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Geothermal Power Plant Screening | Benchmarking Prime Development Regions

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Theory / Method / Workflow

Geothermal siting has traditionally emphasized subsurface heat quality, but project viability is increasingly shaped by surface-level constraints including land access, power prices, permitting friction and demand growth. This work presents a multi-factor geothermal screening framework developed by Enverus Energy Transition Research that integrates subsurface economic modeling with surface indicators. The workflow combines levelized cost of electricity sensitivity by depth and gradient with long-term load forecasts, power price projections, land ownership and control analysis and regulatory and interconnection risk themes. These inputs are layered into a composite scoring system to benchmark geothermal competitiveness across U.S. power markets.

Results, Observations, Conclusions

Results show that enhanced geothermal systems achieve the lowest LCOE in regions where strong geothermal gradients align with existing infrastructure, favorable market pricing and growing dispatchable demand. Modeled EGS costs cluster between $72 and $92 per MWh under favorable conditions (figure 1).

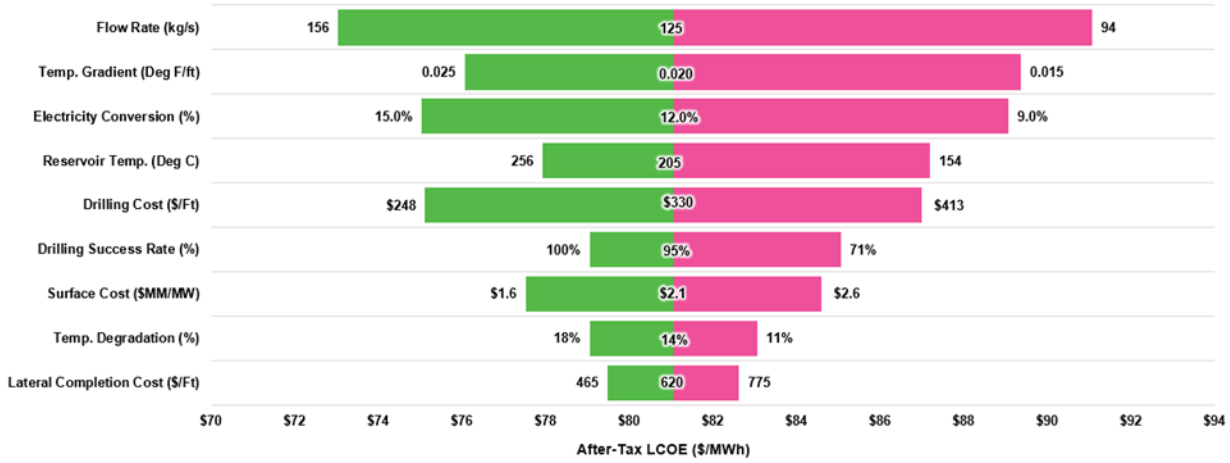


Figure 1: Enhanced Geothermal Systems Pricing Sensitivity

Load growth hotspots including ERCOT North, SPP South and PJM Mid-Atlantic exceed 25 percent growth through 2035, driven largely by data centers and electrified industry. Power price outlooks indicate sustained prices above $100 per MWh with high volatility in ERCOT West and CAISO by 2030, increasing the relative value of geothermal's dispatchable profile. Screening also highlights areas where wind, solar and natural gas development face land, permitting or

infrastructure constraints that geothermal can partially avoid, particularly on brownfield oil and gas sites.

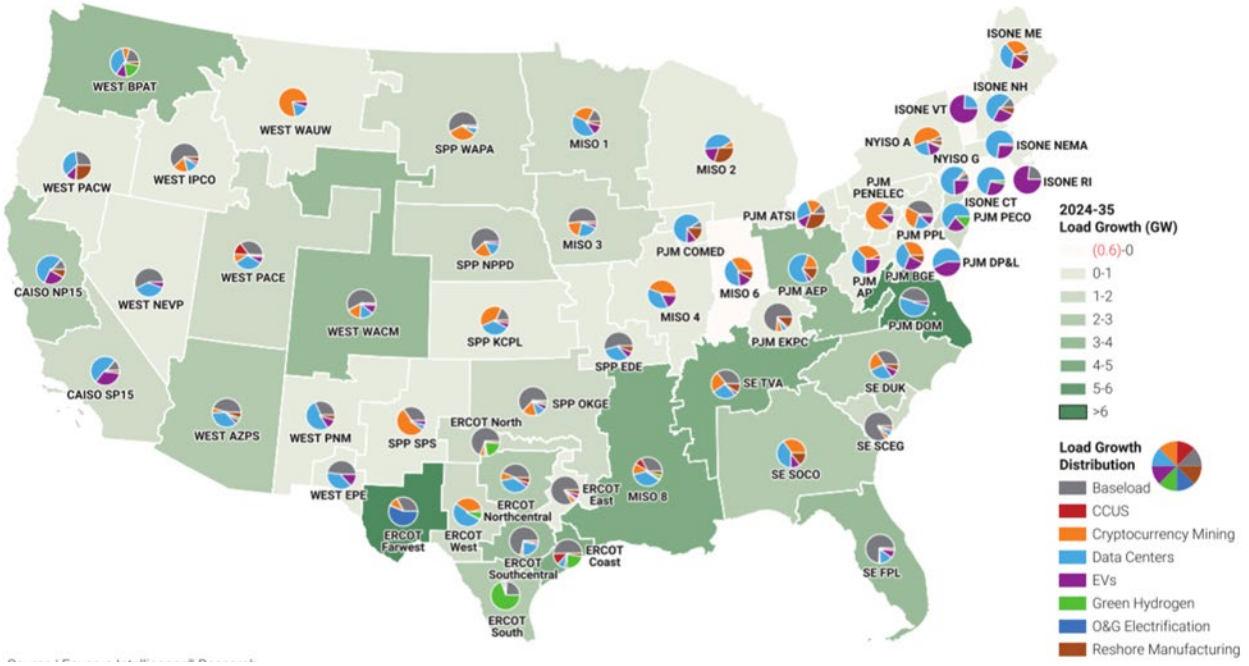


Figure 2: Long Term Load Forecast by Growth and Growth Driver

Novel/Additive Information

This study introduces a surface-aware geothermal benchmarking approach that reframes geothermal as a grid-aligned and load-adjacent solution rather than a purely resource-driven one. By linking geothermal viability to data center siting, hyperscaler land control and dispatchable capacity gaps, the framework identifies high-impact deployment opportunities not captured by traditional heat-focused screening. The results provide actionable guidance for developers, policymakers and investors seeking scalable geothermal pathways that align subsurface potential with real-world market and infrastructure conditions.