



## Existing Skills, Infrastructure Could Power Geothermal Revolution

Closed-loop systems could make geothermal available anywhere

January 2022 | Heather Saucier, Explorer Correspondent

**T**echnological advances in the geothermal energy sector are making some geoscientists hopeful about the potential to deliver its energy resources almost anywhere on the planet.

For decades, places such as California, Hawaii and Iceland have taken advantage of their locations near tectonic settings and in-situ reservoirs, tapping into the Earth's heat where molten rock is closest to the surface and where the Earth's crust is thin. The heat is then used for electricity generation or direct-use purposes, such as space heating and industrial processes.

For example, the Geysers powerplant in California – the world's largest producing geothermal system – generates approximately 835 megawatts of baseload energy, according to the U.S. Geological Survey.

Until recently, this type of conventional geothermal energy did not attract widespread attention because

of its limited availability – notably confined to the Pacific Ring of Fire and other plate boundaries.

However, the growing need for clean, resilient, baseload and/or load-following energy coupled with recent advancements in oil and gas technology have prompted geoscientists to push the boundaries of geothermal resources. Looking beyond the natural settings of the resource, geoscientists are working to bypass geographic and geologic limits so that geothermal energy can be used around the world.

Geothermal Rising (formerly the Geothermal Resources Council) reports that the produced baseload and flexible power generation capabilities of geothermal energy can help stabilize the grid with reliable, continuous, sustainable energy, capacity and ancillary services.

“There are a lot of emerging ideas right now and that’s really driving a spike in geothermal,” said AAPG Member Ken Wisian, associate director of the Bureau of Economic Geology at the University of Texas at Austin. Rather than focusing solely on existing in-situ fluids, geoscientists are looking to engineer circulation systems that “hoover” the Earth’s heat up to the surface.

If such technology proves viable, geothermal energy could be expanded to both densely-populated and remote areas of need.

“Currently, you have to go where nature concentrates the resource,” Wisian explained. “That has the potential to change, which could change the whole energy grid structure. It’s an excellent use of existing industry skills. If you’re in the oil and gas industry right now, probably 90 percent of your knowledge or better is immediately applicable to geothermal.”

## Geothermal Anywhere

Sometimes called “advanced geothermal systems” or “geothermal anywhere,” these non-conventional approaches are essentially closed-loop (or semi-closed) systems that circulate a working fluid, often through a sealed downhole heat exchanger, to absorb and transport heat without physically interacting with the environment.

Closed-loop geothermal systems, or CLG, can operate in a broad range of temperatures and rock compositions – from relatively low-temperature sedimentary zones to hot, dry-rock formations. This range of operating parameters not only increases the number of viable geothermal projects, but also allows the use of high-temperature resources that dramatically increase power output, according to Geothermal Rising. Furthermore, CLG can produce power from previously unproductive geothermal wells.