

Geothermal Resource and Reservoir Characterization for the Cornell University Campus

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Project Background and Research Motivation

Geothermal deep direct use has potential to meet cascaded thermal energy requirements of the Cornell University campus.

Farming	Drying	Tasteurizing	зрасе пеатінg
Greenhouse	Biomass	Dastourizing	Cornell Marketing Group
With the second se	Vie Systems	DAIRY SINCE 1880	Campus Hot Rock Reservoir

• To discover viable reservoir targets at Cornell, characterization of local geologic and temperature data is required.

Target Depths for Geothermal Reservoirs

- Temperatures > 70 °C are estimated for depths > 2.2 km near Cornell.
- We evaluate potential sedimentary reservoir targets from 2.2 km to basement rock.

Depth to Top of Sedimentary Targets



Depth to Precambrian Basement



Subsurface structural maps interpolated from local well data.

Stratigraphy for Target Reservoir Depths

Gamma ray logs along cross section are used to identify rock lithology. Progressing southward, the Trenton Group (light blue) thins and the basin thickens.



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125 °C



Geologic Properties of Potential Reservoirs

- Porosity of reservoir rocks informs reservoir flow productivity.
- Well log measurements of porosity require corrections for hydrocarbons, water, or shale, which is commonly interbedded within potential reservoir formations.



Spatial Variability in Porosity

- Porosity is spatially variable for each potential reservoir formation.
- Within the Black River formation, some wells have trends in porosity with depth.





Four depth intervals identified

Drilling-related thermal disturbances and measurement errors





- We used local well log datasets to estimate the depths, porosities and temperatures for formations of interest for geothermal reservoirs at Cornell.
- Propagating uncertainty in geologic and thermal information into geothermal resource predictions and reservoir modeling allows for site-specific risk and economic evaluations that reflect the available data before a well is drilled.

References

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