3.5 ENERGY AND NATURAL RESOURCES

This section describes the existing energy and natural resources in the study area of the Project in Lewis County and Thurston County, Washington. It evaluates the potential impacts of the Project on those resources and identifies mitigation measures to limit the impacts.

3.5.1 Study Methodology

The study area for energy resources includes the Project site for locally impacted resources and a broader consideration of electricity resources at the regional level. The study area for natural resources includes resources found at the county level. The analysis in this section is based primarily on information provided by the Applicant (SWEP 2017a and SWEP 2017b) and publicly available information regarding regional resources. Potential impacts to energy and natural resources depend on the types of resources present or available locally and the types that will be utilized to construct, operate and decommission the Project.

3.5.2 Regulatory Framework

Energy and natural resources are an element of the environment identified for analysis under SEPA WAC 197-11-444 (1) (e).

3.5.3 Affected Environment

3.5.3.1 Energy Resources

Regional (Pacific Northwest)

The NWPCC develops and maintains a regional power plan with the goal of balancing the Pacific Northwest's environment and energy needs. In the Seventh Northwest Conservation and Electric Power Plan (NWPCC 2016), the NWPCC found that regional population is projected to grow to over 16 million people by 2035. Electricity demand is expected to grow by an additional 1,800 to 4,400 average MW from 2015 to 2035 (NWPCC 2016).

Approximately 54 percent of the regional electricity supply (including Washington, Oregon, Idaho, and Montana) comes from hydroelectric dams (NWPCC 2016). The approximately 34,000 MW of power generated from hydroelectric projects is dependent upon precipitation in the area and snow-pack that provides water for the Columbia River and Snake River hydro-systems. Approximately 15 percent of the regional electricity supply comes from natural gas, 14 percent from wind, and 12 percent from coal. The remaining electricity supply comes from a combination of nuclear, biomass, solar, and geothermal.

Thurston County does not have any utility-size power-generating facilities. Two utility power-generating facilities are located in Lewis County: the 1,460-MW Centralia Coal Plant and the 593-MW Chehalis Natural Gas Generation Facility. No major hydroelectric dams are located in either county (NWPCC 2017); however, a small amount of power (1 MW) is generated at the Skookumchuck Dam, owned by TransAlta, for use at its coal plant (TransAlta 2018).

As discussed in Section 1.3, regional demand for electricity is growing at a very slow rate but is being outpaced by demand for renewable energy by municipalities and utility customers (PSE 2017a, PacifiCorp 2017). Under current regulations, the local utility district where the Project will be located, Lewis County PUD, has no need for additional renewables in its portfolio for the next decade (Samuelson 2018).

Project Area

The following companies provide electricity service in and in the vicinity of the Project Area:

- PSE provides electric service to Thurston County
- Lewis County Public Utility District (PUD) provides electric service to Lewis County.

BPA's 230-kv Chehalis-to-Covington No. 1 line crosses the western portion of the Project site from the southwest to the northeast (Figure 3.5-1) (BPA 2017). Several other regional BPA transmission lines, ranging from 69 to 500 kV extend from the Chehalis/Centralia area toward Olympia (BPA 2017). The proposed Project gen-tie line will connect to the PSE transmission system at the Tono substation, which is located adjacent to the Centralia Coal Plant, to the northwest of the BPA transmission line.

Within the study area, the BP Olympic refined petroleum products pipeline and the Williams Northwest natural gas pipeline are located roughly parallel to the BPA transmission line through both Thurston and Lewis counties (WUTC 2017). Both of these pipelines are installed underground in their respective right-of-way. The proposed gen-tie line will have an overhead crossing of both pipeline rights-of-way; they will be crossed south of Hanaford Creek (see Figure 3.5-1). Neither pipeline is located near the proposed WTG sites.

No utility delivery of natural gas to or within the Project Area occurs, although PSE does provide gas service to southwestern Thurston County and urbanized areas adjacent to the I-5 corridor in Thurston County (PSE 2017b).

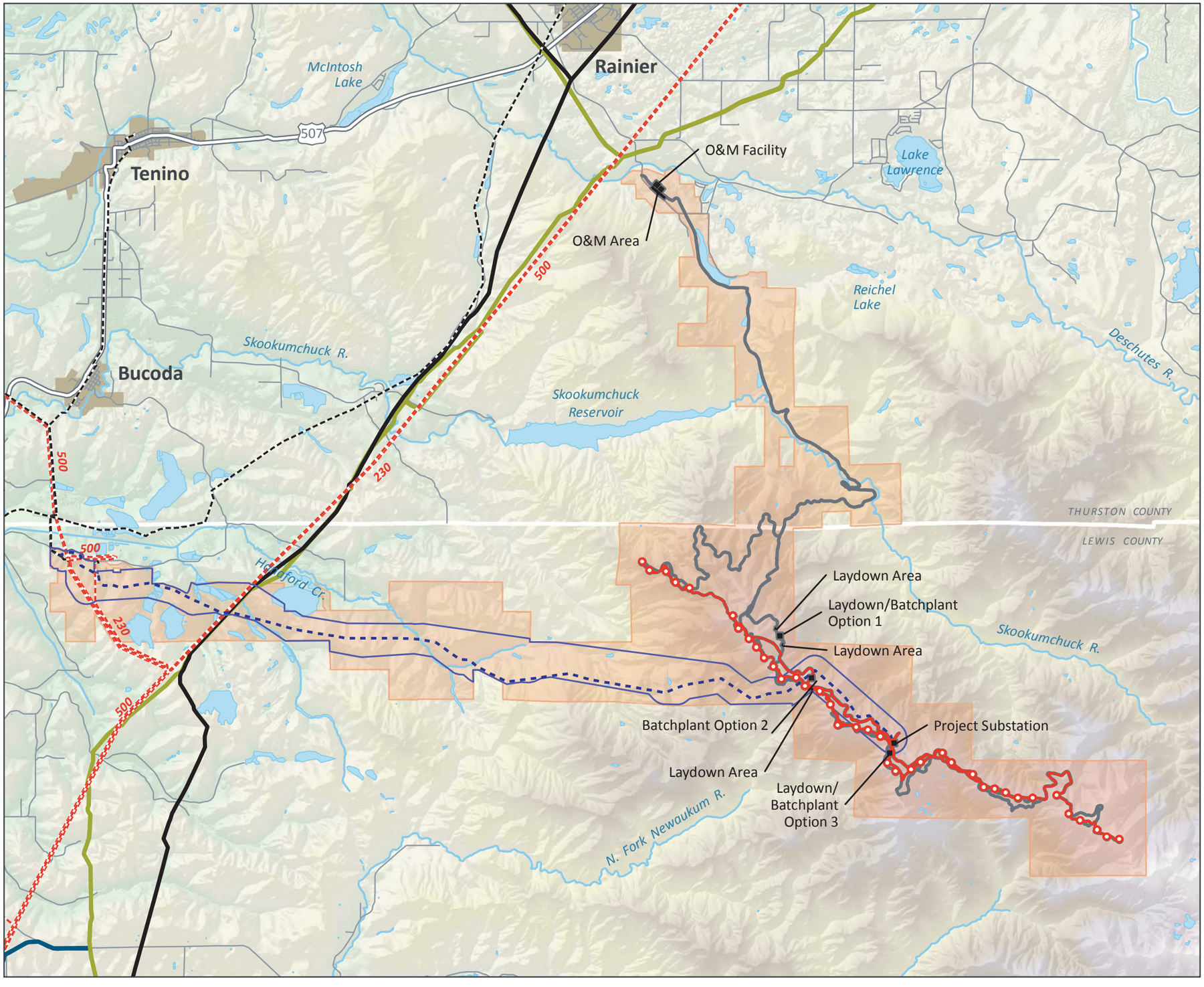

FIGURE 3.5-1
EXISTING PIPELINES AND TRANSMISSION LINES

Existing Pipeline
- Northwest Pipeline LLC
- Olympic Pipe Line Company
- Puget Sound Energy

Existing Transmission Line
- Bonneville Power Administration (Voltage in kV labeled)
- Unknown Owner

- Gen-Tie Line Corridor
- Gen-Tie Micrositing Corridor
- Project Area
- Proposed Turbine Location
- Collector System Cable
- Turbine Micrositing Corridor
- Work Area

SOURCES: CHAMBERS GROUP 2017, HIFLD 2017, LEWIS CO. 2016, THURSTON CO. 2016, USGS NHD 2017, WSDOT 2017, WAUTC 2018

0 1 2 Miles

0 1 2 Kilometers

9/15/2018

SKOOKUMCHUCK WIND PROJECT

3.5.3.2 Natural Resources

Nonrenewable Resources

According to DNR records, approximately 30 rock and stone or sand and gravel quarries are located in Lewis County, and 37 are located in Thurston County (DNR 2010). Regional supply of these materials should be sufficient for the Project. Refined petroleum products (such as diesel fuel and gasoline) are not produced in the Project Area but are available through numerous commercial outlets. No mining for coal, metals, or minerals occur near the study area. The last remaining coal mine in the state of Washington near Centralia closed in 2006 (EIA 2016). See Section 3.3, Water Resources for a full discussion of the water resources in Lewis and Thurston counties.

Renewable Resources

Renewable resources include any material that can be regenerated or is not consumed through use. The primary renewable resources in Thurston and Lewis counties include wind and biomass (US DOE 2007a and US DOE 2010) for energy production, and commercial forest harvesting.

The National Renewable Energy Laboratory (NREL) indicates that Washington State could install up to 67,551 MW of new capacity based on estimates of the wind energy potential (potential capacity based on available windy land area). Lewis County has a high potential for biomass energy development from wood residue from the forestry industry. Thurston County has more limited potential for biomass energy development. No high- or low-temperature geothermal resources are located in Thurston or Lewis counties (DNR 2014). Utility solar generation facilities are generally more viable in the eastern portion of the state (US DOE 2007b). Utility wind energy generation resources are site specific to where a viable wind resource exists and where there is potential for interconnection. To-date, in addition to this Project, only one other utility-scale renewable energy project, the Coyote Crest wind project, has been proposed and permitted in Lewis and Thurston counties and has not yet proceeded to construction (Lewis County 2010).

Forestry is an important renewable resource in Lewis and Thurston counties. In 2015, 377,297,000 board feet of timber were harvested in Lewis County and 87,628,000 board feet were harvested in Thurston County (DNR 2016). The proposed WTGs will be constructed on a tract of land currently managed for timber production; timber production will continue to occur while the Project is under construction and operational.

3.5.4 Impacts of the Proposed Action

Expected energy sources that will be used include vehicle fuel during construction, decommissioning, and operations and electricity to serve the O&M Facility during operations. Other natural resources that will be consumed during construction include water, steel, concrete, and gravel.

Direct impacts associated with or attributable to specific Project elements such as the proposed WTGs, gen-tie line, and O&M Facility are discussed below, where applicable. Indirect impacts on energy and natural resources are not anticipated because the Project is not expected to substantially induce regional growth to the extent that will result in significant changes to offsite energy and fuel consumption. Table 3.5-1 and Table 3.5-2 summarize potential energy and natural resource requirements during construction and operation respectively.

3.5.4.1 Construction

The Project components, including the WTGs, collector and gen-tie line infrastructure, access road materials, and other associated facilities will be constructed of manufactured materials that require energy to produce. Energy resources are also consumed in the transport of these materials to the Project site. Further, energy sources will be used to operate onsite construction equipment. The direct energy consumption will be predominantly in the form of electricity and fuels such as gasoline and diesel.

Electricity required onsite during construction will be minor and generated by diesel-powered portable generators or acquired from PSE's electrical utility system. The amount of electricity consumed during construction will not affect other users or locally available energy supplies.

During construction, up to 38,000 gallons of diesel and 7,600 gallons of gasoline will be consumed. This fuel will be used to power construction equipment, vehicles, and generators. Fuel will be supplied by licensed fuel distributors or local gas stations to fill construction vehicles or to provide fuel for onsite fuel storage tanks. The amount of fuel products consumed during Project construction is not expected to adversely affect locally available resources.

Up to 18 acre-feet (approximately 6.5 million gallons) of water will be consumed during construction. Water will be supplied by the city of Yelm. The city has indicated that they have adequate supply to meet the Project's requirements without affecting other users (Bedlington 2017). Water will be used for dust suppression and concrete production and to the extent feasible will be reclaimed (non-potable) water. Water needs for dust suppression during construction will vary depending on the weather. Hence, the above estimate for construction water consumption is highly conservative. The estimated amounts of water needed for construction are listed in Table 3.5-1.

During Project construction, concrete and aggregate (rock, sand, and gravel) will be required for WTG pads, crane pads, access roads, foundations and yards of other supporting Project elements such as the O&M Facility, the gen-tie line, and meteorological towers. The estimated amounts of concrete and sand or gravel needed for construction is listed in Table 3.5-1. Concrete will be sourced either from permanent concrete batch plants permitted and operated by others offsite or will be manufactured from aggregate quarried and crushed at the site. If manufactured onsite, the Applicant will also deliver cement and water to the onsite batch plant(s). Aggregate will be sourced from either existing permitted quarries or from quarries established at the Project site.

Steel consumed during Project construction will be primarily in the form of the WTG components, meteorological towers, the O&M Facility, and in the collector and gen-tie line cables. The estimated total amount of steel required by the Project will be approximately 18,300 tons. Steel used by the Project will be acquired and manufactured into the necessary components by the selected vendors and will not significantly affect local supply. The estimated amounts of steel needed for O&M Facility construction is listed in Table 3.5-1. Much of this steel can be recycled and reused as part of the decommissioning of the Project at the end of its anticipated life.

Construction of the Project will not impact the existing regional transmission network operated by BPA. The construction of the gen-tie line, which crosses existing BPA transmission lines, will be located to avoid any potential conflicts. Likewise, construction of the gen-tie line will be sited so as to avoid impacts to existing petroleum product and natural gas transmission lines.

A small amount of trees (relative to the overall acreage of commercial forests operated by Weyerhaeuser) will be harvested, as needed, to allow for construction and operation of the Project. However, this will not result in a permanent conversion, as at the end of the Project lifetime, Project components will be removed and the areas replanted with trees (see Section 2.7).

Table 3.5-1. Energy and Natural Resource Consumed during Construction

Resource	Construction Requirement
Electricity Consumption	3000 kwh/month per construction trailer
Diesel Fuel Consumption	38,000 total gallons
Gasoline Consumption	7,600 total gallons
Concrete Consumption	19,000 total cubic yards
Steel Consumption	18,300 total tons
Sand and Gravel (Aggregate) Use	870,000 cubic yards
Water Consumption – Cement	764,000 total gallons
Water Consumption – Dust Suppression	6,500,000 total gallons

Source: Weber 2017.

3.5.4.2 Operation

The amount of energy consumed during Project operations will be minimal. The limited amount of energy consumed during operations (fuel and electricity) is presented in Table 3.5-2. Fuel consumption for O&M vehicles is estimated at 2,900 total gallons. Fuels used during Project operations for O&M vehicles will be obtained from local gas stations. Power needed for operations (primarily to serve the O&M Facility) will be supplied by PSE. The minimal power requirements are not anticipated to impact PSE's ability to supply electricity to their existing customers.

The Project will produce up to 137 MW of electricity annually, increasing the amount of electricity produced via renewable resources available in Washington.

Nonrenewable natural resources may also be consumed in small quantities during operations (Table 3.5-2). These include water for use at the O&M Facility and light maintenance use, as well as lubrication fluids and oils for WTG operation. Water use during operation is estimated to be a maximum annual average use of 5,000 gallons per day. During operations, water will be supplied by a groundwater well, drilled near the O&M Facility. The amount of these resources needed is small compared with the available supply; hence, impacts related to natural resource availability and consumption are not expected. Oils, lubrication, and cooling fluids will be required during operations and will be purchased from appropriate distributors.

Table 3.5-2. Energy and Natural Resources Consumed during Operations

Resource	Operation Consumption
Electricity Consumption	Minimal
Gasoline and Diesel Consumption	2,900 total gallons
Water Consumption	less than 5,000 gpd, annual average
Glycol-Water Mix	1,900 total gallons
Hydraulic Fuel	3,230 total gallons
Lubricating Oil	3,800 total gallons
Synthetic Oil	380 total gallons
Simple Green	380 total gallons
Mineral Oil	25,500 total gallons

Note: Consumption is for life cycle of the Project.
Source: Carroll, 2018

Operation of the Project will preclude a small portion of the existing timber lands in the Project Area from production during the Project lifetime; however, the Project will not preclude future timber harvests as timber growth will be managed around the base of each WTG and harvested when mature (see Section 2.7).

3.5.4.3 Decommissioning

Decommissioning activities will be similar in type but shorter in duration compared to those anticipated for the construction phase. Energy in the form of fuel will be required to operate the equipment used in decommissioning/demolition. Electricity requirements will be small and could be met with onsite generators without affecting local energy or fuel supplies. Some water may also be required for dust control and other purposes. No new raw construction materials will be consumed during decommissioning. Decommissioning or demolition of the Project will release a significant portion of the materials used in construction, such as concrete and steel, to be recycled. Recycling demolition waste wherever possible will minimize the consumption of energy or natural resources during decommissioning. Following decommissioning, the entirety of the site will be returned to active commercial forestry, with the exception of the area over the concrete bases of the WTGs, which will remain in place.

3.5.5 Impacts of No Action Alternative

Under the No Action Alternative, the Project would not be constructed resulting in no change from current conditions and, therefore, no Project-related impacts. Renewable and nonrenewable materials identified above would not be consumed for construction, operation, and decommissioning of the Project. The benefits of an expanded renewable energy supply would be lost.

3.5.6 Mitigation Measures

As the Project will have a net positive effect on the availability and consumption of renewable energy resources, no mitigation measures beyond those included in the Project design are required. Conservation measures proposed as part of the Project are included below.

3.5.6.1 Construction and Decommissioning

During construction and decommissioning, BMPs will include construction waste recycling when possible, and carpooling will be encouraged to reduce consumption of refined petroleum products and their resulting emissions.

The Applicant will obtain necessary approvals from BPA, Olympic Pipeline, Northwest Pipeline, LLC, and others as necessary, for gen-tie line crossings of transmission lines and pipelines before construction permits are issued.

3.5.6.2 Operation

Operations BMPs will be developed that include conservation measures for nonrenewable resources such as water, fuel, and electricity. These BMPs may include the following conservation measures when cost effective:

- Installation of high-efficiency electrical fixtures, appliances, and light bulbs in the O&M Facility
- Use of low-water flush toilets in the O&M Facility
- Encouraging carpooling among operations workers
- Recycling of waste office paper and aluminum will be encouraged.

3.5.7 Connected Action

Construction of the interconnection will involve delivery and installation of a step up transformer in the Tono substation yard, and conductoring to interconnect the gen-tie line to the step-up transformer, and the transformer to the remainder of the substation. These activities will not require excavation or significant ground disturbance either inside or outside the developed area of the yard. Gravel covering existing developed surfaces may be temporarily displaced by the installation activity and will be replaced or repaired to match pre-existing conditions.

Similar to Project components, the step-up transformer and conductors used to interconnect the Project will be manufactured primarily from steel. Minor amounts of fuel to power vehicles and construction equipment will be used during the installation of the transformer. A small amount of fresh gravel may be imported to repair the graveled ground surface to match pre-existing conditions.

3.5.8 Unavoidable Adverse Impacts

The Project will consume various materials as a result of construction of the WTGs and associated Project elements. In addition to those components and materials which will be shipped to the site (e.g., steel in the form of WTGs and electrical cabling), there are sufficient quantities of raw construction materials available locally and regionally to provide for Project construction and other regular consumption. The Project will not adversely affect local utility power availability and will contribute positively towards the availability of renewable energy in the region. No significant unavoidable adverse impacts to energy and natural resources are expected as a result of implementation of the Project.

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