U.S. DEPARTMENT OF ENERGY

Office of ENERGY EFFICIENCY & RENEWABLE ENERGY

Geothermal Technologies Office: Quarterly Update

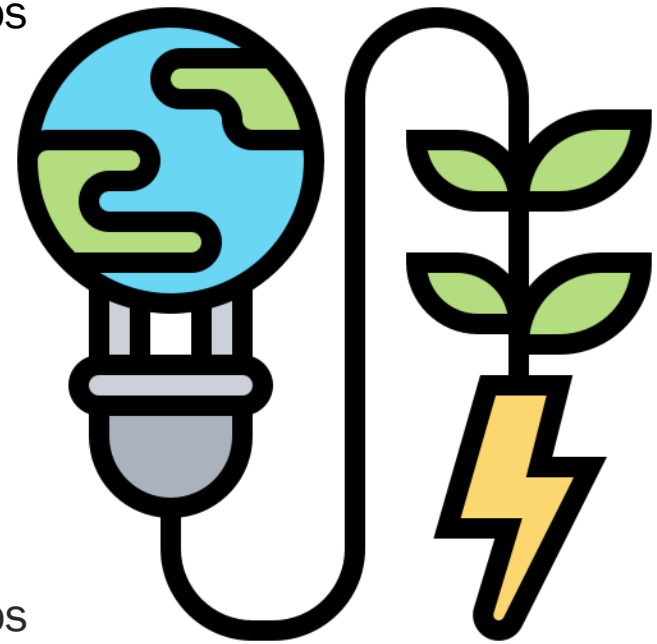
April 27, 2023

Agenda

- Department of Energy / Office of Energy Efficiency and Renewable Energy News and Updates
- Geothermal Technologies Office (GTO) News and Updates
- Recent and Upcoming Events
- GTO FY24 Budget Request
- GTO Project Updates
- Q&A

DOE/EERE Updates

- Office of Clean Energy Demonstrations
  - Clean Energy Demonstration Projects on Current and Former Mine Land (CEML) Funding Opportunity Announcement (FOA)
    - Concept papers due (required to submit full applications) **May 11;** full apps due: **August 31**
  - Energy Improvements in Rural or Remote Areas Program FOA
    - Concept papers were due **April 14**; full apps due **June 28**
  - Energizing Rural Communities Prize
    - Phase 1 closes May 24
- Office of Manufacturing and Energy Supply Chains
  - DOE Heat Pump Defense Production Act Program FOA
    - Concept papers due (required to submit full applications) **May 19**; full apps due: **August 1**
- DOE Earth Day Retrospective: energy.gov/articles/earth-day-2023-retrospective



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 #GeothermalEverywhere

U.S. Department of Energy
- Twitter: @ENERGY
- Facebook: @energygov
- LinkedIn: @u-s--department-of-energy
- Instagram: @energy

Secretary of Energy
- Twitter: @SecGranholm
- Facebook: @SecGranholm
- Instagram: @secgranholm

DOE Office of Energy Efficiency and Renewable Energy
- Twitter: @eeregov
- Facebook: @eeregov
- LinkedIn: @eeregov

#GeothermalEverywhere

- Celebrating GTO's **first two Spanish-language features!**
  - The Weather Channel en Español
  - Telemundo 48 Bay Area (CA)
- Secretary Granholm meets with FORGE team in Utah
- Secretary Granholm and Second Gentleman Emhoff host Tribal geothermal roundtable at University of Oklahoma
- Deputy Secretary Turk visits St. Patrick's Cathedral in New York City
- Secretary Granholm attends CERAWeek

Energía desde el centro de la tierra | The Weather Channel en Español

The Salt Lake Tribune

Energy secretary touts Utah geothermal project, sees green path to U.S. energy independence

Granholm says the Biden Administration isn't giving up on fossil fuels too soon, as evidenced by record U.S. oil production.

Energy secretary visits tribal leaders, others at OU

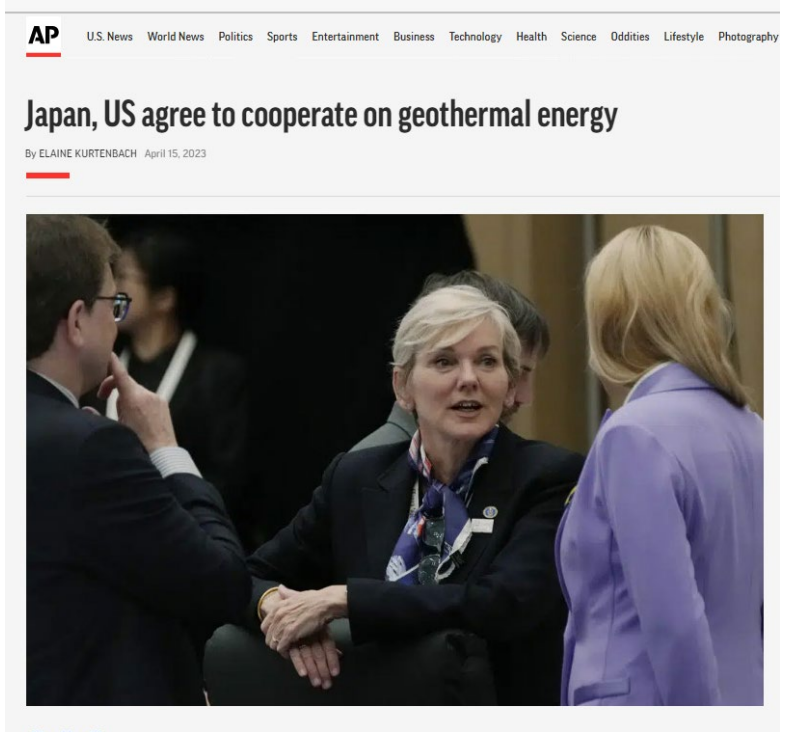
By: Journal Record Staff // April 11, 2023

NORMAN – U.S. Secretary of Energy Jennifer M. Granholm and second gentleman of the United States Douglas

#GeothermalEverywhere

- Secretary Granholm announces **new Geothermal Working Group** with Croatia at P-TECC Ministerial Meeting
- Secretary Granholm and Japan's Yasutoshi Nishimura sign **Memorandum of Cooperation** on geothermal research
- International Energy Agency **Geothermal Working Group** meetings in Denmark

P-TECC
PARTNERSHIP FOR TRANSATLANTIC ENERGY AND CLIMATE COOPERATION


AP U.S. News World News Politics Sports Entertainment Business Technology Health Science Oddities Lifestyle Photography

Japan, US agree to cooperate on geothermal energy

By ELAINE KURTENBACH April 15, 2023

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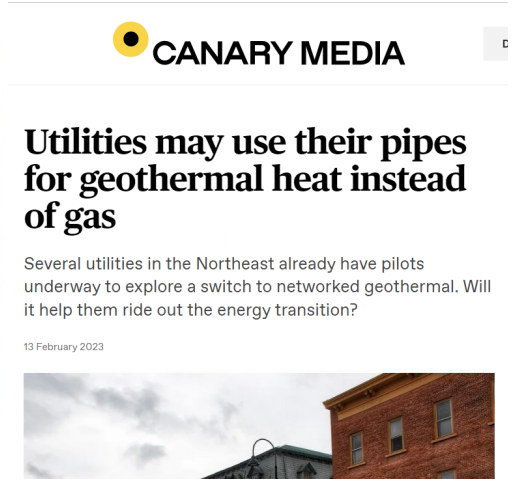
Geothermal in the News

- Esquire | A Clean, Renewable Energy Source? You're Walking On It *featuring GTO's Lauren Boyd!*
- CNN Politics | Biden Administration Eyes a Relatively Untapped Climate Solution to Revolutionize How Homes are Heated and Cooled *featuring GTO's Arlene Anderson!*
- Pewtrusts.org | West Warms to Geothermal Energy as a Path to Clean Power Goals
- ENERGYWIRE | U.S. Heat Pump Production Poised to Rise
- Canary Media | Utilities May Use their Pipes for Geothermal Heat Instead of Gas
- Wired | The Massive 'Batteries' Hidden Beneath Your Feet

Sign up for The Drill Down for updates! geothermal.energy.gov

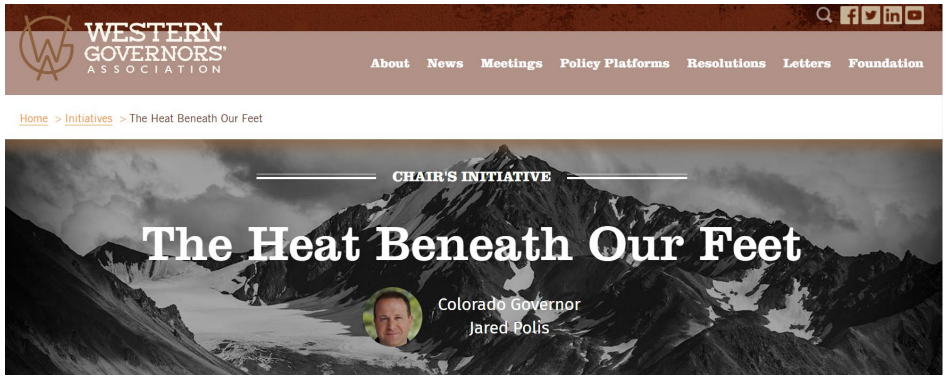


Recent and Upcoming Events

- **Western Governors Association "Heat Beneath Our Feet" Initiative**
  - Meeting at National Renewable Energy Lab in February
  - Webinar March 29
- **Enhanced Geothermal Shot™ Virtual Summit**
  - May 11, 2023, 10:30 a.m.–4:30 p.m. ET
  - Topics include the Enhanced Geothermal Shot™ roadmap, environmental justice and geothermal energy, the geothermal energy workforce, and more!

energy.gov/eere/geothermal/events/enhanced-geothermal-shottm-summit

- **International District Energy Association (IDEA) Annual Conference**
  - June 5–8, 2023 in Chicago



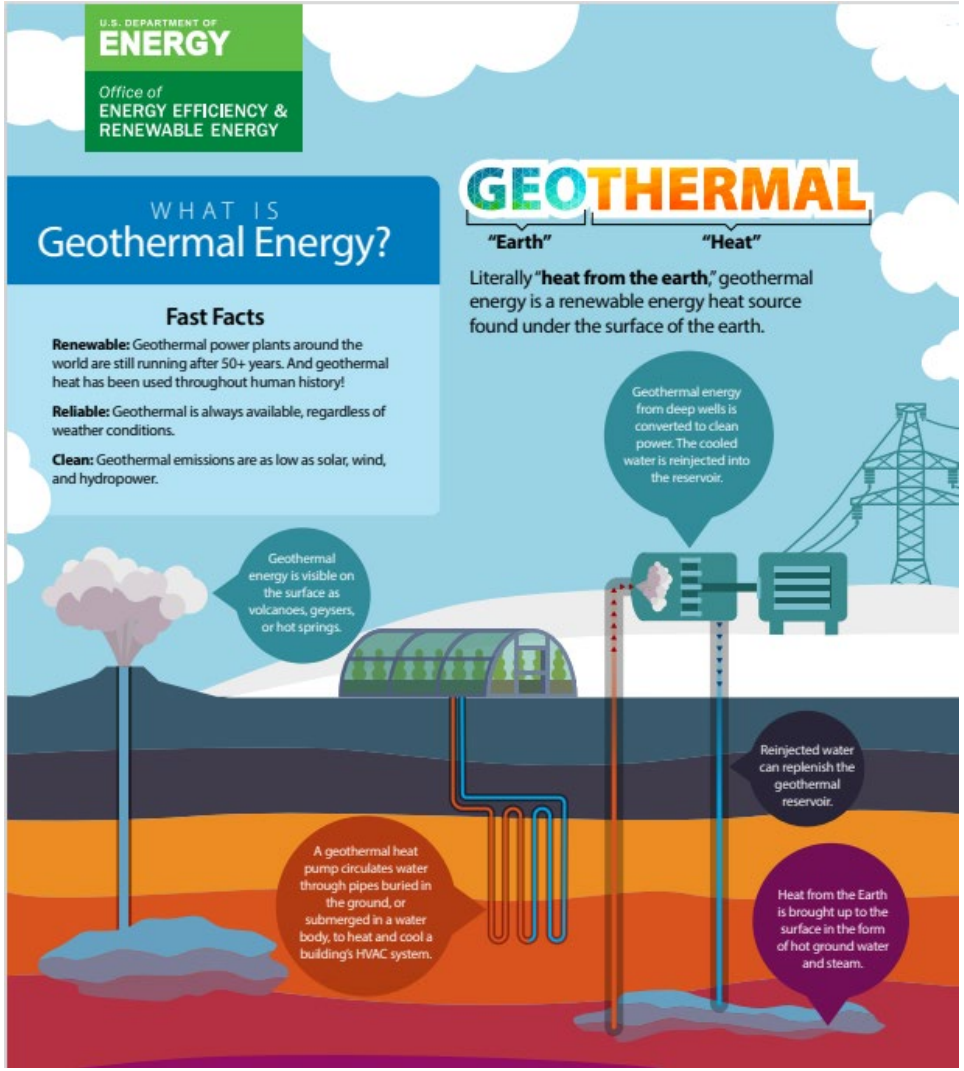
ENERGY earthshots U.S. DEPARTMENT OF ENERGY | Enhanced Geothermal

Register: https://bit.ly/3n1hDEc

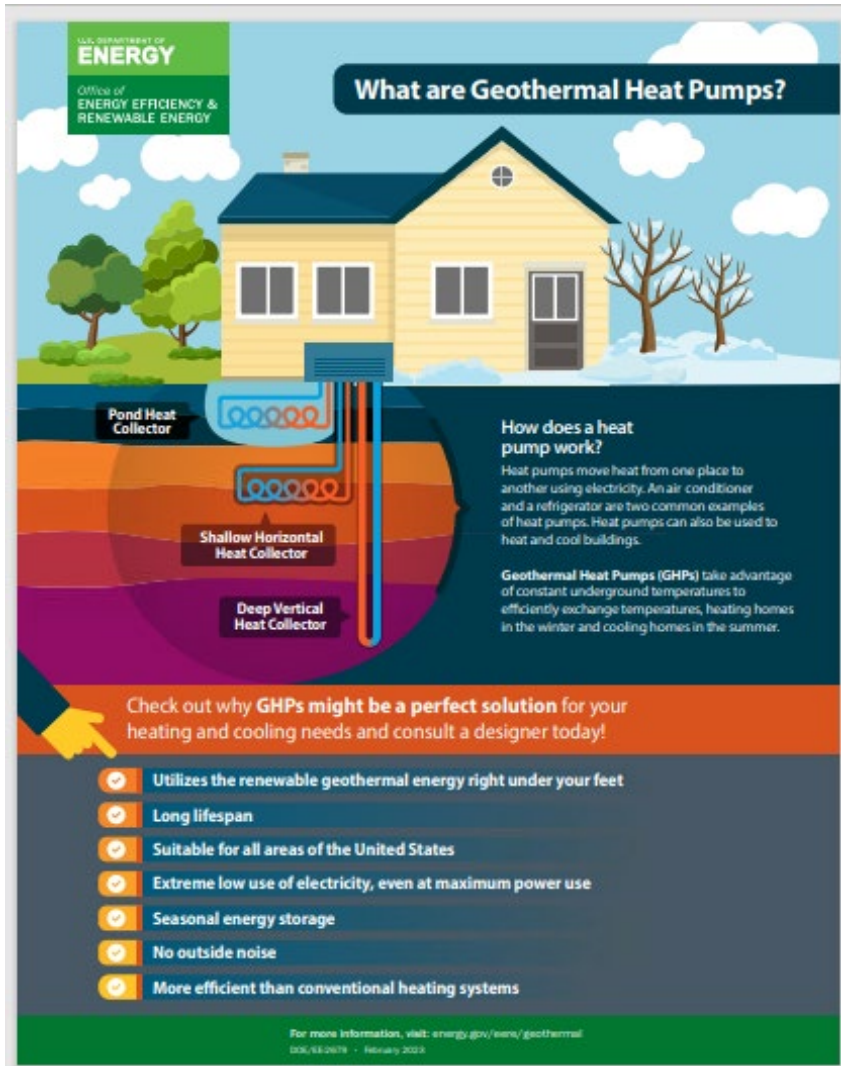
INTERNATIONAL DISTRICT ENERGY ASSOCIATION

Making Geothermal Info Accessible

NEW Geothermal 101 and geothermal heat pumps fact sheets!



energy.gov/eere/geothermal/articles/geothermal-energy-fact-sheet



energy.gov/eere/geothermal/articles/geothermal-heat-pump-fact-sheet

energy.gov/eere/geothermal/

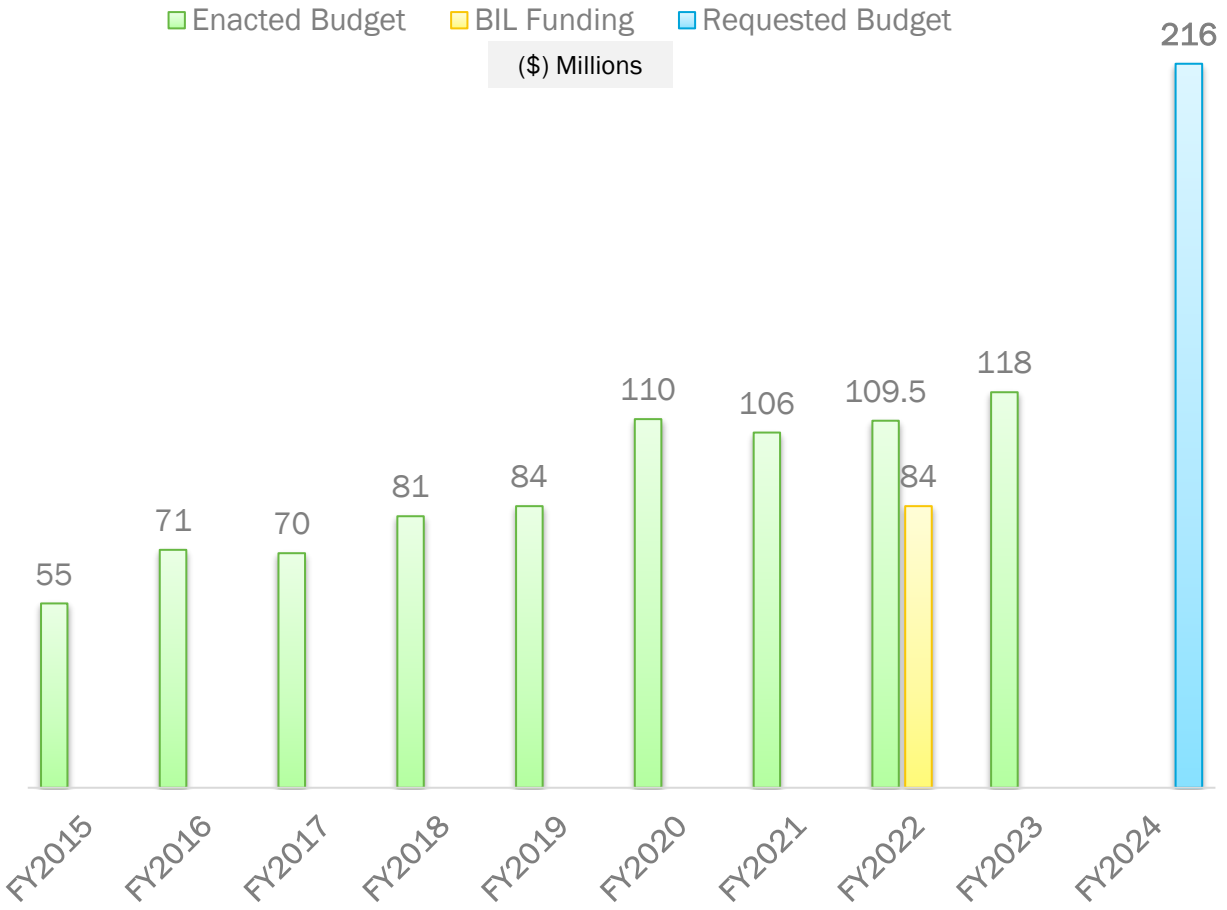
GTO FY24 Budget Request Highlights

- **FY23 Enacted Level: $118M**

$57.5M	Enhanced Geothermal Systems
$24M	Hydrothermal Resources
$24M	Low Temperature and Coproduced Resources
$12.5M	Data, Modeling, and Analysis

- **FY24 Congressional Budget Justification: $216M**

$129.033M	Enhanced Geothermal Systems
$34.787M	Hydrothermal Resources
$34.787M	Low Temperature and Coproduced Resources
$17.393M	Data, Modeling, and Analysis



Program Updates
Enhanced Geothermal Systems

Kevin Jones

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Utah FORGE Updates

- **Drilling 16B well**
  - Follows drilling of 16A and its stimulation that occurred in 2022; the 16A is a first-of-its-kind highly deviated well in hard and hot granite
  - 16B will intersect the fractures created by the 16A stimulation to create an EGS injector-producer well pair
  - Following drilling, FORGE will perform additional stimulations of the injector (16A) and producer (16B) wells and conduct flow testing between the two wells
- **Solicitation 2 applications in review**
  - Awards expected ~June

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Other EGS Updates

- **REMINDER!**
  - Applications for the Bipartisan Infrastructure Law EGS Pilot Demonstration Projects funding opportunity are due June 16!

(*Letters of Intent were required to apply.*)

EGS Enhanced Geothermal Systems

PILOT DEMONSTRATIONS

- **Society of Petroleum Engineers Geothermal Datathon**
  - Challenges participants to solve a geothermal engineering problem using real field data from FORGE
  - Ends May 31

Program Updates
Data, Modeling, and Analysis

Sean Porse

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Addressing Nontechnical Barriers

Recent national lab reports detail findings from GTO-funded projects to assess nontechnical barriers to geothermal projects, including:

- Land access and permitting
- Techno-economic characteristics of the regulatory and nontechnical barriers to development
- Potential value of grid services from geothermal power plants.

NREL fact sheet: nrel.gov/docs/fy23osti/85219.pdf
NREL report: nrel.gov/docs/fy23osti/83133.pdf
LBNL report: doi.org/10.1016/j.renene.2023.02.023
Geothermal Interagency Collaboration Task Force: Summary of Findings: nrel.gov/docs/fy23osti/84684.pdf

Pathways To Overcome Geothermal Deployment Barriers

Report Details Opportunities To Speed Project Timelines and Coordinate Environmental Reviews

Best Practices To Reduce Delays

Renewable Energy 205 (2023) 999–1009

Contents lists available at ScienceDirect

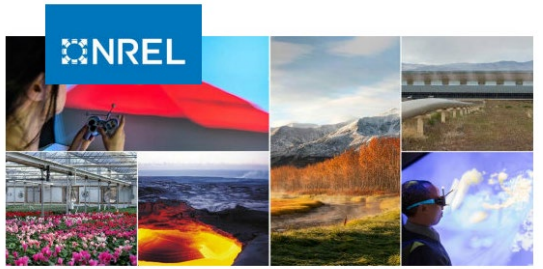
Renewable Energy

journal homepage: www.elsevier.com/locate/renene

Mind the gap: Comparing the net value of geothermal, wind, solar, and solar+storage in the Western United States

Mark Bolinger *, Dev Millstein, Will Gorman, Patrick Dobson, Seongeun Jeong

Lawrence Berkeley National Laboratory, USA



Non-Technical Barriers to Geothermal Development in California and Nevada

Aaron Levine, Ligia E.P. Smith, Jody Robins, Erik Witter, Caity Smith, and Clare Haffner

National Renewable Energy Laboratory

2023 Geothermal Collegiate Competition

- Provides students an on-ramp to the renewable energy field and opportunities to engage with established industry professionals as well as their local communities

- 2023 competition will be announced soon and will kick off in the fall semester!

- Visit https://bit.ly/GTOGCC to learn more and get involved.

Program Updates
Hydrothermal Program

Alexis McKittrick

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Hydrothermal Resources Updates

Selections expected soon!

Will establish a consortium to leverage oil and gas subsurface assets, technologies, and expertise to help solve geothermal energy's toughest challenges.

U.S. DEPARTMENT OF ENERGY

GEODE

Geothermal Energy from Oil and gas Demonstrated Engineering

Drilling Demonstrations Campaign

- Selected two projects in December:
  - Geothermal Limitless Approach to Drilling Efficiencies (GLADE)
  - Evaluation of Physics-Based Drilling and Alternative Bit Design
- Projects expected to start soon!

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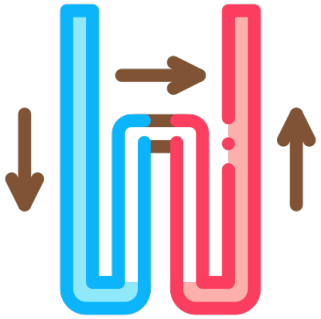

Program Updates
Low-Temperature and Coproduced Resources

Alexis McKittrick

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Federal Geothermal Partnerships

- Oak Ridge National Laboratory and its partners will develop a technical assistance framework and workflow aimed at a deployment-ready report, supporting the deployment of geothermal energy at federal sites.
- First two sites selected:
  - U.S. Army Garrison Detroit Arsenal (Michigan)
  - U.S. Military Academy at West Point (New York)

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

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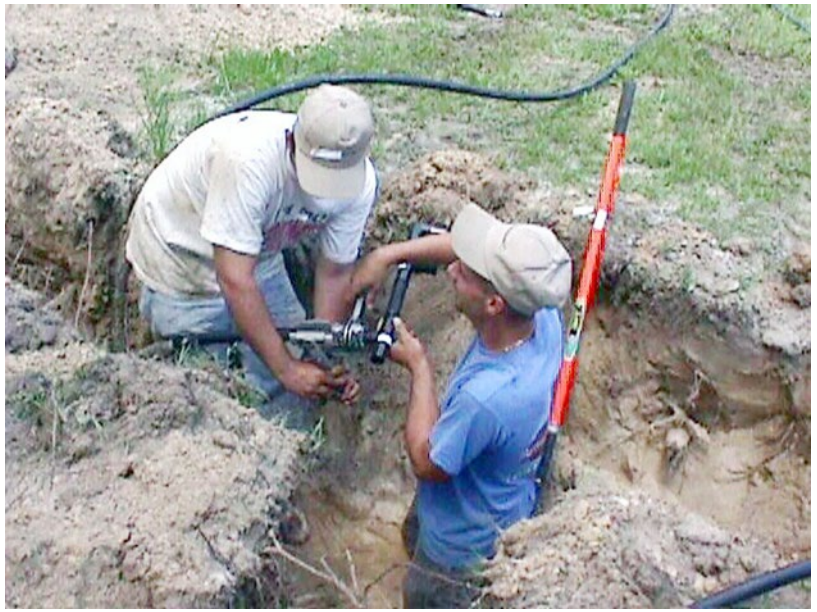
Community-Scale Geothermal

Community Geothermal Heating & Cooling Design & Deployment FOA Goals:

- **Deploy** new or retrofitted geothermal or geothermal-hybrid heating and cooling systems in U.S. districts, neighborhoods, and communities
- Identify solutions for **environmental justice** conditions, such as cumulative environmental pollution and other hazards; underserved and disadvantaged communities; and community members who have historically experienced vulnerability due to climate change impacts
- Assist U.S. communities to develop career and technical education and **workforce transition** initiatives to design, install, inspect, operate, and maintain new energy systems such as geothermal heating and cooling
- Develop U.S. **case studies** about projects, including technical and economic data, to illustrate how projects can be replicated by communities throughout the United States
- Publish **data and information** about U.S. geothermal district heating and cooling system deployment to demonstrate the success of such systems in a range of environments and geographies.



Community Geothermal Heating and Cooling Design and Deployment initiative will help communities:

- Reduce energy burden and fossil fuel dependence
- Increase grid resilience & stability
- Improve environmental quality
- Support jobs

Eligible Projects:

- direct use
- heat pumps
- innovative designs & technologies

Selected to be part of the Department of Energy's Justice40 initiative

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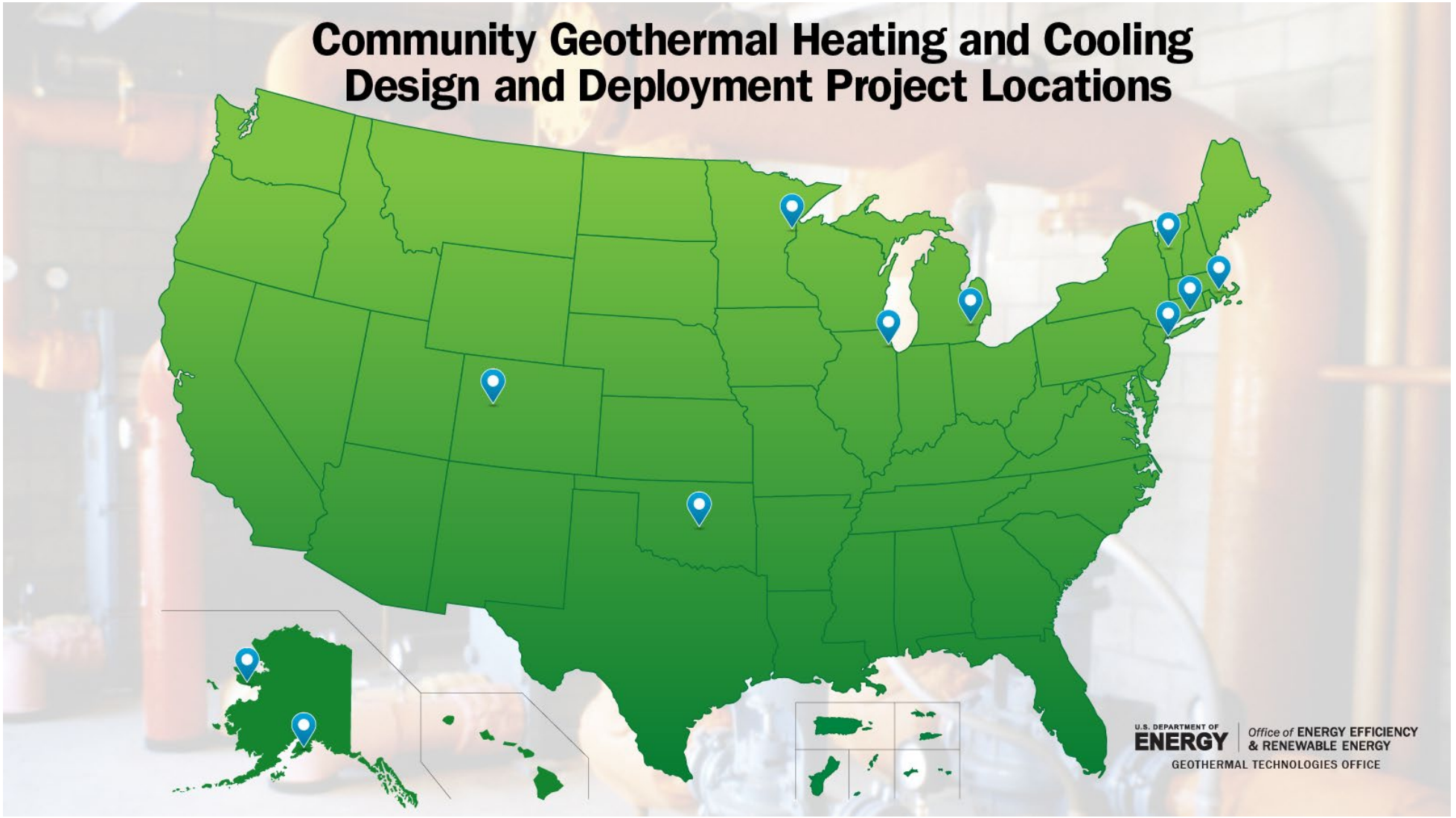
Community-Focused Geothermal



energy.gov/eere/geothermal/community-geothermal-heating-and-cooling-design-and-deployment

Community-Focused Geothermal

URBAN/SUBURBAN COMMUNITIES

- Ann Arbor, MI (Lead: City of Ann Arbor)
- Chicago, IL (Lead: Blacks in Green™)
- Duluth, MN (Lead: City of Duluth)
- Framingham, MA (Lead: Home Energy Efficiency Team)
- New York City, NY (Lead: Electric Power Research Institute)
- Wallingford, CT (Lead: CT Department of Energy and Environmental Protection)

Heat exchangers and circulation pumps in Klamath Falls, OR, district geothermal system. Photo courtesy Geo-Heat Center / NREL pix 03694

energy.gov/eere/geothermal/community-geothermal-heating-and-cooling-design-and-deployment

Community-Focused Geothermal

Installation of snowmelt tubing in slurry backfill under sidewalks in Klamath Falls, OR, which the city uses to melt snow on more than 50,000 square feet of sidewalks and crosswalks as part of its district heating system. Photo courtesy Geo-Heat Center / NREL pix 08832.

RURAL COMMUNITIES

- Carbondale, CO (Lead: Clean Energy Economy for the Region)
- Middlebury, VT (Lead: GTI Energy)
- Seward, AK (Lead: City of Seward)
- Shawnee, OK (Lead: University of Oklahoma)

REMOTE/ISLANDED COMMUNITY

- Nome, AK (Lead: Kawerak, Inc.)

energy.gov/eere/geothermal/community-geothermal-heating-and-cooling-design-and-deployment

Thank You!

the drill down

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

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 our * UPDATED * website at: energy.gov/eere/geothermal or by scanning the QR code.