Hydropower

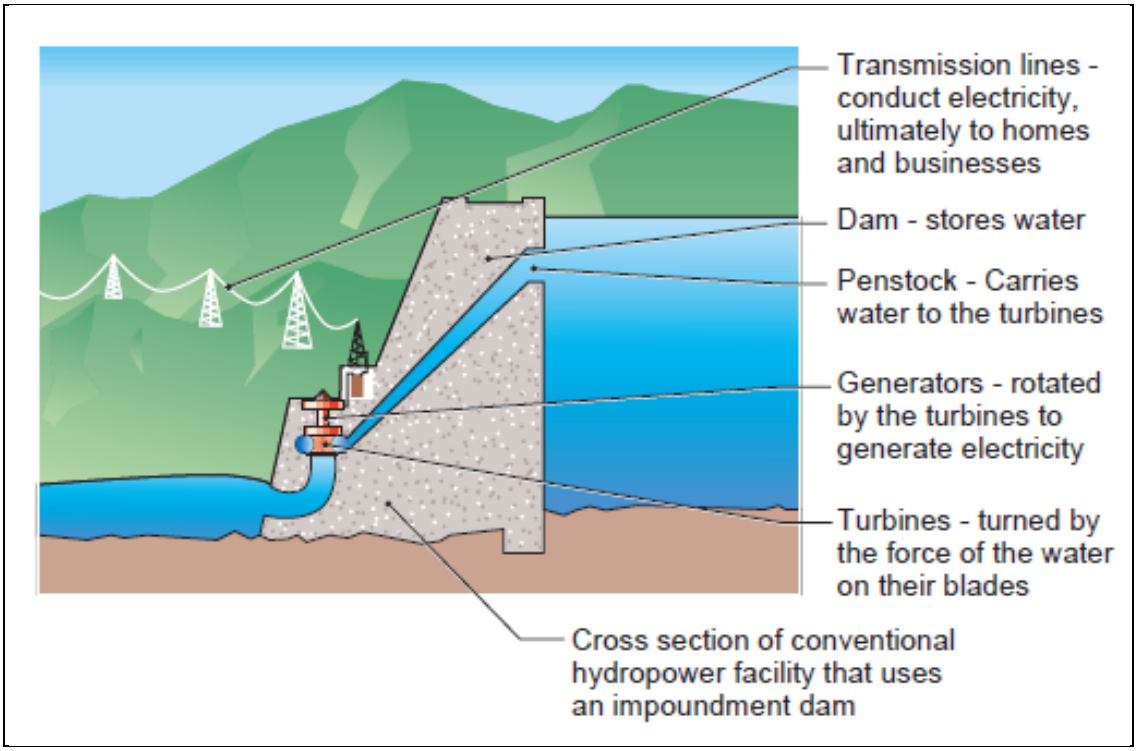


Figure 1 [Impoundment Hydropower Facility Figure published by U.S. Department of Energy on http://www1.eere.energy.gov]

Hydropower, also known as hydroelectric power, uses the energy of flowing water to create electricity. A typical hydropower system passes water through turbines connected to generators that create electricity as they rotate. The amount of energy that can be produced depends upon the flow volume and head. "Head" refers to the water pressure; the amount of pressure depends on the vertical distance the water drops and the characteristics of the pipe or channel. As volume or head increases, there is more potential to generate power. Increasing the amount of head reduces the amount of water needed to produce a certain quantity of power. Conversely, increasing the volume of water reduces the amount of head required to generate a given amount of power.

There are several types of hydropower facilities including: impoundment, diversion, pumped storage, run-of-river, and conduit (also referred to as in-conduit). *Impoundments* release water stored in a reservoir and are the most common type of hydropower plant. *Diversion* facilities have an intake that withdraws water from the river without a reservoir. *Pumped* storage facilities move water between two reservoirs by releasing water from an upper reservoir to a lower reservoir to generate electricity during periods of high demand. During low-demand, the water is pumped from the lower reservoir back to the upper reservoir. *Run-of-river* projects utilize the river's natural flow and do not necessarily require an impoundment. When impoundments are required, they are usually small. Finally, *conduit* hydropower usually incorporates small turbines into existing infrastructure such as tunnels, pipelines, and canals to generate electricity from flowing water.

In the United States, hydroelectric projects are categorized based on their generating capacity. The U.S. Department of Energy has established

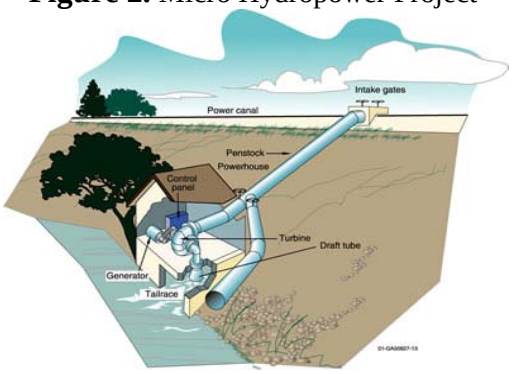
standardized hydropower facility sizes to refer to specific generation capacities as shown in Table 1. For example, micro hydropower refers to facilities producing less than 100 kilowatts of electricity, which is usually sufficient to supply individual users or small communities (Figure 2).

Table 1. Hydropower facility size and generation capacity

Size	Generating Capacity
Large	>30 megawatts
Small	100 kilowatts to 30 megawatts
Micro	<100 kilowatts

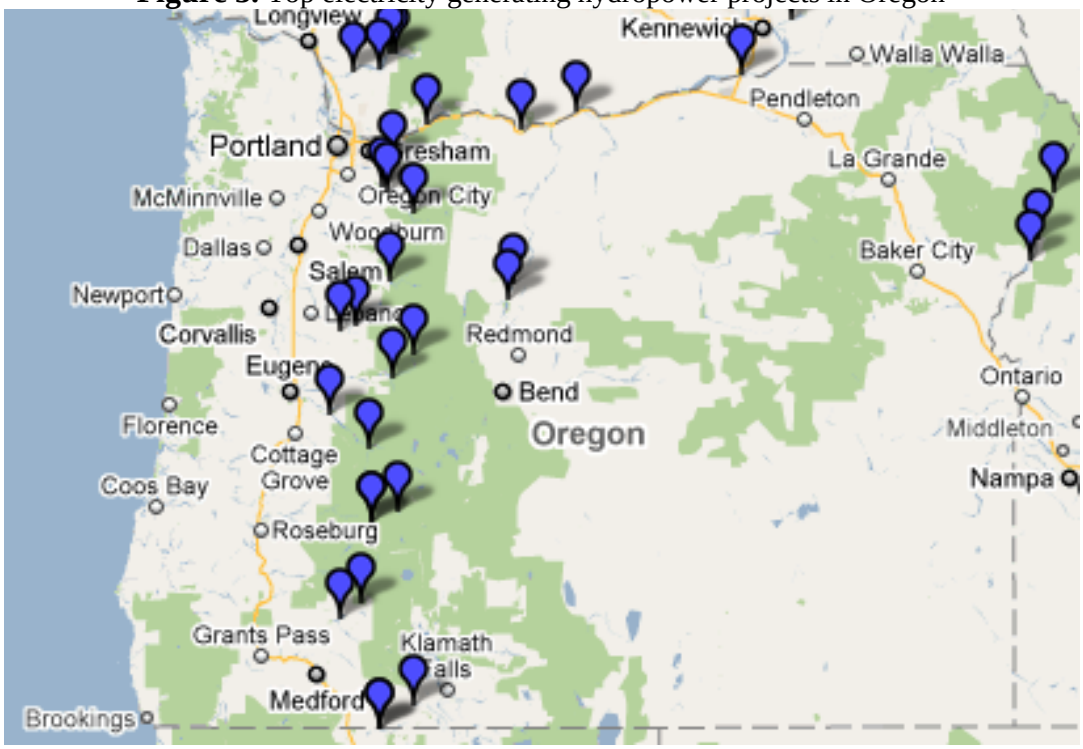
Oregon was the third top hydropower producing state in 2010 according to the U.S. Energy Information Administration, receiving 44 percent of its electricity from hydropower. As shown in Figure 3, most large scale hydropower projects in Oregon are within the Columbia and Willamette River drainages.

Figure 2. Micro Hydropower Project



[Figure from http://www1.eere.energy.gov]

Figure 3. Top electricity generating hydropower projects in Oregon



[Figure generated from Northwest Power and Conservation Council Website http://www.nwcouncil.org/maps/power/Default.asp]