"Blazing Hot EGS" Scenario Description

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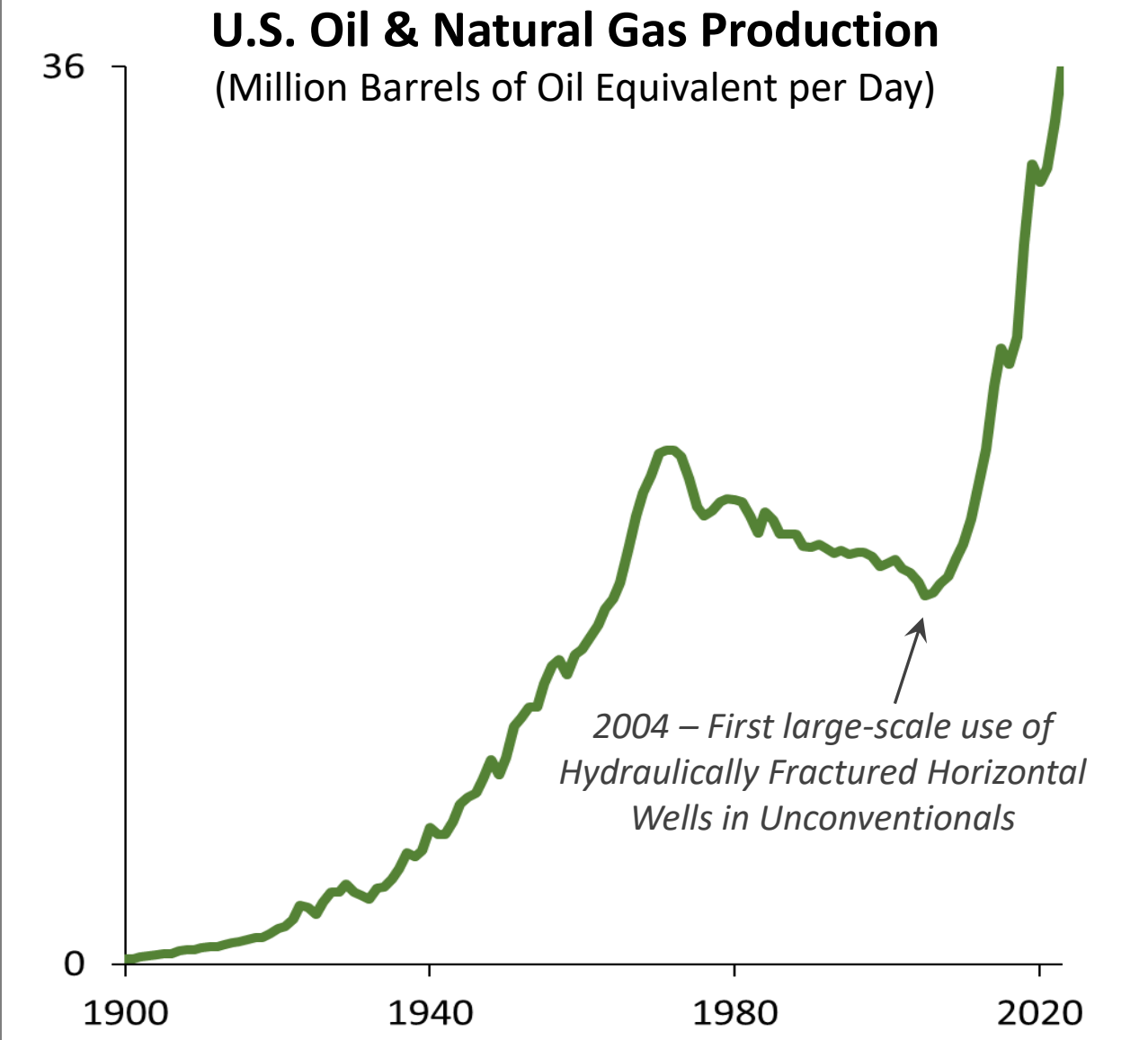
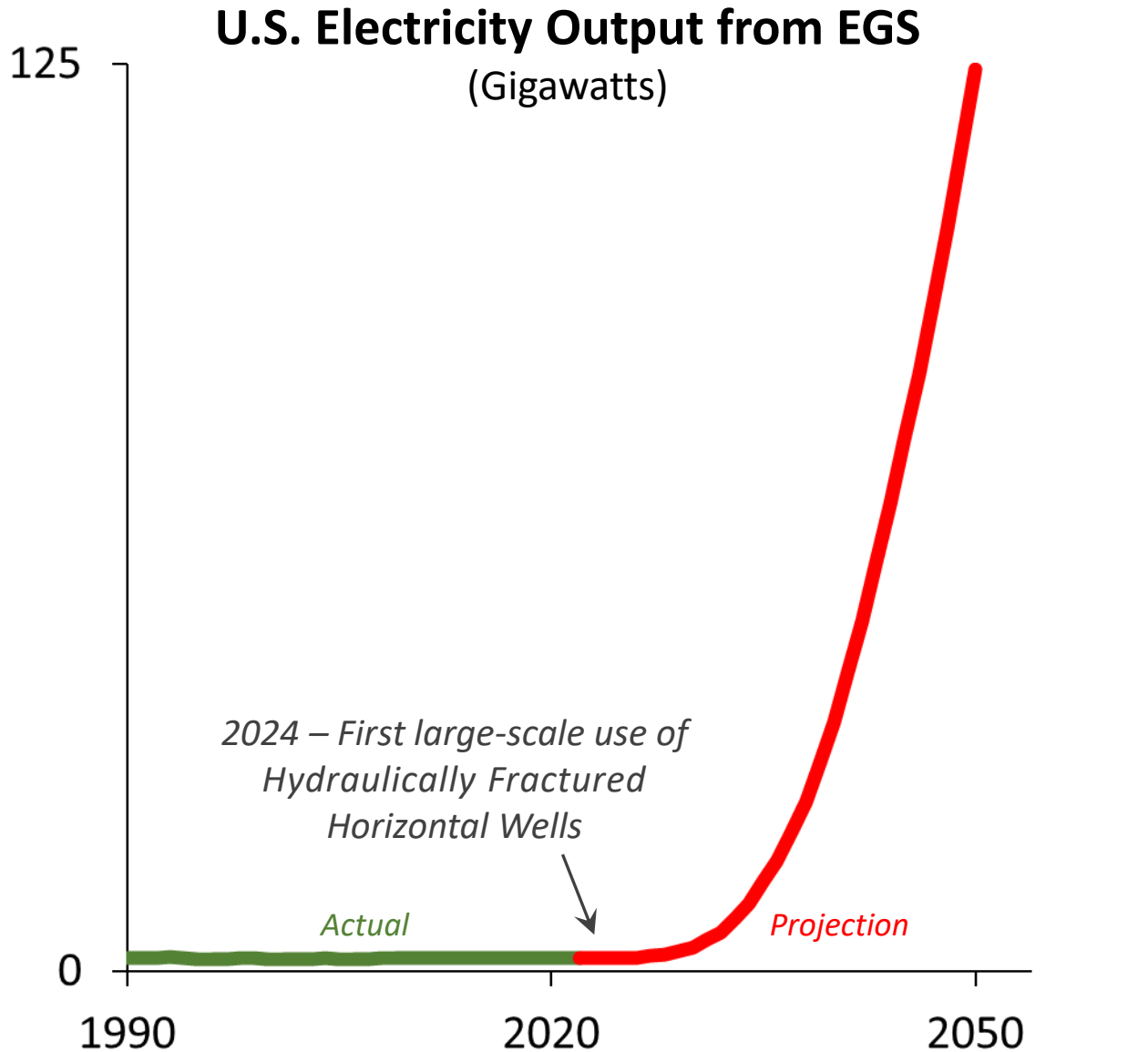
Premise: Hydraulically Fractured Horizontal Wells enable EGS Breakthrough like that achieved in unconventional oil and gas reservoirs two decades ago



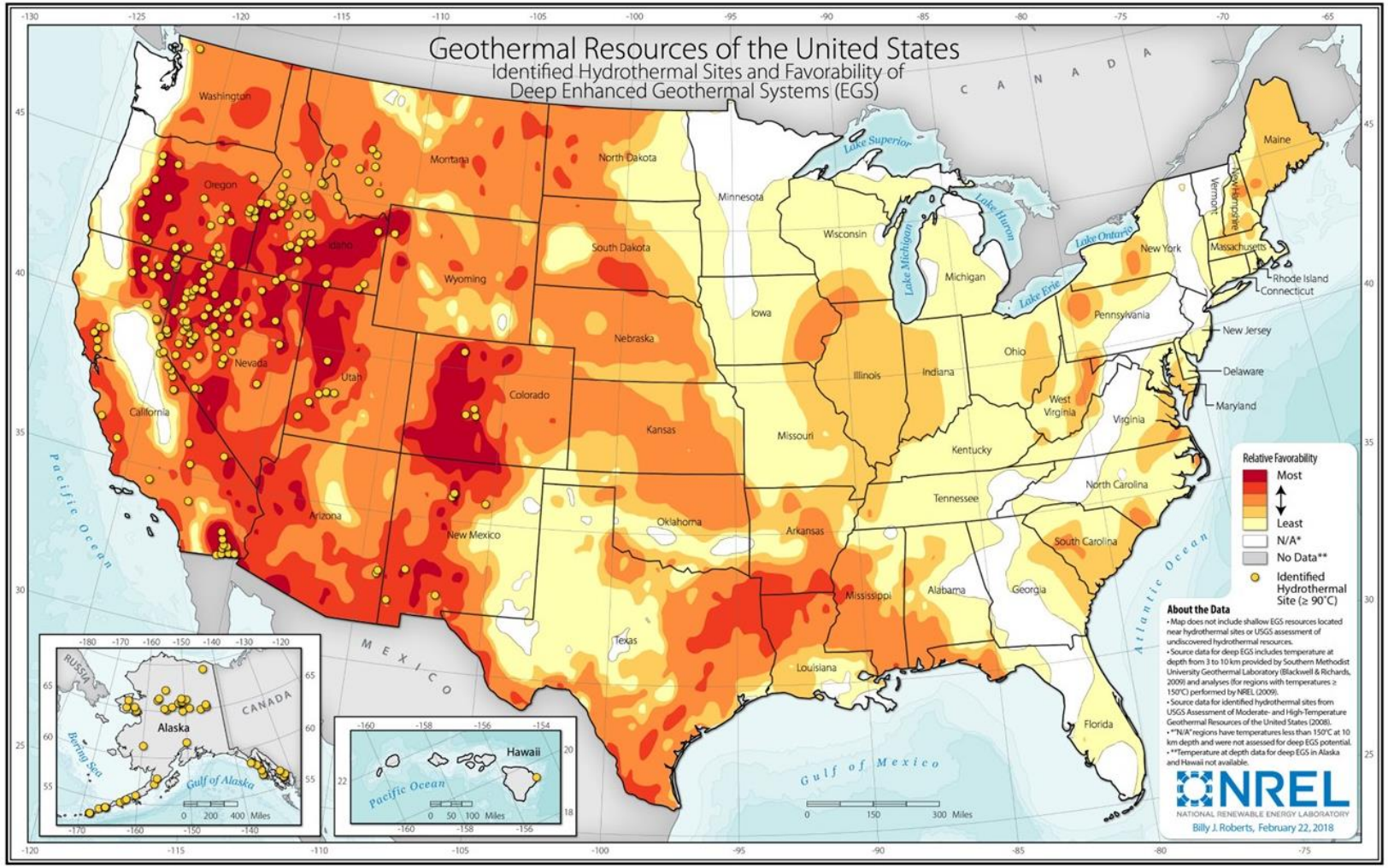
Sources: U.S. EIA, Energy Insights, and BP websites



Sources: U.S. EIA for 1990 to 2022; 2022 average output = 1.8 GW (0.4% of U.S. total); Author projection from 2023 to 2050

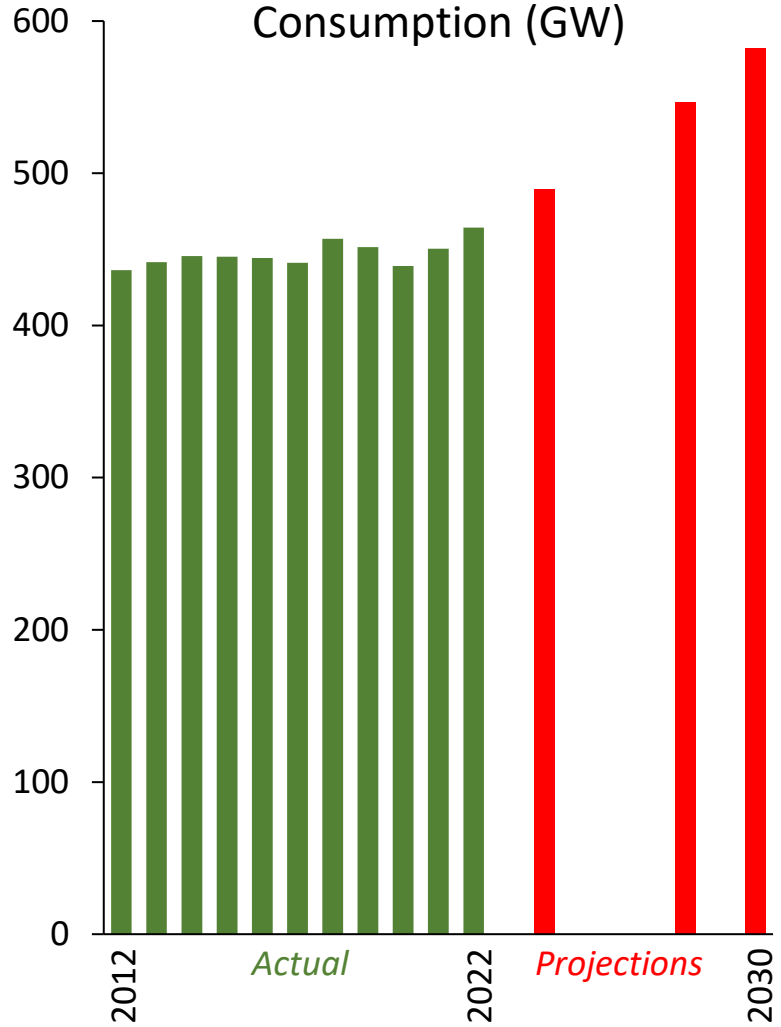
Enablers: Enormous Resource Base and Rapidly Growing Power Demand

Geothermal Resources Have the Potential to Supply a Nearly Inexhaustible Amount of Electricity



Mao taken from U.S. NREL website

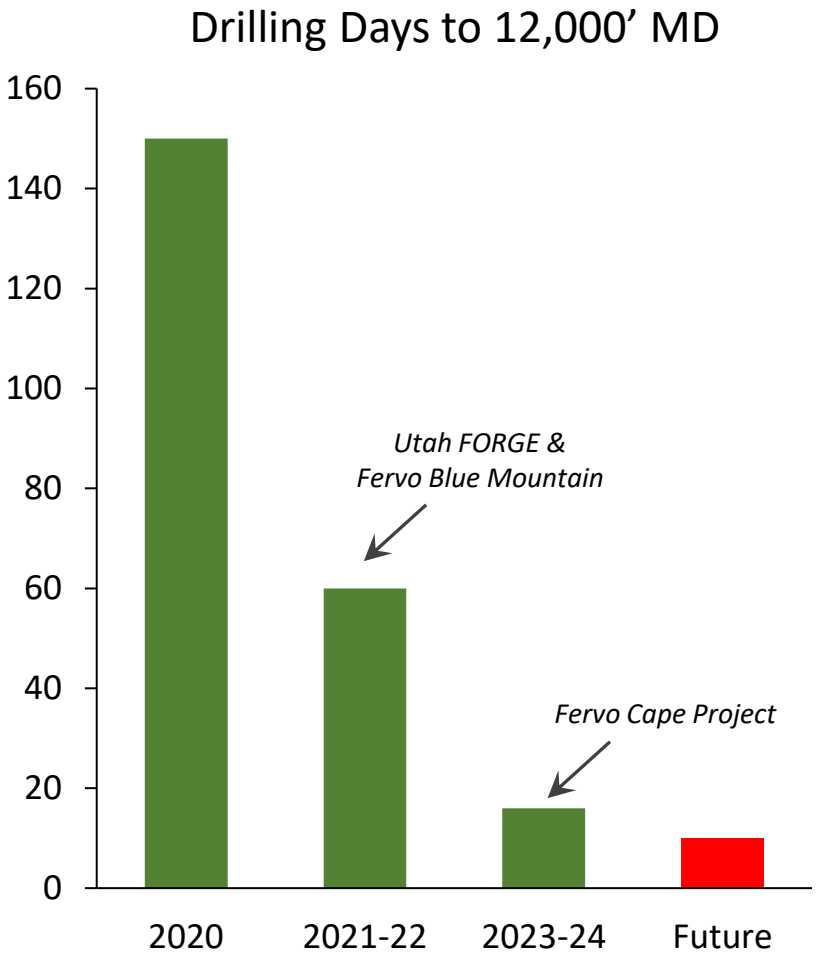
U.S. Electricity Demand is Growing Rapidly; Projected to Continue



Sources: 2012 to 2022 U.S. EIA; 2024, 2028, and 2030 NERC projections modified by BCG; Annual output in TWh converted to GWs to allow easy comparison to available capacity

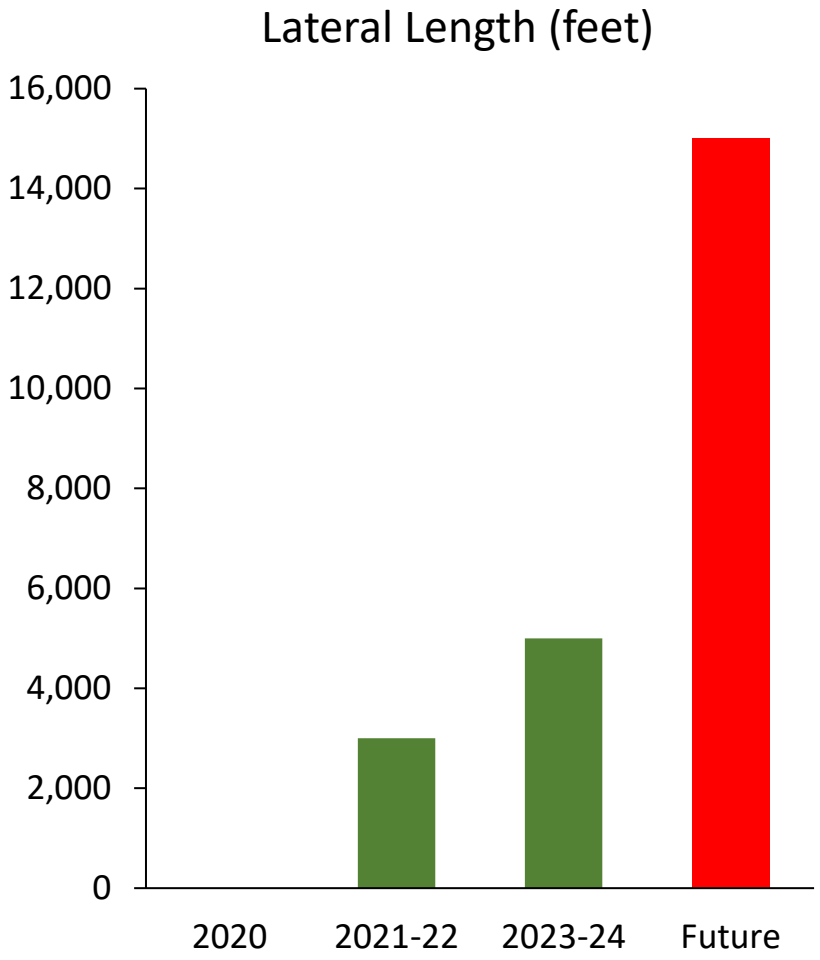
Subsurface Improvements Have Been Dramatic; Likely More to Come!

Dramatic Drilling Performance Improvements



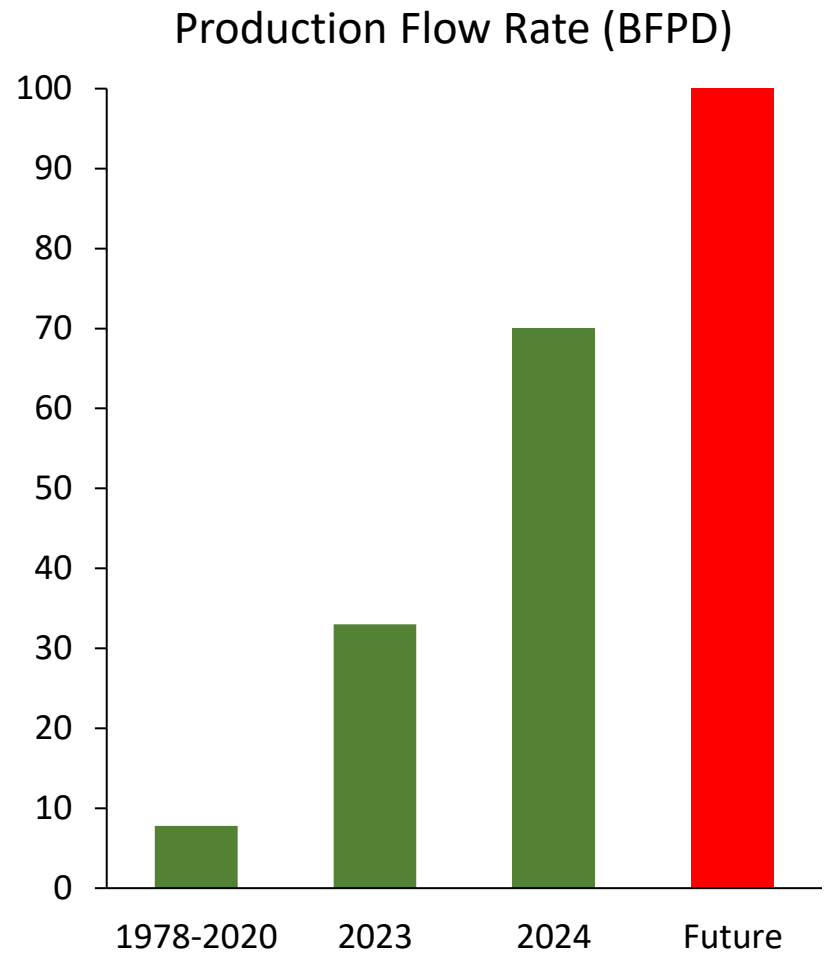
Sources: El-Sadi et al, 2024, Review Of Drilling Performance In A Horizontal EGS Development; Winkler and Swearingen, 2021, Summary of Drilling Activities, Well 16A(78)-32 (Utah FORGE)

Ability to D&C Horizontal Laterals in Basement Rocks



Note: The first fully horizontal EGS wells drilled were those drilled by Fervo at their Blue Mountain project in 2022

Ability to Achieve High Flow Rates & Good Conformance



Note: 1978 – 2020 data from 11 projects; average peak flow rate shown (7,800 bfpd); range was from 2,700 to 16,300; 2023 Fervo's Blue Mtn. project, 2024 FervoCape

Potentially Significant Upsides and Upcoming Tests

Super Hot Rocks	*Higher Flow Rates*	*Greater Surface Area*	*Improved Conformance*	*"Open Hole" Producers*[2]	*One Plant / Deeper Layers*
• Blue Mtn. ≈ 375° F • Cape 400→435→450° F • SHR target 750° F • ≈ 1 MW per 25° F[1]	• Larger casing = > rate • Blue Mtn. 25M bfpd • Cape design 70M bfpd • Higher rates possible	• Longer laterals • Wider well spacing • LL: 3M → 5M → 15M ft. • WS: 300' → 600' → __	• Longer laterals • Optimized completions • Operation practices • Remediation options	• $5 MM or more per well cost reduction • Uncertain flow rate impact, but could yield higher rates	• Synergy with Super Hot Rocks progress • Reuse as much of plant as possible after initial wells die
> Thermal Output	***> Thermal Output***	***>Thermal Longevity***	***>Thermal Longevity***	***Less D&C Cost***	***Less Plant Cost***

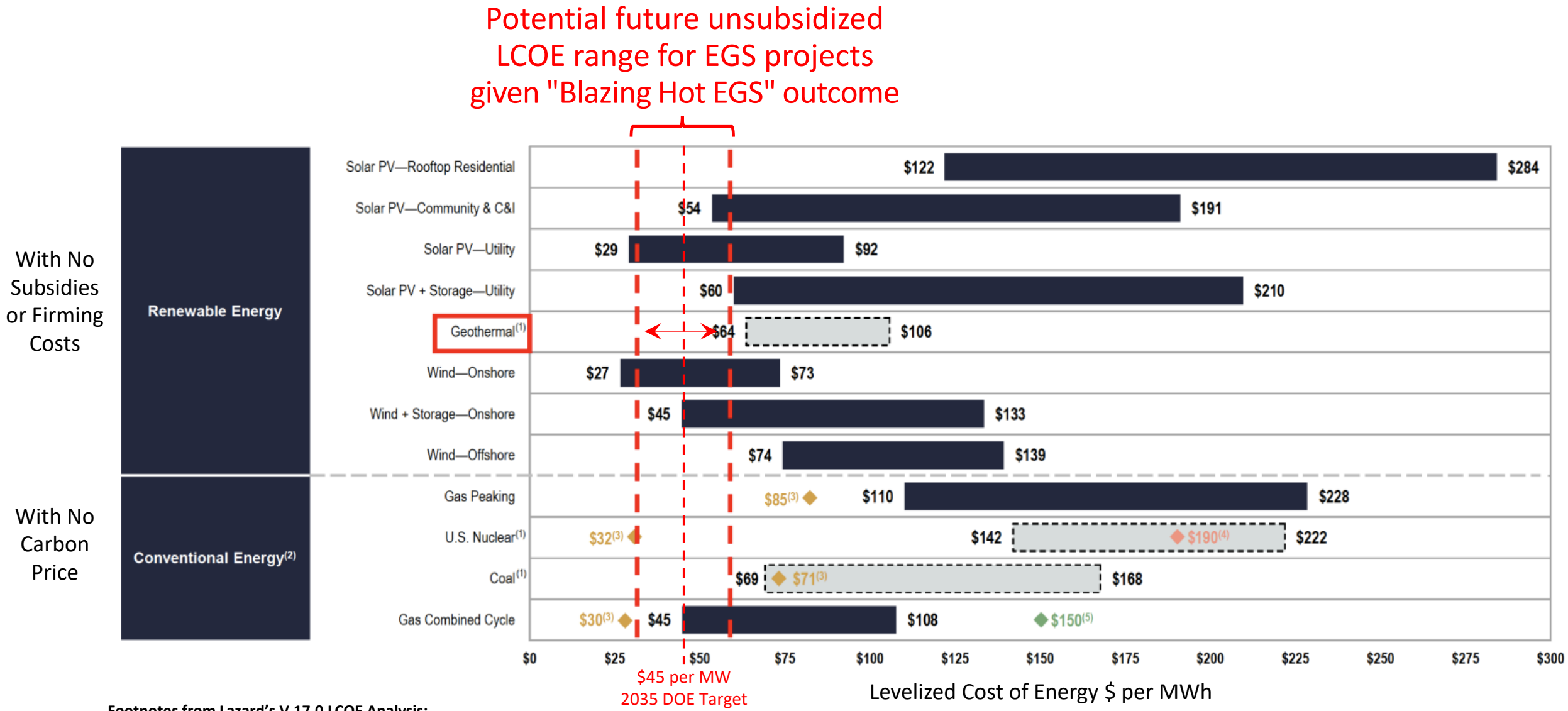
	2024	2024	2025	2025	2025	2025	2026	2026	2026	2026	2027	2028	2029
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	FY	FY	FY
SHR		Progressively hotter targets at Cape (400 → 435 → 450 → 500° F)					Mazama Project Geode Newberry Volcano 650 - 750° F SHR project						
HFR	Cape/FORGE 30-day tests						Test of larger casing sizes?		Cape Phase 1 Production			Cape Phase 1 and 2 Production	
GSA	Cape 30-day tests	Progressively longer and wider spaced laterals at Cape; Longer and wider spaced laterals at yet to be announced projects											
IC	Cape/FORGE	Blue Mountain Production							DOE funded data wells	Cape Phase 1 & 2 Production			
OHP	Cape 30-day test[3]				Additional Cape tests?				Cape Phase 1 & 2 Production				
OP/DL											Blue Mtn. Deeper Layer?		

[1] @ 50,000 bfpd flow rate; [2] Wells could be completed open hole or with a slotted liner, either way, the cost of casing and hydraulically fracturing the well would be eliminated; [3] Fervo left one of the initial Cape Project wells as an open hole completion

If "Blazing Hot EGS" Outcome is Confirmed….

- EGS LCOE (in sweet spots) will be lower than all other sources of clean, firm power
- EGS LCOE will be lower than wind and solar LCOEs with firming costs included
- Will be lower than natural gas and coal LCOEs when the cost of carbon is considered
- EGS will be a disruptive force not only in power markets, but for energy as a whole
- EGS output growth will not be limited to the United States

Levelized Cost of Energy Comparison if "Blazing Hot EGS" Outcome Achieved



Footnotes from Lazard's V.17.0 LCOE Analysis:

All LCOE assessments assume 60% debt at an 8% interest rate and 40% equity at a 12% cost of capital.

[1] Given the limited public or observable data available for new build geothermal, coal, and nuclear projects, the LCOE presented herein reflects Lazard's LCOE V.14.0 results adjusted for inflation. Coal LCOE does not include the cost for transportation & storage.

[2] The fuel cost assumptions for Lazard's LCOE analysis for natural gas generation, coal generation, and nuclear generation are $3.45 per MMBTU, $1.87 per MMBTU, and $0.85 per MMBTU, respectively

Winners – Survivors – Losers in a "Blazing Hot EGS" World

Winners

- Fervo Energy & other EGS startups
- EGS early-mover O&G operators
- D&C service companies
- Geothermal power plant providers
- Power consumers that prefer/need clean, firm electricity supply
- U.S. regions in which development activity is concentrated
- Japan and other large energy importers with relatively shallow hot rocks

Survivors

- Oil producers (since oil is an easily transportable, globally fungible commodity for which declining demand is likely still a ways out in the future even if electrification accelerates)
- Hydrothermal operators who embrace the use of O&G technologies to optimize projects
- Non-EGS power producers and power plant fuel suppliers in areas a long distance from EGS production

Losers

- U.S. natural gas producers
- O&G operators that are EGS laggards
- Oil refiners in countries with large EGS output (due to > electrification)
- Exporters of energy to Ring of Fire countries (e.g., Japan)
- Wind and solar producers and their supply chain companies
- Wind and solar "firming" providers
- CCS providers for gas and coal fired power plants (in areas with access to EGS power)

Recommendations to Maximize Upsides and Limit Regrets[1]

- **Act Now** (No Regrets)
  - Stand up full-time team to identify EGS sweet spots, deepen knowledge of commercial and project execution issues, develop a range of entry strategies, identify potential partners, monitor signposts
- **Act Now** (Low Regrets)
  - Begin securing acreage positions in attractive geothermal provinces and plays
  - Join gov./industry consortiums to test key uncertainties and develop technologies helpful for lowering LCOE
  - Lobby governments to implement favorable regulations and support build-out of transmission capabilities
- **Act if Favorable Signpost(s) Observed** (Low Regrets)
  - Aggressively move to acquire large acreage positions in high-graded areas
  - Commit funding to rapidly mature EGS prospects to drill ready status; test best opportunities
- **Act if Favorable Signpost(s) Observed** (Potentially Significant Regrets)
  - Stop investments in other low carbon technologies and begin scaling back O&G growth capital
  - Escalate EGS investments rapidly to position the company to be a leading global geothermal power producer

[1] From an Upstream O&G Operator's perspective; "Regrets" measured by loss of value if "Blazing Hot EGS" scenario fails to achieve expected levels of commerciality (i.e., company made investments in EGS that don't payout).

Scenario Planning Background Information

Scenario Planning Best Practices

- Scenario planning is a tool used by individuals and organizations to consider implications associated with specific, possible future states of the world
- Scenario planning can be used to analyze uncertain situations, although to understand a range of possible outcomes, multiple scenarios must be developed since for any given scenario, a specific set of internally consistent assumptions should be used throughout the analysis
- To build a scenario, a specific future state of the world is chosen to be investigated
- Imaginative thinking grounded in emerging trends tends to create the most robust scenarios
- It is important to quantify outcomes to be able to consider impacts of a scenario "playing out"
- Typical outputs from scenario analysis includes: a summary of key implications, an assessment of winners-survivors-losers, identification of signposts, a list of recommended actions
- Given that scenario planning deals with complex situations over long time frames, scenarios will need to be periodically updated