

## 3.6 Energy and Natural Resources

The purpose of this section is to describe, in a regional context, the supply and demand for energy and natural resources utilized by existing and future residents and businesses; and long-range planning for services, facilities, and conservation measures to continue to meet the demand. Information sources used to prepare this section include the *Electrical Facilities Plan for the Thurston County Area* (Puget Sound Power & Light Company 1992), the Puget Sound Energy website (<http://www.pse.com>), and personal communication with Puget Sound Energy, Total Energy System Planning (TESP) staff. The actual provision of electrical and natural gas service is described in the Utilities section of this Draft EIS (Section 3.19).

### AFFECTED ENVIRONMENT

#### 3.6.1 Electrical Energy

Puget Sound Energy (PSE) builds, operates, and maintains the electrical system that serves the Puget Sound area, including Thurston County and the City of Yelm. PSE is a private, investor-owned utility with responsibility for providing service to approximately 1,044,458 metered customers within a nine-County service area in western and central Washington (as of December 31, 2007). The Puget Sound Region electric system extends from the Canadian border to Chehalis, and from the Cascades to the Olympic Peninsula. Transmission facilities in the Puget Sound electric system are owned and operated by public utility districts, municipalities, investor-owned entities, cooperatives, Rural Electrification Associations, and federally-controlled utilities like the Bonneville Power Administration (BPA). Through interconnections, these utilities are able to improve reliability, access power generated beyond their own systems, and provide cost-effective service to users.

BPA, a major supplier of power to the Puget Sound electric system, owns and operates most of the 500 kiloVolt (kV) and 230 kV lines and substations in the Pacific Northwest Region. BPA utilizes these facilities to market power generated at federally-operated hydroelectric dams and Washington Public Power Supply System generators. PSE and other utilities purchase power and/or transmission services from BPA, using BPA's facilities when it is economical or necessary.

The Puget Sound Energy electric system is required to:

- ◆ Transfer power from outside of the region into the region
- ◆ Transfer power to other regions
- ◆ Interconnect generation resources into the Puget Sound grid
- ◆ Operate reliably under a full range of loads, throughout all seasons, and with a wide variety of generating patterns, without detrimentally impacting other regions or utilities.

PSE imports electrical energy from generation sources in Canada, along the Columbia River, and from other generation sites inside and outside of their own service territory. PSE also owns and operates generation facilities. New transmission systems, substations, and distribution systems are added as needed to reliably transmit electrical energy required within PSE's service area.

In order to fulfill its state-regulated obligation to serve, PSE must plan diligently to extend or add to its facilities when conditions require expanded service. Due to the high cost of facilities,

and because electric service is viewed as a basic necessity, it is important for PSE to make these additions and expansions in a cost-effective and timely manner. PSE currently operates under a long-range plan, in which the company's system planning, conservation programs, and growth management planning efforts are described. The Plan is based on electrical growth projections anticipated for the near-term (5 years) and long-term (10 years and beyond). Thurston County growth projections produced by the Washington State Office of Financial Management (OFM), as well as commercial and industrial forecasts, were used in 2004 to determine new load growth for a 20-year planning period. To supplement these forecasts for predicting future load growth, PSE studies the energy usage of customers and the ensuing load that would be placed on the system by each new resident and each new employee. The studies included an analysis of: various types of dwelling units (e.g., single-family detached, multi-family, mobile homes), types of fuel used (e.g., electricity, natural gas), load factors for each user group, and diversity factors for all of the groups combined. Other forecasting methods are used to validate these procedures, including a zoning (land use) analysis, construction forecasts by jurisdiction, and 10-year trending analyses. Projected load is calculated as the existing load, minus conservation reductions, minus demand-side management, plus the forecast of new load. Although sequencing and timing may change slightly, PSE's long-range plans are not expected to change unless there are significant and unexpected changes in the economy, energy consumption, and/or the supply/demand balance in the Thurston County sub-system. The current load growth in the greater Yelm area is 1 to 2 percent per year (personal communication with Bill Foster, Senior Engineer, PSE, April 25, 2008).

Design of the power system is based on the regional transmission grid. These projects generally involve improvements that carry power from generating plants to load centers. The area transmission system must be designed around and complement the regional transmission system in a way that meets the recently-approved Federal transmission reliability standards. These standards are mandatory, and are monitored and enforced by the North America Electric Reliability Corporation (NERC).

The President of the United States signed the Energy Policy Act of 2005 (the Act) on August 8, 2005. This is the most significant change to the regulatory landscape since the last *Electrical Facilities Plan for the Thurston County Area* update (2004). The Act contains three key sections that could have an impact on PSE's transmission strategy, and could drive certain transmission investments: Reliability Standards, Transmission Infrastructure Initiatives, and Transmission Operation Improvements. PSE transmission system planning will comply with these Federal reliability standards.

Following is a summary list of Puget Sound Energy projects in-progress and proposed facilities to the year 2020 for the Thurston County area. PSE improvements in the region address both capacity and reliability, with the result that system improvements and new equipment may occur before the load alone justifies it (personal communication with Bill Foster, Senior Engineer, PSE, April 25, 2008).

- System Improvements in Progress:
  - a. Olympia area 55 kV transmission conversion to 115 kV. It includes the following major transmission activities:
    - St. Clair transmission station improvements
    - Hawks Prairie substation upgrade
    - Pleasant Glade Switching station upgrade
    - Transmission rebuild between Pleasant Glade and Pacific Highway.

Plum Street switching station rebuild and upgrade  
Capitol substation upgrade  
Thurston substation upgrade  
West Olympia switching substation upgrade  
Olympia Switching station upgrade

b. Spurgeon Creek Switching station development

Yelm area Reliability Improvement

• Future Transmission Improvements:

230 kV capacity addition at St. Clair / Spurgeon  
Hoffman Transmission Station  
St. Clair - Yelm 115 kV Transmission  
Olympia - St. Clair 115 kV line loop to -Spurgeon Switching station  
BPA Olympia-Spurgeon 115/230 kV Line  
Frederickson-St. Clair & Tono 230 kV Project  
Olympic peninsula System Reinforcement, BPA  
St. Clair - BPA Olympia 230 kV line

• Future Distribution Substations:

Carpenter  
Hobby Acres  
Spurgeon  
Fort Eaton  
Libby  
Ayers  
Offit  
Littlerock

The electrical system serving Yelm is part of the larger Thurston County service area, encompassing the cities of Olympia, Lacey, Tumwater, Bucoda, Rainier, and Tenino in addition to Yelm (see Figure 3.19.5-1 in the Utilities section of the Draft EIS).

### **3.6.2 Natural Gas**

PSE operates and maintains Washington State's oldest and largest natural gas distribution system that serves the Puget Sound Region. As of December 31, 2007, PSE provided natural gas service to 731,451 metered customers (personal communication with Bill Foster, Senior Engineer, PSE, April 25, 2008).

The utility manages a strategically diversified gas supply portfolio from suppliers across the western United States and Canada to minimize financial risks and hold down customer rates. About 50 percent of the gas purchased by PSE is obtained from producers and marketers in Rocky Mountain states; the remainder is purchased from sources in British Columbia and Alberta. Another PSE cost-saving measure involves flexible gas transportation agreements with suppliers that enable PSE to selectively purchase gas from favorably-priced locations. PSE also controls its gas supply costs by storing the product in large underground facilities, then withdrawing it in winter when customer usage is high (Puget Sound Energy website: <http://www.pse.com>).

All natural gas acquired by PSE is transported into the utility's service area through large interstate transmission pipelines owned and operated by another company. Once PSE takes possession of the gas, the product is distributed to customers through more than 21,000 miles of PSE-owned gas mains and service lines, and subsequently distributed to customers through City "gate stations" that meter the gas. PSE regularly-inspects all of its pipelines for corrosion and potential defects, in accordance with applicable federal and state laws (Puget Sound Energy website: <http://www.pse.com>).

Natural gas is supplied to the City of Yelm through a Northwest Pipeline Corporation gate station south of the City center at Bald Hill Road SE/Graybill Road. At this station, gas is metered and becomes the responsibility of PSE. The City of Yelm is served from the Yelm gate station through 8-inch mains.

### **3.6.3 Alternative Energy Sources**

Clean, renewable energy is becoming a core component of Puget Sound Energy's power supply. The utility currently owns and operates two large wind farms in Eastern Washington. These facilities make PSE the largest producer of renewable energy in the Pacific Northwest. PSE's goal is to meet up to 10 percent of its customers' total electrical demand with cost-effective renewable resources by the year 2013 (Puget Sound Energy website: <http://www.pse.com>).

PSE's first wind farm, the Hopkins Ridge Wind Facility, is in Columbia County. The second, and largest, is the Wild Horse Wind Facility in Kittitas County. Together these facilities presently produce enough electricity to serve nearly 100,000 households.

#### *POTENTIAL IMPACTS*

The electrical energy and natural gas requirements of the proposed Thurston Highlands Master Planned Community are quantified in Draft EIS Sections 3.19.5 and 3.19.6, and discussed there in relation to existing and planned PSE facilities within the Thurston County area.

#### *MITIGATION MEASURES*

*Incorporated Plan Features.* The proposal advocates the development of "smart homes" (e.g., "wired homes"), run by computers to maximize energy efficiency and conservation. The project will also include provisions for the use of solar energy; e.g., encouraging builders to use roofing materials with solar power generation capabilities.

“Built green” homes can offer improved energy efficiency through well-designed heating, cooling, ventilation, and hot-water systems; building envelopes; lighting and appliances. Energy-efficient homes may have the added benefit of maintaining better value in a region where there is a high priority for energy conservation. Thurston Highlands, L.L.C. intends to encourage builders to implement measures such as the following:

- ◆ Install locally- or regionally-produced materials.
- ◆ Use rapidly-renewable building materials, such as products made from plants harvested within a 10-year lifecycle or shorter (if available).
- ◆ Use “engineered wood” structural products; e.g., laminated veneer lumber (LVL), wood I-beams and I-joists, and wood roof and floor trusses (if available). Engineered lumber manufacturers use fast-growing, small-diameter trees efficiently.
- ◆ Install materials with longer lifecycles (if available).
- ◆ Use recycled plastic lumber or plastic/wood composite lumber (if available) as a durable alternative to solid wood for non-structural exterior applications such as fences, benches, decking, retaining walls, and landscape borders.
- ◆ Use fiber-cement composite siding materials, with wood fiber reclaimed from wood processing waste or small diameter fast-growing trees (if available). They are resource-efficient, durable and low maintenance, and offer a good fire rating compared to wood or metal siding
- ◆ Use exterior siding, flooring material, windows and trim that are third-party certified sustainably-harvested wood (if available).
- ◆ Install recycled-content products such as roofing material and carpet pad (if available).
- ◆ Post a jobsite recycling plan and recycle scrap building materials to the maximum extent practicable: lumber, wall board, concrete, cardboard, ceiling tiles, paints and packaging.
- ◆ The applicant intends to stay abreast of emerging technologies for energy efficiency and conservation, and to advocate inclusion of these measures within the Master Planned Community over the 10- to 30-year term of build-out.

*Applicable Regulations.* Residential and commercial construction would comply with all applicable Energy Code requirements (at a minimum) at the time Building Permits are applied for and issued. In an effort to encourage the design of energy-efficient buildings, Puget Sound Energy, through its New Construction program, provides grants to owners whose buildings exceed the Energy Code by a minimum of 10%. Owners or developers of new commercial facilities served by PSE with electricity or natural gas are eligible for new construction incentives. Mixed-use and large multi-family buildings are also eligible under this program (PSE, May 3, 2007).

*Other Possible Mitigation Measures.* Energy efficiency measures in construction would include practices such as advanced framing/extra insulation, installation of high-efficiency

household appliances, and air sealing (advanced caulking). The applicant and the City could encourage builders to implement practices such as the following:

- ◆ Advanced framing is a technique used by builders to help reduce construction costs and increase energy savings. On average, advanced framing uses 30 percent less lumber. Advanced caulking is an element of the airtight drywall approach (ADA) for framed structures. Caulk or gasket drywall is installed on exterior walls at the top and bottom plates, windows and doorframes; and on interior walls at intersections with exterior ceilings, and at electrical, plumbing or mechanical penetrations in the drywall.
- ◆ Seal ducts with mastic and insulate to R-11.
- ◆ Use solar design to control heat gain, light, water heating and generating electricity. Good solar design allows winter sun to reach a 'thermal mass,' such as a tiled floor, which holds the heat and radiates into the living space. Good solar design also keeps the same sun from overheating the living space in Summer months through properly-sized window overhangs and strategically-placed deciduous trees in landscaping.
- ◆ Use heat-recovery systems to capture heat from exhaust air or from drain water.
- ◆ Install sealed combustion heating and hot water equipment.
- ◆ In the higher-density development areas of the site (such as the Town Square) construct detached garages, no garages, or garages air-sealed from house.
- ◆ Provide for comfortable space temperatures with added insulation in the attic, floor, and walls, and high-performance windows.
- ◆ Weatherize homes by sealing leaks and insulating attics, floors and walls.
- ◆ Use minimum R-26 for overall wall insulation.
- ◆ Use 75 percent minimum Energy Star light fixtures.

Additional energy conservation measures that could be implemented at the discretion of builders and homeowners may include the following:

- ◆ Install energy-efficient appliances. Select appliances that have "Energy Guide" or "Energy Star" labels to ensure that they meet energy-efficient criteria.
- ◆ Minimize hot water usage by installing efficient front-loading washing machines, fixing leaks, and lowering the temperature of the hot water tank.
- ◆ Locate the water heater within the heated space of the home, and within 20 pipe feet of the highest use.
- ◆ Insulate all hot water pipes and install cold inlet heat traps on hot water heater.
- ◆ Select gas appliances over electrical appliances for clothes driers and stove tops.

- ◆ Centrally-locate the heating/cooling system to minimize the size of the distribution system.
- ◆ Install heat systems with separate zones for sleeping and living areas.
- ◆ Install programmable thermostats to manage changing comfort needs during daytime and nighttime hours.
- ◆ Select high-efficiency heat pumps instead of electric heat.
- ◆ Install a heat-recovery ventilator.
- ◆ Select Energy Star heating and cooling equipment; no air conditioners.
- ◆ Install lighting dimmer switches, photocells, timers, and/or motion detectors to operate lights.

*SIGNIFICANT UNAVOIDABLE ADVERSE IMPACTS*

Based on communications with Puget Sound Energy representatives, no significant unavoidable adverse impacts to energy and natural resources would be anticipated as a result of the 10- to 30-year build-out and occupancy of the Thurston Highlands Master Planned Community. Also see Draft EIS Sections 3.19.5 and 3.19.6.

