

Non-Wire Alternatives to Energize Eastside

submitted by

EQL Energy
3701 SE Milwaukie Ave, Suite A
Portland, OR 97202
March 20, 2019



Report author:
Ken Nichols, Principal, EQL Energy LLC

EQL Energy is an energy and utility consultancy that assists utilities, government agencies, and large customers with planning, developing and implementing programs in grid modernization, demand side resources, and distributed renewables, including non-wire alternative analysis.

Ken Nichols is Principal with EQL Energy. EQL's business address is 1001 SE Division St. Suite 5, Portland, OR 97202.

EQL Report for Bellevue Land Use Hearing on PSE's Energize Eastside

For Bellevue Land Use Hearing on Puget Sound Energy's application for a Conditional Use Permit ("CUP") to construct and operate the Richards Creek substation and 3.3 miles of 230 kV transmission line located in the City of Bellevue ("City"), Washington. The Talbot Hill/Lakeside Transmission Line Project

Abstract

Through increased investments in demand side resources, storage and modern power flow control and transmission technology PSE could avoid future Eastside transmission deficiencies, address NERC reliability criteria, and meet customer objectives for power reliability, clean energy, and low cost. These technologies would also avoid the higher expense and environmental damage that PSE's proposed higher-voltage transmission lines would cause.

Bellevue and the surrounding areas are seen as leaders in technology development, while Puget Sound area sees itself as a leader in clean energy. In contrast, Energize Eastside is an example of a project that might have made sense three decades ago, and an opaque planning process considered antiquated in today's energy systems planning processes. From City of Bellevue's 2015 Comprehensive Plan "Bellevue encourages new technology that improves utility services and reliability while balancing health and safety, economic, aesthetics, and environmental factors."

PSE asserts in their application that upgrading 8.8 miles 115kV line from Talbott Hill substation to a new 230kV substation ("THLTL" or "Project") is needed to meet their NERC reliability requirements and Eastside power demand starting in 2018.

EQL asserts that PSE has not met the decision criteria in Bellevue's Land Use Code decision criteria for LUC 20.20.255.E. 1, 3, 4 and 5.

Table of Contents

1. The Project is not consistent with PSE’s System Plan LUC 20.20.255.E.1	5
2. PSE has not demonstrated Operational Need LUC 20.20.255.E.3	6
3. PSE failed to demonstrate how a non-wire alternative improves customer and system reliability better than the proposed alternative LUC 20.20.255.E.4	8
4. PSE has failed to perform Alternative Analysis that considered all technologies to meet the system needs LUC 20.20.255.E.5 and LUC 20.20.255.D.3	9
5. Appendix A: Non-Wire Alternatives	
6. Appendix B: Resume	

1. The Project is not consistent with PSE's System Plan LUC 20.20.255.E.1

In 2018, the Washington Utilities and Transportation Commission (WUTC) Acknowledgment IRP commented on PSE's Energize Eastside project by saying PSE had "complied with state law by providing a history of its Needs Assessment Reports. However, the Plan did not answer many questions that are needed for determining if the Company's (PSE) conclusions are justified. The WUTC letter goes on to say: "PSE would not discuss these [Energize Eastside] studies in the advisory group, and therefore left unresolved some basic questions about the studies' assumptions, methodologies, and conclusions. For example, the Plan does not include a narrative regarding:

1. The effect of the power flows due to entitlement returns on the need for the Energize Eastside Project.
2. The reason for, and effect on the need for the Energize Eastside Project, of modeling zero output from five of PSE's Westside thermal generation facilities.
3. PSE's choice not to provide modeling data to stakeholders with Critical Energy Infrastructure Information clearance from FERC.
4. Resolution of the effect of lower load assumptions on the need for Energize Eastside Project.

"The IRP process is specifically structured to allow public discussion and inquiry, including a thorough examination of the analysis supporting a conclusion of need. This is an area in which we [WUTC] would like to see more engagement from the Company." WUTC 201

WUTC began a rulemaking proceeding (UE-161024) in 2016, where transmission and distribution planning and investments must undergo similar scrutiny as new generation investments, which includes determination of need and RFPs.

2. PSE has not demonstrated Operational Need LUC 20.20.255.E.3

The City of Bellevue (“City”) does not know the peak loads of Eastside substations that serve the City. PSE has this data, provided it to the City in 2006, and has chosen not to provide throughout the permitting process. In 2006, PSE provided City of Bellevue with 2005 Peak Load data and an exaggerated PSE forecast. PSE has not responded to requests by city staff, and stakeholders for historical and current data documenting Eastside substation peak loads.

Table 1 - Substation Peak Loads

Substation Name	2005 Peak Load	2020 Projected Peak Load
	MW	MW
Ardmore	-	20
Bridle Trails	25.7	32.4
Center	24.7	49.3
Clyde Hill	23.4	38.3
College	20.2	21.8
Eastgate	32	27.1
Evergreen	54.1	57.6
Factoria	28.9	33.8
Houghton	22.8	19.9
Kenilworth	24.6	25.3
Lake Hills	22.4	22.6
Lochleven	19.2	41.1
Midlakes	20.7	22.9
North Bellevue	43.9	48.2
Northrup	26.5	37.5
Phantom Lake	19.3	21
South Bellevue	22.8	24.3
Somerset	18.3	19.6
Totals	449.5	562.7

*Bellevue substation load provided by PSE in City of Bellevue
Comprehensive Plan Utilities Element Update, November 2006²*

² City of Bellevue Comprehensive Plan Utilities Element Update, November 2006
http://www.ci.bellevue.wa.us/pdf/PCD/PSE_System_Plan_Update_November_2006.pdf
(accessed 06.08.2015)

The 2020 forecast PSE provided in 2006 is greatly exaggerated given that **PSE’s actual annual growth rate for peak load was 0.8% from 2006 to 2014.** (See next section study on PSE load forecasting errors). Using actual peak load growth suggests 2020 load would be 506MW, not 563MW.

PSE has a documented 15-year history of exaggerating load forecasts to justify capital projects and has exaggerated load forecasts to justify THLTL.

Since 2003, PSE has provided inflated load forecasts as part of their state-mandated IRP process. This was documented in a report by Department of Energy³, as well as various stakeholders in IRP hearings at WUTC. Between 2006 and 2014 average load forecast PSE used was 1.75% Average Annual Growth Rate (AAGR), while the actual AAGR during that time frame decreased by 0.19% per year.

Table 2 - Projected vs Actual PSE Average Annual Growth Rate (AAGR)

Period	PSE-Projected AAGR	Actual AAGR
2006-2014	1.75%	-0.19%
2012-2014	1.90%	-1.19%

PSE Load Average Annual Growth Rates, Forecasted and Actual

Comparison of PSE Load Forecasts vs Actual Load Growth 2005 to 2011

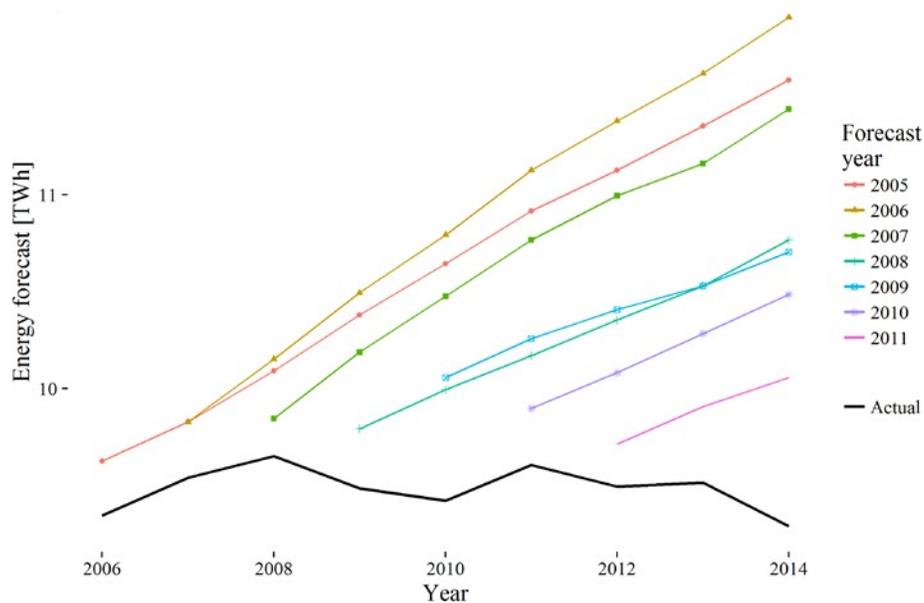


Figure 3: PSE’s peak load growth during this time frame grew at an Average Annual Growth Rate (AAGR) of 0.8%

³ <http://eta-publications.lbl.gov/sites/default/files/lbnl-1006395.pdf>

The PSE 2014 screening report exaggerates the PSE actual peak load and the growth estimate. The growth estimate is:

- 17.6 times larger than Seattle City Light's (SCL) 2017 peak load forecast,
- 9 times larger than PSE's own 2017 IRP forecast.

Throughout the Energize Eastside permitting process, PSE's inflated forecasts for peak loads have led to inappropriate modeling, analysis, and conclusions.

PSE's choice to proceed with only the southern segment suggests that peak loads on the Lakeside substation have been increasing to a point of concern. The City of Bellevue does not have independently verified historic load data at Lakeside Substation or any of the substations in the City.

Without real and verified load data it is clear that PSE has not demonstrated operational need.

3. PSE failed to demonstrate how a non-wire alternative improves customer and system reliability better than the proposed alternative

LUC 20.20.255.E.4

1. North American Distributed Energy Resources (DERs) contribute over 50,000 MW to power system reliability and participate in power system operations.
2. US Supreme court ruling in 2015 allows demand response to participate in wholesale power market operations in order to reduce price and improve reliability.⁴
3. The Federal Energy Regulatory Commission (FERC) in Feb. 2108 issued an order that transmission operators must allow electricity storage to participate in energy, capacity, and ancillary service markets which provide system reliability.⁵
4. NERC interpretation of regional Reliability Standard BAL-002-WECC-2 states that non-traditional resources, including electric storage resources are capable of meeting the operating reserves-spinning requirement of the regional standard.⁶

⁴ <https://www.ferc.gov/media/statements-speeches/bay/2016/01-25-16-SupremeCourt.pdf?csrt=14053913403996174958>

⁵ <https://www.ferc.gov/whats-new/comm-meet/2018/021518/E-1.pdf>

⁶ Ibid., p 82.

5. PSE reliability issues are related to operational errors and equipment outages. PSE received two NERC compliance penalties in 2013 that found that transmission operators failed to respond timely and correctly to a line outage, which caused an exceedance of System Operating Limit on a 115kV line in Whatcom county.⁷
 - a. TOP-004-2 R1 Transmission Operations
 - b. TOP-008-1 R1 Response to Transmission Limit Violations.
6. PGE operates a dispatchable standby generation program that has over 100MW of backup generators that can be called to provide grid and system reliability support. PSE service territory has over 500MW of backup generators which could be used for grid reliability. PGE controls 2,400 hot water heaters to address peak loads. PGE has proposed a 20 MW battery to be used at a 115kV substation.

4. PSE has failed to perform Alternative Analysis that considered all technologies to meet the system needs LUC 20.20.255.E.5 and LUC 20.20.255.D.3

In 2015, EQL submitted an Economic Study Request to Puget Sound Energy's Transmission group, (Grow Eastside Smart Transmission Project Local Economic Study Request)⁸ The study request was essentially a request to study an alternative to THLTL. The study request would address performance criteria listed in the 2015 Supplemental Eastside Solutions Study Report, and would be an alternative to PSE's THL TL.⁹ PSE refused to perform the study saying that:

"The EQL Requests Would Be Unnecessary in light of the Energize Eastside Project"

The study included the following technologies and alternatives. These technologies were never considered, nor were they properly addressed in PSE's application.

1. installation of new 230/115 kV transformers at Lake Tradition (looping in to BPA 230kV line) and/or at Talbot Hill as needed. One of these may not be needed for several years,
2. Installation of Flexible AC transmission system (FACTS) control devices on all 115kV transmission lines serving Eastside load that are affected by all Corrective Action Plans (CAPs) that PSE implements during periods of high flows.

⁷ https://www.nerc.com/pa/comp/CE/Enforcement%20Actions%20DL/FinalFiled_NOP_NOC-2174.pdf

⁸ http://www.oatioasis.com/PSEI/PSEIdocs/Oct_31_PSET_Economic_Study_Request_from_EQL.PDF

⁹ http://www.energizeeastsideeis.org/uploads/4/7/3/1/47314045/supplemental_solutions_study_redacted_final_may2015.pdf

3. Increased investment in Distributed Energy Resources (DERs), e.g., energy efficiency, distributed generation, demand response, and storage in affected Eastside areas.

Utilities across the country issue RFPs or procure resources to avoid or defer building transmission line projects like THLTL. PSE could provide a non-wire alternative (NWA) to THLTL that would not require an upgrade of the transmission line from 115kV to 230kV.

In the US there are over 133 examples of utilities and projects implementing NWA programs to avoid or defer transmission and distribution investments. Example RFPs include:

- Open RFIs and RFPs at REV Connect¹⁰
- Joint Utilities of New York – Utility-specific Non-Wires Alternatives Opportunities¹¹

Since the 1990s utilities across the United States have avoided the need for over 1,000MW of transmission investments through RFPs and procurement of cost-effective distributed energy resources and non-wire alternatives. In the last 5 years, over 1,900MW of NWAs have been evaluated and/or implemented.¹²

1. APS recently announced 850 MW of energy storage on their system. One of the projects is replacing a proposed 20-mile transmission line.¹³ These projects were procured through RFPs.
2. In the US, 10 million customers participate in demand response programs that yield an average peak reduction of 6%. PSE has zero customers in demand response programs with 0% peak reduction. 6% of PSE's peak load would be 300MW.
3. In February 2018 the Federal Energy Regulatory Commission issued an order that utility transmission operators must allow electricity storage to participate in energy, capacity, and ancillary service markets.¹⁴

Cost-effective investments in energy efficiency, demand response, storage, and other distributed energy resources, would alleviate any need to build the proposed transmission line, and would improve power service reliability to customers.

1. PSE issued an RFP in 2018 for general system resources including DERs. These resources unfortunately will not be evaluated to address peak load growth in the Eastside and address the operational need PSE says they have on the Eastside.
2. RFP responses included over 200MW of battery storage and 40MW of demand response.¹⁵ I know several vendors that did not provide responses for Demand Response because PSE has been doing DR RFPs since 2010 and has never invested in these capacity reducing programs.

¹⁰ <https://nyrevconnect.com/open-rfis-rfps/>

¹¹ <https://jointutilitiesofny.org/home/>

¹² <https://sepapower.org/resource/non-wires-alternatives-case-studies-from-leading-u-s-projects/>

¹³ <https://www.greentechmedia.com/articles/read/aps-battery-storage-solar-2025#gs.8PMnrfxI>
<https://www.utilitydive.com/news/aps-to-deploy-8-mwh-of-battery-storage-to-defer-transmission-investment/448965/>

¹⁴ <https://www.ferc.gov/whats-new/comm-meet/2018/021518/E-1.pdf>

¹⁵ <https://www.pse.com/pages/energy-supply/acquiring-energy>

3. PGE has proposed a 20MW battery to be used at a 115kV substation on its system called Coffee Creek.

Since proposing Energize Eastside in 2015, PSE has reduced its investment in energy efficiency and has not pursued any DER investments that provides capacity reductions on their eastside system. These actions also do not support City of Bellevue Utilities¹⁶ policy UT-91 to encourage public to conserve energy.

1. Since 2017 PSE has annually reduced its Energy Efficiency budget from \$103MM in 2017 to \$83MM for 2019.¹⁷
2. PSE, as a board member of the Northwest Energy Efficiency Alliance, has been a vocal opponent of increasing investment in energy efficiency and demand response market transformation.
3. PSE participated in the Glacier 2MW battery storage demonstration project to provide improved service to community of Glacier. Unfortunately, they did not outsource the project, and PSE's energy management system has not performed well. In fact, it failed to discharge during a line outage over Thanksgiving 2017. The reasons for failure are related to PSE's lack of expertise in battery management systems.

¹⁶ https://bellevuewa.gov/UserFiles/Servers/Server_4779004/File/pdf/PCD/07_Utilities_FINAL_20150807.pdf

¹⁷ <https://www.utc.wa.gov/regulatedIndustries/utilities/energy/Pages/CompanyProgramPlansandTargets.aspx>