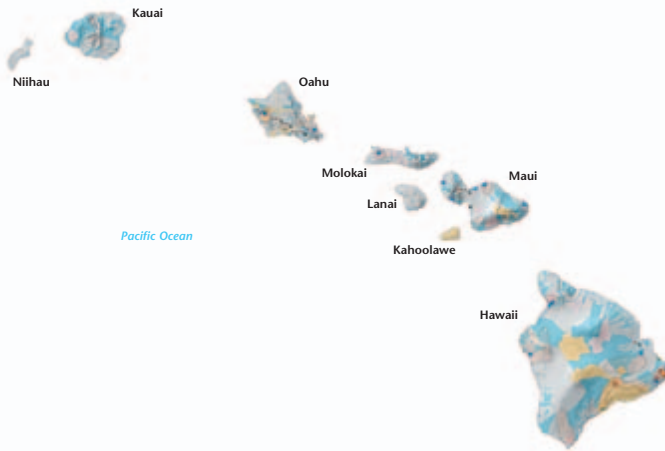


# Geothermal Technologies Program

Tapping the Earth's energy to meet our heat and power needs



## Hawaii

*imports oil for about 90 percent of the state's energy needs. No other state in the United States is so critically dependent on imported oil. Geothermal energy presently supplies nearly one quarter of the power needs of the Big Island. The state's policy supports geothermal energy production on the Big Island exclusively for use on that island.*

## Why Geothermal?

### Current Development

The Hawaiian Islands lie above a geological "hot spot" in the earth's mantle that has been volcanically active for the past 70 million years, with the Island of Hawaii (the "Big Island") having the most recent activity. The Big Island has an obvious, large potential for geothermal energy resources, both for electrical generation and direct utilization. Since the 1976 drilling of the HGP-A well and the discovery of the Kapoho Geothermal Reservoir in the lower Kilauea East Rift Zone (KERZ), the geothermal heat reserves of the entire KERZ have been estimated to exceed 200 megawatts.

While the theoretical geothermal energy potential in the state is substantial, development of such projects has been controversial. Currently, the state's policy supports geothermal energy production on the Big Island exclusively for use on that island. Puna Geothermal Venture provides nearly a quarter of the power consumed on the Island of Hawaii.

### Economic Benefits

The U.S. geothermal energy industry as a whole provided about 12,300 direct domestic jobs, and an additional 27,700 indirect domestic jobs. The electric generation part of the industry

employed about 10,000 people to install and operate geothermal power plants in the United States and abroad, including power plant construction and related activities such as exploration and drilling; indirect employment was about 20,000.

On average from 1997-2001, the Puna Geothermal Venture (PGV) 30-megawatt plant on the Big Island displaced the need to burn about 475,000 barrels of fuel oil per year. During the five-year period, Hawaii Electric Light Company paid an average cost of about \$27.37 a barrel for oil. That translates to an average of about \$13 million annually in fuel cost savings! The PGV geothermal plant also eliminates the need to ship that amount of fuel oil from the refineries on the island of Oahu, thus significantly reducing the risk of oil spills, and the potential economic and environmental impacts a spill can represent for the state.

### Technical Capabilities

Universities, state agencies, private industry, and a DOE regional office bring technical capabilities to the task of managing Hawaii's geothermal resources. The University of Hawaii's School of Ocean and Earth Science and Technology, has been a technical and information resource for many years.

## A Strong Energy Portfolio for a Strong America

Energy efficiency and clean, renewable energy will mean a stronger economy, a cleaner environment, and greater energy independence for America. Working with a wide array of state, community, industry, and university partners, the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy invests in a diverse portfolio of energy technologies.



**A volcanic vent on the Big Island, Hawaii.**



U.S. Department of Energy  
Energy Efficiency  
and Renewable Energy



This power plant provides nearly 25% of the electricity used on the Big Island of Hawaii. It is a hybrid binary and flash plant (courtesy of the Geothermal Education Office).

## History

The first geothermal well in Hawaii to produce steam was drilled in 1976 in the Puna district of the Big Island. This well, named the Hawaii Geothermal Project - Abbott (HGP-A) was 6,140 feet deep and one of the hottest in the world. In July of 1981, a 2.5-megawatt electric plant used energy from this well to produce electrical power that was fed into the Hawaii Electric Light Company's grid. The U.S. Department of Energy, and the state and county governments funded the plant. It was originally designed as a two-year demonstration project, but continued operation until the end of 1989.

Puna Geothermal Venture, a partnership comprised of OESI Power Corporation (an American subsidiary of Ormat Turbines Ltd., Yavne, Israel) and Constellation Power Incorporated (a subsidiary of the Baltimore Gas and Electric Company), developed a 25-megawatt geothermal plant in the Kapoho area of the KERZ on the Big Island. This plant represents the first commercial geothermal plant in Hawaii and production of electricity commenced on April 22, 1993. In 1996, this plant was re-rated to 30 MW.



## GEOPOWERING THE WEST

GeoPowering the West is a cooperative Federal, state, and local effort to promote awareness of the vast geothermal energy resources in the Western United States, including Alaska and Hawaii. GeoPowering the West partners with businesses, government officials, Native American groups, utilities, and energy consumers to expand the use of geothermal energy. For further information on these efforts, please contact the people listed to the right.

**For more information contact:**  
EERE Information Center  
1-877-EERE-INF (1-877-337-3463)  
eereic@ee.doe.gov  
or visit: [www.eere.energy.gov](http://www.eere.energy.gov)

# Hawaii

## GeoPowering the West Contacts

### **Hawaii Department of Business, Economic Development and Tourism**

Strategic Industries Division  
808.587.3807

[www.hawaii.gov/dbedt/ert/energy.html](http://www.hawaii.gov/dbedt/ert/energy.html)

Priscilla Thompson, Energy Analyst  
pthompso@dbedt.hawaii.gov

### **University of Hawaii School of Ocean and Earth Science and Technology**

Klaus Keil, Interim Dean  
808.956.6182

### **Puna Geothermal Venture**

Barry Mizuno, Owner's Representative

[www.punageothermalventure.com](http://www.punageothermalventure.com)

808.965.6233

### **U.S. Department of Energy Seattle Regional Office**

[www.eren.doe.gov/sro/](http://www.eren.doe.gov/sro/)

Curtis Framel, Senior Program Manager  
206.553.7841, [curtis.framel@ee.doe.gov](mailto:curtis.framel@ee.doe.gov)

### **U.S. Department of Energy GeoPowering the West**

[www.eren.doe.gov/geopoweringthewest](http://www.eren.doe.gov/geopoweringthewest)

Susan Norwood, National Coordinator  
202.586.4779, [susan.norwood@ee.doe.gov](mailto:susan.norwood@ee.doe.gov)

### **Sandia National Laboratories**

[www.sandia.gov/geothermal](http://www.sandia.gov/geothermal)

Roger Hill, GPW Technical Director  
505.844.6111, [rrhill@sandia.gov](mailto:rrhill@sandia.gov)

### **Geo-Heat Center**

(Direct-Use Technical Information)

[geoheat.oit.edu](http://geoheat.oit.edu)

John Lund, Director  
541.885.1750, [lundj@oit.edu](mailto:lundj@oit.edu)

Produced for the  
U.S. Department of Energy (DOE)  
Energy Efficiency and Renewable Energy



U.S. Department of Energy  
Energy Efficiency and Renewable Energy

1000 Independence Avenue, SW  
Washington, DC 20585

By the National Renewable Energy Laboratory,  
a DOE National Laboratory

DOE/GO-102004-1907  
April 2004

Printed with a renewable source ink on paper  
containing at least 50% wastepaper, including  
20% postconsumer waste.