The Social and Economic Impact of Rural Wind Farms

Submission to the Senate Community Affairs Committee, Senate Inquiry 2011

by

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1. INTRODUCTION

Rural communities and locations are being selected as industrial developments for wind power stations, commonly known as “wind farms”. The current push for fast tracking industrial wind power stations in rural regions is being put forward as a solution to the problems of climate change and reducing GHG emissions.

However, the public are not being presented with balanced information on the issues surrounding industrial wind energy. Landholders are being persuaded to host industrial wind turbines with little knowledge of the impact this will have on their own and other people’s property, the environment or the wider community in general. In this submission we present evidence that demonstrates that industrial wind energy does not live up to the claims of its proponents, and counters the misleading information the wind industry continues to distribute.

We wholly support the production of energy from sustainable, clean, renewable sources and public education on energy conservation. We are very interested in the development of farming strategies to offset carbon emissions, it is a fast advancing industry, and we regard it as an imperative global/local issue, where farmers will have an increasingly important role and responsibilities.

We support sound scientific solutions for green house gas emissions reductions, however, wind power is not acceptable as ***it fails to deliver in 3 key evaluation areas of science, economics and environment :***

1) it is not a technically legitimate solution to significantly reduce GHG emissions
2) it is not a commercially viable source of energy on its own
3) it is not environmentally responsible.

To date there has been NO proof presented internationally that GHG emissions have been materially reduced, nor that any coal power plant has been shut down due to wind power added to the grid.

A potential proposed solution to a problem requires the proponent to prove its efficacy. This has NOT been done.

The 2009 NSW Inquiry committee report clearly did not address these issues correctly. Furthermore the report stated (p93) :

“The Committee does note, however, that there appears to be a significant degree of confusion and misinformation about the ability of wind farms to reduce greenhouse gas emissions.”

Aside from such a statement being insulting to experienced researchers such as ourselves and many of the other quality submissions, it is an outrage that the careful presentation of peer reviewed research generated by internationally regarded scientists can be so brazenly dismissed. Such conduct is counter intuitive to the goals of a parliamentary enquiry and further reflects the lack of impartiality amongst the parliamentary panel. Of particular concern are the 'industry professionals' that the panel

chose to consult. It needs to be publicly noted that the majority of these 'industry professionals' are strong advocates of the wind industry.

This is a major failing of the public duty of the 2009 NSW Inquiry, which was to give rural people a fair hearing. The result of the 2009 NSW Inquiry had the opposite effect, and was disempowering.

A consistent concern surrounding wind developments the disempowerment of the communities in which the developments most impact. This disempowerment of communities has significant impacts on social, human and economic capital, and is incredibly detrimental to the harmony and future growth of rural communities. Disempoewerment that has been sanctioned by government planning processes will have negative impacts in these communities for generations.

We have conducted significant research about renewable energy and the industrial wind power generation industry. We conducted this research when we and our community were approached by industrial wind energy developers, in order to inform ourselves and others. This research includes:

- Dialogue with an Ecological Consultant who has conducted assessments on Australian industrial wind power stations
- Dialogue with academic researchers
- Statements by people already affected by industrial wind farm developments
- Peer reviewed journal and conference papers
- Local, national and international media

Based on this information we have concluded that, with its significant social and environmental impacts, industrial wind energy developments are not sustainable, and are to the detriment of rural areas, their landowners, environment and surrounding communities. We are strongly opposed to all industrial wind turbine power developments of this type, and will be continuing our research to include further IPCC reports, scientific journal and conference papers, and new results and information as it is published.

Sarah grew up on the family farming property in rural NSW and David has spent many years living in rural areas in the UK and NSW. We have now taken over Sarah’s family farming property in rural NSW. We are both trained academic researchers, Sarah in the arts and community cultural development, and David in acoustics, electronic engineering, sound, computer science and complex systems science; this training employs methodologies that seek information from a range of considered objective, quantitative and experiential resources. After reviewing this research we conclude that industrial wind farm developments have far too many detrimental impacts in the short and long term. These detrimental impacts include (but are not limited to):

- Poor greenhouse gas mitigation potential
- Decreased community health
- Poor electricity generating potential
- Increased bush fire risks
- Increased noise pollution
- Decreased land values and reduction in future land use rights for stakeholders, other properties and wider communities

- Strobe like ‘flickering’ across the landscape created by turbines during sunset and sunrise
- Decreased privacy
- Increased interference with communications devices and resources
- Irreparable destruction to farming resources and related ecologies near or adjacent to industrial wind turbines
- Irreparable destruction to native habitats such as the endangered Box Gum Grassy Woodlands and its associated tree, grass, forbs, bat and bird species
- The liability of landholders for third party claims for loss and damages associated with industrial wind turbine power stations.
- Industrial infrastructure on land zoned for farming/food production and the preservation of natural resources and habitat
- Industrial infrastructure and development that is counter productive to any nature regeneration and conservation efforts

We have also experienced at first hand the inappropriate conduct and divisive tactics employed by industrial wind energy companies within our own community, pitting neighbour against neighbour, blatantly lying and telling farmers that *“everyone else is signing or has signed”.* We have repeatedly asked the industrial wind energy developers to get all the landholders together for a meeting rather than be divisive, nut to no avail. The industrial wind developers even admitted that these tactics are divisive to us, and that we should see it from their perspective. This sentiment was stated several times. Such an admission clearly demonstrates a wilful resistance towards transparency and due process, with lack of regard to the concerns landholders and residents may have about the large scale development and impacts associated with industrial wind turbine power stations. The industrial wind developers stated that should the wind farm proposal proceed any direct impact would only be on the landholders with the turbines, not those on surrounding properties. This statement again demonstrates a lack of regard to legitimate community concerns and totally misrepresents the magnitude of industrial wind power developments, their turbines, risk issues and detrimental impacts.

When we asked the industrial wind developers for unbiased information on wind energy we were directed to unreliable industry propaganda. We have watched as our neighbouring landholders have been constantly harassed by industrial wind developers whose only goal is to get a lease contract signed. Such a contractual arrangement for industrial scale development, especially development that is emergent in the Australian context with very few precedents and no Australia specific long-term impact studies, is grossly unfair to landholders, their neighbours and surrounding communities, and Australia.

We are in no doubt that the wind energy industry’s main motivation is money rather than addressing climate change.

The notion that the community will benefit through money from an **ineffective method to significantly reduce GHG emissions** is also a point that needs addressing, as taxpayer money is helping to pay for such projects, and electricity bills will rise as result of higher electricity prices due to expensive renewables.

Do these developers think we are gullible enough that we can be bribed with our own money?

*What sound reason can there be to bring wind energy money into a community when industrial scale wind energy has **no meaningful benefits in terms of GHG reductions** and despite the fact that industrial scale wind energy has **proven** environmental liabilities.*

2. Australian GHG emissions in context

Wind farm planning applications often include statements by the proponent about the estimated GHG reductions and the energy context of the proposal. These are usually both over-inflated and no proper context is given. Australian per-capita GHG emissions are often mentioned, however this is not a complete picture of GHG emissions context.

The United States DOE Carbon Dioxide Information Analysis Center contains publically accessible information on emissions. Current Australian per-capita figures from CDIAC Per capita emissions are also available, which show Australia 12th :

Ranking of the world's countries by 2007 per capita fossil-fuel CO2 emission rates. National per capita estimates (CO2_CAP) are expressed in metric tons of carbon.

RANK	NATION	CO2_CAP
1	QATAR	14.02
2	KUWAIT	9.30
3	NETHERLAND ANTILLES	8.79
4	UNITED ARAB EMIRATES	8.44
5	BAHRAIN	8.06
6	TRINIDAD AND TOBAGO	7.58
7	ARUBA	6.29
8	LUXEMBOURG	6.16
9	BRUNEI (DARUSSALAM)	5.32
10	FALKLAND ISLANDS (MALVINAS)	5.25
11	UNITED STATES OF AMERICA	5.20
12	AUSTRALIA	4.84
13	MONTSERRAT	4.64
14	SAUDI ARABIA	4.62
15	CANADA	4.61
16	ESTONIA	4.16
17	KAZAKHSTAN	4.00
18	FAEROE ISLANDS	3.92
19	GIBRALTAR	3.78
20	OMAN	3.71

Professor David JC MacKay in the Department of Physics at the University of Cambridge (UK) and member of the World Economic Forum Global Agenda Council on Climate Change in his book (2008) "*Sustainable Energy — without the hot air",* UIT

Cambridge Ltd discusses this issue of greenhouse gas emissions in context :

"Historical responsibility for climate impact

If we assume that the climate has been damaged by human activity, and that someone needs to fix it, who should pay? Some people say "the polluter should pay." The preceding pictures showed who's doing the polluting today. But it isn't the rate of CO_2 pollution that matters, it's the cumulative total emissions; much of the emitted carbon dioxide (about one third of it) will hang around in the atmosphere for at least 50 or 100 years. If we accept the ethical idea that "the polluter should pay" then we should ask how big is each country's historical footprint."

http://www.inference.phy.cam.ac.uk/withouthotair/c1/page_14.shtml

"In total terms the biggest historical emitters are, in order, USA (322 $GtCO_2$), Russian Federation (90 $GtCO_2$), China (89 $GtCO_2$), Germany (78 $GtCO_2$), UK (62 $GtCO_2$), Japan (43 $GtCO_2$), France (30 $GtCO_2$), India (25 $GtCO_2$), and Canada (24 $GtCO_2$). The per-capita order is: Luxembourg, USA, United Kingdom, Czech Republic, Belgium, Germany, Estonia, Qatar, and Canada."

http://www.inference.phy.cam.ac.uk/withouthotair/c1/page_21.shtml

In terms of historical emissions Australia doesn't even get a mention in these rankings. Some information on historical and other rankings is publically available from the World Resources Institute (WRI) in the document "Navigating the Numbers : Greenhouse Gas Data and International Climate Policy" :

http://www.wri.org/publication/navigating-the-numbers

In terms of **total emissions on a yearly basis** the most current (CDIAC) **Top 20 Emitting Countries by Total Fossil-Fuel CO2 Emissions for 2007** puts Australia at number 16. Available online :

http://cdiac.ornl.gov/trends/emis/tre_tp20.html

The "List of countries by carbon dioxide emissions" is another publically available source which gives a handy % figure, showing that **Australia is currently contributing only 1.28% of total global emissions on a yearly basis** :

http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions

3. GHG emissions Context of Australian Wind Energy

Wind farm proponents consistently fail to give any indication of the expected percentage of GHG reduction in any context. There are also statements proposed about the displacement of coal. This further shows that the proponent have no understanding of electricity generation or its operation within the National Electricity Market (NEM). The issues such as intermittency/variability/non-reliability of wind, use of gas for back up, and start up times for coal are clearly stated extensively throughout the Australian Energy Regulator's (AER) State of the Energy Market Report 2009 as shown by the following brief quote (p38) :

"Gas is likely to play an important role under climate change policies in complementing intermittent renewable electricity generation. Wind generation — the likely primary renewable technology to 2020 — has intermittent output and must be backed up by other generation. Open cycle gas plants can respond quickly when there is insufficient wind generation, but any new plant is likely to operate at relatively low capacity factors. There will also be an increased need for gas transmission and storage to provide gas at short notice."

The **current installed wind capacity** in the NEM (NSW, Vic, Tas, SA) is 1856MW

A 30% Capacity Factor (0.3CF) gives :

0.3CF x 1856MW = 556.8MW

To obtain MWh per year is simply :

556.8MW x 8760Hours = **4,877,568 MWh per year total for the NEM**

To obtain a GHG reduction for displacing gas at 0.36tCO2/MWh is also straightforward.

In a year for Australian wind farms connected to the NEM there would be

0.36 x 4,877,568= **1,755,924t of CO2 saved per year**

However, without a context for this figure we can have no idea of what it means quantitatively.

According to UNFCCC Australia's GHG emissions for 2007 without including LULUCF (Land Use, Land Use Change & Forestry) were : 541,178.7 GgCO2 equiv & Reuters have reported it at http://www.reuters.com/article/idUSSP11210320080829 as being 576 million tons. If we include LULUCF the Australian annual figure rises to 825,884 GgCO2 equiv.

http://unfccc.int/files/ghg_emissions_data/application/pdf/aus_ghg_profile.pdf

It is then quite easy to express current NEM connected wind farms contribution as a percentage of GHG reductions :

(1,755,924 / 541,178,700) * 100 = **0.32%**

A grand total of 0.32% reduction of total Australian GHG emissions (not including emissions due to LULUCF) from ALL NEM connected wind farms.

If we include LULUCF : (1,775,924 / 825,884,000) * 100 = **0.21%**

A grand total of 0.21% reduction of total Australian GHG emissions from ALL NEM connected wind farms.

How does that stack up globally for the Australian NEM wind farms? According to this source : http://www.nextgenpe.com/news/global-co2-emissions/

The world total CO2 emissions in 2006 were 29,195,000,000 tons :

(1,755,924 / 29,195,000,000) * 100 = **0.006%**

A grand total of 0.006% reduction of global CO2 emissions from ALL NEM connected wind farms.

Given the simple calculations above it is very easy to get an idea of any existing or proposed individual wind farms effectiveness at GHG reduction at state, country and global levels. The basic process shown for a NSW example :

Example : 30MW Cullerin Wind Farm NSW

A 30% Capacity Factor (0.3CF) gives :

0.3CF x 30MW = 9MW

To obtain MWh per year is simply :

9MW x 8760Hours = **78,840 MWh/year**

Apply the ghg reduction factor, e.g. 0.36t per MWh for gas displacement

0.36 x 78,840 = **28,382**

Percentage reduction of Australian GHG emissions without LULUCF
(28,382 / 541,178,700) * 100 = **0.005%**

Percentage reduction of Australian GHG emissions

(28,382 / 825,884,000) * 100 = **0.003%**

Percentage reduction of Global GHG emissions
(28,382 / 29,195,000,000) * 100 = **0.00009%**

Australian reported GHG emissions figures can be publically obtained from : http://www.climatechange.gov.au/en/climate-change/emissions.aspx

The % GHG reductions that the total wind farms connected to the NEM would achieve

are not even lifted out of the "noise floor" of the +/-3% reporting uncertainty error of the Australian governments reporting figures for 2007. According to the section titled "Uncertainty Analysis" on Page 16 of "State and Territory Greenhouse Gas Inventories 2007″ available at ->
http://www.climatechange.gov.au/en/climate-change/emissions.aspx
this states that :

"Uncertainty is inherent within any kind of estimation. Uncertainty assessments at a sectoral level are reported in the National Inventory report. Overall, at the national inventory level, the uncertainty of the emissions estimates has been assessed at ±3%. While no quantitative estimates have been produced, the Department assesses that the uncertainties for emission estimates for these inventories, particularly the smaller states and territories, will be somewhat higher than for the national inventory. "

According to the section titled "Uncertainty Analysis" on Page 13 of "State and Territory Greenhouse Gas Inventories 2008″ available at, **this uncertainty figure has been reduced to +/-2% without any study or review** ->

http://www.climatechange.gov.au/en/climate-change/%7E/media/3EECC5A54EB54255A62A4EA0F94736B4.ashx

"Uncertainty is inherent within any kind of estimation. Uncertainty assessments at a sectoral level are reported in the National Inventory Report. Overall, at the national level, the uncertainty of the national inventory emission estimates has been assessed at ±2%. While no quantitative estimates have been produced, the Department assesses that the uncertainties for emission estimates for these inventories, particularly the smaller states and territories, will be somewhat higher than for the national inventory."

It is quite clear that building more wind farms will still not get the capacity for GHG reduction out of the *% uncertainty noise floor* of the governments emissions reduction estimates. Wind farms are clearly ineffective.

Table : Effective GHG reduction percentages of a selection of Australian Wind Farms

Wind Farm	**MW**	**% reduction of Australian GHG emissions**	**% reduction of Global GHG emissions**
Cullerin (NSW)	30	0.003	0.00009
Snowtown (SA)	99	0.01	0.0003
Capital (NSW)	140	0.016	0.0004
Waubra (Vic)	192	0.02	0.0006
Yass Valley – proposed (NSW)	380	0.04	0.001
All NEM Wind Farms	**1856**	**0.21**	**0.006**

We also request the Committee take into account Katzenstein and Apt's recent peer-reviewed scientific results from Carnegie-Mellon University which state that GHG reduction figures a wind/gas mix is likely an overestimation, and NOx emissions may also increase. See : Katzenstein, W & Apt, J, "Air Emissions Due To Wind and Solar Power", Environmental Science & Technology (2009) Vol 43 No 2 pages 253-258.

Further work expanding upon the work of Katzenstein & Apt, and others on carbon emissions due to wind can be found here :

http://www.masterresource.org/2009/11/wind-integration-incremental-emissions-from-back-up-generation-cycling-part-i-a-framework-and-calculator/

http://www.masterresource.org/2009/11/wind-integration-incremental-emissions-from-back-up-generation-cycling-part-ii/

http://www.masterresource.org/2009/12/wind-integration-incremental-emissions-from-back-up-generation-cycling-part-iii-response-to-comments/

The summary from *Wind Integration: Incremental Emissions from Back-Up Generation Cycling Part II* states :

"In summary, relative to CCGT plants operating alone with the same capacity as the wind plants:

In the high range of possible annual capacity factors for wind, at 28 per cent, with the introduction of OCGT gas plants and reduced efficiency considerations for the wind shadowing/backup, the calculator shows that the presence of wind results in:

Almost zero gas savings; and an increase in CO2 emissions of 12 per cent.

In the low range of possible annual capacity factors for wind, at 20 per cent, the above results become:

An increase in gas consumption of 10 per cent; and an increase in CO2 emissions of 25 per cent."

Given the recent scientific research on carbon emissions due to wind energy referenced above these GHG reduction figures for Australian wind farms are extremely generous. Even using more generous figures and assuming a "grid-mix" of say 0.46t / MWh, the Proceedings of the 2008 Intergovernmental Panel on Climate Change (IPCC) "*Scoping Meeting on Renewable Energy Sources (page 122)"* suggestion of 0.6t / MWh, or even suggesting 1 for 1 with coal, **the result would be completely unmeasurable.** The purported environmental benefit of reducing GHG emissions from wind farms is therefore negligible in the context of regional, Australian and World emissions, and based on current research may potentially result in increasing our GHG emissions.

Denmark is often quoted as model country, with 20% of electricity coming from wind. However, in Prof David MacKay's book Fig I.9, which shows world figures for carbon

intensity of electricity production (g CO_2 per kWh of electricity), **Denmark is the highest at 881**, and France the lowest has 83.

http://www.inference.phy.cam.ac.uk/withouthotair/cI/page_335.shtml

4. Climate Change Impacts on Wind Energy Electricity Generators

Mention is often made of expected impact of climate change on water supply and other factors. Wind energy developers / proponents have failed to research correctly the expected effects of climate change on energy infrastructure. Given the recent events of Cyclone Yasi in Queensland it is worth considering these effects.

In Chapter 11 (Australia and New Zealand) of the IPCC Working Group II Contribution to the 4th Assessment Report *"Climate Change 2007 – Impacts, Adaptation and Vulnerability*" it should be noted from the following in Section 11.4.10 Energy (page 523) :

"*Climate change is likely to affect energy infrastructure in Australia and New Zealand through impacts of severe weather events on wind power stations, electricity transmission and distribution networks*". Later in the same section an assessment of potential risks for Australia found, among other risks, that : "*increased peak and average temperatures are likely to reduce electricity generation efficiency, transmission line capacity, transformer capacity and the life of switchgear and other components*". This potential for future failures coupled with the known unreliability of wind energy further diminishes the viability or usefulness of wind energy. Particularly given that wind energy requires such a large overbuild and greater transmission capacity / infrastructure.

Other studies have shown that there is also the potential for climate change to impact directly on wind resource : Sailor, D.J., M. Smith, and M. Hart, 2008. "Climate change implications for wind power resources in the Northwest United States," *Renewable Energy*, 33 (11), pages 2393-2406. This paper concludes that wind generated electricity in the area studied could be reduced by up to 40% through climate change. This research builds on their earlier study Breslow, P., and D.J. Sailor, (2002) "Vulnerability of Wind Power Resources to Climate Change in the Continental United States", *Renewable Energy*, 27 (4), pages 585-598. In this work they estimate a 1% to 3.2% reduction in wind speeds in the area studied over the next 50 years, and a 1.4% to 4.5% reduction over the next 100 years. As is well known, turbine power output is greatly affected by any small change in wind speed on the power curve, so even small reductions in future wind speeds can have a significant effect on reducing electricity generation output.

How do wind energy proponent's propose to address these issues?

5. NSW DECC “Wind Farm” Documents and “Fact Sheets”

The documents and fact sheets relating to wind energy at the NSW DECC website are totally inadequate and unacceptable with no basis in the scientific method. Particularly poor is the DECC commissioned “Estimating Greenhouse Gas Emissions Abatement from Wind Farms in NSW” report by McLennan Magasanik Associates (MMA) as this is actually computer modelling and not real world measurements or empirical evidence / data, despite the inclusion of the extremely misleading title of Section 3, page 7 "Measuring Emissions Abatement from Wind Farms". This is a computer modelling *attempt* at *estimation* NOT *measurement* of any physical quantity.

The first sentence Section 3, page 7 states :
“There are a number of issues that need to be considered in attempting to estimate the actual level of emissions abated from wind farms.”

and then present the modeling they used to attempt to estimate emissions abatement. The report by McLennan Magasanik Associates is clearly fundamentally flawed. **Has this report undergone any independent peer review process whatsoever ?**

The web link given by MMA report’s author’s is www.mmassociates.com.au this redirects straight to http://www.skmmma.com/ (Sinclair Knight Merz Pty Ltd). From here one can find :

http://www.skmconsulting.com/Markets/Australia/Power/Wind-Power-Services/

“*Sinclair Knight Merz supports wind energy developers, financial institutions, equipment suppliers and operators world-wide throughout all aspects of the project life cycle, including site prospecting, consenting, design, procurement, construction, commissioning, operation and maintenance and replanting.”*

http://www.skmconsulting.com/Knowledge-and-Insights/News/2002/Wind-Farm-Takes-Off.aspx

'Leading consulting firm, Sinclair Knight Merz, has successfully project managed and engineered an innovative new wind farm, near Lithgow, in Central Western NSW.

"Sinclair Knight Merz provided project management and engineering services for the design, development and construction of the $2.4 million Hampton Wind Park."'

The NSW DECC factsheets are also referencing the flawed report by the NHMRC. I suggest reading the rebuttal by the Society for Wind Vigilance which totally discredits the NHRMC rapid review report and states :

“The "Rapid Review" is neither authoritative nor credible and does little to advance the understanding of the issue of industrial wind turbines and adverse health effects.”

http://windvigilance.com/nhmrc_rapid_review.aspx

We would also suggest examining the following recent report and numerous other references given our supplementary submission :

http://oto2.wustl.edu/cochlea/wind.html

Wind Turbines are Hazardous to Human Health, Alec N. Salt, Ph.D., Cochlear Fluids Research Laboratory, Washington University in St. Louis.

A quick excerpt :

"Wind turbines such as those currently being constructed in rural areas generate high levels of infrasound noise. This is very low frequency noise (sound waves of less than 20 cycles per second) that you cannot hear. Even though you cannot hear the sound, it is easily detected by the ear at the levels that are produced and can have effects on the body that profoundly disturb some individuals.

The situation is somewhat similar to ultraviolet (UV) light and the eye. We cannot see ultraviolet light but we all understand that it can affect us profoundly, causing sunburn, photokeratitis (also known as snow blindness or welder's flash) and cataracts. For UV light, there are simple ways that the damaging effects can be avoided using sunscreens and eye protection.

For infrasound exposure in your home, there is currently NO WAY TO PROTECT YOURSELF."

It is wholly inappropriate for a government department to be grossly misinforming the public through ill informed literature, much of which has been generated by proponents of the wind industry. In the interests of democracy and transparency government departments must be impartial to political agendas, and they should not be pseudo representatives of the wind industry.

The NSW Department of Planning has also clearly demonstrated bias in favour of the wind industry, with many of the approved wind farm development applications being full of glaring errors, fatuous unfounded statements and clearly a complete lack of community consultation by the developers.

The DOP also deemed it unnecessary to meet any of the NSW parliamentary inquiries recommendations, as residents of NSW we deserve to know why such recommendations can be ignored.

6. Box Gum Grassy Woodland and Sustainable Farming

Where we reside and many of these areas subject to approved windfarms and/or pending planning applications are located in Box Gum Grassy Woodlands (BGGW). This habitat has been identified as endangered and vulnerable on NSW state and national registers. Both of NSW and state and federal governments have committed millions of dollars towards conservation and preservation strategies for BGGW habitats, such as the 'Caring for Country' and stewardship incentives.

With many overseas research studies documenting the negative impacts wind turbines have on fauna and natural habitats it is clear that the establishment of wind farms in and around BGGW areas will further fragment this habitat, hinder biodiversity and have a detrimental impact on many of its endangered species, many of which are migratory.

We also wish to register our disagreement that installation of industrial scale wind turbines will “drought proof” farms. As demonstrated in some of the energy policy papers referenced in our bibliography that refer to industrial scale wind energy and its financing; the future of the wind industry and its returns are highly uncertain, irrespective of the numerous other potential problems for landholders, the community and the environment. Put simply, there are too many unanswered questions by the developers and scientifically proven negative impacts.

Industrial wind energy development is not a sustainable landscape management practice and does not meet these principles. Sustainable landscape management is presented in the CSIRO publication McIntyre, McIvor and Heard (2002), and this text also has a specific focus on endangered grassy woodland ecoregions. The most recent research on an 800,000-ha section of an internationally recognised NSW endangered ecoregion is presented in (Fischer et al 2009). These two references provide key information on biodiversity and endangered species with calls for new policy supporting sustainable farming practices to turn the region from *“ecological decline to ecological recovery”.* We believe that industrial wind energy developments will negatively effect any conservation efforts by individual farmers, community groups, and state and federal governments.

The Fenner School of Environment and Society at ANU has, among many other research areas, an excellent online resource *Sustainable Farms: Pathways for Rural Landscapes* at (http://fennerschool-research.anu.edu.au/sustfarms/).

* Fischer, J., Stott, J., Zerger, A., Warren, G., Sherren, K., Forrester, R. (2009) *“Reversing a tree regeneration crisis in an endangered ecoregion”,* Proceedings of the National Academy of Sciences USA 105, 10386-10391. Available on line at :

http://www.pnas.org/cgi/doi/10.1073/pnas.0900110106

Covers the current crisis in NSW and examines an 800,000-ha internationally recognised endangered ecoregion of NSW. Presents sustainable farming practices and calls for new policy supporting sustainable practice.

* McIntyre, S., McIvor, J. and Heard, K (Eds), (2002) *"Managing and Conserving Grassy Woodlands",* CSIRO Publishing

Extensive CSIRO text on endangered grassy eucalypt woodland of Australia. Covers key areas such as biodiversity, sustainable practice, application principles and ecological concepts. Key text for regional planning, landcare, land management, research and on-ground application. A key section of note in this book is on p178 "Adoption of new practices – some issues" which explains conflicts between new practices and sustainable management. Web page relating to the book :

http://www.csiro.au/resources/ps1fs.html

7. Concluding Remarks

We request that this committee recommend :

- Moratorium on further construction of “wind farms” and industrial scale wind electricity generation in rural areas
- Scientific evidence that wind energy significantly reduces GHG emissions
- Complete ban on wind farm construction in areas of Box Gum Grassy Woodlans
- Environmental assessments / impact statements be revisited, independently assessed and revised
- Independent investigation into decommissioning (bonds, costs, management plans, process)
- Salvage/scrap value to be excluded from decommissioning costs as is now happening in the USA
- Comprehensive scientific research report that extends and updates America’s 2007 National Research Council of the National Academies study “*Environmental Impacts of Wind-Energy Projects”.* Such research should be conducted at both state and national levels
- Independent investigation into negative health effects of industrial wind power stations

The NSW Depart of Planning and NSW DECC have become political instruments, and easy rubber stampers for wind developers / speculators. This is quite unacceptable and should be investigated further by the 2011 Senate Inquiry.

The push for large scale renewables such as that proposed in the Beyond Zero Emissions - Zero Carbon Australia 2020 report is impossible. A detailed critique of the Beyond Zero Emissions report is available at Prof. Barry Brooks (University of Adelaide) Brave New Climate (BNC) website. The original BNC community analysis is here :

http://bravenewclimate.com/2010/07/14/zca2020/

and the final report by Peter Lang and Martin Nicholson, with two addendum's by one us (Dr David Burraston) is here :

http://bravenewclimate.com/2010/08/12/zca2020-critique/

(The addendum on wind farm construction rates is included in an additional document to this submission.)

Prof Ted Trainer (University of NSW) also published an excellent critique here :

http://bravenewclimate.com/2010/09/09/trainer-zca-2020-critique/

We conclude that industrial scale wind energy development is not a viable long term option for any farming or mixed farming enterprise. Big company bullying and poor government planning is putting regional and farming communities at risk.

It is quite clear that building more wind farms will be completely ineffective at significantly reducing Australian GHG emissions.

We thank you for taking the time to consider our submission. We have enclosed supplementary submissions giving further research, bibliography and references.

Dr David Burraston and Sarah Last