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The Inquiry into the Social and Economic Impact of Rural Wind Farms

Embark welcomes the opportunity to provide a submission to the Senate Inquiry into the Social and Economic Impact of Rural Wind Farms.

Embark is a not-for-profit body established to facilitate the development of a vibrant community renewable energy sector in Australia. Inspired by the success of Hepburn Wind, Australia's first community owned wind farm, many other communities are keen to participate in, and benefit from, the transition to a low carbon economy.

Over the next decade, Australia's Renewable Energy Target (RET) is expected to generate more than $20 billion in investment and create thousands of jobs. As the lowest cost renewable energy technology, wind power will need to make up much of the growth in renewables to meet the RET and reduce carbon emissions.

It has been well documented that a broad cross section of the community want to see more renewable energy in Australia and support wind power. As with the introduction of any unfamiliar technology, some in the community are against wind farms being located in their local area. What we're currently seeing from a small, but well organised and vocal opposition, is a campaign designed to instill a fear of wind farms by using misinformation and unsubstantiated claims.

Our Prime Minister is acutely aware that broad community support must be present before effective climate policy can be enacted. Community ownership of renewable energy facilities has been integral to the broad acceptance of clean energy technologies in other jurisdictions. Significant community ownership of renewable energy infrastructure is a feature of the UK, USA, Germany, Canada and Denmark.

Embark is committed to eliminating the barriers holding back the growth of a powerful community renewable sector in Australia. We strongly believe that a vibrant community energy sector is an economically efficient way to unlock the power of

the community to support more ambitious action on carbon abatement in Australia over the longer term.

Our submission is structured around the inquiry's key terms of reference.

Adverse health effects for people living in close proximity to wind farms

Numerous studies, here in Australia and internationally, have been conducted to measure the impact on health from wind farms. We understand that there is no generally accepted scientific evidence linking wind farms with adverse health affects due to infrasound, noise, electromagnetic interference, shadow flicker, blade glint or any other phenomenon.

A summary of some of the findings is presented below:

- As a result of the growing concerns about wind farms, Australia's peak health body, the National Health and Medical Research Council (NHMRC), recently conducted a review of the evidence and published a public statement concluding 'there is currently no published scientific evidence to positively link wind turbines with adverse health effects.' If fact, the NHMRC review goes on to say '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.'
- After examining both peer reviewed and validated scientific research, the Victorian Department of Health also concluded 'The Department of Health has examined the available scientific literature on wind farms and has concluded that there are no direct health effects that can be attributed to modern wind turbines.'
- In late 2010, the Clean Energy Council (CEC) commissioned expert noise consultants Sonus to provide the latest information on environmental noise from wind farms. Sonus found there is no evidence that residents will suffer any direct health effects from living near operating wind farms. The Sonus technical paper also noted that once wind farms are built, the rates of complaints are very low in Australia and New Zealand.
- In their report for the World Health Organisation, Berglund and Lindvall stated 'There is no reliable evidence that sounds below the hearing threshold produce physiological or psychological effect.'
- The American and Canadian Wind Energy Association established a scientific advisory panel comprising medical doctors, audiologists and acoustic professionals from the US, Canada, Denmark and the UK. The panel

concluded in its Wind Turbine Sound and Health Effects - An Expert Panel Review 2009 that 'wind turbine syndrome' is 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 Chatham-Kent Public Health Unit (Ontario, Canada) also reviewed the public literature regarding the known health impacts of wind turbines in order to make an evidence-based decision. Their report The Health Impact of Wind Turbines concluded that current evidence failed to demonstrate a health concern associated with wind turbines.

Concerns over the excessive noise and vibrations emitted by wind farms, which are in close proximity to people's homes

Research conducted on modern turbines has shown that the levels of low frequency noise and infrasound are within accepted thresholds. Like any machine, wind turbines emit sounds across a broad range of frequencies, including those below the frequency threshold of human hearing. The sound characteristic is not particularly unusual, and the intensity is similar to sounds emitted by natural sources like ocean waves, wind passing through trees, and industrial sources like vehicles and air-conditioners.

There is currently no peer-reviewed scientific data to suggest that the levels of low frequency sound or infrasound emitted by wind turbines have the potential to cause any adverse medical effects.

A summary of the findings to support this follows:

- To inform the recent public debate on this topic, Pacific Hydro commissioned Sonus, an independent acoustic consulting firm, to measure and compare infrasound levels from wind farms with some common environment infrasound sources, both natural and human-made. The report 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. Interestingly, one of the highest levels of infrasound that was recorded was at the beach.

- The British Wind Energy Association conducted research in 2005 on modern turbines which showed that the levels of infrasonic noise and vibration radiated from modern turbines are at a very low level; so low that they lie below the threshold of perception, even for people who are particularly sensitive to such noise and even when very near to turbines.
- The publication Wind Turbine Sound and Health Effects - An Expert Panel Review 2009 for the American and Canadian Wind Energy Association, involves an extensive review, analysis and discussion of the large body of peer-reviewed literature on sound and health effects in general, and on sound produced by wind turbines. The principal conclusions drawn by this expert panel included:
  - ☐ there is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects;
  - ☐ the ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans; and
  - ☐ the sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel's experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.
- The Department of Trade and Industry UK found in their 2006 study The Measurement of Low Frequency Noise at Three UK Wind Farms that 'Infrasound associated with modern wind turbines is not a source which will result in noise levels which may be injurious to the health of a wind farm neighbour.'
- The NHMRC review of evidence also references Dr Nina Pierpont's opposing view that noise from wind turbines produces a cluster of symptoms which has been termed 'Wind Turbine Syndrome'. Their review points out that 'Dr Pierpont's assertions are yet to be published in a peer-reviewed journal, and have been heavily criticised by acoustic specialists.'
- RenewableUK (formerly the British Wind Energy Association) also recently published an independent report by three experts on Dr Pierpont's 'Wind Turbine Syndrome'. The independent reviews on the alleged condition known as Wind Turbine Syndrome represent a robust and reliable state of knowledge on the issues involved. The experts concluded that:

- ☐ the scientific and epidemiological methodology and conclusions drawn are fundamentally flawed;
- ☐ the scientific and audiological assumptions presented by Dr Pierpont relating infrasound to WTS are wrong; and
- ☐ noise from wind turbines cannot contribute to the symptoms reported by Dr Pierpont's respondents by the mechanisms proposed.

- The Health Protection Agency (HPA) publication Health Effects of Exposure to Ultrasound and Infrasound – Report of the Independent Advisory Group in Non-Ionising Radiation presents a robust and expert state of knowledge on the heath effects of ultrasound and infrasound. The most significant conclusion it presents relevant to the wind sector is that 'there is no consistent evidence on any physiological or behavioural effect of acute exposure to infrasound in humans.'

The impact of rural wind farms on property values, employment opportunities and farm income

Property values

Studies in Australia and overseas continue to demonstrate consistently that property values are not affected by the close proximity of wind farms.

The main finding in the Assessment of the Impact of Wind Farms on Land Values in Australia prepared for the NSW Valuer General was that property values were not negatively affected by the eight wind farms included in the study. No reductions in sale price were evident for rural properties located in nearby townships with views of the wind farm.

This finding is consistent with international studies conducted overseas including:

- An extensive and rigorous assessment of the relationship between wind farms and property values was completed in December 2009 by the US Department of Energy's Lawrence Berkeley National Laboratory. The report The Impact of Wind Power Projects on Residential Property Values in the United States included data and analysis on 7,500 single-family homes over a 12 year period. The analysis revealed that home sales are sensitive to the overall quality of the scenic vista from a property, but that a view of a wind farm did not demonstrably impact sale prices. Neither the view of the wind farm nor the distance of the home to wind farms was found to have any consistent, measurable, or significant effect on the sale prices of nearby homes.
- A major study The Effect of Wind Development on Local Property Values carried out in the USA by the Renewable Energy Policy Project (REPP) examined 24,300 property

transactions from 10 locations within the US over a period of six years. They concluded that there was no evidence to suggest that wind turbines sited within a five mile radius of property had a negative impact on value. In fact, to the contrary, property values appeared to rise above the regional average within the case study locations, suggesting that the wind turbines actually had a positive effect on value.

- A Canadian study Effect on Real Estate Values in Chaltham-Kent, Ontario by independent consultants, Canning and Simmons in 2010 concluded '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 areas that were outside of the viewshed of a wind turbine.'

Economic importance of wind energy

Australia's Renewable Energy Target (RET) will deliver 20% of the country's electricity from renewable sources by 2020, unlocking more than $20 billion in investment and creating many jobs. Wind power is the lowest cost form of readily-available renewable energy available. As a result much of the 20% target will come from wind. The wind industry has already had a significant economic impact in Australia with more than $1 billion investment generated in 2009-10 alone. Bloomberg, New Energy Finance, 2010

- In a report for the Clean Energy Council, Sinclair Knight Merz – McLennan Magasanik Associates found that the wind industry is expected to provide 1600 direct employees by 2020 and 17,000 full time equivalent jobs in construction over the next decade. These jobs will be primarily in regional Australia.
- The benefits of wind farms are not confined to the initial investment in the project as demonstrated in another study conducted by Sinclair Knight Merz. The Economic Impact Assessment of the Hallett Wind Farms investigated the impact of AGL's Hallett project in South Australia. The report found that $800 million had been spent on the projects including $88 million already spent directly in the region, creation of 98 construction jobs and 15 ongoing jobs directly created by the wind farm which increases 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.
- The Hepburn Wind project has already spent $2m in regional Victoria, with more to come. The project employs three locals and has provided valuable learning opportunities to many in the region. And on top of dividends to investors, revenues will go to a Community Sustainability Fund providing $15,000 per turbine per annum.
- Employment in the UK's burgeoning wind energy industry has almost doubled over the past three years, rising 91 per cent between 2007/8 and 2009/10 to over 10,000 full

time employees as referenced in Wind of change – renewables industry reveals jobs 'bonanza'.

- As referenced in 2009 in Wind Energy in Germany from the German Wind Energy Association web site, German manufacturers and suppliers contributed to nearly 30 per cent of the total worldwide turnover of 22.1 billion euros. Together with installation, operation and maintenance services, the wind industry achieved a turnover of more than 8 billion euros. The sector employs close to 100,000 people.

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

The planning systems in each state contain comprehensive frameworks for evaluating wind farm proposal. In fact, Australia's existing standards and guidelines for wind farm development are some of the most stringent in the world. The assessments that precede planning approvals are extremely detailed, and take into account a wide range of potential impacts including environmental, social, cultural, and technical considerations. Wind farms should not be required to meet unnecessarily higher standards than those faced by other infrastructure developments.

The notion of a 'distance based set-back' for wind farms is currently being explored within certain levels of government. We advocate that any set-backs should have a scientific basis and refer to noise, visual amenity, shadow flicker and not distance.

Other relevant matters

Wind farms are broadly supported within the community

AMR Interactive conducted polling during 2010 for the NSW Government on community attitudes to wind farms, finding that 85% of regional residents supported wind farms being built in NSW. The survey also found that 79% of residents were supportive of wind farms being built within 10km of their residence and more than 60% supported them at 1–2km from their residence.

The CEC commissioned a survey by Newspoll in December 2009 which found that in regional areas, 90% of people said that Australia should produce more renewable energy.

At a community level, more than 1400 people have invested in Hepburn Wind, proving that under the right conditions, communities can be very welcoming of wind energy. When Hepburn Wind applied for its planning permit, council received 18 objections and 325 letters of support for the project.

Role of community wind

The transition to a low carbon economy is inevitable. In these early days, the transition may not happen as quickly as many would hope for, or as aggressively as the science demands, but it is clear this transition has to happen.

While most Australians will agree that climate change presents a unique and massive challenge – few know what they can do personally to make a real difference. Without obvious avenues of response, the public becomes at once frustrated, impatient and paralysed. We turn to our leaders for solutions but without a clear mandate our leaders are hamstrung.

Community wind refers to a wind project that is appropriately scaled and supported by the community in which it is located. Although community ownership and financing of renewable energy projects is a relatively new concept in Australia, it is widespread in several European countries and rapidly developing in the US. This model allows communities to actively play a role in and benefit from carbon abatement while at the same time breaking down some of the social barriers we face in relation to education and acceptance of renewable energy.

Many more communities will need to embrace renewable energy infrastructure in their backyard over the coming decade for Australia to meet the expanded RET target of a four-fold increase in renewable energy generation.

Hepburn Wind is a great pioneering example to our leaders and the broader community that, under the right circumstances, renewable energy is warmly welcomed within the community. With more successful local examples of communities investing in, and benefiting from renewable energy, we strongly believe that opposition will be reduced.

Benefits

There are a myriad of benefits for community wind projects including:

Empowerment of communities to be active in carbon abatement

- Community wind projects offer people the chance to make a significant, collective contribution to reducing climate change – way over and above what they can achieve by installing fluorescent light bulbs, using public transport, improving home insulation or other energy savings measures.

- Direct ownership changes attitudes at the local level, and leverages committed individuals in a community, giving them a positive outlet for action;
- Community ownership increases support for additional climate change mitigation measures and improves people's broader environmental awareness.

Delivery of regional economic benefits

- Community wind projects create jobs in regional areas, and generates new income streams for communities adding depth to local / regional economies;
- Most community wind projects commit a specific proportion of profits to the community as financial support. An example of this is the Hepburn Wind project near Daylesford, in Victoria. On top of dividends to investors, revenues will be poured into the Community Sustainability Fund. This fund will provide $15,000 per turbine per annum (indexed) for local projects that address social, economic and environmental sustainability.

Acceleration of renewables industry development and impact

- Small projects often lead to large ones. Denmark and Germany provide examples where community wind initiatives have led the way for large scale corporate investment in renewable energy;
- With successful local examples, community opposition is reduced.

Tapping of a new funding source – the community investor

- Community ownership encourages greater diversity in the investor base and taps a latent, and lower-cost patient source of capital.

Bridging of the gap between individual and corporate action

- The average rooftop solar installation delivers 1.5 kW, while a utility scale renewable energy project may deliver in excess of 100 MW. Between these two extremes lies an enormous opportunity for medium scale and community energy to play a part;
- Community wind projects, typically in the range 2-10 MW, can deliver efficiencies that approach those of utility-scale infrastructure without sacrificing the many benefits of small scale initiatives.

Community wind in Australia

The first two community wind farms are now under construction and are expected to be completed mid year.

Hepburn Wind Community Wind Park Co-operative
Located near Daylesford in Victoria, Hepburn Wind is building a two turbine, 4.1 MW wind farm which will generate enough clean energy to power the houses of Daylesford and much of the surrounding area. Over the past two years Hepburn Wind has secured over $8.6 million from more than 1,400 mostly local members.

Profits from the sale of emissions free electricity will be paid as dividends to co-operative members, as well as $1m over 25 years to a Community Sustainability Fund. The fund will support local initiatives that promote the sustainability of the Hepburn Shire.

Hepburn Wind's membership numbers continue to grow and speak volumes about community support for this project.

Mt Barker Community Wind Farm
Situated on a private sheep farm, 4km north of Mt Barker in Western Australia, Mt Barker Community Wind Farm will consist of three turbines generating 2.4 MW. 80% of the wind farm is owned by local investors.

Other projects
Since launching in October 2010, Embark has been contacted by over 30 communities who are interested in developing their own renewable energy initiatives across a range of technologies and geographic locations. The following wind projects are all at various stages of investigation:

- **Denmark Community Windfarm** (DCW) is planning a 1.6 MW wind farm located in Denmark, Western Australia. Set up in 2003, the project is about to start its capital raising phase after receiving all the necessary planning approvals and 50% of the capital via grants. The wind farm is expected to generate 40% of Denmark's annual electricity consumption and is supported by 70% of the local community.
- **New England Wind** based in Armidale, NSW is an initiative of the New England Sustainability Strategy (NESS). They received initial funding to conduct a feasibility study into a community owned wind farm in the region.
- **Renewable Newstead** aims to convert Newstead, Victoria to 100% renewable energy by 2015. The group has received initial funding to conduct a feasibility study that will examine a range of renewable technologies to achieve their objectives.
- **Woodend Integrated Sustainability Energy** (WISE) and the Macedon Ranges Sustainability Group (MRSC) hope to develop a small-scale community owned wind park facility south of Woodend, Victoria on Crown land leased for pine plantation purposes. They intend to build a community trust funded by local wind power production, and to use these funds for local sustainability projects.
- **Mt Alexander Sustainability Group** (MASG) are also planning to develop a small scale community owned wind farm near Castlemaine, Victoria. Local residents will be responsible for ownership and control of the wind farm,

and there will be an opportunity for all shire residents to have a financial stake in the project if they wish to do so.

- **Clean Green Bellarine** based on the Bellarine Peninsula in Victoria have begun a preliminary investigation into powering the peninsula with a range of renewable energy technologies.
- **Community Wind Power** based in Westbury, Tasmania have started to investigate the feasibility of a community owned wind farm in their region.
- We have held discussions with the RDA representatives for Adelaide Hills, Fleurieu and Kangaroo Island who are examining a range of renewable technologies for Kangaroo Island.
- **The Southern Councils Group** based out of Kiama, NSW is actively promoting the development of a community wind farm in their region.
- **The Central West Renewable Energy Group**, a sub committee of the Bathurst Climate Action Network had begun investigating possible sites during 2010 for a community owned wind farm in their local area.
- **Brimbank Council** in Victoria is investigating the feasibility of putting a small wind turbine on an old landfill site. They have been monitoring the wind speeds at the site for almost 12 months.

Status of community wind internationally

In the United Kingdom and Europe, community-owned projects are commonplace. Denmark has over 200,000 investors owning more than 5,500 turbines.

In the United States and Canada, the community renewables sector is strong and growing, with an installed capacity similar to Australia's entire renewables sector. According to Windustry, the peak US body for community wind, US community wind projects added 544 megawatts (MW) of new energy capacity in 2009, bringing the January 2010 total for community wind capacity to 1,521 MW. Australia's total operating wind capacity at the end of 2009 was 1712 MW (Clean Energy Council).

In a Scottish study from 2010, Does community ownership affect public attitudes to wind energy, Warren and McFadden, found that 95% of citizens living close to community wind farm supported the increased use of wind power. They also concluded that public attitudes are most positive towards wind farm development where local communities have a direct involvement in them than in areas where they do not.

Conclusion

Over the next decade, our national targets require a quadrupling of installed capacity to see renewable energy eventually contributing 20% of Australia's electricity mix. Wind farms are the lowest cost, most widely deployable renewable energy technology and have the potential to create enormous economic, environmental and social benefits for Australian regional communities. Community engagement will be

central to creating the social license that enables the necessary change.

We thank the Senate Committee for the opportunity to make a submission and we would welcome the opportunity to present to the Committee during the Inquiry.

Yours sincerely,

Mary Dougherty
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Embark