

Department of Energy Announces \$20 Million to Boost Development of Innovative Geothermal Technologies

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U.S. Energy Secretary Steven Chu today announced \$20 million to research, develop, and demonstrate cutting-edge geothermal technologies that could reduce U.S. demand for fossil fuels, significantly cut carbon pollution, and create new jobs in geothermal manufacturing and operations. Geothermal energy uses the earth's heat to generate consistent, low-cost renewable energy resources with a small environmental footprint. These seven projects will demonstrate the technical and economic feasibility of non-conventional geothermal energy technologies in three research areas: low temperature fluids, geothermal fluids recovered from oil and gas wells, and highly pressurized geothermal fluids. This funding will help demonstrate and commercialize innovative technologies to lower the high initial costs of geothermal development and help make the operational deployment of low temperature geothermal units more economical.

"These innovative projects have the potential to expand the use of geothermal energy to more areas around the country," said Secretary Chu. "The development of these technologies will allow us to tap into additional renewable energy resources, reduce carbon pollution and create new jobs."

Low temperature resources are widely available across the country and offer an opportunity to significantly expand the national geothermal portfolio. However, most low temperature geothermal resources are not hot enough to be harnessed through traditional geothermal processes, including dry steam or flash steam power plants, which typically use water at temperatures greater than 360°F (182°C). The projects announced today aim to take advantage of geothermal fluids that won't "flash" on their own for electricity generation, but could be used in binary-cycle power plants. In binary cycle technologies, the water from the geothermal reservoir is used to heat another "working fluid," which is vaporized and used to turn the turbine or generator units.

Geothermal coproduction with oil and gas wells also has significant potential to produce electricity for field use or to be sold to the electrical grid. In the United States, an average of 10 barrels of water is produced with every barrel of oil. Historically, this coproduced hot water has been treated as a waste product. Using the water to generate power, however, provides a significant, clean source of energy that can extend the economic life of oil and gas fields.

Highly pressurized or geopressured fluid geothermal production is a type of geothermal resource that occurs in deep basins where fluid and gas occur naturally under very high pressure. These geothermal reservoirs often contain dissolved natural gas that may not be economical to produce alone, but can be economically developed in combination with geothermal energy production. Geopressured reservoirs are located along the Pacific coast, in Appalachia, beneath the Gulf of Mexico, and in other deep sedimentary basins in the United States, so these projects will diversify and expand the country's potential to develop renewable geothermal energy.

The following projects have been selected for award:

Low Temperature Geothermal Fluids

- **Energent Corporation – Dixie Valley, Nevada - \$1,200,000**

Energent will demonstrate the innovative features of a geothermal power plant using a scale-resistant heat exchanger design that will allow increased use of low temperature

resources. The power plant has the potential to increase power production from the brine flow (the volume of hydrocarbon and water per segment of time that come out of the wellhead) by 40 percent over current technology.

- **GreenFire Energy – Springerville, Arizona - \$2,000,000**

GreenFire Energy will provide field evaluations of a low temperature carbon dioxide-based geothermal electric power generation plant. In Phase I, it will set up and initiate seismic monitoring at an existing CO₂ production field, and collect and evaluate existing data. In Phase II, it will test several energy recovery techniques in existing shallow wells and the performance of CO₂ as a working fluid.

- **Modoc Contracting Company – Canby, Modoc County, California - \$2,000,000**

Modoc proposes to create a complete "cascaded" use of a geothermal resource (from low temperature power generation through several direct-use applications including a direct heating system, greenhouse operation and fish farm) that will demonstrate energy-efficient use of the geothermal fluids. The company will procure, install and commission an engineered, scalable and duplicable generator unit to use the waste heat from an existing geothermal plant. The "cascading" application will have significant implications for the nearly 1,500 potential low to moderate temperature well sites located within towns and medium-sized cities in the western United States.

- **Oski Energy, LLC – Susanville, Lassen County, California - \$2,000,000**

Oski Energy will test an innovative power cycle technology that uses a mixture of ammonia and water as the working fluid. It will deploy novel system design techniques that will allow optimized, real-time, self-tuning of the power cycle process that will compensate for variations in the geothermal production fluid and flow rate, as well as changes in ambient temperature that adversely affect power generation.

Geothermal Fluids Produced from Oil and Gas Wells

- **ElectraTherm, Inc. – Florida Canyon Mine, Nevada- \$982,000**

ElectraTherm seeks to demonstrate the financial and technical viability of producing electricity from heat coproduced in geothermal brine. ElectraTherm's innovative mobile heat-to-power generator output capacity is expected to be in the 30-70 kilowatt range. The project will result in the optimization of a low-cost, modular, mobile power plant that can be employed on small resources in remote locations.

Highly Pressurized or Geopressured Fluid

- **Louisiana Geothermal – Cameron Parish, Louisiana- \$5,000,000**

Louisiana Geothermal seeks to demonstrate that electricity can be produced economically from geopressured resources by validating the significant geopressured geothermal resource base in southern Louisiana and the northern Gulf of Mexico basin. The creation and operation of a power generation facility will supply valuable costing and engineering data for future geothermal projects.

- **NRG Energy Inc. – Princeton, New Jersey- \$5,000,000**

NRG Energy will evaluate and characterize a target geothermal reservoir for development of a power plant. NRG seeks to demonstrate and identify viable energy production from

geopressed geothermal resources with the potential for cost-effective recovery of heat, kinetic energy, and natural gas.

Source: DOE's Office of Energy Efficiency and Renewable Energy