reliability, as well as reduce potential O&M costs where structures might be replaced individually instead of with the whole project.

Scope: Original scope was to rebuild approximately 1.5 miles of the Talbot Hill – Boeing Renton #2 115 kV transmission line in Renton. Transfer existing distribution underbuild onto the new structures. Uprate other segments of the line in order to increase the operating capacity of entire line to 100 deg. C.

Design Challenges: This project went through a significant design iteration. This transmission line is in a densely developed residential and commercial section in the City of Renton. It has a circuitous alignment and the existing pole locations do not provide flexibility for larger diameter poles. The original scope was to rebuild entirely to 1272 Bittern on self-supporting structures. Once the initial design (60%) indicated the need for larger pole diameters, the project team identified a lighter weight conductor Starling which is all aluminum core which is a lighter weight and will allow for 100 deg. C and smaller pole diameters with existing guying points.

A “paper” or “thermal” uprate (*i.e.*, no physical changes to equipment or facilities) of a portion of the TAL-PAC line was completed in 2019. The uprate resolved near-term overload issues associated with contingencies related to Energize Eastside transmission line construction. The addition of a second 230 kV/115 kV transformer at RIC substation in combination with the thermal uprate of the TAL-PAC line will solve long-term overloads that were identified in planning studies. Therefore, once the second transformer is installed at RIC, completion of TAL-PAC upgrade will no longer be required. This has been determined to be the most cost effective solution.

Budget: The lifetime budget for the TAL-PCR rebuild and uprate is \$1,055,952.

Schedule: Easement acquisition and permitting is on hold. Design 90%

Risk Profile: This task is currently deferred. Long-term (2028) planning studies identify overloads on the line; however, it is anticipated that the second transformer at RIC substation will be installed solving the overload issues. If the second transformer is not installed at RIC substation, it may be necessary to move forward with the project., Property owner negotiations would then be required and could require condemnation to acquire the necessary property rights. If constructed, large commercial customers will be radially fed by this system during construction; including Boeing, Paccar, and the retail center The Landing.



III. Financial Information

Proposed Budget Year(s):	2021-2025
Expected In-Service Date:	Q4 /2022 (TAL - RIC and RIC substation); Q4 2023 (RIC - SAM)
Lifetime Budget	Capital: \$283,367,914 OMRC: \$646,006 Total (OMRC + CAP): \$284,013,920


Estimated 5-Year Allocation at 2021, 8&4 Forecast

Category:	Year 1 (2021 remaining)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Forecast to Completion	Lifetime Actuals	Total Cost at Completion
TOTAL CAPITAL WITH CONTINGENCY (H/W, S/W) (+Tax+Ship)	\$17,380,517	\$67,819,737	\$51,807,976	\$3,941,084	\$265,100	\$141,214,414	\$142,153,500	\$283,367,914
Energize Eastside Transmission Line (R.10005.01.01.07)	\$14,784,488	\$61,358,787	\$38,604,200	\$3,941,084	\$265,100	\$118,953,659	\$82,712,595	\$201,666,254
Richards Creek Substation (R.10005.01.01.01)	\$3,709,253	\$1,261,637	\$ -	\$ -	\$ -	\$4,970,890	\$29,450,808	\$34,421,698
Talbot Hill Substation (R.10005.01.01.02)	\$55,440	\$960,508	\$ -	\$ -	\$ -	\$1,015,948	\$27,039,493	\$28,055,441
Rose Hill Substation (R.10005.01.01.04)	\$ -	\$332,499	\$11,033,337	\$ -	\$ -	\$11,365,836	\$1,243,906	\$12,609,742
Sammamish Substation (R.10005.01.01.05)	\$ -	\$233,165	\$4,674,915	\$ -	\$ -	\$4,908,080	\$410,523	\$5,318,604
Somerset Substation (R.10005.01.01.06)	\$ -	\$ -	\$ -	\$ -	\$ -	\$0	\$240,223	\$240,223
Talbot-Paccar Transmission Line (R.10005.01.01.08)	\$ -	\$ -	\$ -	\$ -	\$ -	\$0	\$1,055,952	\$1,055,952
TOTAL OMRC (T&D only) WITH CONTINGENCY	\$ -	\$30,000	\$27,000	\$70,000	\$60,000	\$187,000	\$459,006	\$646,006
Energize Eastside Transmission Line	\$ -	\$ -	\$27,000	\$60,000	\$60,000	\$147,000	\$ -	\$147,000

DocuSign Envelope ID: A0B769DF-0E46-408A-AF87-63298CDB6744



Category:	Year 1 (2021 remaining)	Year 2 (2022)	Year 3 (2023)	Year 4 (2024)	Year 5 (2025)	Forecast to Completion	Lifetime Actuals	Total Cost at Completion
Richards Creek Substation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Talbot Hill Substation	\$ -	\$30,000	\$ -	\$ -	\$ -	\$30,000	\$418,850	\$448,850
Rose Hill Substation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$40,016	\$40,016
Sammamish Substation	\$ -	\$ -	\$ -	\$10,000	\$ -	\$10,000	\$ -	\$10,000
Somerset Substation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Talbot-Paccar Transmission Line	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$140	\$140
ONGOING O&M	*	*	*	*	*	*	*	*O&M increase based on business planning analysis for major CAP plant additions



Non-Cash Benefits / Provide reliable service to customers on the Eastside and avoid intentional rolling
Future Cost Avoidance: blackouts. Add capacity to existing transmission system for future growth. Replace aging infrastructure.

Cash on Cash Single Payback: NA

IV. Project Description and Objectives

Project Descriptions

Energize Eastside:

Electricity is currently delivered to the Eastside area through two 230 kV/115 kV bulk electric substations – Sammamish substation in Redmond and Talbot Hill substation in Renton – and distributed to neighborhood distribution substations using the many 115 kV transmission lines located throughout the area. Although PSE has made many system improvements in the Eastside area over the years, the primary 115 kV lines that connect the Sammamish and Talbot Hill substations – the backbone of the Eastside electrical system – have not been upgraded in voltage since the 1960s. Since then, the Eastside’s population has grown from approximately 50,000 to nearly 400,000, with growth expecting to continue.

As required by federal regulations, PSE performs annual comprehensive electric transmission planning studies, to determine if there are potential system performance violations, such as transformer and line overloads under various operational scenarios and forecasted electrical use. Studies completed in 2013 and 2015 demonstrated PSE could not meet federal reliability requirements by the winter of 2017/18 and the summer of 2018 without the addition of 230 kV/115 kV transformer capacity in the Eastside area. Summer projected loads have already been met or exceeded.

To respond to the deficiencies identified in the transmission planning studies, PSE launched the Energize Eastside project in December 2013, which entails installing a new 230 kV/115 kV electric substation in the central Bellevue area connected by upgrading approximately 16 miles of 115 kV to 230 kV transmission line between the existing Sammamish substation in Redmond and the existing Talbot Hill substation in Renton.

Upon completion, the new line will add 1094 MVA of additional load serving and bulk transmission capacity to the Eastside area. The line will be routed through a new 230-115 kV substation called Richards Creek in Factoria adjacent to PSE’s existing Lakeside 115 kV switching station.

The project planning phase had considered looping our existing Somerset 115-12.5 kV substation which is on a radial tap to 230 kV loop. This component of the project is deferred for further consideration in the future as a separate project.



ISP Alignment:

ISP Objectives, Mandatory and/or Corporate Risk	Strategy <i>Abbreviated ISP strategy descriptions²</i>	Benefit Description <i>Benefit, measurement and/or scorecard affected</i>
Financial	<input checked="" type="checkbox"/> Five-Year Strategic Plan <input type="checkbox"/> Maximize long-term value <input type="checkbox"/> Grow core business <input type="checkbox"/> Grow new business	
Customer	<input checked="" type="checkbox"/> Execute the Customer Experience Intent Statement <input type="checkbox"/> Recognition of PSE role in community <input type="checkbox"/> Customer preparedness & safety <input type="checkbox"/> Ideal customer behaviors <input type="checkbox"/> Listen & dialogue with customers	
Process and Tools	<input type="checkbox"/> Streamline processes to drive effectiveness and efficiency <input checked="" type="checkbox"/> System reliability and integrity <input type="checkbox"/> Safety and security of systems, information and assets <input type="checkbox"/> Extract and leverage value from existing technology and assets <input type="checkbox"/> Optimize product/service portfolio consistent with long-term strategy	Increase the capacity of the bulk 230kV transmission system and provide reliability for over 60,000 customers on the Eastside.
People	<input type="checkbox"/> Develop/Retain best employees <input type="checkbox"/> Ownership, innovation and continuous improvement	
Safety	<input type="checkbox"/> Educate and train employees on effective safety and wellness strategies	

Project Objectives and Deliverables:

Objective	Outcomes / Deliverables	KPIs – Describe; Indicated Leading/Lagging	KPI Data Sources
Add 1094 MVA of additional load serving and bulk transmission capacity to the Eastside area.	Rebuild the existing 16- mile Sammamish – Talbot Hill 115 kV to operate at 230kV in the existing corridor with a new 230 -115 kV Substation at Richards Creek (Factoria area) and associated 115 to 230 kV conversions at SAM, TAL, and ROS. Line and facility modifications at LAK and on LAK – PHA, LAK – GOO, SHU-LAK, TAL-LTN, and TAL-PCR rebuild.	Customer outage minutes.	PSE Electric System Planning

² These are no longer available on the PSE Intranet.

**Project Alternatives Assessment:**

Alternative	Pros	Cons	Cost	Duration
Energy Storage	See study documentation	Will not address system need.	See study documentation	See study documentation
Non Wires solutions, efficiency programs, distributed generation	See study documentation	Will not address system need.	See study documentation	See study documentation
Developing a plan for intentional rolling blackouts to meet federal requirements.	System equipment would not over load.	This could impact more than 130,000 customers as early as the summer of 2018,	Tens of millions of direct and indirect dollars to the local economy.	High demand peak.
Alternative wire solutions.	See study documentation	See study documentation	See study documentation	See study documentation

V. Risk Management

Risk	Likelihood	Impact of Occurrence	How Monitored	Mitigation
Construction laydown area in south portion of project	Medium	Medium	Continue to look for potential laydown areas	Have transmission line contractor responsible for acquiring and or coordinating laydown and materials management. Alternatively look for sites prior to contractor selection to ensure area for pole delivery.
Issues during procurement	Low	Medium	Communication with vendors for scope, schedule and budget	Competitively select vendors who have the flexible procurement/ cancellation options and scheduling flexibility.
Steel pole production hold costs	Low	Low	Continue to monitor overall project schedule	Take delivery of poles and store locally.
Construction laydown area in north portion of project	Medium	Medium	Continue to look for potential laydown areas	Have transmission line contractor responsible for acquiring and or coordinating laydown and materials management
Legal challenge or appeal to project CUP	High	High	PSE's Government Affairs and Permitting	Continue to adapt to changing

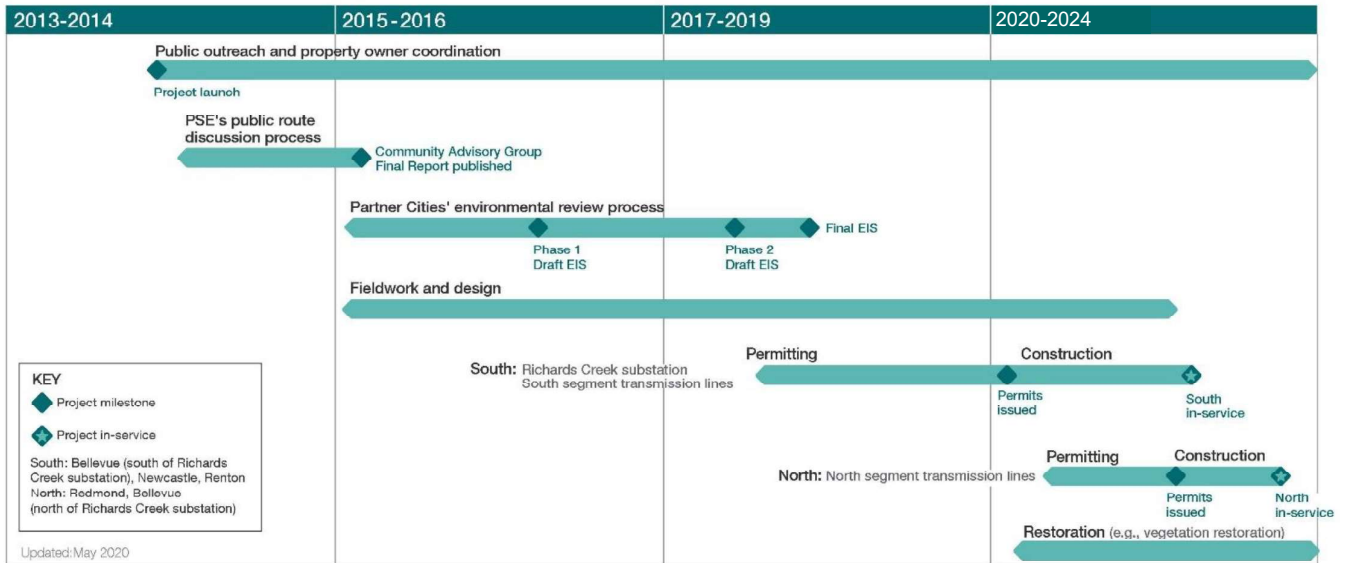


Risk	Likelihood	Impact of Occurrence	How Monitored	Mitigation
			teams work closely together to ensure that interactions with government and permitting authorities are planned and coordinated	circumstances. Implement sound legally based strategy for permitting and appeal defense.
Legal challenge or appeal to project construction permits	High	High	PSE’s Government Affairs and Permitting teams work closely together to ensure that interactions with government and permitting authorities are planned and coordinated	Continue to adapt to changing circumstances. Implement sound legally based strategies for permitting and appeal defense.
Constructability issues to transmission line	Low	Low	Continue to review design, field work to verify identified questions, bring a transmission line contractor for pre-construction constructability review	Continue to adapt to changing circumstances.
BPA Intertie at TAL – modified scope of work leading to permitting and construction delays.	High	Medium	Contract Engineering firm and internal SME’s continue to gather data and evaluate options.	Contract Engineering firm and internal SME’s continue to gather data and evaluate options.
Federal Government’s current policy on importing may impose new 25% tariffs on steel and aluminum imports. The extent of those impacts is not yet known as this risk is effective as of 03/01/2018.	Medium	Medium	Purchasing process.	Carefully evaluate vendor proposals and specifically request tax information.

Risk Register: [2/1/2018 Risk Assessment Update](#)



VI. High Level Schedule for all related projects associated with Energize Eastside



VII. Supporting Documentation

Cost Estimating and Budget:	<u>CAP Summary-BPC, OMRC Summary-BPC</u>
Business Needs:	<u>Eastside Needs Assessment Report 2013 (LINK) and 2015 (LINK)</u>
Alternatives:	<u>Solutions Report May 2015 (LINK); E3 Non-Wires 2014 (LINK); and Energy Storage 2018 (LINK)</u>
Benefits Realization Plan:	<u>Benefits Realization Plan</u>
Project Audit Checklist:	NA
OCM Sizing Worksheet:	NA

Project Implementation Plans: Each Project Component will have a separate PIP as indicated below.

SAM – RIC 230 kV	<u>Energize Eastside PIP</u>
TAL – RIC 230 kV*	
TAL – PCR 115 kV	<u>TAL - PCR Rebuild PIP</u>
TAL Substation	<u>PIP for TAL Bus Improvements and 230kv work</u>
RIC New Substation	<u>PIP for RIC</u>
ROS Substation	<u>ROS Rebuild for 230kv</u>
SAM Substation	<u>PIP For SAM 230 kV work</u>

DocuSign Envelope ID: A0B769DF-0E46-408A-AF87-63298CDB6744



VIII. CSA Signatures:

Approved By*	Title	Role	Date	Signature
Tony Pagano	Manager Major Projects	Manager Major Projects	11/24/2021	DocuSigned by: <i>Tony Pagano</i> C7D3BC00443B4AC...
Roque Bamba	Director Project Delivery	Director Sponsor	11/29/2021	DocuSigned by: <i>Roque Bamba</i> BC203E4E58BB426...
Dan Koch	Vice President Operations	Executive Sponsor & Benefit Owner	12/06/2021	DocuSigned by: <i>Dan Koch</i> 7E7434ECBF5B4C0...

*Benefit Owners must be added to the Approved By section during Execution Phase/Gate.