



PSE PUGET SOUND ENERGY

energize**EASTSIDE**



# **Eastside Needs Assessment Report Transmission System King County Executive Summary December 2013**

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## RESPONSIBILITY TO ACT, ACTING RESPONSIBLY

Major growth in the Eastside region is outstripping the capacity for Puget Sound Energy (PSE) to deliver reliable sources of electricity to the region.

PSE must address escalating electricity use and an electric transmission system that needs more capacity. As electricity use increases, PSE has a legal and moral responsibility to provide its customers with a reliable source of energy.

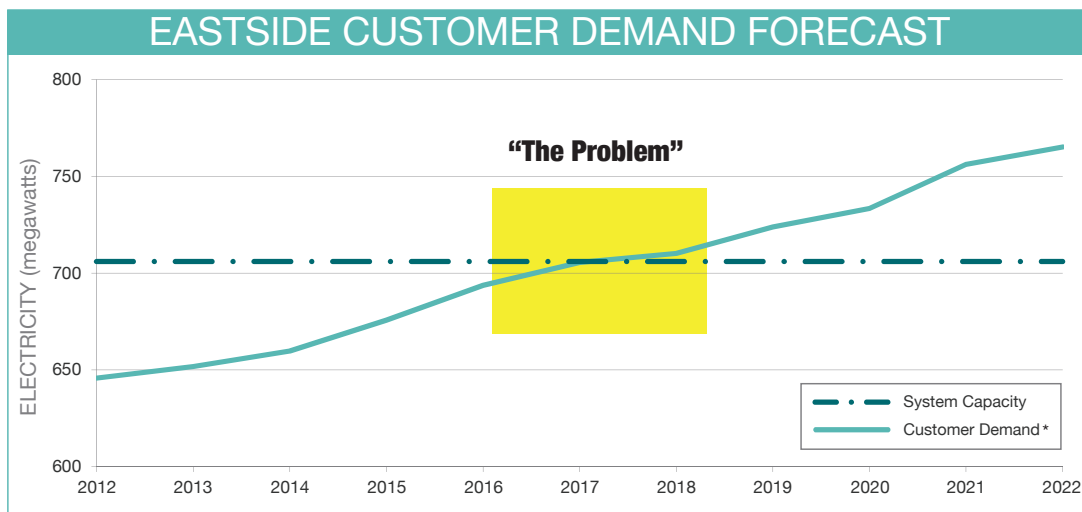
## VERIFYING THE NEED TO ACT

To verify that the need is real, PSE commissioned a six month “Eastside Needs Assessment” by the Quanta Technology engineering firm. This independent needs assessment reviewed population trends, electric load growth, economic development patterns, conservation programs, energy efficiency improvements, and other key trends.

Studies demonstrated that different parts of the transmission system will not meet mandatory reliability requirements. The studies indicated that transmission lines will overload or are **close to overloading** starting in 2017, shown in the graph below.

### Energize Eastside . . .

- ✓ will upgrade approximately 18 miles of electric transmission lines from Renton to Redmond
- ✓ will ensure Eastside’s power system can continue to support the area’s growth
- ✓ route identification will occur throughout 2014 with construction starting in 2017
- ✓ wants to hear from you!  
Visit us at:  
[www.pse.com/energizeeastside](http://www.pse.com/energizeeastside)



\*Customer Demand assumes 100% of conservation goals are set.

This chart shows customer demand with 100% conservation goals met compared to our current electric transmission system’s capacity. By 2017-2018, demand will exceed our ability to provide dependable power.

### The needs assessment study concluded:

- PSE is facing a **power supply problem** on the eastside of Lake Washington.
- In King County, electric generation covers less than 10% of the peak load, therefore the county area is quite **dependent on electric transmission**.
- Overloads of Talbot Hill and Sammamish **transformers**, as well as several 115 kiloVolt (kV) lines, point to the need for a new power supply to support the Eastside area.
- Continuing load growth in the Eastside area would increase the **overload problems** being shown in the first 5 years of the study.
- Detailed analysis shows that the dramatic **increase in conservation anticipated by PSE**, even if attainable, would not be adequate to address the problem.

## THE STUDY

### Assumptions

The following key assumptions were adopted to more fully understand the potential reliability impacts:

- The study horizon selected was the 10-year period from 2012 to 2022.
- System load levels used the PSE corporate forecast published in June 2012.
- Area electricity use forecasts were adjusted by substation to account for expected community developments as identified by PSE customer relations and distribution planning staff.
- Generation usage reflected reasonably stressed conditions to account for generation outages as well as expected power transfers from PSE to its interconnected neighbors.
- Winter electricity transfers between the USA and Canada were assumed to be 1,500 megawatts (MWs) flowing from the USA to Canada.
- Summer electricity transfers between the USA and Canada were assumed to be 2,850 MWs flowing from Canada to the USA.

OUTAGE RISK



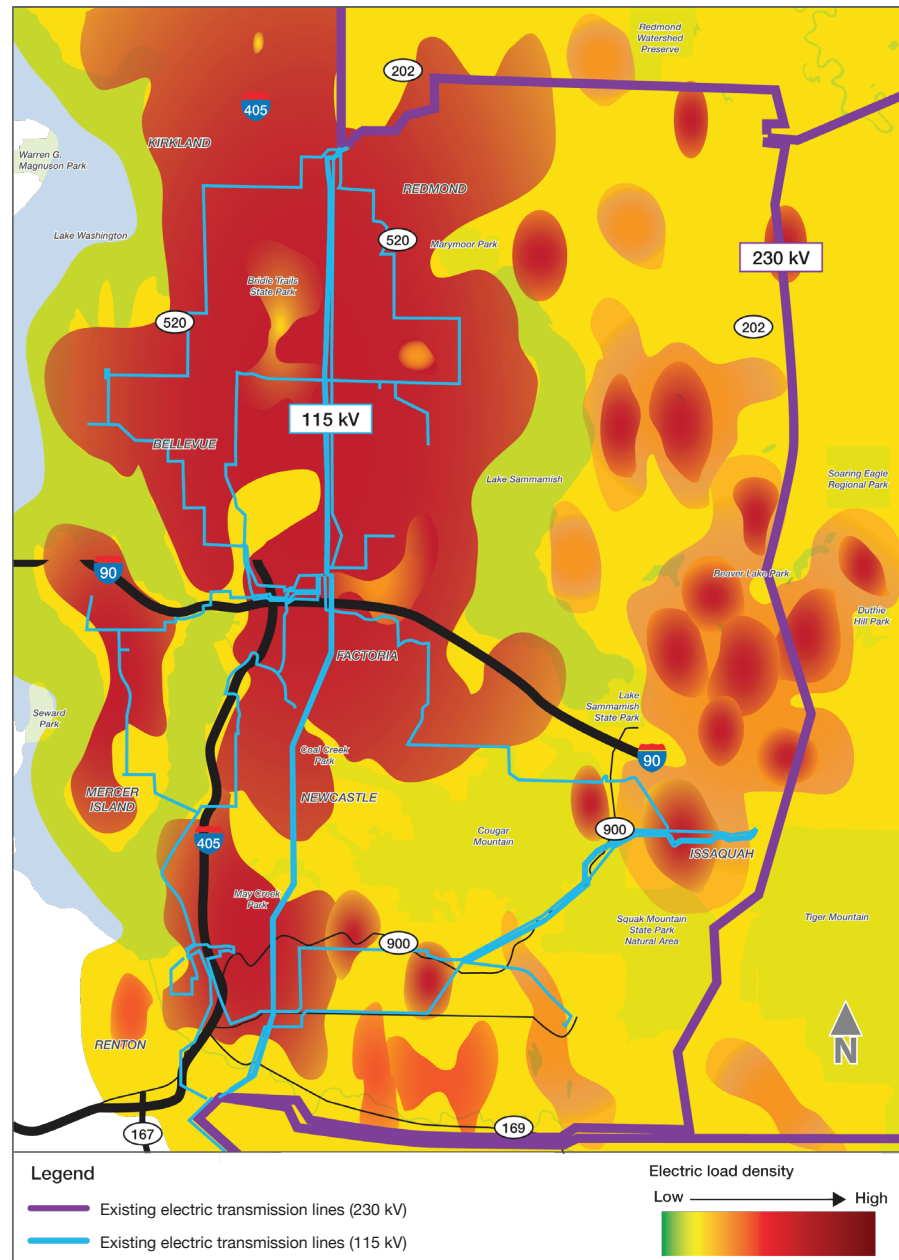
If the transmission supply is not addressed and electric load continues to grow, over **60,000 customers** will be at risk from resulting outages.



## CAPACITY: OVERLOADED SYSTEM

Studies reveal that different parts of the transmission system will overload, or will be close to overloading, within a 10-year study period:

- When regional power flows are south to north, as is typical in the winter, there are potential overloads in the Talbot Hill substation area, on both transformers and transmission lines.
- When the regional power flows are north to south, as is typical in the summer, there are potential overloads in the Sammamish substation area.
- In each case, it is the need to provide power to PSE communities on the east side of Lake Washington that is stressing the local power system.



## PSE determined “Need” for this project by:

- Evaluating past, current and projected community electricity use
- Examining vulnerable points in our electrical system’s reliability
- Examining corridor plans for residential, commercial and industrial development that will require more electricity to be supplied by PSE
- Considering the beneficial impacts of energy efficiency measures that have been mandated by federal, state and local governments and which have been adopted by PSE and the community (i.e., how conservation helps reduce load on the system)

## NEED ASSESSMENT - OVERVIEW

PSE performs an annual comprehensive electric reliability assessment to determine if there are any potential adverse impacts relating to the delivery of electricity on the PSE transmission system. This review is a requirement by the North American Electric Reliability Corporation (NERC) and is part of the mandatory NERC Compliance Enforcement Program.

During the 2009 comprehensive reliability assessment, PSE identified a potential transmission reliability supply issue (overloading) due to the loss of one of the Talbot Hill autotransformers. Currently, PSE configures its system to minimize this overload. However, as the load grows, this action puts more customers at risk for loss of service for certain contingencies on the PSE system.

The time has arrived where it is necessary to expand our transmission system to support this unprecedented demand and ensure an uninterrupted flow of electricity to our homes, our communities and our businesses.

To assess area electric supply needs, comprehensive reliability analyses also were performed to determine the present and future electric transmission supply needs to this economically vibrant portion of King County and the Columbia Grid area.

In early 2013, PSE performed an updated analysis to evaluate if this potential overload would still exist with updated load forecasts. This “Eastside Needs Assessment” 2013, which was performed consistent with the mandatory NERC Transmission Planning (TPL) annual comprehensive analysis, determined the electrical loads have increased as **the Eastside area has grown and the electric transmission system will become increasingly constrained over the next ten years.**

PSE electric system simulations were created to provide a clear understanding of the specific location of the possible overload and identify its cause.

The 2013 Eastside Needs Assessment also reviewed the near and long-term summer simulations developed for the 2012 TPL standard requirements. For the TPL report, cases had been developed for heavy summer of 2014 and 2018 using the 2012 Western Electricity Coordinating Council (WECC) series

What we found was the Eastside transmission system needs a major capacity addition to support growth expected in the very near term.

base cases. **The assessment found that the Eastside transmission system had too little capacity to support expected growth in the region in the very near future.**

These cases were

set up to account for normal summer weather with 100% of the forecasted level of conservation and were updated with the current PSE system configuration and load information.

The analysis covered PSE facilities that are part of the Bulk Electric System (BES) and the interconnected system covered by WECC. **BES facilities were studied** in accordance with the latest approved versions of the mandatory NERC Reliability Standards and the WECC Reliability Standards and **determined the regional transmission was inadequate to reliably support growth expected in even the near term.**

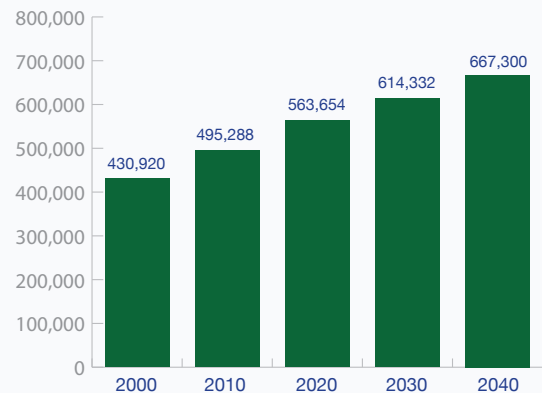
These standards set forth the specific methods to study the performance of the transmission system – 100 kV and above – and govern how that system is planned, operated and maintained.

PSE also issued Transmission Planning Guidelines that describe how to plan and operate PSE's electric transmission system in addition to the mandatory reliability standards. These guidelines are in place to encourage the optimal use of the transmission system for service to loads and generators while staying within the mandatory standards.

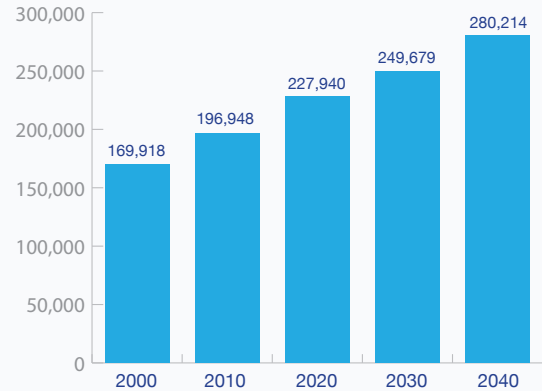
#### Keeping Up with Eastside's Boom

Eastside has exploded with downtown workers and residents, promoting a high-rise construction boom and now concerns about the city's livability.

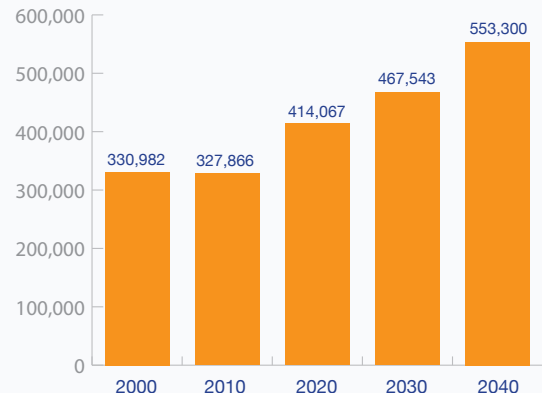
##### TOTAL POPULATION



##### TOTAL HOUSEHOLDS



##### TOTAL EMPLOYMENT



Source: Puget Sound Regional Council-2013 Land Use Baseline Report

**GROWTH IS STRAINING THE EXISTING SYSTEM**

Over the last 30 years, the greater Seattle area has been a major driver of economic growth in the United States and the Eastside region of Puget Sound. PSE has helped power that growth.

This area supports major international businesses such as Boeing, Microsoft, Amazon, Starbucks, and many others. It offers world-class medical facilities and a strong manufacturing base. The economic development fueled by these and many other companies has resulted in this portion of PSE’s service territory growing exponentially over the past 10 years.

Past investment in the PSE transmission system has maintained reliable service to support these businesses and allowed for increased commercial and residential expansion in the area. Because of the economic vitality of the Eastside region, PSE sees substantial growth in the use of the electricity on its system in general and in the Eastside region in particular.

**CONSERVATION HELPS...BUT DOES NOT SOLVE THE PROBLEM**

PSE has adopted the most stringent conservations method available and investigated all options to serve this expected increase in electrical energy. We have factored in improvements in energy efficiency. These options, however, are not sufficient in and of themselves to satisfy the anticipated need.

**INVOLVING YOU**

PSE has determined it must upgrade its regional transmission system and will engage residents, customers and community leaders in exploring where those upgrades should occur and what limitations may exist.

- ☒ Growth is straining our region’s existing transmission system
- ☒ Conservation alone is not enough to meet the challenge.
- ☒ We need to act now
- ☒ Upgrades will power the Eastside’s growth into the future
- ☒ We will work with the community to identify solutions to ensure dependable power for businesses and families