

Multistage Transverse Fractured Horizontal Array Modeling in Enhanced Geothermal Systems using Simulated Reservoir Volumes

Research Themes

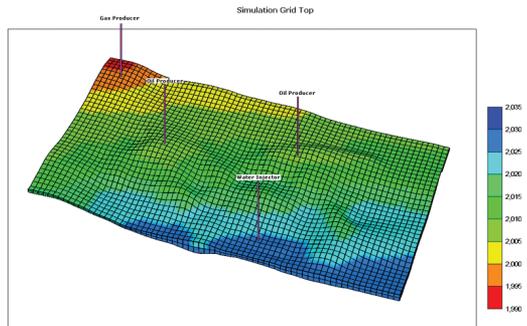
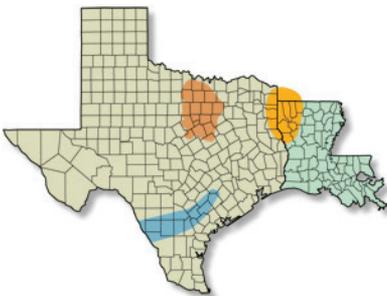
My energy-focused project entails research that is relevant to current upstream operations in the oil and gas industry, such as hydraulic fracturing and reservoir characterization and modeling. While not focusing on the extraction of oil and gas, instead my idea looks at converting economically unsustainable gas wells in the Haynesville shale play where gas production tends to steeply decline shortly after first production and turning them into geothermal wells so that a large-scale geothermal power-plant may be built. The main goals are to provide an opportunity to make extra revenue from depleted assets by converting the Haynesville wellfield to geothermal and to create a renewable and environment-friendly source of energy. An artificial reservoir is to be simulated based on the assumption that fractures would be stimulated so that all wells can “communicate” and act as a single, whole reservoir. Injection of water to be heated in the reservoir would be done and then produced by production wells.

Recent Accomplishments

- Along with Dr. Economides, who together we came up with this idea, I have my reservoir characterization and modeling professor, Dr. Reinaldo Gonzalez, who will be able to provide insight when I use reservoir simulation software to evaluate my theoretical Haynesville reservoir
- Will be using CMG Stars reservoir modeling software to perform this experiment
- Have gathered necessary research material to better understand enhanced geothermal systems (EGS) and the capabilities and limitations of large-scale geothermal operations
- Have a geothermal background from two previous internships with a geothermal company so I understand what is necessary for a successful geothermal operation
- Have set up a planned feasibility report template that will evaluate this entire project idea after I run simulations that will discuss my findings and serve as a good comprehensive review of the research/experiment

Issues

- Gathering credible data from Haynesville oil and gas operators such as temperatures, pressures, and flow rates from wells
- Still working on gaining access to CMG Stars reservoir simulation software, and must develop equations that will describe the behavior of heat and fluid flow in my planned artificial reservoir
- Possibility that more fractures cannot be created to interconnect the entire wellfield
- Energy prices of geothermal may be too high compared still to natural gas, specifically in the Haynesville area
- Might not be as profitable as originally thought



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