

## **Advancement of Geothermal Resources and Research in Utah, USA**

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### **Abstract**

Utah is one of only seven states that generates electricity from geothermal resources, contributing about 1% to Utah's total electricity mix. Utah geothermal power plants have a capacity of 73 megawatts (MW), which is only 0.1% of the total estimated undeveloped potential of 49,400 MW. Multiple avenues of research are underway in Utah to characterize this valuable and under-utilized energy resource. 1) Research on produced waters in the Uinta Basin indicates that about 97% of the 776 wells analyzed exceed standard direct-use temperature requirements (>120°F/50°C) and 5% of those are capable of geothermal electric power production (>285°F/140°C), providing an avenue to utilize wastewater and repurpose existing well infrastructure all through the area. 2) Research conducted on sedimentary- hosted geothermal systems throughout western Utah and the eastern Great Basin identifies unconventional reservoirs with temperatures of 350°–400°F (175°–200°C) at depths of 10,000–13,000 feet (3–4 km) that are capable of supporting several power plants in excess of 100 MW, providing a significant contribution to state energy portfolios. 3) In 2018, DOE committed \$220 million to research and development at the Utah Frontier Observatory for Research in Geothermal Energy (FORGE) site in Milford, Utah, which is actively working to successfully produce geothermal electricity from hot, low- permeability crystalline rock and demonstrate new technologies, many from the oilfield, for enhanced geothermal systems (EGS). 4) In 2021, as part of the DOE INnovative Geothermal Exploration through Novel Investigations Of Undiscovered Systems (INGENIOUS) project, the UGS began work supporting a multidisciplinary geothermal play fairway analysis of the Great Basin to develop input datasets and analysis techniques to target blind geothermal systems. 5) Low-temperature (U-Th)/He thermochronology is being employed to derive geological time-temperature histories in areas of interest for investigating the age, spatiotemporal evolution, and longevity of modern and ancient subsurface geothermal anomalies to explore for hidden resources in the Great Basin of Utah. Overall, these research programs will help advance geothermal exploration and development in Utah, making use of its massive undeveloped geothermal resource potential while assisting to decarbonize the energy sector, help support rural communities, and generate new economic opportunities across the state.

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