Technoeconomic Modeling of Engineered Geothermal Systems (EGS): Feasibility Analysis of Applying EGS to Haynesville Play Reservoirs

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Abstract:

The deployment of EGS geothermal technology has been increasingly reviewed for its merits as a novel approach to developing thermal resources. As a technology which targets rock strata that contain favorable thermal properties but perhaps not the proper porosity or permeability ranges or in situ fluid levels required for conventional geothermal power production, it has a unique ability to be applied to a range of locations in the domestic United States. This study analyzed the feasibility both technically and economically of stimulating subsurface reservoirs typically targeted for hydrocarbon production. The Haynesville Play, tucked in between the intersections of Northwest Louisiana, East Texas, and Southwestern Arkansas, contains suitable infrastructure and geothermal gradients to be a prime candidate for deployment of EGS technology in an economically competitive fashion. This study supports further study of the Cotton Valley and Smackover formations at depths of 3.5 to 4.5 kilometers as particularly favorable reservoirs for geothermal electrical power production. Most notably, coupling an EGS well with an abandoned oil well have yielded projected LCOE of between 6 cents/kWh to 15 cents/kWh. In more optimistic scenarios, EGS deployment in this region appears to be nearly competitive with conventional fossil fuel powered electrical power plants, especially with Oil and Gas co-production if appropriate coupled end-uses and financial incentives are pursued.