

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 Puget Sound Energy *2009 Integrated Resource Plan* (PSE, July 30, 2009), the Puget Sound Energy website (<http://www.pse.com> accessed November 12, 2009), personal communication with Puget Sound Energy, Municipal Liaison staff, and the Kittitas County Public Utility District (PUD) #1 website (<http://www.kittitaspud.com>). The actual provision of electrical and natural gas service to the Cle Elum area and the City Heights site is described in the Utilities section of this Draft EIS (Section 3.18).

AFFECTED ENVIRONMENT

Electrical Energy

Puget Sound Energy (PSE) is Washington's oldest and largest energy utility with a 6,000 square mile service area that extends from south Puget Sound north to the Canadian border, and from Kittitas County west to the Olympic Peninsula. PSE is a private, investor-owned utility with responsibility for providing service to more than 1 million electric customers within an 11-county service area. The electricity that PSE delivers to its customers is generated using a number of different sources. In 2008, the fuel mix for these resources included hydroelectric power (41 percent); coal (36 percent); natural gas (20 percent); nuclear (1 percent); and other – biomass, landfill gas, petroleum, waste and wind (2 percent).

Electrical 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 is a Federal agency based in the Pacific Northwest. Its service area includes Washington, Oregon, Idaho, western Montana, and small parts of eastern Montana, California, Nevada, Utah and Wyoming. Although BPA is part of the U.S. Department of Energy, it is self-funding and covers its costs by selling its products and services at cost. BPA markets wholesale electrical power from 31 Federal hydroelectric projects in the Columbia River Basin, one non-Federal nuclear plant, and several other small non-Federal power plants. The dams are operated by the U.S. Army Corps of Engineers and the U.S. Bureau of Reclamation. About one-third of the electric power used in the Northwest comes from BPA. BPA owns and operates 259 substations and about three-quarters of the high-voltage transmission lines within its service territory (15,238 circuit miles). The operating voltage of BPA transmission lines ranges from below 115 kiloVolts (kV) to 1,000 kV (BPA website accessed November 15, 2009: <http://www.bpa.gov/>). PSE, Kittitas County PUD, 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 (PSE) 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 (the *Integrated Resource Plan – IRP*), in which the company's system planning, conservation programs, and growth management planning efforts are described. The demand forecast PSE develops for the IRP is an estimate of energy sales, customer counts, and peak demand over a 20-year period. These estimates are designed for use in long-term planning for resources and delivery systems. Updates based on the most current information are used to develop near-term annual revenue forecasts and operational plans. To produce forecasts of energy demand and customer growth, PSE uses econometric models based on historical data to explain changes in energy use per customer and customer counts. Significant inputs include information about regional and national economic growth, demographic changes, weather, prices, seasonality, and other customer usage and behavior factors. Known large load additions or deletions are also included.

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. 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.

The *2009 Integrated Resources Plan* predicts that rising customer demand for electricity and PSE's expiring purchased-power contracts with other utilities will create a need for PSE to replace, renew and acquire approximately 676 megawatts (MW) of electric resources by 2012; 1,084 MW by 2016; and 2,453 MW by 2020. The lowest reasonable-cost way for PSE to meet the growing needs of its customers will be to aggressively increase its customer energy-efficiency programs, continue acquiring and/or developing wind generation resources, and meet the balance with natural gas-fueled electrical generation (<http://www.pse.com>, November 12, 2009). Overall, utility costs will continue to increase. In an environment in which both fixed and variable costs are rising, PSE will likely require regular rate increases as the utility system evolves to meet new legislative, compliance, and operational requirements. Over the next 20 years, PSE projects that nominal retail electric rates will increase between 2.2 percent and 2.6 percent per year (PSE, July 30, 2009).

Kittitas County PUD #1 is a municipal corporation organized and existing under the laws of the State of Washington. The District is classified as a political subdivision of the State, established by a vote of the electorate in 1936 for the purpose of engaging in the generation, transmission, distribution and sale of electric energy. The District's service area is approximately 2,315 square miles covering most of Kittitas County and a small portion of Yakima County. The District serves primarily unincorporated areas. The PUD's system includes approximately 13 miles of transmission lines, seven substations, 490 miles of overhead distribution lines, and 190 miles of underground lines. The District is a statutory preference

customer of the Bonneville Power Administration, and currently purchases approximately 80 percent of its power from BPA. Approximately 15 percent of the District's power is supplied by the Priest Rapids Hydroelectric Project on the Columbia River, and 5 percent is provided by other sources (<http://www.kittitaspud.com>).

Natural Gas

PSE operates and maintains Washington State's oldest and largest natural gas distribution system that serves nearly 750,000 natural gas customers in the Puget Sound Region and Kittitas County. In addition, natural gas currently fuels approximately 30 percent of PSE's electrical generation. By 2029, it is projected to fuel 66 percent of electrical generation on an annual basis. Fuel for electric generation is now the primary driver of PSE's overall natural gas resource acquisitions, even though the total amounts required for generation remain lower than the total amount needed for retail gas sales (<http://www.pse.com>, November 12, 2009).

PSE manages a strategically diversified gas supply portfolio from suppliers across the western United States and Canada. At the present time, about 65 percent of both gas sales and electric generation fuel purchased by PSE is obtained from the Western Canadian Sedimentary Basin (WCSB) in British Columbia. Such a high concentration of natural gas supply from one source leaves PSE vulnerable to supply shortfalls should WCSB supply development not expand as projected, should supplies be diverted to Alberta markets, or should interruptions occur due to well freeze-offs, forced outages at processing plants, or pipeline disruptions. It also exposes PSE to WCSB price volatility and limits the company's ability to take advantage of cost differentials across different supply basins. Increasing access to the Rocky Mountain basin may reduce these risks and increase PSE's ability to take advantage of short-term price volatility, but current analyses estimate that doing so at this time would increase costs. PSE is continuing to investigate this issue. If the company is able to demonstrate that the benefits are greater than the costs, they will update resource strategies accordingly (PSE, July 30, 2009).

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 local "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>)).

The PSE 2009 *Integrated Resource Plan* (IRP) projects a significant increase in demand for natural gas both as a clean-burning source to generate electricity, and to serve the direct energy needs of the company's gas customers. This is because economic, political and environmental considerations virtually preclude the development of new hydro, nuclear, or coal-fired power resources in the region. To address the long-range need for more natural gas, the 2009 IRP recommends that PSE secure more natural gas pipeline capacity into the Northwest, and more natural gas storage resources. During the current 20-year planning period, PSE projects that nominal retail gas rates will increase by approximately 2.5 percent per year (PSE, July 30, 2009).

Kittitas County PUD #1 does not provide natural gas service.

Alternative Energy Sources

The 2009 *Integrated Resources Plan* underscores PSE's commitment to developing more renewable-energy resources, primarily wind power. The utility currently owns and operates two large wind farms in Eastern Washington: the Hopkins Ridge Wind Facility in Columbia County, and Wild Horse Wind and

Solar Facility in Kittitas County. These facilities make PSE the second-largest utility producer of wind power in the United States, according to the American Wind Energy Association. PSE's two wind facilities have a combined generating capacity of 386 MW. Their annual output is sufficient to serve the total power needs of approximately 100,000 homes. A 44-MW expansion of the Wild Horse facility was completed in 2009. In addition to wind-generating capabilities, the Wild Horse facility also has 2,408 solar panels capable of generating 500 kilowatts (kW) of energy at peak-rated (full-sun) generation – enough power to serve the needs of 300 households.

PSE's IRP identifies a need for another 1,100 MW of wind power by 2029. The expansion would ensure PSE compliance with Washington's Energy Independence and Security Act (Initiative 937). This voter-approved law requires large utilities to obtain 15 percent of their power supply from renewable resources by 2020. PSE is currently working to develop the Lower Snake River Wind Energy Project in Garfield and Columbia counties, where as much as 1,432 MW of new wind power will be generated.

Other forms of renewable energy, such as solar, biomass and geothermal, may have long-term potential if they can be developed cost-effectively on a utility scale. Federal renewable portfolio standards and climate change legislation could change the amount of renewable resources required, and changing State and Federal policies could also influence the types and locations of such resources (PSE, July 30, 2009).

As part of its responsibilities, BPA also promotes energy efficiency, renewable resources, and new technologies (BPA website accessed November 15, 2009: http://www.bpa.gov/Corporate/About_BPA).

POTENTIAL IMPACTS

The electrical energy and natural gas requirements of the various City Heights conceptual land use alternatives are quantified in Draft EIS Sections 3.18.4 and 3.18.5, and discussed there in relation to existing and planned PSE and Kittitas County PUD #1 facilities within the Kittitas County area. The rate of growth projected with the City Heights development in this location is anticipated in the long range planning of either electrical utility service provider.

MITIGATION MEASURES

Mitigation Measures Included in the Development Proposal. Homes and commercial buildings to be constructed within the City Heights development will comply with the most current energy conservation measures specified in applicable codes. The City of Cle Elum Building Code would apply to Alternative 1 or 2; the Kittitas County Building Code would apply to Alternative 3A or 3B. The applicant will also encourage builders to include provisions for the use of solar energy as this technology advances, such as roofing materials with solar power generation capabilities.

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% (PSE, May 3, 2007).

Other Possible Mitigation Measures. To the extent that builders may choose to construct "built green" homes within the City Heights development, this method of construction could improve 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 being more desirable to some purchasers and maintaining better value in a region where there is a high priority for energy conservation. Representative "built green" measures may include:

- 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.

Energy efficiency measures in construction could include practices such as advanced framing/extra insulation, installation of high-efficiency household appliances, and air sealing (advanced caulking). Builders could be encouraged 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 higher-density development areas of the site, construct detached garages, no garages, or garages air-sealed from the residence.
- 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 and Kittitas County PUD #1 representatives, no significant unavoidable adverse impacts to energy and natural resources would be anticipated as a result of the 6- to 12-year build-out and occupancy of the City Heights Planned Mixed-Use development. Also see Draft EIS Sections 3.18.4 and 3.18.5.