Proceedings Australian Geothermal Energy Conferences 2013
Brisbane, Australia, 14-15 November 2013

Is EGS becoming commercial?

Hal Gurgenci

Queensland Geothermal Energy Centre of Excellence, The University of Queensland, QLD 4072, Australia

h.gurgenci@uq.edu.au

Keywords: Power generation; EGS

ABSTRACT

As a follow-up to a similar report presented at the 2011 Australian Geothermal Energy Conference, the present paper revisits the progress towards commercial viability of EGS power generation in Australia. Recent achievements and reports by the industry are considered.

1. INTRODUCTION

In the 2011 Australian geothermal Energy Conference, I posed the question of what would make EGS work in Australia(Gurgenci, 2011). This was the right question to ask at that time when everyone was conscious of the fact that the Australian EGS costs experienced by the industry were too high.

To represent the state-of-the-art in 2011, I had used the Geothermal Electricity Technology Evaluation Model (GETEM).

This is an economics/performance spreadsheet model developed by the US Department of Energy Geothermal Technologies Program to assess power generation costs and the potential for technology improvements to impact those generation costs.

The levelised cost of electricity using the 2011 EGS cost data was 26.9 ¢/kWh.

Obviously, the conclusion was that EGS was not commercial at that time. This paper will recalculate the projected cost based on recent achievements of the industry.

2. COST OF EGS POWER GENERATION

The 2011 paper had suggested that significant improvements were needed in the following three areas to make EGS commercial:

- Higher flow rates
- Reduced drilling and well completion costs
- Improved power conversion

Recent results obtained by Geodynamics in Habanero #4 suggest progress on the first two points. Our research at the QGECE indicates that the power generation can be increased by up to 50% at acceptable costs.

Therefore, in this presentation, I will revisit my AGEC2011 analysis. Table 1 shows the differences from that analysis:

Table 1. EGS Progress since 2011

	2011	2013
Surface brine temperature, ^{o}C	250	230
Cost of completed well	$18m	$14m
Production flow per well, kg/s	30	40
Brine effectiveness, kJ/kg	90	95
Calculated LCOE, ¢/kWh	27	19
Plant cost, $/kWe	2500	2000

The other GETEM inputs were kept the same as in the 2011 paper and they are explained in detail in that paper included in the 2011 Proceedings.

2.1 LCoE in 2013

The levelised cost of electricity using the changed data in Table 1 is calculated as 19 ¢/kWh. The breakdown of this cost is given in Figure 1.

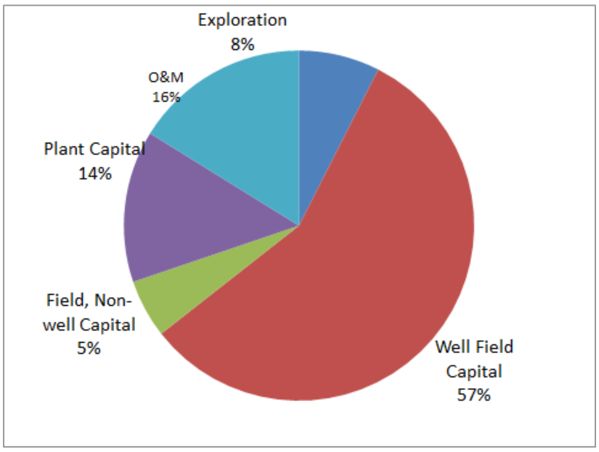

Figure 1: The 2013 LCOE components

This is not commercial yet but much better than 27 ¢/kWh that we estimated in 2011 based on what the industry was able to demonstrate at that time. This analysis does not include exploration risks and therefore the actual cost for an actual project will be higher than 19 ¢/kWh. But even then, the EGS is becoming competitive against remote area diesel generation.

One caveat is that the 2013 data in Table 1 are based on the Geodynamics experience on Habanero #4. It needs to be validated by repeat performance in future wells.

Nevertheless, this is encouraging. The QGECE started a new project to generate detailed cost projections for an optimum surface plant using these new data. The results of this project will be known by early 2015.

3. CONCLUSIONS

The industry progress since our first cost estimate in 2011 reduced the cost of EGS Power in Australia. The technology is a competitively priced for remote area off-grid power generation. A significant increase in production flows is necessary to reduce the cost down to levels where it will be commercially competitive for grid-connected power generation.

REFERENCES

Gurgenci, H.: What will make EGS geothermal energy a viable Australian renewable energy option?, *Proceedings Australian Geothermal Energy Conferences 2011*.