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Clean Energy Council

27 January 2011

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

By email: community.affairs.sen@aph.gov.au

Dear Sir/ Madam,

CEC Response to the Social and Economic Impact of Rural Wind Farms

The Clean Energy Council (CEC) is the peak body representing Australia's renewable energy and energy efficiency industries. Its priorities are to:

- create the optimal conditions in Australia to stimulate investment in the development and deployment of world's best clean energy technologies;
- develop effective legislation and regulation to reduce energy demand and improve its efficient use; and
- work to reduce costs and remove all other barriers to accessing clean energy.

The CEC advocates the development of policies on behalf of its members at federal, state and local government levels and promotes understanding of the industry and its potential through channels such as industry events, forums, conferences, newsletters and publications. The clean energy industry includes generation of electricity using wind, hydro, solar, biomass, geothermal and ocean energy as well as the emerging technologies and service providers in the energy efficiency sector, which includes solar hot water and cogeneration.

The CEC welcomes the opportunity to provide a submission to the Senate Inquiry into the Social and Economic Impact of Rural Wind Farms. The Clean Energy Council supports effective policies being implemented which continue to support the deployment of renewable energy projects and the attraction of clean energy investment and creation of jobs throughout rural and regional Australia. As the peak industry body representing the renewable energy industry, the CEC maintains that wind energy is an integral part of the renewable energy mix required to meet the renewable energy targets of the State and Federal Governments and facilitate Australia's transition to a low carbon economy.

Australia's Renewable Energy Target (RET) will deliver 20 per cent of the country's electricity from renewable sources by 2020. It will unlock more than $20 billion in investment and create many jobs. As wind power is the lowest cost form of large-scale renewable energy, much of the growth in renewable energy required to meet the RET is expected to come from wind energy. In 2009-10 alone, wind energy in Australia generated just under $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 the wind turbine towers is just one example of the importance of the wind industry to Australian manufactures and suppliers.

Modelling by SKM - MMA (Sinclair Knight Merz - McLennan Magasanik Associates) for the Clean Energy Council found the estimated current 282 direct employees, employees working on proposed projects (514) and the 1388 employees associated with the construction of the existing pipeline of wind farm projects, can be expected to grow significantly to around 1600 direct employees by 2020 and involve up to 17,000 full time equivalent jobs in construction over the next decade. Much of this growth will be in regional Australia creating employment opportunities and an economic boost for towns and communities which helps to diversify and strengthen local communities. A key advantage of wind farm development is that the jobs created by wind farms are spread over several regions, not concentrated in a few regions as tends to occur with larger scale fossil fuel plants such as coal.

Research indicates there is extensive support for wind farms in the nation including strong support for wind farms being built in their local region.

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 1-2km 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.

The benefits of wind farms to the local region are not confined to the initial investment in the project. They also provide a reliable 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 AGL's Hallett wind farm project had on the mid-north region of South Australia. The report found that $800million had been spent on the projects including $88million already spent directly in the region, 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.

Wind farms displace fossil fuel generation and provide greenhouse gas emission abatement

The other obvious benefit of wind farms is the 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 size 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.

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.

Any impact of wind's variability on emissions abatement is managed in the National Electricity Market (NEM) by frequency control ancillary services (FCAS). This study found no evidence of a significant increase in the use of FCAS to deal with wind variability. Any increase in emissions as a result of fossil fuels providing additional FCAS would be minimal. The UK's Sustainable Development Commission states " *when wind produces 20% of total output, it is estimated that the emissions savings from wind will be reduced by a little over 1%, meaning that 99% of the emissions from the displaced fuel will be saved".* In other words, almost all of the emissions savings from wind power are still realised even taking its variability into account.

The Australian Wind Energy Forecasting System (AWEFS) provides forecasts of expected wind energy generation and, in conjunction with semi- dispatch rules, allows the Australian Energy Market Operator (AEMO) to better manage the output from wind farms in the electricity market, dispelling claims that the variability of wind will reduce efficiency of the network stability and management.

There is currently less spinning reserve on the NEM than there was when NEM was created despite the fact that 1.8GW of wind has been installed.

An additional benefit of wind energy is the fact that it does not consume any water for generation unlike thermal power stations which require water to generate steam to drive the steam turbines, for cooling the exhaust steam and ash disposal. Thermal power plants, primarily coal-fired power stations, are responsible for around 1.4 % of total water consumption in Australia (ABS, 2005). In a water constrained country, this benefit of wind energy is important to take into account in planning for future electricity generation investments.

Existing standards and guidelines currently used in Australia at a state and federal level for wind farm development are already among the most stringent in the world.

The wind industry accepts the need for effective standards for wind projects. Like any infrastructure project there may be a small number of local community members who do not support the development. 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 faced by other infrastructure developments such as coal mines, conventional power stations or other major industrial operations.

Planning systems already in place provide the overarching framework to assess proposed actions and thus balance the benefits of a wind farm development with any impacts. 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 a range of stakeholders at early stages of feasibility to determine whether there are any further environmental, cultural or amenity impacts that need to be understood and managed 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.

There are numerous planning requirements currently in place at Federal, State and local government levels. The interplay of these existing federal, state and local planning 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. Adding additional regulatory controls would only act to add to this red tape and make wind energy more expensive.

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 have the potential to encourage greater consistency between State planning regimes and remove impediments to development. However the Draft National Wind Farm Development Guidelines as currently

proposed only add serious impediments to wind farm development beyond those imposed on other infrastructure investments, reducing certainty for the planning assessment process by introducing additional, often conflicting guidelines. This would add additional costs and delays to wind farm developers without delivering improved outcomes. A review conducted by Sonus on the Draft National Wind Farm Development Guidelines, July 2010, titled "*Draft National Wind Farm Development Guidelines, Review of Noise Aspects",* found that the draft guidelines introduce less certainty and consistency into the regulatory environment prior to their existence and therefore do not achieve their core objective to "provide consistency between jurisdictions".

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 manmade 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 even very near 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.

Pacific Hydro commissioned Sonus to measure and compare infrasound levels from wind farms and some common environment infrasound sources, both natural and man-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.

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

The National Health and Medical Research Council (NHMRC) (report attached) 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.

The Clean Energy Council commissioned expert noise consultants Sonus (report attached) to provide the latest information on environmental noise from wind farms. Sonus found that there is no evidence that residents will suffer any direct health effects from living near operating wind farms. Australian jurisdictions presently assess the noise from wind farms under a range of standards and guidelines applicable to each State and Territory. These standards and guidelines are stringent in comparison to international guidelines. Common elements in these standards and guidelines utilized in Australian jurisdictions include:

- A background noise and wind speed measurement procedure to determine the applicable background noise related limits at each dwelling;
- A noise level prediction methodology to enable a comparison of the predicted noise level from the wind farm against the noise limits at each dwelling;
- The required adjustments to the predicted noise levels to account for any special audible characteristics of the wind farm noise;
- A compliance checking procedure to confirm the operational wind farm achieves the predicted noise levels at each dwelling.

The base noise level requirement of 35 or 40dB (A) provided in the main assessment tool in Australia is already significantly more stringent than the World Health Organisation's recommended guideline value of 45dB (A). Sonus found that the potential complaints,

annoyance and associated stress and health impacts can be exacerbated by rhetoric, fears and negative publicity relating to the wind farm development.

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 created anticipatory fear in some people that they will experience adverse effects from wind turbines.

In line with this, Sonus also found that once wind farms are built, the rates of complaints are very low in Australia and New Zealand and if a noise can be heard, then annoyance can result for some people, regardless of the noise level or the standard or guideline that applies.

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).

Fixing an arbitrary minimum setback distance not based on any scientific evidence is counter-productive and inconsistent with other infrastructure planning.

Setting of an arbitrary minimum distance not based on the rigorous scientific processes that wind farm developers currently undergo is counter-productive. Establishing a buffer distance for wind farm planning is not consistent with other infrastructure planning assessments. Wind farm developers should be subject to the same planning and development principles as other developments.

Currently all wind farms undergo thorough noise and visual assessment during planning stages which take into account the setback distances from residential dwellings. By fixing the setback distances and therefore limiting the location of turbines and the size of the wind farm, the overall generation output of the wind farm will be less than optimal impacting upon the economics of the project. In some situations this will harm the economic viability of the wind farm to the extent where it is not viable. This would therefore have a severe impact on the nation's effectiveness in producing large scale renewable energy generation with wind currently being the least cost renewable energy option.

A report by Carbon Market Economics (attached) found that a mandatory setback of 2km from neighborhood dwellings would put between 50-70 per cent of proposed wind farms in Victoria in jeopardy. This in turn would jeopardize billions of investment dollars and thousands of jobs. Such an outcome is contrary to the renewable energy targets of the State and Federal governments and would send investment and jobs out of the region.

Instead, as employed by all other infrastructure planning assessments, each development should be addressed on a site by site basis to understand amenity impacts in terms of noise, visual impact, shadow flicker, fauna and flora impacts etc and to determine the acceptability of a particular project.

Any impacts of wind farms on surrounding flora or fauna are carefully assessed and managed or mitigated accordingly.

Any potential effect of wind farms on surrounding flora or fauna are carefully assessed and any impacts are managed or mitigated accordingly. Wind farm proponents conduct extensive surveys over a number of years to assess the potential impact their wind farms could have on surrounding flora and fauna, including birds, bats and vegetation. Detailed mitigation and monitoring measures are utilised to mitigate the impact of proposed wind farms on the flora and fauna species surrounding the site. Development of wind farms are already subject to state and federal environment policies including Environmental and Planning Assessments various state environmental legislations, State Environmental Planning Policies, any relevant Regional Environmental Plans and the Commonwealth Environmental Protection and Biodiversity Conservation Act.

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 (attached) on the impact of wind farms on surrounding land values in Australia 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 international studies in the United States and United Kingdom that 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*"

There is no development activity in Australia that is required to compensate neighbours of an infrastructure project.

The planning and approvals systems that operate throughout Australia provide a transparent process open to third party representations to ensure potential impacts at regional, local and site levels are thoroughly assessed and developments are only granted planning permits if they meet the established planning policies and provisions or have conditions imposed to ensure they comply. This process already provides opportunities for both developers and land owners to enter into commercial arrangements outside of the regulated approval process. Attempting to bring the commercial arrangements into a regulatory system will lead to unintended consequences. For example: the possibility of a "right of veto" by individuals to the development of wind farms will result in lost investment and job opportunities to a much greater proportion of the surrounding regional population, be counterproductive to Australia's transformation to a low carbon economy and its bid to increase energy security, particularly as wind is currently the least cost renewable energy option.

Certainty is critical for investors in these major projects to have confidence in their decision to invest. Projects with a similar scale and nature of impact should be treated in a consistent manner. There is no development activity in Australia that requires neighbours of an infrastructure project to be paid off. Altering the planning provisions for one type of development will set an unrealistic precedent for all major developments such as future highways, power lines, and fossil fuel generation plants which have amenity impacts to a greater number of neighbours.

Wind power will play a crucial role in Australia meeting its renewable energy target and reducing carbon emissions. Effective policies are required to support the development of all renewable energy and while regulatory controls are essential to ensure appropriate development, they should not be so cumbersome to meet that they deter renewable energy development altogether.

If you have any further questions please contact Kane Thornton via telephone on 03 9929 4100 or by email at kane@cleanenergycouncil.org.au. The Clean Energy Council would also be pleased to present on this submission and other related issues to the Senate Inquiry should the opportunity arise.

Yours sincerely

<original signed>

Kane Thornton

Director of Strategy

Attachments