

Economic and Technical Cases for the Commercial Exploitation of Engineered Geothermal Systems

Baria, R.^{1,2}, Petty, S.¹ and Beardsmore, G.R.²

1 AltaRock Energy, Seattle, WA, USA

2 Hot Dry Rocks Pty Ltd, South Yarra, Australia

Email: Roy.Baria@hotdryrocks.com

ABSTRACT

The supply, availability and price of energy resources, like many other commodities, are to a large extent influenced by the supply and demand criteria. World demand for hydrocarbons, among other commodities, has increased significantly and that may have changed the outlook for renewable power sources such as Engineered Geothermal Systems (EGS). Additionally, the environmental issues associated with climate change will also influence governments, industries and public to support environmentally friendly base load energy sources such as EGS, and that should reflect in the economics of EGS by mechanisms such as feed-in tariffs or CO₂ levies.

The development of EGS has taken over 30 years to evolve from a basic concept to an exploitable technology based on modelling, experimentation and observations. It is sometimes forgotten that the economic argument to commercially exploit this technology dictated the technical or engineering parameters. In other words, economic parameters dictated the technical goals that have to be met to make this commercially viable. It has been noted recently that the economic case made for raising capital in the market, in most cases, does not address the engineering parameters needed to make it economically viable. Additionally, the key issue is net power generation (including management and maintenance), and not gross power generation that is generally quoted in economic evaluations.

Some of the engineering parameters to be addressed for economic evaluation are:

- Access to the high temperature heat reservoir at shallow depth as possible;
- Life of the system;
- Separation between wells (injector and producers);
- Maximum fluid production;
- Water losses;
- Flow impedance;
- Thermal drawdown;
- Heat transfer area;
- Reservoir rock volume;
- Water resource;
- Power line;
- Interest rate; and
- Preferential tariff.

The presentation will discuss to what extent commercial levels of these parameters have been achieved, and where we stand in terms of addressing them.