

Geothermal Technologies Office: Quarterly Update

June 9, 2022





Agenda

- DOE/EERE News & Updates
- GTO News & Updates
- Initiatives/Project Updates
- Prizes and Competitions
- Events
- Q&A

DOE/EERE News & Updates



Jolt Newsletter

- Get the latest clean energy news by signing up for the Weekly Jolt: your one-stop-shop for the latest articles, announcements, and upcoming events from EERE!

Stay in the Know

- Follow DOE/Secretary Granholm/EERE on social media
- Use #GeothermallsSoHotRightNow



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Secretary of Energy

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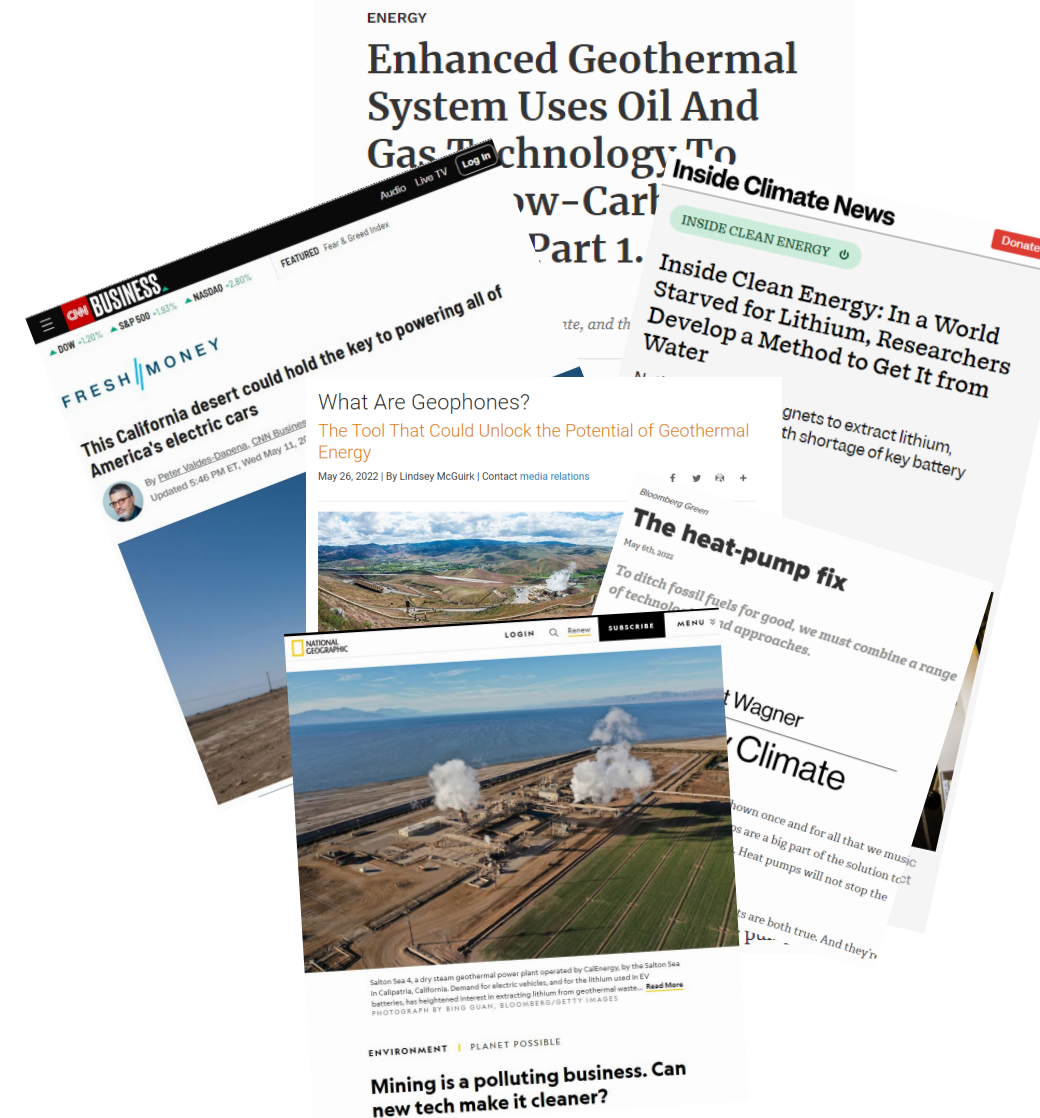
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Geothermal in the News

- [Experts: U.S. Could Enter Lithium Market In A Very Big Way](#) (Oilprice.com, via Yahoo! News)
- [The Heat-Pump Fix](#) (Gernot Wagner, Bloomberg Green)
- [This California Desert Could Hold the Key to Powering All of America's Electric Cars](#) (Peter Valdes-Dapena, CNN Business)
- [In a World Starved for Lithium, Researchers Develop a Method to Get It from Water](#) (Dan Gearino, Inside Climate News)
- [Mining is a polluting business. Can new tech make it cleaner?](#) (Madeline Stone, National Geographic)
- [Transitional Energy Successfully Produces Geothermal Energy at Oil and Gas Well](#) (Businesswire.com)
- [How a few geothermal plants could solve America's lithium supply crunch and boost the EV battery industry](#) (Bryant Jones and Michael McKibben, The Conversation)
- [What Are Geophones?](#) (Lindsey McGuirk, NREL)
- [Tri-Cities Researchers Say They Can Extract Lithium From Water. That's a big deal](#) (John Ryan, KUOW)
- [Geothermal System Is a Real Goldmine](#) (Al Williams, Hackaday)
- [Enhanced Geothermal System Uses Oil and Gas Technology to Mine Low-carbon Energy. Part 1](#) and [Part 2](#). (Ian Palmer, Forbes)



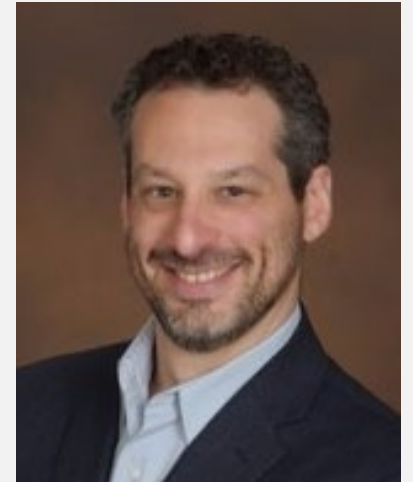
#GeothermallsofHotRightNow

GTO News & Updates

- **Staff Updates**
 - Acting GTO Director Lauren Boyd
 - Acting DMA Lead Jeff Winick
- **Return to Work**
 - Hybrid office schedules
 - Official travel resumed in March
- **GTO 2022 Peer Review**
 - Took place from May 10 to May 26
 - Reviewed 62 GTO-funded projects
 - Final report expected this summer
 - Questions? Email GTOPeer-Review2022@ee.doe.gov



Lauren Boyd
Acting GTO Director &
EGS Program Manager



Jeff Winick
Acting DMA Program
Manager

**2022 PROJECT
PEER REVIEW**

U.S. DEPARTMENT OF ENERGY
GEOTHERMAL TECHNOLOGIES OFFICE

Upcoming Events

- **Association of American State Geologists Annual Meeting (June 12-16)**
 - Alexis McKittrick will be participating in a plenary and a breakout session, “Advances in unlocking the geothermal potential of the western USA”
- **56th U.S. Rock Mechanics / Geomechanics Symposium (June 26-29)**
 - Hosted by the American Rock Mechanics Association
 - Lauren Boyd will be participating in a plenary
- **Geothermal Rising Conference (Aug. 28-31)**
 - The largest annual gathering of the geothermal community.
 - GTO will have a booth
 - GTO and NREL will host a prize event on Aug. 28 with some exciting prize announcements and updates



Data, Modeling, and Analysis: Celebrate GDR

- **Happy 10th Birthday, Geothermal Data Repository**
 - Explore this publicly available resource for geothermal stakeholders to find data on new reports and projects funded by the GTO: <https://gdr.opennei.org/>
- **Help us celebrate: Student Datathon Event**
 - Participants will be challenged to solve a geothermal engineering problem using real field data from Frontier Observatory for Research in Geothermal Energy data
 - Register: <https://www.spegcs.org/events/6411/>
 - PIVOT 2022 (Week of July 25) event organized by the Society of Petroleum Engineers



#geothermaldataisbeautiful



Data, Modeling, and Analysis: Lab Call & Analysis

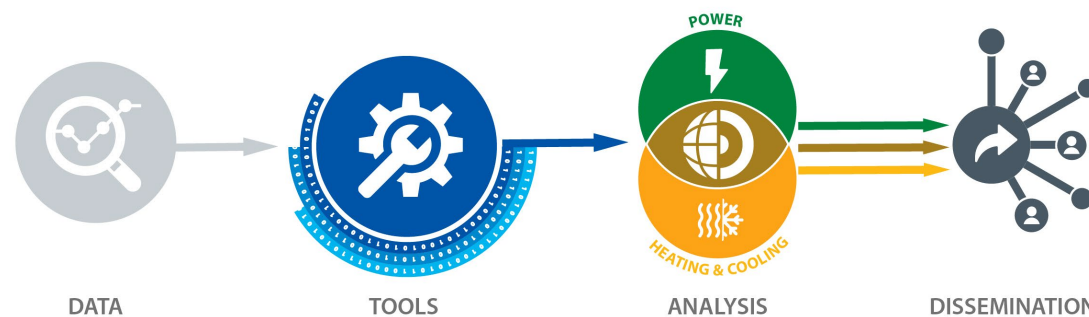
NEW

Geothermal Hybrids Lab Call

- Lab call on research and analysis on geothermal hybrid technologies.
- Concept papers are due by June 17; full proposals due August 9.
- Questions? Email DMAgeothermal@ee.doe.gov

Multiyear Analysis: Geothermal Valuation, Deployment, and Techno-economic Analysis

- Create a geothermal analytical toolkit.
- Build capacity to bridge the gap between what is currently recognized as geothermal energy's cost and its value.
- Disseminate analyses and tools.
- Expand the pool of geothermal stakeholders



Low-Temperature and Coproduced Resources

Community Geothermal Heating and Cooling Design and Deployment

This project will help communities implement technology that can reduce energy burden and fossil fuel dependence, increase grid resilience and stability, and improve environmental quality. The initiative also encourages innovative approaches to community-scale heating and cooling.

It aims to:

- Increase deployment
- Advance environmental justice
- Grow the workforce
- Share best practices
- Provide data.



Consider joining the Teaming Partner list: energy.gov/eere/geothermal/community-geothermal-design-and-deployment-teaming-list

Joint Low-Temperature and DMA: FedGeo Lab Call

- **Federal Geothermal Partnership Technical Assistance**
Leading by Example!
 - GTO is partnering with federal facilities to establish a long-term technical assistance pathway for federal facilities related to low-temperature geothermal technology, including:
 - Geothermal heat pumps
 - District and community heating and cooling systems
 - Hybrid systems that include geothermal resources.
 - Oak Ridge National Laboratory (ORNL) and its partners were selected in early June.
 - ORNL's work will include a technical assistance framework with an innovative workflow that will result in a deployment-ready report, supporting the deployment of geothermal energy at federal sites.



Identify federal sites that are strong candidates for geothermal heating and cooling technologies



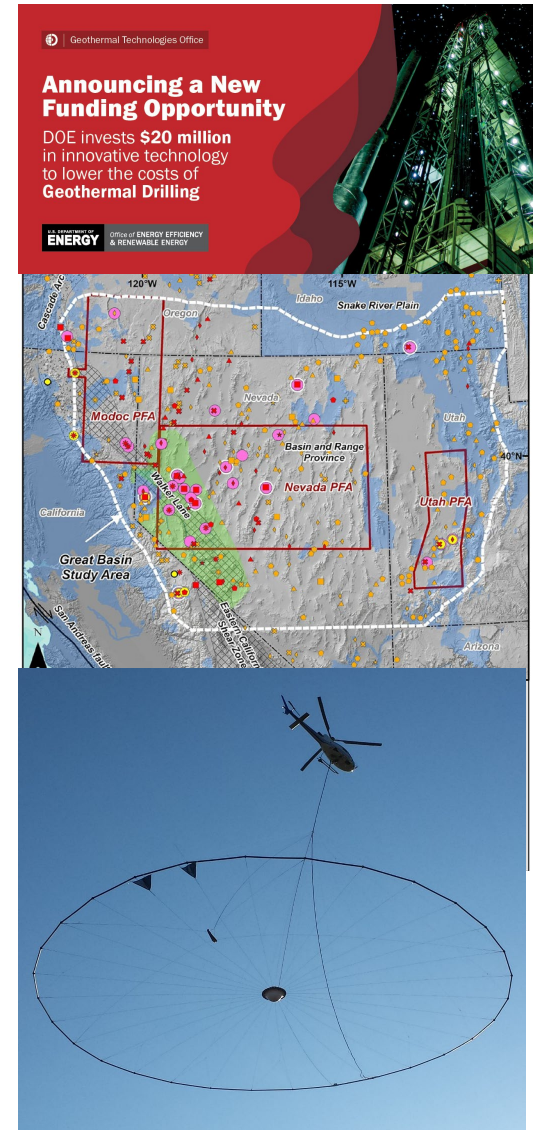
Provide technical assistance for site characterization/resource confirmation activities at these sites



Break ground for multiple innovative geothermal system deployments

Hydrothermal Resources: Project Updates

- **Drilling Technology Demonstrations**
 - This initiative targets technology developments to provide significant improvements in drilling performance in commercial geothermal settings.
 - Closed June 3; selections expected in fall
- **INnovative Geothermal Exploration through Novel Investigations Of Undiscovered Systems (INGENIOUS)**
 - This project seeks to accelerate discoveries of new, commercially viable, hidden systems across the broader Great Basin region and create a comprehensive guide for geothermal operators and future research teams that includes predictive geothermal maps at both regional and prospect scale.
 - Project duration: February 2021 to June 2025
 - Researchers are compiling and synthesizing datasets and plan to start drilling this summer.
- **Basin & Range Investigations for Developing Geothermal Energy (BRIDGE)**
 - The goal of this project is to improve baseline technology across three main components of the exploration process: efficiency of discovery of new hidden resources; effectiveness of characterization and ranking of resources so that the best ones can be prioritized for detailed study and drilling; and completion of test drilling and resource modeling to determine the probability of success for developing a prospect.
 - Researchers are completing their Helitem surveys and development of initial conceptual models and will begin focused prospect exploration this summer.



Hydrothermal Resources: Lithium

- **Energy Secretary Jennifer M. Granholm visits the Salton Sea and Imperial Valley in April**
 - Attended a series of listening sessions with local community members and leaders to hear first-hand from communities grappling with public health impacts of climate change and historic disinvestment.
 - Visited geothermal facilities in the region
- **Quantification of Lithium Resources in Salton Sea**
 - Lawrence Berkeley National Laboratory-led project aims to better quantify the sources and amounts of lithium present in geothermal brines within the Salton Sea geothermal reservoir.
 - Results should provide more detailed estimates of the lithium resource size and predicted lithium depletion rates in the region than available currently.
 - Learn more: <https://newscenter.lbl.gov/2022/02/16/quantifying-californias-lithium-valley-can-it-power-our-ev-revolution/>
- **Geothermal Lithium Prize update**
 - Phase 2 submissions were due in April
 - Finalists to be announced this summer
- **New Lithium projects webpage *Coming soon!***



Bipartisan Infrastructure Law

During next five years, the Bipartisan Infrastructure Law (BIL) will stand up 60 new DOE programs, including 16 demonstration and 32 deployment programs, and expands funding for 12 existing Research, Development, Demonstration, and Deployment programs.

DOE will partner with states, communities, and industry as we move the U.S. economy towards a clean energy, lower carbon emissions future by strengthening the nation's outdated energy infrastructure.

Funding will be delivered through formula funds to state, local, and tribal governments, as well as through competitive solicitations.



Subscribe for updates:

- https://public.govdelivery.com/accounts/USDOE0FE/subscriber/new?topic_id=USD0E0FE_56

Visit:

- <https://www.energy.gov/bil/bipartisan-infrastructure-law-programs>
- <https://www.energy.gov/bil/articles/bipartisan-infrastructure-law-frequently-asked-questions>

Long Duration Energy Storage for Everyone, Everywhere Initiative, created by BIL, will advance energy storage systems toward widespread commercial deployment by lowering the costs and increasing the duration of energy storage resources. View new RFI: <https://www.energy.gov/articles/biden-administration-launches-bipartisan-infrastructure-laws-505-million-initiative-boost>

EGS: BIL Demonstrations

- **Bipartisan Infrastructure Law (BIL) EGS Demonstrations**
 - GTO solicited feedback from industry, academia, research laboratories, government agencies, and other stakeholders on issues related to EGS demonstrations.
 - Areas of interest included the best steps and outcomes to seek in the planned BIL EGS Demonstration funding opportunity and how DOE can engage and promote increased diversity on demonstration teams.
 - Request for information released on April 19 with responses due May 13
 - *Next Steps:* Funding opportunity to be released this summer

U.S. DEPARTMENT OF
ENERGY LAUNCHES
\$84 MILLION PROGRAM
TO DEMONSTRATE
ENHANCED GEOTHERMAL
ENERGY SYSTEMS



U.S. DEPARTMENT OF
ENERGY Office of ENERGY EFFICIENCY
& RENEWABLE ENERGY

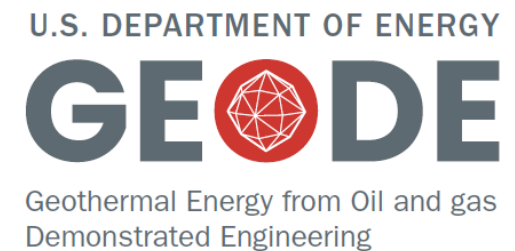
EGS: Frontier Observatory for Research in Geothermal Energy

- **FORGE**, GTO's largest funding initiative, is a dedicated site where scientists and engineers can develop, test, and accelerate breakthroughs in enhanced geothermal systems technologies and techniques.
- In April, the Utah **FORGE** team successfully completed a three-stage hydraulic stimulation of its first highly deviated injection. This is a key milestone in learning how to create fully human-made geothermal reservoirs that can be used to generate electricity anywhere.
- Upcoming activities will focus on locating the most promising fractures, using the micro-seismic data that was collected during the stimulation, to target and plan the location of the producer well, which will be drilled in early 2023.
- **FORGE** has the potential to chart a commercial pathway for further EGS development.



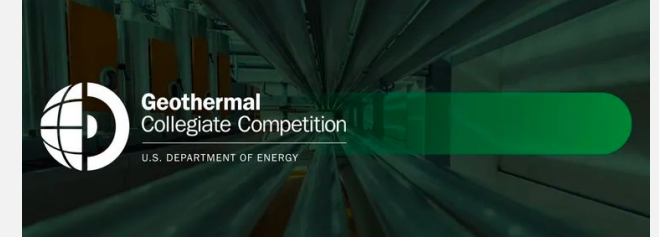
GEODE: Geothermal Energy from Oil and gas Demonstrated Engineering

- This effort seeks to establish a consortium that will leverage oil & gas subsurface assets, technologies, and expertise to help solve geothermal energy's toughest challenges, while providing clean energy employment opportunities and environmental benefits for communities.
- The GEODE initiative will develop a strategy and establish an organizational framework to effectively transition the oil and gas technologies and workforce into geothermal.
- The initial funding opportunity will form the consortium.
In future years, subject to appropriations, GEODE will release periodic competitive solicitations for analysis, research, development, demonstration, and workforce efforts.



2022 Geothermal Collegiate Competition Winners

The **Geothermal Collegiate Competition** aims to engage with students not traditionally involved with geothermal research and raise awareness of geothermal resources. Winners, announced in May, are:



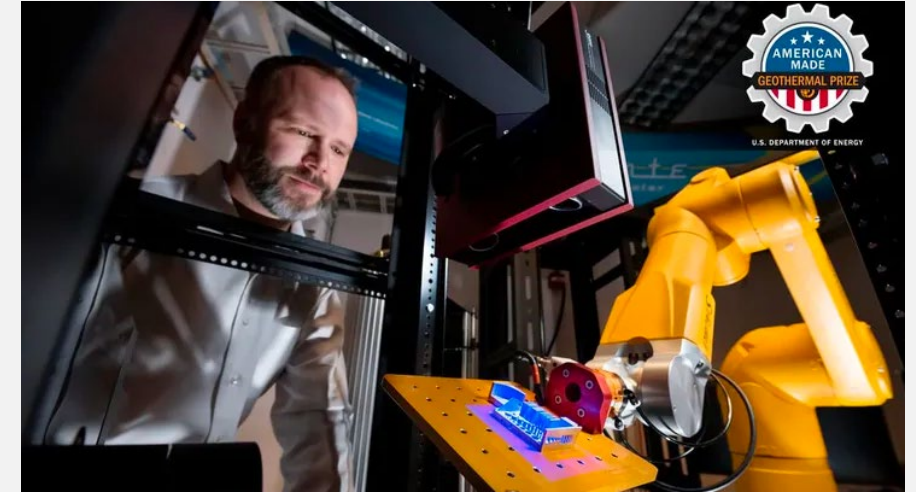
- **First place: University of Oklahoma (\$10k)** – Designed a system repurposing six abandoned oil and gas wells in Shawnee, Oklahoma, to provide clean, renewable geothermal energy for more than 730,000 square feet of educational and municipal buildings, including sites within the Absentee Shawnee Tribe and Potawatomi Nation jurisdiction.
- **Second Place: University of North Dakota (\$5k)** – Designed a combined heat and power geothermal system for New Town, North Dakota, on the Fort Berthold Indian Reservation and home to the Mandan, Hidatsa, and Arikara Nation.
- **Third Place: University of Colorado Boulder (\$2.5k)** – Designed a geothermal ground source heat pump for the I Have a Dream Foundation of Boulder County, a local non-profit that offers social, emotional, and academic support to young people from under-resourced communities.

Visit <https://bit.ly/GTOGCC> to learn more and get involved!

GTO Prizes: Other Active Prizes

American-Made Geothermal Manufacturing Prize

- This prize offers \$4.65 million in incentives and comprises four escalating challenges. It is designed to spur innovation and address manufacturing challenges fundamental to operating in harsh geothermal environments.
- Five finalists announced in January. Winner(s) will be announced at a GTO event at the annual Geothermal Rising Conference in August.



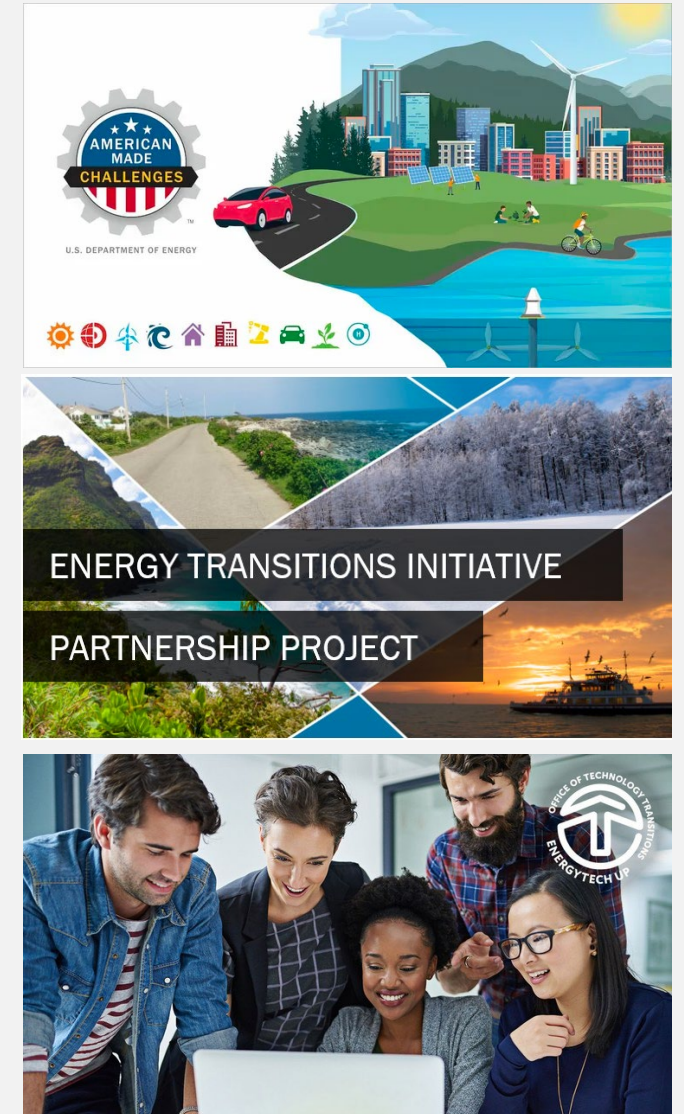
Geothermal Geophone Prize

- This prize launched on Earth Day 2022. It offers \$3.65 million in incentives to develop high-temperature seismic sensors (geophones) that collect real-time data monitoring for enhanced geothermal systems (EGS).
- By accelerating EGS, DOE can dramatically expand geothermal to new geographic areas and help deliver a carbon-free electricity grid.
- Learn more at <https://www.herox.com/GeophonePrize>.



Other DOE Prizes

- **Inclusive Energy Innovation Prize**
 - Seeks to enable and enhance business and technology incubation, acceleration, and other community and university-based entrepreneurship and innovation in climate and clean energy technologies
 - DOE announced 18 Phase One winners in May.
- **Energy Transitions Initiative Partnership Project (ETIPP)**
 - Supports remote, island, and islanded communities seeking to transform their energy systems and increase energy resilience through strategic energy planning and the implementation of solutions that address their specific challenges
 - Cohort 1, announced in April 2021, included 11 communities. Cohort 2 to be announced soon.
- **EnergyTech University Prize**
 - Challenges multidisciplinary student teams to develop and present a business plan that leverages lab-developed and other high-potential energy technologies
 - National winners, regional winners, and technology bonus prize finalists announced in March
 - The next edition of this student competition is coming this fall.



Thank You!



Get the hottest geothermal news from *The Drill Down*, the monthly newsletter from GTO!

Sign up today:

geothermal.energy.gov

Interested in serving as a merit reviewer for GTO RD&D projects?

Send us your resume or CV:

doe.geothermal@ee.doe.gov

Questions?

The **Geothermal Technologies Office (GTO)** works to reduce the cost and risk associated with geothermal development by supporting innovative technologies that address key exploration and operational challenges.

Visit us at: www.energy.gov/eere/geothermal

See what Energy Secretary thinks about geothermal in her geyser-side chat with former GTO Director Susan Hamm: <https://bit.ly/GeyserSide>

BACKUP

Agenda detailed – not for inclusion in final deck

- **EERE Updates**
- **Office News & Updates**
 - Staffing Updates (acting director, new staff, open positions)
 - Travel/transition back to office
 - Peer Review brief recap/next steps
- **Program Updates**
 - Data, Modeling, and Analysis
 - DMA Geo Hybrids Lab Call (5/26)
 - NREL analysis
 - Datathon
 - Hydrothermal Resources
 - Drilling Demos closed; next steps?
 - Lithium update? (S1, GTO efforts)
 - USGS partnership
 - Ingenious drilling
 - Low-Temperature and Coproduced Resources
- Community Geothermal Heating and Cooling Design and Deployment
- FedGeo Partnership
- Enhanced Geothermal Systems
 - BIL RFI
 - FORGE update
 - Woo?
- Geode (6/15)
- **Prizes and Competitions**
 - GCC winner(s)
 - Geophone Prize
 - Inclusive Energy
 - GLEP
 - ETIPP?
 - GRC Prize event
- **Upcoming Events**
 - GRC prize event
 - AASG, ARMA
- **Q&A**

EGS: Wells of Opportunity

- To help advance geothermal research and development, GTO funds programs like the Wells of Opportunity (WOO): Amplify II & ReAmplify, which provides up to \$14.5 million to establish the commercial viability of geothermal energy production in existing oil and gas wells.
- GTO is partnering with well owners or operators to help cost effectively bring more geothermal power by field testing EGS technologies and techniques within existing wells.
- **ReAmplify**
 - GTO selected four projects to help establish commercial viability of geothermal energy production from existing hydrocarbon fields in the lower 48 states.

