







Image courtesy of Sage Geosystems

Enhanced Geothermal Energy Can Go Where No Geothermal Has Gone Before

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The Intertubes lit up when the powerful US firm Meta announced that new, cutting edge geothermal energy technology will power a new data center, to be located somewhere east of the Rocky Mountains in the US. If the east-of-the-Rockies angle sounds new, it is. Until now, the only accessible geothermal resources in the US have been concentrated almost exclusively in states west of the Rockies, shutting the door on many gigawatts' worth of underground

clean power for the eastern half of the country.

New Geothermal Energy Systems For The Whole USA

Partly due to the uneven distribution of suitable, naturally occurring geothermal resources in the US, the geothermal industry has not significantly expanded its footprint for decades. That doesn't mean that nothing has been going on, though. In 2021 the Energy Department's National Renewable Energy Laboratory reviewed the three-year period ending in 2019 and reported new signs of activity. Although 11 older geothermal power plants with a combined capacity of 103 megawatts dropped out, a total of 186 new megawatts came online, from seven new plants.

"United States geothermal power capacity increased slightly from 3.627 gigawatts (GW) to 3.673 GW from the end of 2015 through the end of 2019," NREL noted.

That a drop in the bucket compared to an estimate of [100 gigawatts](#) of potentially accessible resources, and that's where new enhanced geothermal technology comes in. Instead of relying on natural thermal reservoirs underground, enhanced geothermal systems create human-made reservoirs in rock formations.

Go-Anywhere Enhanced Geothermal Systems

If you're thinking that hydrofracturing is involved, that's a good guess. Back in 2014, *CleanTechnica* took note of a new \$18 million Energy Department program covering 32 new geothermal energy projects. Of that group, 11 were located in areas with the right conditions for enhanced geothermal systems, including parts of the eastern US as well as Alaska and the Pacific Northwest. The underlying goal was to borrow technology from hydrofracturing. Also known as fracking, hydrofracturing became widely used

hydrofracturing. Also known as fracking, hydrofracturing became widely used in the oil and gas industry in the early 2000s after the relaxation of [federal protections for ground water](#) (see more [fracking background here](#)).

"The 11 projects will tweak an oil and gas subsurface mapping technique called play fairway analysis in order to find likely spots where three prerequisites for [enhanced geothermal systems](#) coexist: heat, permeability, and fluid," *CleanTechnica* reported.

Another group of 12 projects focused on cutting the cost of enhanced geothermal systems. More specifically, this group was tasked with developing less expensive, more precise hydrofracturing techniques, in order to reduce, if not eliminate, unanticipated impacts such as earthquakes and ground water contamination.

The Enhanced Geothermal Systems Chickens Have Come Home To Roost

Now all that hard work is paying off. By 2022, the Energy Department was laying the groundwork for a major [new geothermal research facility](#), and its private sector partners were beginning to stir the pot.

At [an Energy Department event](#) on August 26, Deputy Secretary David M. Turk highlighted several firms, including the Texas startup Sage Geosystems, which has drawn on the oil and gas experience of its founders to leverage hot dry rock formations for geothermal energy extraction. Secretary Turk used the occasion to draw attention to the company's new 150-megawatt partnership with Meta.

"The agreement uses Sage's proprietary technology to provide clean power to Meta's data centers," Secretary Turk observed.

"And this is the first use of next-gen geothermal power east of the Rockies — we're expanding the frontiers of geothermal to the eastern half of the country," he added.

Who's next, indeed. As described by Turk, the road to a self-sustaining geothermal industry in the US is a long one. "DOE's Geothermal Liftoff Report estimates that we need five to ten new projects across a range of geologies, requiring \$20 to \$25 billion total by 2030 to create a self-sustaining industry that can scale to the hundreds of billions," Turk said.

The US Department Of Defense Is Next, That's Who

That sounds like a tough row to hoe, but the US geothermal energy industry is getting a helping hand from the Defense Department. Shortly after its founding in 2020, Sage Geosystems was engaged by the US Air Force to study the feasibility of enhanced geothermal systems in partnership with the University of Texas Bureau of Economic Geology, using the Ellington Field Joint Reserve Base in Houston to showcase the company's proprietary Geopressured Geothermal Systems technology.

"This project is designed to demonstrate that geothermal can provide 24/7 load following power generation in a stand alone and easily hardened

load-following power generation in a stand-alone and easily hardened microgrid located 'within the wire' on the reserve base and meet 100% of Ellington's current electricity needs," [Sage Geosystems](#) explained in a press statement.

"This project has the potential for wide deployment to provide reliable primary and back-up power to critical infrastructure and place the US in the lead of building a new energy industry.

More Geothermal Energy For The US Defense Department

There's more where that came from. Earlier this year, Sage Geosystems announced another geothermal project for the US Army at Fort Bliss. This one involves the Defense Department's Defense Innovation Unit, which opens up the potential for additional deployments across US military facilities.

Along with the primary task of providing zero emission, 24/7 geothermal energy to Fort Bliss, Sage Geosystems will be assessing energy storage and other related technologies, with the aim of improving energy resilience and security while keeping costs down.

"We are focused on scaling our innovative GGS technology and are thrilled to have the support of the U.S. government in showcasing the advantages of hot dry rock geothermal," explained Sage Geosystems CEO Cindy Taff.

"Energy resilience for the U.S. military is essential in an increasingly digital and electric world and we are pleased to help the U.S. Army and DIU to support energy resilience at Fort Bliss," Taff added.

These Geosystems Are...

Where Goes Texas, Again

The connection between Texas and game-changing new geothermal energy technology is of interest, considering the state's deep roots in the oil and gas industry. Nevertheless, Texas has become a hotbed of activity for geothermal energy and other clean tech aimed at shunting oil, gas, and coal to a forgotten backwater of the US energy landscape.

In a press statement about the Fort Bliss project, Ken Wisian, the Associate Director of the UT Environmental Division of Bureau of Economic Geology, was not shy about underscoring the potential for enhanced geothermal energy technology to push fossil fuels aside.

"This is a win-win for the Army and Texas and marks the third geothermal initiative by the Department of Defense in the state" he said. "This initiative adds to the momentum of Texas as a leader in the 'geothermal anywhere' revolution, leveraging the robust oil and gas industry profile in the state."

The iconic coal mining state of West Virginia is also poised to spearhead a geothermal makeover for the US. It hosts one of the rare [naturally occurring geothermal formations](#) located east of the Rockies. The University of West Virginia has embarked on a long term initiative aimed at replacing its on-campus coal power plant with a district geothermal energy heating system.

Geothermal district heating is also beginning to catch on in New York City and other parts of the US, so stay tuned for more on that.

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Image: The Texas startup Sage Geosystems has partnered with Meta to showcase the ability of [next-generation geothermal](#) energy systems to go where no geothermal facility has gone before (courtesy of Sage Geosystems)

geothermal facility has gone before (courtesy of Sage Geosystems).

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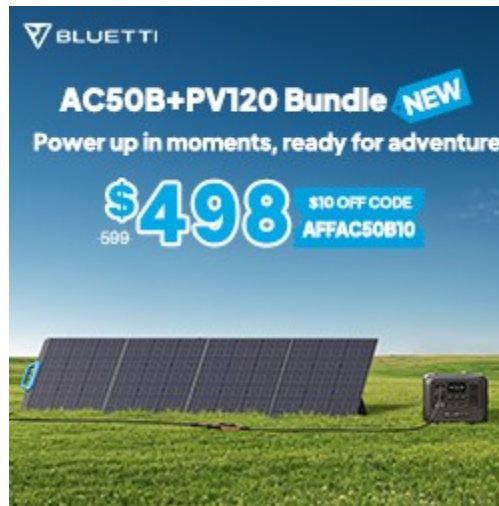




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