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What is Hydroelectric Energy?

Hydroelectric energy, or hydropower, makes electricity by **harnessing or redirecting the natural flow of moving water**. Hydropower facilities come in many different shapes and sizes, and can be used on large rivers or small streams.

Hydroelectric energy is only used on the islands of Kaua'i and Hawai'i. It accounted for less than 1% of all electricity produced in Hawai'i in 2024.



All hydroelectric power plants use gravity and water to make electricity, but they manage the water differently. There are three main types of hydroelectric power plants.

Impoundment



Impoundment facilities use a dam to hold river water in a reservoir. Water is released from the reservoir and flows through the dam, where it spins a turbine to generate electricity.

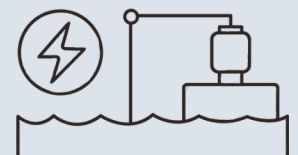
Photo courtesy of Hawaiian Electric

Diversion



Diversion, or “run-of-river” facilities, harness or redirect a portion of a river, ditch, or stream. The natural downhill slope of the waterway pushes water through a turbine and generates electricity before returning the water to the source.

Pumped Storage



Pumped storage hydropower (PSH) stores electricity made by other sources, functioning like a big battery. When demand is low, PSH uses electricity to pump reservoir water from lower to higher elevations. When demand is high, it releases the water, which flows back down to the reservoir and spins a turbine to make new electricity.



The Wailuku River Hydroelectric Power Company plant on Hawai'i Island is a diversion facility.

Hydroelectric Energy and the Environment



Hydropower is one of the oldest forms of renewable energy used in Hawai'i, dating back to the early sugarcane era. Some of the older power plants have been refurbished and are still in operation.



Photo courtesy of Hawaiian Electric

Hydroelectric Energy: Key Takeaways



Firm: As long as there is adequate streamflow, hydropower produces reliable, consistent electricity available 24/7, and can even store electricity from intermittent sources.



Renewable: Hydropower uses the natural water cycle to generate electricity.

Properly maintained hydropower plants can last 100 years or more, making them some of the lowest-cost options for electricity.



Changes Water Flow: Hydropower changes water flow, which can impact fish, wildlife, and people downstream if not managed carefully.



Versatile: Hydropower reservoirs can also be used to store heavy rainfall and prevent flooding.



Learn more about hydroelectric energy at www.energy.hawaii.gov



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