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Water supply uses its resources to pay the bills

by Carolyn Lucas
West Hawaii Today
clucas@westhawaii.com
Wednesday, March 25, 2009 8:45 AM HST

Hawaii County Department of Water Supply is using the power of water flowing naturally downhill from its Waikoloa Reservoirs to generate electricity, enough to power its entire Waimea Treatment Plant and sell the excess to the Hawaii Electric Light Co., said Julie Myhre, engineer and energy management analyst for the water department's Operations Division.

A hydroelectric generator, designed by Mike Maloney of SOAR Technologies Inc., was installed four months ago at the treatment plant. The Water Board, DWS staff and public toured the site Wednesday afternoon.

The water in the reservoirs is considered stored, or potential, energy. When water flows downhill through the pipelines, it becomes kinetic energy. The amount of electricity generated is determined by the volume of water flow and the amount of head -- the distance between the water surface and turbine.

The in-line hydroelectric generator at the plant harvests kinetic energy through a Pelton turbine, intercepting the gravity-fed flow of mauka water. As the turbine spins, the flowing water releases energy to the shaft of an electric generator, creating power in the system. It is expected to consistently generate a maximum of about 40 kilowatts of power -- enough electricity to power roughly 50 households daily. The project cost about \$190,000. Myhre estimated a full return of

investment in five to 10 years.

Following the hydroelectric generator tour, the group viewed the 50 million-gallon Waikoloa Reservoir No. 2, which was drained by order of Hawaii County Civil Defense shortly after the Oct. 15, 2006, earthquakes when water was found leaking from a number of "boils," 2- to 3-inch-diameter holes. Built in 1975, this reservoir is one of three that supply water to Waimea and the region between Kawaihae and Paauilo, said Terry Nago, project engineer.

Repair work by contractor Goodfellow Bros. is expected to begin soon. Construction is expected to end in November, barring weather-related or unanticipated delays, Nago said.

More than 6 acres of new Hypalon polymer liner will be installed on the floor and internal slope, following cleaning and repair of cracked concrete panels. Under the Hypalon layer, there will be a geotextile fabric that will act as a cushion layer, protecting the liner from the rough surface of the concrete panels.



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The hydroelectric generator at the Waimea Water Treatment Plant can be seen at the end of the walkway. - Brad Ballesteros | Special To West Hawaii Today



Engineer Julie Myhre talks about the hydroelectric generator at the Waimea Water Treatment Plant on Tuesday during a tour of the site. - Brad Ballesteros | Special To West Hawaii Today

The external slope will also be stabilized and improved with a filter drainage system to remove subsurface water from the reservoir embankment, Nago said.

This project will cost about \$1.9 million with about \$900,000 reimbursed by the Federal Emergency Management Agency. The remainder will be provided by DWS funds, Nago said.