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Submissions
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The Australian Geothermal Energy Association (AGEA) RET Submission

Introduction

AGEA welcomes the opportunity to contribute to the review of the Renewable Energy Target (RET) Scheme, which incorporates the Large-scale Renewable Energy Target (LRET), and the Small-scale Renewable Energy Scheme (SRES).

Both the LRET and the SRES have the potential to assist the development of the Australian geothermal energy sector. Once operational, the industry expects that electricity generation projects utilising geothermal resources would be supported with incentives from the LRET Scheme. This submission will argue that the LRET and importantly the SRES also offer the opportunity to provide incentives for the industry in its efforts to increase the installation of geothermal or ground source heat pump (GSHPs) systems across Australia.

AGEA's submission will focus on two main areas of material concern to the Australian geothermal energy industry in regard to its effectiveness for the development of geothermal energy projects being:

1. Incentives for emerging technologies and technology diversity; and
2. The eligibility of displacement technologies and GSHPs.

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Definition of Eligible Renewable Energy Sources

AGEA notes that the following technologies are identified in *The Renewable Energy (Electricity) Act 2000* as ***eligible renewable energy sources***:[1]

(a) hydro;
(b) wave;
(c) tide;
(d) ocean;
(e) wind;
(f) solar;
(g) geothermal-aquifer;
(h) hot dry rock;
(i) energy crops;
(j) wood waste;
(k) agricultural waste;
(l) waste from processing of agricultural products;
(m) food waste;
(n) food processing waste;
(o) bagasse;
(p) black liquor;
(q) biomass-based components of municipal solid waste;
(r) landfill gas;
(s) sewage gas and biomass-based components of sewage;
(t) any other energy source prescribed by the regulations.

AGEA suggests that the sources identified as geothermal-aquifer (g) and hot dry rock (h) are now considered to be outdated terminology to describe the two 'ends' of the geothermal resource spectrum for electricity generation. AGEA suggests that the terms hot sedimentary aquifer and hot rock are more appropriate to describe the geothermal resource from which energy is extracted in the Australian geothermal context.

These are projects that are developed at one end of the technology scale in the hot aquifers of sedimentary basins and at the other end of the technology scale, those that are developed in the deep, hot granites and sandstone that will require engineered stimulation and which are referred to as Enhanced Geothermal Systems (EGS) and it is misleading to say that these projects are developed in hot dry rocks as it is most likely that they will be developed in areas with naturally occurring water tables intersecting geothermal wells.

INCENTIVES FOR EMERGING TECHNOLOGIES AND TECHNOLOGY DIVERSITY

AGEA acknowledges and supports the view that major changes to the RET Scheme should not be made in order to provide certainty to investors and potential investors in renewable energy projects over the lifetime of the Scheme's operation. AGEA argues however, that the review does offer an early opportunity in 2012 to examine whether the current settings will deliver optimum outcomes in regard

[1] *The Renewable Energy (Electricity) Act 2000*, Division 3, Section 17.

to the future of renewable energy supply to 2020 and beyond in the context of the Australian energy market and its operation and objectives.

In relation to the LRET, the geothermal energy industry re-asserts its ongoing concerns that the Scheme as currently constructed is designed to support projects developed from the limited range of renewable technologies currently available in the market and that this has potentially adverse consequences.

The overwhelming incentive offered to investors in renewable energy projects is to build projects that will bring in immediate income from the currently available technologies in the market. While AGEA sees this as a fundamentally positive goal in itself, it also has the effect of deferring interest and investment in the emerging renewable energy technologies from the energy utilities. The utilities, given the vertically integrated nature of the national energy market, build generation projects and are thus eligible to receive Renewable Energy Certificates (RECs). They also have a liability under the Scheme to purchase a required number of RECs annually so they are fundamentally incentivised to build the more limited range of technologies already commercialised in Australia and to acquit their liability internally.

This means that the Government risks having a limited range of technologies available to carry the large burden of meeting future energy supply goals while simultaneously and significantly reducing emissions towards the middle of this century. The modeling undertaken by the Commonwealth to guide the development of its Clean Energy Future Package predicts that a range of energy technologies will need to be available in the market to meet these simultaneous goals. The modeling also predicts that around twenty per cent of Australia's energy needs will be met by geothermal energy.

Further, the Scheme as it is currently constructed offers a REC for every MWh of generation from accredited projects. This process does not take into account the value of that electricity in relation to demand and supply equations at the time of generation nor does it account for the value of other capabilities offered by individual technologies such as baseload. The baseload capability of geothermal energy offers such additional benefits as an optimum use of the heavy investment made in transmission infrastructure and scalability in light of the eventual retirement from the market of coal generation assets. Geothermal energy with its capacity factor of over ninety per cent is not an intermittent technology, is available '24/7' and is not dependant on weather conditions to supply energy.

It is AGEA's strong view that these are serious matters and that prudent risk management would encourage and enable the meaningful entry of a range of renewable generation technologies into the RET Scheme. This would mitigate against future risks to emissions free and low emissions energy supply such as limits to the penetration of wind technology, the pace and cost of the development of storage technologies at large scale, increasing gas prices in line with global pricing, challenges in developing clean fossil fuel and storage technologies and community acceptance of nuclear energy.

Recommendations

AGEA argues that these abovementioned matters are material to the ability of the Government to meet national energy supply and emissions reductions targets and that they warrant meaningful action.

AGEA recommends that this action be in the following forms:

1. **Formal policy alignment of the RET Scheme with the incentives yet to be offered by the Australian Renewable Energy Agency (ARENA) and the Clean Energy Finance Corporation (CEFC) to develop the emerging renewable energy technologies in line with the timelines and incentives offered through the RET Scheme; and**
2. **Setting aside a reasonable proportion of the incentives offered through the RET Scheme to support emerging technologies as they enter the commercialisation phase.**

DISPLACEMENT TECHNOLOGIES

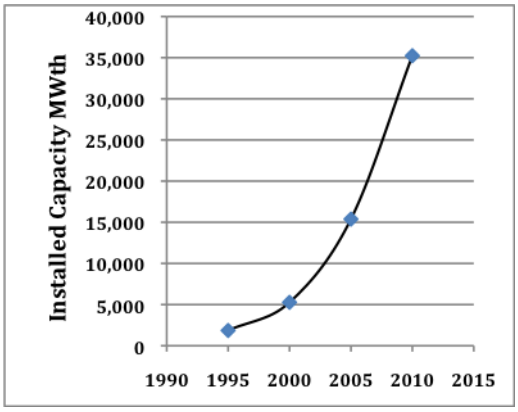
Geothermal energy can be used to displace electricity generation and ultimately contribute to the demand for additional generation infrastructure. Geothermal energy can be used as a displacement technology at large scale, for example to provide heat and reduce the reliance of coal burning in coal fired power stations. This heat can be used to drive- district heating and cooling schemes. AGEA argues that projects of this scale should be made eligible projects under the LRET Scheme.

At the smaller scale, GSHPs can be used at domestic through to commercial scale such as heating swimming pools in aquatic centres, and provide domestic heating and cooling and hot water all year. Market penetration of these systems could be increased if they were eligible under the LRET (for commercial scale systems) and SRES Scheme (for domestic scale systems). A comprehensive range of uses at temperature is provide by Geoscience Australia and is attached to this submission.

AGEA has been arguing for some time that the current situation where some displacement technologies are eligible under the RET Scheme and others are not is inequitable. The direct use of geothermal energy offers a material opportunity to contribute to a reduction in the reliance of coal fired electricity in Australia and as such should be eligible under the RET. Further, this would have the advantage of broadening the range of technologies available to share the emissions reduction burden over the course of the coming decades and reduce the risk of meeting future emissions reduction targets, increase completion and contribute to an overall reduction in the cost of meeting targets.

1. Established Attributes of GSHPs

GSHPs are an established technology, with over 2.9 million 12 kW equivalent units installed (2010)[2].



Installations are growing rapidly in Europe and North America, with between 100,000 and 200,000 installations each year each.

But in Australia there are only a few hundred installations in total.

Typically these systems:

- Are used for
  - Heating and cooling (reverse cycle air conditioning, ducted, hydronic)
  - Hot water heating (potable, process, aquatic centre pool heating)
- Are recognized as being the most energy efficient commercially available technology for the above purposes, using typically less than half the amount of energy than conventional technologies (and consequently less than half the emissions). Efficiency does not fall away under extreme conditions as it does with conventional technologies.
- Can be installed in new residential and commercial buildings and also retrofitted in most cases.

2. Commercial Logic and Equity

Present eligibility under SRES includes renewable solar technologies such as:

- solar hot water (for hot water production and grid electricity replacement)
- solar PV (grid electricity replacement), and
- air source heat pumps for heating and cooling and for hot water (they exchange energy with the air rather than with the ground).

The number of certificates that can be created is based on the amount of electricity in megawatt hours displaced by the solar water heater or heat pump over the course of its lifetime of up to 10 years.

GSHP technology also is an established renewable technology that provides hot water and reduced the demand for grid electricity. However this technology is not listed in the register managed by the Clean Energy Regulator and thus is not eligible to attract STC's.

This is both illogical and commercially inequitable. It has an unintended and significantly adverse (unequal) impact in the market place.

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[2] Lund W. et al. (2010) Direct Utilization of Geothermal Energy 2010 Worldwide Review. Proceedings World Geothermal Congress, Bali, Indonesia.

3. Contribution to Emissions Reduction

Buildings consume almost 40% of primary energy consumption and are responsible for 43% of carbon emissions in the U.S. Heating and cooling, and water heating consume 17% of total energy in the U.S. and are responsible for around 20% of carbon emissions. Australia is probably similar.

With GSHPs consuming less than half the energy of conventional technologies, there is a clear opportunity to cut emissions. They are significantly more efficient that air sourced heat pumps. The alternative is to lock in technologies that are more emission intensive in new buildings.

The consequence is that GSHPs should be treated the same as other technologies offering similar benefits.

4. Contribution to Cutting Infrastructure Costs

GSHPs offer a means of reducing demand on the electricity network because they reduce demand for electricity and the fact that performance does not fall away under extreme conditions, as does for example the performance of air source heat pumps. This is critical during times of peak demand. There is a lag between peak solar radiation and peak energy demand – with peak energy demand occurring later in the day. Any reduction in the peak demand profile will reduce the requirement for the most costly generation of electricity.

This is an important feature at a time when projections for increased investment in generation and transmission and distribution infrastructure will place increased costs on energy users and can ultimately defer the demand for this infrastructure.

5. Cost Structure and National Economics

Like solar hot water and solar PV, GSHPs have a cost structure where the capital cost is higher (because of the addition of ground infrastructure) but the operating costs are significantly lower than alternatives, in particular because the above ground infrastructure can be housed indoors and away from weather. Therefore, life-cycle costs of GSHPs are usually lower than conventional alternatives (at current energy prices).

It is suggested that with movement from the emerging market conditions to the mainstream market, costs will be reduced – as has happened with solar PV.

The consequence of this is that:

- Building owners/developers see the up-front capital cost as a barrier
- Lower life cycle costs and lower infrastructure costs suggest that it is in the national economic interest for GSHPs to be treated the same as other displacement technologies offering similar benefits.

Recommendation

AGEA strongly recommends that GSHPs be included in the register managed by the Clean Energy Regulator.

It is noted that the SRES has a 100 kW cap, and the same cap would be appropriate for domestic scale GSHPs.

It is expected that STC's would be treated commercially in the same way that they are treated for solar hot water and solar PV. This would:

- **Remove the unintended commercial differential between the technologies, and**
- **Enable a reduced capital cost to be offered and thus cutting that barrier as it does for the other technologies.**

AGEA again expresses its support for the fundamental objectives of the RET Scheme and the ongoing development of renewable energy projects across Australia. AGEA believes that the current review process offers a once off opportunity to improve the operation of the scheme to increase the range of technologies it incentivises to enter the national energy market and therefore contribute to national goals of increased energy security and greenhouse gas emission reductions in line with Australia's national and international obligations.

For further information or clarification I can be contacted at susan@agea.org.au or on 0419833556.

Yours sincerely

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