

Design to yield reliable resource

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ULUPALAKUA – The Auwahi wind farm may contain a pumped storage component to generate hydroelectric power.

If it works out, it will be the first combined wind-hydro project Shell WindEnergy has ever done, says John Hofmeister, president of Shell Oil Co.

Pumped storage has long been offered as the solution to the Holy Grail of alternative electricity – a way to convert erratic wind, solar or wave energy into a stream of electrons as steady and reliable as that produced by a steam or gas turbine.

The concept is simple. On Maui, the wind tends to blow mostly at night, when demand for power is lowest. Rather than wasting that electricity, it can be used to pump water up to a reservoir.

Later, when demand jumps, the water runs downhill to another reservoir, passing through a water turbine along the way to use the power of gravity to generate electric power.

It also works with nuclear power plants, whose fuel decays at a steady rate whether the heat it makes is needed at that moment or not.

Although offered as a source of virtually free electricity, pumped storage projects are not common.

In the Hawaiian Islands, natural lakes are rare because most rocks are fractured and water disappears into the lens of groundwater that underlies each island.

Building artificial reservoirs is consequently expensive. The largest on Maui, the Department of Water Supply's two ponds at Kahakapao, cost a dollar per gallon – \$100 million for 100 million gallons of storage.

Sumner Erdman, president of Ulupalakua Ranch, says the probable location of an Ulupalakua reservoir may not present the topographical challenges of Kahakapao. "The terrain is pretty reasonable," he said.

Also, for pumped storage, the water doesn't have to be potable.

In any event, the reservoir will have to be lined.

Water for it would come either from rainfall or possibly from wells. Brackish water would be suitable, says Erdman.

The water is reused, but at the ranch the reservoir could serve a dual purpose.

The Erdmans have been planting native plants, primarily koa, in water courses and other areas that can be protected from cattle.

Their goal has been to plant a thousand a year, but success has been variable because of drought. Having a reservoir available could increase the survival rate of saplings in dry South Maui.

Koa is a fast-growing and valuable hardwood, and some of the Ulupalakua plantings are now 15 years old – harvestable for timber.

“We don’t plan for harvesting them,” says Erdman. The plantings are part of efforts to rehabilitate soil and reduce erosion.

No estimates of how much power a pumped storage component would add to the total output have been made.

The location of the reservoir is also undetermined, but Erdman says it could be quite distant from the wind farm.

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