

## Office of Geothermal FY 2026-27 SBIR/STTR Additional Information

The Office of Geothermal is seeking high-impact, innovative proposals for the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs. Rather than restricting submissions to narrow, highly specified technical pathways, this solicitation presents several broad, overarching areas of interest to maximize creative problem-solving. This open framing is intended to encourage novel, out-of-the-box solutions, facilitate the adaptation of technologies from adjacent sectors (such as oil and gas, aerospace, and defense), and lower barriers to entry for early-stage innovations that can accelerate the deployment of gigawatt scale geothermal energy systems.

### Exploration and Characterization

The Office is interested in advancing the accuracy, precision, and efficiency of subsurface mapping and reservoir characterization to reduce upfront resource risk. This technical area focuses on novel methods to monitor and model critical subsurface parameters before, during, and after stimulation or production. Key areas of interest include:

- **Geothermometry and Geochemical Kinetics:** High-accuracy geochemical modeling tools and chemical kinetic research to predict reservoir temperatures and fluid-rock interactions.
- **Advanced Data Integration:** Machine learning algorithms and/or advanced geophysical inversion techniques for multi-physics data fusion (e.g., joint inversion of electromagnetic, seismic, and gravity data) to map geothermal reservoirs or improve exploration survey design.

### Power Generation

The Office is interested in optimizing surface plants and conversion cycles to maximize power output, handle extreme fluid chemistry, reduce parasitic loads, and improve overall system reliability. This area focuses on converting geothermal heat into grid-ready electricity at a lower levelized cost of electricity (LCOE). Key areas of interest include:

- **Plant Repowering** Technologies and retrofitting strategies to upgrade legacy geothermal facilities, optimize turbine efficiency, and maximize power output from existing thermal assets.
- **Parasitic Losses:** Innovative methods, fluids, and auxiliary equipment designs to reduce internal power consumption from pumps, cooling fans, and other in-plant systems, thereby increasing net electricity delivered to the grid.

- **Scaling and Corrosion Mitigation:** Innovative chemical inhibitors, surface coatings, or online monitoring systems to combat mineral scaling (e.g., silica, calcite) and aggressive corrosion.
- **Grid Flexibility:** Operational strategies and control technologies that enable geothermal power plants to operate flexibly, providing ancillary services and dispatchable baseload capability to highly variable grids.

## Drilling R&D

The Office is interested in reducing the cost of well construction, which represents one of the largest capital barriers to geothermal deployment (especially for deep, high-temperature Enhanced Geothermal Systems). Projects of interest target improving drilling speed, material durability, and wellbore integrity. Key areas of interest include:

- **Control Logic:** Systems and automated software designed to dynamically select and optimize controllable drilling parameters (such as weight-on-bit, RPM, and fluid flow) to maximize the rate of penetration and mitigate drilling dysfunction, acting as an advanced auto-driller or drilling advisory system.
- **Harsh-Environment Materials:** Advanced high-temperature (250 °C) cements or cement like materials, robust casings, coatings, and cost-effective corrosion-resistant alloys capable of enduring extreme thermal cycling. Development of next-generation alloys, high-temperature elastomers, robust polymers, and advanced ceramics designed to maintain mechanical and chemical integrity under extreme conditions. Next-generation downhole electronics, batteries, and high-bandwidth telemetry (such as wired pipe or electromagnetic telemetry) rated for temperatures exceeding 200 °C.
- **Temperature Management:** Technologies to cool drilling fluids downhole or manage thermal damage to the bottom-hole assembly during high temperature drilling, tripping in, etc. (e.g., continuous circulation units).

## Commercial Scale-Up Priorities

The Office is interested in accelerating the commercial deployment of geothermal technologies at scale, addressing critical barriers and opportunities across the value chain. Key areas of interest include:

- **Energy Storage & Data Center Integration:** Advancing technologies for coupling geothermal with high-density computing and long-duration energy storage.

- **Permitting & Regulatory Streamlining:** Innovative tools and workflows to address regulatory bottlenecks and enable faster project timelines through digital and collaborative innovations for geothermal projects.
- **Grid Valuation & Offtake Mechanisms:** Innovative tools that quantify geothermal's grid value, including capacity, flexibility, and ancillary services to enhance commercial viability.