Submission to *House of Representatives Committee on Aboriginal and Torres Strait Islander Affairs*

Inquiry into developing Indigenous enterprises

from Dr. A. Barrie Pittock, PSM

Biographical note: I was active in Aboriginal rights in the 1960s through the 1980s, principally regarding Aboriginal land rights and development, first with the *Aboriginal Scholarship Scheme*, then *FCAATSI* and later the *National Tribal Council*. I am trained as a physicist and worked for CSIRO in atmospheric and climate research from 1965 until my official retirement in 1999. Since then I have been a CSIRO Honorary Fellow and have written two books on climate change, one for the Australian Greenhouse Office in 2003, and one for CSIRO Publications in 2005. I was awarded a Public Service Medal for my work on climate change and have contributed to each of the four major reports of the *Intergovernmental Panel on Climate Change*.

Summary of submission: The need to reduce emissions of greenhouse gases because of climate change has raised the importance of increasing the use of renewable energy. With a carbon emissions trading scheme putting a price on fossil-fuel based energy, renewable energy will become more competitive and improved technology is being developed.

This creates a great opportunity for Indigenous communities in remote areas of Australia to develop renewable energy sources for their own use, and perhaps equally importantly, provides an economic base for remote communities including employment and training opportunities and income.

Large-scale renewable energy sources such as geothermal, solar thermal, solar photovoltaic, wind turbines and tidal installations could be developed by outside interests in close proximity to many Indigenous communities in order to export electricity (or even hydrogen or other energy carriers), with programmes to train and employ local people, and with royalties or rent going to those communities. This is possible with modern electricity transmission grids, including the use of dedicated high voltage direct current cables which have low energy transmission losses over large distances (e.g., the Basslink cable).

Such systems will be needed to connect remote energy producers such as the geothermal developments in the Cooper Basin to electricity markets. This is foreseen in the Garnaut Draft Report, Chapter 17, which advocates the financing, possibly via the Building Australia Fund, of a high-value national electricity transmission infrastructure to optimize the use of renewable energy.

I suggest that the design of such an energy infrastructure should include consideration of the location of remote communities where employment and income might be generated. Further, this possibility suggests that developers of renewable energy in remote Australia

should be encouraged to liaise with local communities with a view to suitable locations and the provision of training and employment programmes.

Detailed Submission

First Term of Reference

I will not comment on existing enterprises and support for them (as I am not very familiar with these), other than to note that The Bushlight programme, run under the auspices of the Centre for Appropriate Technology (CAT), works in remote areas of central and northern Australia, to facilitate the development of local renewable energy supplies to provide refrigeration, power and light. The map below indicates that they have worked in about 100 remote communities. They install local renewable energy units and train local people to maintain them. Bushlight, as part of CAT, is governed by an Indigenous Board and it would seem to me might be a good entry point to consultation with Indigenous communities regarding the possibility of developing larger installations that could export energy via a grid connection. Further details and contacts are available on the website www.bushlight.org.au. (I hope to consult them before submitting this submission, but the deadline is close.)

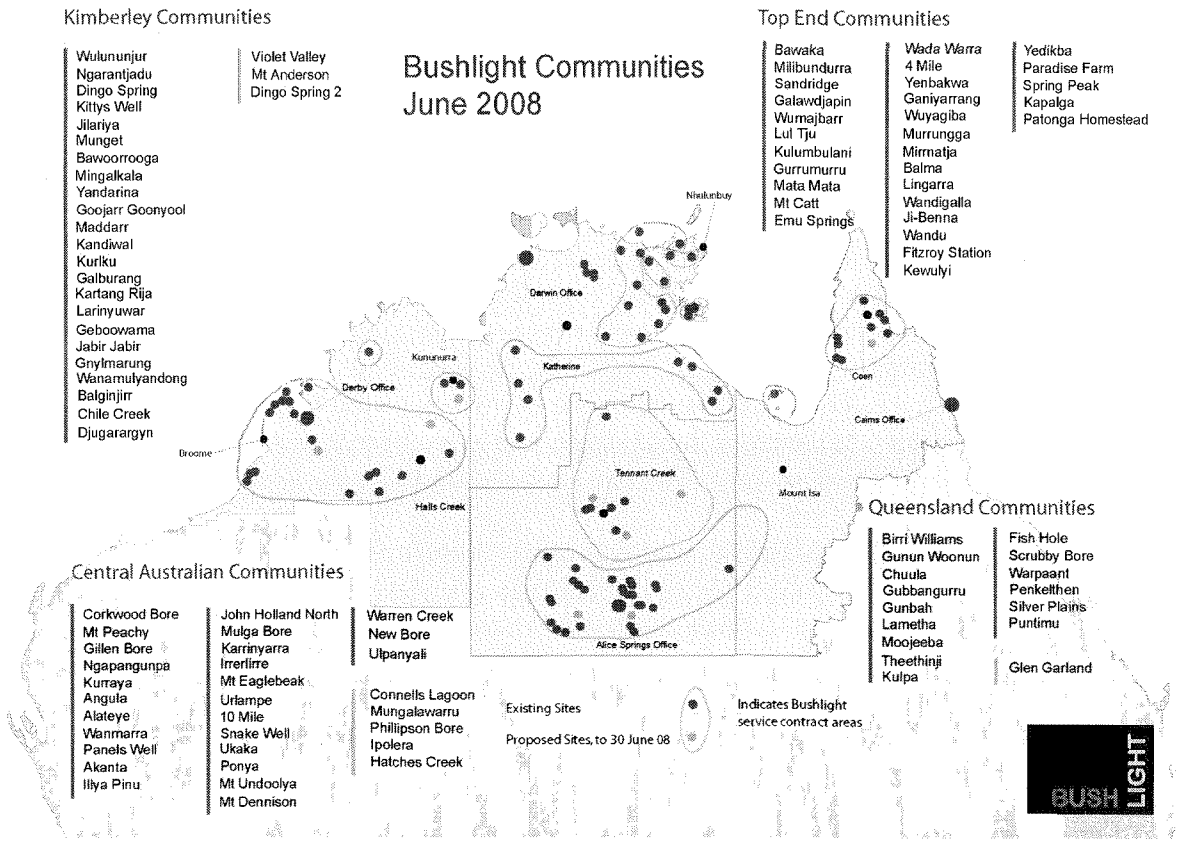

Figure 1. Map of remote Indigenous communities serviced by Bushlight.

Second Term of Reference

The main commercial advantage I see in these communities is their location in, and in many cases their land rights over, large areas where renewable energy potential is large, indeed the largest in Australia. They also have local and growing populations in these areas who are familiar with the land and who want to stay there, so that they are a potential source of reliable labour and local enterprise. Such development would be of great value to these communities as they often have large rates of unemployment, with social problems accentuated by lack of work and sense of purpose, especially for the men who would in other circumstances find satisfaction in providing for their families.

Figure 2 serves to indicate the potential for solar energy energy developments in these remote areas. Note how the most intense incident solar energy overlaps with the communities indicated in the map from Bushlight.

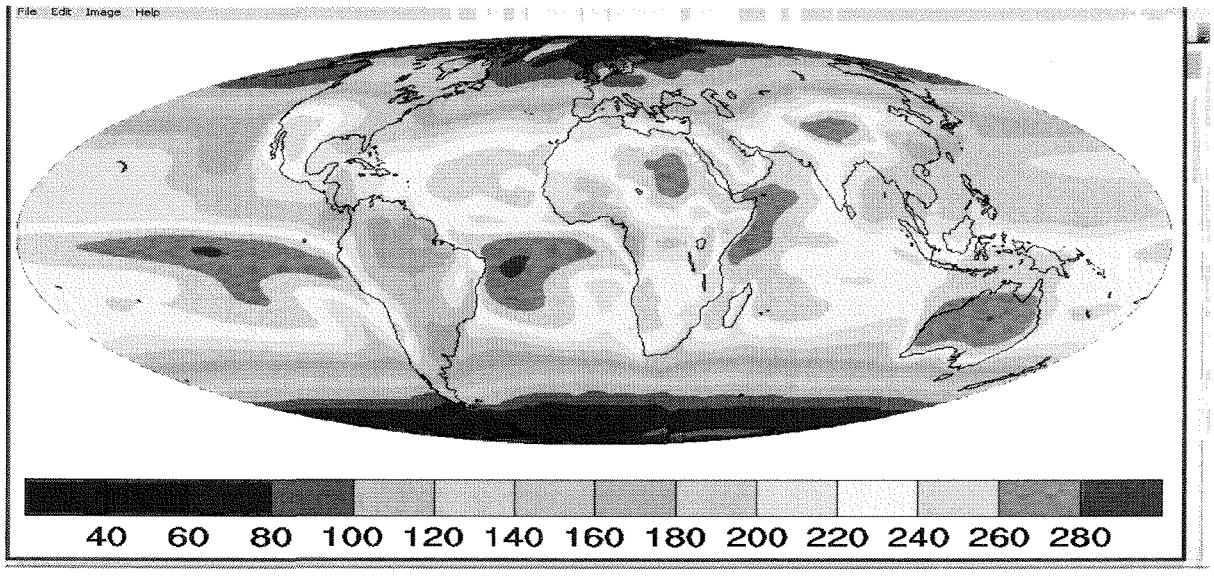

Figure 2. Global map of annual average solar energy in Watts per square metre, courtesy of NASA & Martin Dix (CSIRO). Note the high energy density over inland and northern Australia, providing one of the greatest sources of solar energy over land anywhere on the globe.

Similarly, Figure 3 shows the potential for geothermal energy resources across Australia. Again, note that most of this is located in remote areas, some of which overlap with the remote communities in Figure 1.

Clearly, with climate change being generally agreed to have been accentuated by global emissions of greenhouse gases, of which carbon dioxide from fossil fuels is a major contributor, there is an increasing imperative to develop renewable energy supplies as one way of reducing emissions. Indeed, the prospect of an emissions trading scheme,

with an increasing price on carbon emissions, means that solar and geothermal power are becoming increasingly competitive with coal and oil.

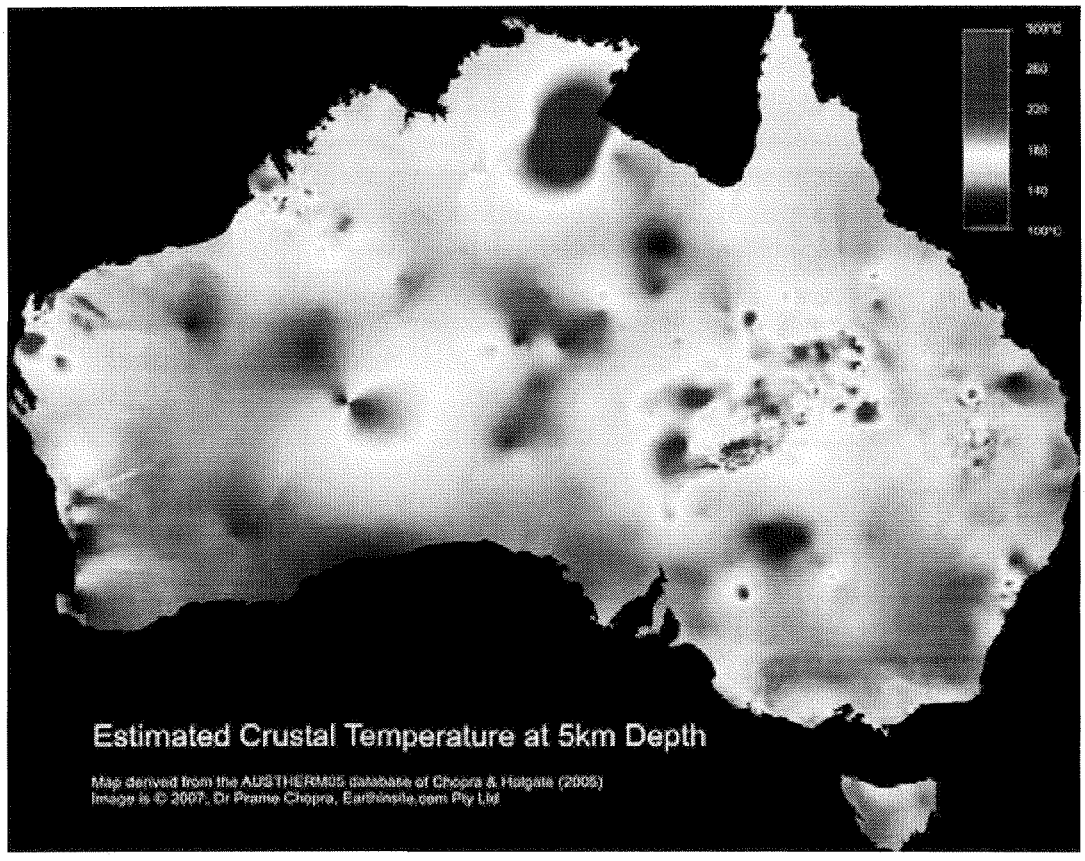

Figure 3. Estimated crustal temperature at 5 km depth. This is an indication of the potential for exploiting geothermal power.

Geothermal energy is already well on the way to development in Australia with companies such as Geodynamics Ltd. (at www.geodynamics.com.au), Torrens Energy (at www.torrensenergy.com) and Petratherm (at www.petratherm.com.au) working on preliminary drilling and site testing. They are planning to link their geothermal sites by high voltage cables to users, either with conventional alternating current cables, or with high voltage direct current cables that have low losses over long distances but higher costs for terminals. These have the potential to provide network connections across large areas of interior Australia, as shown in Figure 4 from Geodynamics Ltd.

Similar prospects further north provide the hope that a national grid could be constructed, along the lines suggested in the Garnaut Draft Report, Chapter 17 (see at www.garnautreview.org.au) , which advocates the financing of a high-value national electricity transmission infrastructure to optimize the use of renewable energy both by connecting remote sources and by smoothing out fluctuations in supply through greater connectedness.

Such a grid could be expanded to reach Darwin and even extended via an undersea cable such as Basslink to join up with the Indonesian power grid, thus enabling electricity to be exported to Indonesia and further north. This is advocated in more detail by Desertec-Australia, or "Clean power from deserts" (see, www.trec.net.au) which is allied with the group TREC or Trans-Mediterranean Renewable Energy Cooperation (see www.trecers.net) that has recently had its proposals heard by the European Parliament . These proposals are to be investigated by a group of countries surrounding the Mediterranean Sea. Under TREC's proposals high voltage DC cables would be used to link renewable energy sources across Europe, North Africa and the Middle East to supply Europe with electricity and the other states with desalinated water from surplus electricity generation in off-peak periods. Such a prospect in Australia holds enormous potential for employment and income in remote parts of Australia.

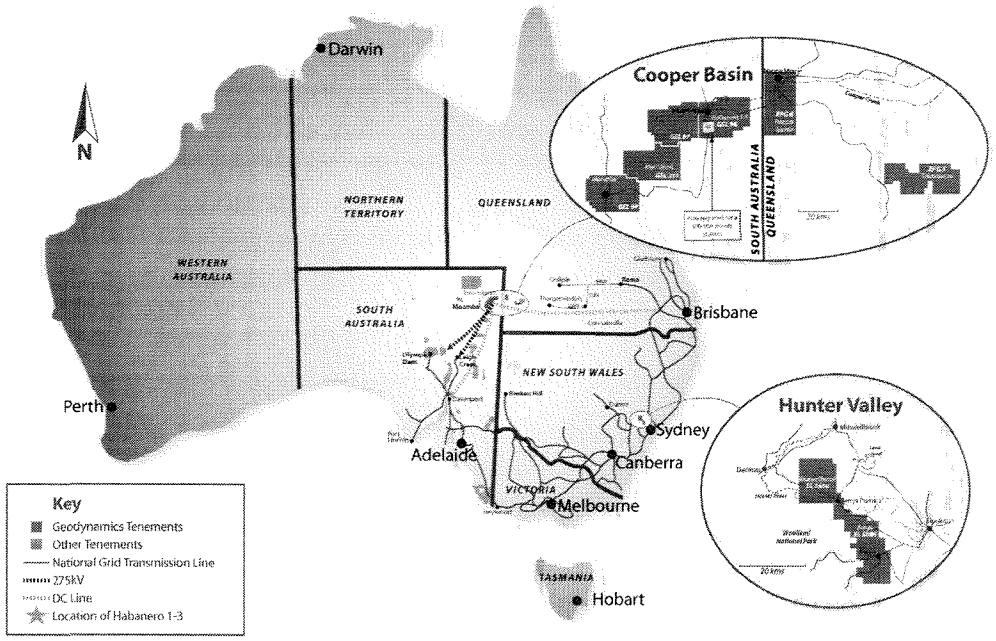

Figure 4. Geodynamics Ltd.'s proposal to link its geothermal power generation to markets in southern and eastern Australia via an extension of the electricity grid.

Third Term of Reference

I have no information on this, and so have no comments.

Fourth Term of Reference.

i). Clearly existing or proposed remote non-Indigenous renewable enterprises should be encouraged or required to provide training or apprenticeships to local Indigenous people to be employed preferentially as staff in manual or better in skilled jobs of maintenance and construction.

This obligation might be related to land rights and a social responsibility ethic, and there are good precedents with several mining enterprises on Aboriginal land giving preferential treatment to employing local people. The new geothermal enterprises should be encouraged to adopt similar practices.

ii. It would be good to build on existing small-scale renewable enterprises such as those sponsored by Bushlight in more than 100 remote communities, with a view to them expanding to export energy, and to be the skills base and existing link to local communities.

iii. Explore with the existing large-scale industries the needs for and ways to link remote areas to electricity grids via conventional or high voltage DC cabling so as to increase opportunities for local communities to export energy. This should be part of a long-term plan to facilitate remote energy generation nationally as a response to the need for reducing carbon emissions, as proposed in the Garnaut Draft report.

iv. Examine the role of carbon emissions trading and other incentives in making remote renewable energy generation and export to the grid more economic.

v. Explore with biochar experts the potential role of this means of providing energy and fertiliser using bio-wastes, for application in remote communities. This involves the pyrolysis (heating without oxygen) of organic waste (including sewage and domestic waste) providing energy in the form of hydrogen or methane gas, and charcoal for use in the soil of market gardens as a fertilizer. This may prove to be highly suited to new small-scale development in remote communities. See www.biochar-international.org. See also www.terrapreta.bioenergylists.org. Australian contact: Dr. Stephen Joseph, Materials Science, UNSW.