

1 August 2006

The Director ERIG Secretariat
Level 4, 33 Allara Street
CANBERRA CITY ACT 2601

Dear Director

RE: National Transmission Grid

Thank you for an opportunity to make a submission to your review. I would like to draw your attention to the rapidly emerging geothermal energy industry in Australia, its potential to make very large contributions to Australia's supply of clean electricity, and the associated transmission line opportunities and needs.

For the reasons outlined herein, we believe that there is a need for a high level vision to guide the development of the electricity transmission grid as "strategic infrastructure" for long term benefit of Australia.

This vision needs to be supported by a regulatory framework which incorporates the broader "national interest" benefits in the economic assessment of transmission investments which contribute to this high level vision.

It has become clear over the past few years that Australia had a huge and high quality endowment of hot rock geothermal energy:

- The low estimate of electricity production is 2.5million PJ, equivalent to Australia's current consumption for over 420 years¹. Estimates of the power that can be generated from Geodynamics' delineated resources in the Cooper Basin are 400,000 PJ, equivalent to Australia's current consumption for more than 50 years.
- The hot rock resources, especially those in the Cooper Basin in the north-east of South Australia, and in the larger Eromanga Basin extending into south west Queensland, are arguably the best such resources in the world. Temperatures of the buried granites range from

¹ Estimates of recoverable energy from Australia's hot rock resources in an ERDDC report by Sommerville et al. 1994.

250°C to over 300°C and we know that this heat can be extracted and converted into zero emission power.

- There are now at least 11 companies pursuing geothermal energy in 87 tenements in South Australia and additional tenements are in the process of being awarded in Queensland. Figure 1 shows the locations of these activities which are generally remote from existing transmission lines.
- The power generated from hot rocks is expected to be very competitive if there is some form of cost on carbon. An independent analysis of cost positions carried out by ACIL Tasman concluded that *“Once carbon penalties or CCS technologies are applied the competitive position of the geothermal option is assured”*. The summary of the cost position is summarized in Figure 2.
- The development of reasonable scenarios by Geodynamics has demonstrated the opportunity for geothermal energy to have an installed capacity of 4000 MW and be generating 10% of Australia’s electricity by 2030, and 25% of new generation.
- The current status is that the resource is known to exist and appraisal and demonstration work is in progress. It is expected that the first producing plant will be operating during 2009 and that a 40 MW plant will be operating by 2012. From there it will be a matter of “how fast”.

It is also clear that the generation of large amounts of power from the Cooper and Eromanga Basins will require transmission lines to reach major load centres. There are two aspects to this.

Firstly, how does the industry match the growth in transmission capacity with its growth in generation capacity, and the real focus here concerns the early stages for the first 250 MW to 500 MW. The obvious focus for all Cooper Basin generators will be Olympic Dam, either to help meet BHPB’s expansion needs or to access the grid at that point.

Secondly, and much more importantly, is the development of a very significant new transmission system with line capacities in the order of notionally 1500 MW (the optimal size has not been assessed). Geodynamics engaged ROAM Consulting to carry out an initial study of these lines, and their report is enclosed for your information. It highlights the economic feasibility of constructing large capacity direct current lines over distances of 1,000 km to 1,200 km to reach major centres, especially Sydney, Adelaide, and Melbourne, as depicted in Figure 1:

- There are many comparable lines in the world.
- Direct current lines cut transmission losses to 3% to 5% over those distances and total losses to 5% to 7%.
- Transmission costs are estimated to be about \$10/MWh for nominal 1500MW lines.

Geodynamics also engaged The Centre for International Economics to assess the economic value to Australia from the geothermal electricity generating industry. Their report (enclosed) concludes that: *“Gains of national significance are expected following demonstration of the technical and*

commercial feasibility of the generation of electricity from HFR". In particular, they showed that:

- The net economic benefit to 2030 is estimated at \$10.3bn. An additional benefit from enabling mining development in the Moomba to Adelaide corridor is crudely estimated at \$4.3bn.
- The new transmission lines would generate competition benefits estimated at \$1.4bn by 2030. These benefits will arise through a multi-pronged augmentation of transmission capacity in the NEM that can be expected to bring interconnection efficiencies, including enhanced competition. The driving force of this competition will be the fact that a large quantity of essentially base-load electricity capacity will become available, smoothing out some volatility in electricity prices.
- The ROAM report has also identified the opportunity to cut reserve capacity, since the combined links to Adelaide and Brisbane will convert the NEM into a much more efficient loop than the current distribution system.

Geodynamics believes that the development of a high level vision for the grid will provide a sound basis on which the various regulatory frameworks and instruments can be built.

Yours sincerely

Geodynamics Limited

Adrian Williams
CEO

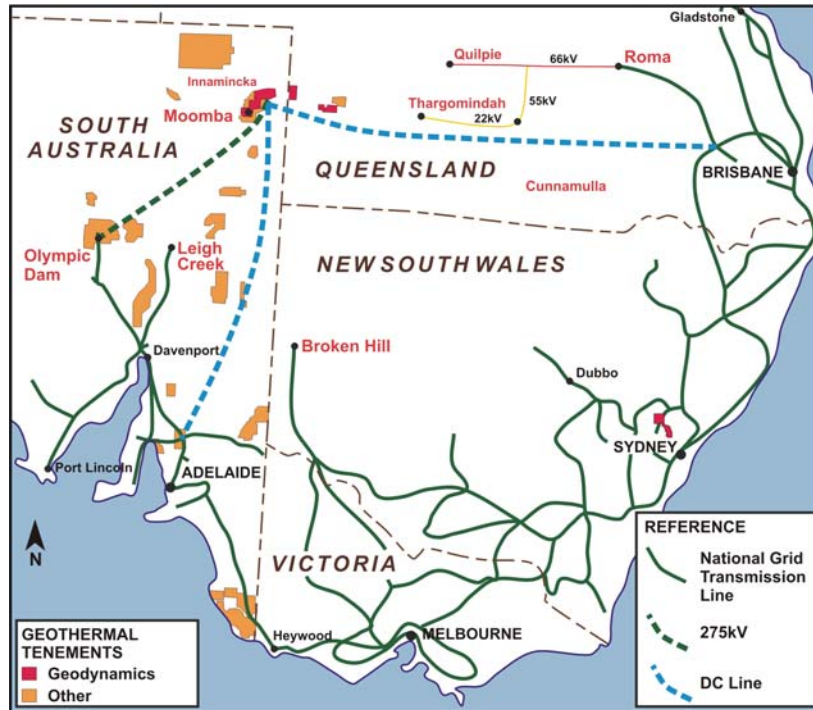


Figure 1. Location of geothermal energy exploration in South Australia and Queensland, and concepts for new transmission lines bringing geothermal power to the market.

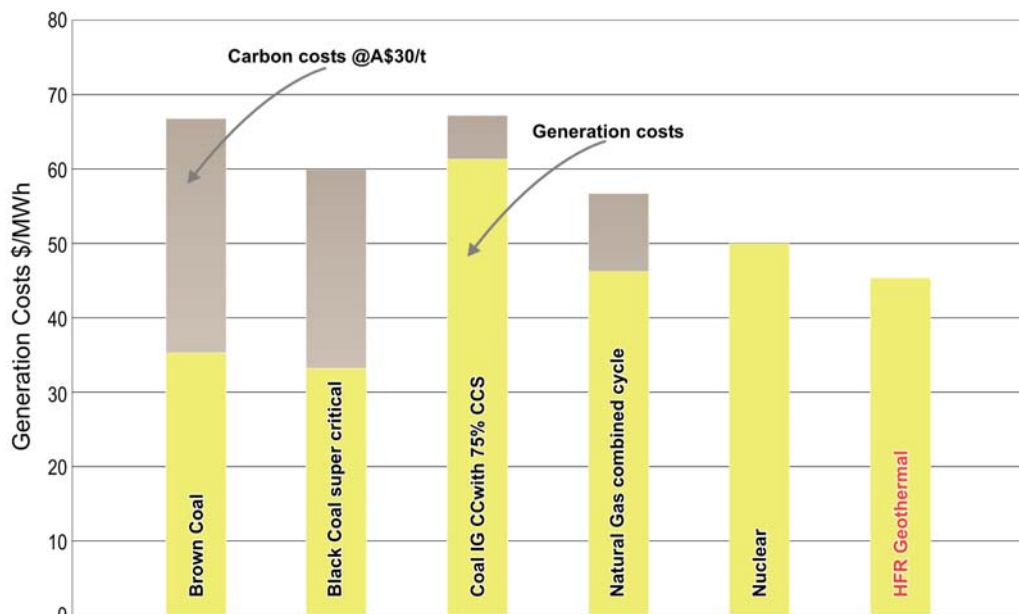


Figure 2. Competitive cost positions. After ACIL report to Geodynamics Ltd.