

SECTION 4: INTRODUCTION

Cost of Project

The documents in this section compare the life-cycle cost of the proposed transmission line project with the costs of alternatives rejected by PSE.

Table of Contents

- 4.1 Lifetime Cost Analysis for Energize Eastside
Jeffrey King, Economist
- 4.2 Cost of Talbot Hill/Lakeside Transmission Line Project
Jeanne DeMund, CENSE

Lifetime cost analysis for Energize Eastside

What will Energize Eastside cost customers over its lifetime?

February 17, 2016

*If those numbers seem large, it's mostly
because state policy guarantees PSE
a return on investment of 9.8% per year
for infrastructure projects.
Interest adds up quickly at that rate.*

What will Energize Eastside cost customers over its lifetime?

CENSE engaged Jeffrey King, a utility financing expert, to give us better answers to this question. Mr. King worked as a Senior Resource Analyst for the Northwest Power Planning Council for nearly 30 years.

Mr. King used MicroFin modeling software to come up with three different lifetime scenarios (45, 55, and 65 years) using a project base cost of \$100 million. The details of his analysis can be found in the following pages of this document.

A base cost of \$100 million is considerably less than PSE's cost estimates, but the results of the model can simply be scaled by the ratio of the actual cost to the base cost. For example, if the cost were to be \$300 million (three times the base cost), the results from Mr. King's analysis could simply be multiplied by a factor of 3.

PSE has not updated cost estimates for Energize Eastside, and the EIS contains no reference to the project's cost. Our best guess is that it will cost at least \$250 million. We scaled the results of Mr. King's analysis by a factor of 2.5 to arrive at the following lifetime costs:

Lifetime of Energize Eastside	
<i>transmission line</i>	<i>Total cost to ratepayers</i>
45 years	\$1.45 billion
55 years	\$1.74 billion
65 years	\$2.03 billion

If those numbers seem large, it's mostly because state policy guarantees PSE a return on investment of 9.8% per year for infrastructure projects. Interest adds up quickly at that rate.

Revenue collected by PSE for this level of investment would be approximately \$32 million per year. This is an important number, because it is possible to buy quite a bit of technology to implement alternative solutions with expenditures of that size. Because alternative solutions can be built incrementally as the need arises, we probably wouldn't need to continue that level of investment for 45-65 years.

We see an opportunity to build a solution of just the size we need and save a lot of money for ourselves, our children, and our grandchildren.

Estimation of the fixed charge rate and revenue requirements for the proposed Energize Eastside transmission project

Prepared for CENSE.org by Jeffrey C. King & Associates
February 10, 2016

The Energize Eastside transmission project is intended to reinforce the Puget Sound Energy electrical distribution system on the east side of Lake Washington in King County, Washington, an area that has experienced significant growth over the past several decades without concurrent expansion of the local transmission system. The Energize Eastside project is proposed to be an overhead single-circuit 230 kV transmission line¹ extending from the existing Talbot Hill substation in Renton approximately 18 miles north and east to the existing Sammamish substation in Redmond, passing through Bellevue, Kirkland and other Eastside communities. The line would feed, from both ends, a new or expanded substation in the Bellevue vicinity. Preconstruction fieldwork commenced in January 2015 and construction is proposed to commence in the second quarter of 2017 for fourth quarter 2018 energization.

The purpose of the work described in this paper is to estimate the levelized fixed charge rate (FCR)² and revenue requirement³ of the proposed Energize Eastside project. Revenue requirement can subsequently be used to estimate the rate impact of the proposed project.

The MicroFin Levelized Project Revenue Requirements model, developed by the Bonneville Power Administration and the Northwest Power and Conservation Council is used to calculate project FCRs and revenue requirements. MicroFin uses normalization accounting⁴ to simulate investor-owned utility financing of electric power projects. MicroFin calculates total project investment costs using a construction cost estimate, construction cash flows and financing information. Annual cash flows over the forecast service life of the project are then calculated. Components of annual cash flows for transmission projects include debt service, debt interest, return on equity, equity recovery, income and property taxes, insurance, operation and maintenance expenses, interim capital replacement costs and the cost of losses. The net

.....

¹ The project may use towers capable of carrying a future second 230KV line.

² The Fixed Charge Rate is the levelized annual cost of financing the construction of a project over the economic life of the project, expressed as a percentage of total investment cost. The total investment cost is the cost of developing and constructing a project (capital cost), including price escalation and interest incurred during the construction period.

³ Project Revenue Requirements are the annual costs of constructing and operating a project. Revenue requirements consist of the annual financing costs (Fixed Charge Rate x Total Investment Cost) plus annual operation and maintenance costs (expensed and capitalized).

⁴ Normalization accounting shifts a portion of the benefit of accelerated tax depreciation to later years of the life of a project. Normalization accounting is mandated by the Internal Revenue Service for investor-owned utilities.

of these comprise annual revenue requirements. Annual revenue requirements may vary over the life of a project due to factors such as cost escalation and a service life that exceeds the financing life. A levelized revenue requirement (an equivalent constant value) is then calculated by taking the net present value of the series of annual revenue requirements, then calculating a constant series of annual payments with equivalent net present value.

For calculating the FCR and revenue requirements of a transmission project, MicroFin requires information regarding project capital costs, operation and maintenance (O&M) costs, interim capital replacement costs; construction cash flows; the project owner's financial structure, tax obligations and incentives, if any; forecast general inflation and escalation rates of capital and O&M costs; and electrical losses. Other MicroFin input data such as fuel cost and emission costs are not applicable to a transmission project. The information needed by MicroFin to calculate a fixed charge rate and revenue requirement for a transmission project is shown in Table 1 with the known or assumed values for the Energize Eastside project and sources of this information. Additional information regarding the derivation of certain input assumptions is provided in the Appendix.

Capital costs for transmission projects vary widely and the capital cost estimates for the proposed Energize Eastside project were not available for this analysis. \$100 million is used as a placeholder. \$100 million is substantially greater than typical cost for a 230kV project of this size, however the congested nature and environment of the proposed corridor will likely increase construction cost well above typical costs. Once construction cost estimates are available, revenue requirements can be calculated by taking ratios of \$100 million. Because all cost input assumptions for this project are a constant percentage of the capital cost and all input costs are independent of the load factor of the line, the relationship of overnight capital to revenue requirements is linear.

An uncertainty of some importance is the assumed service life of the project. PSE estimates that the service life of transmission facilities will range from 45 to 65 years. For this reason, FCR and revenue requirements calculations were run for 45, 55 and 65 year service lives.

The estimated fixed charge rates and levelized annual revenue requirements for a \$100 million overnight capital cost investment in a project with the characteristics of the proposed Energize Eastside project are shown in **Table 2** for 45, 55 and 65 year service lives. Also shown is the AFUDC ratio, to calculate total plant investment (*basis of the fixed charge rate*) from the overnight construction cost. All values are "nominal", e.g., include the effects of forecast general inflation, and therefore represent the actual dollar impact on rates.

Table 1: Modeling input data values and sources

Input	Value	Source	Note
Plant Data:			
Start of construction	1/1/2017	Approximation of PSE Q2 2017	Closest MicroFin time series increment.
Service date	1/1/2019	Approximation of PSE end of Q3 2018	Closest MicroFin time series increment
Service life	44, 55 and 65 years	PSE 2014 FERC Form 1 page 123.14	
Overnight capital cost	100 million	Placeholder	
Annual construction cash flow	50%/yr	JCK assumption	
Capital cost real escalation	Zero	JCK assumption	Reflects currently low rates of labor and equipment price escalation.
Annual operation and maintenance expenses	1.3% of overnight capital cost	See Appendix	Exclusive of property tax and insurance.
O&M cost real escalation	Zero	JCK assumption	Reflects currently low rates of labor and equipment price escalation.
Generation integration costs	n/a		No significant generation would be interconnected to the proposed project.
Control and dispatch costs	Zero		Project is assumed not to significantly affect the control and dispatch costs of the PSE system
Cost of losses	Zero		Project will likely reduce system losses overall but extent not known w/o load-flow analysis
Interim capital replacement	1.2% of overnight capital cost	See Appendix	Levelized annual cost of replacing major equipment over the life of the project.
Input price year dollars	2016		Cost estimates are assumed current
Project financing			
Debt term	30 years	JCK assumption	
Equity recovery period	30 years	JCK assumption	
Debt/Equity ratio	52/48	PSE 2014 FERC Form 1, page 109.2	WUTC approved, effective 1/2014
Debt interest rate (nominal)	5.75%	See Appendix	Average of recent PSE 30-year issues plus 0.25% for Dec 2015 Federal Reserve increase.
Return on equity (nominal)	9.8%	PSE 2014 FERC Form 1, page 109.2	WUTC approved, effective 1/2014
Debt financing fee	1.0% of issue	See Appendix	Average of recent PSE 30-year issues.
Discount rate (nominal)	6.7%	Calculated	After-tax cost of capital for the assumed financial parameters (PSE perspective)
General inflation rate	See Appendix	NPCC 7 th Plan (draft)	
Taxes and Insurance			
Federal income tax rate	35%	PSE 2014 FERC Form 1	
FIT recovery period	20 years	IRS Pub 946	Recovery period for transmission assets
Federal investment tax credit	None		
State income tax rate	None		
State investment tax credit	None		
Annual property tax rate	0.95% of overnight capital cost	See Appendix	Average King Co. property tax rate x ratio of assessed to true value for King Co.
Annual property insurance rate	0.06% of overnight capital cost	See Appendix	Average PSE property insurance cost on electric plant property

Table 2: Estimated AFUDC ratio, fixed charge rates and revenue requirements (*Nominal values*)

Case	AFUDC Ratio	Annual FCR (% Total Plant Investment)	Annual Revenue Requirement (\$/yr)
\$100 MM overnight cost; 45-year useful life	1.038	9.9%	\$12,869,000
\$100 MM overnight cost; 55-year useful life	1.038	9.7%	\$12,622,000
\$100 MM overnight cost; 65-year useful life	1.038	9.6%	\$12,505,000

Appendix: Derivation of certain modeling input assumptions

Operation and maintenance costs: Operation and maintenance costs for this project include the expensed costs of operating and maintaining the system plus administrative and general costs. Major equipment replacement costs are normally capitalized and are considered separately. System control and dispatch costs are not included because it is believed that PSE control and dispatch costs would not be significantly affected by the proposed project. Generation integration costs are also excluded because no significant generation would be interconnected to the proposed project. Operating and maintenance costs were estimated from PSE operation and maintenance cost data appearing on page 321 of the PSE 2014 Federal Energy Regulatory Commission (FERC) Form 1 annual report. Administrative and General (A&G) costs (Form 1 page 323), excluding property insurance (entered separately in MicroFin) were calculated as a percentage of total O&M. That percentage was applied to transmission O&M, as calculated above, to obtain an estimate of transmission A&G. The transmission O&M estimate plus the transmission A&G estimate were then divided by total transmission asset value (Form 1 page 206) to obtain transmission O&M plus transmission A&G as a percentage of transmission capital cost.

Interim capital replacement cost: Interim capital replacement cost is the annual cost of replacing major components over the expected service life of the project. Information regarding utility interim capital replacement costs is scarce – these costs are rolled into annual capital costs that also include system expansion and disaster recovery expenditures. Reported interim capital replacement expenditures by North American utilities for substation and transmission assets are relatively high, about 5% of asset value annually. However, North American transmission systems are aging - the average age of large power transformers is reported to be 40 years. Because replacement costs increase with age, the levelized lifetime replacement rate for a new transmission line will be less than the replacement rate for a 40 year old facility. Assuming an exponential increase in replacement costs over the service life of a facility, a 5% rate at age 40 yields a levelized lifetime rate of 1.2% of asset value for a facility with an expected service life of 55 years (midpoint of PSE service life estimates).

Debt interest rate and financing fee: The average interest rate of 30-year PSE bonds issued from 2009 through 2014 is 5.48% (PSE FERC Form 1 page 256 and 257). To this was added 0.25% to account for the December 2015 Federal Reserve rate increase. The result was rounded to 5.75%. The same source was used to calculate an average debt placement fee of 1.03% (rounded to 1%) for the same bond issues.

General inflation rate: The forecast general inflation rate used by the Northwest Power & Conservation Council for its 7th power Plan (draft) was adopted for this study. That series is 1.6% for 2015, 1.7% for 2016, 1.6% for 2017, 1.7 % for 2018-2028 and 1.8% for 2029 and on.

Property tax: An average property tax rate for King County, Washington was calculated as the product of assessed property value to true property value (Property Tax Ratio) and the average King County property tax rate, as follows:

Property tax ratio for King Co.	93.800%	(WA Dept. of Revenue)
Average property tax rate for King Co.	1.014%	(www.smartasset.com)
Average property tax rate on true value	0.950%	

Property insurance: Total PSE insurance expenditures (2014 PSE FERC Form 1 page 323) were divided by total electric plant in-service asset value (Form 1 page 206) to yield a 0.06% rate based on asset value.

JEFFREY C. KING

3828 N.E. Alameda Street
Portland, Oregon 97212
503-984-0415
jkingeca@gmail.com

January 2016

EXPERIENCE

2011 - Present: President, Jeffrey C. King and Associates. Jeffrey C. King and Associates is a consulting firm engaged in energy-related analysis for public and private clients. The principal topics of the firm include energy policy analysis, technical, economic and environmental assessment of electric power generating technologies and power price forecasting.

2011: Planning Approaches for Water Resource Development in the Lower Mekong Basin. The purpose of this project, funded by USAID through AECOM International Development and Portland State University, was to propose and evaluate methods for improving planning for energy development of the Lower Mekong Basin (LMB). Mr. King was responsible for preparing the assessment of potential alternatives for power production in the LMB.

1984 - 2011: Senior Resource Analyst, Northwest Power Planning Council, Portland, Oregon. Mr. King was responsible for assessing the commercial availability, performance, economics, development potential and issues associated with development and operation of electric power generating resources. Mr. King was also responsible for the Council's forecast of wholesale electric power prices, using the AURORAxmp® Electric Market Model, a proprietary model of the western electric power system. The model is also used to assess the CO₂ production and other effects of regulations and policies affecting the power system. Mr. King's activities included assessment and analysis, operation of computer models, preparation of issue papers, organization and chairing of advisory committees, administration of contracts, presentations to the Council and interested organizations, and work with utilities, government agencies, research organizations, resource developers and public interest groups. Information developed by Mr. King is widely employed by utilities, agencies and others outside the Council.

2008 - 2010: Chief Planner, National Energy Development Framework Project, State of Eritrea. Mr. King served as the chief planner for preparation of a 20-year energy development framework and five-year action plan for the State of Eritrea. The framework, funded by USAID, presents a vision for a future energy supply system for Eritrea to support an adequate, reliable, affordable, and sustainable energy supply for rural and urban areas, transportation, industry, and water resource, port and tourism development. Mr. King fashioned the contributions of specialists in various energy resources into a coherent description of Eritrean energy resource potential, formulated goals and objectives in response to concepts provided by the State of Eritrea, and lead the development of a proposed Eritrean energy future, action plan and framework for implementation.

1974 - 1984: Staff Engineer, Energy Systems Department, Battelle, Pacific Northwest Laboratories, Richland, Washington - Mr. King managed and contributed to projects involving assessment of the economic and environmental aspects of electric power conservation and supply resources and application of decision analysis techniques to energy policy and technology issues. Projects included the first assessment of conservation and generating resources for the newly-formed Northwest Power Planning Council, assessment of generating resource alternatives for the State of Alaska, assessment of decommissioning costs and priorities for retired nuclear facilities and analysis of high-level nuclear waste disposal alternatives.

1964 - 1970: Test Engineer, Nuclear Power Division, Puget Sound Naval Shipyard, Bremerton, Washington - Mr. King was responsible for the planning and execution of acceptance testing procedures for the construction, overhaul and refueling naval nuclear power plants.

EDUCATION

Bachelor of Science in Mechanical Engineering, University of Washington, Seattle, Washington. 1964.

Graduate Studies, Zoology, University of Washington, Seattle, Washington. (1970-1972).

Graduate Studies, Regional Planning, University of Pennsylvania, Philadelphia, Pennsylvania. (1972-1974).

SELECTED PUBLICATIONS

Seventh Northwest Conservation and Electric Power Plan (Document 2015-09). Northwest Power and Conservation Council. Portland, Oregon. October 2015. (Contributing author)..

Wave Energy Utility Integration. Prepared by Pacific Energy Ventures for the Oregon Wave Energy Trust. December 2013. (Contributing author)

Planning Approaches for Water Resources Development in the Lower Mekong Basin. Portland State University, Mae Fah Luang University. July 2011. (Contributing author).

Effects of an Increasing Surplus of Energy Generating Capability in the Pacific Northwest (Document 2011-01). Northwest Power and Conservation Council. Portland, Oregon. March 2011.

Sixth Northwest Conservation and Electric Power Plan (Document 2010-09). Northwest Power and Conservation Council. Portland, Oregon. January 2010. (Contributing author).

National Energy Development Framework - Part I. Prepared for State of Eritrea, Ministry of National Development. Asmara, Eritrea. April 2009. (Contributing author).

Carbon Dioxide Footprint of the Northwest Power System (Document 2007-15). Northwest Power and Conservation Council. Portland, Oregon. November 2007.

Pacific Northwest Wind Integration Action Plan (WIF 2007-15). Northwest Wind Integration Forum. Portland, Oregon. March 2007. (Contributing author).

ACKNOWLEDGEMENT

I am now and at all times herein mentioned a citizen of the United States, over the age of 18 and competent to testify as a witness herein. I am the author of the preceding report, Estimation of the Fixed Charge Rate and Revenue Requirements of the Proposed Energize Eastside Transmission Project.

I declare under the penalty of perjury under the laws of the State of Washington that the preceding report is true and correct to the best of my knowledge and belief.

DATED this 23 day of March, 2019.

Signature:

Jeffrey C. King

Printed Name:

Jeffrey C. King

Cost of PSE's Talbot Hill/Lakeside Transmission Line Project

Abstract

In Columbia Grid's 2011 Transmission Grid Expansion Plan, PSE estimated the cost for Energize Eastside at \$65-\$80 million. When announced to the public in 2012, the project was projected to cost between \$150 and \$300 million. Both of these initial estimates are now woefully out of date. PSE has not provided any cost estimate for the 8.78-mile Talbot Hill/Lakeside Transmission Line Project (THLTL).

The initial estimates did not include the long-term costs of the project when PSE's anticipated 9.8% Return on Equity (ROE) is calculated.

According to CENSE's consultant's calculations, using PSE's original projections, the total cost of the project over time ranges from \$579 million to \$2.4 billion, depending on actual initial cost and project lifespan.

Recent information from PSE shows that \$54 million has already been spent on the transmission project. That enormous expenditure at this pre-permit stage of the project indicates that the total costs for the project before ROI will very likely be at or beyond the high end of either PSE's or CENSE's consultant's estimates.

PSE's ratepayers will pay for the project, despite misleading statements to the contrary in some of PSE's promotional materials. PSE's required analysis of alternative solutions, (Bellevue LUC 20.20.255 D.3.a.) concluded that all of the alternatives were more costly than transmission lines. CENSE has continued to examine the various alternatives to 18 miles, or even just 7-8 miles of towers and transmission lines and finds that costs for alternatives have fallen dramatically since PSE's initial assessment, and all indications are that costs will continue to fall rapidly.

PSE promised to provide updated project costs following the selection of a preferred route. It has not done so.

Given the scale of the long-term financial obligation for its citizens, Bellevue cannot approve a project without accurate, up-to-date cost data.

Table of Contents

1. Cost of project
 - Original estimates – Columbia Grid
 - Current estimates
 - Estimate needed for Talbot Hill/Lakeside Transmission Line (THLTL)
 - Expenditures to date
2. Cost of project over time – Lifetime Cost Analysis – Jeffrey King
3. Cost of Alternatives
 - PSE original estimates
 - CENSE estimates
4. Who pays for Energy Eastside?
4. Conclusion

1. Cost of Project

Original estimates – Columbia Grid

Columbia Grid is the non-profit corporation whose mission is to improve reliability and efficient use of the transmission grid, perform transmission planning and facilitate the development of solutions related to the operation, use and expansion of the interconnected Northwest transmission system. It lists the project publicly known as Energize Eastside in each of its currently available *Biennial Transmission Grid Expansion Plan* documents: 2009, 2011, 2013, 2015, 2017; and in the three mid-biennium updates: 2010, 2012 and 2016.

The biennial plans indicate some project evolution, and one notable constant. Figures 1A and 1B summarize the data from these reports. Of note, although changes were made in each biennial plan or mid-biennium update, once project cost was estimated at \$65 – 80 million in 2009, it was not updated until 2018, and then only to \$110 million, in spite of the fact that from the first public discussions in 2014, PSE told the public that project cost would be \$150 – 300 million, substantially more than PSE indicates in even the most recent Columbia Grid estimate.

A notable absence from the Columbia Grid planning process is any mention of the newly-truncated 8.78 mile south-end only Talbot Hill/Lakeside Transmission Line (THLTL) Project.

Current estimates

Although PSE still estimates to Columbia Grid that Energize Eastside will cost \$65 – 80 million, on the PSE website the cost estimate has been increased to \$150 – 300 million¹. This figure is repeated in multiple locations². This figure has not changed since 2014, although PSE said, “Once we determine the final design and alignment, we will have a better idea of the total cost.”³ No PSE updates to total cost are available on the Energize Eastside website.

Estimate needed for shorter project: Talbot Hill/Lakeside Transmission Line

Although PSE’s website continues to state that the Energize Eastside project “will build a new substation and upgrade approximately 16 miles of existing transmission lines from Redmond to Renton,”⁴ PSE has stated that they do not know when permit applications will be filed for the northern 7.4 miles⁵, and in fact the project north of the Lakeside Transmission Substation will be for “redundancy only” and that the THLTL can “function independently.”⁶

PSE has not provided any cost estimates for the shorter, 8.78 mile, Talbot Hill/Lakeside Transmission Line project.

Expenditures to date

The Energize Eastside Project has been in the public eye since it was announced in December 2013. Starting in 2014, the public process began to select a final route, develop draft and final Environmental Impact Statement and move towards permitting. As of the end of 2017, PSE reported that they spent \$54,634,345.00⁷ on the Eastside Transmission Project, also known as Energize Eastside. This is the expenditure as reported to the Federal Energy Regulatory Commission (FERC), the agency within the U.S. Department of Energy that, among other responsibilities, administers accounting and financial reporting rules of its jurisdictional companies.

From City of Bellevue Resolution 9297, stating, “Authorizing execution of an amendment to the Professional Services Contract with Environmental Science Associates (ESA) by \$688,595 for a total amount not to exceed \$3,170,335, plus all applicable taxes, to prepare a Final Environmental Impact

¹ PSE. “Who will pay for the project and how much will it cost?” PSE. Access date, December 19, 2018.

<https://energizeeastside.com/faq/who-will-pay-for-the-project-and-how-much-will-it-cost>

² PSE. “General” PSE. Access Date December 19, 2018. <https://energizeeastside.com/Contents/Item/Display/1256>

³ PSE. “Who will pay for the project and how much will it cost?” PSE. Access Date December 19, 2018.

<https://energizeeastside.com/faq/who-will-pay-for-the-project-and-how-much-will-it-cost>

⁴ <https://www.pse.com/pages/pse-projects/energize-eastside-transmission-line-project>

⁵ Email from Keri Pravitz, Community Projects Manager, PSE, to Loretta Lopez, cc: Warren Halvorson, Norm Hansen and Heidi Bedwell August 13, 2018, 7:17pm

⁶ City of Bellevue, Development Services Department, Land Use Division Staff Report File numbers 17-120556-LB and 17-120557-LO, page 111.

⁷ Stephen J. King, Controller and PAO, Puget Sound Energy, Inc. “FERC Financial Report, FERC Form No. 1: Annual Report of Major Electrical Utilities, Licensees and Others and Supplemental Form 3-Q: Quarterly Financial Report” 2017/Q4, submitted 4/18/2018, 216.

Statement (EIS) for PSE's proposed Energize Eastside Project."⁸ We can see the cost for the EIS, which may, or may not, have been included in the \$54,634,345.00 spent by PSE by end of 2017.

It is clear that having spent over \$54 million before permits are issued or any work has commenced, the Energize Eastside cost estimates PSE has provided to Columbia Grid (\$65 – 80 million or \$110 million) are not realistic. This level of expenditure at this stage of the project also raises serious questions about PSE's public cost projections of \$100 - \$300 million. The fact that the project may now be only 54% of its original length, (8.78 miles, not 16 miles) makes the \$54 million pre-permit expenditure even more questionable. And none of these estimates consider the overall cost of the project over time, calculating the 9.8% standard allowable profit (Return on Investment-ROI) discussed in Section 5, and likely to be approved by the Washington Utilities and Transportation Commission (WUTC) once Energize Eastside is built.

⁸ City of Bellevue, Resolution 9297, August 7, 2017. <https://bellevue.municipal.codes/BCC/RT>

Document	2009 PEFA Biennial Plan Transmission ¹	2010 Update ²	2011 Biennial Transmission Expansion Plan ³	2012 Update ⁴
Project Name	North King County Capacity Increase	North King County Capacity Increase	East King County Transformer Capacity	“ “
Description	A 230kV line between Sammamish Substation in North King County to Talbot substation in central King County. The project would involve rebuilding an existing 115kV line to 230kV.	A 230kV line between Sammamish Substation in North King County to Talbot substation in central King County. The project would involve rebuilding an existing 115kV line to 230kV.	This project involves rebuilding the Sammamish-Lakeside-Talbot 115kV line to 230kV and installing a new 230/115kV transformer at Lakeside.	Rebuild the Sammamish-Lakeside-Talbot 115kV lines and energize one at 230kV and install a new 230/115kV transformer at Lakeside
Sponsor	PSE	“ “	“ “	“ “
Parties Impacted	In parallel w/Bonneville & SCL w/impacts to the Westside Northern Intertie	“ “	BPA, SCL, Northern Intertie	“ “
Project Stage	Blank	Conceptual Project for future need	Project Under Study	Project Identified in PSAST (Puget Sound Area Study Team) Expansion Plan
Project Commitment Level	Blank	Blank	Committed	Utilities negotiating cost allocation
Scheduled Completion	2015-2017	“ “	“ “	2016
Cost Estimate	Blank	Blank	\$65-80M	“ “
Project Need/Driver & Other Notes	Increased capacity across the Monroe-Echo Lake cutplane for native load and transmission service.	Increased capacity across the Monroe-Echo Lake cutplane for native load and transmission service.	Additional transformation capacity for east King County to meet load growth.	Load Service, Capacity Increase, Reliability
Changes from Previous Plan	Blank	Blank	Blank	Blank
Type of Project	Existing Obligation Project	“ “	Single System Project, possible impacts	Single System Project
Study Team	Puget Sound Area Study Team	“ “	“ “	“ “

Figure 1A Evolution of Energize Eastside 2009-2012

A summary of the data contained in ColumbiaGrid’s *Biennial Transmission Grid Expansion Plans* and *mid-biennium updates*

¹Columbia Grid, 2009 Biennial Transmission Expansion Plan, (Approved by Columbia Grid Board of Directors, February 18, 2009), 70-71.

²Columbia Grid, 2010 Update to 2009 Biennial Transmission Expansion Plan, (Approved by Columbia Grid Board of Directors, February 17,2010), 62-63

³Columbia Grid, 2011 Biennial Transmission Expansion Plan, (Approved by Columbia Grid Board of Directors, February 16, 2011), 53-54.

⁴Columbia Grid, 2012 Update to 2011 Biennial Transmission Plan, (Approved by Columbia Grid Board of Directors, February 15, 2012), 71-72.

Document	2013 Biennial Transmission Expansion Plan ⁵	2015 Biennial Transmission Expansion Plan ⁶	2016 Update ⁷	2017 Biennial Transmission Expansion Plan ⁸	2018 System Assessment ⁹
Project Name	“ “	Eastside Project: Lakeside 230/115kV Transformer and Sammamish-Lakeside-Talbot Line Rebuilt to 230kV		“ “	“ “
Description	“ “	“ “	“ “	“ “	“ “
Sponsor	“ “	“ “	“ “	“ “	“ “
Parties Impacted	BPA, SCL	“ “	“ “	“ “	not indicated
Project Stage	“ “	“ “	“ “	“ “	not indicated
Project Commitment Level	Utilities have negotiated cost allocation	“ “	“ “	“ “	not indicated
Scheduled Completion	2017	2018	“ “	“ “	2020
Cost Estimate	“ “	“ “	“ “	“ “	\$110M
Project Need/Driver & Other Notes	Load Service, Capacity Increase, Reliability, prevent curtailment of firm transfers	“ “	“ “	“ “	not indicated
Changes from Previous Plan	Blank	Delayed from 2017	Blank	Blank	not indicated
Type of Project	“ “	“ “	“ “	“ “	not indicated
Study Team	“ “	“ “	“ “	“ “	not indicated

Figure 1B Evolution of Energize Eastside 2013-2018

A summary of the data contained in ColumbiaGrid’s *Biennial Transmission Grid Expansion Plans* and *mid-biennium updates*

⁵Columbia Grid, 2013 Biennial Transmission Expansion Plan, (Columbia Grid, February 2013), 83-84.

⁶Columbia Grid, 2015 Biennial Transmission Expansion Plan, (Columbia Grid, February 2015), 83-84.

⁷Columbia Grid, 2016 Update to the 2015 Biennial Plan, (Columbia Grid, February 2016), 79-80.

⁸Columbia Grid, 2017 Biennial Transmission Expansion Plan, (Columbia Grid, undated), 75-76.

⁹Columbia Grid, 2018 System Assessment, (Columbia Grid, September 2018), 50.

2. Cost of Project Over Time – Lifetime Cost Analysis

Puget Sound Energy's website <https://energizeeastside.com/faqs> says the following about the total cost of the project:

“Who will pay for the project and how much will it cost?”

“Regular upgrades or additions to the electric infrastructure are shared by all of PSE’s 1.1 million customers and paid for over time. We don’t yet know the total cost of the project but estimates range from \$150 million to \$300 million”.⁹

CENSE engaged Jeffrey King, a utility financing expert who worked as a Senior Resource Analyst for the Northwest Power Planning Council for nearly 30 years, to analyze the lifetime cost of the project. At the time of his analysis, the above estimates were not available. Mr. King used a placeholder of \$100 million to conduct the MicroFin Levelized Project Revenue Requirements model calculations. Details of this calculation are available in the report “Estimation of the fixed charge rate and revenue requirements for the proposed Energize Eastside transmission project”, February 10, 2016¹⁰.

Mr. King stated that \$100 million “is substantially greater than typical cost for a 230kV project of this size, however the congested nature and environment of the proposed corridor will likely increase construction cost well above typical costs.”¹¹ Mr. King goes on to say, “Once construction cost estimates are available, revenue requirements can be calculated by taking ratios of \$100 million”¹².

Another variable is the length of useful life. PSE estimates that the service life of transmission facilities will range from 45 to 65 years.

Therefore, the total cost of the project to local ratepayers over time ranges from \$579 million to more than \$2.4 billion, depending on the initial total cost and useful life. See Table 1.

⁹ PSE. “Who will pay for the project and how much will it cost?” PSE. Access date, December 19, 2018.

<https://energizeeastside.com/faq/who-will-pay-for-the-project-and-how-much-will-it-cost>

¹⁰ Jeffrey King, “Estimation of the fixed charge rate and revenue requirements for the proposed Energize Eastside transmission project”, February 10, 2016, p. 4-7.

¹¹ Ibid., p.2

¹² Ibid., p.2

Table 1 *Estimated Annual and Lifetime Revenues of Energize Eastside**

CASE	Annual Revenue	Lifetime Revenue
100 MM overnight cost; 45-year useful life	\$12,869,000.00	\$579,105,000.00
100 MM overnight cost; 55-year useful life	\$12,622,000.00	\$694,210,000.00
100 MM overnight cost; 65-year useful life	\$12,505,000.00	\$812,825,000.00
200 MM overnight cost; 45-year useful life	\$25,738,000.00	\$1,158,210,000.00
200 MM overnight cost; 55-year useful life	\$25,244,000.00	\$1,388,420,000.00
200 MM overnight cost; 65-year useful life	\$25,010,000.00	\$1,625,650,000.00
250 MM overnight cost; 45-year useful life	\$32,172,500.00	\$1,447,762,500.00
250 MM overnight cost; 55-year useful life	\$31,555,000.00	\$1,735,525,000.00
250 MM overnight cost; 65-year useful life	\$31,262,500.00	\$2,032,062,500.00
300 MM overnight cost; 45-year useful life	\$38,607,000.00	\$1,737,315,000.00
300 MM overnight cost; 55-year useful life	\$37,866,000.00	\$2,082,630,000.00
300 MM overnight cost; 65-year useful life	\$37,515,000.00	\$2,438,475,000.00

**Revenues based on initial cost of investment.*

If Energize Eastside is built, PSE is virtually assured of receiving WUTC approval for the 9.8% annual return. In public testimony before the Bellevue City Council, Mr. Mark Vasconi, WUTC Director of Regulatory Services, stated that he was unaware of any situation in which the WUTC had questioned a utilities' request for reimbursement of investment¹³.

¹³ City of Bellevue, City Council, Summary Minutes of Study Session, July 7, 2014, p.5.

3. Cost of Alternatives

PSE original estimates

In 2015 PSE contracted for a report entitled, “Eastside System Energy Storage Alternatives Screening Study”, written by Strategen Consulting, LLC. The report concluded, not surprisingly, that based on PSE’s inflated needs-paradigm, all of the studied alternatives either cost far more than PSE’s preferred pole and wire configuration or were limited in scope to eliminating only emergency overload situations, and thus didn’t meet the pre-set requirements. PSE’s low-ball estimates, given the \$54 Million spent to date, exaggerate the cost differences.

Table 2 Energy Storage Configuration Summary¹⁴

Configuration	Power (MWp)	Energy (MWh)	Duration (hours)	Est. Cost (\$MM)	Includes Non-Wires Alternatives ¹¹	Technically Feasible	Meets Requirements
Baseline Normal Overload Reduction	328	2,338	7.1	\$1,030	✓	✗	✓
Alternate #1 Emergency Overload Elimination*	121	226	1.9	\$184	✓	✓	✗
Alternate #2 Normal Overload Elimination	545	5,771	10.6	\$2,367	✓	✗	✓

In 2018, Strategen produced the “Eastside System Energy Storage Alternatives Assessment Report Update – September 2018,” likely to counter mainstream and industry media reports of battery storage costs falling rapidly in recent years. The technical details of the various scenarios will be discussed in the Section 6 of this document. Strategen’s updated cost estimates for battery storage ranged from a low of \$824 Million to a high of \$1.455 Billion intending to make the Energize Eastside look like a good deal at an estimated cost of \$150 – \$300 Million.

As PSE has now substantially changed the scope of the project to the 8.78 miles between Talbot Hill and Lakeside Substations any cost estimates previously made for alternatives are meaningless. A new analysis and cost estimate are necessary to make an informed decision.

¹⁴ Mark Higgins, Jim Eyer, Randy Fish, Strategen Consulting, LLC. “Eastside System Energy Storage Alternatives Screening Study” 2015, 20. http://www.energizeeastsideeis.org/uploads/4/7/3/1/47314045/eastside_system_energy_storage_alternatives_screening_study_march_2015.pdf

CENSE estimates: alternatives costs decreasing

The technical possibilities for alternative solutions are presented in CENSE consultant EQL's report in Section 6 of this document. We do know that costs for alternatives such as battery storage, demand response and smart grid solutions are decreasing.¹⁵ There are many additional sources in the Appendices to document this trend. In fact, a major planned transmission line between NW Oregon and SW Washington was canceled in 2017, in favor of "non-wire alternatives, grid management, and energy storage"¹⁶, to quote BPA Administrator and CEO Elliot Mainzer, "embracing a more flexible, scalable, and economically and operationally efficient approach."¹⁷

Comparing the cost for alternatives is now impossible, because PSE has moved the goalposts in anticipating a much smaller project, the 8.78-mile Talbot Hill/Lakeside Transmission Line. Not only do we not have a cost estimate for the shorter project, we have no analysis of or cost estimates for any possible alternatives.

4. Who Pays for Energize Eastside?

The simple answer is: The costs will be "shared" by all of PSE's 1.1 million customers¹⁸, and paid for over time, as we have seen in Jeffrey King's analysis above.

PSE's shifting explanations are documented by Russell Borgmann in his paper, "Who Pays for Energize Eastside?"¹⁹:

1. "<From PSE's website from 2014 until August 2016> *"Who will pay for Energize Eastside and how much will it cost? Upgrades or additions to the electric infrastructure are shared by all of PSE's 1.1 million customers and paid for over time. We don't yet know the total cost of the project, but estimates range from \$150 million to \$300 million. **We expect approximately \$1 to \$2 of the average monthly bill for residential customers will go towards paying for Energize Eastside.**"*
2. <From PSE's website from 2014 until August 2016> *"Once we determine the final design and alignment, we will have a better idea of the total cost."*
3. <From PSE's website, changed in August 2016> *"Who will pay for Energize Eastside and how much will it cost? Regular upgrades or additions to the electric infrastructure are shared by all of*

¹⁵ Bloomberg NEF, Tumbling Costs for Wind, Solar, Batteries Are Squeezing Fossil Fuels, <https://about.bnef.com/blog/tumbling-costs-wind-solar-batteries-squeezing-fossil-fuels/>, March 28, 2018.

¹⁶ Robert Walton, Utility Dive, "BPA turns to non-wire alternatives in cancellation of transmission project", <https://www.utilitydive.com/news/bpa-turns-to-non-wire-alternatives-in-cancellation-of-transmission-project/443125/>, May 19, 2017.

¹⁷ Ibid.

¹⁸ <https://energizeeastside.com/faq/who-will-pay-for-the-project-and-how-much-will-it-cost> screenshot 1-5-18.

¹⁹ Borgmann, Russell, "Who Pays for Energize Eastside?" March, 2018

PSE's 1.1 million customers and paid for over time. We don't yet know the total cost of the project, but estimates range from \$150 million to \$300 million. Once we determine the final design and alignment, we will have a better idea of the total cost. **We don't expect customers will see any changes in their monthly bill to pay for this project.**"

<https://energizeeastside.com/faqs> (screenshots exist of PSE's older website pages)

4. <From PSE's recent Energize Eastside flyer received in the mail, 8/11/2017> "How will Energize Eastside affect rates? **Customers will not see an increase in their monthly bill as a direct result of Energize Eastside.** That's because PSE's annual capital budget, which funds infrastructure upgrades is **already included in customer rates.**"
5. <From PSE's Docket Nos. ER12-778-000 and EL12-46-000, dated February 14, 2013> "3. Cost of Capital/Return on Equity: The Settlement describes the Parties' agreement that PSE shall be entitled to earn a return on equity ("ROE") of 9.8% on its transmission rate base, **except that with respect to those transmission facilities identified in the Memorandum of Agreement between BPA, PSE, and Seattle City Light** (BPA Contract No. 11TX-15450) dated January 31, 2012 ("PSANI Facilities"), **PSE shall be entitled to an ROE of 10.3%.** The ROE provisions of the Settlement **reflect a downward negotiation from the 10.6% ROE originally requested by PSE in its January 6 Filing.** The higher equity return for the PSANI Facilities is reflected in Attachment 7 of the Formula Rate Template attached to the Settlement as Exhibit A. The Settlement also provides that the equity component of PSE's capital structure will be capped at 50%."
http://www.oatioasis.com/PSEI/PSEIdocs/Formula_Rate_Settlement_Package.pdf
6. <From communications with the WA Assistant Attorney General, Public Counsel Unit Chief, dated September 20, 2017> "...The Utilities and Transportation commission does not pre-approve utility projects – in other words, **ratepayers do not pre-pay for projects.** Utilities must first make the investment, seek rate recovery, prove prudence, then ratepayers pay for the project. It is my understanding that Energize Eastside is still in the planning phase and has not yet been built....If the transmission project is built and determined prudent, the amount invested will be included in rates and all customers will pay for it in rates....In many respects **we are a reactionary party** – we react to proposals brought before the Commission by the utilities."²⁰

Mr. Borgmann further explains there are many unanswered questions about by whom, how and when Energize Eastside will be paid for:

7. <From the August 2017 mailing from PSE> PSE is leading customers to believe that their rates will not increase. In fact, their statements lead ratepayers to believe they are already paying for Energize Eastside. (see #3: "...already included in customer rates...")

²⁰ Ibid.

Statement #4 sounds like PSE may have already pre-negotiated a ROE on Energize Eastside of 10.3% as far back as 2013. The Memorandum of Agreement (MOA) between BPA, PSE, and Seattle City Light discusses Energize Eastside (nee: Sammamish to Lakeside to Talbot Rebuild Project and Lakeside 230 kV Transformer Addition Project).

http://www.energizeeastsideeis.org/uploads/4/7/3/1/47314045/2015-06-01_moa_with_bpa-seattlecitylight-pse.pdf

Are ratepayers already paying for Energize Eastside when the final EIS was just issued in March 2018? Are ratepayers already paying for Energize Eastside when the City of Bellevue (lead SEPA agency) has not yet issued permits? Are ratepayers already paying for Energize Eastside when PSE has not yet applied for permits on the Northern Segment (Lakeside substation north to Redmond)? Are customers paying for a project that has not yet gone through a prudency review by the WUTC?²¹

And the biggest question of all: Why does PSE find it necessary to offer many different and misleading answers to a very simple question: Who will pay for Energize Eastside?

Again, the answer is simple. The people of King County, 1.1 million ratepayers will pay. The cost will be hidden away, it may not be noticed, but it will be paid.

5. Conclusion

The estimated costs of Energize Eastside as presented to Columbia Grid even as recently as 2018 are outdated, vastly understated and do not match what PSE is telling the public and the city councils being asked to approve this project. As of December, 2017, PSE has spent over \$54 million on Energize Eastside. The total cost of Energize Eastside may well exceed PSE's high-end estimate of \$300 million, made over 4 years ago. A promised update on costs has not been forthcoming. PSE has, over time, given different and misleading answers about who will pay for the project. Now, on the eve of permitting, PSE is anticipating a much smaller project. PSE should be required to provide updated information on both expenditures to date and a cost estimate for the shorter, 8.78-mile Talbot Hill/Lakeside Transmission line project, including the proposed Richards Road Substation. A permit should not be granted and citizens should not be obligated to pay for a project for which no one knows the price tag.

²¹ Ibid.