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To The Secretary
Senate Economics Legislation Committee
Inquiry into the RET
Parliament House
CANBERRA ACT 2600

Submission to the Senate Economics Committee's Inquiry into the Renewable Energy (Electricity) Amendment Bill 2009

The Australian geothermal energy industry has grave concerns about the design of the expanded National Renewable Energy Target ("RET"), as detailed in the *Renewable Energy (Electricity) Amendment Bill 2009 ("The Bill"),* in its effectiveness to deliver the best long term benefit for the Australian economy.

The RET, as outlined in *The Bill,* will not deliver the appropriate scale, diversity and lowest production costs for the renewable energy sector consistent with the nation's need for a reliable, low cost energy industry. Some straightforward amendments need to be made to the RET in order to ensure the emerging, renewable energy sector, which includes the geothermal energy industry, is provided the opportunity to develop throughout the lifetime of the RET.

The RET in its current form does not provide for the required acceleration in the development of the emerging renewable technologies, and in fact impedes the pace of development, as neither industry nor the investment community have confidence that the RET incentives, in the form of Renewable Energy Certificates ("RECs"), will be available when emerging renewable technology projects come on stream.

Facilitating the speedy entry of geothermal energy into the national market is in Australia's interest as it is the only low cost, base-load, renewable energy source and estimated to be the lowest cost of all renewable and low emission generation technologies from 2020.

Geothermal energy delivers base-load, lowest cost, emissions free renewable energy 24 hours a day, 7 days a week.

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The Commonwealth's own modeling of the RET estimates that up to 70% of the RECs will be taken up by wind projects which, by 2020, are estimated to have higher production costs than geothermal, produce intermittent-load and require additional back-up capacity. Under the RET design, the current low cost structure of the wind projects will deny the geothermal industry, and other emerging renewable technologies, the benefit of the RECs and significantly delay their entry to the national market. This will have significant long term implications for the National Electricity Market.

The modeling undertaken for the Government focused on how to meet the target at least cost. The emerging renewable technologies have serious concerns with this limited focus, in particular:

- The failure to focus on the costs of delivering large scale, low cost, renewable energy from 2020 onwards;
- The failure to place an economic, or energy security, value on other benefits, including:
    - Base-load energy;
    - job intensity;
    - export potential;
    - integration into the national energy market; and
    - Displacement of electricity generation by geothermal in direct heat usage.

BUILDING LONG TERM CAPACITY FOR LOW COST, LARGE SCALE RENEWABLE ENERGY

Australia and the world will not meet future emission reduction targets and simultaneously satisfy energy demand, with the current suite of mature energy technologies. New technologies need to be developed and Australia has a leadership position in a number of these including in geothermal energy. As previously stated, geothermal energy is predicted to be lowest cost renewable energy by the time the RET peaks in 2020, but this is predicated on the industry receiving the appropriate incentives to fully develop over the next 10 years.

As coal fired power stations are retired from the market, due to their age and the impact of the CPRS, a base-load capability needs to replace them. Geothermal energy is the only renewable technology with this capability.

The following table, developed by McLennan Magasanik Associates (MMA) in *Comparative Costs of Electricity Generation Technologies*, (full report attached) shows the projected generation cost of all forms of electricity generation at 2030. These projected costs can only be realised if the emerging renewable technologies are operating by 2020, on a large scale.

Table 1: Comparison of long run marginal cost of generation technologies in 2030

	$/MWh
Coal technologies	
Post-combustion capture	174
Supercritical coal (dry cooling)	117
IGCC	110
Supercritical coal with oxyfiring and CC	109
IGCC with CC	98
Natural Gas technologies	
CCGT - small	104
CCGT –with CC	102
CCGT - large	95
Cogeneration	80
Renewable Energy technologies	
Roof Top PV	397
Concentrating PV	259
Solar Thermal	229
Solar Hot Water	150
Biomass	105
Geothermal – Direct Heat (i)	100
Wind	96
Geothermal - Hot Rocks	95
Geothermal - Hot Sedimentary Rocks	93

Source: *Produced by McLennan Magasanik Associates: "Comparative Costs of Electricity Generation Technologies" -February 2009*

(i) Geothermal - Direct Heat should be compared to retail tariffs rather than wholesale tariffs. At the estimated long run marginal costs of $105/MWh, as shown above, (which assumes heat demand is located close to the heat source), the delivered energy cost for this technology will be significantly lower than current average retail tariffs for commercial customer classes (currently averaging above $130/MWh) and some less energy intensive (low voltage level) industrial customer classes (where current retail tariffs are above $100/MWh).

The current RET design provides a very strong incentive to build projects as early as possible to generate RECs over the lifetime of the scheme.

The RET scheme is designed to bring the cheapest available renewable energy into the market, however the scheme as proposed is likely to have the effect of locking out the potentially cheapest form of emissions free energy particularly as integrated energy companies purchase from themselves rather than from the market. The significant value of the RECs for projects built in the first few years of the scheme may result in early start, but higher cost projects getting off the ground and taking the vast majority of the RECs. This will lock out lower cost projects that will not be ready for development until later years yet could be producing cheaper energy over the project lifetime.

OTHER BENEFITS

(i) Baseload Energy

The value of base-load renewable energy sources, as distinct to the value of intermittent load renewable energy sources, has not been acknowledged or incorporated in the RET design.

Geothermal energy is currently the only renewable energy technology capable of deliver base-load energy.

As coal fired power stations are retired from the market, due to both their age and the impact of the CPRS, low cost base-load capability must be available to replace them. Geothermal energy is the only renewable technology with this base-load capability. Without replacement of base-load capacity, the transmission network will become unreliable and the cost of electricity will increase significantly. As indicated in the table above, geothermal energy is predicted to be the least cost renewable energy technology and should provide the required low cost, base-load, capacity. However, although the RET scheme is being put in place to encourage the deployment of renewable energy, the current design only encourages the deployment of the current least cost technologies and ignores whether that renewable energy can deliver base-load power.

The transmission network can sustain a certain quantity of intermittent-load; however there is a limit to that quantity. The RET scheme as currently designed will result in deployment of intermittent-load at the expense of base-load. This lack of support for base-load power generation will leave a vacuum in the development of base-load capability which will lead to a transmission network crisis post 2030.

While wind has an important contribution to make with its emissions reduction benefits in the early years of the scheme, until geothermal energy and other emerging renewable technologies are more mature, an overbuild is not in the national interest.

The need for the replacement of base-load power generation has been recognized by the Commonwealth Government through their $3.5 billion support for the development of clean coal technologies over the next 9 years. As the above tables shows however, the cost of generation from post combustion capture projects is estimated to be $174/MWh in 2030 compared to $93-95/MWh for geothermal energy. Against the considerable support for clean coal technologies, despite the comparative expense, The Commonwealth Government has only committed $50 million exclusively for the geothermal industry through the Geothermal Drilling Program. The industry can also compete with other renewable technologies under the remaining $400 million Renewable Energy Demonstration Program however the lifetime of both these programs is uncertain and funds are likely to be committed in the next financial year potentially leaving the geothermal industry without financial support when it needs similar timeframe commitments accorded to clean coal.

Given the urgent requirement for the development low cost, base-load, energy the geothermal industry believes that the Commonwealth should not only be committing significantly more funds to accelerate the development of geothermal projects, it should also be ensuring that the RET design encourages, not hinders, their development.

(ii) Job Intensity

Employment has been a major issue in the national climate change debate. The emerging renewable energy technologies have a far greater employment intensity than that of wind, the single largest predicted beneficiary of the RET scheme. This outcome is not in the national interest.

AGEA recently commissioned ACIL Tasman to produce a report on employment intensity *Employment in the Renewable Generation Sector* (full report attached) and the findings are summarized in the following table.

Table 2: Estimated upper bounds for cumulative employment for the construction of a 100MW renewable energy plant

	Wind	Geothermal
Direct employment on construction /MW	2.9	4
Capacity (MW)	100	100
Annual employment	290	400
Construction time (years)	2	3
Cumulative employment (man years)	580	1,200
Indirect employment multiplier	1.1	1.3
Total cumulative employment	1,218	2,760

Source: *ACIL Tasman estimates*

The major finding from the report is that the research and development work is being undertaken in Australia for the emerging renewable technologies and these areas are job intensive, but this is not so for wind where the majority of the equipment and knowledge is imported.

(iii) Export Potential

As not only Australia, but the global community, is unlikely to meet future emission reduction targets and energy demand requirements with the current suite of generation technologies, Australia can become a major supplier of technology and expertise to the global market in the emerging renewable technologies.

The international geothermal energy community is a highly collaborative community. Many of the world's leading experts are either Australian or they are involved as consultants or directors with Australian companies. Australia has some of the best known untapped geothermal resources in the world and the international community is looking to Australia to develop the techniques to enable rapid development and deployment. Australia is often referred to as 'the world's laboratory' amongst the international geothermal community.

Any disincentive in the RET for the optimum development of the geothermal energy industry will result in more research and development activity happening overseas as we become overtaken by the learning, and the application of the learning, occurring elsewhere. This will result in not only the loss of potential export income but also the loss of potential jobs and the delayed availability of the low cost, base-load electricity.

The benefits of accelerating the development of geothermal energy projects and the positive impact that they would bring through export income have not been factored into the RET design.

(iv) Integration into the National Energy Market

The accelerated development of the wind industry brought about by the current RET design will require additional investment in transmission infrastructure. This will require a significant investment by the Australian community that may not ultimately deliver the optimum benefits for the national market.

While wind has an important contribution to make with its emissions reduction benefits in the early years of the RET scheme, until geothermal energy and other emerging renewable technologies are more mature, an overbuild against baseload generation technologies is not in the national interest.

Additionally, intermittent wind generation places constraints on the use of finite transmission infrastructure, including transfer capability of regional interconnectors such as Basslink (ref attached publication). In effect, not only does a greater presence of wind generation create a need for greater transmission redundancy, but in many cases may also disproportionately 'lock out' later stage emerging renewable generation technologies seeking connection to, or use of, limited transmission assets.

For the same installed MW capacity, wind generation greatly under-utilizes the required transmission capacity. The full nameplate MW capacity of the wind generator is needed in the transmission network to accommodate the wind generator but this is only needed one-third of the time. This is a highly inefficient use of transmission investment.

The intermittent and variable nature of wind generation, compared with the base-load capacity of geothermal, has already had a marked effect on the NEM and its participants. Back up generation infrastructure, usually in the form of gas turbines and additional transmission infrastructure has been required and an increase in the need for the gas turbines to be cycled up and down, reducing their effective life and increasing upward pressure on the pricing of electricity.

(v)Direct Heat Eligibility

The current RET design fails to include a potentially significant and very low cost source of renewable energy. Electricity displacement technologies, using geothermal energy, that will provide low cost renewable energy, are being designed, evaluated and developed by the geothermal energy industry. These technologies have been acknowledged by the CSIRO and the West Australian Government through their joint establishment of the Geothermal Centre of Excellence at The University of Western Australia.

The market for heaters/air-conditioners powered directly by geothermal energy at temperatures around 100°C, for large commercial buildings in the Perth metropolitan area alone, is estimated to displace up to 100MWe of electricity. The inclusion of a REC in the income for these projects, i.e. the

ability to generate a REC for each MWh of electricity displaced, will bring them into the same cost/price competitive position as the projects they displace.

The exclusion of direct use geothermal energy in the RET, will curtail the development of a significant renewal energy technology, and associated carbon pollution reduction, that:

- has the potential to replace the major user of peak electricity, namely electricity powered compression air-conditioners;
- uses lower enthalpy geothermal resources which are more numerous than the higher enthalpy required for electricity generation;
- provides a more efficient utilization of the contained energy than electricity generation;
- like solar hot water heaters, which are included in the RET, displaces energy generated from fossil fuels.

AGEA strongly urges the inclusion of larger scale (greater than 1,250 MWh of electricity displacement per year) direct use plants in the RET scheme. This is not only consistent with the inclusion of another electricity displacement technology, solar water heaters, but will also it also increase the investment, and the rate of development, in this potentially low cost renewable industry in Australia.

MARKET CONFIDENCE IN EMERGING RENEWABLE TECHNOLOGIES

Throughout its history Australia has had more difficulty than larger markets in raising capital to invest in new technology innovation. This is currently exacerbated by the current global financial environment.

Since the release of the exposure draft and the subsequent COAG position on the RET, the investment community, including the large infrastructure investment funds, has been expressing concern about the benefit the RET will provide the emerging renewable technologies. They too see the benefit of the RET passing through to wind generation, and they see the Australian Government favoring wind over the emerging technologies as it has developed a scheme under which the wind industry is designed as the 'winner'.

This perception is a further barrier to the development of the Australian geothermal industry at a time when capital is already difficult to access.

RECOMMENDATIONS FROM THE AUSTRALIAN GEOTHERMAL ENERGY ASSOCIATION

AGEA has put a range of suggestions, to overcome the above concerns, to the formal processes employed by the Department of Climate Change. These suggestions addressed the undesirable affect of unlimited banking and recommended a flatter increase in the target path in the early years of the RET scheme. We understand that these suggestions are not being adopted on the basis that a low cost outcome in 2020 was the primary driver of the design process. This is a shortsighted approach that will lead to higher cost outcomes into the future.

Since the release of the exposure draft the geothermal energy industry has made independent and joint representations with the solar and ocean energy industries and has discussions on a range of options with Government, Opposition, Green and Independent Members and Senators.

These options are outlined below:

1) Introduce an additional 'Emerging Renewable Energy Target' starting in 2015 which increases the target to 30% by 2025, the additional 10% to be met solely from emerging renewable technologies while still enabling them to be eligible for RECs in the underlying scheme.
2) Maintain the existing target but require 50% of the scheme to be met from emerging renewable technologies in 2020.
3) Maintain the existing target but band the renewable energy technologies into 'existing' and 'emerging' where the existing technologies receive 1 REC for every 1.25MWh of electricity produced and the emerging technologies receive 1 REC for every 0.75MWh of electricity produced. Review the weightings every 5 years and adjusted in line with the rate of the deployment of new renewable electricity generation capacity.

Emerging renewable technologies can be defined as renewable energy technologies that have the potential to provide large volumes of electricity at a high level of year round supply reliability. Using the nomenclature in Section 17 of the *Renewable Energy (Electricity) Act*, "emerging" renewable technologies are wave; tide; ocean; solar concentrator (thermal and photo-voltaic); geothermal-aquifer; EGS (enhanced Geothermal Systems) or 'hot rock' and Geothermal Direct Use. An "emerging" renewable technology will become an "existing" renewable technology once it achieves 500 MWe of installed capacity.

AGEA appreciates the opportunity to further discuss our concerns at the public hearings to be held by the Committee in early August.

Yours sincerely

Susan Jeanes
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