

GEOHERMAL ENERGY DEVELOPMENT IN UTAH

A Position Paper by the Utah Geothermal Working Group - April 2005

Geothermal Energy: *is heat (thermal) derived from the earth (geo). It is the thermal energy contained in the rock and fluid (that fills the fractures and pores within the rock) in the earth's crust.*

Geothermal Resources Include:

- High-temperature steam and hot water (> 350°F), used for direct-steam and flash-steam power generation
- Moderate-temperature fluid (200° – 350°F), used for binary power generation and commercial space and process heating
- Low-temperature (< 200°F) water, used for greenhouse heat, aquaculture and other light commercial uses; geexchange systems utilize rock, soil, or ground water at temperatures from 40°F to 100°F as a heat source in winter and a heat sink in summer for space conditioning in commercial and residential buildings

Benefits:

- Economic development opportunities, especially in rural areas
- Reduction of greenhouse gas emissions
- Lessened reliance on imported energy
- Increased tourism and recreation, due to unique qualities of many geothermal sites

Current Uses: *(See map for existing development locations)*

- Roosevelt Hot Springs (Milford) and Cove Fort-Sulphurdale power plants, 30 MW combined capacity (high-temperature geothermal areas); Utah is one of only four states with geothermal electric power plants
- Six commercial greenhouses including Milgro at Newcastle, one of the nation's largest producers of flowers and bulbs
- Utah State Prison near Bluffdale (space heating)
- Several commercial aquaculture and recreation facilities, such as resorts, spas, scuba diving facility (heat and special chemical qualities)
- Geexchange (ground-coupled) heating and cooling systems are reducing energy costs in newer Utah schools

Potential Uses: *(See map for potential development areas)*

- High-temperature power generation capacity could reach 200 MW, or about 5% of Utah's total current electric generation capacity from the two developed areas (Roosevelt Hot Springs near Milford and near Cove Fort-Sulphurdale)
- Limitless increase in the direct application of the resource (space heat, production of commercial products, or recreation); virtually anywhere in the state is suitable for geothermal heat pumps (geexchange systems)

Reliability and Affordability:

- Geothermal power plants are highly reliable, supplying base electricity load to the grid, the same as coal, natural gas, and other fuels
- Utah has an abundance of lower temperature geothermal resources that can be economically developed for direct-use applications

Policy and Program Options: The State of Utah can utilize a variety of means to stimulate development of our abundant geothermal energy resources:

- Educate policy makers and the public by supporting outreach programs
- Identify regulatory, policy, and market barriers and aid in the removal or reduction of those barriers
- Support technical studies of geothermal resources and associated technologies
- Promulgate building codes that accommodate geothermal design needs
- Support renewable energy standards (RES) for energy consumers
- Favor renewable energy for the state's internal procurement

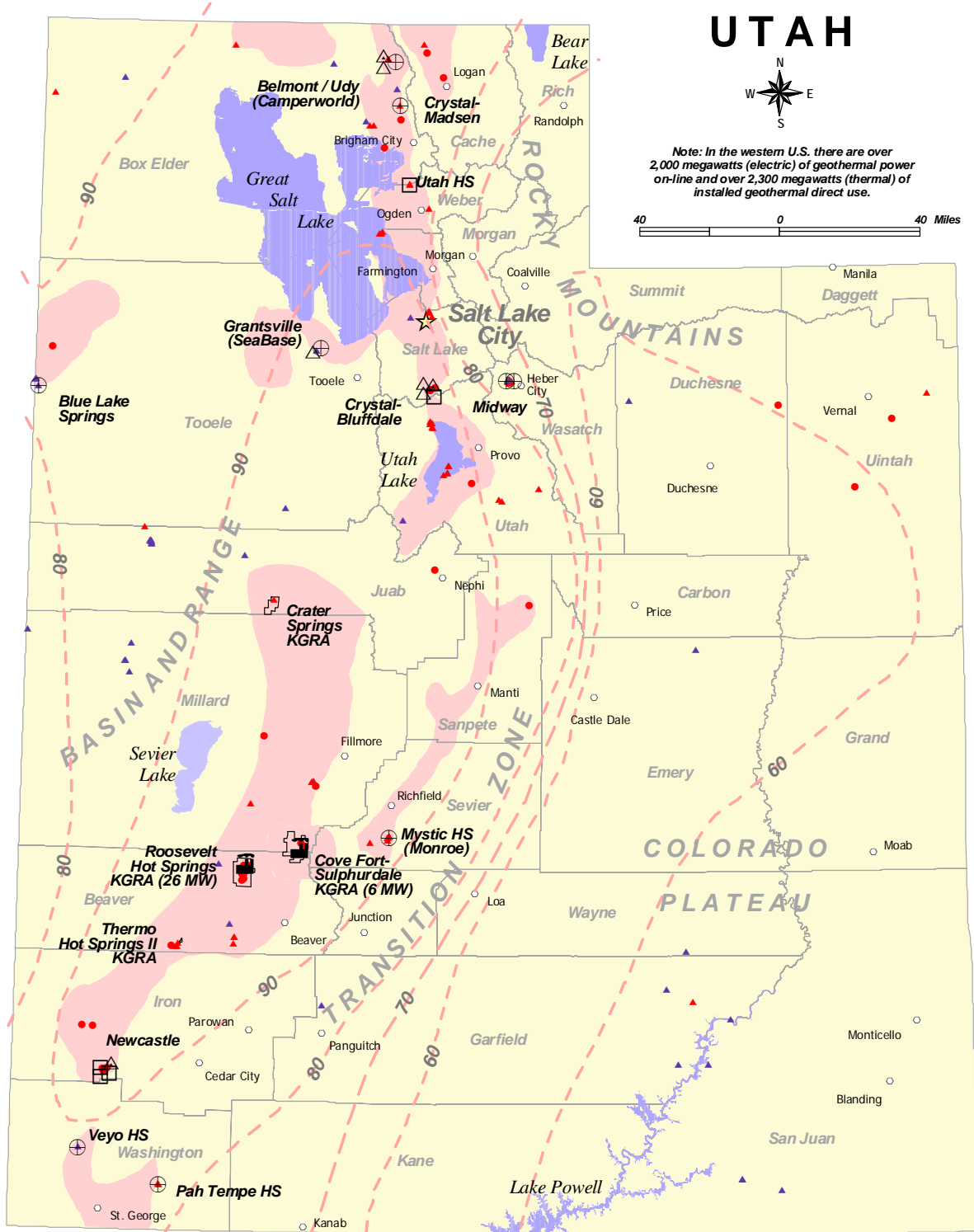
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UTAH



Note: In the western U.S. there are over 2,000 megawatts (electric) of geothermal power on-line and over 2,300 megawatts (thermal) of installed geothermal direct use.

40 0 40 Miles



- - - 90 Heat-Flow Contour values in mW/m^2
(Note: $90 mW/m^2$ corresponds to a temperature gradient of about $36^\circ C/km$)
- ⊕ Recreation
- △ Aquaculture
- ⊞ Power Generation
- Greenhouses
- △ Space Heating
- ⊞ Geothermal Potential Areas
- ▲ Thermal Springs $25^\circ - 30^\circ C$ ($77^\circ - 86^\circ F$)
- ▲ $> 30^\circ C$ ($86^\circ F$)
- Thermal Wells $> 50^\circ C$ ($122^\circ F$)

Geothermal Resources and Uses in Utah