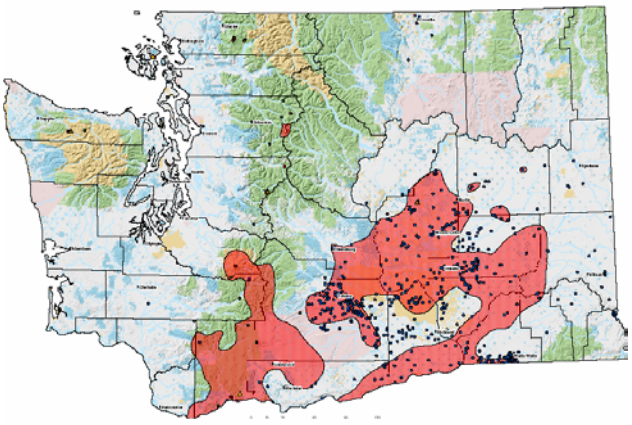
Geothermal Technologies Program

Tapping the Earth's energy to meet our heat and power needs



Washington

Much of the state of Washington east of the Cascade Range has good low-temperature (less than 100°C, or 212°F) geothermal resources. This is especially true in the southern portion of the state throughout the Columbia River basin, where there are more than 900 thermal wells. Such low-temperature geothermal resources have the potential for direct-use applications — where hot water may be used directly to heat buildings, grow plants in greenhouses, heat water for aquaculture, and other applications.

The Cascade Range itself offers good low- to high-temperature resources (greater than 150°C, or 302°F) along the stratovolcanoes (volcanoes with conic forms) and volcanic fields. Among the low-temperature resources are more than 30 known hot and mineral springs. Three of the high-temperature areas have thus far been identified as having particularly good potential for development of geothermal electric power. These are the Mount Adams area in the southern Cascades, the Wind River area east of Vancouver, Washington, and the Mt. Baker area in the northern Cascades.

A Strong Energy Portfolio for a Strong America

Energy efficiency and clean renewable energy will mean a stronger economy, a cleaner environment, and a greater energy independence for America. Working with a wide range of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.

Why Geothermal?

Current Development

There are several pending leases for exploring the approximately 300 MW electrical production potential of the state's high-temperature geothermal resources. A drawback, however, is that these resources tend to be in scenic areas, so environmental preservation would be a primary concern during exploration and development.

There may be even greater potential for direct-use applications from thermal wells in the Columbia River basin. Nevertheless, Washington has yet to develop the basin for geothermal applications.

On the other hand, Washington has developed several of its hot springs resources, including:

- Carson Hot Mineral Springs Resort. Located on the north shore of the Columbia River, about 55 miles east of Vancouver, Washington, this resort includes a hotel, several cabins, and a bathhouse that use the geothermal energy from the 52°C (126°F) hot springs located there.
- Soap Lake. Near the Grand Coulee dam on the Columbia River in central Washington, Soap Lake is a 3-mile long lake with a 31°C (87°F) constant summer temperature and a heavy mineral content. Spas along the lake yearly attract tens of thousands of people to these therapeutic waters.
- Doe Bay Village Resort. At 43°C (110°F) the waters from the hot mineral springs at this resort, located on Orcas Island of the San Juans, are piped into hot tubs on a deck above the beach.
- Sol Duc Hot Springs. This is a resort on the Olympic Pensinsula that offers a restaurant, soaking pools, hot tubs, and a swimming pool that are heated with the nearby hot springs, whose water temperatures reach 56°C (133°F).

Built in 1901 at Carson Hot Mineral Springs, the Hotel St. Martin is still in use today.

Economic Benefits

The developed hot and mineral springs of Washington provide about 11 billion Btus of geothermal energy per year. Compared to statewide energy consumption, this is relatively little energy and so does not have a large impact on the economy of the state in terms of offsetting other uses of energy. Instead, the economic impact is concentrated on the effect that the springs on the tourism industry. Sol Duc Hot Springs, for example, attracts 50,000 visitors a year, and Soda Lake draws far more than that.

Yet, if the state's estimated geothermal electric potential of 300 MW were to be fully developed, the economic and energy impact

The four-star hotel at Sol Duc Hot Springs, circa 1914.

would be significant. The typical geothermal power plant operates at full capacity about 95% of the time. This means that 300 MW could produce about 2.5 billion kilowatt-hours of electricity a year — enough to provide more than 265 thousand average U.S. homes with electricity.

Technical Capabilities

The geothermal experts at the Washington State University Energy Extension Program. have world-class expertise on high- and low-temperature geothermal energy. They have prepared a series of guides on developing geothermal energy and a series of case studies on geothermal heat pumps. They can provide information on planning, financing, and permitting a geothermal project.

History

In Washington, the history of geothermal use is the history of its hot and mineral springs. There are many such springs in the state as well as throughout the western United States. These springs were used by native Americans and their ancestors for thousands of years for cleaning, cooking, healing, and even negotiating. White men did not “discover" these springs until the mid to late 1800s. But by the late 1800s California, Idaho, Oregon, and Wyoming had begun to develop spas at some of the springs.

In Washington the first spa was developed in 1901 with the construction of the Hotel St. Martin at Carson Mineral Springs. A bathhouse and cabins were added in 1923 and an 18-hole golf course in 1974.

Other early developments were at Soap Lake with the building of the Lombardy Hotel and the Siloam Sanitarium in 1905, and at Sol Duc Hot Springs with the 1912 construction of a world-class resort, comprising a four-star hotel, a three-story sanitorium, and many other amenities.

The Sol Duc story is particularly interesting. The resort burned down in 1916, was rebuilt on a much less grand scale in the 1920s and was operated into the 1970s until it ran into trouble with its thermal spring in the 1970s. These problems were overcome and the resort was rebuilt in the 1980s. It continues to operate until this day, attracting thousands of visitors a year.

GeoPowering the West

GeoPowering the West is a cooperative federal, state, and local effort to promote awareness of the vast geothermal energy resources in the western United States, including Alaska and Hawaii. GeoPowering the West partners with businesses, government officials, Native American Groups, utilities, and energy consumers to expand the use of geothermal energy. For further information on these efforts, please contact the people listed to the right.

For more information, contact:
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