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BIRCH GEOTHERMAL

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Birch Geothermal:

Big Again

The return of the joint venture to American geothermal

Delivering Gigawatts in America

Mike Matson, PhD, PE | Co-Founder & CEO

EnerCom Denver | August 2026

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Roadmap

1 Where the market is

The resource base, the demand, and what is available to serve it.

2 How this industry got its shape

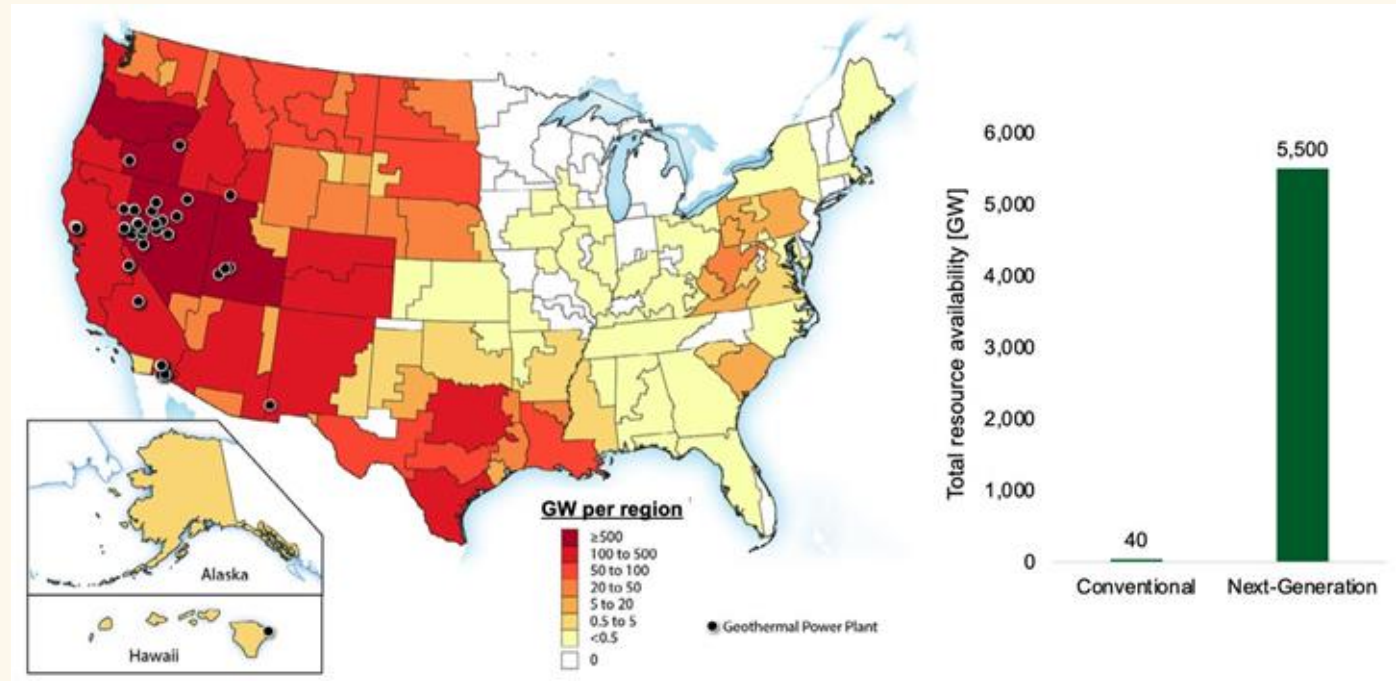
Large partnerships, then four decades of small single-owner projects.

3 What is breaking that shape

Enhanced geothermal, and the drilling and completion work that made it possible.

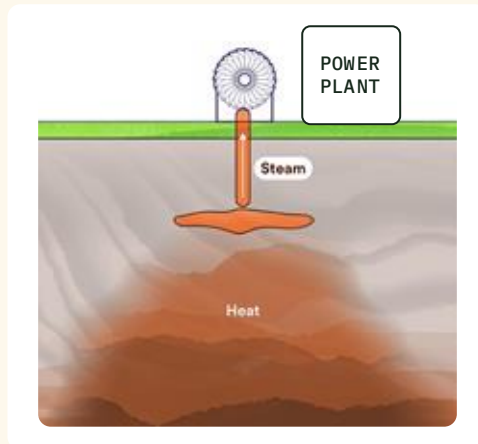
4 What emerges

Project scale, capital structure, and who is positioned to build.



EGS will outcompete conventional and other next-gen geothermal approaches to meet today's demand

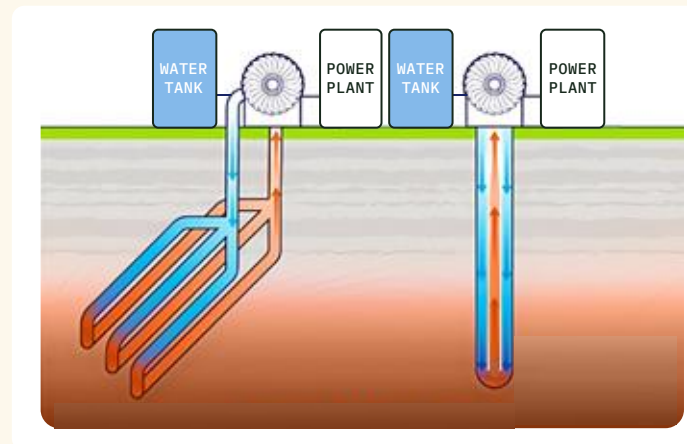
Hydrothermal



GEOGRAPHIC REACH

EGS more scalable / broader reach vs. hydrothermal

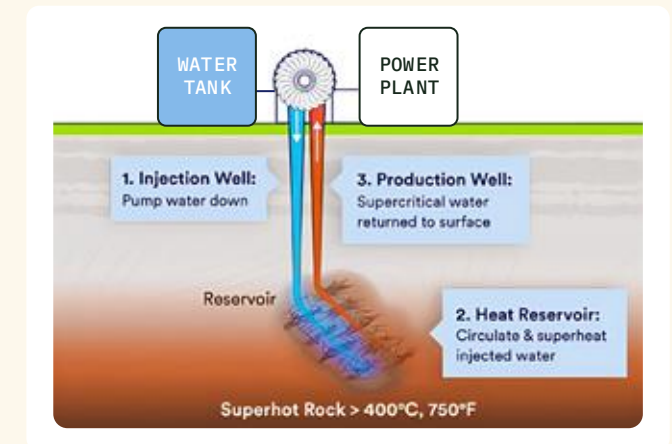
Advanced Closed-loop



COST

EGS has ~10× more power, ~10× less drilling vs. advanced closed loop.

Superhot EGS (>400°C)



TRL

EGS is proven at field scale today vs. super hot rock.

The resource base just went up 140x

1

CONVENTIONAL HYDROTHERMAL

40 GW

US addressable resource

Heat, permeability and fluid all have to occur in the same place.

That combination is rare, which is why the existing fleet sits within its geographic limitations.

2

NEXT-GENERATION GEOTHERMAL

5,500+ GW

US addressable resource

The requirement drops to hot rock alone.

You engineer the permeability and you supply the water.

The demand is here...



Data centers: about 60 GW today, roughly 135 GW by 2030

US data center draw on the grid rose about 20% in the last year alone.

Roughly 75 GW of new load in five years

That increment on its own is about 3/4 of the entire US nuclear fleet.

700 to 900 GW of clean firm capacity by 2050

DOE modeling puts the requirement at roughly 4x the clean firm supply on the grid today.

... but very little of it can be delivered this decade

Gas turbines

Sold out through 2030

GE Vernova closed with an 80 GW backlog running into 2029, and expects reservations sold out through 2030 by the end of this year.

New nuclear

Unachievable this decade

10.4 GW of nuclear sits in the entire national interconnection queue, none of it under construction.

Capacity markets

Clearing at the cap

PJM's most recent auction cleared at \$333.44 per MW-day and finished 6,600 MW below its own reliability target.



The PJM clear was a third consecutive record, at a total cost of \$16.4 billion.

The buyers have already moved to meet the moment

NEXT-GENERATION GEOTHERMAL OFFTAKERS IN THE US

Southern California Edison	320 MW
Meta	150 MW in New Mexico
Microsoft	up to 100 MW in Nevada
Google	operating since 2023
Shell Energy	31 MW

61%

of recent US geothermal PPA
volume is next-generation: 1,007 MW
across 12 agreements

And yet most of it is stuck waiting for interconnect

5,500 GW

of resource



Addressable next-generation geothermal in the United States.

700-900 GW

of clean firm capacity needed
by 2050



Roughly four times the clean firm supply on the grid today.

4.8 GW

in the queue



All the geothermal in the national interconnection queue, which is the whole American pipeline.



The national queue holds 2,061 GW in total, and 4.8 GW of it is geothermal.

Geothermal's first era was big, fueled by JVs

THE GEYSERS

2,043 MW

peak output, 1987, across 21 plants

- 1955-58: Magma Power and Thermal Power find the steam and jointly bring PG&E in as the buyer
- 1967: Union Oil buys a 50% stake in their position, to fund the development

The Hoover Dam is 2,080 MW

COSO

270 MW

rated by January 1990

- Dec 1980: California Energy Company and Caithness form the China Lake Joint Venture, a California general partnership
- Navy landowner, private developer, utility offtake

The CEC registry still lists the plant as Coso Navy 2 / China Lake Joint Venture



Structure follows scale: a project too large for its discoverers gets split across balance sheets.

Then the large resources were taken, and projects got smaller...



There was only one Geysers

What remained to develop came in at 20 to 40 MW at a time.

Binary and ORC plants, 1980s

New turbine technology made a 20 MW resource economic to build, so the industry built 20 MW projects.

Federal power law, 1978

Utilities were required to buy from small independent generators at set rates, so a single owner could finance a project alone.

... which shaped the industry we have today

3,969 MW

across 99 plants

Total US geothermal capacity after 66 years of development.

32 MW

average plant size

Across Ormat's 46 operating plants, the largest fleet in the country.

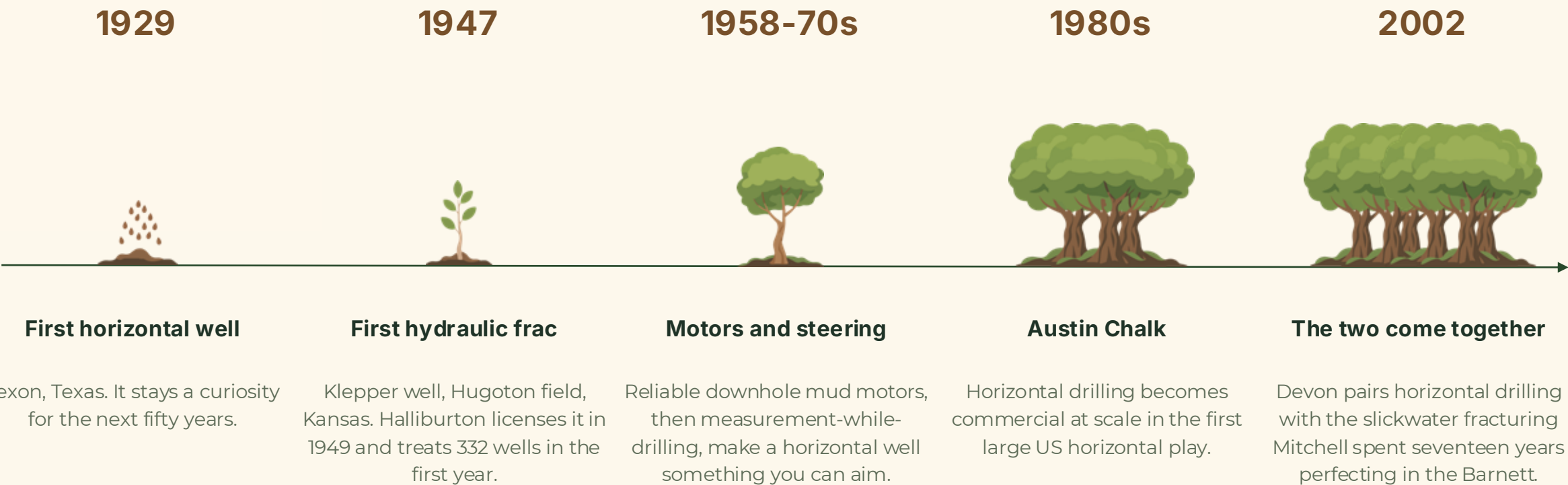
69%

held by two companies

Ormat and Calpine together hold more than two thirds of US installed capacity.

→ **After 66 years of development, the average American geothermal plant is only 40 MW.**

This industry built the tools that solved it



➔ **Horizontal wells went from 2% of US wells drilled in 1990 to over 75% by 2019.**

55 years of EGS progression

1970 Fenton Hill, New Mexico

Los Alamos begins Hot Dry Rock. The concept: engineer the permeability where the rock is hot and tight.

1986 Soultz-sous-Forets, France

A European joint venture. 5,060 m at 201°C by 2000.

2003 Cooper Basin, Australia

The largest demonstration EGS project of its era. Modeled heat recovery came in under 2%.



Every project circulated under 40 L/s, against the 50-100 L/s a commercial well pair requires.

And the transfer into geothermal is proven

SUCCESSFUL PILOTS

3

modern EGS pilots, showing progressive improvement since 2021

- Utah FORGE, Utah
- Project Red, Nevada
- Cape Station, Utah

Modern EGS designs leverage oil & gas developed technologies of multi-stage hydraulic fracturing in long horizontal laterals.

COMMERCIAL WELL DESIGN

70 to 21 days

per well, 2022 to 2026

Deeper, hotter and twice the lateral at the same rig days. Per-well cost moved from roughly \$9.4M to \$4.8M.

The same completion practices, running in hard hot rock.

So the projects are big again

500 MW

largest announced
project

Against an existing fleet
whose average plant is 40
MW.

2 to 320 MW

range of recent PPAs

The developer now sets the
size of the project, working
from the same hot rock.

8 acres

of surface per MW

About 30 MW per square
kilometre with multi-bench
targeting, from a single pad.



A first-of-a-kind 30 MW project runs about \$450M, and DOE puts the capital to reach liftoff at \$20-25 billion.

What I think happens next

The companies that win next-generation geothermal will look a great deal like E&P companies.

Subsurface risk management

The asset is a reservoir, and reservoirs get managed by reservoir people.

Drilling programs on a learning curve



Performance measured in days per well and dollars per foot.

Joint ventures and non-operated positions

Structures this room has executed a hundred times, and clean energy has rarely used.

The joint venture returns to a different room

	PROJECT	NAMEPLATE CAPACITY	YEAR
1	The Geysers	~1,517 MW	1960
2	Imperial Valley (Salton Sea Complex)	~432 MW	1982
3	Coso Geothermal Complex	~270 MW	1987
4	Heber Geothermal Complex	~160 MW	1985

Together they are ~60% of US installed capacity. Every one of them was built through a JV partnership.

Scalable geothermal of the future

JVs with a variety of partners, incl. IPPs, hyperscalers, oil and gas operators, and PE and infrastructure funds to develop big projects again

The structure that built these projects is what this decade needs, and the partners are in this room.

Sources: DOE, History of Geothermal Energy in America; 2025 U.S. Geothermal Market Report (NLR); operator project records. Capacity shown is nameplate.



The heat was never the constraint.

For sixty years the resource set the size of a project, and projects that small did not require partners. That has changed.

The joint venture is coming back to this industry.

The capability it needs already exists in this country, and much of it is owned by people in this room.