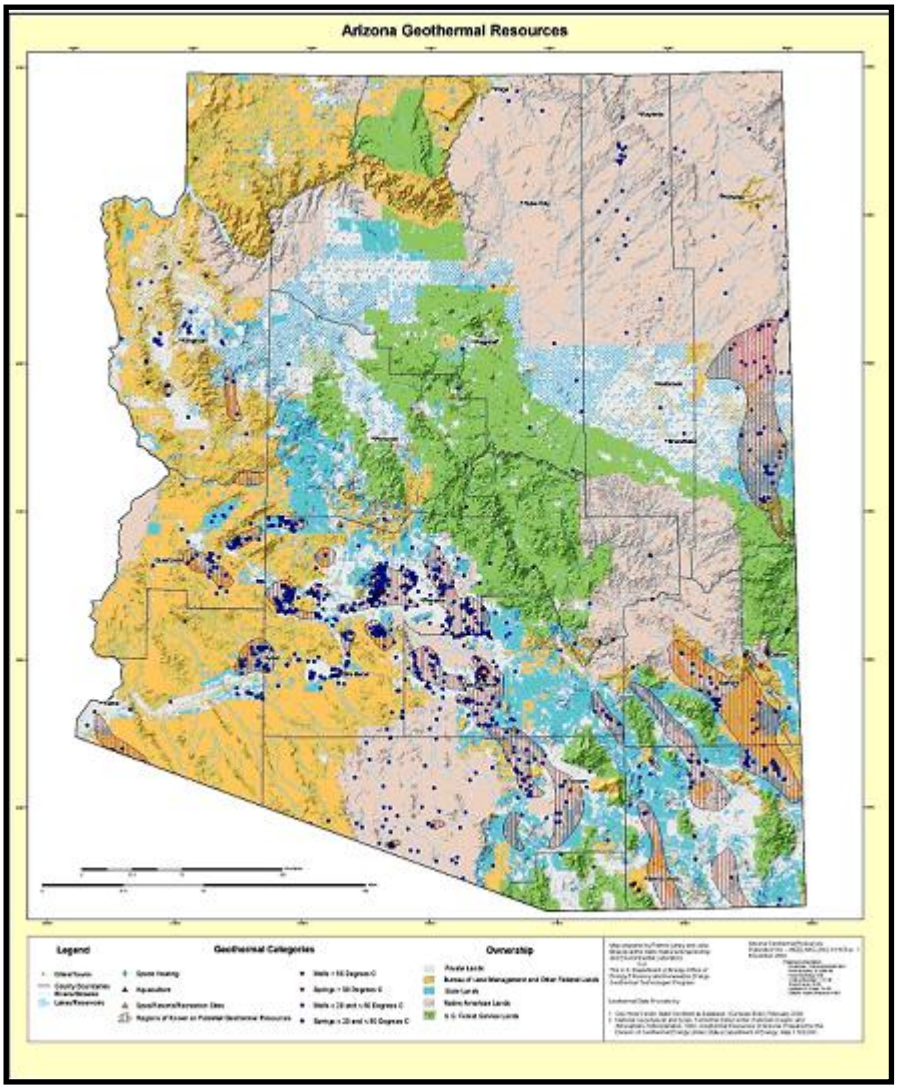
Geothermal

Review of the NREL geothermal maps indicates that Arizona does not have significant amounts of high thermal level geothermal resources like our neighbors in Nevada and California. The Arizona geothermal resource is limited and its potential is confined to areas where the geothermal resources are readily accessible.



For a number of years Arizonans familiarity with geothermal energy primarily came from three well-known hot springs. These are Buckhorn Baths in Apache Junction, Castle Hot Springs in the Bradshaw Mountains, and the Verde Hot Springs near Camp Verde. Additional hot springs near Kingman (Kaiser Hot Springs and Ringbolt Rapids Hot Springs), Marana, and in the Hyder Valley near Yuma, provided hot water for spas and aquaculture.

The two highest temperature springs in the state are Clifton and Gillard, both in the Clifton-Morenci area of southeastern Arizona. The water temperature at these springs ranges from 158-180 degrees Fahrenheit and may exceed 284 degrees Fahrenheit at depth. A detailed geophysical survey of the Clifton Hot Springs area has been completed and two exploratory wells have been identified and are being considered for possible commercial development. This would mark the first attempt in Arizona to "mine" geothermal energy for electricity production on a large scale.

Arizona utilities are actively looking at the geothermal potential in the state. One utility is involved in the exploratory wells near Clifton, while another utility has a Geothermal Electric Development program for exploration and basic research into the location and extent of high thermal level geothermal resources in Arizona. Another utility has included geothermal power generation in its proposed renewable portfolio. The proposal is to purchase 20 MW of geothermal produced electricity from a California producer.

Besides these geothermal resources and activities, in the early 1990s there was an exploratory geothermal resource well bored near Nutrioso, in northeastern Arizona, using DOE funding. The results of this exploratory well indicated a lack of sufficient thermal gradient to justify further review of that site or the surrounding related geology for geothermal development.

Presently, a team of Northern Arizona University (NAU) scientists has begun a research project to assess the geothermal potential of volcanic areas near Flagstaff. NAU geology professors will conduct surface studies and determine whether geothermal energy exists in the San Francisco Volcano Field. The San Francisco volcanic field contains about 800 extinct volcanoes at an elevation of 8,000-9,000 feet. If a resource is found, the study could be followed by drilling for a more in-depth assessment.

Additionally, the Arizona Geothermal Collaborative Outreach Program seeks to increase geothermal energy activities for electricity production and direct use. The collaborative is conducting a series of Geothermal Awareness Forums in rural areas of the state to educate residents, businesses, economic development agencies and elected officials about their area resources. The collaborative plans to use these forums as a way to identify areas where the potential for geothermal energy can be matched with interest in developing the resource.

In summary, major geothermal resources have not yet been developed for commercial power purposes in Arizona. The resource that exists in the state has been recognized and, to some degree, explored, with only the Clifton Hot Springs area under consideration for a commercial geothermal power plant at this time. But it is more than just the accessibility of the resource that will determine whether the geothermal energy is "mined", the economics of geothermal power also plays a role. The cost of geothermal electricity in the U.S. ranges from $0.05 to $0.08 per kilowatt-hour. The lowest cost geothermal producers sell power for $0.015 per kilowatt hour and a geothermal power plant built today would require about $0.05 per kilowatt hour to be economic. By comparison, modern natural gas-fired power plants, and wind turbines in good wind resource regions are producing power for considerably less than this figure.

Links and Resources
www.geothermal.nau.edu/