



Australian Geothermal Energy Association Inc.

STRATEGIC ENERGY INITIATIVE 2030

The Australian Geothermal Energy Association (“AGEA”) is the national industry body representing the major geothermal energy explorers, developers and equipment and service providers. It pleased to be offered the opportunity to make a submission to the Office of Energy as part of the development of the Western Australian Strategic Energy Initiative.

Western Australia contains some of the most prospective areas for geothermal resources in Australia. These areas, which occur in the Perth Basin (including the Perth metropolitan area) and Pilbara region (Carnarvon Basin) are the only potential sources of large-scale, base-load renewable energy that can be developed within proximity to large markets and existing transmission infrastructure. Consequently, a thriving geothermal industry that delivers large amounts of emissions-free energy can be developed in Western Australia without substantial investment in new transmission infrastructure.

Geothermal energy from hot sedimentary aquifers (such as contained in the Perth Basin) and hot rocks are estimated to be the lowest cost of all renewable energy sources (refer McLennan Magasanik Associates “Comparative Costs of Electricity Generation Technologies” report of February 2009).

LONG RUN MARGINAL COSTS - 2020	
	\$/MWh
Roof Top P.V.	507
Solar Thermal	250
Gas with Carbon Capture	104
Wind	102
Coal with Carbon Capture	101
Geothermal – Hot Rocks	99
Geothermal – Sedimentary	97

Source: Comparative Costs of Electricity Generation Technologies, McLennan Magasanik Associates, February 2009

Geothermal Energy Unit Costs based on:

- 2008 dollars
- Carbon prices as per Treasury’s CPRS-5 scenario
- Excludes transmission costs

Cost of renewable energy sources (MMA, Feb 2009)



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Western Australia will benefit from the development of the geothermal industry through the provision of cheap, reliable, renewable, emissions-free, base-load power. Power from geothermal energy will be provided through the generation of electricity and the direct utilisation of heat to displace electricity use (demand side management).

Under the current regulatory and legislative regime however, the development of geothermal energy is at commercial disadvantage compared to fossil fuels and other renewable energy sources. This is significantly hampering the rate at which geothermal resources can be developed in the State.

THE STATE'S ENERGY DEMAND AND SUPPLY SCENARIOS

1) **Are the broad trends and drivers identified credible, and are there others that may impact on the future demand and supply of energy?**

Mitigation of carbon output, increased cost of carbon based energy, a carbon tax or equivalent and mandatory renewable energy targets will be key drivers stimulating the uptake of renewable energy. Geothermal energy has the capacity to meet many of the goals embodied in the Strategic Energy Initiative relating to secure, reliable, competitive and cleaner energy. However, this new industry was only spawned in Western Australia with the release of the first geothermal acreage in 2008 – and for which the first tenements were awarded in July 2009. To get a new industry off the ground requires appropriate government policies, regulations and financial support to provide the environment to attract the substantial capital required to deliver, in the case of geothermal energy, very capital intensive, large scale, sustainable projects. Demonstrator projects and government financial support will play a critical role in securing investment from capital markets.

Western Australia has the opportunity to employ base-load geothermal energy across an array of applications, from electricity generation derived from hot sedimentary aquifers and dry hot rocks to heating, cooling, desalination and other uses from hot sedimentary aquifers. Perth is particularly well placed in sitting over a sequence of hot aquifers which can generate energy for a range of applications. Technologies associated with the direct use to displace electricity generated from non-renewable sources, rather than the generation of electricity, from geothermal energy are not new and have been employed variously in many parts of the world. This form of energy must be considered in the mix of renewable sources that can contribute to the State's energy requirement and assist it to meet its renewable energy target on a cost competitive basis.



SECURE ENERGY

Upstream Production and the Bulk Transportation of Energy

- 1) What are the current Commonwealth and State regulatory impediments in upstream energy resources and infrastructure necessary to supply our domestic economy?**

Exploration for coal (mining) and oil and gas (petroleum) receives an immediate taxation deduction under Section 40 of the Income Tax Assessment Act whereas exploration expenditure for geothermal energy does not, despite it operating under the same legislation as petroleum. Geothermal energy is required to be specifically mentioned under the Act, as are mining and petroleum, to be eligible for immediate deduction of exploration expenditure.

Although it requires just a simple change to amend the legislation, without the change, and as it currently stands, the Commonwealth is supporting exploration for fossil fuels at the expense of renewable geothermal energy.

- 2) What changes and/or adjustments are required to Commonwealth and State taxation arrangements (e.g. royalty and production taxes, depreciation provisions) to provide incentives for the development of primary fuels and investment infrastructure?**

Exploration expenditure for coal (mining) and oil and gas (petroleum) receives an immediate taxation deduction under Section 40 of the Income Tax Assessment Act whereas exploration expenditure for geothermal energy does not. Exploration for geothermal is similar to oil, gas and coal and at the early stages to mineral exploration and was not included in the Act solely because it was not considered as a potential energy source at the time the Act was drafted. Geothermal energy is required to be specifically mentioned under the Act, as are mining and petroleum, to be eligible for immediate deduction of exploration expenditure. Although it requires just a simple change to amend the legislation, without the change, and as it currently stands, the Commonwealth is supporting exploration for hydrocarbons at the expense of renewable energy.

In this State geothermal energy is subject to a 2.5% State Government royalty, however unlike minerals and petroleum, where the bulk of the product is sold overseas, geothermal energy is totally consumed locally. Rather than place a financial impediment to the development of a base-load, emission free, renewable energy, the state should be providing a financial incentive for its uptake and use.



3) What changes (if any) are required to current policies to facilitate the development of energy resources and facilities?

Solar panels and solar hot water are provided Government subsidies to encourage their use. The direct use of geothermal energy for heating and cooling receives no subsidy and even though it provides base-load energy on an industrial scale, is at a distinct disadvantage compared to the solar technologies, but will in comparison attract a 2.5% royalty on production.

4) How can regulatory systems affecting investment in, and protection of, energy infrastructure be improved to ensure the availability of energy for downstream markets?

Section on Regulatory Issues associated with simple exploration.

Although geothermal energy is regulated under the Petroleum and Geothermal Energy Act, field exploration at the early stages typically has a substantially lower environmental impact than petroleum exploration which requires seismic surveys or drilling of deep wells. In this respect early stage geothermal exploration is more like mineral exploration than petroleum exploration. However low impact geothermal exploration in WA has substantially higher and unnecessary levels of regulation which are not being applied to minerals exploration or water exploration for water when using the same exploration techniques in the similar locations.

Geothermal exploration permits in the State have a condition attached that requires the holder to enter into an access agreement with aboriginal title claimants before exploration can commence on ground where aboriginal title has not been extinguished. The onus is on the title holder to determine where native title is extinguished or not. In itself this is both time consuming and expensive. The cost of obtaining clearances prior to exploration being allowed to commence can exceed the cost of low impact exploration itself and in such situations can more than double the cost of carrying out the exploration. This is a substantial disincentive to geothermal activities in substantial parts of the State.

There is significant potential to use geothermal energy resources in the Perth metropolitan area. To economically develop this extensive in place resource drilling rigs are required that can penetrate kilometres deep. The cost to drill to these depth is largely determined by the type and size of rig required and the time taken to complete the drilling. To ensure that drilling time and costs do not become prohibitive it is critical that drilling can be carried out on a 24 hours a day basis, 7 days a week and local councils can not unreasonably block or hold up drilling operations.



5) What are the alternative sources of primary energy? What are the barriers to their development and how can these barriers be overcome?

Geothermal – electricity production

Advantages

- Local energy source – reduces energy supply disruptions
- Base-load renewable - not intermittent, fully utilises infrastructure, no back-up plant or energy storage facilities required
- Reduces the exposure to potential increases in fossil fuel prices
- Is forecast to be cheap with respect to other renewables

Barriers

- *Potential queue for access to grid*

Requires:

- commitment from Government to give priority access to renewable energy and special recognition for non-intermittent generators
- bolstering of network (330kV line) in the northern SWIS to enable linkage between large projected loads and nearby energy sources

- *High upfront costs to prove and quantify the resource*

Requires:

- State Government recognition through financial support, such as grants to support deep drilling and demonstrator projects, which will assist in providing an incentive for capital market investment.
- Feed in tariff, such as exist in Europe.

Geothermal – direct use – such as heating and cooling

Advantages

- Local energy source - reduces energy supply disruptions
- Base-load renewable energy
- Displaces non-renewable sources of electricity
- Reduces the need for increased expenditure on the electricity transmission network
- Reduces the exposure to potential increases in fossil fuel prices



Barriers

- *High upfront costs to prove and quantify the resource*

Requires:

- State Government recognition through financial support, such as grants to support deep drilling and demonstrator projects, which will assist in providing an incentive for capital market investment.

Downstream Infrastructure and Markets

1) What are the current Commonwealth and State regulatory impediments to investments in downstream energy infrastructure?

The potential queue for access to grid requires:

- commitment from Government to give priority access to renewable energy and special recognition for non-intermittent generators
- bolstering of network (330kV line) in the northern SWIS to enable linkage between large projected loads and nearby energy sources

2) What are the current impediments to the development of alternative energy and low emission technologies?

The Renewable Energy Target legislation provides power stations powered by renewable energy (including solar, wind, hydro and geothermal), and owners of solar water heater and small generation unit installations (small-scale solar PV, wind and hydro electricity systems) with a financial incentive through the creation and trade of Renewable Energy Certificates (RECs). However, RECs are not granted for **the direct use of geothermal energy such as in commercial, industrial and residential district heating and cooling systems**, where geothermal energy is the direct power source displacing rather than generating electricity – not dissimilar to solar hot water systems.



RELIABLE ENERGY

- 1) How can the State ensure that its energy supply systems have adequate backup or redundancy to meet end-user expectations, while also ensuring that the price of energy remains competitive?**

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Geothermal energy has the capacity to meet many of the goals embodied in the Strategic Energy Initiative relating to secure, reliable, competitive and cleaner energy. However, this new industry was only spawned in Western Australia with the release of the first geothermal acreage in 2008 – and for which the first tenements were awarded in July 2009. To get a new industry off the ground requires appropriate government policies, regulations and financial support to provide the environment to attract the substantial capital required to deliver, in the case of geothermal energy, very capital intensive, large scale, projects. Demonstrator projects and government financial support will play a critical role in securing investment from capital markets.

CLEANER ENERGY

- 1) What are the technical, regulatory and market barriers to the introduction of renewable energy projects in Western Australia and how can these be overcome while ensuring equal treatment within market and regulatory frameworks**

Exploration for coal (mining) and oil and gas (petroleum) receives an immediate taxation deduction under Section 40 of the Income Tax Assessment Act whereas exploration expenditure for geothermal energy does not, despite it operating under the same legislation as petroleum. Geothermal energy is required to be specifically mentioned under the Income Tax Act, as are mining and petroleum, to be eligible for immediate deduction of exploration expenditure. Although it requires just a simple change to amend the legislation, without the change, and as it currently stands, the Commonwealth is supporting exploration for fossil fuels at the expense of renewable energy.



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2) What role should the government have in facilitating cleaner energy projects

Geothermal energy has the capacity to meet many of the goals embodied in the Strategic Energy Initiative relating to secure, reliable, competitive and cleaner energy. However, this new industry was only spawned in Western Australia with the release of the first geothermal acreage in 2008 – and for which the first tenements were awarded in July 2009. To get a new industry off the ground requires appropriate government policies, regulations and financial support to provide the environment to attract the substantial capital required to deliver, in the case of geothermal energy, very capital intensive, large scale, projects. Demonstrator projects and government financial support will play a critical role in securing investment from capital markets.

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