



U.S. Department of Energy

## Energy Efficiency and Renewable Energy

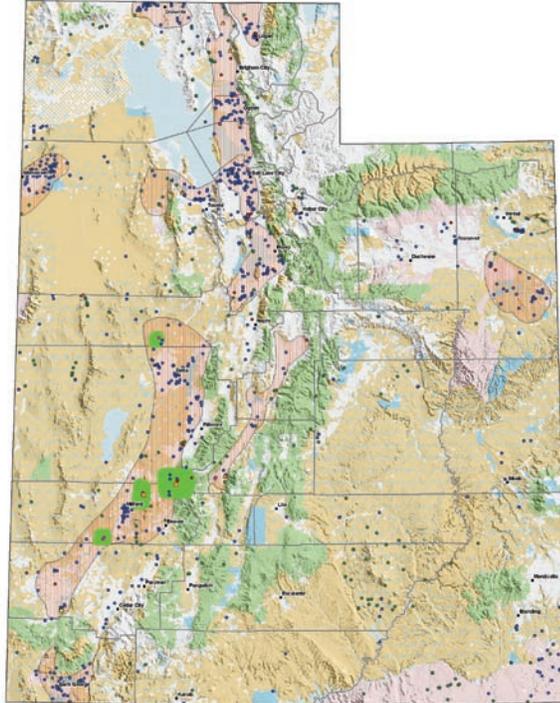
Bringing you a prosperous future where energy is clean, abundant, reliable, and affordable



# Geothermal Technologies Program Utah



**M**ost of the higher temperature geothermal areas in Utah occur in what is referred to by geologists as the Basin and Range Province, or within the Basin and Range-Colorado Plateau transition zone in central and southwestern Utah. While two geothermal power plants operate in southwestern Utah, direct use is more extensive. Eighteen projects use geothermal energy at ten areas. Greenhouse heating is the largest use, followed by swimming pools. Six resorts use geothermal water for the heating of pools, small space-heating applications, and therapeutic baths. The direct use amounts to a savings of about 162,000 barrels of oil (assuming 35% efficiency from electricity), eliminating 21,700 tons of carbon and 42,000 tons of carbon dioxide.



**Pacificorp's Blundell geothermal power plant at Roosevelt Hot Springs KGRA near Milford, Beaver County.** (Utah Geological Survey)

### Current Development

Presently, electric power is generated at the Roosevelt Hot Springs and the Cove Fort-Sulphurdale Known Geothermal Resource Areas on the eastern margin of the Basin and Range Province, about 165 miles south of Salt Lake City. The installed gross capacity for the two areas is about 33 MW (electric). The Blundell Geothermal Plant, a single flash plant near Milford in Beaver County began operation in 1984. The geothermal resource is a high-temperature hydrothermal field where young, cooling intrusive rocks (magma) heat meteoric ground water. The plant produces 26 MW gross (23 MW net), which equals the energy that would be produced by burning roughly 48,000 cubic meters (300,000 barrels) of oil annually.

At the Cove Fort-Sulphurdale KGRA near Cove Fort in southeastern Millard County, Recurrent Resources recently acquired the 10 MWe (gross) Bonnett power station and rights to the geothermal resource from the Utah Municipal Power Agency and Provo City.

Operations at the plant and field are currently suspended as Recurrent evaluates options for field development.

Commercial greenhouses using thermal water for space heating operate near Newcastle in Iron County and at Crystal Hot Springs near Bluffdale in Salt Lake County. Covering more than 24 acres, Milgro Nurseries operates one of the largest geothermally heated greenhouses in the country. Milgro produces potted chrysanthemums, Easter lilies, and poinsettias, but also has large Dutch bulb crops, including irises, tulips, daffodils, hyacinths, and potted calla lilies among others. Milgro's main complex and several other commercial greenhouses at Newcastle, covering a total of more than 26 acres, use the geothermal fluid from shallow production wells about 500 feet deep.

At Crystal Hot Springs near Bluffdale in southern Salt Lake County, geothermal water is used for space heating and aquaculture in multiple projects.

### 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.

In January 2004, the Utah State Correctional Facility, through a long-term contract with an energy service company (Johnson Controls) began providing space heat and domestic hot water to the Oquirrh 4 minimum-security wing from an existing, 1,000-ft deep geothermal well. On adjacent

property, Bluffdale Flowers (formerly Utah Roses) raises cut roses in 250,000 sq ft of geothermally heated greenhouses, also supplied from a 1,000-ft deep well. Both of these developers supply the spent geothermal water to two separate aquaculture facilities that raise tropical fish for commercial sale.

Three newer direct-use developments focus on commercial scuba-diving near Grantsville in Tooele County, near Plymouth in Box Elder County, and at Midway in Wasatch County.

## Proposed Development

A proposed expansion of the power production at the Roosevelt Hot Springs KGRA is currently under evaluation. According to PacifiCorp's 2003 Integrated Resource Plan, a 10-12 MW expansion of generating capacity is under review and will be implemented if "appropriate and cost effective." The expansion, reportedly, would employ binary cycle technology. PacifiCorp operates the power plant while Intermountain Geothermal Company is the field developer.

Recurrent Resources reportedly intends to re-develop the geothermal resource and re-build a power station at the Cove Fort-Sulphurdale KGRA. Company officials have indicated that they are investigating constructing a power station of 30 to 40 MW capacity using Kalina Cycle technology.

## Technical Capabilities

The Utah Geological Survey maintains a geothermal web site for Utah ([www.geology.utah.gov/geothermal](http://www.geology.utah.gov/geothermal)) and recently released Open-File Report 431,



**Milgro Nurseries geothermally heated greenhouses near Newcastle, Iron County**

Utah Geological Survey

Geothermal Resources of Utah, 2004 on compact disk. Located on the University of Utah campus in Salt Lake City, the Energy and Geoscience Institute offers technical expertise on exploration and development of geothermal resources.

## History

Native Americans were the first to enjoy Utah's thermal springs as they often camped near these springs in winter. Later, Mormon pioneers wrote accounts of the springs. The popularity of Utah hot springs influenced the development of the railroads in the state. The early railroads commonly owned and operated resorts on or at the end of their lines to stimulate traffic. While there are currently nine resorts in Utah that use thermal water for swimming pools, spas, and baths, there have been many more of these pleasure resorts in the past – some with very colorful individual histories.

The energy price shocks of the 1970s brought renewed interest in geothermal as an energy source. Energy companies along with federal and state government became interested in studying, exploring, and developing geothermal sources in the state. Many areas were examined. Some were identified as known geothermal resource areas, or KGRAs. Some KGRAs, like Roosevelt Hot Springs, Cove Fort-Sulphurdale, and Newcastle, were eventually developed for power generation or direct use.



## 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 more information contact:

#### EERE Information Center

1-877-EERE-INF (1-877-337-3463)

[eeeric@ee.doe.gov](mailto:eeeric@ee.doe.gov) or visit: [www.eere.energy.gov](http://www.eere.energy.gov)

#### Utah Geological Survey

Robert Blackett

(435) 865-8139

[robertblackett@utah.gov](mailto:robertblackett@utah.gov)

#### Utah Geological Survey

Nykole Littleboy

(801) 538-5413

[nykolelittleboy@utah.gov](mailto:nykolelittleboy@utah.gov)

[www.geology.utah.gov/geothermal](http://www.geology.utah.gov/geothermal)

#### University of Utah, Energy and Geoscience Institute

Joseph Moore

(801) 585-6931

[jmoore@egi.utah.edu](mailto:jmoore@egi.utah.edu)

[www.egi.utah.edu](http://www.egi.utah.edu)

#### Central Regional Office

Sandy Glatt

(303) 275-4857

[Sandy.Glatt@hq.doe.gov](mailto:Sandy.Glatt@hq.doe.gov)

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-102005-2144

June 2005

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