Prototyping Geothermal Technology

By harnessing the Earth's natural geothermal resources, Department of the Air Force installations can tap into year-round resilient energy - 24 hours a day.

Why It Matters

In an era of Great Power Competition, installation resilience is more important than ever. Geothermal power is a reliable, dispatchable, renewable energy source that can significantly enhance energy security and reduce energy costs for Department of the Air Force (DAF) installations. By tapping into naturally occurring heat deep underground, installations can harness geothermal energy to generate year-round electricity at a near constant capacity.

Overview

The DAF is prototyping geothermal energy at two installations, Mountain Home Air Force Base, Idaho and Joint Base San Antonio, Texas, with the potential for additional locations to be identified in the future.

Photo courtesy of the Bureau of Land Management, New Mexico

Using Other Transaction Authority (OTA), the Defense Innovation Unit solicited third-party vendors to conduct feasibility studies and geophysical testing to determine the viability of geothermal energy production at each installation. If successful, this work will result in follow-on contracts for the construction, ownership, operation, and maintenance of geothermal facilities.

Full feasibility studies and testing of the geothermal potential can take up to two years, with targeted commercial operations starting in three to five years.

Did you Know?

Geothermal power plants emit little to no carbon dioxide and no nitrogen oxides and have the potential to help the DAF achieve its goal of 100% carbon-free electricity by 2030!

Harnessing Geothermal Technology

A naturally occurring geothermal system, known as a hydrothermal system, requires three key elements to generate electricity: heat, fluid, and permeability (when water can move freely through the underground rock).

HEAT FLUID PERMEABILITY

DAF's geothermal prototype locations seek to utilize Enhanced and/or Advanced Geothermal Systems to create this environment and produce electricity for the selected installations:

Enhanced Geothermal Systems: Man-made systems that increase the permeability of underground rock to allow fluids to circulate and mimic naturally occuring geothermal systems. High pressure fluid is injected into hot, impermeable rock, causing pre-existing fractures in the rock to reopen and fluid to circulate/heat up. Operators pump the hot water up to the surface, where it generates electricity for the grid.

Advanced Geothermal Systems: Utilizes hot dry rock with natural permeability where naturally occurring fluids are not present. An artificial liquid is circulated in a closed-loop system between the hot underground rock and the geothermal plant via conduction processes.

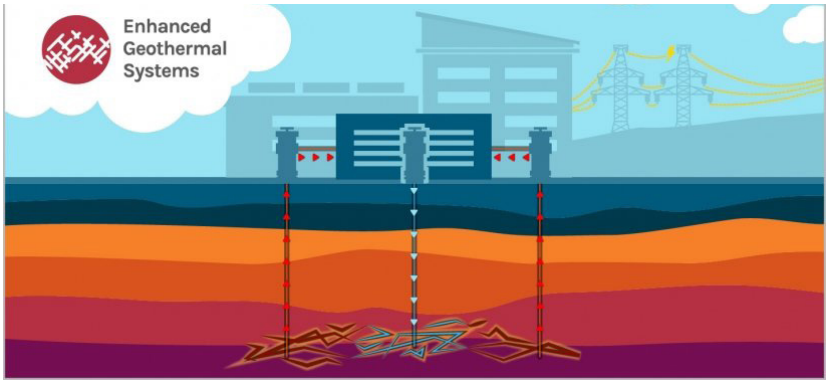

Photo courtesy of the Department of Energy

10 USC 2917 specifically authorizes development of geothermal energy on Department of Defense land. DAF will conduct proper coordination with the Bureau of Land Management where applicable to ensure alignment with agency regulations and maximize positive relationships to benefit all relevant stakeholders.

For More Information:

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The Department of the Air Force is taking a resilience-focused approach to future energy and water projects concentrated on providing strategic agility for missions and installations.

For more information:

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