



# Hydroelectric Projects

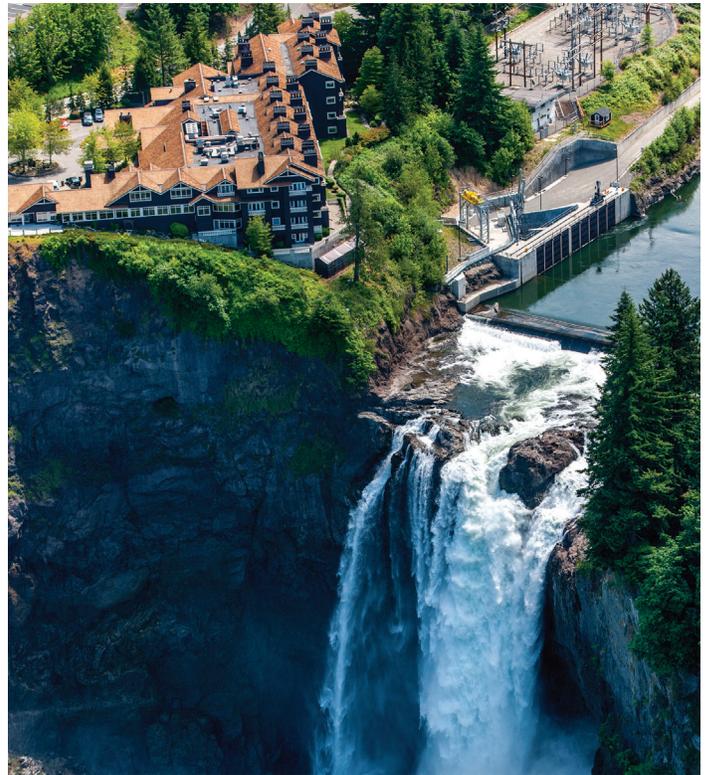
Puget Sound Energy strives to ensure reliable electric service at a reasonable cost by acquiring power supplies from a variety of different sources, both PSE-generated and purchased from other suppliers. These sources primarily are hydropower, wind power, natural gas-fired generation, and coal-fired power from Montana. This diversified-portfolio strategy minimizes risk—and costs—in the event of an unforeseen circumstance (a drought, for example) causes regional shortages in one form of power and, in turn, drives up wholesale power prices.

Hydroelectricity is the single largest resource in PSE’s power-supply mix, comprising more than one-third of the utility’s electric resources. Of this, eight percent comes from two PSE-owned generating facilities in Washington state: the Baker River Hydroelectric Project in Skagit (and Whatcom) County and the Snoqualmie Falls Hydroelectric Project in King County. The rest is purchased from other hydropower resources, primarily large Columbia River dams owned by central Washington public utility districts.

PSE is dedicated to being a steward to its communities and the environment. The utility’s innovative fish enhancement programs are helping to protect and propagate the local salmonids (Sockeye, Coho and trout) population. PSE is also invested in maintaining the natural beauty of the public parks and recreation areas at its Snoqualmie Falls and Baker River facilities.



▲ Baker River Hydroelectric Project



▲ Snoqualmie Falls Hydroelectric Project

# Baker River Hydroelectric Project

## Location

The Baker River Hydroelectric Project is located on a tributary of the Skagit River in northwest Washington and covers almost 300 square miles in Skagit and Whatcom Counties.

## Power output

- 215 megawatts maximum operating capacity between its two dams
- Output is sufficient to meet the peak electricity needs of about 96,000 households

## Facility profile

The Baker River Hydroelectric Project is located approximately 30 miles east of Sedro Woolley and directly north of Concrete, Washington, in both Skagit and Whatcom counties. The project includes Lower Baker Dam, completed in 1927; Upper Baker Dam, completed in 1959; the Lake Shannon and Baker Lake reservoirs behind the respective dams; the associated project powerhouses; and a variety of support facilities.

The Lower Baker Dam is located on the Baker River approximately one mile upstream from its confluence with the Skagit River in the town of Concrete, Washington. It has a height of 285 feet and it holds back the water for the Lake Shannon reservoir. The lake is 7 miles in length, covers 2,278 acres at its full pool, and has an elevation of 440 feet above sea level.

The Upper Baker Dam is located upstream of Lake Shannon and 9½ river miles upstream from the town of Concrete. A straight concrete gravity dam and an earth-filled saddle dam back up water for a distance of nine miles, creating the Baker Lake reservoir. The normal full lake elevation is 727 feet above sea level. The dam is 312 feet high and 1,200 feet long and it has a public roadway across the top.

The project also provides flood risk management and maintains the reservoirs low during the flood session from Oct. - Mar.

## Hydro project features

Two dams, each with its own powerhouse:

- Upper Baker: Unit 1 – 52 MW capacity and Unit 2 – 48 MW capacity
- Lower Baker: Unit 3 – 85 MW capacity, and Unit 4 – 30 MW capacity

## Fish protection

The Baker River is a major tributary of the Skagit River, one of Washington state's most prolific river systems for fish. To support the watershed's fish populations, PSE uses innovative floating surface collectors on Baker Lake (completed in 2008) and Lake Shannon (completed in 2013) to attract and safely hold juvenile

salmon for downstream transport by "fish taxi." The facility also includes a new fish hatchery; an advanced, upstream trap-and-haul facility; and a sockeye spawning beach.

## License

The Federal Power Commission issued its original license for the Baker River Project on June 4, 1956. That license expired on April 30, 2006. PSE filed for a new license with the Federal Energy Regulatory Commission (FERC) on April 30, 2004, and the FERC issued a new 50-year license on October 17, 2008. Under the terms of the FERC license, the Baker River Project assists in supporting flood risk management objectives in the Skagit Valley under contract with the United States Army Corps of Engineers. PSE also performs a wide range of activities involving fisheries, wildlife habitat, water quality and stream flow, recreational and cultural resources, and more.

## Public accommodations

Puget Sound Energy operates and maintains several recreation facilities at the Baker River Project. This includes an overnight campground at Kulshan and day-use sites that include boat launch ramps on both project reservoirs, a visitor's center at the PSE business office in Concrete, and a scenic overlook on Glover Mountain in the upper basin.

## Personnel

45 full-time PSE employees operate and maintain the Baker River Hydroelectric Project.

## Tax benefits to public

Property taxes levied on PSE's Skagit and Whatcom County facilities, including the Baker River Hydroelectric Project, provide significant revenues for local schools, county roads, and other public services.



▲ Floating surface collector

# Snoqualmie Falls Hydroelectric Project

## Location

The Snoqualmie Falls Hydroelectric Project is located along the Snoqualmie River in Snoqualmie, Washington, about 30 miles east of Seattle.

## Power output

- 54 megawatts maximum operating capacity
- Output is sufficient to meet the peak electricity needs of about 25,000 households

## Facility profile

The Snoqualmie Falls Hydroelectric Project is PSE's oldest power-generating operation and the world's first completely underground power plant. More than a century after its construction, the facility still produces clean, cost-effective electricity for PSE customers. In addition, the hydroelectric project's public park and trails have for decades been one of the Pacific Northwest's most popular scenic destinations, drawing approximately 2 million visitors annually to view the majestic, 270-foot waterfall.

The facility recently underwent a four-year redevelopment project, which included substantial upgrades and enhancements to the power-generating infrastructure and public recreational facilities.

## Hydro features

- Plant 1 powerhouse, built in 1898-1899 just above Snoqualmie Falls inside a bedrock cavity 270 feet below ground; plant's five power-generating units have 14 megawatts (MW) of generating capacity
- Plant 2 powerhouse, built in 1910 a quarter-mile downstream from the falls and expanded in 1957; plant's two generating units have 40 MW of generating capacity
- A small diversion structure, ranging about 4 to 18 feet in height, just upstream from Snoqualmie Falls; the structure helps direct water to powerhouses and boost their power-generation capacity
- Steel penstocks (pipes) and concrete-lined tunnels for carrying river water to powerhouses
- In 2013 the 102 year old Plant 2 was fully replaced with a new building and new generating unit

## Fish passage

New flow-control equipment installed in our Plant 2 powerhouse will ensure consistent outflows from the plant if an emergency shutdown occurs and prevent rapid changes in downstream river levels that could potentially strand fish in side channels. In addition, PSE is protecting the fish habitat along Tokul Creek and supporting a state Department of Fish & Wildlife fish-enhancement program in the upper Snoqualmie River watershed.

## Public accommodations

- The 12-acre Snoqualmie Falls Park contains picnic areas, restrooms, education kiosks and signs, and cliffside observation areas for viewing Snoqualmie Falls
- The lower park area offers a trail through forested wildlife habitat, restrooms, a kayak and canoe launching area, education and interpretive displays and a riverside boardwalk and observation platform for viewing Snoqualmie Falls
- Parking in the main park area accommodates tour buses and approximately 300 cars (450 total spots -150 assigned to Salish Lodge guests); lower park has three bus stalls and space for 41 cars
- Hydropower Museum, open Memorial Day through Labor Day (hours: Wed - Sun, 10 a.m. to 5 p.m.) located at SE 69th Place with parking onsite

## Project license

- The Snoqualmie Falls Project's operating license was renewed in June 2004 by the Federal Energy Regulatory Commission (FERC), authorizing another 40 years of hydropower generation

## Personnel

About 19 full-time PSE employees operate and maintain the Snoqualmie Falls Hydroelectric Project.

## Tax benefits to public

Property taxes levied on PSE's King County facilities, including the Snoqualmie Falls Hydroelectric Project, provide significant revenues for local schools, county roads, and other public services.



▲ Snoqualmie Falls