



Energize Eastside
Updated February 2023
Corporate Spending Authorization (CSA)

Date Submitted:	2/28/2023
Officer Sponsor:	Dan Koch
Program Director Sponsor:	Roque Bamba
Program Manager:	Brad Strauch

I. Program Overview

Update each section with high level information as applicable, noting any changes from the previous request/Gate.

Business Need:	The Energize Eastside project is needed to address the transmission planning deficiency on the Eastside as identified during annual Transmission Planning Studies (TPLs). Additional information is provided below.
Proposed Solution:	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 program is necessary to eliminate Corrective Action Plans that include load-shedding. This undertaking is complex and requires substantial coordination with other proposed projects on the Eastside in order to ensure cost efficiency and continued reliable operation of the electric system. As a result, the projects referenced below were included for planning and project management purposes.
Program Outcome/Results:	Once energized, the need to rely on Corrective Action Plans that include load-shedding will be eliminated. This is a NERC compliance requirement and will improved reliability of the transmission system on the Eastside.
Primary ISP Alignment:	Customer <u>ISP strategy descriptions</u>
Portfolio Description:	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 will include the construction of the new Richards Creek 230 kV to 115 kV substation and 230 kV transmission lines from the Talbot Hill and Sammamish 230 kV substations. The other projects referenced below have been included for planning and project management purposes.

Problem Statement: The growth on the Eastside means demand for electricity was forecasted (at project initiation) to outgrow our ability to provide reliable service by the 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 Short-Term Corrective Action Plans (CAPs) and will remain as such until Energize Eastside is put into service. 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 five of the past six years, and as recently as 2022.

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 expected to continue.

As required by federal regulations, PSE performs annual comprehensive electric transmission planning studies (TPLs), to determine if there are potential system performance violations, such as transformer and line overloads under a myriad of 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. Recent TPLs continue to show system deficiencies and summer forecasted 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. The new substation, referred to as Richards Creek, will be energized by upgrading approximately 16 miles of 115 kV transmission lines to 230 kV transmission lines between the existing Sammamish substation in Redmond and the existing Talbot Hill substation in Renton.

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

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

Proposed Solution: Add a new 230 kV source on the Eastside between Sammamish and Talbot Hill substations (Long-Term CAP).

- Construct a new 230 kV/115 kV Substation at the Richards Creek site (adjacent to the existing Lakeside substation) in Bellevue. The substation is identified 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. *Scope change from previous CSA:* 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 Olympic Pipeline (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, Renton, and Newcastle Conditional Use Permits (CUP). 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 kV 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 substation area for the LAK-PHA, LAK-GOO, SHU-LAK lines and north of TAL, re-route TAL-LAK to TAL-LTN lines.
- Rebuild and uprate the TAL-PCR 115 kV line to operate at 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.e.*, 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 identified planning contingencies until the second RIC 230 kV/115 kV transformer is installed.

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](#).

The Energize Eastside project, as it is currently designed and being implemented, is still the most cost effective approach to address the transmission system deficiency that has been identified during annual transmission planning studies that have been performed following the standards provided for in the NERC TPL standards. Alternatives that have been analyzed as part of the project development were determined to be significantly more expensive, impracticable to implement, or did not solve the identified problems. This is documented in the documents listed above, as well as the current cost of a battery solution as provided by CENSE's Expert Testimony at the Newcastle CUP Hearing in 2022.

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



II. Phase Gate Change Summary

Project	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 Construction (PCR 11, 2/8/22 / PCR 12, 8/15/22)	
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 13) 2/08/22	
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	4/21/22, 45%		
TAL – PCR (Paccar) Re-conductor and uprate.	2009 – 2013	9/3/13 Amendment 12/17/14 Amendment 1/27/15 Amendment 5/27/15	3/19/18, 90%	See details below.	

*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.

Phase Gate and Approval Summary

- September 3, 2013, a CSA was approved to enter the Planning Phase.
- December 17, 2014, a CSA amendment was approved to extend the planning phase of the project to May 2015.
- January 9, 2015, a CSA was approved for the work at Talbot substation to enter the Design Phase.
- January 27, 2015, a CSA amendment was approved to update the schedule and lifetime cost estimate.
- May 27, 2015, a CSA amendment #2 was approved to extend the planning phase to Q1 2016.
- 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.
- 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 request 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. June 24, 2018, a CSA amendment was approved that refined and updated the schedule and lifetime cost estimate.
- i. 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 7, 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 to construction costs and contaminated soil remediation to the RIC scope are documented in PCR #12.
- k. 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. The 2021 CSA captured the move to the execution phase for the South Transmission Lines (TAL-RIC).
- n. In February 2022, RIC PCR #13 and Energize Eastside Transmission Lines PCR#11 were approved as documentation of the annual budget Record.
- o. PCR #12 was approved on August 15, 2022, which increased the overall lifetime budget.
- p. This CSA captures the current 2023 budget.

Project Summaries

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. The various routes that were studied are discussed in the 2013 “Eastside 230 kV Project Constraint and Opportunity Study for Linear Site Selection” prepared by TetraTech.
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 Lakeside substation.
4. Rebuild existing PSE Network fiber within an optical ground wire and associated splice locations.
5. Perform wetland mitigation at Willows Creek located immediately south of the Sammamish substation. This is a City of Redmond permitting requirement for Energize Eastside, as well as the SAM-JUA 115 kV project. As appropriate, the costs associated with this work will be allocated between the two projects.

Budget:

The lifetime budget for the TAL-LAK (RIC)-SAM transmission lines is \$259,062,734.

**Schedule:**

The design phase began 8/8/2017, after Phase 2 of the SEPA Draft EIS was released. The final EIS was issued on March 1, 2018. Partial construction of the TAL-RIC lines was completed in 2021, specifically in Renton and King County. The south Bellevue section (I-90 south to Newcastle) was completed in 2022. Due to delays associated with permitting in Newcastle, the Newcastle and remaining Renton sections are on track to be completed in 2023. Construction of the RIC-SAM lines are planned in 2023 and 2024. Both the Bellevue and Redmond segments are dependent upon permitting and material availability.

Risk Profile:

The primary risks come from permitting and system outage availability. Conditional Use Permit appeals are less likely as of 2022, but could delay construction permits and the start of construction for up to a year. The south Bellevue Conditional Use Permit was appealed to King County Superior Court and King County Court of Appeals. Both appeals were denied. The Renton, Newcastle and Redmond CUPs were issued without appeal. The north Bellevue segment CUP is still pending. A thorough risk assessment was prepared with the assistance of a consultant. [LINK to Risk Summary](#); however, at this point in the project, the greatest uncertainties are around issuance of the final permits and availability of key materials.

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. Make provisions for the connection of the new 230 kV lines at Talbot Hill by building a double bus double breaker 230 kV bus design to allow connection of the new line, wherever it physically fits best and provides additional substation operational flexibility.
3. In 2017, further analysis of pipeline interaction with the transmission lines was conducted. 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 as originally planned. Under both operating scenarios, both transmission lines were to be built to 230 kV standards. Operating the lines at equivalent voltages was later required by Conditional Use Permits issued by Bellevue, Newcastle, and Renton. This condition added the need for one additional 230 kV bay at TAL. The DNV 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 2 (south half) work includes:



- a. New foundations for the south half of the substation (TAL 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 lines.
 - b. New drainage in 230 kV TAL 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 of TAL.
 - f. Finish TAL substation driveway entry which is the last 25 feet toward the ROW gate on the road. The road frontage work was deferred using fee in lieu paid to the city.
5. BPA Intertie: The current limiting reactor (CLR) and bus-tie relay issues on BPA's side of the 230 kV intertie have been installed.
- 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 at the BPA substation 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 that PSE could pursue.

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. The CLR 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 \$27,749,990.
Schedule:	<p>Phase 1 construction was completed in 2016.</p> <p>Phase 2 construction was completed in 2019.</p> <p>The CLRs were installed in summer of 2020.</p> <p>The Bus-Tie Relay/Transfer Voltage Mitigation is expected to be completed in 2023.</p>
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:** Build a new 230 kV substation (Richards Creek).
- Install one 325 MVA 230 kV-115 kV transformer, 230 kV bus work and 230 kV circuit breakers in a breaker and a half configuration.
 - Four 230 kV terminals will be required initially for four lines and one transformer.
 - Yard space allocation for a future 115 kV line and one additional 230 kV-115 kV transformer. The second transformer has been installed during the original development of RIC as a cost saving measure.
 - Loop in two 230 kV lines 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 \$37,558,897

Schedule: Completion of the RIC substation is on the critical path with TAL-RIC 230 kV rebuild. Civil work started in September of 2020, with the majority of the work completed in 2021. Electrical assembly work was initiated in early 2022. The remainder of the station is scheduled to be constructed simultaneously with the south transmission line rebuild, once permitting is completed. Energization of the RIC substation will occur upon completion of the Newcastle transmission line segment – Q2 or Q3 of 2023.

Risk Profile: The primary risks came from permitting and system outage availability. The Newcastle CUP has been issued and the majority of the RIC substation is complete; therefore, these risks are minimal.

Rose Hill substation 115 kV to 230 kV conversion:

Scope: Prior to 2016, Rose Hill (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 opted 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 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 operations



and will require a re-build of the substation with 230 kV compatible equipment. Conversion of ROS substation to a 230 kV-12.5 kV configuration must be completed prior to converting the 115 kV transmission lines to 230 kV.

The 2016 ROS 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 115 kV line (north side of loop)
 - b. One line for Lakeside's future 115 kV line (south side of loop)
 - c. One to connect to the existing 12.5 kV 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

The 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 transmission line conversion will replace the entire high side of the substation with 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 relocating the existing PSE parking lot located between the station halves.

Scope of work includes:

1. Remove existing 115 kV-12.5 kV equipment
2. New equipment 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 \$12,662,038. This includes costs associated with 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-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 30%.

Risk Profile: The primary risks come from permitting and system outage availability. The Redmond Conditional Use Permit was issued and no appeals were filed. However, issuance of the construction permits remains a risk due to limited city staff resources. Construction is scheduled for 2024; therefore, permitting risks remain low.

Sammamish Substation:

Scope: Portions of the scope are still under technical review at this time. Other projects such as Sammamish – Juanita 115 kV line, Substation Reliability Program 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.

Known scope needs to connect the new 230 kV lines associated with Energize Eastside include:

1. Install two 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 \$5,203,786.

Schedule: SAM is to be constructed prior to or concurrently as the SAM-RIC transmission line rebuild, once permitting is completed. This is a finish-to-finish schedule item. Schedule may be impacted by changes in scope as planning and SAM-JUA teams finalize their needs. Coordination with that project will continue.

Risk Profile: The primary risks come from permitting and system outage availability. The Redmond Conditional Use Permit was issued and no appeals were filed. However, issuance of the construction permits remains a risk due to limited city staff resources.

TAL – PCR Re-conductor 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 types and is 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:	<p>The original scope was to rebuild approximately 1.5 miles of the Talbot Hill – Boeing Renton #2 115 kV transmission line in Renton. This included transferring the existing distribution underbuild onto the new structures. In addition, the other segments of the line would be uprated in order to increase the operating capacity of the entire line to 100 deg. C.</p> <p>Design Challenges: This project went through a significant design iteration. This transmission line is located in a densely developed residential and commercial section of Renton. It has a circuitous alignment and the existing pole locations do not provide flexibility for larger diameter poles, which are required for the heavier higher-capacity conductor. 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 an all-aluminum core and will allow for operations up to 100 deg. C, as well as smaller pole diameters with existing guying points.</p> <p>A “paper” or “thermal” uprate (<i>i.e.</i>, 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.</p>
Budget:	The lifetime budget for the TAL-PCR uprate is \$56,217.
Schedule:	No further activities are planned for this project.
Risk Profile:	<p>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. However, property owner negotiations would then be required in order to obtain the necessary operating rights. This may 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.</p>

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



SAM – RIC 230 kV / TAL – RIC
230 kV*

[Energize Eastside PIP](#)

TAL – PCR 115 kV

[TAL-PCR PIP](#)

TAL Substation

[TAL Bus Improvements and 230kV PIP](#)

RIC New Substation

[RIC PIP](#)

ROS Substation

[ROS Rebuild for 230kV PIP](#)

SAM Substation

[SAM 230 kV PIP](#)

III. Key Financial Information

Expected Program Start Date: 2013

Expected Program Closeout Date: 2026

Proposed Budget Year(s): 2023-2026

Expected In-Service Date: Q4 /2023 (TAL - RIC and RIC substation); Q4 2024 (RIC – SAM and ROS substation); 2025 Willows Creek Mitigation Construction; 2026 Maintenance and Monitoring for restoration work.

Overall Estimate Investment: High-Level Budget & On Going O&M

Last Updated: 2/2/2023

Energize Eastside – Transmission lines and RIC substation

Overall Estimated Investment:	(\$MM)
Capital (contingency included)	\$297,321,631
Program O&M	\$586,006
Total	\$297,907,637
Ongoing O&M (Annually)	

For 2023, the lifetime budget for Energize Eastside (Richards Creek substation and transmission lines) is \$297,321,631. Increases over the years are as a result of some of the following factors:

- Additional pipeline protection requirements were implemented by Olympic Pipeline Company. These included more intensive corridor access analysis, double matting in most collocation areas, and adding a dedicated Damage Prevention Specialists. The double matting also includes additional civil work that could not be anticipated.
- Extended construction into 2025 due to delays in permitting – North Bellevue and Rose Hill substation plus the Willows Mitigation site.
- Limited outage windows.
- Construction delays due to supply chain issues.
- Additional land liaison support needed to interact with property owners.
- Note: The above are related to the transmission lines and are documented in the change orders.
- Permitting and weather delays, contaminated soil removal, and site dewatering at Richards Creek substation.

Additionally, the annual budgets have changed as the result of the following:



- Delays in permitting the Newcastle segment have pushed construction from 2022 to 2023 for that segment.
- Delays in permitting and conductor availability have pushed the construction of the north Bellevue segment out from 2023 to 2024.
- The delay of constructing the entire north transmission line has pushed the 230 kV – 12.5 kV conversion of the Rose Hill substation out to 2024 from 2022.

There are anticipated additional costs that have not been included in the above budget. The table below provides a high level summary of these potential expenses. These costs have not been realized and are only estimates at this time. Once additional information is obtained later in 2023 and early 2024, additional certainty can be assigned and the estimates refined.

Task	Anticipated Expense*	Key Factors/Risks
Traffic control pass through – north half transmission line	\$2,750,000	This is a projected pass through cost based on actuals from the south half transmission line construction. These costs are expected to be realized in 2024, but the actual costs will not be known until traffic control plans have been developed.
Tree removal for north Bellevue and Redmond	\$2,850,000	This is a rough projection based on completed transmission line construction. These costs would not be realized until 2024 once an updated tree removal inventory has been completed.
Pipeline protective matting – north half transmission lines	\$6,600,000	These are projected costs from the south transmission line construction. The actual costs will be based on the required pipeline protective measures approved by OPL later in 2023.
Newcastle restoration - 2023	\$500,000	This is an estimate based on actuals from the transmission line construction restoration to date. A better estimate will be available once landscape plans have been developed with each property owner.
North half transmission line restoration 2024/25	\$1,500,00	This is an estimate based on actuals from the transmission line construction restoration to date. A better estimate will be available once landscape plans have been developed with each property owner.
*Does not include PSE overheads Estimated costs are subject to additional increases if delays are encountered		

Schedule Adjustments as of Feb. 2023

In assessing the remaining construction and maintenance work associated with Energize Eastside, a number of considerations have been evaluated to inform the development of the following completion schedule. There are several key components that need to be constructed as well as associated maintenance and monitoring activities as required by permit conditions. The following table shows the primary remaining construction tasks and their anticipated construction timing.



Remaining Construction Tasks	Construction Timing
Newcastle segment transmission line (poles 4/3 to 5/7 [total 24 poles])	2023
A small portion of transmission line in Renton near TAL substation (poles 0/1 to 0/8)	2023
Redmond limited segment transmission line (0/1 to 0/8 [east line]; work necessary in 2023 to avoid conflicts with the SAM-JUA project)	2023
Redmond segment transmission line (poles 0/1 to 0/5 [west line] to 2/2)	2024
Richards Creek substation wire work and commissioning, plus remaining wetland mitigation installation	2023
230 kV transmission lines between RIC and LAK substations	2023
230 kV transmission line drops into TAL substation	2023
230 kV transmission line drops into SAM substation	2024
Rose Hill substation rebuild from 115 kV to 230 kV / 12.5 kV	2024
North Bellevue segment transmission line (poles 2/3 to 7/9)	2024
Willows Creek Restoration site construction adjacent to SAM substation	2025
Fiber cable (OPGW) splice at 0/5 (#2 line) then to SAM	2023
Distribution relocations: Glendale Country Club; RTC guy pole; 5/3 near K.S. property; evaluating area north of ESO	2023 2024

The above construction schedule differs from the 2019 PIP, which showed construction starting at RIC in 2020 and the T-line work beginning in the south half in Q2 2021, with the north half T-line construction starting in Q2 2022. A number of factors contributed to the revised schedule presented above. In 2021, construction permits were not issued when anticipated from Renton and Bellevue. This not only delayed the start of construction, but limited the amount of work that could be accomplished in 2021 due to outage constraints and wet weather construction limitations. This resulted in south Bellevue segment construction being pushed to 2022. Newcastle construction permits are still pending, but are expected in Q1 2023, which will allow for completion of the south half of the project, including the energization of the RIC substation in 2023.

Looking to 2023 and 2024 construction, the north Bellevue CUP permit hearing has not been scheduled and Redmond construction permits are still pending. In addition, supply chain issues have created uncertainty in the delivery of key transmission line components for the north half of the transmission line.

**Estimated 3-Year Allocation at the 2023, 1&11
Forecast**

Category:	Year 1 (2023 remaining)	Year 2 (2024)	Year 3 (2025)	Year 4 (2026)	Forecast to Completion	Lifetime Actuals	Total Cost at Completion
TOTAL CAPITAL WITH CONTINGENCY (H/W, S/W) (+Tax+Ship)	\$41,429,833	\$59,934,003	\$3,342,629		\$104,706,465	\$238,247,197	\$342,953,662
Energize Eastside Transmission Line (R.10005.01.01.07)	\$34,829,228	\$48,963,524	\$3,342,629		\$87,135,381	\$172,627,353	\$259,762,734
Richards Creek Substation (R.10005.01.01.01)	\$973,421	\$ -	\$ -	\$ -	\$973,421	\$36,585,476	\$37,558,897
Talbot Hill Substation (R.10005.01.01.02)	\$613,646	\$ -	\$ -	\$ -	\$613,646	\$27,136,344	\$27,749,990
Rose Hill Substation (R.10005.01.01.04)	\$345,267	\$10,970,479	\$ -	\$ -	\$11,315,746	\$1,306,292	\$12,622,038
Sammamish Substation (R.10005.01.01.05)	\$4,668,271	\$ -	\$ -	\$ -	\$4,668,271	\$535,515	\$5,203,786
Talbot-Paccar Transmission Line (R.10005.01.01.08)	\$ -	\$ -	\$ -	\$ -	\$0	\$56,217	\$56,217



Category:	Year 1 (2023)	Year 2 (2024)	Year 3(2025)	Year 4 (2026)	Forecast to Completion	Lifetime Actuals	Total Cost at Completion
TOTAL OMRC (T&D only) WITH CONTINGENCY	\$30,000	10,000	\$27,000	\$60,000	\$127,000	\$459,006	\$586,006
Energize Eastside Transmission Line	\$ -	\$ -	\$27,000	\$60,000	\$87,000	\$ -	\$87,000
Richards Creek Substation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Talbot Hill Substation	\$20,000	\$ -	\$ -	\$ -	\$20,000	\$418,850	\$438,850
Rose Hill Substation	\$ -	\$10,000	\$ -	\$ -	\$10,000	\$40,016	\$50,016
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


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IV. Ongoing Benefits

Summary of Benefits	Energize Eastside project will construct the new Richards Creek 230 kV/115kV substation in Bellevue and upgrade approximately 16 miles of transmission lines to 230 kV within the existing corridor from Redmond to Renton. This project is required to meet capacity requirements for the local area as identified during annual TPL studies. Project in-service is scheduled for 2024.
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V. Change Summary

Use this section for changes over the Program lifespan. To have a history of the changes at each program update, **copy/paste the table below, above the previous table.**

Year:	Choose an item
Scope:	See details provided in Section 2.
Budget:	See details provided in Section 2.
Schedule:	See details provided in Section 2.
Benefits:	See details provided in Section 2.

VI. CSA Approvals

Program Year	Select Year			
Approved By	Title	Role	Date	Signature
Tony Pagano	Manager Major Projects	Manager	03/01/2023	DocuSigned by: <i>Tony Pagano</i> C7D3BC09443B4AC...
Roque Bamba	Director, Project Delivery	Director Sponsor	03/06/2023	DocuSigned by: <i>Roque Bamba</i> BC203E4E58BB426...
Dan Koch	Vice President, Operations	Executive Sponsor	03/07/2023	DocuSigned by: <i>Dan Koch</i> 7E7434ECBF6B4C0...
		Choose an item		

Please direct any questions to Capital Budget team at CSA-TeamMail@pse.com