OPTIMIZATION OF THE ECONOMICS OF ELECTRIC POWER FROM ENHANCED
GEOTHERMAL SYSTEMS

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ABSTRACT

Based on a review of the Enhanced Geothermal Systems (EGS) developed to date, numerical simulation of idealized EGS reservoirs, economic sensitivity analysis, and practical considerations of certain site characteristics, this paper shows that certain steps can be taken towards optimizing the economics of an EGS project: These steps, in decreasing order of their importance, are as follows: (a) reduce the operations and maintenance cost; (b) reduce the power plant cost; (c) choose the site with the highest possible vertical temperature gradient and for the thickest possible sedimentary cover on the basement; (d) choose the drilling depth that maximizes a well’s power capacity per unit drilling cost rather than reaches the hottest resource; (e) create the largest possible stimulated volume per well; (f) improve stimulation effectiveness, and particularly, reduce the fracture spacing and heterogeneity in the hydraulic characteristics of the stimulated volume; (g) pump the production wells, if possible, taking advantage of the evolving advancements in pump technology; (h) develop multiple, contiguous EGS units to benefit from the economy of scale; and (i) through reservoir modeling optimize well spacing and injection rates that minimize the rate of decline in net generation with time.

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