Submission No: 78

AUSTRALIAN LANDSCAPE GUARDIANS ASSOCIATION INC

SUBMISSION TO THE HOUSE OF REPRESENTATIVES STANDING COMMITTEE ON INDUSTRY AND RESOURCES – INQUIRY INTO DEVELOPING AUSTRALIA'S NON-FOSSIL FUEL ENERGY INDUSTRY

I write to you on behalf of the Australian Landscape Guardians Association ("ALGA") in response to your advertisement for submissions in respect of Renewable Energy in Australia. The ALGA is a national group formed to protect landscapes, wildlife and social values in rural and regional Australia and to assist regional Landscape Guardians Associations carry out their objectives in their specific areas of focus.

The writer is a chemical engineer with 30 years experience in the energy industry and with a special interest in the economics and future of the energy industries.

Background to the Submission

1. We note the evidence of higher than "normal" temperatures in many parts of the globe.

2. We know and accept that over both geological time and the much more recent time of mankind, climate changes of quite extreme nature have been shown to have taken place, but that the causes of these historical and pre-historical climate changes are not well understood.

3. We share the proposition that the technology of modern civilisation has, to an as yet unknown degree, contributed to the present warming phenomenon, but also understand the scientific arguments that there may not yet be sufficient proof that this is so.

4. Nevertheless, it seems entirely rational, for a range of reasons, for mankind to make significant efforts to reduce atmospheric pollution which, in this country, is largely derived from vehicles, power generation and open cut mining of coal. We also note that there is little commitment by some of the world's major polluters to contribute to this effort and until they do, progress in the global reduction of atmospheric pollution is not likely to be significant. Nonetheless we think it is important for developed nations to create the example. That said, we need to understand and acknowledge that our direct contribution to the reduction of global greenhouse gas emissions can only be minimal and that significant global progress is not within our gift.

5. Our comments relate to the place of renewable energy in the generation, storage and transmission of electricity. Our submission is about what we know; and not about what we do not know.

6. In considering the relative state of development of, and the likely prospects for, economically viable electricity generation, storage and transmission from renewable sources, we believe it is necessary to benchmark against the presently available methods of power generation. We expect the Committee will have available to it comparative data specifying the basics of each of the major non renewables and the significant renewables. Some of this information has

been researched and presented by The Institute of Public Affairs (see the attached report). Our independent and wide ranging research confirms the data and conclusions of that report.

7. Unfortunately there seems to be very limited definitive and sufficiently authoritative information about renewable energy available to the public, and what there is, has not seemed to have caught the attention or curiosity of the press. This lack of knowledge is compounded by at least one State Government, namely the Victorian, whose Treasurer, for example, refuses to release a 2006 report from the Victorian Competition and Efficiency Commission that refers to that Government's policy on renewables; presumably because it does not support government policy. Another example is a 2004 report to the South Australian Government by Ernst and Young that is apparently negative about windpower and is not readily available.

8. In any situation where accurate information is not available, there is a real possibility that public expectations become, and may remain, unrealistic; with the deliberate promotion of commercial and political interests that may be based on deliberate misinformation and half truths, and thereby promote the misallocation of public assets. We believe this to be the case at present, particularly with the promotion of windpower. Therefore, the publication as early as possible and with the stamp of the House Committee, of a simple comparison of capital and operating costs and greenhouse gas emissions per unit of energy generated for each technology would make a major and most useful contribution to the public debate and resource allocation.

What Makes a Good Renewable?

We are of the view that the list of what makes a good renewable is relatively short and submit it is virtually limited to:

- the resource being infinite;
- the capacity to deploy being such that a significant quantity of power might be generated;
- a potential cost of production that is close to an energy price we can afford or are prepared to endure; a most difficult number to gauge;
- production being as continuous and steady as possible, so that the produced energy can be fully or largely used in the building of base load capacity to meet new demand, or to progressively replace power stations employing technologies or fuels that produce large amounts of greenhouse gases;
- flexibility to be turned up, down, or off in a relatively short period of time to allow effective grid management and grid stability;
- minimal effects on the landscape, wild life and the lives, livelihoods and assets of people nearby.

How Can We Simplify the Ranking of the Renewable Options?

We believe there are some facts which the Committee could easily establish which would simplify the inquiry and help focus attention on possible strategies for the medium term. We offer our thoughts on how the analysis might be simplified.

1. **Wave and tidal power** remain untested and uncosted for commercial scale operations. At this time neither of these technologies presents great conceptual problems, but there are substantial practical engineering matters awaiting definition, commercial scale trialling and optimisation. Until these matters are considered and real progress made, there can be no economic analysis, and therefore the likelihood of deployment on a significant scale appears limited in the mid term (10 to 20 years), perhaps explaining the current lack of research. **Trying to fit these technologies into the mid term context is at this time pure speculation.** Any present analysis of these two potential resources should probably, therefore, be limited to how much money to allocate to desk studies and pilot testing.

   Having reached that conclusion we note that these two resources have certain potential advantages in that:

   - the energy is truly renewable;
   - the scale, particularly for wave power, is substantial;
   - tidal is totally predictable and therefore easier to accommodate in the grid;
   - both these power sources are flexible, in that if the mechanical aspects are designed for the purpose, they can be harvested or not harvested at will; again a major factor in grid management;
   - there appears plenty of scope for locations that do not interfere with wildlife, landscapes, or with the lives, livelihoods and assets of people living nearby.

2. **Geothermal** – there are a number of companies that have recently been set up to test and, hopefully, to develop power from geothermal resources. Most of these companies have, or are in the process of, sourcing capital from the sharemarket. The capital available is sufficient to allow test drilling and, perhaps, trial energy extraction in the form of heat. The fundamental questions that need to be answered in respect of this resource are:

   - depth, temperature and areal extent of the hot rocks; this is a question the geologists and sharemarkets can be expected to sort out if the initial testing is positive; if it is we would still expect that it will take ten years of exploration to yield a reliable view of the significance of this source in our energy future;
   - derivative questions are basically engineering; for example the detail of the down hole interfacing of the fluid with the rocks to maximise the energy that can be extracted from a single borehole. this is more a question of adaptation and optimisation of related technologies rather than developing a totally new approach;
   - initial drilling and heat extraction trials could well establish some early economic data which will either fuel additional work or slow it down, but one could expect that meaningful economic data will start to emerge in the next one to three years.

   So, this is another untested and somewhat speculative resource and, because one has to go where the hot rocks are, needs to be operated on a large scale as it will most likely be expensive to link into the power distribution grids. At this stage this technology **cannot be considered as a sure and substantial contributor in the medium term,** but it does meet some useful criteria:

- production will be totally reliable and can be included as base load capacity;
- flexibility may pose a minor engineering challenge but in the end, may be as simple as stopping the fluid flow down the borehole;
- deployment would have a very limited effect on the environment, wildlife, and people nearby.

3. **Hydropower** is proven, clean and of known cost, but of limited expansion potential. It is, however, very flexible in that it can be turned up and down readily and quickly.

Such a simplification would leave us with solar and wind as the major deployable renewables in the short term (present to 10 years); and coal, gas and nuclear as the established and economically optimised technologies deployable in large units at a known cost and with known greenhouse gas emissions per unit of power generated.

In this context it is worth observing that Australia has enough coal, enough gas and enough uranium for these fuels to provide adequate power for many generations of Australians. This leads to some observations and questions.

Some Intermediate Observations and Questions

1. A proper question is: if we have enough fossil fuels why not take our time to evaluate and research the more expensive renewables before deploying them? Surely the answer is because renewables do not, at the macro level, produce greenhouse gas; and we want to be, and to be seen to be, acting responsibly in the abatement of greenhouse gas. The good global citizen argument. Alternative conclusions include we are "saving" our not so scarce fossil resources (but for what and for whom?), and/or to the generally held view of the inappropriate nature of nuclear power generation in Australia.

2. Clearly if sources of energy are not the fundamental problem, then it is reduction of greenhouse gas emissions, not the renewability, of energy that is the short and medium term problem. It just so happens that renewable energy resources do not, prima facie, produce greenhouse gases.

2. Thus for Australia, one could say that the need for (perpetually) renewable energy is "tomorrow's" problem. Reducing greenhouse gas emissions is "today's" problem.

3. We observe that this somewhat obvious fact should allow us to place some kind of time frame on the evaluation and deployment expectations for renewable energies. A very clear statement of this fact could be most helpful to the debate.

4. Thus we now have **three** proven, and costed technologies, each based upon a fuel that is in adequate supply, namely coal, gas and nuclear; and **two** developing and, as yet, expensive technologies, namely solar and wind, both infinitely renewable, and both, more or less, greenhouse gas efficient and potentially **three** "experimental" technologies including wave, tidal and geothermal hot rocks with some potentially very attractive characteristics. We choose to make no comment on hydrogen power as we are not adequately informed.

5. It appears to us that the challenge is to focus on how we can maintain power supplies, keep cost increases to a minimum, and decrease greenhouse gas emissions per unit of electricity generated.

So What About the Two Known and Currently Deployable Renewables?

1. **Solar Power's** characteristics are well understood, but to allow a comparison with wind, they are summarised below:

   - solar is expensive, but costs are known and likely to decrease;
   - it is suitable for deployment on any energy consuming building: houses, offices, factories, etc.;
   - there are no distribution costs with this form of deployment;
   - there are no environmental nor significant visual impacts with deployment on buildings;
   - it does not cause major grid management problems as much of the energy generated is used at the deployment site;
   - it can typically meet a significant proportion of the energy needs of most households; no doubt the Committee will have access to good data on this;
   - it produces no greenhouse gas;
   - it is simple and safe;
   - it enhances, in a small way, the value of property on which it has been installed;
   - since in building applications it is principally used for temperature control and to heat water, it actually allows energy to be stored in a useful form (heat) and then used on an as required basis over a twenty four hour cycle, this is a very important advantage;
   - improvements are continuously being made in energy collection and therefore in cost;
   - it does no harm to wildlife or neighbours.

   One can therefore conclude that subsidies for solar installations on dwellingS, office and other buildings could have a large and growing effect on the reduction of greenhouse gases.

   The deployment of solar generating facilities in large industrial scale installations will no doubt be the subject of submissions by others, but putting present costs aside, such installations may be placed quite readily in areas where there will be minimal disruption to landscape, wildlife, people and property values. Also the energy output from industrial deployments will be at the right time in the 24 hour demand cycle, predictable, and much easier in terms of grid management.

2. **Windpower** is an appealing concept, but in many ways a practical disaster. Its characteristics are not understood by the press and the public, and are ignored by some state legislatures trying to meet what appear to be excessive and self-imposed MRET's. To summarise:

- windpower is expensive, and costs are unlikely to show substantial reduction through major technical breakthroughs;

- windpower is an unreliable resource and contributes virtually nothing (typically 8% of its rated capacity) to the building of base load;

- windpower is totally inflexible and unsuitable for peak load use;

- windpower creates major grid management difficulties,

- unlike building-based solar, windpower requires new collection and transmission infrastructure;

- windpower is a consumer, as well as a producer, of power (see attachment).

- **windpower is a failure as a significant net reducer of greenhouse gas**, principally because of its intermittent nature; ie., when the wind blows the generated power has to be accepted into a grid (grids have no storage capacity and are not likely, without extraordinary technical advances, to be different in the medium term).

  To meet this influx of wind energy the grid manager therefore needs to reduce intake from other generators at very short notice. The main back-out option is hydro power, which is cheaper than wind and is produced with no greenhouse gas emissions. Therefore there is no net reduction in greenhouse gas emissions and an increase in the cost of power. If a gas generator happens to be running it is backed out next, but gas is cheaper again and, compared to coal, a relatively low producer of greenhouse gas. Coal driven generators cannot be turned on or off in real time. if power derived from coal has to be backed out of the grid, the steam that is generated from coal combustion and drives the turbines, is vented to atmosphere but the coal keeps burning and generating greenhouse gas;

- windpower destroys landscape values;

- proper scientifically designed trials of wind facilities in the US have shown it is much more lethal to birds and bats than random and badly constructed "trials" have heretofore indicated; and it certainly is in conflict with our international agreements with, for example, Japan and China on protection of migratory species;

- windpower causes great hardship and anxiety for residents near wind facilities by the creation of a totally overwhelming and foreign industrial man-made environment where people have previously enjoyed living and working in rural landscapes largely unchanged since early settlement;

- windpower creates serious health issues including: shadow, light flicker, vibrations, noise, etc. for those living nearby;

- windpower causes destruction of property values or the rendering of properties unsaleable. Specific data is now appearing in Gippsland indicating property devaluations of around 35% to 40% as being typical.

We calculate this level of damage as applying for at least some 5km around a turbine tower. For a simple model of a multi-tower facility being enclosed in, say, the equivalent of a five km. diameter circle, then the affected area would amount to 157square km. or 15,700 hectares. If the land is worth, say, $5000 per hectare, then the destruction in value of surrounding property is, at 35%, some $27.5 million. This is an **appalling cost to the neighbours** for which it appears there is no redress.

Reductions of this nature whilst being clearly inequitable, cause corollary problems including halting of any planned infrastructure improvements, disrupting generational change so important for rural families, producing severe depression amongst farming families and will, as the banks become aware, reduce significantly with the deemed value of security held by a farmer's bank.

- Windpower conflicts with water supply through interference with aquifers: rows of turbines and their 1,000 tons of concrete foundations are now proposed to be sown into various Western Victorian volcanic aquifers, even around the (water) recharge areas. Given the fractured basalt nature of these types of aquifers, it highly likely that the insertion of large structures will seriously affect the springs and bores that arise from these very valuable water resources.

- The conflict between those accepting (for money) this "modern" form of industrialisation of rural communities, and those who resent their loss of amenity and capital, has divided these communities in every development or proposed development in a very profound and unpleasant manner.

Our submission in relation to windpower is simply that it is of little or no value as a generator of readily useable power, it is not a significant contributor to the reduction of greenhouse gases, it is destructive of wildlife, landscape, rural communities and peoples' health, amenity and assets. We submit its deployment should be halted and delayed until means of managing these substantial negatives can be developed.

A Suggested Framework

We conclude that for an intermediate period, say up to twenty years, our **options** are limited to: cleaner coal, the use of much more gas to materially reduce greenhouse gas emissions, and ultimately nuclear, all complemented with as much solar as is possible.

There are simply no other solutions. So a national plan might include the following.

1. No new coal generation plants to be built until their greenhouse gas emissions are cut to those of gas generators.

2. Existing coal plants to be "taxed" unless they meet targeted greenhouse gas reductions through using clean coal or by fitting gas burners or any other improvements that might arise.

3. All new base load generators in the medium term to be gas.

4. Recognise that in the absence of a major new technology, the major portion of base load, in practice, can only be met by coal, clean or otherwise, and/or nuclear energy and develop strategies and plans to fit this reality.

5. An absolute minimal power requirement priced at network figures should be set for households and buildings, with conservation and building solar units promoted by any power consumption above the base minimum being charged at a much higher rate.

6. Windpower, if we are to have any at all, to be located offshore or in remote locations.

7. Educate the public about energy, energy costs and greenhouse gas.

8. Try to formulate a progamme and a timetable to manage the annual rise in energy costs to, say, 5% to 7% per annum real.