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Geothermal industry searching for its 'Carnegies and Rockefellers': panel

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* Geothermal doesn't figure into 2050 forecasts

* Industry needs 'wildcatting behavior'

A nascent geothermal industry in the US needs to encourage the same 'wildcatting behavior' that once defined and catalyzed the oil and gas industry of the early 20th century, geothermal stakeholders said during the University of Texas Energy Week conference.

"We're looking for today's Carnegies and Rockefellers, both with breakthrough technologies and with massive economic advantages out the gate," Rayyan Islam said March 29.

Islam's venture capital firm, 8090 Industries, focuses on supporting the startups developing geothermal and nuclear technologies that could one day help decarbonize the hardest to decarbonize industrial sectors.

"In geothermal, the interests are aligned where you have large corporates, often publicly traded, who have no incentive to go out there and do this wildcatting behavior," he said. "They're business as usual, managing existing assets, reporting to a board. So how do you encourage that kind of swashbuckling entrepreneurial spirit in geothermal? That's being pioneered by startups today."

Geothermal energy resources, which draw from subsurface heat several miles beneath the Earth's surface to generate electricity, are projected to generate just 1% of the global fuel mix by 2050. But recent research shows that it has the potential to provide 77% of future global electricity demand by 2050 and 146% of global 2050 heat demand.

Presently, global geothermal energy amounts to about 16 GW of utility-scale generation. The US accounts for about 4 GW, making it the largest geothermal producer in terms of output, according to the World Economic Forum.

Most of this generation is conventional hydrothermal, where the geologic heat energy is accessed close to the surface, near volcanoes or hot springs. Scaling geothermal resources to hit highest potential will require tapping into the deeper reaches of the Earth, between three and six miles subsurface, according to research recently published by the University of Texas Energy Institute.

This will require a whole new set of technological skills, but not ones wholly foreign to Texas' oil and gas industry that has used hydraulic fracturing to plumb Texas' depths for decades. These technologies, often known as enhanced geothermal systems or closed loop systems, inject water several miles below the surface where temperatures reach hundreds of degrees, then capture the steam that rises back up to power turbines.

"The leading edge of this work rests solely in the startup world with some support from the academic world," said Ken Wisian, associate director of the **Bureau of Economic Geology** at the University of Texas. "Right now, we're at the prototyping stage, and over the next year or two the picture is really going to clarify on what works and what doesn't. If even one of these systems works, it's off to the races."

Startups leading in geothermal

One such Texas-based startup is Sage Geosystems, which has geothermal operations in South Texas. For the past six weeks the company has demonstrated a technique it calls mechanical storage, where water is pumped through a vertical well where it balloons under pressure when the well head is shut. Then that water flows back up at higher pressure, creating a power generation potential.

"It's amazing, the power of that fracture closing and jetting that water back to surface is just huge," said Sage CEO Cindy Taff.

Sage will be moving the project to its commercial demonstration phase as soon as it can get a high-pressure turbine.

"We were able to demonstrate that the duration in which you can produce power is in direct proportion to the volume of water that you put in the fracture," Taff said. "So, if you put 5,000 barrels in the fracture, we were able to produce 200 kW for five hours. When we put 20,000 barrels, we were able to produce 200 kW for 17 hours."

But while activity in the geothermal industry has started picking up over the last couple of years, rarely do future energy predictions take it into account.

"I think we have a long way to go to making geothermal mainstream," said Marit Brommer, executive director of the International Geothermal Association. "I think we have a long way to go to be known for our green and clean image. ... Part of that is good branding."

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