

# **Techno-Economic and Environmental Analysis of Energy Efficiency and Geothermal Cooling of Communication Company Offices and Data Centers**

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In this project, you shall investigate the technical, environmental and economic performance of geothermal heat pumps used for cooling of large-scale data centers. Based on energy data from a large scale commercial data center, you shall propose the design of a geothermal heat pump system using industry standard methods to replace currently employed absorption chillers and/or vapor compression refrigeration machines. Specifically, the design includes sizing of heat pumps and boreholes, and estimating capital and operating costs and full life cycle cost. Also a comparison of the environmental impacts and benefits with current cooling systems should be made that includes tradeoffs in terms of energy consumption, costs, and CO<sub>2</sub> and other emissions.