Submission to Senate Inquiry into Rural Wind Farms

Prepared by:

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10 February, 2011

To

Department of the Senate
PO Box 6100
Parliament House
Canberra ACT 2600
Australia

Dear Sir/Madam

I would like to submit the following information in support of the development of wind farms in Australia. Some personal views are below, followed by the excellent submission information provided by Friends of the Earth.

As a sustainable energy systems engineer, researcher and educator for over 30 years, I have been involved in many aspects of the development and application of renewable energy and energy efficiency in Australia, including policy development. Wind energy is a crucial part of the mix of clean renewable energy technologies that we need to use to transform are economies from polluting fossil fuels to clean renewable fuels.

Need for a Rapid Transition to Renewable Energy and Energy Efficiency

Over the past two decades, It has become clear that the continued use of fossil fuels is unsustainable, even with the adoption of 'clean coal' technologies, as these fuels are polluting the climate systems (the lungs of the Earth) and many of Earth's other ecological systems as well (Gore, 2009). Neither "Clean Coal" technologies, nor nuclear power generation, can provide the emission reductions in the time frame required to halt catastrophic climate change resulting from CO2e levels greater than 450ppm or global average temperature increases of more than 2oC. Only renewable energy technologies together with energy efficiency technologies, systemic and behavioural changes, can be scaled up in time to address the problems that our over-consumption of fossil fuels have caused (Diesendorf, 2007; Gore, 2009).

Hence, there is a need for Government to set a strong renewable energy target, in addition to targets for improved energy efficiency. This can bring about a rapid transition in our energy supply and demand management systems, while reducing the future costs of climate change as outlined by Stern, Garnaut and others (Stern, 2006; Garnaut, 2008). These costs to Australia are potentially enormous, as seen in the recent extreme climate events around Australia. Now and in the future, there is greatly increased probability of the loss of tourism to the Great Barrier Reef and Daintree rainforests now a very high probability as these ecosystems deteriorate.

Although climate change policy has become the key driver for energy policy change, there are other important reasons to swap from fossil fuels to renewable energy and energy efficiency for both electricity generation and transport fuels. These should not be overlooked and include:

- The peaking of global oil supply – Some energy analysts suggest that this is either imminent or may have already occurred (ASPO; Diesendorf, 2007:189; Gore, 2009:18). While significant coal, oil and gas reserves exist, it is becoming increasingly politically, socially, economically and environmentally irresponsible to extract and use these fuels (NRDC, 2010).

- All fossil fuel use is polluting – On-going large scale impacts include:

- The massive oil spills currently in the Gulf of Mexico, but also on-going and largely unreported spills in the Amazon and Niger River basins (Strahan, 2010)).
- The massive cloud of atmospheric pollution that now travels across the Pacific Ocean from China to Los Angeles and beyond, resulting from the rapid industrialisation of China and the uptake of the private motor car.
- Health impacts and costs of air pollution levels over Australian Cities, mostly from motor vehicles. A CSIRO study in 2007 found: "The cost of air pollution to Australia is already high. The human health cost is estimated at between A$3 billion and A$5.3 billion every year, and annual damage to materials, property and buildings is between A$3 billion and A$5 billion – one per cent of gross domestic profit (GDP). Cars are the biggest cause of air pollution." (CSIRO, 2007).
- A 2005 study by the Department of Transport and Regional Economics states: "This study estimates that in 2000 motor vehicle-related ambient air pollution accounted for between 900 and 4500 morbidity cases—cardio-vascular and respiratory diseases and bronchitis—and between 900 and 2000 early deaths. The economic cost of morbidity ranges from $0.4 billion to $1.2 billion, while the economic cost of mortality ranges from $1.1 billion to $2.6 billion." (Dept. Transport and Regional Economics, 2005).
- Loss of productive farmland to coal mining and gas/oil extraction. This is emerging as a huge political problem as farmers across the Darling Downs and other parts of Australia confront the loss of their land to overriding mining rights. There is now a rapidly growing protest movement in both the Hunter Valley of New South Wales and Queensland's Darling Downs (See Friends of Felton www.fof.org.au)

- Political security – A large scale shift to renewable energies as the main energy supply reduces the likelihood of conflict over future access to oil and gas supplies and resulting pollution. The US Natural Resources Defence Council website states: "The oil disaster in the Gulf of Mexico graphically demonstrates the dangers of our dependence on fossil fuels" and " To date, we have chosen to rely primarily on fossil fuels to meet our energy needs, but these fuels have tremendous short-term and long-term consequences, from oil spills to mining disasters to global warming. Yet even beyond environmental and health impacts the national security implications of our energy choices are among the most controversial and political." (US NRDC, 2010). Military leaders are also recognising the threats of continued oil dependence and climate change on their operational abilities and are seeking to increase their use of energy efficiency and renewable energy technologies (Dept. of Defence, USA, 2010).
- Equitable availability of energy – Renewable energy resources are distributed around the globe with most countries having access to a range of these resources. More importantly, the resources are also available to the poorer developing countries. For example, many are in equatorial regions with greater levels of solar energy. The resource can be used once suitable technologies are available. This is now the case, with renewable energy technologies being available on large and small scale, and from simple to complex. For example, solar thermal or photovoltaic technologies are already providing heating/cooling and electricity to millions. Simple solar cookers are alleviating the need to collect firewood for many poor people in developing countries.

Public Support for Renewable Energy, Not for more Coal!

There has been strong, ongoing support for renewable energy for many years in Queensland. As far back as the early 1990s , public opinion surveys conducted on behalf of the Queensland Electricity Commission (QEC) showed overwhelming public support for renewable energies and energy efficiency as the preferred future supply options.

Regarding the power sources suitable for Queensland, the 1994 QEC survey found:

"The majority of respondents (95.5%) think that energy efficiency is the most suitable power supply strategy for Queensland. This was followed by solar power generation which was considered suitable by almost ninety percent (89.9) of respondents. All measures investigated received at least around fifty percent rating of suitability with the lowest rating being coal and gas turbines." (REARK, 1994).

More recent surveys show similar trends with ongoing high public support for renewable energy technologies. "The highest mean level of support, by a substantial margin, was for solar power and wind power, both eliciting a mean 'moderate' to 'strong' support." The lowest support was for oil, nuclear and coal (Ashworth, 2008).

This survey data shows that Government should not fear voter backlash over action on climate change, particularly if energy generation cost increases are offset by energy efficiency.

Governments, however, have largely ignored this support till more recent elections because it wasn't a vote winner or loser. This was largely because:

- In past decades the public was less well informed on climate change and other issues regarding fossil fuel use.
- Renewable energy and energy efficiency industries were small with limited lobbying power, unlike the fossil fuel industry, which has lobbied actively and succeeded in delaying climate change action (Pearce, 2009 & 2010; Hamilton, 2007).
- Few marginal seats depended on votes over this issue.

However, with high degree of scientific certainty over climate change and voters swinging to the green vote, this situation has now changed with the public demanding action on climate change and support for renewable energy and energy efficiency. It has now become a major election issue, particularly in marginal seats. The recent demise of Prime Minister Kevin Rudd is a direct result of his lack of ability to act on climate change and support renewable energy industry expansion.

I am currently working with farmers on the Darling Downs, west of Brisbane which is some of Australia's prime farming land. These farmers and their land are now under threat from coal mining and coal seam gas extraction, as mining legislation overrules all other land rights. This is absurd and archaic. These farmers want renewable energy systems on their properties to complement their income from farming. This includes wind farms. This is possible and now done successfully in many parts of the world. The modern wind energy industry is the direct result of farmers cooperatives in Denmark building their own wind farms. By comparison, coal extraction is not compatible with farming. Given that Australia has so little fertile land with reasonably reliable rainfall (roughly 2 percent of our land area), such as the Darling Downs, this is even more absurd.

Finally, I would like to point out how biased the need for an inquiry into wind farms is. Why not inquire into every form of energy generation and compare the benefits and disadvantages of all forms of energy, including coal mining and other forms of fossil fuel. When this is done objectively, it is very clear that there are many advantages to a renewable energy and energy efficient future.

The future lies in decision makers hands such as yours. I only hope you have the depth of knowledge, wisdom and foresight to make the right decision for future generations.

Regards

Trevor Berrill

Response to the Social and Economic Impact of Rural Wind Farms

Please accept my submission, prepared by Friends of the Earth, to the Senate Inquiry into the Social and Economic Impact of Rural Wind Farms.

With what we know about climate change and the need to greatly reduce our greenhouse emissions this decade, it is clear to me that we will need to move away from our current reliance on coal and other fossil fuels to meet our energy needs as soon as is humanly possible.

The good news is that we already have the technology to do this. The facilitation of a massive roll-out of renewable energy across Australia will be essential if we are to have a hope of reducing our emissions sufficiently to have a chance of avoiding dangerous climate change.

Wind is currently the most advanced and cheapest option for us to begin the transition away from coal. Well planned wind energy projects must be a cornerstone of this new renewables industry.

Wind energy is of great benefit to communities in regional Australia and is already producing a considerable job yield and also direct financial support for many farmers and other land owners. In 2009-10 alone, wind energy in Australia generated almost $1.6 billion in investment (Bloomberg, New Energy Finance, 2010). The wind industry is of huge economic importance to the nation, not only through the creation of jobs during the development, construction and ongoing operation of the wind farm but also throughout the supply chain, including the manufacturers and suppliers of products and services to the industry. The supply of steel for wind turbine towers is just one example of the importance of the wind industry to Australian manufactures and suppliers.

Apart from direct jobs in the industry, there is considerable 'down stream' employment opportunities, as well as an obvious economic boost for towns and communities which helps to diversify and strengthen opportunities in these communities. This in turn reduces the need for individuals to leave these areas to seek employment. A key advantage of wind farm development is that the jobs created by are spread over several regions, not concentrated in a few areas, as tends to occur with larger scale fossil fuel plants such as coal.

I would like to respond to specific areas of interest outlined in the scope of the inquiry.

"This inquiry will look into the social and economic impacts of rural wind farms, and in particular:

(a) Any adverse health effects for people living in close proximity to wind farms";

Current research and scientific investigations have found that there are no adverse health effects for people living in close proximity to wind farms.

The following is a summary of some key research in this realm:

· The National Health and Medical Research Council (NHMRC) recently found that "there is currently no published scientific evidence to positively link wind turbines with adverse health effects".

· In addition the World Health Organisation states that "There is no reliable evidence that sounds below the hearing threshold produce physiological or psychological effect".

· The Victorian Department of Health (WorkSafe, 2010) after examining both peer reviewed and validated scientific research also concluded that "the weight of evidence indicated that there are no direct health effects from noise (audible or inaudible) at the levels generated by modern wind turbines."

Further international studies in North America and the United Kingdom also support this finding.

For instance, the American and Canadian Wind Energy Associations established a scientific advisory panel comprising medical doctors, audiologists and acoustic professionals from the US, Canada, Denmark and the UK. This panel concluded that labels such as "wind turbine syndrome" are not a recognised medical diagnosis but rather reflective of symptoms associated with annoyance. Factors culminating in annoyance include the nocebo effect defined as "an adverse outcome, or worsening of mental or physical health based on fear or belief in adverse affects".

The large volumes of negative media coverage related to the effects of wind turbines we are seeing in Australia only serve to create fear in some people that they will experience adverse effects from wind turbines. Often once the farms are actually operating, the resulting intrusion is far less than had been anticipated by people living around the developments.

Research produced by Sonus for the Clean Energy Council (CEC) highlights this fact – it found that once wind farms are built, the rates of complaints are very low in Australia and New Zealand. It also found that if a noise can be heard, then annoyance can result for some people, regardless of the noise level experienced.

This effect is backed up by the NHMRC review which concludes “It has been suggested that if people are worried about their health they may become anxious, causing stress related illnesses. These are genuine health effects arising from their worry, which arises from the wind turbine, even though the turbine may not objectively be a risk to health” (Chapman, 2010).

(b) Concerns over the excessive noise and vibrations emitted by wind farms, which are in close proximity to people’s homes;

Research conducted on modern wind turbines has shown that the levels of low frequency noise and infrasound are within accepted thresholds.

Modern wind turbines can generate noise across the frequency range of human hearing. As with most sounds, some of this energy occurs below the level of human hearing. Human hearing ability ranges from 20Hz to 20,000Hz, with 1dB being the smallest change in noise that humans can detect. Low frequency noise refers to noise in the range of 10 to 200 Hertz (Hz) and infrasound occurs in the range of 20 Hz down to 0.001 Hz – below what the human ear can pick up. Low frequency noise and infrasound is emitted by many other natural sources, for instance wind passing through trees or waves at a beach or human-made sources such as industrial processes, air-conditioning and vehicles.

There is currently no peer reviewed scientific data to suggest that the levels of low frequency noise or infrasound emitted by wind turbines make humans sick. Research to date has not shown any negative health effects at the sound levels produced by operational wind turbines.

Advances in technology mean that noise from wind turbines is minimal. Research conducted on modern wind turbines has shown that the levels of infrasonic noise and vibration radiated from modern wind turbines are at a very low level; so low that they lie below the threshold of perception, even for those people who are particularly sensitive to such noise and even when very near to turbines (British Wind Energy Association, 2005).

The first wind turbines for large scale generation of electricity began operating over 100 years ago. There are now more than 150,000 turbines installed globally, and some of these have been in place for more than 20 years. With decades of successful wind turbine operation, there has been ample opportunity for any negative effects to be identified. The fact that no credible scientific research has identified any negative effects supports the prevailing view that wind power is one of the safest ways of generating electricity.

In contrast, coal-based energy production, which is a major contributor to our current greenhouse gas emissions, is literally fuelling climate change and hence impacting directly on human health. The individual and public health implications of climate change are well documented, widespread, and already occurring on massive scale. For instance, the United Nations Intergovernmental Panel on Climate Change (IPCC) suggests that 150,000 people around the world actually die as a result of climate change every year (World Health Organisation). Climate change science tells us that the recent massive flooding in many parts of Australia is indicative of the type of extreme weather events we can expect in coming decades unless we take substantial action at a global scale to reduce emissions to a safe level. It is easy to see the massive human suffering that has come with these floods, and imagine what could happen to many individuals, families and communities in coming decades should we decide to take insufficient action on climate change as we experience ever more natural disasters. Australia, as one of the highest per capita greenhouse gas emitters, and one of the richer nations on the planet, must show leadership in reducing our emissions. We need big picture thinking if we are going to be able to respond at sufficient scale to the problem of climate change. Yet growing numbers of people engaging in the domestic debate around energy are incredibly focused on themselves and perceived impacts on their amenity from the wind industry. Fear stories always make

for good copy in the media. However, I would trust that a committee reporting to the Australian Senate will be able to think more grandly than that, and see that many of the claims of ill-health associated with wind energy are over stated or based on conjecture.

There has been research carried out locally about possible impacts of infrasound. Wind operator Pacific Hydro commissioned Sonus to measure and compare infrasound levels from wind farms and some common environment infrasound sources, both natural and human-made. The report titled "Infrasound and Measurements from Wind Farms and other Sources" demonstrated that the levels of infrasound produced by wind turbines is well below established perception thresholds and, importantly, is also below levels produced by other natural and man-made sources.

Infrasound was measured at two wind farms – Clements Gap in South Australia and Cape Bridgewater in Victoria. As a comparison, measurements were also taken in the Adelaide CBD and suburbs, at the beach, on a coastal cliff, inland from the coast and at a gas-fired power station. At all these locations infrasound was not audible to the human ear and the infrasound was recorded at higher levels on the beach and in the Adelaide CBD than it was near a wind turbine. The report re-affirms that infrasound is not unique to wind farms and provided further evidence to support existing data which shows that infrasound emissions from operational wind farms are significantly below recognised perception thresholds.

(c) The impact of rural wind farms on property values, employment opportunities and farm income;

Studies have found no statistical evidence that wind farms reduce property values.

An assessment of 45 property sales located within a 10 kilometre radius of 8 wind farms sites was made by the NSW Valuer General. It considered the impact of wind farms on surrounding land values and found that wind farms do not appear to have negatively affected property values. No reductions in sale price were evident for rural properties located in nearby townships with views of the wind farm.

The findings of the NSW Valuer General are consistent with studies in the United States and United Kingdom which also found no statistical evidence of reduction in property values associated with the development of wind farms.

An extensive and rigorous assessment of the relationship between wind farms and property values was completed in December 2009 by U.S. Department of Energy's (DOE) Lawrence Berkeley National Laboratory (LBNL). The report titled "The Impact of Wind Power Projects on Residential Property Values in the United States: A Multi-Site Hedonic Analysis" was based on site visits, data collection and analysis of almost 7,500 single-family home sales in areas where wind farms have been developed. The data was collected on homes situated within 10 miles of 24 existing wind facilities in nine different U.S. states. Each home in the sample was visited to collect important on-site information such as whether wind turbines were visible from the home. The home sales used in the study occurred between 1996 and 2007, spanning the period prior to the announcement of each wind energy facility to well after its construction and full-scale operation.

The analysis revealed that home sales prices are very sensitive to the overall quality of the scenic vista from a property, but that a view of a wind farm did not demonstrably impact sales prices. Neither the view of wind farm nor the distance of the home to wind farm was found to have any consistent, measurable, and significant effect on the selling prices of nearby homes.

The Berkeley Lab researchers also did not find statistically observable differences in prices for homes located closer to wind facilities than those located further away, or for homes that sold after the announcement or construction of a wind energy facility when compared to those selling prior to announcement. Even for those homes located within a one-mile distance of a wind project, the researchers found no persuasive evidence of a property value impact.

Another Canadian study by consultants Canning & Simmons, 2010 demonstrated "where wind farms are clearly visible, there was no empirical evidence to indicate that rural residential properties

released lower sale prices than similar residential properties within the same area that were outside of the viewshed of a wind turbine"

The employment benefits are substantial.

The benefits of wind farms to local regions are not confined to the initial investment in the project. They also provide a reliable and on-going income for landowners, direct employment opportunities for locals, and flow-on employment for local businesses through provision of products and services to the project and its employees.

This is demonstrated in a study titled "The Economic Impact Assessment of the Hallett Wind Farms" prepared by SKM which investigated the economic impacts that AGL's Hallett wind farm project had on the mid-north region of South Australia. The report found that $800 million had been spent on the projects, including $88 million spent directly in the region, and the creation of 98 construction jobs and 15 ongoing jobs directly created by the wind farm, which will increase to 42 upon completion. The study also found that for every job created directly by the wind farms, at least three further jobs are created indirectly.

I would also like to point out that unlike coal and coal seam gas (CSG) production – which are significant and growing threats to agricultural communities in a number of parts of the country – wind energy is compatible with grazing and crops. It occupies less land area per kilowatt-hour (kWh) of electricity generated than any other energy conversion system, apart from rooftop solar energy.

(d) The interface between Commonwealth, state and local planning laws as they pertain to wind farms;

I certainly accept the need for robust planning processes, to ensure wind farms are placed in appropriate locations. Equally, the wind industry accepts the need for effective standards for wind projects.

I would urge caution in regards to making substantial changes to existing guidelines simply to appease the vocal but relatively small number of opponents to wind energy, as appears to be the case in Victoria where the new Coalition government has announced a very restrictive wind energy policy.

Like any infrastructure project there may be a small number of local community members who do not support a specific development proposal. Planning policies should recognise this, while balancing the need for outcomes in the greater public good.

Wind farms should not be required to meet unnecessary higher standards than what is faced by other infrastructure developments such as coal mines, conventional power stations or other major industrial operations.

I believe that the planning systems already in place provide a sufficient framework to assess proposed developments, and thus balance the benefits of wind farm development with any impacts that may arise. Further, many jurisdictions have already introduced some form of planning provisions to cater for any unique characteristics of wind farms. Unnecessary burdens on clean energy development are contrary to the government's 20 per cent renewable energy target and are detrimental to the attraction of clean energy investment and the creation of clean energy jobs in Australia.

Wind energy proponents already apply rigorous processes to their developments to ensure they are appropriately managed and mitigate potential impacts on the environment or the amenity of local communities. Extensive and exhaustive assessments are undertaken by proponents prior to submitting a development application to determine whether a wind farm is feasible on a specific site and as to whether there are any potential environmental or social issues that will impact upon the viability of a proposal.

In addition to this, proponents engage with a range of stakeholders at early stages of feasibility assessment to determine whether there are any further environmental, cultural or amenity impacts that need to be understood and responded to as part of the development. Stakeholders that are consulted include not only the local community, the landowners, local council, but also the State and Federal Governments, government agencies such as CASA, Network Service Providers, electricity retailers, indigenous groups and other specific interest groups including groups advocating in relation to local fauna or flora.

The final form of the proposed development is often substantially different from the original plan, because of issues that have arisen during the planning and approvals phase. I would argue that this shows that existing systems are working effectively to find the balance between what a developer wants and what the community will support.

There are numerous planning requirements currently in place at Federal, State and local government levels. The interplay of these existing laws already create a sometimes ineffective and unnecessary hurdle to the development process of wind farms, with differing regulatory controls in different jurisdictions making it more cumbersome for developers working across jurisdictions. Certainly, the intention of the Coalition government in Victoria to introduce an exceptionally restrictive set of guidelines will negatively impact on the further development of wind energy in that state.

Adding additional regulatory controls would only act to add to this red tape and make wind energy more expensive.

The industry group for the sector, the CEC, has previously highlighted concerns with the Draft National Wind Farm Development Guidelines. In 2008, a report was developed for the Environment Protection and Heritage Council (EPHC) Report on Impediments to Environmentally and Socially Responsible Wind Farm Development. This report identified that the existing approval systems in the jurisdictions are generally robust and that many of the issues that have been identified are adequately dealt with through the existing procedures.

National guidelines do have the potential to encourage greater consistency between State planning regimes and remove impediments to further development. However the Draft National Wind Farm Development Guidelines as currently proposed only add substantial impediments to wind farm development beyond those imposed on other infrastructure investments, reducing certainty for the planning assessment process by introducing additional, and often conflicting guidelines. This would add additional costs and delays to wind farm developers without delivering improved outcomes.

(e) Any other relevant matters.

I would like to briefly address the following additional, and very relevant, points:

Community support

It should be remembered that while there has been a vocal campaign organised by some people and organisations against the development of the wind industry, it remains well supported in the broader society.

For instance, a Newspoll survey commissioned by the Clean Energy Council in December 2009 found that in regional areas 90% of people said that Australia should produce more renewable energy.

Similarly, an AMR Interactive survey commissioned by the NSW government in mid 2010 on community attitudes to wind farms, found wind farms were regarded as an acceptable form of power generation by 81% of the population. The survey also found that 80% of residents were supportive of wind farms being built in their local region and more than 60% supported them at 1 – 2 kilometre from their residence. There was also broad acknowledgement of the benefits of wind farms to the local community including economic and employment benefits and broad endorsement of more wind farms being built in the area.

Greenhouse abatement

The other obvious benefit of wind farms is the greenhouse emissions abatement that they provide.

A study by MMA on "Estimating Greenhouse Gas Emissions Abatement from Wind Farms in NSW" found that wind displaces fossil fuel generation and can act to lower wholesale electricity prices. Wind reduces demand for electricity from other sources, which are typically fossil fuel based generation. An average sized wind farm of 150 MW will displace from 150 kt CO2e to 450 kt CO2e per annum, while a large (500MW) wind farm will displace from 900 kt CO2e to 1,600 kt CO2e per annum.

The level of greenhouse gas abatement varies depending on the location of the wind farm. Increased greenhouse abatement occurs for wind farms located in areas with good quality wind resource which are close to electricity users or high quality transmission lines. For many projects the commercial viability of a wind farm relies on optimisation of wind turbine types and layouts to maximise the electricity output which in turn would result in the highest emission abatement. This is of particular relevance for this inquiry.

The MMA study also found that the emissions resulting from the manufacture, construction and operation of wind farms are low relative to those associated with the manufacture, construction and operation of large fossil fuel plants. For a 50 MW wind farm of average output it takes about 14kg CO2e/ MWh to manufacture, build and operate it. This represents less than 2% of the typical emissions reduction that such a wind farm would achieve from displacing fossil fuel generation.

Low water consumption

An additional benefit of wind energy is the fact that unlike traditional cower-fired power stations it does not consume any water for generation. Coal powered stations require large quantities of water to generate steam to drive the steam turbines, and for cooling the exhaust steam. Thermal power plants, primarily coal-fired power stations, are responsible for around 1.4 % of total water consumption in Australia (ABS, 2005).

Given the on-going water stress in most parts of Australia, and growing demands for fresh water supplies for agricultural and other human use as well as to ensure environmental flow in our river systems, wind looks even more attractive compared with older, and dirty, coal fired power generation.

Conclusion

I will finish by urging you not to give in to unsubstantiated rumour and outright fear campaigns about wind energy.

With appropriate controls and robust planning processes, wind has proven itself to be an excellent form of energy as part of a broader mix, while driving investment and employment in rural areas and acting to reduce our greenhouse emissions.

Regards

Trevor Berrill

References

(Note: not all references are used in this submission but these are indicative of the extensive reading I have done on energy issues over many years.)

Ashworth, P. (2008). Societal Attitudes to Solar, Queensland. CSIRO.

Association for the Study of Peak Oil and Gas (ASPO). www.peakoil.net/

Berrill, T. (2010). Felton Valley Sustainable Energy Plan. Prepared on behalf of Friends of Felton farming community www.fof.org.au

Berrill, T. (2007). Review of CSIRO Report – Assessment of economic and technical viability of renewable energy options in Queensland (2007 – 2015) with particular reference to niche regional opportunities. Queensland Sustainable Energy Industry Development Group.

Brown, L.R. et al (2009). Time for Plan B – Cutting Emissions by 80 percent by 2020. Earth Policy Institute Report.

Clean Energy Council (2009). Clean Energy Australia 2009 Report. www.cleanenergycouncil.org.au/cec/resourcecentre/reports

CSIRO (2009). Intelligent Grid – a value proposition for distributed energy in Australia. www.csiro.au/files/files/pu0g.pdf

CSIRO (2007). Reshaping cities for a more sustainable future. www.csiro.au/science/ReshapingCities.html

Detmers, J. (2010). Are Fossil Fuels Really Cheaper than Renewables? http://www.greentechmedia.com/articles/read/are-fossil-fuels-really-cheaper-than-renewables/

New Economist (2006) Stern Quote: "..greatest market failure..". http://neweconomist.blogs.com/new_economist/2006/10/stern_review_2.html

Dept. of Defence, USA (2010). Quadrennial Defence Review. www.defense.gov/QDR/images/QDR_as_of_12Feb10_1000.pdf

Dept. of Transport and Regional Services (2005). Health impacts of transport emissions in Australia: Economic costs. www.bitre.gov.au/publications/94/Files/wp63.pdf

Diesendorf, M. (2007). Greenhouse Solutions with Sustainable Energy. UNSW Press.

Diesendorf, M. (2005). Clean Energy Futures for Queensland. Report to Qld Conservation.

Flannery, T. (2006). We are the weather makers. P. 232 The Text Publishing Company Melbourne Australia

Hamilton, C. (2007). Scorcher: The Dirty Politics of Climate Change. Black Inc. Publishers.

Hansard Record of Proceedings, Tuesday 7 October 2008, page 2821

Garnaut, R. (2008) The Garnaut Climate Change Review. www.garnautreview.org.au/index.htm

Gore, A. (2009). A Plan to Solve the Climate Crisis. Rodale Press.

Graham, P. Et al (2007). Assessment of the economic and technical viability of renewable energy options in Queensland (2007 – 2015) with particular reference to niche regional opportunities. CSIRO.

IPCC (2007). Fourth Assessment Report: Climate Change 2007. www.ipcc.ch/publications_and_data/ar4/syr/en/spms5.html

Natural Resources Defence Council (2010). Comments by R. Redford http://www.nrdc.org/globalwarming/legislation/senate.asp?utm_source=homepage&utm_medium=feature&utm_campaign=climatebill

Office of Clean Energy. (2009) The Queensland Renewable Energy Plan: A Clean energy Future for Queensland. Qld. Govt. www.cleanenergy.qld.gov.au/queensland_renewable_energy_plan.cfm

Pearce, G. (2010). King Coal. Article in The Monthly, Issue May, 2010.

Pearce, G. (2009). Quarry Vision: Coal, Climate Change and the End of the Resources Boom. Quarterly Essay Issue 33, 2009.

REARK Research (1994). Survey of Public Preferences for Energy Supply in Qld. Qld Electricity Commission.

Stern, N. (2006). Stern Review: The Economics of Climate Change. See http://siteresources.worldbank.org/INTINDONESIA/Resources/226271-1170911056314/3428109-1174614780539/SternReviewEng.pdf

Strahan, D (2010). Americans should be thanking BP. The Independent, 1 June 2010.