

OPINION

Our Water Matters

BY **TREY GERFERS**

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Presidio County's geothermal future looks bright

Conventional geothermal energy is found in the form of steam and very hot water beneath the earth's surface at depths of several feet to a few miles. These reservoirs of liquid heat can be tapped and brought to the surface to generate electricity. Recent advances in drilling and recovery techniques pioneered for unconventional oil and gas extraction are paving the way to a future of unconventional geothermal energy production, also known as geothermal anywhere (GA), which involves mining the heat stored in the hot rock deep in the earth's subsurface. A 2023 report titled "The Future of Geothermal in Texas — Contemporary Prospects and Perspectives," included a map that highlighted Presidio County as one of the areas with some of the hottest rock in the state. Based on that report, the Presidio Municipal Development District (PMDD) hired Dr. Ken Wisian and his team at the Bureau of Economic Geology (BEG) at UT-Austin to conduct an assessment of the county's geothermal potential, which was recently completed.

GA involves the use of novel drilling methods to create a closed loop deep in the ground, through which a liquid (such as water or an engineered fluid) is then pumped. This liquid picks up heat from the surrounding formation and returns to the surface in the form of steam, where it drives turbines to generate electricity. The steam then condenses at the top of the system, where it is collected and pumped back into the subsurface to repeat the process again.

The assessment divides Presidio County into three zones: the "Border" zone (where known subsurface temperatures are hottest), the "Interior" zone (which surrounds Marfa and where known temperatures are not as hot as the border region, but remain above the worldwide subsurface average), and the "Big Bend" zone (where available data are sparsest). The authors combined several data sources to produce generalized models of the subsurface in each of the three zones. Based on an analysis of the available data, Presidio County's ace in the hole, so to speak, is the "basement" level of the subsurface in the Border zone, which occurs at around 8,000 feet and reaches temperatures of between ~300°F to 390°F, "indicating "a high-quality resource."

Beyond the potential for electricity generation, the authors emphasize that “it is critical also to explore the direct uses of heat, which can utilize more resources more efficiently than electricity generation.” Direct heat from geothermal sources “can be used for heating and cooling, agriculture/aquaculture, and virtually any industrial process.” If geothermal is additionally used to replace electricity for heating and cooling, this can greatly reduce the greenhouse gas emissions associated with conventional power generation.

The authors ultimately suggest that combining geothermal uses into “cascading scenarios” that produce additional cumulative revenue streams could improve the overall economic benefits of investing in geothermal development. “After a geothermal resource has been used to generate electricity, the effluent output will still contain usable heat, which can be used for a secondary application requiring a lower temperature. The heat pattern can be continued in an efficiently designed system, with the effluent of one process cascading through lower and lower temperature applications.”

Several such scenarios described in the assessment could involve food processing, high-value crop production, or a fresh-cut-flower growing hub near the Texas-Pacifico South Orient Rail Line in the Border zone near Presidio. Here, the heat would go into facilities for drying food or into greenhouses for optimal plant growth, and the generated electricity would be used for “running the pumps, fans, and other equipment required” to keep those facilities running at maximum efficiency. Another scenario involves geothermally-powered direct air capture of CO₂ from the rocks that underlie in the Interior zone around Marfa and exporting the CO₂ to the Permian Basin for use in enhanced oil recovery processes.

Perhaps the most fascinating scenario could involve siting geothermal electricity production to keep the existing molten sodium-sulfur battery system near the town of Presidio “fully charged and online” to supplement Presidio’s existing solar voltaic facility. Additional battery systems and solar voltaic facilities could be constructed to improve the region’s energy resilience as the statewide grid is likely to decline and fail more frequently. All of the leftover heat could then be fed into the cascade of wealth-creating processes described above, transforming Presidio County into an economic hotbed fueled by emission-free, renewable energy. The fact that all of southern Presidio County is designated by the state as an Economic Development Zone would qualify these projects for “substantial state supported subsidies (as well as federal subsidies from the Build-Back-Better and Inflation Reduction Act),” making our little corner of heaven out here a seriously attractive area for innovative investment.

Dr. Wisian will present his findings on Wednesday, May 8, at 5 p.m. at the PMDD offices at 608 W. O’Reilly St. in Presidio. Visit <https://meet.google.com/rpu-ftcx-gfo> to watch the presentation remotely.

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