

## Hawaii Pursues Renewable Energy

*Renewable Energy World 12/23/10*

*By Richard M. Rosenblum, President & CEO, Hawaiian Electric Co.*

Hawaii, United States -- If you know Hawaii mostly for beaches and golf courses, you need to understand how unique the islands are when it comes to energy. Each island is a stand-alone grid without interconnections.

When sugar was king, plantations renewably supplied up to half the electricity on some islands. As plantations vanished, imported oil grew so today oil powers 75 percent of Hawaii's electric generation and 90 percent of all non-aviation energy use.

This is not a recipe for sustainability. The 2008 Hawaii Clean Energy Initiative aims to protect Hawaii's energy, economic and environmental future.

October 2010 marked the second anniversary of this landmark clean energy agreement between the State of Hawaii and the Hawaiian Electric companies. The agreement set Hawaii on the path to a 70 percent reduction in fossil fuel consumption by 2030. The targets are a 30 percent reduction statewide in fossil fuel use through energy efficiency and 40 percent through renewable energy substitution in just over 20 years.

At Hawaiian Electric, Maui Electric and Hawaii Electric Light companies, we are committed to a three-pronged goal: 1) reduce fossil fuel consumption, 2) protect our customers from the volatility of highly variable fossil fuel costs and 3) reduce customer cost to below what it would have been had we continued today's near-total dependence on fossil fuels.

Part of the clean energy agreement calls for changing Hawaii's regulatory model. A newly approved ratemaking model called decoupling disconnects utility revenues from sales to encourage energy conservation and renewable energy. A feed-in-tariff will make it easier for renewable energy developers to enter the market. More dynamic clean energy scenario planning will replace an older, less flexible process. And newly approved electric vehicle charging rates are making Hawaii EV-ready.

With 10 percent of electricity from renewable sources, Hawaii is already among the top half dozen states. The "Big Island" of Hawaii has reached nearly 40 percent renewable generation from geothermal, wind and other sources. Maui is not far behind.

On Oahu, the population center with over 75 percent of our people, renewable generation is only about 4 percent, but the pace is picking up. A new 30 MW wind farm will go into full operation early next year. A second planned Oahu wind farm is in the early environmental review stage.

The sparsely populated islands of Molokai and Lanai have some of the world's most favorable wind regimes. We are working with developers proposing to build 400 MW of high-capacity wind farms on these islands and with the State of Hawaii in planning an undersea cable to connect the islands. It will bring cost effective wind power to Oahu by linking multiple islands into a single grid for the first time.

Integrating up to 500 MW of wind into the Oahu grid, where demand typically peaks at 1,200 MW, offers some engineering challenges. For example, to take as much wind energy as possible requires that we turn conventional units down below what has been their "minimum output" to make room for wind. At the same time we have to maintain our

ability to quickly ramp units up or down to respond to rapid fluctuations of wind power. Exposing existing generators to more frequent cycling and ramping has implications for long-term life cycle and further operations and maintenance monitoring.

Another challenge is that our island wind farms are relatively small and close to one another, often in the same "wind regime." Our geography makes it difficult to balance low output from one wind regime with high output from another regime.

Wind is not our only resource. We have the potential to switch from "black" liquid fuel to sustainably produced "green" biofuels. Late last year, we completed a 110 MW power plant that ranks among the largest totally biofueled combustion turbines in commercial operation. Early next year we will test-fire biofuel/oil mixtures in our other fossil-fuel units to allow eventual conversion to renewable biofuels.

To reach our renewable goals, we are investigating every available technology. We support distributed renewable generation, waste-to-energy plants, run-of-river hydro generation and the electricity potential of the ocean all around us. On the volcanically active Big Island, existing geothermal production has the potential to be a larger source of dispatchable renewable generation.

Can we meet our three-pronged goal? We think so. In just the last two years our focus has changed from striving to meet the 40 percent renewable energy goal to seeking to exceed it. The obstacles are real, but we're committed to doing everything possible to shift Hawaii to a clean energy future for the benefit of all our customers.