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NZGA Submission on Draft National Energy Efficiency and Conservation Strategy
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Executive Summary

The main points of our submission are, in summary:

1. New Zealand possesses a large, readily developable high temperature geothermal resource which is environmentally more friendly than many other sources of energy, in particular, hydrocarbons.
2. The full benefit of the geothermal resource is not available under the current Resource Management Act for a variety of reasons, the most important being that decisions are made on a local basis, there being no guidelines covering wider considerations.
3. Economically, electricity from geothermal energy tends to be more expensive than that from hydrocarbons for a variety of reasons. The difference is relatively small and could be offset by a relatively small change in the relative cost of hydrocarbons.
4. For these reasons, we strongly support the development of a National Policy Statement under the RMA covering sustainability and balancing of environmental effects; and the imposition of some form of positive incentive regime as suggested in the Draft Strategy.

Submission

The New Zealand Geothermal Association (NZGA) welcomes the opportunity to make a submission on the Draft National Energy Efficiency and Conservation Strategy as released by the Energy Efficiency and Conservation Authority (EECA) and the Ministry for the Environment. The NZGA is very supportive of the aims of the Strategy, and we wish to continue to be involved in the consultation process. Our aim is to see that maximum advantage is taken of the positive benefits of geothermal energy in the National Strategy.

Generally we consider the six Goals and the priorities indicated in the draft strategy are appropriate. The general goal of a sustainable energy supply, including geothermal development, will benefit both the local geothermal industry and the nation. Geothermal development has the potential to be a major contributor to the general goals of reducing CO_2 emissions and providing a sustainable energy supply. Geothermal is the only renewable energy form which can provide long term reliable base load electricity generation (e.g. Wairakei plant load factor of greater then 95% for over 40 years).

However, we consider that the draft strategy does not give enough recognition to geothermal as being a renewable resource. Geothermal is only mentioned in passing and should be given equal status as wind and the others. Actions mentioned in 6.4.1 (ii) state "EECA will continue to provide support to renewable industry associations such as Wind Energy Association, Solar Industries Association, Bioenergy Network and the fledgling Photovoltaics Association". We wish to ensure that the Geothermal Association is added to the list.

Geothermal is a renewable resource, which like wind is site specific and due to the relatively small scale of development, easily embedded. This creates both opportunities to increase transmission efficiency and barriers as lines and transmission companies have no incentive to pass the benefits to end consumers or developers.

The role of geothermal energy in New Zealand's future was debated by members of the Association at a recent seminar held in Taupo. We have attached certain papers from that seminar to this submission, rather than repeating the detail contained therein. We wish however to emphasise the following key points:

1. **Relatively low greenhouse gas emissions.** Emissions considerations imply there will be a global benefit from increased use of geothermal relative to fossil fuels. The most recent data we have available indicate that the average CO_2 emissions from actual geothermal plant in New Zealand per GWh are around 25 % of those of combined cycle gas turbine plant (representing the most efficient form of fossil fuel generation readily available), or less than 10% of that of a modern coal-fired plant.

2. **Efficiencies of direct use.** We wish to re-emphasise the potential efficiency advantages of direct use of geothermal heat wherever appropriate and commend the Strategy on recognition of appropriate energy quality (Item 3.6 103).

3. **Size of New Zealand's geothermal resource base.** New Zealand's high temperature geothermal resource base is large, though largely concentrated in the Bay of Plenty area and the energy-constrained area of Northland. A recent estimate gave a 90 % probability that the capacity for electricity generation using only existing technology was 3,000 to 5,700 MWe with a median value of 4,100 MW (Lawless 2001). However access to most of this resource base is limited by conservation values, caution over local environmental impact and land status. Only about 10 % of this has been developed.

4. **Constraints to development.** The major constraints to new geothermal projects are both regulatory and economic, the economic constraints being at least partially of regulatory origin. Recent geothermal projects in New Zealand have been small in comparison to the size of the resources and developments overseas, largely because of regulatory constraints. This, in turn has reduced the ability to take advantage of economies of scale. Two of the successful resource consent applications for geothermal projects in recent years have had the quantity of fluid that can be taken restricted to only about 25 % of that applied for (Poihipi and Ngawha), and in another case 40% (Tauhara). Furthermore, the regulatory process itself leads to long delays which impose a significant up-front cost on the projects, greatly reducing their financial viability. It is exceedingly unlikely that a new geothermal project of 100 MW would be permitted anywhere in the country without an appeal to the Environment Court, adding at least two years and probably over a million dollars in costs in comparison to, say a, new gas turbine project.

5. **Sustainability issues.** Some regional authorities have been taking a rather cautious approach to the of sustainability of a geothermal resource. It is worth keeping in mind that the requirement for sustainability of the energy content of the geothermal resource, applied by the regional councils under the RMA, is not applied to competing energy resources. For example, it is accepted without question that exploitation of a gas field is done 'un-sustainably', that is gas is extracted faster than it replenished. This leads to a highly advantaged position for fossil fuels under the RMA irrespective of the relative merits under economic and environmental impact values. Regarding the issue of geothermal resource sustainability, we make the following points:

- Geothermal fields have been exploited world-wide for electricity generation for nearly 100 years. No geothermal field has ever been exhausted. One of the worst examples world-wide where field capacity failed to meet expectations was at Ohaaki, where the result has been a scaling back of generation and under utilisation of plant. This has been to the developers' cost but the physical sustainability of the field itself in terms of heat capacity has not been significantly affected.

- Previous over exploitation of fields such as at The Geysers in California, has largely been overcome by the 'single tapper' approach, where a single developer has the rights to exploit the field.

- Exhaustive exploration and proving in advance of development can be uneconomic because of the delay in project implementation, and as Ohaaki has demonstrated, does not necessarily lead to a better outcome. Knowledge of field performance is greatly improved by observing performance over a few years of actual exploitation but some fields in NZ have been allowed such a small scale of development that is insufficient to 'test' the capabilities of the field.

6. **Absolute costs.** The draft Strategy document probably over-estimates the cost of new geothermal developments at 5.5 to 8.5 c/kWh. It should also be noted that there is considerable potential for expansions to existing projects, which will generally be less expensive than completely new projects. At the recent seminar it was estimated that, based on readily identifiable extensions to existing projects by 2010, an additional 200 MW of generation could be commissioned (Bromley 2001), and the existing 300 MW maintained. This was based on a levelised cost of 4.6 c/kWh for existing recent new projects. A further 175 MW could be added by 2020 while still maintaining an appropriate degree of sustainability. New projects on 8 geothermal fields, that are presently undeveloped and not classified for protection, have the potential of adding a further 500 MW by 2020, assuming the adoption of relatively conservative development strategies. This assumes however that the resource consent process does not prevent their installation.

7. **Relative costs.** Economically, the main factor inhibiting the development of geothermal energy is competition from other cheaper power sources, natural gas in particular. With a floating wholesale power price, the actual cost of geothermal generation is almost irrelevant. Pegging the electricity price higher would not encourage more geothermal or hydro generation- it would simply encourage generating companies to install more gas-fired plant and make larger profits. The problem is not that geothermal is expensive, nor even that the power price is too low, it is that gas is cheap and easy to develop. Therefore encouraging more renewable generation by economic means will only come from reducing the cost differential, either by making fossil fuels more expensive through a taxation or permit regime, or incentivising renewables.

8. **Promotional regime.** The Association does not have a consensus view on which pro-renewable regime would be most effective, but a majority of the Association has expressed support for a mandated renewable regime. We are aware that mandatory renewable energy targets may produce substantial conflicts between developers required to develop renewable energy developments, and resource consenting authorities considering applications under the current system. We accept that a carbon tax or tradable permit regime would have a small, but not excessively detrimental, impact on geothermal power projects, but would not necessarily oppose such a scheme.

9. **Relative environmental impacts**. We do not claim that geothermal energy development is free of environmental impact, nor do we advocate developing New Zealand's geothermal potential to the fullest regardless of the conservation values. What we do wish to point out is that a balance must be struck between the environmental impacts of developing geothermal (or for that matter other renewables), and the environmental impacts of not developing geothermal and consequent continuing unnecessary greenhouse gas emissions. The difficulty comes that under the current regulatory regime there is no means of doing this. Decisions on geothermal projects are made in the context of the RMA by Regional authorities. Whether projects are in the National interest, or whether minor local environmental impacts of the project in question can be more than compensated for by positive environmental effect elsewhere (by say, not building a gas-fired plant) cannot be taken into account.

10. **Need for a National Policy Statement.** We strongly urge therefore that the way forward is for a National Policy Statement under the RMA to be promulgated, addressing the issues of the role of renewable energy sources and how such an environmental balance should be struck.

Attached: papers from 2001 seminar by Bromley, Lawless, Brown & Dunstall