

Renewable energy for Hawaii: What does it take?



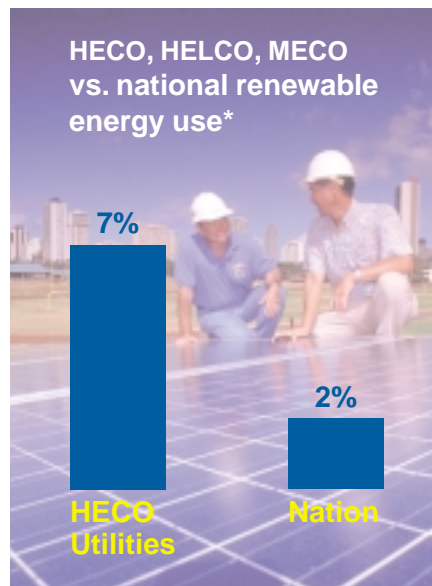
Solar users like the Onos of Millilani participate in the largest solar rebate program in the nation.

Hawaiian Electric supports renewable energy that's reasonably priced and reliable for our customers

Hawaii is a leader in the use of renewable energy

- About 7% of the electricity sold to customers of HECO and our subsidiaries, HELCO and MECO, comes from renewable sources like the sun, wind, geothermal and biomass. This compares to the nationwide average of only 2% (excludes large hydro dam projects not feasible in Hawaii).
- More than 28% of the electricity sold on the Big Island came from renewable sources (1999 figures).
- Hawaii outperforms the nation in supporting the federal Million Solar Roofs Initiative. To date, over 80% of the Initiative's installed solar systems nationwide are in Hawaii, thanks to HECO, HELCO, and MECO's solar programs.

- HECO, HELCO, and MECO sponsor the largest solar water heating program in the country. Since the program began in 1996, more than \$13.5 million in utility rebates have helped Hawaii residents pay for over 14,000 solar water heating systems. Over the next five years, our goal is to add at least 10,000 more.



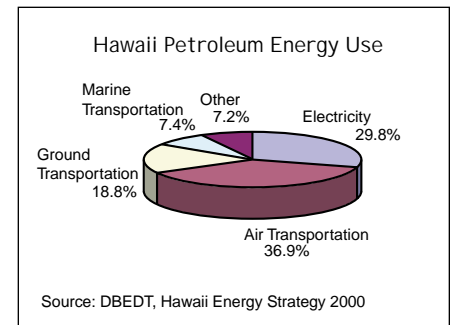
*1999 figures, excluding hydro power. Large hydro dams are not feasible in Hawaii.

The continuing need for oil

National policy acknowledges our country will continue to need fossil fuels.

"Fossil fuels are fundamental to America's future. While we hope to increase the diversity of the nation's energy mix, traditional fuels will continue to...fuel our factories, power our automobiles and help grow the economy for many years into the future." - U.S. Department of Energy

Nevertheless, Hawaiian Electric is committed to reducing Hawaii's use of oil by supporting renewable energy and energy efficiency programs.



Renewable power and energy efficiency will save millions of barrels of oil

Over the next ten years, HECO, HELCO, and MECO expect to save an estimated 19 million barrels of oil from using renewable energy to generate electricity and by encouraging energy efficiency through our incentive programs.



HOW CAN HAWAII USE MORE RENEWABLES?

To increase renewable energy use, we need to address these issues:

- **Cost.** It costs more to produce electricity from some renewable energy sources than from fossil fuels. Electricity is a basic necessity that must be affordable to all. HECO, HELCO, and MECO buy renewable energy when it's at a reasonable cost for customers. We are helping lower the cost by supporting research and demonstration projects.

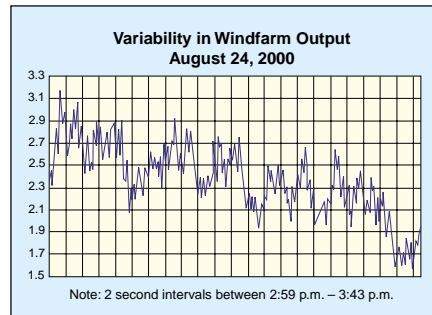
Costs per kWh*

Oil/coal	7 to 11 cents
Geothermal	11 to 14 cents
Biomass	19 to 25 cents
Photovoltaic	30 to 40 cents
Wind	8 to 11 cents

*Based on Oahu costs for new generation, except for geothermal, which is only available on the Big Island. Neighbor island wind costs may be lower due to better wind sites.

- **Reliability.** Unlike Mainland utilities that can buy power from other states, Hawaii doesn't have interconnections to other utilities to provide backup power when renewable energy is not available.
- **Availability.** Except for geothermal and biomass, many renewable sources aren't available on demand. "As available" sources like solar and wind still need back-up generation or energy storage systems to ensure power is available when customers need it – 24 hours a day, 7 days a week.

- **Variability.** The variability in strength and direction of wind can affect the quality of power produced. This can cause problems for sensitive electronic equipment.



- **Lots of land.** Large-scale renewable energy facilities may need a lot of acreage.
- **Environmental effects.** Some renewable energy sources have environmental impacts, such as noise and visual impacts of large wind turbines.

What is HECO doing to help?

Sun Power for Schools

Thanks to contributions from customers and HECO, HELCO and MECO, 15 public schools now receive a small amount of electricity from demonstration photovoltaic (solar electric) systems. For more information, call 543-7511.



Sun Power for Schools has paid for photovoltaic systems at 15 high schools, including Waianae High School, pictured here.

Photovoltaic projects

HECO, HELCO, and MECO are gaining more hands-on experience with solar electric technology by installing, operating and maintaining photovoltaic systems:

- 15 kW PV system on county gymnasium in Kailua-Kona
- 18 kW PV system at Hickam AFB
- 20 kW PV system in Kihei
- Special building-integrated PV system at Ford Island
- PV modules at Maui Whale Sanctuary in Kihei

Research and development

HECO, HELCO, and MECO are installing and operating many demonstration projects, and contributing to national research efforts to improve the technology.

Partnerships and alliances

HECO, HELCO, and MECO are

- supporting the extension of renewable energy TAX CREDITS to help make technologies more affordable for Hawaii's residents and businesses.
- developing simplified agreements to make it easier for renewable energy producers to sell power to Hawaiian Electric utilities.
- creating alliances such as with the EPA's Energy Star financing program, making solar water heating more affordable for homeowners.