

3.5 ENERGY AND NATURAL RESOURCES

WAC 463-42-342 Natural environment – Energy and natural resources.

Amount required/rate of use/efficiency – The applicant shall describe the energy and natural resource consumption during both construction and operation of the proposed facilities as rate of use and efficiency that can be achieved during construction and operation.

(2) Source/availability – The applicant shall describe the sources of supply, locations of use, types, amounts, and availability of energy or resources to be used or consumed during construction and operation of the facility.

(3) Nonrenewable resources – The applicant shall describe all nonrenewable resources that will be used, made inaccessible or unusable by construction and operation of the facility.

(4) Conservation and renewable resources – The applicant shall describe conservation measures and/or renewable resources which will or could be used during construction and operation of the facility.

3.5.1 Introduction

The Project will consume limited amounts of energy and natural resources primarily during construction. Operation of the Project will consume very limited amounts of natural resources, as the wind turbine generators will use wind, an abundant, naturally occurring renewable resource, to generate electricity. By using wind, rather than non-renewable fossil fuels, to generate electricity, operation of the Project will help reduce overall consumption of non-renewable natural resources.

Numerous independent life cycle analyses of wind power projects have shown that wind farms have a very high "energy payback" (ratio of energy produced compared to energy expended in construction and operation), and that wind's energy payback is higher than that of thermal power plants. Several studies have found that it generally takes less than six months of operation for a wind farm to produce the total amount of energy used to construct the equipment and build the project. (Energy Center of Wisconsin, 1999; Grum-Schwensen, 1990; G. Hagedorn et al, 1991; Gydesen. D et al, 1990.)

The consumption of energy and material quantities of consumables involves the:

- The consumption of electricity and natural resources to produce the durable equipment and construction supplies used to build the Project;
- The consumption of electricity during construction and operation;
- The consumption of gasoline and diesel oil for motor vehicles during construction and operations; and
- The consumption of lubricating oil, greases, and hydraulic fluids for operating Project equipment controls and for providing lubrication of moving parts in wind turbine generators.

3.5.2 Energy and Other Natural Resource Consumption

3.5.2.1 Consumption of Energy and Natural Resources During Construction

The main categories and approximate amounts of energy and consumables used during construction are expected to be as follows:

- 25,000 gallons of fuel (diesel and gasoline) for mobile construction equipment.
- 11,000 tons of steel for turbine towers
- 2,000 tons of steel for tower foundation reinforcement
- 30,000 yards of gravel (aggregate) for roads and crane pads
- 30,000 yards of concrete for turbine foundations
- 5 million gallons of water for road compaction, dust control, wetting concrete, etc. assuming plain water is used for dust control, or 2 million gallons of water if lignin or other dust palliative is used (see Section 3.2.4, 'Dust' and Section 3.3.7 'Water Use')

3.5.2.2 Sources of Natural Resources Used During Construction

The source of fuel for construction equipment and vehicles will be existing, licensed fuel distributors or gas stations, as described in Section 2.9, 'Spill Prevention'. Water for construction will be obtained from a local source with a valid water right, as described in Section 3.3.7, 'Water Use'. Concrete will be purchased from existing suppliers located near the Project site. Aggregate will be obtained from existing, permitted local quarries. Several gravel pits and quarries are located near the Project site in Kittitas County. Electricity for construction use will be generated using portable generators.

3.5.2.3 Consumption of Energy and Natural Resources During Operations

Operation of the Project will consume very limited amounts of energy and non-renewable natural resources. Energy will be generated using the kinetic energy in wind, transformed by the wind turbine generators into useful electricity. Types and quantities of energy and natural resources consumed during operations will primarily consist of the following:

- Fuel for O&M vehicles,
 - Annual consumption is expected to be about 8,500 gallons
- Lubricating oils, greases and hydraulic fluids for the wind turbine generators
 - Minor quantities, as described in Section 2.9.2.2, 'Spill Prevention – Operations'
- Electricity for Project operations
 - Estimated to be less than 600 kWh/WTG/month, or about 0.1% of Project energy generation
- Water for domestic use at the O&M facility and periodic maintenance of turbine blades
 - Estimated to be less than 1,000 gallons/day (see Section 3.3.7 'Water Use')

Sources of Energy and Natural Resources Used During Operations

Fuel used for O&M vehicles will be purchased from local gas stations. Lubricating oils and hydraulic fluids used for wind turbine generator maintenance will be purchased from distributors of such materials. The final selection of these distributors will depend on the specific turbine model chosen for the Project. Electricity for Project operations will mostly be generated by the Project itself, during periods when the wind turbines are not generating power, it will be purchased from the regional utility.

3.5.2.4 Scenic Resources

Scenic resources are described and discussed in Section 5.1.4, 'Aesthetics/Light and Glare'.