LSU Receives $1 Million to Explore New Energy Source from Reservoir Heat Extraction

A group of LSU researchers is conducting innovative research to harvest heat from geothermal reservoirs to generate electricity. The proposed method couples forced convection (the movement of molecules within fluids) through long, near-horizontal wellbores with free convection arising from natural geothermal gradients.

Christopher White, associate professor, and Mayank Tyagi, assistant professor, both of the LSU Craft and Hawkins Department of Petroleum Engineering and the Center for Computation & Technology (CCT), along with other LSU researchers, were awarded a grant for $997,333 from the U.S. Department of Energy for the project "Zero Mass Withdrawal, Engineered Convection, and Wellbore Energy Conversion."

Compared to conventional geothermal development strategies, engineered convection improves thermal recovery efficiency and delays thermal breakthrough of heat-depleted geofluid at the heat extraction point. Computer simulations indicate that the engineered convection strategy could be effective for the saline aquifer temperatures, thicknesses, extents, permeabilities, and dips that are common in the U.S. Gulf Coast region.

"Low-cost, environmentally benign geothermal energy could boost the economy of the region, especially in socioeconomically disadvantaged areas and remote areas with poor electric power transmission and transportation infrastructure, such as the coastal wetlands," said White, principal investigator of this project.

The engineered convection strategy could provide robust, modular power with individual wells contributing hundreds of kilowatts up to megawatts in net electric power. This could add up to a regional capacity of tens of gigawatts by the year 2050.

"Engineered convection geothermal systems could be made robust with respect to floods and storms by placing some of the energy conversion components in the wellbore, providing valuable emergency and post-hurricane distributed power. In-wellbore generation could also reduce the surface facilities footprint, reducing noise and potentially reducing water requirements," said White.

Also participating in the project are Arash Dahi Taleghani, Richard Hughes, and Mileva Radonjic, LSU Craft and Hawkins Department of Petroleum Engineering; Jeffrey Hanor, LSU Department of Geology & Geophysics; Chacko John, Louisiana Geologic Survey; Mark Kaiser, LSU Center for Energy Studies; Fahui Wang, LSU Department of Geography & Anthropology; and Blaise Bourdin, LSU Department of Mathematics.

For more information on LSU's College of Engineering, visit: eng.lsu.edu.

For more information on this or other research being done at the CCT, visit: http://www.cct.lsu.edu/home.

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