Study Reveals Geothermal Energy Potential in Singapore

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Researchers from Nanyang Technological University, Singapore (NTU Singapore) and TUMCREATE have discovered a significant geothermal resource in Singapore, which could serve as a reliable source of clean energy alongside solar power.

The study, led by NTU Associate Professor Alessandro Romagnoli and TUMCREATE Principal Scientist Tobias Massier, involved drilling an exploratory slim hole to a depth of 1.1 kilometers at Admiralty Lane near the Sembawang hot spring. Samples of the Simpang granite, the underlying rock formation, were collected during the drilling.

The team found that the Simpang granite at Admiralty Lane has high levels of heat-generating elements, making it capable of producing and storing heat. The rock temperatures varied at different depths, with estimates suggesting that temperatures could reach 200°C at depths of four to five kilometers and deeper. At a depth of 1.1 kilometers, the average temperature of the Simpang granite is already hot enough to cook a soft-boiled egg.

The study identified various potential applications for geothermal energy based on different temperature ranges. For example, lower temperatures between 30 to 60°C could be used for recreational heating, food processing, and water desalination. Higher temperatures above 150°C could be utilized for electricity and hydrogen generation.

The Simpang granite at Admiralty Lane was found to have high heat flows, twice as much as the global average for granite rocks. This discovery suggests that the site has great potential for geothermal energy production.

NTU Vice President (Industry) Professor Lam Khin Yong stated that the study aligns with NTU's and Singapore's focus on renewable energy research. The findings indicate a new renewable energy resource that could make a significant contribution to the nation's energy mix.

Mr. Ralph Foong, deputy chief executive (energy planning and development) at EMA, sees the study as a basis for understanding and fully assessing Singapore's geothermal potential. If proven viable, geothermal energy could help diversify the country's energy mix and contribute to a more sustainable future.

The study's lead scientists, Assoc Prof Romagnoli and Dr. Tobias Massier, emphasized the uniqueness of Singapore's geothermal potential. The higher temperature gradient and heat production of the Simpang granite, combined with its high heat flow, make it a valuable resource for meeting the country's cooling demand.

The research team suggests further exploration and development of emerging technologies, such as heat pipes, to harness Singapore's geothermal energy potential. They believe that geothermal energy could serve as a constant, low-carbon energy source that is not dependent on weather conditions, unlike solar power.

Overall, the study reveals the untapped potential of geothermal energy in Singapore and highlights the possibility of unlocking a clean and abundant energy source that could last for decades. Continued research and collaboration will be crucial in fully assessing and harnessing Singapore's geothermal resource.