

21 August 2006



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Dear Minister

On behalf of the Western Australian Sustainable Energy Association (WA SEA) Inc. I would like to congratulate you on taking initiative to develop the proposed draft drafting instructions for possible legislation to accommodate geothermal resource exploration and production in Western Australia and for the opportunity to comment at this early stage.

WA SEA Inc. is the peak body of the Western Australian sustainable energy industry. The Association promotes the development and adoption of sustainable energy technologies and practices that minimise and/or displace fossil fuel use. The Association has over 60 individual and company members representing a broad spectrum of the sustainable energy industry.

Many of the components of the proposed legislation are considered to be good or acceptable. The comments outlined below are in reference to areas where significant changes are recommended or required.

### **Definitions**

“Geothermal Reservoir” – note in EGS (engineered geothermal systems), also known as hot dry rock (HDR) systems, permeability is not inherent, it is engineered by fracture stimulation. So the definition of “reservoir” should state “a rock having natural or engineered permeability containing geothermal resources.”

“Ownership” – this is satisfactory but the legislation should put no requirement on the geothermal tenement holder to carry out any scientific work for petroleum in the event of an accidental discovery as contemplated. Also the geothermal well should be owned by the geothermal tenement holders and no right of access to the well should be granted to the petroleum tenement holder.

“Tender Process” – this is the most contentious aspect of the proposed legislation. The only reason it seems that competitive bidding would be used is to make the administrative process easier for the government. It is not appropriate given the embryonic nature of the industry and the extremely high risks involved in establishing a resource.

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Because the contained energy in geothermal hot water resources recovered to the surface are much much lower than the contained energy in the equivalent volume of petroleum and the most geothermal exploration in Australia will take place in remote onshore areas where drilling has to go to even greater depths than exploration for petroleum the exploration cost relative to the reward is much much greater than for petroleum which attracts much higher prices. Profit margins in the geothermal industry are generally orders of magnitude lower than in the petroleum industry. Unlike the petroleum industry the geothermal industry can not carry failures.

All this means that competitive bidding is likely to be very unattractive to geothermal explorers. Geothermal exploration is best served where ground can be applied for on an ad hoc basis when the explorer has a specific target area to assess. It is unlikely there will be substantial competition for any particular areas released for bidding because the exploration is at an extremely immature stage. Most companies would not enter into competitive bids as shown in Queensland with their ill conceived geothermal legislation. Open application on an ad hoc basis encourages competition, an objective of the new legislation, because different explorers can target different exploration concepts in different locations when they are ready (ie when they have done some preliminary research). This is more attractive to companies than being restricted to applying for acreage when a government is ready to release acreage in locations that may not interest the companies.

“Licence Areas” – this recommendation is appropriate.

“Royalty” – we suggest that no royalty should be imposed on the use of geothermal energy for direct heat purposes where the value is low as opposed to sale of electricity.

### **Other comments on drafting instructions**

“Commercial v non-commercial” – this concept changes with time and depends on prevailing costs of goods and services (eg drilling) but the definition looks reasonable.

“Compatible titles” – see our comments above under “Ownership”. The proposed obligation on the holder to make a declaration of discovery in the event of discovery should allow for the fact that geothermal explorers will not always have run a suite of logs that can detect the likely presence of hydrocarbons so the obligation should only be in the event the geothermal tenement holder has actual knowledge of the presence of hydrocarbons in the well. Please note that mineral type slim holes are commonly used in the initial phases of geothermal exploration to determine the stratigraphy and avoid the high costs of seismic surveys. Also down hole tools and logs that can cope with high temperatures are not commonly available in Australia for such slim hole drilling which means the geothermal explorer will not be able to detect the presence of hydrocarbons.

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“Consultation” – this ministerial consultation with the prior tenement holder should only happen after applications are lodged by the geothermal applicants so as to protect the applicant from the petroleum or mineral title holder lodging an application themselves to thwart the geothermal applicant.

“Dispute Resolution” – the first applicant in time principle should be subordinated to the concept of multiple land use. It would be preferable for multiple uses should be allowed over the same land to the extent they are not inconsistent. This principle is recognised in the provision requiring the minister to consult with both parties with the objective of enabling exploitation of both resources. Also it should be ensured that while the rights of use of a prior tenement holder are preserved a prior mineral or petroleum producer can not prevent an application by a geothermal applicant and later apply itself for geothermal title over any part of the same area (or if it does later apply the former applicant should be given the priority right for geothermal energy over that contested area).

“Explorative Energy Production” – this also needs to allow production trials of “hot water” because in most likelihood water is the medium which will collect the geothermal heat and transport it to the surface.

“Nomination of Blocks as location and declaration of location” – the logic of an adequate location size as set out in the drafting notes is good. Note that it may be that a resource size sufficient to produce say only 5MWe is considered commercial but the geothermal tenement holder may want to produce at much greater scales of say 1000MWe so the location size must be large enough to enable the exploitation of the ultimate commercial size. The size of the resources can be at least equivalent in area to the offshore giant gas fields. So the lack of size restrictions on production tenements should be preserved. The Victorian solution to this size issue seems a good approach for Ss 46 & 47.

“Term of Production Licence” – s63 – we agree with the proposal.

“Good Geothermal Industry Practices” – s68(5) - the requirement to conform to good petroleum industry practices until geothermal practices are developed should be qualified by the words “to the extent such practices are reasonably applicable”. This should be an objective test and could be determined in consultation with the regulators in the case of each work program. In certain places geothermal energy will be sought in locations where there are no petroleum basins and where the risk of say blow out is zero or negligible. It would be silly to ask geothermal explorers in that case to conform to all petroleum drilling standards when many of them are not applicable. There are geothermal industry practices being carried out in scores of countries around the world for conventional, volcanic geothermal resources. This knowledge is available. On the contrary the EGS or HDR industry is still developing its standards as no commercial geothermal EGS electricity generation is in operation anywhere in the world.

“Development Plans” – s68 - this suggestion is **contentious**. The major difference with development of petroleum resources is that development on a large scale can only be done and financed in stages. In this aspect it is more like

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deep underground base metal mines with a long resource life. A large number of very deep wells will be required to develop large geothermal resources. This takes many years to implement and must be financed in stages. Given this development plan is very likely to change with time as new technologies in drilling, fracture stimulation and power plant efficiencies are devised and utilised. Therefore a rigid legally binding development requirement and the right for the minister to cancel licences for non-adherence is not appropriate and could actually hinder the most economic development of the resources over time.

“Royalty” – see our comments above. Agree with comments on s143 and 144(1).

“Royalty Rate” – given that coal pays around 1.8% on the basis this should be set at zero or a much lower rate than 2.5% for direct use geothermal energy. A lower rate for geothermal energy than applies to coal is consistent with the WA’s energy sector’s objectives, contained in the *State Sustainability Strategy* (Government of Western Australia, 2003); to reduce reliance on fossil fuels and increase reliance on renewable energy. Note that coal currently pays around \$2.39 per tonne. This is equivalent to around \$1,000/GWh on an energy basis for coal – given Collie coal generates around 2MWh per tonne. This is equivalent to coal paying a Royalty Rate of around 1.8% on a GWh basis.

“Water” – the draft legislation says "water resources accessed, during geothermal resource exploration and production, be bound to geothermal resource titles". It is unclear what this means, but it says that water discovered by the geothermal exploration drilling is then available to the geothermal developer. This possibly refers to the water that can be pumped from a disused geothermal exploration hole or production well. Currently, in WA, water users can access groundwater resources using the rights under the Water & Irrigation Act. This act governs groundwater exploration and development for all users, such as municipal water supply, irrigators, industrial requirements and miners etc. We can see potential difficulties in areas where there is competition for groundwater supplies or potential interference between different groundwater users. An untenable situation for example would occur if geothermal explorers drilled shallow temperature measurement holes in an over-utilised aquifer and claimed the groundwater resources. It may be better not to bind the groundwater resources to the geothermal title but to just recognise that the bore or well can only be used for water supply if it does not interfere with other users. In this respect, the geothermal explorer/developer retains ownership of the hole or well but applies for groundwater resources under the Water & Irrigation Act in the same manner as all other groundwater utilisers. In WA, geothermal explorers will be able to apply for groundwater exploration licences to safeguard potential groundwater resources at an early stage in their program.

Finally, we restate that we do not believe that a tender system of granting high risk exploration tenements will be in the best interests to the State. A tender system is not appropriate and is not likely to be well accepted by the embryonic exploration industry here. A good illustration of this is in Queensland where only two companies bid for acreage released there this year via a competitive bidding scheme. Indeed Queensland has come under strong criticism from the industry for using a tender system despite most of the industry being against it. This is in

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stark contrast to South Australia where 58 GELs have been issued since the legislation was introduced there. If South Australia introduces a tender system then it too can reasonably expect to see the number of future applications to dry up. The State should do everything to encourage the maximum number of applications for geothermal licences and the best way to do this is to have a first come first served application system.

WA SEA Inc. would like to congratulate the Government for taking initiative to draft this legislation and welcome feedback. If you require further information about this submission, please contact Johanna Gastevich on (08) 9328 8411.

Yours sincerely



Matthew Rosser  
Chair  
Western Australian Sustainable Energy Association (WA SEA) Inc.

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