**From:** reg brownell |
**Sent:** Thursday, 31 May 2007 4:33 PM
**To:** Committee, ISR (REPS)
**Subject:** Inquiry into non fossil fuel energy

Submission No: 6

To:
The Committee Secretary
House of Representatives Standing Committee on Industry and Resources

Inquiry into developing Australia's non-fossil fuel energy industry

From:
Reg Brownell
24th May, 2007

My background includes a Masters degree in Economics; a career in the private sector including many years as a CEO; and experience as a director of several companies and not for profit organizations. My particular interest in this Inquiry stems from my membership of the Victorian Landscape Guardians, but primarily from my concern for the wellbeing of Australia and of the environment.

This Inquiry offers a critical opportunity to address concerns about greenhouse gases emissions in an organized and thoughtful manner. It would be no exaggeration to note that efforts to date in Australia and globally have been ad hoc, uncoordinated and have dismally failed to meet targets.

What is the purpose of this Inquiry?

It would be most desirable if the ambit of this enquiry were to include all measures which can have a bearing on reducing greenhouse gases [GG]. There are many initiatives in addition to non fossil fuels which have a huge impact on GG emissions [GGE]. The programme required in Australia must be capable of achieving major reductions in GGE and doing so in the most efficient way in order to minimize negative economic impacts.

What is needed?

This can only be done with a coordinated programme which includes all those elements which can contribute most effectively. Those measures finally selected for attention must be those which deliver the greatest reductions for the smallest financial outlay. This is of course modified in the short term by emphasizing those initiatives which can effectively reduce GGE in the immediate future. It is also modified by the need to recognize that changes in technology and investment in these will bring new and better means of reducing GGE in the medium and longer term.

Additional factors to be addressed for any programme to work must include an on going review, measurement and accountability process. This means reductions in GGE must be measured as must also be the cost of these measures-both capital and operating. In developing such measures it is imperative that measurements are "global". i.e. Reductions in GGE must be net and costs must include the consequential and opportunity costs as well as the costs directly required. The absolute focus must be on the cost per tonne of net reductions in GGE.

The other measures which must be clearly established as a benchmark are the current sources, volumes and pattern of power and fuel use. If these are better understood, it

2.

must assist in determining the most effective ways of reducing GGE and also enable improvements to be measured against meaningful benchmarks.

A list of those initiatives which can be explored and evaluated includes those I have noted below. You will see that I have not included market mechanisms such as carbon credits and carbon trading as these are only a means of stimulating or influencing behaviour, much as has been the purpose of MRET. They do not provide in themselves a physical means of reducing GGE.

Sources of power which are GGE "free":
Hydro
Solar
Wind
Wave
Tidal/current
Geothermal
Nuclear
Ethanol, biodiesel and other biofuels
Wood
Other?

Other means of reducing GGE:
Substitution of more polluting fossil fuels by those with lower GG levels. eg gas for coal.
Cogeneration by industry-capturing heat energy created in manufacturing and other activities.
Carbon dioxide sequestration
Develop technology to convert CO2 into fuel [pilot project in hand in Latrobe Valley].
Hybrid cars
Reduce air and road freight in favour of shipping and rail.
Reduce private transport in favour of public transport, cycling and walking.
Discourage first and business class air travel in favour of economy class.
Use office, factory and residential heating and cooling to ameliorate extremes of heat and cold rather than to maintain absolutely optimal temperatures. [dress to compensate]. Install smart lighting systems.
Update all lighting to replace incandescent with fluorescent, light emitting diode [LED] etc.
Building design to improve insulation properties-insulation, less glass, double glazing, orientation of buildings and tree cover.
Improve traffic management to enable freer traffic flow with less stopping/starting.
Smaller cars
Less powerful cars
Somehow increase use of clotheslines and reduce use of tumble dryers.
Replace or upgrade old fossil fuel power stations.

3.

Upgrade electricity and gas distribution networks as necessary to reduce transmission losses.
Improved waste recovery and recycling.
Other?

Specific comments.

I note below a few observations and examples which hopefully provide a pointer to the sort of comprehensive analysis needed to avoid a lot of waste, non effectiveness and even mere symbolism in the quest to reduce GGE:

Solar:

At present this is a very costly answer. Recent developments to enable much lower cost silicon panels and other new technology will undoubtedly change this. After all, solar is the original or direct source of power. With the exception of geothermal, all the other sources we use are secondary sources, derived from the energy of the sun.

However, the capture of solar energy by households [and other] to simply produce hot water is very cost effective. As I understand it this application is little used because it does not readily fit in with existing domestic power supply and it is not actively promoted or encouraged. Instead, the promotion of solar for home use is focused on the installation of PV solar panels which are not a rational or affordable proposition for most households at present.

Mobile directional traffic signs have traditionally used diesel generators as a power source to enable them to operate remote [not attached to the power grid]. The majority in Australia still operate in this way. However, a significant number now use LED. LED requires less power than the former incandescent and enables these units to be powered by a battery which relies on a solar panel. It is cheaper to use and virtually eliminates GGE from this application.

Wind:

Most of the financial support and effort relating to the use of renewable energy [excluding the well established hydro industry] has been centred on wind power, facilitated by MRET, so I will devote some more attention to this subject. I can only conclude that the adoption of wind in preference to others is due to a number of peculiar conditions. On any reasonable, independent evaluation it is unarguably a hugely expensive way of reducing GGE. It has the advantage of physical presence in the form of massive wind towers and turbines. In the absence of effective measurement of performance, it gives the appearance that something is being done. Also it does not become a drain on Government resources. The community pays for the much higher cost of wind power through higher power charges/costs.

Public claims regarding the contribution of wind power always state that they will supply the power needs of X number of homes. However, this conveniently overlooks the fact that this is only for something like 30% of the time [when the wind is blowing at



an appropriate speed]. For the rest of the time it actually draws power from the grid and the houses it claims to supply rely for the other 70% on fossil fuel power.

The amount of power generated by wind varies by the cube of the wind speed. Thus, when the wind speed drops away, the drop in power output is dramatically magnified. The industry and others who support wind power always use the installed capacity of a wind turbine installation-ie X turbines with a capacity of say Y kilowatt
hours. This is in fact the rated capacity at optimal wind. For the reasons I note above, it is not indicative of its actual contribution to the power grid which is much lower.

Wind almost always fluctuates, often substantially. The resulting intermittent supply of power to the grid is difficult to accommodate. This difficulty increases more than proportionately as wind power increases as a proportion of the total supply capacity. It also poses onerous system control problems when located at the extremities of the grid.

The effectiveness of wind turbines is questionable at very high wind speeds and high temperatures.

Because the availability of wind power cannot be forecast, it must be backed up by other sources of power. There are several implications. The first is that when substantial wind installations are added to the system to meet growing power demand there must be an almost matching expansion of alternative [fossil fuel] generators to ensure that backup is provided without the risk of power blackouts or brownouts. Therefore, when we look at the capital cost of wind turbines we must add the cost of the back up generators because this reflects the true cost to the community of the wind power installation. The second implication results from the need to "warm up" a fossil fuel generator before it can effectively produce power. This takes much longer for coal [many hours] than for gas. However, whichever source is used as backup, when wind power is being generated, a fossil fuel generator must be actively running and generating GGE even though it is in

spinning mode, not generating-ie on active standby. This has two effects. First, there is a cost to this fruitless activity by the fossil fuel generator. Second, the GGE savings achieved by the use of wind power is very significantly offset by the GGE which must unavoidably be produced by the back up plant.

One of the major power distributors in Germany is EON Netz. It has about 7,000 wind turbines within its power supply sources. In 2005 EON published a report dealing with a review of their performance and experience. This included their findings about the impact of wind power. Despite the fact that they had the use of some 7,000 turbines, their conclusion on the basis of observed data was that there was no significant net reduction in GGE attributable to wind power. Their report illustrated why this was the case. So. Two conclusions: Despite the massive investment of many billions of dollars no significant benefit was achieved in reducing GGE. Arguably, the vast bulk of the population would still believe that their support for wind power was making a real difference. There have been several other reports such as for Ireland which arrive at a similar conclusion.

5.

What is the key message?

The sole goal is to reduce GGE and to do so with maximum cost effectiveness and on as large a scale as is reasonably sustainable. We certainly cannot afford to squander resources, so the choices we make are critical!

We need to know the real ["global"] cost of each of the alternative means of reducing GGE. That is the $ cost per tonne of GGE saved per annum. These costs need to include secondary effects and unintended consequences. For example, the construction of a new plant in a sensitive area may have a negative effect on tourism
which in turn has a negative economic impact. It represents a real cost which should be recognised in assessing overall costs. Similarly, the costs of decommissioning plant at the end of its useful life needs to be provided for.

We need current benchmarks, clearly stated and measurable goals and finally we need a process for regularly and publicly reporting on the actual outcomes in reductions in GGE and the cost of achieving these compared with our goals. We cannot afford "partial" solutions or anything less than rigorous accountability. To the extent that you rely upon the power industry for your primary input without subjecting it to intense scrutiny and at the same time actively seek independent and informed input, experience to date would suggest the conclusions you arrive at may be far from being in the best interests of Australia, nor its contribution to this global issue.

Reg Brownell

4/06/2007