



20 February 2009

The Renewable Energy Sub Group Secretariat  
Renewables Offsets and COAG Branch  
Department of Climate Change  
GPO Box 854  
CANBERRA ACT 2601

**Submission on the design features in the exposure draft of the Expanded National Renewable Energy Target scheme (RET)**

The Australian Geothermal Energy Association (AGEA) is concerned about the effect of the combination of design features in the exposure draft released in December 2008. AGEA believes that they will be deleterious to the growth of the geothermal energy industry as it matures over the lifetime of the RET.

AGEA's major concerns are:

1. The combination of design features will lock out emerging technologies, including geothermal energy, from the incentives provided under RET;
2. The exclusion of direct use geothermal energy projects will lockout a significant low cost technology option (Solar Water Heaters have the same displacement rationale utilising energy from a renewable resource yet are included); and
3. The failure to address these concerns will result in the imposition on the community of higher cost renewable energy generation capacity over the longer term.

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To support its position, as detailed in this submission, AGEA has sought advice from McLennan Magasanik and Associates (MMA) about the relative cost forecasts for each of the generation technologies that will be required to increase deployment levels over the coming decades to meet climate change and energy demand imperatives. This report, *“Comparative Costs of Electricity Generation Technologies”*, shows that geothermal energy is predicted to become the lowest-cost form of emissions free energy in the national market by 2020 with the additional benefits of baseload capability and scale and is attached to this submission. This finding is consistent with a number of other modeling reports produced in recent years.<sup>1</sup>

### 1. Combination of Design Features

AGEA is concerned about the combined impact of:

- the proposed phase path;
- unlimited banking; and
- the availability of RECs to eligible projects for the lifetime of the measure.

AGEA understands that this combination is designed to keep costs down but maintains that they will lock out the emerging technologies and contribute to an overall higher transformation cost for the Australian economy. Although some deployment can be expected in the early years, particularly from projects closer to markets, emerging technologies, including geothermal and large scale solar, are forecast to reach a significant capability for deployment throughout the second half of the RET lifespan.

The current Mandatory Renewable Energy Target (MRET) scheme produced a rush of activity in the early years with the scheme producing an ‘investment cliff’ halfway through its implementation because the renewable energy industry built heavily in the early years taking advantage of the opportunities available through the banking provisions. Furthermore, investment was skewed towards projects that did little to ameliorate the demands for base-load energy. AGEA is concerned that this will occur again under the expanded RET and that the emerging technologies, including geothermal energy, will be locked out of the incentives offered through the RET. While an early build under MRET may have benefited the development of the renewable energy industry, the difference in the timeframe for the expanded RET is fundamentally that the emerging technologies with large scale, base-load capability and low cost output will be coming through the demonstration stage and into the commercialisation stage through the middle period of the measure. Under the current design proposal, they are likely to be locked out of the incentives provided under the new RET as the lead time for the development of these projects will see them ready to come on-stream at large scale in the second half of the RET’s timeframe.

AGEA is concerned that the combination of these features will not only lock out low cost emerging technologies, but that they will overly subsidise more expensive technologies

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<sup>1</sup> ESIPC, MMAI for REGA the McKinsey Cost Curve

towards the end of the RET, preventing the development of additional generation infrastructure at a time when the emerging technologies will be technically capable of deployment at large scale.

Further, AGEA considers that a commercially sound project should not require more than 15 years of REC income to be viable. Limiting the eligibility to issue RECs to 15 years will contribute to more generation infrastructure being developed and AGEA expects that geothermal projects can successfully compete in the market on this basis.

The modeling undertaken for AGEA by MMA clearly shows that the forecast cost for the range of geothermal energy technologies are predicted to be the lowest cost renewable energy technologies currently operating in the market by 2020<sup>2</sup>. AGEA expects that a certificate price of around \$40 will be adequate to support geothermal energy generation projects at the commercialisation stage of above 300MW if there are adequate incentives left in the scheme (as mentioned above).

In August 2008, MMA identified a cost range for geothermal generation of projects at the commercialisation stage (from 300MW) of between \$80 and \$110MWh. It can be expected that all renewable energy projects will also be supported by a predicted black energy price of around \$50 with the added carbon impost of around \$25 under the Government's Carbon Pollution Reduction Scheme (CPRS)<sup>3</sup>.

## 2. Direct Use Geothermal Energy

The Australian Geothermal Energy Industry's initial focus was on the development of electricity generation from Engineered Geothermal Systems 'EGS' or 'Hot Rock' projects followed by a search for appropriate sites for generation projects in hot sedimentary aquifers (HSA). Companies have also recognized the opportunity to utilize the energy from lower enthalpy, or lower temperature, resources in hot sedimentary aquifers for a range of commercial and industrial applications including industrial heating/air-conditioning and water desalination/distillation.

Direct use of geothermal energy, not only provides a more efficient utilization of the contained energy but also provides the opportunities to displace energy generated from fossil fuels and to develop a new industry in Australia. These opportunities 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. Their work includes the development of more efficient technologies in the utilization of geothermal energy in the distillation/desalination of water and in air-conditioning large commercial buildings.

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<sup>2</sup> Important to note the figure for hydrothermal projects in the report is highly unlikely to apply to Australia as no hydrothermal projects are planned at this stage due to geological constraints but that global roll out has cost reduction implications for Australian projects..

<sup>3</sup> This will depend on the target ultimately set by the Government and it needs to be clear so that the renewable energy can plan projects.

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 generation infrastructure. AGEA believes that 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. Air-conditioners are one of the major users of electricity; particular peak load electricity. This technology has the potential to be developed, during the next 15 years, from applying to not just large commercial buildings as currently planned, but for combined district heating and air-conditioning as the primary energy source in new suburban developments.

Commercial scale distillation desalination plants use hot water, or steam, to evaporate salt water to produce pure drinking water. The water temperature of the heat source for such a plant is around 100°C. Geothermal water can be used as this direct heat source for the evaporation process. On the other hand, reverse osmosis desalination plants, which have, and are being, commissioned in Australia, use high-pressure pumps to force sea water through semi-permeable membranes to filter out the salt and fine solids. These plants require large amounts of electricity; around four times more than consumed by a distillation desalination plant.

The inclusion of direct use geothermal energy in the RET, will facilitate the development of a significant renewable 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; and
- has the potential to provide a very cheap source of energy comparative to other emissions free forms.<sup>4</sup>

AGEA seeks the inclusion of larger scale (greater than 1,250 MWh of electricity displacement per year) direct use geothermal energy plants in the RET. AGEA will work with the Department of Climate Change, and appropriate parties, to define the nature and type of direct use geothermal energy which can be based on the definitions in the Australian Code for the reporting of Exploration Results, Geothermal resources and

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<sup>4</sup> See MMA, *Comparative Costs of generation technologies*” p.6.

Geothermal Reserves. In order to assist in the Department's consideration of AGEA's proposal on the inclusion of direct heat projects, definitions pertaining to geothermal direct heat are attached.

### 3. Longer Term Cost Impact

AGEA fully supports the intention that the CPRS, working in conjunction with the new expanded RET, can transform Australia's national economy to a low carbon economy at lowest cost, the design features, as proposed in the exposure draft may well work against this outcome.

AGEA is concerned about the way in which 'lowest cost' has been interpreted throughout the development of the policy position outlined in the exposure draft. AGEA understands that the modeling of the RET, undertaken for the Department of Climate Change, assumes that the cheapest available renewable energy in the market will come into the market when it is required up to 2020. However, in the early years of the expanded RET the technologies currently receiving support under the existing MRET are likely to be the only technologies available to meet the increased demand created by the measure. AGEA supports their increased market penetration at the early stage of the RET lifespan as it strongly supports the growth of the energy generation capacity without a consequential growth in emissions. However, most of these existing renewable energy technologies are not inherently base-load energy suppliers, and their continued penetration will produce a mismatch between the energy market demand and the physical supply capability that no amount of demand management could offset.

It is clear from the foregoing that the presently employed zero emission technologies will not have the operational capability to meet the future emissions reduction targets that Australia will be signing up to in order to play its part in achieving a stabilisation of the global climate. Other technologies with larger scale, base-load capabilities, greater resource availability and generation output that is more in line with energy market demand will be needed and have additional benefits including:

- Lower cost after economies of scale and learning by doing benefits are achieved in the second half of the RET lifespan and beyond;
- Base-load capability requiring less disruption to the overall operation of the electricity market; and
- Continuous base-load capability, placing less strain on transmission infrastructure, therefore bringing greater stability to the network as it does not require back-up generation capacity due to intermittent supply characteristics.

As outlined above, these technologies including geothermal, large scale solar and ocean energies are still in their emerging stages. Geothermal energy in particular has demonstrated strong development potential within the lifetime of the expanded RET. The August 208 Report for AGEA by MMA concluded that the industry was capable of building of to 2,200MW of installed capacity by 2020. The limitations on the industry's progress

are more likely to be the availability of investment and funding support rather than technical challenges.

AGEA is concerned that locking out the emerging technologies from the incentives available under the measure and delaying their optimum deployment capability<sup>5</sup> will contribute to a higher overall cost outcome in the transformation to a low carbon energy supply system and a low carbon economy both before, and particularly after, the 2020 target date.

## Summary

In ensuring that an additional 45,000GWhs of renewable energy is generated by 2020, AGEA believes that the expanded RET scheme also provides the opportunity to support the development of Australia's emerging renewable energy technologies and accelerate their deployment into the national electricity market while simultaneously accelerating their progress down the technology cost curve. AGEA believes that this will result in a lower cost outcome overall in the delivery of the renewable energy projects that will be developed to meet the target in 2020 and beyond. This support will also have other substantial benefits in assisting the development of an Australian renewable energy industry with significant export capability.

The Australian geothermal energy industry, while still in the early years of its development, is already exhibiting a globally significant capability in the areas of heat exploration and heat flow modeling, fracturing techniques, well design and generation technology efficiencies. Our projects are attracting global interest from the geothermal and wider energy industries, academics and researchers and governments looking for new renewable energy solutions. Australia has a globally acknowledged expertise in the development of EGS and our industry leaders are now in demand in many areas across the world. AGEA's members are actively working with other industry experts across the world to collaboratively accelerate the development of the industry. Expectations for the successful deployment of EGS projects at large scale across the world are now being realised with successful demonstration projects now operating in a number of countries including Germany, France and USA with Australia as a major participant.

The conclusion in MMA's 2008 study for AGEA that up to 2,200MWe of installed capacity could be operating on Australia by 2020 is unlikely to be realised if the design features of the proposed RET combine to mitigate against this opportunity and produce a higher cost outcome over time. This will simultaneously dampen the opportunity to develop domestic and export focused industries in the emerging technologies.

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<sup>5</sup> The deployment capability of geothermal energy over the next decade is more likely to be impeded by commercial constraints rather than by technical or physical constraints. The industry has consistently put a position to government that the early years of its development will require support in the form of capital grants until the point where the investment market has the confidence to invest in geothermal projects having seen their successful demonstration.

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Yours sincerely

A handwritten signature in blue ink that reads "Susan Jeanes". The signature is written in a cursive, flowing style.

Susan Jeanes  
Chief Executive

## **Renewable Energy Target Scheme** **Direct Use Geothermal Energy**

### **DEFINITIONS**

**“geothermal reserves and resources”** means the quantum of heat energy, defined and reported in terms of the Australian Code for Reporting of Exploration Results, Geothermal Resources and Geothermal Reserves, and governed by geothermal legislation of the appropriate Australian jurisdiction.

**“direct use geothermal energy”** means the heat energy extracted from **geothermal reserves and resources** and used for industrial or commercial purposes without the generation of electricity.

**“direct use geothermal energy plant”** means a plant and/or equipment that uses the **direct use geothermal energy** as the principal power source to produce a commercial outcome as a substitute for an alternative plant and/or equipment that would use electricity as the principal power source to achieve the same commercial outcome.

A **direct use geothermal energy plant** has a kW rating of no less than 200 kW and displaces no less than 1,250 MWh of electricity each year.

The quantity of electricity displaced by a **direct use geothermal energy plant** is based on the ratio of kW energy consumed by the **direct use geothermal energy plant** to the kW electricity displaced as agreed with the Regulator prior to the **direct use geothermal energy plant** being accredited.