2.4 ALTERNATIVES CONSIDERED BUT NOT INCLUDED

The following alternatives were identified through scoping but are not included for analysis in the Phase 1 Draft EIS for reasons explained below.

2.4.1 Use Existing BPA High-Power Transmission Line

Using the existing BPA line east of Lake Sammamish instead of installing a new 230 kV line in the Eastside is not being included in the Phase 1 Draft EIS because this source is outside the area that PSE has identified as being in need of more electrical power. To connect this source to the deficiency area would require new 115 kV line construction to marginally support the area. PSE considered several scenarios examining this potential solution. These included the following:

- Tapping the BPA Maple Valley – Sammamish 230 kV line and the SCL SnoKing – Maple Valley 230 kV line, and looping a new 230–115 kV Lakeside substation between the tapped lines.
- Using the 230 kV BPA Maple Valley – Sammamish Line to loop into Lake Tradition and installing a new 230–115 kV transformer at Lake Tradition to serve 115 kV load. The solution also included re-conductoring the SCL Maple Valley – SnoKing 230 kV with high-temperature conductors.
- Adding a 230–115 kV transformer at Lake Tradition and looping in BPA Maple Valley –Sammamish 230 kV line. Adding a third 230–115 kV transformer at Sammamish substation and assuming no new 115 kV lines are added to either substation.
- Adding a 230–115 kV transformer at Lake Tradition, looping in BPA Maple Valley – Sammamish 230 kV line, and adding a third 230–115 kV transformer at Talbot Hill substation. It was assumed that no new 115 kV lines were added to either substation.
- Adding a 230–115 kV transformer at Lake Tradition, looping in BPA Maple Valley – Sammamish 230 kV line, and adding a third 230–115 kV transformer at Sammamish substation. This assumed new 115 kV lines would be constructed to both substations.
- Adding a 230–115 kV transformer at Lake Tradition and looping in BPA Maple Valley –Sammamish 230 kV line, and adding a third 230–115 kV transformer at Talbot Hill substation. This assumed new 115 kV lines would be constructed to both substations.

All of these solutions were found to overload either transmission lines or transformers and therefore would not address all relevant PSE equipment violations (electrical criterion #13). See *Eastside Transmission Solutions Report*, October 2013 (updated February 2014), Tables 4.1 and 4.2, and Sections 4.6.3, 4.6.6, 4.6.8, 5.1.1, and 5.1.2 for more information (Gentile et al., 2014).

2.4.2 Upgrade/Adjust Existing Electrical System

Several changes and adjustments to the electrical transmission system were proposed as potential solutions. Several related to discontinuing the flow of electricity through the

Eastside to Canada during some peak demand periods. These were described in comments received during scoping regarding renegotiation of the Columbia River Treaty (which relates to river flows and electrical supply across the U.S. - Canada border), diverting power flowing from the south toward Canada to other transmission lines, or simply cutting off power flow to Canada altogether. Disconnecting the system from the region or not providing power to the rest of the region during peak periods is not included as an alternative because it was not considered viable for the following reasons:

- PSE has statutory and regulatory obligations that require being interconnected to the electric grid and that cannot be violated without penalties. Those obligations are with the FERC, NERC, WECC, ColumbiaGrid, and UTC (electrical criterion #1).
- This solution would also compromise PSE's ability to supply power and maintain reliability in an efficient and cost-effective manner; the generation that is owned and contracted for by PSE is generally outside PSE's service area and requires transmission lines to transport that power to PSE's service area. The diversity of the generation mixture provides security in the event that one kind of generation becomes limited (e.g., hydroelectricity in a year with low snowmelt or rainfall). Being part of the regional grid allows the dispatch of the least costly generating units within the interconnected area, providing an overall cost savings to PSE customers. Planned outages of generating and transmission facilities for maintenance can be better coordinated so that overall cost and reliability for the interconnected network is more efficient. Being interconnected also allows economies of scale for both transmission and generation facilities. Finally, this solution could reduce the supply of power to the Eastside, necessitating additional conservation, generation, or storage beyond that considered in the other alternatives in the EIS (electrical criteria #1 and 7).
- Disconnecting the north and south sections of the route at a central Bellevue substation to prevent non-Eastside load from being carried on this line during peak periods of demand on the Eastside would deprive the Eastside of power supply needed during these periods. Separating the system in central Bellevue from the regional grid would also not meet FERC mandatory reliability standards. This could be a CAP, which is temporary in nature and not a long-term solution, and does not bring a new source or new generation into the deficiency area (electrical criteria #1 and 7).
- Relying on BPA projects would not deliver the appropriate amount of power to the Eastside area because the BPA sources are outside the deficiency area and would address only wider regional problems, leaving a deficiency on the Eastside (electrical criterion # 7).
- Renegotiating the Columbia River Treaty is outside the purview of PSE and the Eastside Cities and would not help solve the problem as described previously (electrical criterion #1).

Other suggested solutions made during scoping include converting an existing alternating current (AC) line to a direct current (DC) power line, using "self-healing" lines, and changing conductor types and sizes.

Although switching to DC could potentially address the problem by marginally increasing the capacity of the lines, it would add complexity to the system that would reduce operational flexibility, which could have adverse impacts to the reliability and the operating characteristics of PSE's system. For example, if there was a problem within the DC portion of the system, it would not be possible to switch among other sources, as it is when the entire system is on AC. This alternative has not been included because avoiding such adverse impacts to reliability is one of PSE's stated electrical criteria (electrical criterion #1).

Suggested upgrades to the system (such as self-healing lines, up-conductoring, and installing transformers and inductors) would not improve reliability but would shift electrical load onto other components of the system, causing new deficiencies without addressing the transmission problem. Self-healing lines are automated switching systems that are triggered by adverse events in the system. They do not add capacity to the system, just speed in recovery from an adverse event. Inductors perform similarly, shifting load but not adding capacity. PSE examined up-conductoring in its solutions report and found that increasing capacity of 115 kV conductors led to transformers being overloaded (Gentile et al., 2014). Conversely, adding transformer capacity led to overloading lines. These solutions either do not meet the project objectives, or they offer a short-term solution that would not meet PSE's performance criteria for serving 10 years or more after construction (electrical criterion #1).

2.4.3 Larger Generation Facilities

Adding a large generation facility is not included as an alternative. To be effective, PSE found that the facilities would have to be located near the center of the Eastside area, such as near the Lakeside substation. This alternative is not included because the Cities determined that it does not meet SEPA requirements to provide a reasonable alternative that could feasibly attain or approximate a proposal's objectives at a lower environmental cost or decreased level of environmental degradation (WAC 197-11-440(5)(b)). Such a facility would likely have to be gas-fired to be capable of producing power reliably whenever it is needed.

PSE determined that at least 300 MW of power generating capacity would be needed and the most cost-effective way to generate that amount of power would be in a single plant. The 2013 Solutions Report (Gentile et al., 2014) found that small distributed generation and energy storage would have little impact on the problem unless a large number were developed, as described in Alternative 2, Integrated Resource Approach. Generation facilities at the 300 MW size would require gas and/or water infrastructure that is presently unavailable. These types of facilities also generate "atmospheric emissions and noise [that] would be extremely challenging" to permit in a feasible location that would not also require a significant new transmission line (Gentile et al., 2014).

Even if it were economically feasible to create multiple generation facilities of less than 300 MW, such as a series of plants generating 10 MW or more, they would need to be clustered close to the center of the Eastside to be effective, and would likely impose noise, air, and utilities impacts similar to or even greater than a single plant. Therefore multiple generation facilities of greater than 10 MW were not included for the same reason a single large generation plant was not included.

Smaller backup generators within the Eastside could potentially solve the peak demand; however, PSE did not find that there are currently enough generator owners willing to connect to the network to meet the project objectives (Gentile et al., 2014). PSE cannot compel owners of generators to connect to a network. In addition, increased usage of diesel generators would not meet present clean air regulations, and such facilities often have considerable noise impacts. This is not included as a stand-alone alternative because it does not meet PSE's performance criteria of serving 10 years or more after construction (electrical criteria #5, 6, and 15 and non-electrical criterion #3). However, providing a portion of the projected load by this method is examined as part of the distributed generation component of Alternative 2.

Generating more power outside of the Eastside area during peak periods, such as at PSE's existing peak generator plants, would not address the project objectives, because that would still require transmission to deliver power to the load area without risking damage to transmission equipment. This alternative is not included because it would not address the deficiency in the Eastside (electrical criteria #5, 6 and 14). Peak generator plants providing a portion of the projected load within the Eastside are considered under Alternative 2.

2.4.4 Submerged 230 kV Transmission Line in Lake Sammamish

The option of using a submerged line in Lake Washington is included in the Phase 1 Draft EIS. Scoping comments also suggested using Lake Sammamish for a submerged line. However, there are a number of technical issues that constrain the feasibility of a Lake Sammamish submerged line. These include the following:

- Submerged cables are typically delivered to a site by ship or barge. Large barges cannot access Lake Sammamish due to the weir at the outlet.
- Weight limits on highways would limit the length of cable reels to 1,100 feet, which would mean approximately 34 splices to reach the length of the lake.
- Highway transport may also be limited due to the 14-foot reel diameter.
- Underwater splices increase the risk of cable failure, while splices on land require construction of a vault at each splice. (Strauch, personal communication, 2015b)

Given these constraints, placing a cable in Lake Sammamish was deemed to not be a viable option.

2.4.5 Other Approaches

An alternative addressing a phased approach is not included because it would not address the quickly approaching transmission capacity deficiency during peak periods identified in the Eastside (electrical criterion #10).

Combining alternatives that provide partial solutions was suggested during scoping. Combinations of various solutions were considered. Alternative 2 includes suggested components that would directly address the transmission capacity deficiency in the Eastside that has been identified by PSE. Combinations with other components that would either increase the problem or have little or no effect, such as those listed above, were not carried forward.

Solving the Eastside deficiency requires a reliable alternative composed of one or more of the following:

- A new high-voltage energy source from the outside brought into the deficiency area;
- A new generation source or energy storage of sufficient size and duration installed within the deficiency area; and/or
- Reduction in electrical load during peak demand periods.

Alternatives that would violate PSE's Planning Standards and Guidelines (such as changing a transmission line from AC to DC) or that could harm other utilities in the region (such as disconnecting the Eastside from the regional grid during peak periods) would not become compliant by combining them with other alternatives (electrical criterion #1). Alternatives that would reduce the availability of power to the Eastside (such as limiting the flow of power from sources outside of the Eastside) would require even greater measures to compensate for the reduced power supply to the Eastside (such as new generation or storage, more conservation, or new transmission capacity) and as such would likely have greater impacts than the alternatives that are evaluated in the EIS (electrical criteria #1, 5, 6, and 14). Among the alternatives suggested, this leaves only the alternatives that will be studied and a few alternatives that provide temporary solutions, such as increasing the capacity of wires and transformers, or temporary rerouting of power during peak periods. Combining temporary solutions with the alternatives included in the EIS does not materially change the range of alternatives for the EIS, although such measures could reduce the severity or risk of impacts under the No Action Alternative.

Reducing the scope to include only Bellevue would require a generation facility within the Bellevue city limits, which is not included for the same reasons as indicated earlier under Larger Generation Facilities, or a solution similar to the Integrated Resource Approach (Alternative 2). Therefore, narrowing the scope to include only Bellevue will not be considered as a separate alternative.

2.5 BENEFITS AND DISADVANTAGES OF DELAYING THE PROPOSAL

Delaying the project would have the benefit of avoiding the impacts in the near future for the action alternatives described in the EIS. It is possible that by delaying the project, some of the expanded conservation measures described in Alternative 2 would be incorporated into development, reducing energy demand further than PSE has projected. Additional conservation could have the benefit of reducing greenhouse gas generation from electrical consumption on the Eastside. Delaying the project could allow technological advancements to occur in areas such as battery storage or generation, providing additional feasible alternatives to increased transmission capacity in the near term.

The disadvantages of delaying the project are that the risks of power outages (described in Chapter 1) that would be associated with the No Action Alternative could develop over time. It is also possible that the awareness of such risks would discourage development within the Eastside.