

## Geothermal Power/ Oil & Gas Coproduction Opportunity

The U.S. Department of Energy's (DOE's) Geothermal Technologies Program (GTP) conducts research, development, and demonstration projects throughout the United States; including efforts focused on coproduced resources.

Recent funding opportunities have enabled GTP to support work that extends into sedimentary basins; including geothermal resources collocated within oil and natural gas fields. The Program is striving to demonstrate innovative technologies that will lead to advanced geothermal energy use and electricity production in these currently underutilized resource areas.

### Technology Benefits

- Capacity ranges from 50 kW to more than 10 MW
- Design flexibility and reduced construction lead times
- Scalable plant sizes based on local geothermal resource and demand
- Ability to utilize off-the-shelf units, easily added to when more generation potential is identified



The Rocky Mountain Oilfield Testing Center in Wyoming was one of the first projects to validate the use of co-produced geothermal fluids from oil and gas wells for power generation. The binary cycle plant, shown here, produces approximately 200 kW of electricity.

### Coproduced Resources

It is estimated that an average of 25 billion barrels of hot water is produced annually from oil and gas wells within the United States. Historically, this “coproduced” hot water has been an inconvenience and a disposal issue for operators; however, low temperature power conversion units can now take this waste stream and use the thermal energy within it to generate power. These innovative technologies can use closed-loop binary cycle units to produce zero emission electricity. This is done by using a heat exchanger to transfer the heat from the coproduced water to a second fluid, with a lower boiling point than water. This causes the secondary fluid to flash to vapor, which then drives the turbines. The electricity produced can be used for field operations or sold onto the grid.

The oil and gas (O&G) industry today is in possession of thousands of established wells with known temperatures and flows that could be producing emissions-free power. Using these binary units will allow operators to generate renewable, cost-competitive electricity. **Coproduced geothermal resources can deliver near-term energy savings, diminish greenhouse gas emissions, extend the economic life of oil and gas fields, and profitably utilize oil and gas field infrastructure.**

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### Coproduced Facts & Statistics

- 823,000 oil and gas wells in the U.S. produce hot water concurrent with oil and gas production.
- The water produced annually by oil and gas fields could generate up to 3 GW of clean, base-load power using binary geothermal units.
- U.S. oil and gas industry already invests beyond hydrocarbons.

*The industry invested almost \$16 billion for advanced technologies from 2000-2007.*

### Learn More

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## Oil and Gas Industry/Geothermal Partnership Benefits

- Renewable, base-load power for on-site operations
  - Eliminates the need for diesel or gas fired power
  - Eliminates the need for transmission line installation
- Quick and minimally invasive installation
- Mobile unit that can be transferred to other wells
- Scalable to larger operations
- Potential for longer well life
- Provides roughly \$100,000 revenue (assumes 200kW unit)/year

## Value Proposition

The Department of Energy's (DOE) Geothermal Technologies Program (GTP), is exploring opportunities to partner with Industry to deploy binary systems in operating commercial oil and gas (O&G) fields. These GTP units could be available for two year demonstration periods.

\*100% proceeds/electricity goes to industry partner.\*

### GTP Provides:

- Units at low/nominal cost (subject to final contract)
- Funds for minimally invasive and fast installation
- Necessary O&M of the unit

### Industry Partner Provides:

- Site Access for installation and contingency operations
- Shared information on coproduced water volumes, temperature, flow rate, fluid chemistry, and power production and operability
- Design and engineering of the field (for cost estimate)
- Clearly defined site ownership/control