

Comments on Emission-saving Evidence in:

Rural Wind Farms Report from the New South Wales Standing Committee #5

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Wind farms are cropping up in New South Wales, Australia, in a manner not too dissimilar from many other parts of the world. The NSW Parliament has created a Standing Committee to study and provide guidance on the various issues surrounding wind energy. The Committee took submissions from a variety of stakeholders and issued a 232-page report that summed up the Committee's view on these issues and presented 21 recommendations. This Report is saved at http://windfarmrealities.org/wfr-docs/australian-report_091004.pdf (975kb). Much of the Report concerned itself with procedural issues specific to NSW; for example, there was no legislation that provided a basis for handling noise complaints. The main impression I came away with was that this Report was quite critical of the way wind energy development was being controlled, and how local communities were shut out of the planning process.

As an aside, on the four major issues surrounding wind projects, the Report had the following to say.

- 1) Noise – it recognized that noise could be a real problem for the neighbors, and had a number of recommendations. One in particular stood out – a 2km minimum setback, as a precautionary measure.
- 2) Emissions – it claimed to have been provided evidence that wind projects did reduce emissions. Of course I was curious to see what this evidence was, and will discuss it further below.
- 3) Health – it took the stance that health issues are not supported by the evidence, and suggested no further studies be conducted. I'll be saying more about this in a different commentary.
- 4) Wildlife – they were critical of the studies that were not being done to determine the extent of any detrimental effects.

Returning to emissions, in the Executive Summary, their page xiii, they state:

It [wind power] also contributes to the Commonwealth Renewable Energy Target through reducing greenhouse gas emissions.

As the Report continued, it started providing the evidence to support this statement. Below I go through the statements that mentioned that emissions are saved and try to follow their references to see if there is actually any evidence there. Feel free to repeat my exercise, it does build character. To sum it up, I could find no evidence in either this report nor in any of its references that wind has ever saved any emissions. The

Committee seems to have accepted all these assertions that are in the end based on faith, and on faith alone. Perhaps the Committee has a different meaning for the word “evidence”. To me, evidence is something that actually exists, can be observed and preferably can be measured. As in science-based. To them, evidence must be when someone of sufficient gravitas makes an assertion.

Chapter 2, Background, contains the first specific comments relating to emissions. Out of 76 subsections, the following seemed relevant.

2.13, page 7, they state:

When generating electricity, renewable energy sources generally produce less greenhouse gas emissions than fossil fuel or non-renewable energy sources. Indeed, in its State of the Energy Market 2008 report, the Australian Energy Regulator (AER) found that renewable energy sources, such as hydroelectric, wind and solar, produced some of the lowest greenhouse gas emissions.

I followed the reference given, saved at

<http://windfarmrealities.org/wfr-docs/aer-state-energy-market-2008.pdf> and

there's no further information there. In any event, this statement isn't particularly controversial. This is simply an assertion that isn't particularly relevant in any case. The issue isn't if these technologies produce no emissions, but rather if they can be shown to save emissions overall.

2.14, page 7, they state:

Renewable energy technologies have therefore been sought and developed not only to increase the diversity of energy supplies but to potentially displace fossil fuels and consequently reduce greenhouse gas emissions generated by electricity production.

A snapshot of the referenced web page is shown below.



I guess they were using the first two sentences as a reference. There was no justification or further reference for this statement and a quick search of the IEA web site produced no other evidence that emissions were lowered by wind.

2.18, page 7, in part states:

The GWEC, however, maintain that wind energy is on track to supply 10 to 12% of global electricity demand by 2020, reducing greenhouse gas emissions by 1.5 billion tonnes per year.

The reference for this is the page 4 of GWEC Report for 2008, saved at <http://windfarmrealities.org/wfr-docs/gwec-2008-report.pdf> . No further reference is given, neither here nor anywhere else in this report, so it is unknown where GWEC obtained this number. GWEC is, by the way, an interested party.

2.54, page 14, states:

Dr Diesendorf believes that not only will utility scale wind generation reduce greenhouse gas emissions from the electricity sector by 20%, but that wind power alone could contribute at least 20% of Australia's electricity.

Mark Diesendorf is a professor at the U of NSW and is prominently referenced throughout this Report, and is the Deputy Director of the Inst. of Environmental Studies there. As far as I can tell, he is fond of repeating wind industry talking points and has never provided any evidence for any of his claims. A typical example is this article: <http://www.onlineopinion.com.au/view.asp?article=3057> . Certainly no evidence was presented for this Report

Now to Chapter 3, Wind Energy in NSW. There's a total of 63 subsections, of which 4 are in the "Reducing Greenhouse Gas Emissions" section. The following statements seemed most promising.

3.12, page 20, states in part:

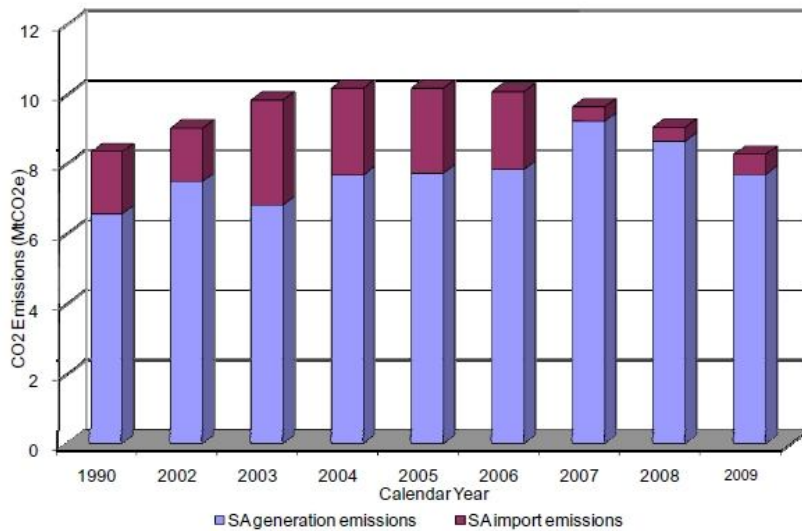
Each megawatt-hour of energy produced by a wind farm is one megawatt-hour of energy that does not have to be produced by emissive sources such as coal-fired or gas-fired power stations.

The reference for this statement was apparently an answer to a question, given in an unreferenced document. No evidence was provided.

3.14, page 21, states in part:

I refer to a report in South Australia by ElectraNet, one of its annual reports, which shows that given that wind power now provides about 17 per cent of the State electricity demand, that the emission levels of the electricity industry now in South Australia is back down to 1990 levels. They attribute that almost entirely to wind farms being built in South Australia. It has gone down. It has dropped roughly by about 20 per cent since its peak in 2004-05.

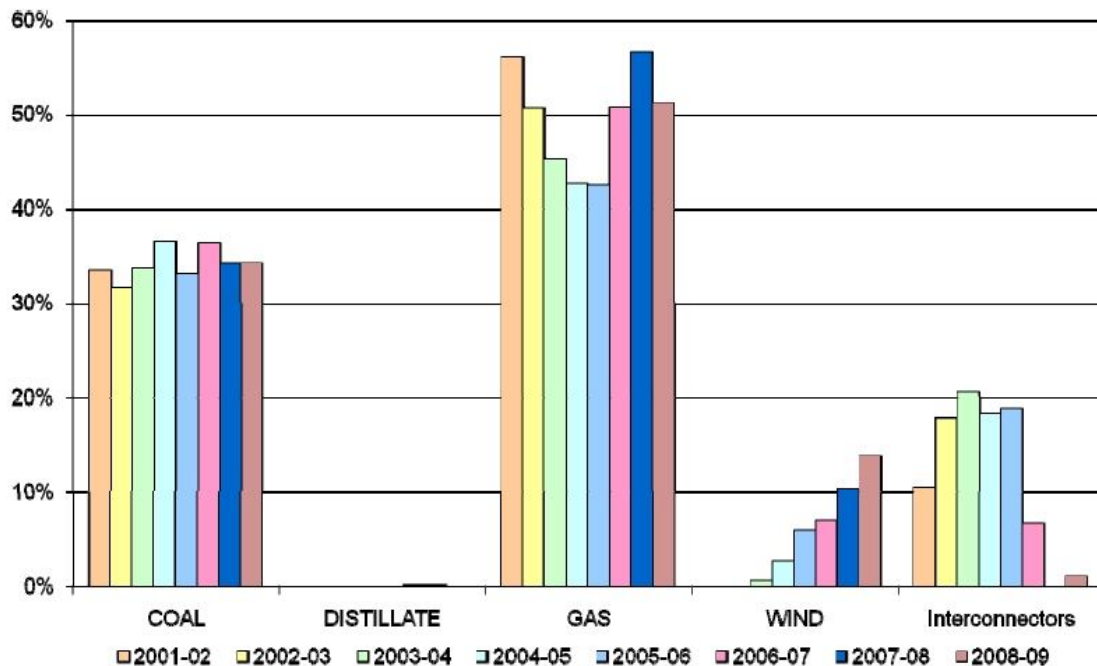
Finally! A reference that promises some real numbers! So off I go to read up on ElectraNet. Their latest report is saved at <http://windfarmrealities.org/wfr-docs/electranet-ren-energy-091202.pdf> . And voila, I find the following chart.



South Australian electricity emissions are down nearly 20% on 2004/05 peak

And sure enough, look how the emissions have gone down, especially from 2006 to 2009. Is this due to wind energy? Or is it due to the higher use of natural gas? Or generating less electricity?

Here's another chart from the same report.



Clearly the output from wind has increased. But also note that the use of natural gas, which always seems to accompany wind energy (no other form of fossil fuel generation can respond quickly enough to wind's fluctuations, so of necessity gas plants are more widely used), has also increased, thus lowering emissions. Another thing to note – coal production has remained constant, even though wind production has increased from 0% to about 13%. What SA has done is to use a combination of gas and wind to replace imports. The real question should be: would the emissions be more or less with wind + gas or with just gas alone? These charts do not provide an answer to this, and even after studying them (and others) for a while, I can't come to any conclusion one way or the other.

Chapter 4, Wind Power and the Electricity Market, curiously includes a number of comments that maybe the emissions savings are not very great. There are a total of 64 subsections of which 14 are in the "Intermittency and Back-up" section, which impacts emissions savings. To save space, I won't go into all of them here, but they reflect the usual stances and arguments, none of them backed up with any evidence.

Chapter 6, Environmental Impact, with 127 subsections, promised to provide more discussion on emissions savings. Most of this discussion was the typical unsupported assertions.

6.29, page 92, showed some promise.

In a paper authored by Macintosh and Downie from the Australian National University entitled, Wind farms, the facts and the fallacies, it was

stated that wind power directly displaces power produced by greenhouse gas emitting sources:

For every megawatt hour (MWh) of wind energy, one less MWh of output is needed from another source. As around 90% of Australia's electricity comes from fossil fuel based generation, this means that the energy production that is displaced by wind farms is likely to be from coal- or gas-fired power stations. By displacing coal- and gas fired generation, wind farms reduce greenhouse emissions. The evidence indicates that a modern 50 megawatt (MW) wind farm operating at 30% capacity will reduce emissions by approximately 120,231 tonnes of CO2 each year, which is equivalent to the annual emissions from 27,767 cars.

So off I go again to check on this report, saved at <http://windfarmrealities.org/wfr-docs/macintosh-facts-fallacies-2006.pdf> to see if it has any evidence. Alas, when digging down to find where they got their numbers, page 16, you find

To do this, we can use an emission coefficient (or emission factor) that estimates the average amount of greenhouse emissions from each unit of electricity produced in the relevant system (i.e. it takes into account generation from both fossil fuels and renewables).

Notice the word “estimates”? Their number is simply what I call a “direct displacement” on my in the Emissions section of my web site at <http://windfarmrealities.org>, and is just another assertion, invalid for all the reasons I discuss there.

6.30, page 92, also showed some promise.

Infigen Energy also highlighted studies which demonstrate the significant greenhouse gas emission savings that can be achieved from wind power, including a study of Victorian wind farms in 2006:

A number of these detailed studies have been performed documenting the significant greenhouse gas emissions resulting from increased wind energy generation in Australia. Perhaps, the most focused of these studies was performed for the Victorian Government by McLennan Magasanik and Associates Pty Ltd (MMA) in 2006. This study, Assessment of Greenhouse Gas Abatement from Wind Farms in Victoria found that 1000MW of wind energy facilities in Victoria would result in a reduction of between 2.4 and 2.9 million tonnes of CO2 per annum ... 1000MW of wind energy is forecast to result in a reduction of slightly more than 1000 tonnes CO2 for each GWh of electricity generated by wind energy.

This report, saved at <http://windfarmrealities.org/wfr-docs/mclennan-magasanik-2006.pdf> quickly wipes out. Immediately from the Executive Summary, page i, I knew this report would not be useful.

The level of [emission] abatement from wind generation was estimated using a simulation model of the National Electricity Market (NEM).

Followed by this on page 2.

This is derived from the electricity pool coefficient, which is the average of the greenhouse emissions per unit of electricity generated from the mix of generators contributing to Victoria's electricity supply.

This report uses the same invalid direct displacement method as the report in the previous subsection did.

6.34, page 93, also showed some promise.

Pacific Hydro reported that the amount of greenhouse gas emissions that have been abated through the development of this company's wind farm in Victoria is one million tonnes over six years:

Pacific Hydro's 52.5MW Challicum Hills Wind Farm, located near Ararat in rural Victoria, was commissioned in 2003. In the six years of its operation, it has abated one million tonnes of greenhouse gas emissions. Pacific Hydro's current operating wind farms in Australia abate up to 670,000 tonnes of greenhouse emissions every year. Projects in our development pipeline would increase this figure by up to two million tonnes per annum.

Sounds nice, even understanding this statement is from Pacific Hydro, a wind energy developer, and thus an interested party. Where did they get their number? Let's take a look at the fact sheet on Challicum.

Capacity	52.5 MW
Electricity Generation	141 GWh p.a.
Capacity Factor	30.6%
Commissioned	2003
Wind Generator Manufacturer	NEG Micon
Location Victoria	Victoria, Australia
Number of Wind Generators	35 x 1.5 MW
Power Purchase Agreement	Origin Energy
Greenhouse Gas Saving	est. 180,000 tonnes pa
Homes Supplied	est. 25,000 p.a.

The second line from the bottom gives it away. The “est” does not mean “established”. They offer no further information on how they figured their number. Another strikeout.

As far as I can tell, these 9 items represent the essential totality of the “evidence” the Standing Committee received, with everything else in both directions being just assertions, with no attempt to support them at all. In spite of that, the Committee, in section 6.38, page 93, found

The Committee notes information provided to the Committee about the amount of greenhouse gases that are abated through wind power in

Australia. As wind farms displace carbon dioxide emissions from non-renewable sources of electricity, the Committee believes that wind power has the potential to reduce dependency on non-renewable sources of electricity and reduce greenhouse gas emissions. For example, greenhouse gas emissions could be reduced by approximately 120,231 tonnes of CO₂ each year with the operation of a 50 MW wind farm operating at 30% capacity.

That comes to 0.9kg/kw-hr, which is the standard coal-based direct displacement number.

Note that 8 of the 9 items presented no evidence at all to support this number, and the 9th (item 3.14) presented no number at all, and was inconclusive in any event.

The Committee then goes on, in 6.41, page 93-94, to state

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. For such a potentially valuable contributor to reducing greenhouse gases this is an anomaly and one that is, somewhat understandably, giving rise to unnecessary suspicion. As this inquiry has discovered in relation to a number of issues, misinformation can have a detrimental effect on people's perception and understanding of a particular issue. As wind farm developments are causing a great deal of stress among local residents (as discussed in Chapter 8), it is important to clarify this issue.

I guess it never occurs to them that just maybe the "significant degree of confusion and misinformation" is due to the inability of the wind industry or their supportive governments to come up with a reality-based (dare I say *scientific*?) demonstration that wind energy does in fact save on emissions.