



Executive Director, Geothermal Energy Association, The Geothermal Energy Association is a trade association composed of U.S. companies who support the expanded use of geothermal energy and are developing geothermal resources

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Geothermal Potential in the Gulf of Mexico

by [Karl Gawell](#)

Q: I hear that there is geothermal power potential in the Gulf of Mexico. Is that true? Where is it located, and will it ever be developed? - Danielle J., Dallas, Texas

A: Good question. You're right -- considerable geothermal energy potential exists in the Gulf of Mexico and onshore in Louisiana, Texas, Alabama and Mississippi. Two types of geothermal resources are of particular interest in the Gulf area: "geopressured" geothermal and "oil field co-produced" geothermal resources.

The Basics

Let me begin with some basic background information:

A geopressured resource consists of hot brine (salty water) saturated with methane (natural gas) found in large, deep aquifers that are under higher pressure due to water trapped in the burial process. These resources are often found at depths of 3 to 6 km (2 to 4 miles). Water temperature can range from 90 to 200 degrees C (190 to 390 degrees F).

Geopressured resources are present in several areas of the country, ranging from California and the Dakotas to Texas, Louisiana and Alabama. This prime resource is considered to be abundant in the area around the Gulf of Mexico, both onshore and offshore.

An oil field co-produced resource makes use of wells already drilled by the oil and gas industry that are either deep enough to encounter hot water, or could be deepened into these hot zones. To the oil industry, producing hot water is at best a nuisance. It is difficult to handle, costs money to pump, and has to be reinjected at an additional cost. What better way to use this hot water byproduct than to produce free, renewable, reliable electricity?

Southern Methodist University (SMU) researchers have documented the large amounts of hot water produced by existing oil and gas wells. In West Texas, for example, for every barrel of oil produced, nearly 100 barrels of hot water are co-produced. In 2002, Texas produced over 12 billion barrels of waste (often hot) water as a byproduct of oil and gas extraction, which was reinjected into the ground at a cost to the producer.

While the extent of oil field co-production is still being assessed, research has identified numerous states where significant hot water is produced from oil and gas wells, including Texas, California, Florida, West Virginia, Colorado, Wyoming, Montana, North Dakota, New Mexico, Oklahoma and Utah.

Potential

The energy potential of these resources is enormous. Experts estimate that geopressured resources could hold as much as a 200-year supply of gas for the entire U.S. at 2002 levels of demand. That's not even considering the thousands of megawatts (MW) of thermal energy potential from the hot brines. If realized to its full potential, geopressured resources could double the total recoverable natural gas in the United States and meet a significant portion of our electricity needs.

Producing energy from oil and gas fields in Texas alone could produce between 400 - 2200 MW of geothermal power, according to SMU scientists. Looking at all of the oil field production potential, significantly more power production is possible, with estimates in the tens of thousands of MW.

The National Renewable Energy Laboratory (NREL) recently published a report titled, *Geothermal -- The Energy Under Our Feet*, which estimates that co-produced and geopressured resources could supply as much as 70,000 MW of new power -- 10% of our total national electric power needs -- in the next 20 years. Today, geothermal resources supply about 0.3% of US electricity needs, so 10% represents a significant jump.

Outlook for Development

Production from geopressured resources has been completed on a demonstration basis in the past. The US Department of Energy (DOE) built a pilot power plant using a converted gas well in Brazoria County during 1989 and 1990. The project was technically successful, but after 6 months of operation the power plant was dismantled because the low price of gas at that time made the project uneconomic. Today, higher energy prices coupled with national security concerns have regenerated interest in the development of geopressured resources. With changes in the market and advances in technology over the past fifteen years, geopressured resources are once again being considered.

Production of geothermal power from oil and gas wells is a relatively new topic of discussion. One new technological development that has helped raise interest in the co-production of electricity from oil fields is the advent of small power technology that produces energy at lower temperatures. Small-scale geothermal power technology, like that pioneered at Chena Hot Springs in Alaska by UTC Power, demonstrate that small units (250 kilowatts) are feasible at relatively low temperatures (165 degrees F). This technology appears to be what is needed to tap the large amounts of hot water produced from oil fields.

There are, however, questions to be answered about this method of energy generation. The first-ever technical conference on producing geothermal energy from oil fields was held at

SMU in May of 2006, and a follow-up conference was held in 2007. These events brought together experts from the oil and gas industries as well as geothermal professionals to talk about how to pursue the large energy potential of this resource.

Congress has recently expressed interest in both of these resources. Representative Ralph Hall (R-TX) introduced an amendment into the Advanced Geothermal Energy Research and Development Act, sponsored by Rep. McNerney (D-CA), which proposes authorizing cost-shared demonstrations for geothermal co-production from oil fields, and a design competition leading to a state-of-the-art demonstration plant for geopressured resources. The amendment was adopted and the bill approved on a bi-partisan basis by the House Science Committee on June 13.

We hope the full House of Representatives will take action on this bill in July. This is a very important bill that could speed the development of geothermal resources in the Gulf of Mexico and across the country. With government partnership and support as proposed by Representative Hall and the Science Committee, along with renewed industry interest, the outlook for developing of these resources is very promising.