



ANZSES

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Submission No:117.....

Submission from ANZSES to the:

**House Standing Committee on Industry and Resources
“Inquiry into the development of the non-fossil fuel energy industry in Australia: Case study into selected renewable energy sectors”**

Prepared on behalf of ANZSES by Keith Lovegrove and Artur Zawadski

Who is ANZSES

The Australian and New Zealand Solar Energy Society is a non profit organization of renewable energy professionals and supporters that promotes energy sourced from the sun. This is interpreted broadly to encompass all true renewable energy technologies. In promoting renewable Energy Technology, the society is committed to solutions that are truly ecologically sustainable and not simply opportunistic.

ANZSES has approximately 1000 members and includes the bulk of active researchers in the field. ANZSES is the organizer of the high profile “Sustainable House Day” (www.sustainablehouseday.com) and an annual conference showcasing the latest developments in the field (<http://www.anzses.org/conference.htm>)

ANZSES is the local section of the International Solar Energy Society (www.ises.org). ISES has been serving the needs of the renewable energy community since its founding in 1954. A UN-accredited NGO present in more than 50 countries, the Society supports its members in the advancement of renewable energy technology, implementation and education all over the world. The ACT branch of ANZSES has a well developed tour itinerary of working examples of renewable energy systems in the Canberra region. ANZSES would be happy to organize a such a tour for members of the standing committee.

The ISES White Paper

Many of the issues that this enquiry is seeking to cover are dealt with comprehensively in a White Paper prepared by the International arm of our organization, titled “Transitioning to a Renewable Energy Future”. This paper is attached and forms the bulk of our submission. It can also be downloaded from <http://www.ises.org/shortcut.nsf/to/wp>

The context

In recent times the need to reduce greenhouse gas emissions has been receiving a very high level of attention and the need for action is accepted by the majority of political players on both sides of the spectrum in Australia and Internationally.

In addition there is strong consensus that the peak in world production of oil (peak oil) has either already occurred or will occur very soon. Demand will increasingly exceed supply into the future with consequent trends to increasing prices.

Renewable Energy overall is possibly the world’s fastest growing industry with sustained rates of growth in excess of 20% for the last two decades and overall annual turnovers now exceeding USD80billion / annum.

If this rate of growth is sustained, then all the worlds energy needs could theoretically be met by renewables in just a few decades.

Emissions Trading and Renewable Energy Targets

ANZSES welcomes the recommendations of the recent "Report of the Task Force on Emmissions Trading" from the Prime Ministerial task group, that Australia move toward an emissions trading system. Both sides of politics in Australia are now committed to a market based mechanism for achieving cuts.

The target date of 2012 for the introduction of emissions trading is too cautious and should be brought forward.

In making this claim it is noted that the GST was introduced in just 12 months and is arguably a harder change to implement.

In considering emissions trading, it is important to recognize that in its early stages emissions trading will bring on the cheapest reductions such as energy efficiency and targeted forestry.

Renewable Energy technologies are vital for the longer term deeper cuts needed, however they will not be directly supported in the early stages of an emissions trading regime.

It is essential to maintain and grow strong Mandatory Renewable Energy targets to stimulate the growth of the industry so that it has the capacity to deliver the deep cuts in emissions that are needed to stabilize the climate system.

Renewable Technologies – current status

The invitation for submissions seeks information on a series of nominated Renewable Energy technologies, specifically; Solar, Wave, Tidal, Geothermal, Wind and Bioenergy.

Some brief comments on these are offered here.

Solar

The Australian continent has the highest average amount of solar radiation per square metre per year of any continent on the planet, ranging from 1500-1900 kWh/m²/yr. Australia's total current primary energy consumption of approximately 5,500 PJ/a could be met by an area of 4000 km² of solar collectors with an average of 20% conversion efficiency. If this were constructed as a power station with 20% land coverage it would measure just 138 x 138 km. Alternatively, the collector area needed is close to the area of domestic house roofs available nationally.

In considering the solar energy category, there are three technology areas that should be examined separately; Solar Hot Water systems, Photovoltaics and Solar Thermal Power.

Solar Hot Water

The share of the Austalian solar hotwater market currently occupied by solar hot water heaters is a little over 5%. This is surprisingly low for a continent with such good solar resources. Israel for example is notable for achieving very high rates of use via government policy.

The technology is extremely well proven, most companies provide very similar flat plate collector based systems for domestic hot water.

The low penetration of Solar Hot Water is an example of market failure. At current prices the systems are economically marginal over lifetime, however if more widely adopted competition and volume of sales would drive prices down and they would be the cheapest solution to providing hotwater when a properly discounted analysis of capital and running costs over the product lifetime is considered. The reason can be attributed to the inertia in the market and the higher up front capital cost.

There is no fundamental reason why Australia could not move rapidly to very high levels of Solar Hot Water use give the correct policy drivers.

Photovoltaics

Australia has a very impressive track record in Photovoltaics R&D, with major groups at the University of New South Wales and the Australian National University, plus others. Manufacturing is limited, and although output has grown somewhat, the massive growth in activity overseas has reduced Australia's share. Overall the PV sector has achieved phenomenal growth over several decades of the order of 30%/a. Its turnover is close to that of the large scale wind industry, however actual installed capacity is much less due to higher costs. As production has increased, costs have come down and this trend will continue making the possibility of roof mounted systems that can offset retail prices for electricity rather than wholesale generating costs increasingly attractive.

Solar Thermal Power

Solar Thermal Power is an area in which there has been little commercial movement internationally for the last 2 decades, however there has been a huge upsurge in activity in the last 2 years. The technology approach is well proven, with plants with a total installed capacity of 354MWe operating in California for nearly 20 years. The recent upsurge has seen construction projects which will deliver a further 200MWe commence and plans for many GW suggested. The most recent plant completed was the 64MWe Nevada Solar One plant that was constructed in under 15 months. This is a technology area with potential for rapid growth. There are major research efforts at the Australian National University and CSIRO and companies offering Dish systems and Linear concentrators commercially.

Wave

Wave power is an industry sector somewhat in its infancy. There are a number of companies around the world. In Australia Energetec is the notable key player. There is enormous energy embodied in the wave system, however the amount that can practically be accessed is limited.

Tidal

There are well established approaches to tidal power around the world. However this sector is not particularly active. Most approaches involve damming of estuaries with considerable ecological impact. Successful systems need high tidal ranges such as found in Northern Australia. The environmental impact plus the large separation between possible sites and load in Australia makes this approach relatively unfavourable.

Geothermal

There are a range of companies from the Geothermal sector who will no doubt make submissions. The pioneer in Australia is Geodynamics who seek to exploit a Hot Fractured Rock resource in the Cooper Basin. The Geodynamics resource offers the highest temperatures of any of the players. To access this resource Geodynamics is proposing a major grid extension to their area, with initial power station construction of a capacity of 200MW. This is a plausible scenario. It is worth noting that if such an extension were built it would also provide connection to an area with very high solar resources and thus facilitate connection of large scale solar plants also.

Wind

The large scale wind industry is the renewable energy sector that has shown the greatest growth around the world and in Australia. The strong growth in this sector has largely been driven by the policy initiatives in Western European countries, where the wind resource is more apparent than the direct solar resource.

Other groups such as AusWEA and BCSE will no doubt provide detailed submissions in this area.

Bio-energy

Bio energy is a direct use of solar energy. Dedicated energy crops, crop waste and forestry are approaches that are considered. Use of sugar cane waste is implemented successfully. With

Bioenergy however, there are issues around conflicting demands for land use, the large areas potentially needed to make a significant contribution and impacts on native forests.

A relatively new approach is the suggestion of algae cultivation in large ponds. This offers much higher rates of production per hectare and can use saltwater.

A major benefit of bio-energy approaches is the inherent energy storage potential they offer and the link to providing transport fuels such as biodiesel.

It is important that any expansion in the contribution of Bio-energy to Australia's energy mix be implemented in an ecologically sustainable manner.

Export potential

Australia's single biggest source of export income is coal. In a carbon constrained future it is important to plan for changes to this situation into the future.

Possible contributions to our export income from the renewables sector include:

- Manufacturing of renewable energy technology. In many ways this is no different to any other manufacturing sector, however a strong local market would provide a good basis for building competitiveness
- Revenue from Australian companies trading in a global market place. Much technical innovation and initiative originates in Australia. A strong local market will enhance the chances that commercialization efforts will retain Australia as a home base.
- Direct export of energy. Australia's role as an energy exporter can continue into a renewable energy future if renewable fuels are pursued on a large scale. A promising near term approach to this is the solar driven gasification of coal or biomass and the synthesis of methanol for export. This can be implemented on a large scale using solar concentrators. Japan would be a key target market. In the longer term, hydrogen production for export is possible.

Storage and intermittency

Much discussion of renewable energy solutions touches on the issue of intermittency and the need for storage. In reality this is less of an issue than realized and viable technical solutions for storage do exist. Intermittency is no limit on the size of the contribution that renewables can make to Australia's energy mix. Some pertinent observations:

- Many sources (such as the recent UMPNER review) acknowledge that intermittent renewables could meet 20% of electricity demand before grid management would become an issue
- Technologies such as Hydro, Geothermal and Biomass are inherently energy storing in nature.
- Adopting a broad portfolio of renewables over a wide geographic area makes the management of intermittency easier
- There are a range of promising approaches to storage for electricity production, many of which are being demonstrated under the AGO's Advanced Energy Storage Technologies program.