The Senate

Environment and Communications Legislation Committee

Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012

November 2012

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TABLE OF CONTENTS

List of Recommendations

Recommendation 1

2.20 The committee recommends that specific noise measures, thresholds and measuring locations not be included in legislation, as there is insufficient consensus on these elements of the proposed bill.

Recommendation 2

3.51 The committee recommends that there should be no regulatory changes prior to the release of the NHMRC's assessment in 2013, as this would be premature.

Recommendation 3

4.59 The committee recommends that, where there is ongoing debate over noise compliance issues for particular wind farms, that governments consider making data for those operations available to an independent authority for review of compliance.

Recommendation 4

5.31 The committee recommends that the bill not be passed.

Chapter 1

The *Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012*: Background and details of the bill

1.1 The *Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012* (the bill) was introduced to the Senate on 28 June 2012. The bill is a private members bill co-sponsored by Senators Madigan and Xenophon.

1.2 On 11 October 2012 the Senate referred the provisions of the bill to the Environment and Communications Legislation Committee for inquiry and report.

1.3 In accordance with usual practice the committee advertised the inquiry on its website. In addition, the committee wrote to relevant organisations and certain individuals inviting submissions. The committee received submissions from approximately 165 individuals and organisations, and some form letters. The committee also received a number of items of correspondence that, while addressing wind farm noise in general, did not comment on the bill. These items were not published as submissions, but have been received and noted by the committee. Owing to the large numbers of documents that were accepted as correspondence, and the provision of duplicate submissions, some submission numbers were not used: the list of submissions in Appendix 1 is therefore complete, despite some submission numbers being missing.

1.4 The committee held a public hearing in Canberra on 14 November 2012. At the hearing, and subsequently, the committee received evidence from a range of experts, both from Australia and overseas. The committee is very grateful to overseas witnesses for their co-operation in giving evidence at what would have been for them very inconvenient times, and in providing prompt responses to questions taken on notice.

1.5 The committee received written submissions that contained adverse comments about a range of individuals and organisations, all of which were given an opportunity to provide written response. These have been published by the committee and are included in the list in Appendix 1. During the public hearing, Mr Steven Cooper made comments critical of a NSW Department of Planning employee, Mr Jeff Parnell. Mr Cooper said:

> I had discussions with him prior to my undertaking the work, and at a recent meeting that was at Cullerin he refused to talk to me…The one officer who is handling noise, at a meeting which was part of an audit process for Cullerin, refused to talk to me and had his back to me for the entire two hours.[1]

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1 Mr Steven Cooper, *Proof Committee Hansard*, 14 November 2012, p. 32.

1.6 Mr Parnell, a scientist with thirty years' experience with NSW government agencies, wrote to the committee, providing a different account of the meeting described by Mr Cooper, and gave the committee names of others present who he said could corroborate his account. He stated:

> The meeting discussed in evidence by Mr Cooper occurred at the home of a resident that had raised concerns regarding a nearby wind farm to the Department… Mr Cooper was introduced as being present as an observer only and did not sit around the coffee table with everyone else, but sat a metre or so away, not behind me but to the side… Mr Cooper was not part of the meeting and did not contribute or speak to me until we were shaking hands at the end…[2]

1.7 Mr Cooper had wanted to speak to Mr Parnell about another matter, but Mr Parnell pointed out that it would not have been appropriate in the circumstances:

> When we were leaving the… residence, Mr Cooper said to me "I sent you an email" referring to an email regarding a newspaper clipping in a South Australian paper which discussed the quality of a report he had submitted to the Department. As the project (Flyers Creek Wind Farm) was still having its response to submissions prepared at the time, I replied "This is not the right forum to discuss this, but I am happy to do so at another time". That was the full extent of my conversation with Mr Cooper.

1.8 Mr Cooper also stated during the hearing that he had provided information in a submission to the Department of Planning, that he had raised some issues in that submission, but that ' there has been no response'.

1.9 Mr Parnell replied that he had not responded because it would not be appropriate to do so under the relevant planning processes:

> it can be seen on the Department's website that the Flyers Creek Submissions Report has not been completed. It has therefore been inappropriate to comment on Mr Cooper's submission. It should however be noted that it is the proponent that prepares responses to submissions, not the Department…I propose to the Committee that Mr Cooper's version of events is not true and was designed to portray myself as being unprofessional in the carrying out of my duties.

Background

1.10 The scientific evidence shows that the climate is changing. Greenhouse gas emissions caused by human activity are contributing, and if climate change is not tackled it will cause significant human, environmental, and economic costs. In addition to the Intergovernmental Panel on Climate Change, organisations which have given the government this advice include the CSIRO, the Bureau of Meteorology and

2 Mr Jeff Parnell, correspondence to the committee, received 28 November 2012.

the Australian Academy of Science. More recently the World Bank commissioned report *Turn down the heat* has added to the international evidence.[3]

1.11 The Government's response on climate change includes increasing renewable energy supply, energy efficiency measures and putting a price on carbon.

The expansion of renewable energy generation and wind farms

1.12 In 2009 the Australian Government implemented a legislative target, the Renewable Energy Target (RET), aimed at sourcing 20 per cent of energy from renewables by the year 2020.[4] The RET ensures a guaranteed market for electricity generated from renewable sources by requiring wholesale purchasers of electricity ('liable entities') to meet a share of a renewable energy target in proportion to their share of the national wholesale electricity market. The compliance of liable entities with the RET is ensured by the creation of Large-scale Generation Certificates (LGCs). Generators of renewable energy, such as wind farms, receive LGCs which can then be sold to liable entities to enable them to meet their individual RET target.[5]

1.13 Although the *Renewable Energy (Electricity) Act 2000* is technology neutral – in that it does not provide additional incentives for one type of clean energy over another – it encourages the most cost-effective form of clean energy generation.[6]

1.14 According to the Australian Government, in order to meet this target, the number of wind farms 'can be expected to increase significantly in the new few years'.[7] As explained by the Clean Energy Council:

> Wind power as the lowest cost form of large scale renewable energy is an integral part of the renewable energy mix that will be required to meet Australia's legislated target of 41,000 gigawatt hours by 2020.[8]

1.15 Australia currently has 59 wind farms consisting of 1345 wind turbines with 2480 megawatts of capacity.[9] By way of comparison Liddell Power Station in New South Wales for example is 2000 megawatts. The Energy Supply Association of

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3 Potsdam Institute for Climate Impact Research and Climate Analytics (for the World Bank), *Turn down the heat*, November 2012, http://www.worldbank.org/en/news/2012/11/19/world-bank-flash-turn-down-heat-why-tackling-climate-change-matters-development (accessed 26 November 2012).

4 The Renewable Energy Target replaced the Mandatory Renewable Energy Target and commenced on 1 January 2010.

5 Environment, Communications and the Arts Legislation Committee, *Renewable Energy (Electricity) Amendment Bill 2010 [Provisions]; Renewable Energy (Electricity)(Charge) Amendment Bill 2010 [Provisions]; Renewable Energy (Electricity)(Small-scale Technology Shortfall Charge) Amendment Bill 2010 [Provisions]*, June 2010, pp 1–2.

6 Pacific Hydro, *Submission 207*, p. 3.

7 Australian Government Response to the Senate Community Affairs Reference Committee Report *The Social and Economic Impact of Rural Wind Farms*, tabled 13 September 2012, p.2.

8 Clean Energy Council, *Submission 165*, p. 1.

9 Clean Energy Council, *Submission 165*, p. 5.

Australia (ESAA) detailed the rise of wind power in recent years, suggesting this is being driven by the requirements of the RET:

> Electricity generation from wind farms has increased markedly over the past few years in order to help meet the RET. The rapid expansion in the number of wind farms has seen production increase from 1.7TWh in 2005–06 to 5.8TWh in 2010–11. Wind energy has increased from 650MW of capacity in 2006 to 2175MW in 2011.[10]

Issues of appropriate noise levels / planning laws

1.16 As with all large scale developments, individual state governments make and administer their own regulations regarding developments.

1.17 The Clean Energy Council argued that planning responsibilities, including sound and placement matters, fall within the domain of individual states, and that wind farms should be treated in the same way as all other projects:

> Every Australian state government has planning guidelines that are best suited to the unique requirements of their community, industry, and land use configurations. Planning rules for wind farms (and for any other major project) must simultaneously consider various technical issues and social issues…Appropriate regulations and community consultation should apply to any wind farm, as they do to any new infrastructure.[11]

1.18 In its submission to the committee, the Queensland state government affirmed that it has systems in place to ensure developments balance community, ecological and economic considerations. It stated that it:

> …has existing requirements that address environmental impacts, including noise impacts, through the *State Development and Public Works Organisation Act 1971*, *Sustainable Planning Act 2009* and *Environmental Protection Act 1994*. The environmental impact assessment processes are rigorous, and address the:
>
> - existing environment;
> - project's environmental impact; and
> - ways of avoiding, mitigating or offsetting these impacts.[12]

1.19 It was argued to the committee by Pacific Hydro that noncompliance with current state planning and noise regulations attracts strong penalties 'which can include financial penalties and shutdowns.'[13]

1.20 In its submission, Infigen Energy – the largest owner and operator of wind energy in Australia – argued that the current planning regimes in Australia are stringent by international standards:

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10 Energy Supply Association of Australia, *Submission 205*, p. 1.

11 Clean Energy Council, *Submission 165*, p. 3.

12 Queensland Government, *Submission 217*, p. 1.

13 Pacific Hydro, *Submission 207*, p. 2.

> The State Governments have been doing a very thorough job of writing and enforcing some of the most stringent wind farm planning regulations in the world. The Victorian Government has specified a minimum distance between neighbouring residences and turbines of two kilometres. This compares with jurisdictions, with far more extensive experience with wind energy, such as Canada, Denmark, and the USA, specifying much smaller setback distances of 500–600 metres.[14]

1.21 Similarly, the ESAA notes that:

> Currently, planning laws are administered by state governments. There is no clear or justifiable reason for the Federal Parliament to interfere with existing state government planning laws.[15]

1.22 The growth of Australia's wind farm industry has not been without its critics. The planning laws applying to wind farms have also been criticised by some groups. For example, the Western Plains Landscape Guardians Association argued in their submission that:

> There has arisen within the community an increasingly pressing concern that the present planning guidelines for wind turbine noise control, right across Australia, are not doing their job. In the majority of turbine installations within Australia serious problems have resulted for neighbours once the plant begins operation, even when noise guidelines have supposedly been complied with.[16]

1.23 Similarly, the Parkesbourne/Mummel Landscape Guardians Inc. argued that:

> The [NSW] planning legislation does not give adequate attention to the needs of the neighbours of developments. And the noise guidelines are completely inadequate to protect the health and well-being of the neighbours of wind farms.[17]

1.24 Planning issues are explored further in Chapter 4. In addition to planning concerns, opponents of wind farm developments also cite the potential harm to human health caused by wind farm noise. These concerns are canvassed in Chapter 3 of this report.

Current state and territory noise regulations and guidelines for wind farm development

1.25 In relation to noise turbine compliance requirements, the following figures provide some context:

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14 Infigen Energy, *Submission 202*, p. 2.

15 Energy Supply Association of Australia, *Submission 205*, p. 2.

16 Western Plains Landscape Guardians Association, *Submission 131*, p. 2.

17 Parkesbourne/Mummel Landscape Guardians Inc., *Submission 50*, p. 3.

- The World Health Organisation adopts a guideline value of 40dB(A) for general sleep disturbance effects;[18]
- South Australia adopts a guideline of 35dB(A) in rural living zones or 40dB(A) in other zones or the background noise +5dB(A), whichever is greater;[19] and
- Victoria applies NZS 6808:2010 which specifies a guideline of the greater of 40dB(A) or background noise +5dB(A) or in special circumstances a 'high amenity noise limit' of 35dB(A).[20]
- New South Wales draft guidelines for new wind farm developments specify 35dB(A) or background noise +5dB(A), whichever is the greater. Furthermore, the 'noise criteria must be established on the basis of separate daytime (7am to 10pm) and night-time (10pm to 7am) periods'.[21]

1.26 Internationally, many countries use noise standards similar to those currently used in Australia:

- Sweden applies a standard noise limit of 40dB(A), and 35dB(A) in low-background noise areas;
- Denmark applies a noise limit of 44dB(A) at a wind speed of 8 metres per second (m/s) and 42dB(A) at 6m/s. For sensitive areas the allowable noise limit is reduced by 5dB(A) at the respective wind speeds.
- The Netherlands applies a 40dB(A) noise limit at night, increasing incrementally up to 50dB(A) at 12m/s.[22]

2010 National Health and Medical Research Council rapid review

1.27 In July 2010 the National Health and Medical Research Council (NHMRC) released a review of the available evidence at the time culminating in the report: *Wind Turbines and Health: A Rapid Review of the Evidence* (Rapid Review). The Rapid Review concluded that:

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18 Birgitta Berglund, Thomas Lindvall and Dietrich Schwela (eds.), *Guidelines for Community Noise*, World Health Organization, 1999, sec 4.3.1.

19 South Australian Government, Environment Protection Authority, Wind Farms Environmental Noise Guidelines, July 2009, p. 3.

20 Government of Victoria, Department of Planning and Community Development, Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, July 2012, sec. 14, p. 45; see also Standards New Zealand Paerewa Aotearoa, Standards New Zealand FactSheet, Revised Wind Farm Noise Standards NZS 6806:2010 — Frequently Asked Questions, 26 July 2010, p. 3.

21 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 6.

22 Clean Energy Council, *Submission 165 Attachment A*, p. 17.

- There is currently insufficient published scientific evidence to positively link wind turbines with adverse health effects;
- Relevant authorities should take a precautionary approach; and
- People who believe they are experiencing any health problems should consult their GP promptly.[23]

1.28 The findings of the Rapid Review have been used by many supporters of wind power – including developers – to argue that wind farms have no adverse impacts on human health and therefore developments should be approved.[24] Critics of wind farms have argued that the Rapid Review which is being used to justify the current regulations of wind farms was not sufficiently thorough, omitted vital information, and has contributed to a lack of understanding regarding the health impacts of wind farms. For example, the Waubra Foundation's Dr Laurie argued to the committee that:

> The 2010 NHMRC document omitting this vital knowledge about the known adverse health impacts of low-frequency noise is still being widely used by wind developers and government departments to assert that there are no known health problems with wind farms.[25]

1.29 The Chief Executive Officer of the NHMRC previously clarified that the Rapid Review is a work in progress:

> I do want to make a point to anybody who is relying on [the Rapid Review].
>
> We regard this as a work in progress. We certainly do not believe that this question has been settled. That is why we are keeping it under constant review. That is why we said in our review that we believe authorities must take a precautionary approach to this.[26]

1.30 The NHMRC informed the committee that there is a review of the evidence regarding the impacts of wind farms on health currently underway:

> The NHMRC has commissioned a third party contractor to conduct a systematic review of the literature examining the potential effects of wind farms on human health. The review is being overseen by an expert working committee that comprises of experts in epidemiology, sleep, psychology, acoustics and a consumer…As this review is not yet complete we are unable to submit any additional advice than that which has been outlined in the NHMRC *Wind turbines and health – a rapid review of evidence (2010)*.[27]

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23 National Health and Medical Research Council, *Response to adverse comment received on 12 November 2012*, p. [1].

24 Senate Community Affairs References Committee, *The Social and Economic Impact of Rural Wind Farms*, 23 June 2011, p. 25.

25 Dr Sarah Laurie, Chief Executive Officer, Waubra Foundation, *Committee Hansard*, p. 17.

26 Senate Community Affairs References Committee, *The Social and Economic Impact of Rural Wind Farms*, 23 June 2011, p. 25.

27 National Health and Medical Research Council, *Submission 39*, p. [1].

1.31 According to the NHMRC, the *Revised NHMRC Public Statement: Wind Turbines and Health Public Statement* will be published in May 2013.[28]

2011 Senate Inquiry

1.32 In 2011 the Senate Community Affairs References committee conducted an inquiry examining the social and economic impact of rural wind farms. The Community Affairs committee received in excess of one thousand individual submissions, many letters and other documents, and had access to much published information. Public hearings and site visits were held in various capital cities and regional areas. The committee tabled its report, *The Social and Economic Impact of Rural Wind Farms* (Inquiry Report) in Parliament on 23 June 2011 making seven recommendations.

1.33 From the outset, the Inquiry Report delineated the relevant responsibilities of State and Commonwealth governments:

> Planning and compliance issues for wind farms are matters for the state governments…The Commonwealth also has responsibility for certain aspects of the development of wind farms, such as air safety, and it may become involved in planning processes under the provisions of the *Environment Protection and Biodiversity Act 1999*.[29]

1.34 In relation to the health impacts of wind farms, the committee concluded that:

> Adverse health effects may be caused by wind turbines but they may be caused by factors other than noise and vibration, such as stress related to sleeplessness or perceptions of harm. There is insufficient rigorous research to know the answer.[30]

1.35 After the tabling of that report, Dr Sarah Laurie from the Waubra Foundation was reported as saying: 'Given the Senate recommendations and strength of evidence to the inquiry, the precautionary principle should be adopted.'[31] The Clean Energy Council's policy director Russell Marsh was reported as saying:

> [The Inquiry Report] acknowledges the important contribution that wind energy makes to employment and economic development…There is no reason to slow the development of new wind farms based on this report.[32]

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28 National Health and Medical Research Council, *Snapshot of NHMRC Wind Farms and Human Health Project*, available from: https://www.nhmrc.gov.au/_files_nhmrc/file/your_health/wind_farms_timeline_snapshot_120814.pdf, accessed: 21 November 2012.

29 Senate Community Affairs References Committee, *The Social and Economic Impact of Rural Wind Farms*, 23 June 2011, p. 3.

30 Senate Community Affairs References Committee, *The Social and Economic Impact of Rural Wind Farms*, 23 June 2011, p. 27.

31 Graham Lloyd, 'Blow for wind farms as senators push probe into noise and health fears', *The Australian*, 24 June 2011.

32 Graham Lloyd, 'Blow for wind farms as senators push probe into noise and health fears', *The Australian*, 24 June 2011.

Government response to 2011 Senate Inquiry

1.36 On 13 September 2012 the Commonwealth Government tabled its response in the Senate which addressed the seven recommendations made in the Inquiry Report.

1.37 In response to recommendations one through three which relate to noise standards, complaint resolution, and infrastructure locations, the Commonwealth reasserted the prerogative of individual states and territories to establish their own planning regimes and requirements.[33]

1.38 The Commonwealth accepted recommendations four through six in principle. Recommendations four, five and six pertain to the need for research of the possible effects of wind farms on human health, including the impacts on human health of infrasound. The Commonwealth explained that:

> The NHMRC is already actively engaged in supporting the assessment of the available research on this issue and will shortly commission a comprehensive review of the literature to inform any update to its 2010 public statement. The review will include audible noise, infrasound and low-frequency noise. A reference group will be established to advise on the review and will include members of the public, industry, researchers, sound engineers/consultants and planning representatives.[34]

1.39 Furthermore, the Commonwealth noted that there is a range of funding mechanisms available for researchers to explore the potential impact of wind farms on human health.[35]

1.40 The Commonwealth did not accept recommendation seven which called for:

> …the draft National Wind Farm Development Guidelines to be redrafted to include discussion of any adverse health effects and comments made by NHMRC regarding the revision of its 2010 public statement.[36]

1.41 As well as noting that the result of the possible revision of the NHMRC's 2010 public statement would depend on the outcome of available research, the Commonwealth advised that no further work would be undertaken on the National Wind Farm Development Guidelines in recognition that relevant jurisdictions have taken appropriate steps, saying:

> The Australian Government understands that jurisdictions have developed, or are currently developing, planning application, assessment and approval processes within their own planning frameworks to manage community

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33 Australian Government Response to the Senate Community Affairs Reference Committee Report *The Social and Economic Impact of Rural Wind Farms*, tabled 13 September 2012, pp 3–4.

34 Australian Government Response to the Senate Community Affairs Reference Committee Report *The Social and Economic Impact of Rural Wind Farms*, tabled 13 September 2012, p. 4.

35 Australian Government Response to the Senate Community Affairs Reference Committee Report *The Social and Economic Impact of Rural Wind Farms*, tabled 13 September 2012, p. 4.

36 Senate Community Affairs References Committee, *The Social and Economic Impact of Rural Wind Farms*, 23 June 2011, p. 49.

concerns about wind farm developments such as turbine noise, shadow flicker, electromagnetic interference and impacts on landscapes and wildlife. The EPHC Standing Committee therefore has decided to cease further development of the Guidelines.[37]

Purpose of the bill

1.42 The bill seeks to amend the *Renewable Energy (Electricity) Act 2000* (Act) to give powers to the Clean Energy Regulator that ensure that accredited power stations that are wind farms, either in whole or in part, do not create excessive noise.[38] The accreditation of wind power stations who do create excessive noise would be suspended, thereby preventing them from creating and on-selling Large-scale Generation Certificates (LGCs)

Large-Scale Generation Certificates

1.43 The Act provides for the creation of LGCs by accredited power stations that generate their electricity through renewable technology. Each LGC represents one megawatt hour (MWh) of generated renewable energy electricity. Accredited renewable energy power stations create LGCs which can be sold through the open LGC market, where the price varies according to supply and demand. LGCs improve the financial viability of renewable energy projects by allowing them to sell both the electricity generated, and the LGCs.

1.44 Demand for LGCs is created by the Large-Scale Renewable Energy Target (RET) that specifies the amount of renewable energy to be generated by renewable energy power stations, for every year up to 2030. The RET places a legal requirement on 'liable entities' (typically electricity retailers) to purchase a set number of LGCs each year taking into account factors such as volume, specific exemptions, and that year's national renewable energy target.

1.45 Liable entities must surrender the required number of LGCs to the Clean Energy Regulator to meet their annual liability. If a liable entity does not surrender its required number of LGCs in a year, it is liable to pay a shortfall charge – currently set at $65 per LGC not surrendered. By comparison, the Clean Energy Regulator has estimated the volume weighted average market price for a LGC for the 2012 year as $35.24.[39] Energy Australia warned in its submission that if the LGC market was

37 Australian Government Response to the Senate Community Affairs Reference Committee Report *The Social and Economic Impact of Rural Wind Farms*, tabled 13 September 2012, p. 5.

38 *Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012*, Explanatory Memorandum, p. 2.

39 Clean Energy Regulator, *Volume weighted average market price for a renewable energy certificate/large-scale generation certificate*, available from: <http://ret.cleanenergyregulator.gov.au/For-Industry/Emissions-Intensive-Trade-Exposed/market-price>, accessed: 21/11/2012.

insufficiently supplied, liable entities would pass the additional costs of the shortfall charge onto consumers resulting in higher power prices.[40]

1.46 Producers of renewable energy can sell both their electricity to the National Energy Market as well as the LGCs that they earn. This significantly improves renewable energy projects' financial viability.

Provisions of the bill

1.47 The bill includes one schedule that includes nine sections which will be considered in this section thematically.

1.48 Sections one, two and four deal with issues of definition. Section two defines 'wind farm' as 'a power station that generates some or all of its power from wind'. Sections two and four together define what constitutes 'excessive noise' for the purpose of the bill. A wind farm is deemed to create excessive noise if the level of noise attributed to the wind farm exceeds background noise by 10dB(A) or more when measured within 30 metres of any premises that is used for residential, work, or congregational purposes. The issues surrounding wind farm noise, and appropriate noise standards, are discussed in further detail in Chapter 2 of this report.

1.49 Section three amends subclause 14(2) of the Act which related to the eligibility of power stations for accreditation under the Act. Section three of the bill adds an additional criteria to the existing eligibility criterion in the Act, namely, that a wind farm can only receive accreditation if 'the Regulator is satisfied that the wind farm does not, and will not, create excessive noise.'

1.50 Section five of the bill amends the Act to require the operator of a wind farm to publish on the internet information pertaining to noise, wind speed and direction, weather conditions, and power output of individual turbines.

1.51 Sections six through eight of the bill amend the subclause in the Act that empowers the Regulator to suspend the accreditation of a power station in three ways. The effect of the suspension of a power station is that the suspended power station can no longer earn RECs for the duration of the suspension, however, the power plant can continue to operate.

1.52 At present the Regulator 'may' suspend the accreditation of a power station if the Regulator 'believes on reasonable grounds' that the power station 'is being operated in contravention of a law of the Commonwealth, a State, or a Territory'. Section six of the bill proposes to substitute 'must' for 'may', thereby removing discretion in this matter from the regulator.

1.53 Secondly, section seven proposes to extend the scope of laws that an operator can be in contravention by replacing 'law of' with 'law (whether written or unwritten) of or in force in'. The *Explanatory Memorandum* of the bill explains that the purpose of this is to:

40 Energy Australia, *Submission 159*, p. [3]; Energy Supply Association of Australia, *Submission 205*, p. 2.

> …make it clear that a power station's accreditation may be suspended if it contravenes any law in force…including the common law tort of nuisance which is captured by the proposed reference to 'unwritten' laws.[41]

1.54 Lastly, section 8 of the bill details an additional set of criteria that apply specifically to wind farms. The Regulator must suspend the accreditation of a wind farm if the regulator believes on reasonable grounds that the a wind farm is creating excessive noise, or if the wind farm is not collecting and publishing the data stipulated in section five of the bill.

1.55 Section 9 of the bill outlines the scope of the bill, namely, that the amendments will apply to power stations regardless of whether the power station is already accredited at the date of commencement, or is seeking accreditation after the commencement of the bill.

41 *Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012*, Explanatory Memorandum, p. 4.

Chapter 2

Noise and Noise Measurement

2.1 The sound generated by wind turbines is caused by the conversion of wind energy to rotational and acoustic energy. The rotational energy produces electricity while the acoustic energy produces sound.[1] According to the Clean Energy Council:

> Noise is often the most important factor in determining the separation distance between wind turbines and sensitive receivers like houses. The assessment of noise therefore plays a significant role in determining the viability of and the size of wind farms.[2]

2.2 The committee received evidence from many of the same acousticians as the Community Affairs References Committee in its 2011 inquiry into the social and economic impact of rural wind farms. The Clean Energy Council, and the acoustic consultants, Sonus Pty Ltd provided the committee with the same technical information about the nature of sound as they did to the Community Affairs Committee.

2.3 The Sonus paper, prepared in 2010, discusses two principal types of noise that a wind farm may generate. These are mechanical noise from the turbine itself, and aerodynamic noise from the operation of the blades. Within the category of aerodynamic Noise the Sonus paper includes different types of noise:

- Amplitude Modulation – Commonly described as the "swish" noise that comes from the blades as they rise and fall;
- Low Frequency Noise – has a frequency range between 20 and 200 (Hz) often described as a "rumble"; and
- Infrasound – has a frequency range under 20 Hz and often described as inaudible.[3]

Much of the controversy in this inquiry concerns the subset of noise categories within aerodynamic noise.

Low Frequency Noise and Infrasound

2.4 Mr Steven Cooper from the Acoustic Group submitted that there are 'low frequency, infrasound components' in wind turbine noise that have:

> …a unique signature associated with turbines and you can measure them near the turbines and measure them up to seven kilometres away…and seven kilometres away I can see this signature and the pattern is there. You

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1 Community Affairs Committee Report, *The social and economic impact of rural wind farms*, June 2011, p. 5.

2 Clean Energy Council, *Submission 165*, p. 2.

3 Clean Energy Council, *Submission 165*, Attachment 1, Sonus, Wind Farms Technical Paper, Environmental Noise, November 2010, pp. 8–10.

> cannot hear it because it is lower than the threshold of hearing, both in frequency and in level, but it is there.[4]

2.5 Professor Hansen added that low frequency noise is particularly difficult to avoid, as the techniques used to mitigate higher frequency are significantly less effective:

> The problem with wind farm noise is that it is dominated by low-frequency noise by the time it gets to people's residences. Many residences, especially if windows are open, are sort of transparent to that noise.
>
> The noise level at low frequencies is not much less than what it is outside, whereas the higher-frequency noise—if there is a little bit left—gets attenuated through the walls of the house and the roof. What you are left with when you are inside is a dominant low-frequency noise, and there is no higher-frequency noise to mask it. There is nothing to mix with it. It is just this low-frequency, annoying noise.[5]

2.6 Sonus discussed the nature of infrasound from wind farms in their paper for the Clean Energy Council. It described the low frequency noise, which includes infrasound, as being:

> …easily measured and can also be heard and compared against other noise sources in the environment. Low frequency sound produced by wind farms is not unique in overall level or content and it can be easily measured and heard at a range of locations well in excess of that in the vicinity of a wind farm.[6]

2.7 Dr Leventhall's paper in the journal *Canadian Acoustics* cited showing that wind turbines do produce infrasound but not at perceptible or harmful levels:

> Modern up-wind turbines produce pulses which also analyse as infrasound, but at low levels, typically 50 to 70dB, well below the hearing threshold. Infrasound can be neglected in the assessment of the noise of modern wind turbines (Jakobsen 2004).[7]

2.8 The current NSW guidelines, which are probably some of the most stringent in the world, also discount low frequency or infrasound as a significant component of wind turbine noise emissions.

Noise Measuring Methodology

2.9 Mr Cooper described the difficulties in measuring noise in his experience over 35 years:

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4 Mr Cooper, The Acoustic Group, *Proof Committee Hansard*, 14 November 2012, p. 30.

5 Professor Hansen, *Proof Committee Hansard,* 14 November 2012, p. 12.

6 Clean Energy Council, *Submission 165,* Attachment 1, Sonus, Wind Farms Technical Paper, Environmental Noise, November 2010, p. 44.

7 G. Leventhall, 'Infrasound from wind turbines: Fact, Fiction or Deception', *Canadian Acoustics*, Vol. 34, No. 2, 2006, p. 32.

> In some cases I have been to houses and I could not hear a thing and I could not measure anything. That is the nature of the beast. Sometimes the wind blows in different directions. That is the variability that you get. It happens in all sorts of noise studies. Take noise from a hotel. Sometimes there is a noise problem; sometimes there is not.[8]

2.10 Professor Hansen discussed the technical difficulties in measuring background noise:

> It is also important to define how background noise is measured. When you are trying to make a statement that you cannot exceed background noise by a certain amount, you need to be able to define how you measure it. For obvious reasons, there should not be a single number representing an average over many weeks or a single number as a function of wind turbines. Background noise is much lower late at night, in the early hours of the morning and also in cases when you have significant wind shear and there is no wind at the residence where the noise is being experienced. So there really should be different values of background noise at different hours of the night with different wind conditions for the measurement.[9]

2.11 Pacific Hydro Australia submitted that they have conducted testing at two of their wind farms and compared that to other natural and manmade sources and found that:

> …[the] levels of infrasound at the wind farms to be well below the World Health Organisation hearing threshold and significantly lower than at the beach.[10]

2.12 The current method of measuring noise is to measure dB(A). According to evidence in the Community Affairs Report in 2011, this measure is appropriate because:

> …it simulates human hearing. Dr Warwick Williams, a Senior Research Engineer at the National Acoustic Laboratories, explained that the A-weighting heavily discounts the low frequencies and the very high frequencies. A-weighting discounts infrasound as it is below the level of human hearing.[11]

2.13 Professor Salt, in constrast, was not convinced that the A-weighted measure was adequate to detect potentially harmful noise such as low frequency and infrasound:

> I do believe that the sound from wind turbines is a problem. I also think that the current method of using A-weighted sounds to characterise wind turbine noise is as big a problem, because that is missing the low-frequency content

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8 Mr Steven Cooper, *Proof Committee Hansard*, 14 November 2012, p. 30.

9 Professor Hansen, *Proof Committee Hansard*, 14 November 2012, p. 10.

10 Pacific Hydro Australia, response to adverse comment, received on 22 November 2012, p. 1.

11 Community Affairs References Committee, *The social and economic impact of rural wind farms*, June 2011, p. 12.

> that these machines generate. I agree that the legislation, at the moment, is not considering different measurements, but at some point it needs to be considered that measuring infrasound levels from these machines could be extremely important to understanding how they affect people.[12]

2.14 Professor Hansen also agreed that there is a deficiency inherent in regulating noise using A-weighting:

> …all of the current regulations are written in terms of A-weighted sound level and A-weighting does not properly account for low frequency components. Some regulations apply a five dB penalty if a noise is dominated by low frequency components, but in many cases this is insufficient to properly account for the true effect of low frequency noise. [13]

2.15 The Sonus report of 2010 explained that G-weighting is the most appropriate mechanism for picking up infrasound, and also what levels of dB(G) could have adverse impacts:

> Weighting networks are applied to measured sound pressure levels to adjust for certain characteristics. The A-weighting network (dB(A)) is the most common, and it is applied to simulate the human response for sound in the most common frequency range. The G-weighting has been standardised to determine the human perception and annoyance due to noise that lies within the infrasound frequency range (ISO 7196, 1995).
>
> A common audibility threshold from the range of studies is an infrasound noise level of 85 dB(G) or greater. This is used by the Queensland Department of Environment and Resource Management's (DERM's) draft Guideline for the assessment of low frequency noise as the acceptable level of infrasound in the environment from a noise source to protect against the potential onset of annoyance and is consistent with other approaches, including the UK Department for Environment, Food and Rural Affairs (DEFRA., Leventhall, 2003).[14]

2.16 Mr Cooper said that the underestimation of noise is compounded by the fact that the attenuation rate of low frequency noise is less than that of mid or high frequency noise:

> The noise for general noise in the dBA drops off at six dB per doubling of distance. Every time you double the distance, it goes down six dB. But, when you deal with low frequencies and you deal with line sources, it goes off at a lower rate. It is identified in one of Dr Chapman's reference documents. It shows that the rate of low frequency is a much lower rate than normal noise. So what happens is that the low frequency and

12 Professor Salt, *Proof Committee Hansard*, 14 November 2012, p. 2.

13 Professor Hansen, *Proof Committee Hansard*, 14 November 2012, p. 14.

14 Clean Energy Council, *Submission 165*, Attachment 1, Sonus, Wind Farms Technical Paper, Environmental Noise, November 2010, p. 10.

> particularly the infrasound are underestimated as you go further away from the wind farm.[15]

2.17 Mr Cooper also critiqued other conclusions of the various reports by Sonus. Specifically Mr Cooper questioned the report carried out by Sonus into the Cape Bridgewater wind farm. He suggested that there were various technical discrepancies or omissions in the report that related to the noise levels inside and outside of the dwelling, and that the report omitted relevant data, including that of the wind speed.[16]

Committee View

2.18 In the committee's view the technical issues raised by Mr Cooper are best answered by Sonus. The committee is also of the view that even if the report were found to be flawed in the terms that Mr Cooper suggests, there was still no evidence provided that would suggest that infrasound is present at harmful levels.

2.19 The committee notes that, even amongst supporters of the bill, there appeared to be no agreement about what noise measurement should be included in the bill, nor what noise thresholds should be adopted.

Recommendation 1

2.20 The committee recommends that specific noise measures, thresholds and measuring locations not be included in legislation, as there is insufficient consensus on these elements of the proposed bill.

Changes to wind turbine technology

2.21 Wind Farm technology has changed since the introduction of turbines in Australia. These changes have made a significant difference to how sound is produced and the types of noise generated. Mr Jonathan Upson from Infigen Energy also explained that new turbines have resulted in lower levels of infrasound that those that were manufactured 15 to 20 years ago:

> …downwind turbines—that is, turbines with the rotor downwind of the tower—were known for producing higher levels of infrasound. Those types of turbines have not been made in probably 15 or 20 years, so it is possible for that turbine design to have higher low-frequency and infrasound levels than the large turbines of today.[17]

2.22 Alstom Wind gave evidence to the committee that while there are noise reduction benefits this was not the primary driver for the technical innovations:

> In the early eighties turbines did not have variable speed control; they operated at fixed speed because of the size of the turbine. As the industry has developed, to reduce the cost of energy globally, one of the big differences introduced about 10 years ago is what we call variable speed pitch control. Variable speed pitch control in a turbine—and all modern

15 Mr Steven Cooper, *Proof Committee Hansard,* 14 November 2012, p. 33.

16 Mr Steven Cooper, Answer to Questions on Notice, received 25 November 2012.

17 Mr Jonathan Upson, Infigen Energy, *Proof Committee Hansard,* 14 November 2012, p. 58.

> turbines now employ this—means that the tip speed of the turbine can be varied through variation of the generator speed.
>
> There has been significant technical development in the industry—nothing to do with noise generation but to increase the efficiency and reduce the cost of energy of the wind industry. As a side effect of that what we can do is we can manually reduce the tip speed during normal power production to reduce the sound power level, purely because sound power is generated by the tip speed of the turbine. So we can control that. It was a secondary effect of the technical innovation in the industry. It was not developed for noise purposes at the start.[18]

Committee View

2.23 The committee is aware that wind turbines, like most industrial sources, create noise. The argument that was presented to the committee by Dr Sarah Laurie and others was that this noise is hazardous because of its low frequency and infrasound component.

2.24 It was also suggested that this potential to do harm is compounded because noise is routinely measured in dB(A) and not dB(G) which picks up very low frequency noise and infrasound. If the noise is not being measured then it cannot be regulated. The committee believes that, as part of transparency and openness, low frequency and infrasound should be measured and endorses Recommendation 1 of the Community Affairs Committee's 2011 report that 'noise standards…should include appropriate measures to calculate the impact of low frequency noise…[19]

2.25 The committee heard evidence from a number of acousticians that infrasound is produced at various levels by a variety of different natural and industrial sources. This includes wind turbines. The question that concerns the committee is whether wind turbines emit noise, regardless of the frequency, at levels that are likely to cause harm. In light of the evidence received through this inquiry the committee is of the view that while infrasound is produced it is not at levels that are likely to cause harm. This is considered further in the next chapter.

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18 Mr Josef Tadich, Alstom Wind, *Proof Committee Hansard*, 14 November 2012, p. 51.

19 Community Affairs References Committee, *The social and economic impact of rural wind farms*, June 2011, p. 15.

Chapter 3
Health

Introduction

3.1 The bill being considered by the committee does not directly mention health effects of wind farm noise. However, as the second reading speech by Senator Madigan indicated, and as the submissions reflect, health issues are the rationale behind the bill.

3.2 The committee acknowledges the concerns of residents, who need to understand whether there may be health impacts of existing wind farms in their area, or of a wind facility planned for their district.

3.3 Individual witnesses, and some organisations, reported to the committee a range of symptoms they said were being experienced by people living up to ten kilometres away from wind farms. The most common reported complaint was sleep disturbance.[1] Others included headaches, nausea, anxiety and a range of other symptoms, many (though not all) common to stress-related conditions. Examples of individuals expressing concern about current health impacts included these:

> members of my family have experienced various symptoms including excruciating painful ear pressure, severe headaches, severe nausea to the point of being unable to keep food down, profuse nose bleeds, dizziness, chronic and severe sleep disturbance and worrying chest pains. We have never suffered any of these symptoms before the wind farm was built too close to our home at Waubra.[2]

> Once the turbines were operating I began to suffer extremely bad headaches and had a very cold body after sleeping… I can no longer work or go to the property… without suffering nausea, pains in the head, pains in the chest, and difficulty breathing…[3]

> I get head aches, nervous tension, nose bleeds…angina…[another person] now has diabetes which has been brought on by those B turbines.[4]

3.4 The committee also heard from people who had not experienced health effects but were concerned about the potential for them:

> I have spent hundreds of hours talking to, listening to, reading about, and corresponding with, real, normal people for whom a real, normal life is no longer possible... These are people…whose lives have been completely devastated by a wind farm development nearby. I have listened to their

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1 Waubra Foundation, Answers to Questions on Notice, received 23 November 2012.

2 Samantha Stepnell, *Submission 51*.

3 Janine Dean, *Submission 174*.

4 Enid Thomas, *Submission 176*.

> explanations of the impact on their lives, knowing that their experience will become our experience if the proposed development near us goes ahead.[5]
>
> Our community has recently been involved in a proposal for an industrial wind facility in our heritage-listed Trawool Valley. Concerned about excessive noise and the potential adverse health affects as a result of infrasound, low frequency sound and vibration, our community organised an information session in August 2012. We invited some members of other wind facilities close by and two residents from the Waubra area attended. They recounted their experience of living in close proximity to a wind energy facility and also of their belief that it was creating excessive noise and that the complaints procedure was ineffective and deficient to adequately address their countless concerns.[6]

3.5 There is an extremely diverse range of adverse effects on people and on animals that have been claimed in submissions to this inquiry and in other sources.[7] It is unlikely that all of these are due to wind farms, but the issue nevertheless requires thorough attention.

3.6 As noted in Chapter 1, the National Health and Medical Research Council is considering the current literature in detail and will address this issue definitively in 2013.

Number of health complaints relating to noise

3.7 The committee heard a range of views about the scope of effects on people residing near wind turbines. The Waubra Foundation claimed it was aware of:

> over 40 families from Queensland, New South Wales, Victoria and South Australia who have left their homes because of excessive noise from the wind turbines near their former homes, and the consequent serious health problems they experienced.[8]

3.8 On the other hand, others considered the concern to be limited in geographic scope, arguing that it tends to be in particular sites and not others:

> expressions of concern among residents living adjacent to wind farms only occur in relatively few places. The overwhelming majority of wind farms around the world do not have any sorts of examples of people expressing anxiety. There is something like 200,000 wind turbines around the world and most of the concern which is being expressed is in areas like Ontario, in Canada—but not in other places in Canada—several areas of the east in the United States, the United Kingdom and Ireland, and some places in Australia.[9]

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5 Tony Walker, *Submission 156*.

6 Dr Adam McCarthy and Ms Rebecca Fagan, *Submission 181*.

7 See, for example, Professor Simon Chapman, *Submission 185*, Attachment 4.

8 Waubra Foundation, *Submission 197*, p. 3.

9 Professor Simon Chapman, *Proof Committee Hansard*, 14 November 2012, p. 47.

3.9 Given that as of April 2012 there were approximately 1345 turbines operating in 59 facilities around Australia,[10] the numbers expressing concern appear small compared to the numbers of residents near these turbines. The committee received just over 160 submissions, of which a little under 140 supported the bill and/or expressed concern about noise effects. Of these, the majority were from people worried about whether they *might* experience noise or health effects from *proposed* wind farms, rather than from people who claimed to have actually experienced annoyance or other adverse effects. The submissions related to a minority of Australia's wind farm operations.

3.10 Professor Chapman indicated that he had commenced gathering data from wind farm operators about numbers of complaints about noise, and numbers of residents within five kilometres of wind farms. The committee notes that the research is in its early stages and has not been peer reviewed. Nevertheless, his results to date are that in only two cases out of the 35 wind farms for which he had data at the time of making his submission, were there more than five complaints to the operator, and for the majority the number was zero.[11] These figures appear indicative of the overall level of complaint, and consistent with committee evidence.

Committee view

3.11 The number of health-related complaints about wind farms is small in proportion to the number of people living near these facilities. The numbers also vary greatly from one facility to the next, for reasons not apparently related to the number of residents in the area.

3.12 The committee believes that, while small in number, the nature and cause of the complaints must be taken seriously.

The health effects of audible sound

3.13 Noise can be annoying, and can lead to adverse health effects. This is most evident for extremely loud noise, the effects of which can include deafness. However, noise does not have to be extremely loud to have health effects: other pathways exist, such as through sleep disturbance.[12]

3.14 Health effects from wind farm noise result from the same mechanisms as from other sound sources. Dr Shepherd stated:

> wind turbine noise really is no different to other forms of annoying community noise such as aviation noise, road traffic noise or nightclub or

10 Clean Energy Council, *There's power in wind: national snapshot*, April 2012, http://www.cleanenergycouncil.org.au/dms/cec/factsheets/CEC_POWER-OF-WIND_NATIONAL-SNAPSHOT_May-2012_FINAL/CEC_POWER%20OF%20WIND_NATIONAL%20SNAPSHOT_May%202012_FINAL.pdf (accessed 20 November 2012)

11 Professor Simon Chapman, *Submission 185*, pp. 2–3.

12 Professor Simon Chapman, *Proof Committee Hansard*, 14 November 2012, p. 47.

> neighbourhood noise in that people do find it very annoying and it has a potency to disrupt sleep.[13]

3.15 The committee received some evidence from individuals reporting sleep disturbance from audible sound.

> We have a property literally in the middle of the Waubra Wind Farm…From our residence we have… 5 [turbines] within 1.5 km. with the closest 600 metres. We are surrounded by turbines on three sides… Since the turbines were turned on in 2009, we have had on average 3-4 nights per week of disrupted sleep.[14]

> We have 4200 acres at Waubra of high quality farming land…our home is 800 to 900 metres from 4 turbines…our bedroom is closest to the turbines some nights you put your head on the pillow and all that you can hear is the constant noise and the constant rotation of the turbine blades.[15]

> I live [near Leonards Hill, Victoria] where there are 2 – 125mtr wind turbines which are situated between 550–650 metres from the back door. I hear the noise from the turbines day and night, inside and outside… After a week of the turbines operating I started to suffer severe tension head aches and tightness in my shoulders, neck and my lower jaw felt tight and my teeth ached. I would wake up in the morning with vertigo when I stood up out of bed and have a bad runny nose. It has been over a year now that the turbines have been operating and my symptoms are becoming worse, I still have all of the above and now I get pains in my chest, eye spasms while reading or watching TV, do not sleep as I wake up in fright two or three times and do not know why but you can just hear the turbines in the bedroom.[16]

3.16 There was no evidence to the committee of a causal link between the relatively low levels of noise that are produced by wind farm noise and the symptoms reported by those living near wind turbines. Though there is evidence linking community noise in general to health problems, there is little research on turbines in particular, and none at all testing the relationship between turbine noise and health-related quality of life.[17]

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13 *Proof Committee Hansard*, 14 November 2012, p. 26.

14 Steve Coleman, *Submission 79*.

15 Samantha Stepnell, *Submission 51*.

16 Louis Hughes, *Submission 83*.

17 Daniel Shepherd, David McBride, David Welch, Kim Dirks, and Erin Hill, 'Evaluating the impact of wind turbine noise on health-related quality of life', *Noise & Health*, Vol. 13, No. 54, 2011.

3.17 The NHMRC reviewed some of the literature available in 2010, and noted the conclusion of one of the few relevant studies, 'that no adverse health effects other than annoyance could be directly correlated with noise from wind turbines'.[18]

3.18 The committee was provided with two recent publications that sought to examine the relationship between wind turbine noise and sleep or mental health.[19] Both were based on questionnaires filled out by residents, though the nature of the survey was different in each case. The study by Shepherd included 39 respondents living near wind turbines and 158 in a control group. There were no differences between the groups in self-reported illness or self-rating of general health, but the turbine group survey responses indicated lower physical health-related quality of life than the control group, and this was linked to their responses to questions on sleep quality and self-reported energy levels. The study by Nissenbaum and others included 38 respondents near two wind farms, and 41 respondents in a control group, with results that increased daytime sleepiness and reduced sleep quality was reported among those closer to turbines though, counter-intuitively, there was no difference in the use of sleep medications as a result.

3.19 The committee received commentary that questioned some key aspects of the studies. This included discussion around the noise level assessment and significance of key health indicators in the case of the paper by Nissenbaum and others,[20] and about causal factors in both papers.

3.20 The possibility that respondents were influenced by their own attitudes toward wind farms, or the views of others, was an issue. Discussing both studies, Professor Chapman commented:

> Both of those studies suffer from the same problem. That is that there has been considerable activity, in both regions studied in those two papers, of anti-wind-turbine activity. For example, in the New Zealand paper there had been, for a large number of years, a resident group called 'something guardians'. I cannot remember the name of the area now but they were the local landscape guardians group over there. They have a website which lists all of their activities against wind turbines and so forth. So the idea that this was an environment which was unpolluted by people going around saying, 'These wind turbines are going to cause health problems—will probably

18 NHMRC, Wind Turbines and Health: A Rapid Review of the Evidence, July 2010, p. 4, citing E. Pederson & K. Persson Waye, 'Perception and annoyance due to wind turbine noise – a dose-response relationship', *Journal of the Acoustical Society of America*, Vol. 116, No. 6, 2007, pp. 3460–3470.

19 Michael A. Nissenbaum, Jeffery J. Aramini, and Christopher D. Hanning, 'Effects of industrial wind turbine noise on sleep and health', *Noise & Health*, Vol. 14, No. 60, 2012, pp. 237–243; Daniel Shepherd, David McBride, David Welch, Kim Dirks, and Erin Hill, 'Evaluating the impact of wind turbine noise on health-related quality of life', *Noise & Health*, Vol. 13, No. 54, 2011, p. 333.

20 Intrinsik Environmental Services, Review of 'Nissenbaum MA, Aramini JJ, Hanning CD. Effects of industrial wind turbine noise on sleep and health', Undertaken for Canadian Wind Energy Association, 14 November 2012, provided in Infigen Energy, answers to questions on notice, received 25 November 2012.

> make you unable to sleep well and will affect your quality of life in a detrimental way—was not mentioned in that paper at all. I think that the failure to mention that was really a very severe problem. It was also absent in the other paper—the more recent one.[21]

3.21 The New Zealand study notes that, by concealing the questionnaire's specific purpose, such effects should be minimised, and Dr Shepherd wrote to the committee noting that the website of the local landscape guardians had not been updated for a long period before the survey was conducted.[22] However, the committee was later advised by another researcher that there had been a television broadcast featuring wind farm opponents, specifically mentioning sleep disturbance effects, in August 2009.[23] This was quite close to the date of the survey, and also indicated that critics of the facility were active at that time.

3.22 The committee is unable to form a view about how this discussion will ultimately play out. It expects that information, including these two recent studies, will be considered by the NHMRC in the course of its review. As the NHMRC noted in 2010, 'the measurement of health effects attributable to wind turbines is…very complex'.

Committee view

3.23 There is limited, and contested, published evidence that wind farm noise may be associated with annoyance and sleep disturbance in some individuals, but the causes are not clear; this is also considered further below. State governments and planning authorities currently have in place guidelines that are intended to address audible noise pollution, including from wind farms. Some aspects of these are discussed in subsequent chapters.

Proposed causes of health effects: infrasound

3.24 The effects of audible and mid-frequency noise are relatively well-known and understood. However, most inquiry participants appeared to refer not to normal audible noise issues, but to possible health effects from low frequency sound, or infrasound. It has been suggested by some inquiry participants, including some researchers or professionals,[24] that there may be pathways by which infrasound may be creating symptoms of health problems, even though the sound is not audible. The Waubra Foundation, while referring to the 'full spectrum' of noise, commented:

> Currently, there are a growing number of Australian residents who are experiencing serious health problems resulting directly from exposure to excessive noise from operating wind turbines…This pattern of exposure

21 Simon Chapman, *Proof Committee Hansard*, 14 November 2012, p. 49.

22 Correspondence from Dr Shepherd, received 19 November 2012.

23 Review of Shepherd et al by Fiona Crighton, University of Auckland, provided in Infigen Energy, answers to questions on notice, received 25 November 2012.

24 For example Professor Alec Salt, *Submission 18*, and *Proof Committee Hansard*, 14 November 2012, pp. 1–8.

> related symptoms has been long known to acousticians working in the field of both infrasound and low frequency noise…[25]

3.25 This is often referred to as 'wind turbine syndrome'. One witness observed:

> I shall leave the scientific and/or neurological theories and explanations to the experts. Nevertheless, the existence of low frequency sound energy, produced by wind turbines, and inaudible to the human ear, may be the reason for this syndrome. While this low frequency noise or sound energy (aka infrasound) may be inaudible and thus not able to be consciously perceived by the human ear, it does appear that the ear's vestibular system is still capable of perceiving the presence of this infrasound, and so send signals to the central nervous system for processing, in this case without the conscious awareness of the affected individual.[26]

The potential health impacts of low frequency noise

3.26 Professor Alec Salt in his written and oral evidence to the committee asserted that the human ear perceives sounds that may be inaudible to most people. According to Professor Salt the inner ear 'does respond to low-frequency sounds at levels well below those that are heard' through outer hair cells that:

> …respond well to low frequencies and infrasound, and if you measure the ear's responses to an infrasound stimulus, they can be four- to five-times larger than to any sounds you normally hear. So, the ear is extremely sensitive and responds very strongly to infrasound stimuli.[27]

3.27 The key question for Professor Salt is 'whether these responses stay confined just to the ear and do not have any effect on you at all, but I think this is very, very unlikely'.[28]

3.28 Dr Levanthall commented specifically on Professor Salt's arguments by stating that:

> In contrast to the unproven claims made by Professor Salt, my own belief continues to be that infrasound from wind turbines is just another sound, which you hear if it is above your hearing threshold and you don't hear if it is below. There is no mystery about infrasound, but it has been falsely used by those opposed to wind turbines in order to alarm others, and also as a distraction, which they know will be difficult and time consuming to work on, whilst at the same time they ask for a moratorium on further constructions until the work is done.[29]

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25 Waubra Foundation, *Submission 197*, p. 2.

26 Dr Peter Trask, *Submission 162*.

27 Professor Salt, *Proof Committee Hansard,* 14 November 2012, pp. 1–2.

28 Professor Salt, *Proof Committee Hansard,* 14 November 2012, pp. 1–2.

29 Correspondence from Dr Geoff Leventhall, 16 November 2012, p. 2.

3.29 Dr Leventhall argued that people are not affected by sounds they cannot hear. He cited studies on deaf people to see if exposure to infrasound caused any effects. The conclusion of the studies according to Dr Leventhall was that:

> Work with deaf people shows that they are not influenced by infrasound which they cannot hear. (Landström and Byström 1984, Landström 1987).[30] This work showed that infrasound just below the hearing threshold had no effect on either hearing or deaf people. That which was just above the normal threshold made hearing people sleepy but had no effect on deaf people. People were not affected by sound which they could not hear.[31]

3.30 Other research has shown no brain response in subjects exposed to 90dB sound at 12Hz, a level that, while higher than typical for wind farm infrasound, is below the generally accepted threshold for hearing at that frequency.[32] Dr Leventhall described this:

> There is recent confirmation in the work of Dommes et al, who used functional magnetic resonance imaging fMRI to investigate brain activity of subjects listening to infrasound and low frequency sound…It was shown that infrasound above the threshold level i.e. which was audible, activated the auditory cortex, which is the part of the brain associated with hearing. Infrasound below the threshold level i.e. inaudible, did not excite the auditory cortex.[33]

3.31 In drawing attention to what it considered the neglect of infrasound as a health issue, the Waubra Foundation made reference to a literature review *A Review of published research on low frequency noise and its effects* (2003). The Waubra Foundation was critical of the NHMRC and others for not considering this report when reaching conclusions in this area.[34]

3.32 The Waubra Foundation drew attention to this document as demonstrating 'the adverse health effects of low frequency noise on human health'.[35] However, the 2003 report does not appear relevant to wind turbine noise. That report points out that most of what is written in popular sources is misleading and 'should be discounted'.[36] It

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30 Cited in Dr Leventhall's paper as: U. Landström and M. Byström, 'Infrasonic threshold levels of physiological effects', *Journal of Low Frequency Noise & Vibration*, Vol. 3, No. 4, 1984, pp. 167–173; U. Landström, 'Laboratory and field studies on infrasound and its effects on humans', *Journal of Low Frequency Noise & Vibration*, Vol. 6, No. 1, 1987, pp. 29–33.

31 Correspondence from Dr Geoff Leventhall, 16 November 2012, p. 2.

32 E. Dommes, H.C. Bauknecht, G. Scholz, Y. Rothermund, J. Hensel and R. Klingebiel, 'Auditory cortex stimulation by low frequency-tones – An fMRI study', *Brain Research*, Vol. 1304, 2009, pp. 129–137.

33 Correspondence from Dr Geoff Leventhall, 16 November 2012, p. 2.

34 Sarah Laurie, *Proof Committee Hansard*, 14 November 2012, p. 17.

35 Waubra Foundation, *Submission 197*, p. 5.

36 Geoff Leventhall, Peter Pelmear and Stephen Benton, *A Review of published research on low frequency noise and its effects*, Department for Environment, Food and Rural Affairs, London 2003, p. 8.

concluded that 'No medical condition has been reported in the literature… to be associated with the perception of infrasound or its enhancement'.[37]

3.33 Dr Leventhall was the principal author of that report. He wrote to the committee, indicating that low frequency noise 'and infrasound from wind turbines were not considered in the report as they were not believed to be a problem. A belief which I still hold'.[38] He rejected the idea that infrasound presented an issue different in nature from other sounds. While the report focussed on low frequency noise, this was because that was the brief he was given, and did not imply that it was qualitatively different from other noise.[39] He pointed out that the review cited peer reviewed research showing that, in an experiment during which some subjects were exposed to low frequency noise and others were not, there was 'no significant difference in medical or psycho-social symptoms between the groups'.[40] Finally, Dr Leventhall was critical of reference made by some witnesses including Dr Laurie to the NIEHS (National Institute of Environmental Health Sciences) report *Infrasound Brief Review of Toxicological Literature* (2001). He noted that that review in fact only showed health effects from low frequency sounds at levels typically around one million times higher than those generally involved in the case of wind farm noise.[41]

3.34 In its answers to questions on notice and elsewhere, the Waubra Foundation has also drawn attention to the results of a 2004 published study by Chen Yuan Huang Qibai and Hanmin Shi.[42] The Waubra Foundation claimed that this showed that exposure to low frequency sound 'causes increases in heart rate and blood pressure as well as symptoms such as nausea'.[43] However, the study in fact exposed subjects to these sounds at 110 and 120dB, levels several orders of magnitude higher than those involved in wind farms. This research also therefore appears not relevant in considering possible effects of low frequency sounds from wind turbines.

3.35 Professor Seligman pointed out that people are exposed to a great deal of infrasound. Its presence is ubiquitous and this raised questions for the committee about how it would be possible that inaudible infrasound could cause health problems in one particular setting and not in others. Professor Seligman indicated that he and colleagues were planning some research in this area:

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37 Geoff Leventhall, Peter Pelmear and Stephen Benton, *A Review of published research on low frequency noise and its effects*, Department for Environment, Food and Rural Affairs, London 2003, p. 59.

38 Correspondence from Dr Geoff Leventhall, 16 November 2012, p. 2.

39 Correspondence from Dr Geoff Leventhall, 16 November 2012, p. 3.

40 Correspondence from Dr Geoff Leventhall, 16 November 2012, pp. 5–6.

41 Correspondence from Dr Geoff Leventhall, 16 November 2012, p. 9.

42 Chen Yuan Huang Qibai and Hanmin Shi, 'An Investigation on the Physiological and Psychological Effects of Infrasound on Persons', *Journal of Low Frequency Noise, Vibration and Active Control*, Vol. 23, No. 1, pp. 71–76, 2004.

43 Waubra Foundation, Answers to Questions on Notice, received 23 November 2012.

> My first comment is that the environment is awash with infrasound, which is both from natural and man-made sources and which is often far in excess of what is produced by wind farms.
>
> The second point is that there is a claim that it is modulation of low-frequency noise that can produce the symptoms that have been described. The Melbourne Energy Institute, in combination with the Department of Psychology, are planning to do a double-blind study with this type of noise to see if we can actually induce the symptoms that have been described.[44]

3.36 The Public Health Association of Australia commented on the current literature in the field, stating:

> It is important to note though that reviews of all the literature to date have failed to identify any adverse physiological effects attributed to exposure to wind turbines, with the exception of those mediated by noise in a small proportion of exposed people whose symptoms may or may not be related to perception, annoyance and other psychosocial factors related to the uptake of the new technology.[45]

Proposed causes of health effects: Psychogenesis and Nocebo effect

3.37 Late in the inquiry process, the committee was provided with recent research, peer reviewed and accepted for publication by the leading journal *Health Psychology*, but not yet released.[46] The research comprises a controlled double blind study, in which subjects were exposed to infrasound and sham infrasound.

> Fifty-four participants were randomised to high or low expectancy groups, and presented audiovisual information, integrating material from the internet, designed to invoke either high or low expectations that exposure to infrasound causes specified symptoms.[47]

3.38 The authors' results and conclusions were:

> High expectancy participants reported significant increases, from pre-exposure assessment, in the number and intensity of symptoms experienced during exposure to both infrasound and sham infrasound. There were no symptomatic changes in the low expectancy group.
>
> Conclusion: Healthy volunteers, when given information about the expected physiological effect of infrasound, reported symptoms which aligned with that information, during exposure to both infrasound and sham infrasound. Symptom expectations were created by viewing information

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44 Peter Seligman, *Proof Committee Hansard*, 14 November 2012, p. 35.

45 Melanie Walker, Deputy CEO, Public Health Association of Australia, *Proof Committee Hansard*, 14 November 2012, p. 43.

46 Fiona Crichton, George Dodd, Gian Schmid, Greg Gamble & Keith J. Petrie, 'Can expectations produce symptoms from infrasound associated with wind turbines?', *Health Psychology*, forthcoming (2013).

47 Correspondence from Fiona Creighton, 22 November 2012 (quoting the abstract of the forthcoming paper).

> readily available on the internet, indicating the potential for symptom expectations to be created outside of the laboratory, in real world settings. Results suggest psychological expectations could explain the link between wind turbine exposure and health complaints.[48]

3.39 This research is consistent with the views expressed by Professor Chapman, that one of the factors likely to be involved in symptom reports from people near wind farms is the nocebo response (the opposite of a placebo response). A medical journal review published this year explains the response:

> A nocebo effect is the induction of a symptom perceived as negative by sham treatment and/or by the suggestion of negative expectations. A nocebo response is a negative symptom induced by the patient's own negative expectations and/or by negative suggestions from clinical staff in the absence of any treatment. The underlying mechanisms include learning by Pavlovian conditioning and reaction to expectations induced by verbal information or suggestion. Nocebo responses may come about through unintentional negative suggestion on the part of physicians and nurses. Information about possible complications and negative expectations on the patient's part increases the likelihood of adverse effects.[49]

3.40 Nocebo responses produce real symptoms, but the cause is psychological rather than physical in origin:

> CHAIR: Professor Chapman, if people do suffer the nocebo effect, do they actually feel ill?
>
> Prof. Chapman: Yes, very much so. There is no suggestion that they are making it up or that they do not feel ill or that, in many cases, you cannot physiologically measure the problems that they are having—they do… I want to emphasise that, by talking about nocebo effects or psychogenic effects, I am not saying at all that people who say that they are feeling nauseous or have any of the other 207 diseases or symptoms I have seen on the internet are making it up. They very often genuinely do have those symptoms, but it is whether or not they are actually being caused by the turbines or by the anxiety which is being spread about the turbines.[50]

3.41 The possibility that psychological factors, rather than infrasound, are a key 'link between wind turbine exposure and health complaints' is also consistent with some of the anecdotal evidence received by the committee. Significant numbers of submissions came from people who were being informed and becoming worried about the claimed effects of a wind farm prior to one commencing operation near them, expressing fear or anxiety about negative health effects:

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48 Correspondence from Fiona Creighton, 22 November 2012 (quoting the abstract of the forthcoming paper).

49 Winfried Häuser, Ernil Hansen and Paul Enck, 'Nocebo Phenomena in Medicine', *Dtsch Arztebl Int*, Vol. 109, No. 26, 2012, pp. 459–65.

50 *Proof Committee Hansard*, 14 November 2012, p. 50.

> I will be close to proposed wind development if it is built, and don't want to be getting sick in my own home and unable to sleep just like the people at Waubra who came and told me about their situation.[51]
>
> [From a resident 3.4 kms from a proposed development] There is already enough evidence to prove people are suffering from the effects of low frequency noise, infrasound and vibration from industrial wind turbines, these noise levels can affect people living up to and beyond 10KM from industrial wind turbines.[52]
>
> I was told of side effects of other people from other wind farms before the Waterloo windfarm was built and thought that it would not get me, but it has.[53]
>
> I live 9kms away, within the 5km to 10km zone of the potential effects of a proposed wind farm… IF the proposed wind farm is built near me I will have my symptoms [of pre-existing fibromyalgia] exacerbated and my recovery jeopardised, but not the data to confirm the cause.[54]
>
> From my reading and research it appears that sleep disturbance, nausea, irregular heartbeat and headaches have been reported by people living in close proximity to wind turbines. I will see and hear 46 turbines from my house, currently under construction. Excessive noise is a major concern for me.[55]
>
> My serious concerns of being impacted by excessive noise by the Proposed …Wind Farm as i live approximately 4k from the nearest (Proposed) Wind Turbine. As I already have suffered from Mental Illness for 20+ years. The impact of of this will undoubtedly force myself to leave this Tranquil Valley.[56]
>
> There is currently a proposal for a wind development close to my home. I have major concerns regarding health problems caused by noise emissions from turbines. I am alarmed by reports of sleep disturbance, tinnitus, and headaches by people living in the vicinity of wind farms.[57]
>
> This letter is to request an initial and ongoing review of The Bald Hills Wind farm that is currently under construction, I am deeply concerned about the severe impact this will have on our young family, our business and our lifestyle.[58]

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51 Name withheld, *Submission 31*.

52 Dianne Jackson, *Submission 48*.

53 Roger Kruse, *Submission 160*.

54 Anna Dominguez Smith, *Submission 172*.

55 Annette Allwood, *Submission 178*.

56 William Kelly, *Submission 180*.

57 Claudia Scheid, *Submission 196*.

58 Stuart and Brianna Kilsby, *Submission 204*.

3.42 There was some evidence to suggest that psychological expectations may have played a role in the reporting of symptoms. Anecdotal evidence submitted to the committee includes symptoms being associated with phenomena other than wind farms, symptoms not occurring coincident with the start of wind farm operation, not being related to whether there is wind blowing, or being at distances far greater than those usually reported:

> About five kilometres west of us is the Macarthur Wind Farm…Upon returning from an overseas trip, I immediately noticed adverse health effects. I am restless and not sleeping well. In the short time I have been home, I am noticing a pattern already. When the wind is in the west, and also if it is very mild, with no or little wind, I have trouble sleeping, and pressure in my ears builds up. I am really alarmed at how quickly I have noticed these symptoms, as the Macarthur Wind Farm is only in the testing phase with a small number of turbines turning.[59]

> I have problems daily that are only happening when I am near a wind farm or high voltage electricity… I began noticing the noise when the wind farm had been operating for several months.[60]

> Some people may not be affected but [others are]... People who stand underneath them cannot hear anything and up to 10 km away in some cases further they are heard…[61]

3.43 Another submitter described symptoms that she associated with the turbines, but also said there was no pattern to their occurrence.[62] A further submitter identified a precise date on which she believes she became sensitive to low frequency sound, but it was long after turbines were built in her area, and she experiences symptoms wherever she goes, not only near the turbines in her region.[63]

Committee view

3.44 The committee concludes that, while it is possible that the human body may detect infrasound in several ways, there is no evidence to suggest that inaudible infrasound (either from wind turbines or other sources) is creating health problems. In contrast, there is an established literature confirming the existence of psychogenic, or nocebo, effects in general, and at least one study suggesting they may be responsible for symptoms in some wind turbine cases.

3.45 The committee wishes to emphasise that it does not doubt that the symptoms are real. It also does not doubt that some people may be affected by audible noise. It is concerned, as Dr Tait from Doctors for the Environment Australia expressed, that the

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59 Maria Linke, *Submission 32*.

60 Bradley Kermond, *Submission 164*.

61 Marie Burton, *Submission 3*.

62 Enid Thomas, *Submission 176*.

63 Elisabeth Jonkman, *Submission 29*.

discussion about a purported wind turbine syndrome is hampering progress on the issue:

> Part of the problem, I think, of going around and promoting a wind turbine syndrome and going into communities and getting people scared about wind turbines is that it has muddied the water and it is distracting us from actually dealing with those small groups of people who have got a legitimate problem and do need us to be having some sort of debate about how we as a society work to help them with the issues that they are experiencing.[64]

3.46 As Dr Shepherd pointed out, some individuals may be particularly sensitive to noise, though the underlying causes of the sensitivity are not well understood.[65] The needs of these individuals should be addressed, but in the context of established medical research.

Health and wind farm noise: future research

3.47 The NHMRC have set out the timetable for their wind farms and human health project, which is included in Appendix 3. Doctors for the Environment Australia supported this work.[66] And both they and the Public Health Association of Australia argued that to support the current bill would be to pre-empt the NHMRC's work.[67]

3.48 The committee notes the strong academic record of the NHMRC's Wind Farms and Human Health Reference Group, established to 'ensure a thorough and robust evaluation of the evidence occurs'. It notes the inclusion of two external observers, from the Waubra Foundation and the Clean Energy Council, 'to ensure transparency of processes and to assist the Reference Group fulfil their Terms of Reference'.[68]

3.49 The committee notes Professor Seligman's plans, in conjunction with others, to conduct research to test whether modulation of low-frequency noise can produce the some of the symptoms heard about in this inquiry.[69]

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64 Dr Tait, Doctors for the Environment Australia, *Proof Committee Hansard*, 14 November 2012, p. 46.

65 *Proof Committee Hansard*, 14 November 2012, pp. 26–27.

66 Dr Tait, Doctors for the Environment Australia, *Proof Committee Hansard*, 14 November 2012, p. 45.

67 Doctors for the Environment Australia and Public Health Association of Australia, *Submission 23*.

68 NHMRC, Wind Farms and Human Health Reference Group, http://www.nhmrc.gov.au/your-health/wind-farms-and-human-health/wind-farms-and-human-health-reference-group (accessed 26 November 2012)

69 Peter Seligman, *Proof Committee Hansard*, 14 November 2012, p. 35.

Committee comment

3.50 This committee is not a group of experts, and does not draw any conclusions about the experiences of any particular individual reporting effects from wind turbine operation. However, the wide range of symptoms, the regular expression of anxiety about wind farm construction, and the widely varying relationship between the facilities and the symptoms experienced, all suggest a complex situation that cannot obviously be ascribed to the operation of wind turbines alone. The committee concurs with Dr Tait that recurring claims of a wind turbine syndrome, for which there is no peer-reviewed evidence, are obscuring the focus on assisting properly the small number of people whose cases do need attention. The committee is also concerned that a nocebo response is developing, caused by the reproduction and dissemination of claims about adverse health impacts – claims not grounded in the peer-reviewed literature currently available.

Recommendation 2

3.51 The committee recommends that there should be no regulatory changes prior to the release of the NHMRC's assessment in 2013, as this would be premature.

Chapter 4
Noise Regulation of wind farms

Existing regulations

4.1 Governments apply noise standards to wind farms to ensure that noise levels do not exceed certain thresholds. These standards apply firstly during the planning process and secondly with regard to compliance measures on completion of the turbines and operation of the wind farm.

4.2 The World Health Organization's guidelines for community noise say that in order to avoid sleep disturbance, noise inside bedrooms should be limited to 30dB(A). The guidelines assume that with the window partly open, there will be a noise reduction of 15dB(A) between the outside of the building and inside the bedroom. The World Health Organization therefore recommends a maximum external sound level of 45dB(A) at night, but says that 40dB(A) should be the maximum for all new developments whenever feasible.[1]

4.3 Although noise standards for wind farms vary across the world, current standards in Australia are particularly strict. In November 2010, Sonus concluded that:

> The standards and guidelines used for the assessment of environmental noise from wind farms in Australia and New Zealand are amongst the most stringent and contemporary in the World.[2]

New and more stringent provisions

4.4 The introduction of new planning provisions has meant that the standards in New Zealand and some Australian jurisdictions have become markedly tighter in the last two years. The New Zealand standards are considered first because they inform some Australian standards.

4.5 The New Zealand government operated a standard 6808:1998 *Acoustics – The assessment and measurement of sound from wind turbine generators*. It revised its wind farm standards in 2010. This updated New Zealand Standard 6808:2010, *Acoustics – Wind Farm Noise*, like its predecessor, recommends that at noise sensitive locations:

> the level of sound from a wind farm should not exceed the background sound level by more than 5 dB, or a level of 40 dB $L_{A90(10min)}$, whichever is the greater.[3]

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1 Birgitta Berglund, Thomas Lindvall and Dietrich Schwela (eds.), *Guidelines for Community Noise*, World Health Organization, 1999, sec 4.3.1.

2 Sonus Pty Ltd, Wind Farms Technical Paper, Environmental Noise, November 2010, p. 4.

4.6 However, the New Zealand Standard 6808:2010 contains stricter new provisions including the ability for an authority to apply lower noise limits in designated areas, known as 'the high amenity limit'.[4]

4.7 In Australia, noise standards (including noise emanating from wind farms) are set by the states or local government authorities as part of their planning guidelines. Standards between jurisdictions are similar but not uniform, and the current standards for Victoria, New South Wales (NSW), South Australia, and Western Australia are given below.

4.8 The Victorian government applies New Zealand Standard 6808:2010 in its policy and planning guidelines for wind farms, modified by certain additional provisions.[5] The compliance and complaint mechanisms of the Victorian government are covered in later sections.

4.9 The Victorian government has also introduced new restrictions on the location of wind farms. On 29 August 2011, the Victorian government amended the Victoria Planning Provisions and all planning schemes in Victoria with regard to wind energy facilities. Amendment VC82 prohibits a wind energy facility in the following circumstances and locations:

> Turbines within two kilometres of an existing dwelling except where the planning permit application includes evidence of written consent from the owner of the dwelling to the location of the turbine.
>
> Areas of high conservation and landscape values including National and State Parks described in a schedule to the National Parks Act 1975 and Ramsar wetlands as defined under section 17 of the Environment Protection and Biodiversity Act 1999.
>
> Locations that feature a high degree of amenity, environmental value, or significant tourist destinations including the Yarra Valley and Dandenong Ranges, Mornington Peninsula, Bellarine Peninsula, Macedon and McHarg Ranges, Bass Coast and the Great Ocean Road region.
>
> Locations identified for future urban growth including land in the Urban Growth Zone and designated regional population corridors specified in the

3 Standards New Zealand Paerewa Aotearoa, Standards New Zealand FactSheet, Revised Wind Farm Noise Standards NZS 6806:2010 — Frequently Asked Questions, 26 July 2010, p. 3. Note: L90 is a measurement of the sound level exceeded for 90 per cent of the time.

4 Standards New Zealand Paerewa Aotearoa, Standards New Zealand FactSheet, Revised Wind Farm Noise Standards NZS 6806:2010 — Frequently Asked Questions, 26 July 2010, p. 3.

5 Government of Victoria, Department of Planning and Community Development, Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, July 2012, sec. 14, p. 45.

Regional Victoria Settlement Framework Plan in the State Planning Policy Framework.[6]

4.10 Under amendment VC78, the Victorian government amended the planning provisions to make Councils the responsible authority for all wind farm planning permit applications.[7] However, the Pyrenees Shire Council in Victoria stated that based on legal opinions sought by various councils, the State government was the responsible planning authority for both determining the permit for a wind farm, and monitoring and enforcing compliance.[8]

4.11 In NSW, responsibility for the assessment of a proposed wind farm depends on the scale (capital investment value) and location (local, regional, state significant) of a proposed wind farm. Small local wind farms are typically assessed and determined by Councils. Larger more significant proposals may still be Council assessed, but determined by a Joint Regional Planning Panel. Significant development proposals are state assessed and determined by the statutory Planning Assessment Commission.[9]

4.12 Typical set back distances between wind farms and residential properties in NSW currently vary between 0.8 – 2.0 km, with the average being 1.2 km.[10] The Draft NSW Guidelines propose increasing the minimum setback to 2km, unless the wind farm proponent receives specific written consent from all landowners within a 2km zone.[11]

4.13 The proposed new noise standards for NSW 'are stringent by both Australian and world standards being approximately 10dB(A) lower than most European countries'.[12] The Sonus *Wind Farms Technical* Paper notes that 10dB(A) is a significantly lower amount given that reducing a noise source by even 5dB(A)

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6 Government of Victoria, Department of Planning and Community Development, Amendment VC82, http://www.dpcd.vic.gov.au/planning/planningapplications/moreinformation/windenergy#policy (accessed 27 November 2012)

7 Government of Victoria, Department of Planning and Community Development, Amendment VC78, http://www.dpcd.vic.gov.au/planning/planningapplications/moreinformation/windenergy#policy (accessed 27 November 2012)

8 Pyrenees Shire Council, *Submission 211*, p. 1; Mr Chris Hall, Senior Town Planner, Pyrenees Shire Council, *Proof Committee Hansard* , 14 November 2012, p. 22.

9 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 1.

10 NSW Government, Submission 819 to the Senate Community Affairs Committee Inquiry into the Social and Economic Impact of Rural Wind Farms, 2011, p. 3.

11 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 2.

12 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 6.

requires either the distance between the source and the receiver to be approximately doubled, or a reduction of up to two thirds in the total number of turbines.[13]

4.14 The NSW Draft guidelines state that for a new wind farm development, noise levels at nearby residences 'should not exceed 35dB(A) or the background noise (L_{90}) by more than 5dB(A), whichever is the greater'. Furthermore, the 'noise criteria must be established on the basis of separate daytime (7am to 10pm) and night-time (10pm to 7am) periods'.[14]

4.15 The NSW government proposes to amend existing state mechanisms in order to give effect to the new provisions:

> It is proposed to strengthen the regulation of noise from wind farms under the Protection of the Environment Operations Act 1997 with the Environment Protection Authority (EPA) having a regulatory role in relation to wind farms that are State Significant Development as well as existing transitional projects.[15]

4.16 The NSW guidelines note that low frequency noise 'is typically not a significant feature of modern wind turbine noise'. However, the guidelines include provisions for a 5dB(A) penalty 'if excessive levels of low frequency noise above the human threshold of hearing are occurring'.[16]

4.17 The new regulations in both Victoria and NSW may have had an impact on the development of wind farms in both those states. According to Clare Corke and Tina Latif, no new wind farm applications have occurred in Victoria or NSW since the introduction of the Victorian amendments and the NSW Guidelines.[17]

4.18 The South Australian government updated its wind farm noise guidelines in 2009. The guidelines provide that noise from new wind farm developments should not exceed 35dB(A) at 'relevant receivers' in rural-residential localities and 40dB(A) in other zones, or the background noise by more than 5dB(A), whichever is greater.[18] This meant that the base level noise limit was increased by 5dB(A) in non-rural-residential localities over the 2003 guidelines. The change was implemented:

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13 Sonus Pty Ltd, Wind Farms Technical Paper, Environmental Noise, November 2010, p. 45.

14 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 6.

15 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 6.

16 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 34.

17 Clare Corke and Tina Latif, Gone with the wind: planning laws blow away investment, *Climate Spectator*, 6 July 2012, http://www.climatespectator.com.au/commentary/gone-wind-planning-laws-blow-away-investment (accessed 21 November 2012)

18 South Australian Government, Environment Protection Authority, Wind Farms Environmental Noise Guidelines, July 2009, p. 3.

> to ensure consistency with the assessment limits applied by the South Australian Environment Protection (Noise) Policy 2007 to other noise sources in a general farming or rural locality.[19]

4.19 On 12 October 2012, the Statewide Wind Farms Development Plan Amendment (DPA) came into effect. It included changes to discourage wind farms in particular areas of scenic and amenity value, and the introduction of a 1km setback between turbines and dwellings and a 2km setback between turbines and townships.[20]

4.20 The Western Australian government has not developed its own specific wind farm guidelines, but in 2004 the government endorsed the South Australian *Environment Protection Authority — Wind Farms Environmental Noise Guidelines*.[21] The committee is not aware of any further update to the Western Australian planning documents, which would indicate that the maximum noise level in Western Australia remains at 35dB(A) for all localities.

The adequacy of current noise regulations for wind farms

4.21 The committee received evidence from individuals and organisations arguing that existing mechanisms either do not effectively regulate for noise, and/or that the compliance and complaint mechanisms are ineffective. The Waubra Foundation submitted that 'noise pollution from industrial wind turbines' is 'unregulated'. The committee's understanding of existing regulatory systems, and evidence received regarding ongoing scrutiny of some facilities, refutes this suggestion absolutely.

4.22 A second claim by the Foundation is that wind farm operators are able 'to break the law with impunity'.[22] Similar concerns were expressed in some individual submissions from people living in the proximity of wind farms. The following section looks at the issue of compliance with standards and complaint mechanisms.

4.23 One of the concerns arising in many submissions was the issue of low frequency noise and infrasound. In order to determine whether current regulations are adequate to regulate noise, mid-to-high frequency as well as low frequency sound and infrasound must be considered. A key element is the need to determine the extent to which low frequency sound and infrasound from wind farms is a problem, and whether the current regulations that focus on the A-weighting are adequate to deal with the low frequency sound. As discussed in previous chapters, the available evidence does not support the proposition that inaudible levels of low frequency noise and infrasound from wind turbines are problematic for health.[23]

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19 Sonus Pty Ltd, Wind Farms Technical Paper, Environmental Noise, November 2010, p. 15.

20 The Hon. John Rau MP, Minister for Planning, Government of South Australia, Ministerial statement — Statewide Wind Farms DPA, 18 October 2012; The South Australian Government Gazette, Development Act 1993, Section 26(9): Statewide Wind Farms Development Plan Amendment, 18 October 2012, p. 4678.

21 Western Australian Government, Western Australian Planning Commission, Planning Bulletin No. 67 — Guidelines for Wind Farm Development, May 2004.

22 Waubra Foundation, *Submission 197*, p. 5.

23 Response to adverse comment from Dr Geoff Leventhall, 16 November 2012, p. 2.

Committee view

4.24 Given that it is audible levels of sound from wind farms that must be addressed in regulatory standards, it appears firstly that the A-weighting used to measure sound from wind turbines is fit for purpose, and secondly, that current regulations that specify sound levels as low as 35-40dB(A) at relevant receivers in Victoria, NSW, South Australia and Western Australia are sufficient to protect citizens and communities from undue noise exposure.

Noise compliance mechanisms

4.25 Prior to the operation of a wind farm, noise assessment is an integral aspect of the development planning for a wind farm. Energy Australia points out that a wind farm would not receive planning approval unless the responsible authorities were satisfied that the relevant noise standards would be met.[24]

4.26 After completion of a wind farm, the states have similar requirements for assessing noise compliance. The Victorian standards require acoustic compliance reports to be prepared by an independent acoustic engineer, with the initial report after completion of the first turbine and at six-monthly intervals thereafter until full operation. A final compliance report is due 12 months following full operation of the facility, and those reports should be publicly available.[25]

4.27 The NSW standards require the operator to prepare and submit a noise compliance report within 12 months of the operation of the facility, and that report should be publicly available. In addition, 'noise monitoring must be undertaken during "worst case" periods'.[26]

4.28 State governments also commission noise audits of wind farms. In 2012, the NSW government hired, by tender, an independent noise specialist to conduct a noise audit of all operating wind farms in the state. The selection process ensured the independence of the auditors from the wind farm operators:

> Importantly, the successful tenderer has not previously carried out monitoring or assessment work on the three wind farms that are the subject of these audits as it is essential that auditors do not review their own work.
>
> Nor has the company ever done any work for either of the wind farm operators involved in the audit – Infigen Energy and Origin Energy – on any other facilities.[27]

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24 Energy Australia, *Submission 159*, p. [3].

25 Government of Victoria, Department of Planning and Community Development, Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, July 2012, pp. 45–46.

26 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, p. 7.

27 NSW Government, Department of Planning and Infrastructure, Wind Farms Compliance Audit — Frequently Asked Questions, May 2012, p. 1; see also NSW Government, Department of Planning and Infrastructure, Conduct of Wind Farm Audits, March 2012.

4.29 There is community concern that the noise compliance audits are not representative of the actual noise experienced by wind farm neighbours. The Waubra Foundation alleged that wind farm noise audits misrepresent the typical noise emitted by wind farms:

> The operation of the turbines during such an "audit" period, does not represent the reality and extent of noise and vibration pollution which the residents live with when such an audit is not occurring.[28]

4.30 Community concern about the audit process has been recognised by the NSW government. The government notes that these concerns will be discussed 'at length' with the successful tenderer and that the audit will be representative and will include worst case conditions:

> Appropriate strategies will be adopted to ensure noise measurements are taken under normal wind farm and turbine operating conditions.
>
> In order to ensure the most stringent analysis of compliance with consent conditions, the measurements will also be scheduled to take place at the times and under the conditions that typically produce worst case noise impacts from wind farms.[29]

4.31 The South Australian guidelines also recognise that there are community concerns around the representativeness of a compliance audit. The guidelines therefore recommend 'that compliance checking be repeated at different periods of the year where valid concerns exist'. The guidelines also point out that failure to collect representative data may result in one or more turbines being stopped.[30] Furthermore, the South Australian guidelines note that the 'EPA will restrict operation of the wind farm' during periods of excessive noise from the wind farm.[31]

4.32 The committee was made aware of a number of investigations that indicated that wind farms were in compliance with their planning permits. These included Hepburn Wind's facility at Leonards Hill, which in October 2012 reported that it had:

> received formal notification that, after thorough investigation and assessment, the Hepburn Shire Council is satisfied that the wind farm is compliant with the relevant noise standards.
>
> At the request of the shire, the Victorian Environment Protection Authority (EPA) provided an independent assessment and have advised that they too are satisfied with the acoustic reporting.[32]

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28 Waubra Foundation, *Submission 197*, p. 4.

29 NSW Government, Department of Planning and Infrastructure, Wind Farms Compliance Audit — Frequently Asked Questions, May 2012, p. 2.

30 South Australian Government, Environment Protection Authority, Wind Farms Environmental Noise Guidelines, July 2009, p. 8.

31 South Australian Government, Environment Protection Authority, Wind Farms Environmental Noise Guidelines, July 2009, p. 16.

32 Taryn Lane (Hepburn Wind), 'Compliance confirmed', October 2012, http://hepburnwind.com.au/2012/10/ (accessed 26 November 2012).

4.33 In responding to a complaint about Capital Wind Farm (CWF), the NSW government Department of Planning and Infrastructure undertook noise monitoring at CWF and 'also reviewed the [CWF] operator's noise monitoring report'. However, the department did not find any instance of non-compliance as a result of this work.[33]

4.34 Infigen Energy, which operates facilities in New South Wales, South Australia, and Western Australia, made the following observations:

> For our NSW wind farms, the register of complaints has been reviewed by the NSW Department of Planning and their Independent Environment Auditor on at least an annual basis. The NSW Department of Planning most recently examined the complaints registers during July and August 2012.
>
> …In NSW, our wind farms also had to demonstrate compliance with the applicable noise regulations and consent conditions. Even after this, the NSW Government decided to undertake an additional noise audit this year, utilising an acoustic consultant of their own choosing, to repeat the compliance testing. It is worth nothing the consultant chosen by the NSW Government has appeared twice in the NSW Land & Environment Court on behalf of wind farm opponents, so it would be difficult to argue that the consultant was "pro-wind energy".[34]

4.35 One of the issues raised in connection with compliance assessment was the ability of members of the public to access wind farm noise data. These matters are covered in a later section on transparency and access to data.

Committee view

4.36 The committee has seen evidence of adequate compliance mechanisms and audit processes in place, and acknowledges the work of state governments in strengthening aspects of these processes over the last three years.

Complaint mechanisms

4.37 One component of current planning regimes is the requirement that wind farm operators include a complaint mechanism to enable citizens to lodge a complaint about a wind farm, and mechanisms by which an authority can ensure that complaints are dealt with and compliance is met. This mechanism is intended to provide affected parties with a formal avenue to resolve disputes.

4.38 For example, guidelines in Victoria require a wind farm operator to prepare a complaint register prior to the commencement of operation. The plan shall include:

- how contact details will be communicated to the public;
- a toll free telephone number and email contact for complaints and queries;

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33 NSW Government, Department of Planning and Infrastructure, Wind Farms Compliance Audit — Frequently Asked Questions, May 2012, p. 3.

34 Answers to questions on notice from Infigen Energy, 23 November 2012.

- details of the appropriate council contact telephone number and email address (where available); and
- a table outlining complaint information for each complaint received, including:
    - the complainant's name;
    - any applicable property reference number if connected to a background testing location;
    - the complainant's address;
    - a receipt number for each complaint which is to be communicated to the complainant;
    - the time, prevailing conditions and description of the complainant's concerns including the potential incidence of special audible characteristics; and
    - the processes of investigation to resolve the complaint.[35]

4.39 In addition, the operator must provide a complaints report to the responsible authority each year. This report must include 'a reference map of complaint locations', and must also outline the 'complaints, investigation and remediation actions'.[36]

4.40 Various requirements apply for the evaluation of noise complaints including the measurement of sound levels at the same locations where the background sound levels were initially determined. In Victoria, if a breach in noise compliance is detected, an independent assessment report must be prepared including a remediation plan. If the complaint remains unresolved, the responsible authority may request an independent peer review at the cost of the permit holder and on/off shut down testing. The responsible authority may also require independent assessment following noise complaints if the authority believes the complaints warrant investigation.[37]

4.41 In South Australia, the EPA can require the developer to repeat the compliance checking procedure if it receives any complaint that may be valid about an unreasonable interference on those premises from noise impacts.[38]

4.42 The NSW guidelines require the operator to establish a community consultative committee and to provide that committee with a record of all community concerns and complaints. The committee is empowered to conduct 'regular inspections

35 Government of Victoria, Department of Planning and Community Development, Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, July 2012, pp. 46–47.

36 Government of Victoria, Department of Planning and Community Development, Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, July 2012, p. 47.

37 Government of Victoria, Department of Planning and Community Development, Policy and Planning Guidelines for Development of Wind Energy Facilities in Victoria, July 2012, p. 46.

38 South Australian Government, Environment Protection Authority, Wind Farms Environmental Noise Guidelines, July 2009, p. 15.

of the wind farm in conjunction with its meetings, or at other times convenient to it'. The guidelines also include provisions for a dispute resolution process.[39]

4.43 The NSW government notes that it has responded to a complaint about CWF. The Department undertook noise monitoring at capital wind farm and 'also reviewed the Capital wind farm operator's noise monitoring report'. However, the department did not find any instance of non-compliance as a result of this work.[40]

4.44 Pacific Hydro states that it 'takes all complaints from community members seriously' and that it has 'a thorough complaints process which investigates concerns thoroughly'. However, the company notes that 'some complaints are challenging to resolve'. Pacific Hydro has received complaints that it regards as unreasonable to resolve including:

> increased mosquitos in the area and another where it is alleged an earth tremor was caused by the wind farm. We have also had a complaint about significant noise and health impacts from one of our wind farms while it was shut down for maintenance for an extended period.[41]

4.45 Hepburn Wind is a community-owned wind farm in Central Victoria. Hepburn Wind state that 'within our local community we enjoy overwhelmingly strong support', but they do acknowledge that there are a few objections, some of which pre-date the project construction. Hepburn Wind state that while negotiating the resolution of complaints can be difficult, they are committed to dealing with concerns:

> There are approximately 65 homes within 2.5 km of our wind farm. We currently have outstanding noise complaints at three of these homes. There is no relationship between distance to the wind farm and these complaints. In each case we are patiently awaiting the co-operation of the complainants.[42]

4.46 The committee has also been made aware that certain complainants have either refused to engage in discussions with wind farm operators to try and resolve complaints. Dr Andja Mitric-Andjic stated in a submission that both her family and clients in her practice are suffering from a cluster of symptoms that she has attributed to the Hepburn wind farm, and in particular infrasound from the turbines.[43] In response, Hepburn Wind point out that over the last two years, they:

> have requested a face-to-face meeting with Dr Mitric-Andjic via email, telephone or letter on 10 occasions …

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39 NSW Government, Department of Planning and Infrastructure, Draft NSW Planning Guidelines Wind Farms, December 2011, pp. 38–42.

40 NSW Government, Department of Planning and Infrastructure, Wind Farms Compliance Audit — Frequently Asked Questions, May 2012, p. 3.

41 Response to adverse comment from Pacific Hydro, 22 November 2012.

42 Hepburn Wind, *Submission 215*, p. [1].

43 Dr Andja Mitric-Andjic, *Submission 141*, p. 1.

> All of these requests have been either rejected or ignored. Despite writing multiple letters to our local newspapers and making a submission to the current Inquiry, we have yet to meet Dr Mitric-Andjic …
>
> We carefully monitor the scientific literature on wind turbine noise, including infrasound, and we are happy to discuss this matter with Dr. Mitric-Andjic, but have been denied the opportunity to do so.
>
> We find it difficult to understand, given the seriousness of Dr. Mitric-Andjic's claims, why she has been unable to find time to sit down with us at any time over the past 15 months to discuss her claims. We cannot reconcile her apparent concern with her continued refusal to work towards resolution.[44]

4.47 The committee has also been informed that there is more to the complaints about wind farms than the matter of noise levels alone. According to Hepburn Wind, securing the resolution of complaints is hampered by anti-wind lobbying in the community with the result that some objectors have decided to opt out of the protections offered under the noise compliance protocols:

> The anti-wind lobby has enjoyed a degree of success in undermining community confidence in the noise compliance processes. As a result, a number of objectors to our project chose not to participate in the noise compliance protocols imposed by our planning permit. In effect, these objectors opted out of the protections granted to them by the planning process.[45]

Transparency and access to noise data

4.48 The issue of access to data was raised by several witnesses. Emeritus Professor Colin Hansen stated that 'it is extremely difficult to get data' from a wind farm operator.[46] Both Mr Les Huson and Mr Steven Cooper stated that it was crucial to know the wind speed at the hub height in order to determine compliance with noise standards, but that data was not available from either the wind farm operators or the relevant authority. Mr Cooper said that he was told the information was commercial-in-confidence.[47] Mr Huson received similar advice and noted that he could not agree with certain clauses in the confidentiality agreement proposed by the wind farm operator.[48] The Waubra Foundation noted that in their experience, the summary acoustic reports provided to residents by wind farm operators either lacks raw data, or

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44 Response to adverse comment from Hepburn Wind, 23 November 2012, p. [1].

45 Response to adverse comment from Hepburn Wind, 23 November 2012, p. [3]; see also Hepburn Wind, *Submission 215*, p. [4].

46 Emeritus Professor Colin Hansen, *Proof Committee Hansard*, 14 November 2012, p. 14.

47 Mr Steven Cooper, *Proof Committee Hansard*, 14 November 2012, pp. 28–29.

48 Mr W Les Huson, *Submission 216*.

has crucial pieces of data missing.[49] Similar views were also expressed by Mr Huson.[50]

4.49 The committee heard of a difference in opinion between the Pyrenees Shire Council and the Victorian Department of Planning and Community Development over the publication of noise data and reports. Mr Hall stated that the Council had:

> been advised that the Department of Planning and Community Development have refused to provide information to landowners who have requested copies of noise data and reports on their properties. I would have thought individual assessments of some properties may need to be kept confidential, but I think the general report that is provided on the wind farm development as a whole should be disclosed once it has been signed off. I would personally like to see that information made available before it has been signed off, so that the public can review it.[51]

4.50 Wind farm operators and industry organisations were questioned at length about what data they were required to supply to state regulators as part of the compliance process and why this data could not be made publicly available.

4.51 In their submissions and responses at the committee's public hearing, many wind industry companies and organisations stated that the provisions in the bill that would require operators to collect, collate and publish wind speed and direction at the wind farm, weather conditions at the wind farm, and power output of individual turbines at the wind farm would be onerous and unnecessary. For example, Vestas noted that the power output of individual turbines is commercially sensitive, but that the generation output of wind farms is already publicly available from the Australian Energy Market Operator's website. Similarly weather and wind speed data is already available from the Bureau of Meteorology.[52]

4.52 Mr Jamie McGilp stated that under the current standards, Acciona was required to have independent compliance testing undertaken. Mr McGilp also noted that Acciona supplied data on wind speed, noise levels and weather conditions to the regulator, in their case, the Victorian Department of Planning and Community Development:

> All of that information, including wind speed, noise levels, weather conditions et cetera, is provided to the regulator such as DPCD in Victoria.[53]

4.53 Pacific Hydro explained why the public availability of wind speed data is commercially sensitive information for a wind farm proponent, and proposed a

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49 Waubra Foundation, *Submission 197*, p. 4.

50 Mr W Les Huson, *Submission 216*.

51 Mr Chris Hall, Senior Town Planner, Pyrenees Shire Council, *Proof Committee Hansard*, 14 November 2012, p. 23.

52 Vestas, *Submission 191*, p. [5].

53 Mr Jamie McGilp, Manager, Acciona, *Proof Committee Hansard*, 14 November 2012, p. 61.

mechanism whereby the data could be made available to an independent statutory body:

> By way of background, as far as we are aware all transmission connected and semidispatchable wind farms in Australia provide real time wind speed and energy generation data to the Australian Energy Market Operator (AEMO) … It should also be noted that AEMO provides highly detailed energy generation data for Australian wind farms and this is available from their website.
>
> Importantly, all wind speed data is provided to AEMO under the strictest confidentiality. This is due to the commercially sensitive nature of this data.
>
> In addition to this data being the intellectual property of the wind farm owner that has been acquired at some expense, wind speed data is the critical element in establishing the commercial viability of wind energy projects. It is important to note that relatively minor variations in wind speed translate into meaningful differences in sent out energy costs, contract pricing and investor returns.
>
> Wind speed data is the one element of the projects financial model that cannot be accessed by other parties. Other aspects such as turbine pricing, finance, transmission access and connection costs for example can be found through publicly available sources.
>
> To make this data available would allow competitors and contract counterparties to gain invaluable intelligence on a project's commercial status and allow them to create an accurate "shadow" financial model for the project, placing the wind farm proponent at a distinct commercial disadvantage.
>
> For a wind farm proponent to make this data publically available would be akin to Apple placing the detailed design and cost structure of its next generation I-Phone on the internet 6 months before public launch.
>
> While we would not be prepared to make wind speed data publicly available, for the reasons outlined above, we would be prepared to consider a process whereby wind speed data is provided to an independent statutory body. As with our arrangements with AEMO, this data would only be provided under strict confidentiality and its use would need to be restricted by well-defined protocols.[54]

4.54 The Public Health Association of Australia and Professor Simon Chapman both believed that the general principle of transparency in the regulatory data and process was a good idea.[55]

Committee view

4.55 The committee notes that current state regulations pertaining to the development of wind farms are stringent by world standards in terms of the

54 Correspondence to the committee from Pacific Hydro, 22 November 2012, pp. [1–2].

55 Melanie Walker, *Proof Committee Hansard*, 14 November 2012, p. 45; Simon Chapman, *Proof Committee Hansard*, 14 November 2012, p. 48.

permissible noise levels and setback requirements. The committee notes that potential adverse health effects appear confined to the audible sound range, and considers that current state regulations adequately address noise levels in the audible range.

4.56 The committee notes that current standards in Victoria, NSW, and South Australia limit the noise attributable to wind farms to between 35-40dB(A) or 5 dB(A) above the background noise, whichever is greater. These standards are also endorsed by the Western Australian government. The standard of 5dB(A) above background noise already in place in these states is significantly lower than the 10dB(A) above background noise proposed in the bill.

4.57 Planning decisions, as always, must weigh up the overall benefits of developments against local effects that those developments may have. This is true for rural developments such as land clearing or irrigation projects, urban developments such as shopping centres and residential development, and infrastructure in all areas, such as roads, hospitals or power stations. The stringent tests being applied to wind farm developments overall indicate local effects are now being taken very seriously.

4.58 There should be community confidence in the regulatory process and in particular in the capacity for successful examination of complaints and the implementation by regulators of enforcement action in the event of non-compliance. This requires balancing the need for transparency in compliance data, with the protection of privacy and of commercial in confidence information of business operators. The committee does not believe any purpose is served through the release of raw data to residents, as residents are not the agents responsible for regulation and enforcement. Regulators should have access to the data, and should act on complaints about non-compliance, particularly where those complaints are backed by professionally-obtained acoustic data. The committee believes that there is merit in the compromise, put by Pacific Hydro late in the inquiry, to make industry data available to an independent body to test compliance claims.

Recommendation 3

4.59 The committee recommends that, where there is ongoing debate over noise compliance issues for particular wind farms, that governments consider making data for those operations available to an independent authority for review of compliance.

Chapter 5

A consideration of the administrative issues in the bill

5.1 The committee has established that there is no evidence available to it to show that wind farms produce health impacts different in nature to those caused by other noise sources. Wind farms do produce noise, which is why they are subject to planning regulations, including guidelines prepared specifically for wind farm proposals, intended to ensure that noise issues are addressed.

5.2 In the course of considering health and noise issues, the committee has identified a number of reasons why the bill is inappropriate. In addition to these points, there are a range of other arguments that were put to the committee regarding why the bill should not be supported.

The bill is discriminatory against one kind of power generator

5.3 In its current form the bill discriminates against one kind of industrial noise producer. Ratch-Australia Corporation argued that '[t]he amendment singles out wind farm developments for an increased level of scrutiny.'[1] The Clean Energy Council concurred with the view that wind farms are being singled out in the bill in comparison with the regulatory burden on other types of power generation:

> Appropriate regulations and community consultation should apply to any wind farm, as they do to any new infrastructure – be it a conventional fossil fuelled power station, a tourist development, a road, a dam or a mine. Where appropriate, on the basis of merit, the planning scheme should manage impacts and relevant concerns. However, that must be balanced within broader state policy objectives.
>
> Treating wind farms differently from other forms of infrastructure could create a precedent that stifles investment in other projects essential to Australia.[2]

5.4 Energy Australia also argued that the bill was not consistent in its treatment of all infrastructure:

> The application of regulations and standards should apply equally to wind farms and other new infrastructure, for example, roads, fossil fuelled power stations, ports, or mines.[3]

5.5 The health implications from the noise from wind farms was discussed by the Public Health Association of Australia, which also could not understand why wind farms were being treated differently to other forms of power generation:

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1 Ratch-Australia Corporation, *Submission 117*, p. 1.

2 Clean Energy Council¸ *Submission 165*, p. 3.

3 EnergyAustralia, *Submission 159*, p. 5.

> We also note that electricity generation from other sources particularly fossil fuel mining and combustion has a range of well-documented adverse impacts. These include: visual impacts, dust and organic particulate and gas emissions, effects on local communities, and lifecycle environmental effects such as greenhouse gas emissions and consequent global warming. Noise is only one of the factors which affect health and well-being. These other impacts have received disproportionally less attention than issues relating to wind turbines. A focus on a single aspect of one method of electricity generation will create a skewed approach to the policy question of 'as-healthy-as-possible' electricity generation choices in Australia.
>
> Given this broad context of adverse effects, we submit that it is not appropriate for a Bill intending to address any adverse effects to focus on only one aspect of a single electricity generation process.[4]

5.6 The Conservation Council of South Australia pointed out succinctly that 'noise is not unique to wind farm developments,'[5] while Joe Hallenstein suggested 'that any noise legislation should cover ALL emitters of noise, be it noise from energy generation, industry, cars, farm equipment, barking dogs or bleating sheep'.[6]

5.7 The committee also noted the submission from Community for the Accurate Impact Assessment of the Dalton Power Station, a residents' organisation concerned about noise issues associated with the construction of a gas turbine power station in a rural area.[7] The issues raised in that submission are the same as those raised about wind farms, and the committee sees no reason why the regulatory approaches to the two types of facility should be different.

The bill will not prevent wind farms from operating but could impact on electricity prices

5.8 The bill has also been criticised because it will not prevent wind farms from operating, even if there are issues of non-compliance. A wind farm that contravened the provisions in this bill would lose its capacity to earn Large Scale Generation Certificates (LGCs) until it established compliance. But this has no bearing on the wind farm's right to operate. As long as a wind farm complies with existing planning laws relating to noise, it will be able to operate, regardless of whether the bill passes.

5.9 This would not be the case. However, while not directly affecting wind farm operations, the bill's provisions would impose a financial penalty on the operating company and could increase electricity prices.

5.10 Energy Australia and the Energy Supply Association of Australia submitted that the *Renewable Energy (Electricity) Act 2000* currently creates a certain amount of LGCs to meet the Renewable Energy Target. They argued that if the number of LGCs falls then this would increase costs, and consequently prices:

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4 Public Health Association of Australia, *Submission 23,* pp 2-3.

5 Conservation Council SA, *Submission 198,* p. 2.

6 Joe Hallenstein, *Submission 46*, p. 1.

7 Community for the Accurate Impact Assessment of the Dalton Power Station, *Submission 167*.

> Under the RET, liable retailers of electricity are statutorily required to acquit a certain number of Large Scale Generation Certificates (LGCs) to the Clean Energy Regulator each year. The Excessive Noise Bill significantly exposes electricity retailers who are statutorily required to acquire LGCs under the RET, where the retailer is sourcing LGCs from a wind farm subject to suspension of accreditation.[8]
>
> The effect of this bill, should it be implemented, would be to increase the costs of complying with the RET. This would flow through to higher electricity prices. In many cases, wind farm developers have entered into power purchase agreements (PPAs) with electricity retailers. PPAs secure a price for the wind farm developer for the electricity generated and any associated RET certificates. This also helps retailers to secure a source of certificates to meet their obligations under the RET. If electricity generation and RET certificate creation from a wind farm decreases as a result of this bill, retailers would then need to source certificates elsewhere. This increases the costs of compliance for retailers and would increase electricity prices as a result.[9]

Increased monitoring cost

5.11 There was concern that monitoring the obligations contained in the bill would be costly and impractical. The Clean Energy Council queried the expense of installing additional monitoring equipment:

> The excessive noise bill requires ongoing monitoring of noise at numerous locations, as well as wind speed, direction, and undisclosed other "weather conditions". Such monitoring, done properly, would come at significant cost.[10]

5.12 Pacific Hydro also suggested that the requirement to assess noise levels against background noise would create an impossible situation:

> …we are of the view that the proposed legal limit cannot be measured continuously. To do so would require turning the wind farm on and off to establish the actual impact above the background noise level at the time. This is an entirely unworkable proposition.[11]

The bill involves the Commonwealth taking over planning and regulatory responsibilities from states

5.13 Several submissions highlighted that the bill involved the Commonwealth assuming control of planning and regulatory responsibilities that are the responsibility of State governments. Repower Australia put it that:

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8 Energy Australia, *Submission 159,* p. 2.

9 Energy Supply Association of Australia, *Submission 205,* p. 2.

10 Clean Energy Council¸ *Submission 165,* p. 3.

11 Pacific Hydro, *Submission 207,* p. 3.

> State Governments are responsible for establishing the planning framework for new infrastructure, such as wind farms, and already have clear standards relating to wind farm noise.[12]

5.14 The Energy Supply Association of Australia (ESAA) noted that:

> The proposed legislation would also set a worrying precedent in terms of Commonwealth involvement in state planning issues. Currently, planning laws are administered by state governments. There is no clear or justifiable reason for the Federal Parliament to interfere with existing state government planning laws in the case of wind farms.[13]

5.15 In the same vein, EnergyAustralia observed that:

> Currently, the relevant jurisdictional Environmental Protection Agency is the only body that regulates noise compliance of wind farms. The Excessive Noise Bill implicitly proposes that the Clean Energy Regulator (as the regulatory agency in relation to the RET) will also have a role to play in regulating compliance of noise arising from wind farms.[14]

5.16 In contrast to these views, the Waubra Foundation argued that the bill is necessary because:

> No responsible State noise pollution regulation authority is actively and thoroughly investigating the noise pollution, even when multiple complaints are made, and the seriousness of the situation is made clear. The investigation, if it occurs, is cursory, often with equipment which cannot measure the full acoustic spectrum or the true background noise accurately, and it always occurs when the wind project operators are well aware that such an investigation is occurring.[15]

5.17 The Clean Energy Council expressed fears that duplicating planning requirements at the Commonwealth and State level would create inconsistency and confusion:

> Noise guidelines form a part of an overall planning scheme and should be determined by individual state governments, to be considered and defined alongside other aspects of infrastructure planning. Setting a national rule sitting above existing state-based planning regimes will create inconsistency and confusion for planners, industry and the community...State governments should be left to design their noise requirements as part of their broader planning regime.[16]

5.18 The Queensland Government opposed most of the bill's provisions, and pointed out that it has existing processes for addressing impacts, including noise impacts. It also argued that the bill's removal of discretion in how a regulator acts

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12 REpower Australia, *Submission 137*, p. 1.

13 Energy Supply Association of Australia, *Submission 205*, p. 2.

14 EnergyAustralia, *Submission 159*, p. 4.

15 Waubra Foundation, *Submission 197*, p. 4.

16 Clean Energy Council, *Submission 165*, pp 2–3.

because it bypasses opportunities for more appropriate enforcement actions such as directions to comply.[17]

Appropriateness of the noise standard in the bill

5.19 A number of submissions received by the committee queried the appropriateness of the bill establishing a noise standard that applies only to one kind of operation. For example, the ESAA posited that:

> A range of industrial and transport installations generate noise, often more consistently than turbines. There is no clear reason as to why wind farms alone should be shut down because of this. This Bill would place requirements on one particular technology which do not apply to any other form of technology. Furthermore, defining 'excessive noise' as exceeding background noise by 10dB within 30 metres of a range of premises sets an astonishingly low threshold for what is considered to be excessive noise.[18]

5.20 Similarly, EnergyAustralia argued that the proposed noise standards were inappropriate:

> In its operation, the [bill] would allow wind farms to be louder than existing noise guidelines at time of high background noise, and will restrict wind farms to unreasonable noise levels when background noise is very low. If background noise levels were about 5 dB then a wind farm would be allowed to emit only 15 dB, 30m from a dwelling, workplace or congregation area…The proposed standards are overly onerous given that the World Health Organisation recommends noise levels in sleeping areas are kept to less than 30 dB for healthy sleeping conditions.[19]

5.21 The Clean Energy Council also questioned the selection and appropriateness of the noise standards to be established by the bill:

> The excessive noise bill, at its core, demands that wind farms do not exceed background noise levels at residences by more than 10dB. However it does not describe the rationale behind the selection of this noise level. The excessive noise bill also neglects to describe the methodology of this measurement. For example, the measurement distance from dwellings or workplaces of 30m is totally arbitrary and unscientific.[20]

5.22 Vestas[21] and Alstom[22] also pointed out that the excessive noise provisions in the bill appear inappropriate and could have adverse consequences. Vestas states that:

> The provisions of section 4 will actually allow wind farms to be louder than they would be permitted to be under existing noise guidelines at times of

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17 Queensland Government, *Submission 217*.

18 Energy Supply Association of Australia, *Submission 205*, p. 2.

19 EnergyAustralia, *Submission 159*, p. 4.

20 Clean Energy Council, *Submission 165*, p. 2.

21 Vestas, *Submission 191*.

22 Alstom, *Submission 186*.

> high background noise. Such a rule will also restrict wind farms to unreasonable noise levels when background noise is very low.[23]

Impact on operators

5.23 Although not retrospective, the bill would treat some operators unfairly and undermine investment confidence. TrustPower, a New Zealand-based renewable energy company, noted possible repercussions of the passage of the bill:

> TrustPower's continued investment in Australian wind farms requires regulatory certainty over the life of a project. TrustPower considers the bill in its current form as practically unworkable with very significant unwarranted regulatory risk for existing and future wind farm investments.[24]

5.24 Similarly, EnergyAustralia noted:

> Imposing additional, more onerous, noise regulations in relation to existing assets is a serious concern and something that will have significant ramifications in relation to the existing commercial and financing arrangements which underpin these large infrastructure projects.[25]

5.25 The bill's requirement that operators provide various data measures was questioned on the grounds of cost, relevance, and reason. It was pointed out to the committee that a large amount of data is already publicly available through such sources as the Bureau of Meteorology and the Australian Energy Market Operator.[26]

5.26 The bill seeks to put commercially sensitive data into the public arena.[27] Some submissions questioned the rationale behind releasing data on individual turbines noting that:

> The power output of individual wind turbines is proprietary information and is protected vigorously by a project owner as well as the turbine manufacturer. Other power stations are not required to publish operational data.[28]

5.27 As well as commercial sensitivity, the committee heard allegations that the data provided by operators to stakeholders was often unreliable.[29] If the data is inaccurate, it is unclear how the public having access to this data would limit excessive noise.

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23 Vestas, *Submission 191*, p. [4].

24 TrustPower, *Submission 208*, p. 2.

25 EnergyAustralia, *Submission 159*, p. 3.

26 Energy Supply Association of Australia, *Submission 205*, p. 3.

27 Clean Energy Council, *Submission 165*, p. 3.

28 EnergyAustralia, *Submission 159*, p. 5.

29 Waubra Foundation, *Submission 197*, p. 4.

Conclusion

5.28 Every resident, whether in a city or rural area, should be protected from unreasonable environmental impacts by the operation of planning laws and guidelines. These processes, primarily the responsibility of states and territories, should be non-discriminatory as they apply to different kinds of development, and should make provision for monitoring and enforcement.

5.29 It is a principle of good practice law-making that laws and regulations should be designed to target their intended outcome, and minimise unintended consequences. They should, as far as possible consistent with meeting their objectives, minimise uncertainty and the costs associated with compliance.

5.30 On all of these tests, the current bill has significant shortcomings. The committee does not believe it should be passed.

Recommendation 4

5.31 The committee recommends that the bill not be passed.

Senator Doug Cameron

Chair

Coalition Senators' Additional Comments

Coalition Senators are strongly of the view that the Gillard Government's lack of responsiveness in relation to a significant issue affecting many people has greatly contributed to a deep sense of frustration and powerlessness among many in the community affected by the issues this Bill seeks to address.

Coalition Senators note that at least some support for this Bill appears to be founded in a desire to see something happening in response to concerns about wind farms rather than nothing happening, for example:

> I feel there needs to be independent health studies into rural wind farms, focusing on excessive noise ... However until that happens, I fully support the Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012.[1]

Coalition Senators appreciate the concerns about how this Bill would operate were it to be passed.

Nonetheless, Coalition Senators believe the issues this Bill seeks to address do need addressing, as has previously been highlighted by a Senate Committee inquiry.

The Senate Community Affairs References Committee's inquiry into The Social and Economic Impact of Rural Wind Farms reported on 23 June 2011.

Among several recommendations made by this Committee was that well resourced research be initiated as a matter of priority:

> The Committee recommends that the Commonwealth Government initiate as a matter of priority thorough, adequately resourced epidemiological and laboratory studies of the possible effects of wind farms on human health. This research must engage across industry and community, and include an advisory process representing the range of interests and concerns.[2]

Far from treating this as a matter of priority, it took more than 14 months – and more than 7 months after an 8 February 2012 Senate motion calling on the Government to act immediately on the Senate committee's recommendations[3] – for the Gillard Government even to respond, on 13 September 2012.

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1 Mrs Maria Linke, *Submission 32*, p. 1.

2 Senate Community Affairs References Committee, *The Social and Economic Impact of Rural Wind Farms*, 23 June 2011, p. 28.

3 *Journals of the Senate*, No. 74, 8 February 2012, pp. 2054–2055.

Even now after it took so long for the Government to respond, Coalition Senators consider deeply inadequate the Government's response:

> The Australian Government accepts these recommendations in principle.
>
> The National Health and Medical Research Council (NHMRC) is already actively engaged in supporting the assessment of available research on this issue and will shortly commission a comprehensive review of the literature to inform any update to its 2010 public statement. The review will include audible noise, infrasound and low-frequency noise. A reference group will be established to advise on the review and will include members of the public, industry, researchers, sound engineers/consultants and planning representatives.
>
> The results of the literature review and the revised public statement will be published on the NHMRC website.
>
> Further, there are a range of funding mechanisms within the Australian Government, in particular within the NHMRC, that could be used to fund additional research on the possible impacts of wind farms on human health, including epidemiological and laboratory studies.[4]

This response is manifestly inadequate.

Nowhere in this Government response is there any suggestion of the Government initiating thorough, adequately resourced epidemiological and laboratory studies of the possible effects of wind farms on human health, let alone as a matter of priority.

Simply assessing available research is not adequate and is not what the Senate Community Affairs References Committee recommended.

These issues should be seriously and properly addressed and the only way debate surrounding these issues is going to progress meaningfully is for adequate research that is conducted in a manner in which all sides of the debate can have faith.

The Senate Community Affairs References Committee made good and worthy recommendations in June 2011 that remain good and worthy recommendations today.

In particular, had the recommendation cited above been implemented, and as a matter of priority as recommended – as Coalition Senators remain of the belief should have occurred – such action could most likely have obviated the introduction of this Bill or the conduct of this inquiry at this time.

Accordingly, Coalition Senators recommend that such action be taken. Further, given the intransigence of the Labor Government on these matters to date, Coalition Senators recommend that the Bill be amended so that its passage would actually require the Government to undertake such research.

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4 Australian Government Response to the Senate Community Affairs Reference Committee Report *The Social and Economic Impact of Rural Wind Farms*, tabled 13 September 2012, p. 4.

Recommendation 1:

That the Commonwealth Government initiate, as a matter of utmost priority, research into the potential health effects of wind farms, including adequately resourced epidemiological and laboratory studies of the possible effects of wind farms on human health, as well as an independent study into the impact of wind farm project proposals on the environment and on the social and health aspects on the community.

Recommendation 2:

That the Bill be amended such that its purpose would be to cause such research and study to be undertaken.

Senator Simon Birmingham
South Australia

Senator Chris Back
Western Australia

Senator Bridget McKenzie
Victoria

Dissenting Report by Senator John Madigan and Senator Nick Xenophon

Introduction

1.1 The Senate Economics Committee's referral of the Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012 ('the Bill') to the Environment and Communications Legislation Committee ('the committee') gave an opportunity for an examination of the Bill, albeit with a constrained hearing schedule and time frame which affected communities expressed concern to us about. Given the continuing public and scientific debate surrounding the impacts of noise generated by wind farms, this inquiry was an opportunity to examine the current state of evidence from communities, scientists and wind farm operators alike.

Noise Regulations

1.2 In our Dissenting Report to the Senate Economics Committee's inquiry into the Bill (attached) we raised concerns regarding the adequacy of current noise guidelines. We take this opportunity to affirm these concerns and add the following comments to this particular and critical aspect of the debate.

1.3 The Bill seeks to establish a definition of "excessive noise":

> (6) For the purposes of this Act, a wind farm creates excessive noise if the level of noise that is attributable to the wind farm exceeds background noise by 10 dB(A) or more when measured within 30 metres of any premises:
>
> (a) that is used for residential purposes; or
>
> (b) that is a person's primary place of work; or
>
> (c) where persons habitually congregate.

1.4 As explained by Mr Steven Cooper, a leading and well respected acoustician and Principal of The Acoustic Group:

> excessive noise, which relates to the first part of the bill, may be identified in various planning documents and wind farm guidelines but is not defined. The purpose of the bill gives a methodology for defining excessive noise.

1.5 The importance of having a nationally applicable definition of excessive noise was discussed by Dr Bob Thorne during the public hearing:

> Dr Thorne: The thing that none of us has is a consistency across all states. That leads to my mind to the most important function of this bill: it gives a consistent approach to excessive noise throughout all of Australia, whereas each individual state could and does have completely different criteria, different standards. Back in the old days, there was a competition policy process whereby one state could not disadvantage the other states by having different criteria. In the days when I was working with it, we were dealing

> with environmental noise. We tried to get a consistency of approach through all the different states—this was back in the mid-nineties. This is where I would see the benefit of this particular bill in that it provides a certainty of approach to all states, it provides a certainty of approach to the industry and it gives a clear definition to all the different states' legislation.

1.6 The benefits of a definition of excessive noise that applies to all states and territories are twofold: it provides clarity and consistency of application throughout Australia. Those who live close to wind farms can therefore be assured the wind farms are required to operate in accordance with established noise guidelines so that any disturbance caused by wind farm noise is minimised.

The impact of noise on sleep and health

1.7 The committee acknowledged sleep disturbance is the most commonly reported complaint in relation to the operation of wind farms. Dr Nissenbaum, a radiologist at the Northern Maine Medical Centre in the United States, discussed the potential consequences of chronic sleep disturbance:

> Senator Madigan: Dr Nissenbaum, why is chronically impaired sleep a health problem?
>
> Dr Nissenbaum: When one has chronically impaired sleep… (it) will result in adverse health effects through stress mediated effects on the hormonal systems in the body. This will result in all sorts of stress related illnesses, as well as cardiovascular effects, as well as changes in cognition and mental health in a pretty significant subset of individuals.

Dr Nissembaum continued:

> Some people are more immune than others, but we have to take people as they come, and a significant proportion of people will be affected in a negative way when there is chronic sleep disturbance. It is important to recognise that fact. Once we recognise that fact, the question becomes: do industrial wind turbines that are sited too close to people result in sleep disturbance? If we can prove that is correct, then we will know that over time very serious adverse health effects will develop.

1.8 Significantly, Dr Nissenbaum identified the need for further research to be undertaken in relation to the link between noise generated by wind farms and sleep disturbance. The impact of night time noise on sleep disturbance was discussed in the World Health Organisation's 'Guidelines for Community Noise':

> If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dBA indoors for continuous noise. If the noise is not continuous, sleep disturbance correlates best with LAmax and effects have been observed at 45 dB or less. This is particularly true if the background level is low. Noise events exceeding 45 dBA should therefore be limited if possible.

1.9 These guidelines relate to residential areas in European urban environments. Therefore it is not unreasonable that the Bill seeks to require that wind farms operate within lower noise limits so as not to disturb the sleep of residents in quiet, rural Australian environments.

1.10 The committee has recommended that "specific noise measurements, thresholds and measuring locations not be included in legislation, as there is insufficient consensus on these elements of the proposal." We fundamentally disagree with the committee's finding in this respect. The Bill is taking a conservative approach by only referring to dB(A), even though there is a mounting body of scientific evidence to suggest other spectrums should be considered.

1.11 The committee refers to recent research entitled 'Can expectations produce symptoms from infrasound associated with wind turbines?' by Crichton, Dodd, Schmid, Gamble & Petrie regarding the 'nocebo effect'. The report concludes:

> Results suggest psychological expectations could explain the link between wind turbine exposure and health complaints.

1.12 The research by Crichton, Dodd et al specifically refers to infrasound which is not a subject addressed by this Bill. Furthermore, the research excludes audible sound which is the subject of the Bill. Excessive noise levels set by the Bill are not related to infrasound and as such the research of Crichton, Dodd et al is not relevant. With respect to the overall health effects of wind turbines the research by Crichton, Dodd et al suggests 'psychological expectations could explain the link…' However in medical research other factors must be eliminated before making such a diagnosis, which is premature and pre-emptive.

1.13 Correspondence provided by Dr Nissenbaum stated:

> On 'nocebo', if a physician provides the diagnosis of 'nocebo' (a psychologically mediated effect analogous to a 'psychosomatic illness/response'), medical protocols dictate that it be done subsequent to a process of thoroughly excluding the possibility of any pathophysiological pathways that are plausible, more likely, or more important (because of serious downstream implications) to consider.

Dr Nissenbaum continued….

> The 'nocebo' concept is inapplicable and it would be irresponsible to apply it as an explanation for the chronic sleep disorders which are the result of often unremembered nighttime arousals related to noise.

1.14 The committee received a range of evidence regarding possible links between noise produced by wind farms and health effects. This debate is continuing however the body of evidence demonstrating the impact of sleep disturbance and sleep deprivation on health continues to grow.

1.15 We are concerned that the current literature review underway by the NH&MRC is just that: a review of the literature rather than actual research into the

relationship between wind farms and human health. While it is true that Federal Government grants are available for research purposes, given community concerns and the likelihood that more wind farms will be built in Australia near homes we believe the Federal Government should establish and fund an independent expert panel in order to conduct further research. This is imperative given the Federal Government's ongoing financial support of wind farms to achieve the Renewable Energy Target.

Recommendation

The Federal Government establish and fund an independent expert panel in order to conduct research into the impact of noise generated by wind farms on human health.

Reporting of wind speed and noise data

1.16 In order to test compliance, it is necessary for wind speed data to be made available:

> Mr Cooper… the noise emission for the wind farm is expressed in terms of a DBA level versus the wind at the hub height. So the only way you can do a compliance check is to measure the noise at the residence and compare it with the wind at the hub height. If you cannot get the wind at the hub height, you cannot determine acoustic compliance. So you need that information. It is not available. The wind proponents or the authority will not supply the material.
>
> Senator Xenophon: To use one of Senator Cameron's classic phrases, there is some information asymmetry here with respect to that?
>
> Mr Cooper: Yes. It is impossible for anybody to do a compliance check without this data.
>
> Senator Xenophon: So it is a catch-22. You cannot work out whether there is compliance or not for a particular development without this data?
>
> Mr Cooper: As it is expressed in terms of a noise limit versus the speed. If there were an absolute limit full stop it would be a different kettle of fish. But because the wind farms are expressed relative to the background level and the wind speed you have to do the compliance with respect to that criteria.

1.17 The committee has recommended 'where there is ongoing debate over noise compliance issues for particular wind farms, that governments consider making data for those operations available to an independent authority for review of compliance'.

1.18 We agree with and are encouraged by the intention of this recommendation, however we believe it could be made stronger in a number of ways.

1.19 Firstly, the recommendation relates only to 'ongoing debate over noise issues for particular wind farms' (emphasis added). The Bill is intended to apply to all wind

farms and as such noise and wind speed data should be made available by all wind farms.

1.20 Secondly, the recommendation relies on 'governments' making the data available. This makes the assumption that governments already have access to the data. We believe this assumption needs to be addressed by including an explicit requirement that wind farm operators must make data available to an independent authority directly.

1.21 Lastly, the recommendation does not specify when the data should be made available. We would suggest that wind and noise data be supplied to the independent authority at regular intervals (for example every three months) as well as on request in the event a specific complaint has been made. Data held by the independent authority should be publically accessible under defined protocols.

Recommendation

Where there is ongoing debate over noise compliance issues for wind farms, wind farm operators are required to provide data (including wind and noise data) to an independent authority every three months as well as on request in the event a specific complaint has been made.

1.22 We would like to take this opportunity to acknowledge that Pacific Hydro's offer to provide data to an independent statutory body under strict confidentiality with the data's use restricted by well-defined protocols. It is our understanding this offer to provide wind data is the first of its kind by a wind farm operator and believe Pacific Hydro should be given credit for setting an example for the rest of the industry.

Conclusion

1.23 This bill will ensure there are mechanisms in place to enable the monitoring of noise generated by wind farms and that where wind farms are shown to have created excessive noise, they are unable to receive Large Scale Renewable Energy Certificates for the electricity generated. We believe it is not appropriate for wind farms to be financially rewarded through these Certificates when they are shown to be non-compliant with noise guidelines. Therefore wind farm operators that are compliant have nothing to fear from the requirement that they must not create excessive noise.

Recommendation

The Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012 be passed.

Senator Nick Xenophon
South Australia

Senator John Madigan
Victoria

Attachment to Dissenting Report by Senator John Madigan and Senator Nick Xenophon

Senate Economics Legislation Committee's inquiry into the *Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012*: Dissenting Report by Senators Madigan and Xenophon (Tabled 17 September 2012)

Dissenting Report by Senator John Madigan and Senator Nick Xenophon

Introduction

1.2 The Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012 was introduced as a result of the disappointing response of the Federal Government to the Community Affairs Committee's report into the Social and Economic Impact of Rural Wind Farms. The Community Affairs Committee inquiry received over 1000 submissions and heard evidence from a wide variety of witnesses, including rural residents, doctors, lawyers, community groups, environmental groups and wind farm operators. In response to the evidence received the committee made the following seven unanimous recommendations:

Recommendation 1

The Committee considers that the noise standards adopted by the states and territories for the planning and operation of rural wind farms should include appropriate measures to calculate the impact of low frequency noise and vibrations indoors at impacted dwellings.

Recommendation 2

The Committee recommends that the responsible authorities should ensure that complaints are dealt with expeditiously and that the complaints processes should involve an independent arbitrator. State and local government agencies responsible for ensuring compliance with planning permissions should be adequately resourced for this activity.

Recommendation 3

The Committee recommends that further consideration be given to the development of policy on separation criteria between residences and wind farm facilities.

Recommendation 4

The Committee recommends that the Commonwealth Government initiate as a matter of priority thorough, adequately resourced epidemiological and laboratory studies of the possible effects of wind farms on human health. This research must engage across industry and community, and include an advisory process representing the range of interests and concerns.

Recommendation 5

The Committee recommends that the NHMRC review of research should continue, with regular publication.

Recommendation 6

The Committee recommends that the National Acoustics Laboratories conduct a study and assessment of noise impacts of wind farms, including the impacts of infrasound.

Recommendation 7

The Committee recommends that the draft National Wind Farm Development Guidelines be redrafted to include discussion of any adverse health effects and comments made by NHMRC regarding the revision of its 2010 public statement.

1.3 It should be noted that Recommendations 4 and 6, relating to epidemiological studies of wind farms and human health and studies of the noise impacts of wind farms are yet to be conducted, despite the passing of more than a year since the committee reported. Furthermore, recommendations 1 and 2 are yet to be acted on by any of the states or territories.

1.4 The NHMRC is currently undertaking a "systematic review of the scientific literature to examine the possible impacts of wind farms on human health including audible and inaudible noise". Given the NHMRC's "rapid review" in 2009 could not reasonably be referred to as a thorough examination of the evidence, we welcome this further examination of all available literature. We understand the 2009 review did not include an examination of a report by the United Kingdom's Department of Food and Rural Affairs entitled 'A Review of Published Research on Low Frequency Noise and its Effects'. Given the relevance of such a study to the NHMRC review, we encourage the NHMRC to include this report in their examination of the literature.

1.5 With respect to the current NHMRC review, there are concerns that the bulk of anecdotal evidence (in the form of personal testimonies from affected residents) will not be included in the review unless it is submitted in an 'organised' fashion with accompanying analysis. Such an examination of first hand claims is precisely what the Community Affairs Committee recommended, but no studies of this kind by independent researchers have taken place. Should affected communities be able to collate their experiences in the required format, any analysis they may perform could be labelled as 'amateur' or 'non-scientific' due to their lack of qualifications.

1.6 Therefore, appropriate weight may not be afforded to individual testimonies, even where analysis has been attempted.

1.7 Over the past 12 months we have spoken to many residents who have complained about the noise produced by nearby wind farms. Many of these residents had requested the wind farm operators conduct noise monitoring at their properties. To our knowledge, none of these residents has been given access to a full range of noise monitoring results.

1.8 It should also be noted that AGL withdrew their development application for the Hallett 3 wind farm only days before they were due to produce noise monitoring data, including wind mast data, for their Hallett 2 wind farm, as ordered by the Environmental, Resources and Development Court in South Australia.

1.9 Wind farm operators claim their wind farms are compliant with noise guidelines. For instance, Acciona have said their Waubra wind farm is operated in such a way so as to ensure that all noise compliance guidelines are met. However, noise monitoring by acousticians who are not employed by wind farm operators have

revealed that some wind farms are not. Relevantly, a study by acoustician Dr Bob Thorne has found that the wind farm at Waubra is operating outside noise regulations.

1.10 In June 2012 Senator Madigan submitted a copy of Dr Thorne's report to the Victorian Minister for Planning, the Hon Matthew Guy MLC, who had committed to suspending the operation of any wind farms found to be non-compliant with noise guidelines. No response has been received from the Minister's office to date.

1.11 We are also aware of concerns raised by acousticians independent of the wind industry that the noise monitoring conducted by wind farm operators is not performed using equipment sensitive enough to measure infrasound and low frequency noise. Furthermore, we have been told that when noise monitoring equipment is installed, it is not positioned inside homes.

1.12 Of further concern are doubts that the current noise guidelines – with which wind farm operators purport to comply - do not protect the quality of life which was enjoyed by nearby residents prior to the construction of the wind farm.

1.13 If the Federal Government is to subsidise wind farms by way of Renewable Energy Certificates (RECs) this must not be at the expense of the quality of life of nearby residents. Therefore, RECs should only be issued where an operator can show they are consistently operating within acceptable noise standards.

1.14 We acknowledge the Economics Committee believes an examination of the practical operation of the bill, its interaction with state and local government laws and its impact on the Clean Energy Regulator falls outside of the expertise of this committee. However, we believe that the property rights of residents are affected by wind farm developments as many are being denied the quiet enjoyment of their homes, and in some cases are being forced to abandon their properties without compensation, just or otherwise.

1.15 It has been reported that over 20 homes have been abandoned at Waubra in western Victoria. We are told a further 5 homes in Waterloo, South Australia, have also been abandoned. Investment in the property markets in rural communities may suffer as a result, particularly if populations begin to dwindle. Declining rural populations and the associated reduction in economic productivity are, in our view, economic issues worthy of further examination.

1.16 Therefore, whilst we disagree with the Economics Committee's view (given the quality and depth of the reports provided by the committee in relation to other inquiries), we will seek for this matter to be referred to another committee for inquiry which ought to involve public hearings and evidence called by both sides of the wind farm debate. It is also worth nothing there is an urgency that the empirical and scientific research necessary to thoroughly examine the issue of noise standards for wind farms and human health take place within a reasonable time frame.

Adequacy of current noise guidelines

1.17 Currently the South Australian Environment Protection Authority 'Wind Farm Environmental Noise Guidelines 2009' ('SA EPA Guidelines) and the New Zealand Standard 'NZS6808:2010 Acoustics – Wind Farm Noise' are the primary guidelines

against which wind farm noise are assessed. These documents address both audible and inaudible characteristics of noise.

1.18 However, these standards require the use of dB(A) sound meters, which do not adequately take infrasound and low frequency noise into account. Infrasound can only be measured using equipment that does not use an A-weighted scale.

1.19 Wind farm operators have also been known to compare their noise emissions with the World Health Organisation's 'Guidelines on Community Noise'. It should be noted the WHO Guidelines do not address the inaudible characteristics of noise and were written in the context of issuing guidelines for densely populated European cities rather than rural environments.

1.20 Concerns have been raised that the SA EPA Guidelines do not protect nearby residents from "adverse noise impacts", which is contrary to the aim of the Guidelines. This is partly due to the belief that the background noise level which has been set by the EPA is already too high for rural zones. Another concern is the lack of attention paid to infrasound and low frequency noise in these guidelines, other than describing them as "annoying characteristics" of noise which are not "present at modern wind farm sites."

1.21 Until such time as the recommended epidemiological study into the possible effects of wind farms on human health and the National Acoustics Laboratories study have been conducted, complaints from residents about the possible effects of wind farms noise cannot continue to be dismissed as "hysteria" or the results of a "nocebo" effect.

Difficulty faced by residents in obtaining noise monitoring results

1.22 Given the confident assertions of wind farms operators that they are operating within the current noise guidelines, their reluctance to release noise monitoring data to residents must be viewed with suspicion. That residents have been forced to initiate legal proceedings in order to access this data serves to compound the suspicion surrounding wind farm operators' claims.

1.23 The Renewable Energy (Electricity) Amendment (Excessive Noise from Wind Farms) Bill 2012 sought to create transparency in the operation of wind farms by requiring the publication on the internet information about noise, wind speed and direction, weather conditions and power output. It is our belief that the publication of such data would be of immense benefit to both communities and wind farm operators alike.

1.24 Such data would make it clear when wind farms are non-compliant which will enable their operators to take steps to adjust their operations in order to achieve compliance. Developers spend large amounts of time and money convincing communities around proposed developments that they take noise concerns seriously. However these efforts are undermined by the lack of transparency when it comes to releasing noise data from existing wind farms.

Concerns about wind energy intermittency and RECs

1.25 The intermittent nature of wind energy raises concerns about wind's ability to cope with peak demand. The Australian Energy Market Operator (AEMO) anticipates the contribution of South Australian wind farms during future summer and winter peak demand will be 5% and 3.5% respectively of installed wind farm capacity. Furthermore, figures obtained by the AEMO demonstrated that during the heatwave between 20 January 2011 to 2 February 2011 "as demand (for electricity) increased, the contribution from wind generation fell".

1.26 We hold reservations that this technology should be subsidised to the extent that it is, given its shortcomings in replacing baseload power due to its inherently intermittent nature. Further there is a concern that in economic terms, given the nature of the structure of the REC scheme and the issue of RECs in their current form, that investment in alternative renewable energy sources is being compromised, particularly geothermal, solar thermal and tidal power. Those forms of alternative energy have the real potential to replace coal fired power stations.

1.27 Further to the previous paragraph, wind farm output can be bid into the National Electricity Market at zero dollars because wind farm owners can access RECs as an income stream once eligible energy has been generated. As the lowest cost output is the first to be dispatched to the grid, wind energy – with the assistance of RECs – has the ability to displace electricity from sources that have higher marginal costs of generation. This leads to the following questions:

- Is wind energy the most cost efficient form of renewable energy to achieve greenhouse gas abatement? and;
- Are RECs driving out investment from other forms of renewable energy technology that could provide baseload generation, such as geothermal technology?
- It is time the energy production and efficiency of wind farms is examined against the impact this technology is having on rural communities. Wind farm operators cannot continue to be rewarded with RECs if wind farms are not complying with acceptable noise standards.

1.28 It is hoped the Senate will support a resolution to refer this bill to another Senate Committee in order to allow for public submissions and evidence to be called from those who both support and oppose this bill.

Senator John Madigan
Democratic Labor Party Senator for Victoria

Senator Nick Xenophon
Independent Senator for South Australia

Appendix 1

Submissions, additional information, correspondence and answers to questions taken on notice

Submissions

Submission numbers not used have been intentionally left blank. A number of documents have been accepted as correspondence instead of as submissions, because they were about wind farm noise, but not directly relevant to the bill under consideration.

2 Mr Timothy Le Roy

3 Mrs Marie Burton

4 Name Withheld

6 Confidential

9 Mr Sam Walker

10 Mr Ronald Burton

11 Mr Mark Burfield

12 General Electric

13 Mrs Heather McKenry

16 Mr and Mrs Frank and Angela Kearns

18 Professor Alec Salt

23 Doctors for the Environment Australia and Public Health Association of Australia

25 Name Withheld

26 Emeritus Professor Colin Hansen

27 Ms Kate Headlam

28 Mr Cameron Rowe

29 Ms Elisabeth Jonkman

30 Kerrisdale Mountain Railway and Museum Inc

31 Name Withheld

32 Mrs Maria Linke

33 Mr and Mrs Ron and Chris Jelbart

34 Mr Keith Staff

35 Mr Andreas Marciniak

36 Confidential

37 Confidential

38 Mr and Mrs John and Heather McMahon

39 National Health and Medical Research Council

40 Mr and Mrs Allan and Anne Schafer

41 Confidential

42 Ms Lilli-Ann Green

44 Mr and Mrs Allan and Maxine Coulson

46 Mr Joe Hallenstein

48 Ms Dianne Jackson

49 Confidential

50 Parkesbourne/Mummel Landscape Guardians Inc

51 Mrs Samantha Stepnell

52 Mr Patrick Holmes

53 Mr David Charles

55 Mr and Mrs John and Elizabeth Fincher

56 Mr Carl Stepnell

58 Holy Transfiguration Monastery

60 Mrs Patricia Gabb

61 Mr Bill Nicholson

63 Confidential

64 Confidential

65 Mr and Mrs John and Niki Zubrzycki

67 Ms Shelley McDonald

68 Mr and Mrs Peter and Lisa Allen

69 Peter Wingett, Linda Brookman, John O'Shea and Alexander McKinlay

75 Confidential

77 Mrs Rosemary Rees

78 Mr Maurice Newman

79 Mr Stephen Coleman

80 Confidential

82 Mr and Mrs Philip and Chris Ruediger

83 Mr Louis Hughes

87 Cooranga North Concerned Citizens Group

89 Confidential

90 Confidential

91 Mr and Mrs Andrew and Annie Gardner

93 Ms Carmen Krogh

94 Name Withheld

95 Dr CD Hanning

96 Ms Sonia Trist

97 Dr Bob Thorne

98 Mr Crispin Trist

102 Miss Hannah Bruty

103 Confidential

104 Confidential

115 Mr and Mrs Adrian and Tamako Johnson

116 Ms Sharyn Anderson

117 RATCH-Australia

118 Ms Geraldine Conheady

119 Confidential

120 Name Withheld

121 Mr Rodney Brew

122 Maureen Campbell and John Foster

123 Mr and Ms Stuart and Brianna Robb

124 Mr Owain Rowland-Jones

125 Mr and Mrs Brian and Joanne Kermond

126 Confidential

128 Mr Phillip Duggan

129 Mr Ivan Chan

130 Name Withheld

131 Western Plains Landscape Guardians Association

132 Mr and Mrs Warwick and Megan Read

133 Robert and Krista Watkins, Bruce and Kem Watkins, Ann Dunford and Garth Dunford

134 Ms Belinda Wehl

135 Mr and Mrs Geoffrey and Vanessa Knox

136 Dr Wayne Spring

137 REpower Australia Pty Ltd

138 Ms Ruth Corrigan

139 Mr and Mrs Angelo and Daniela Tudini

141 Dr Andja Mitric-Andjic

142 The Acoustic Group Pty Ltd

143 Ms Robyn Brew

144 Mrs Janet Hetherington

148 Mr and Mrs CR and FL Schaefer

149 Mr Peter Dawes

151 Name Withheld

152 Ms Sandra Clark

154 Confidential

155 Mrs Helen Lyon

156 Mr Tony Walker

157 Confidential

158 Ms Judy Hollamby

159 EnergyAustralia

160 Mr Roger Kruse

162 Dr Peter Trask

164 Mr Bradley Kermond

165 Clean Energy Council

166 Ms Felicity Martin

167 Community for the Accurate Impact Assessment of the Dalton Power Station

168 Confidential

169 Mr and Mrs Humphrey and Jennifer Price-Jones

170 Confidential

171 Australian Environment Foundation

172 Ms Anna Dominguez Smith

173 Confidential

174 Ms Janine Dean

175 Mr Roderick Dean

176 Mrs Enid Thomas

177 Mrs Kelli-Jane Abbott

178 Ms Annette Allwood

179 Mr Noel Dean

180 Mr William Kelly

181 Adam McCarthy and Rebecca Fagan

182 Mr and Mrs David and Mary Morris

183 Mr Noel Thomas

184 Mr Sam McGuiness

185 Professor Simon Chapman

186 Alstom

187 Mrs Patina Schneider

188 Confidential

189 Dr David Burraston

190 Confidential

191 Vestas

192 Alan Watts and Colleen Watts

193 Flyers Creek Wind Turbine Awareness Group Inc

194 Mr Charlie Arnott

195 Noise Watch Australia Inc

196 Ms Claudia Scheid

197 Waubra Foundation

198 Conservation Council of South Australia

199 Mrs Sue Braid

200 Confidential

201 Ms Sarah Last

202 Confidential

204 Mr and Mrs Stuart and Brianna Kilsby

205 Energy Supply Association of Australia

206 Young Lawyers for Law Reform

207 Pacific Hydro Australia

208 TrustPower Australia

209 Infigen Energy

210 Mrs Rosa Dawes

211 Pyrenees Shire Council

212 Mr and Mrs Shane and Wanda Allott

213 Mrs Chelsea Taylor

215 Hepburn Wind

216 Mr W Les Huson

217 Queensland Government

Form Letters

1 Form Letter Style 1, received from approximately 4 individuals

2 Form Letter Style 2, received from approximately 3 individuals

3 Form Letter Style 3, received from approximately 2 individuals

4 Form Letter Style 4, received from approximately 9 individuals from Presentation Sisterhood, NSW

Additional Information

1 Additional Information from Michael Nissembaum MD, received 1 November 2012

2 Tabled document from Senator Madigan, at Canberra public hearing 14 November 2012

3 Tabled document from Mr Steven Cooper, at Canberra public hearing 14 November 2012

4 Tabled document from Senator Madigan, at Canberra public hearing 14 November 2012

5 Sonus Pty Ltd (November 2010) Infrasound Measurements from Wind Farms and Other Sources, prepared for Pacific Hydro

Correspondence

1 Response to adverse comment, received from NHMRC on 12 November 2012

2 Response to adverse comment, received from Windlab on 13 November 2012

3 Response to adverse comment, received from Dr Geoff Leventhall on 16 November 2012

4 Response to adverse comment, received from Origin on 19 November 2012

5 Correspondence from Ms Fiona Crichton, received 21 November 2012

6 Response to adverse comment, received from Pacific Hydro on 22 November 2012

7 Correspondence from Pacific Hydro, received 22 November 2012

8 Response to adverse comment, received from Hepburn Wind on 23 November 2012

Answers to questions taken on notice

1 Answer to Questions on Notice from Alstom, received 16 November 2012

2 Answer to Questions on Notice from Professor Colin Hansen, received 18 November 2012

3 Answer to Questions on Notice from Professor Peter Seligman, received 20 November 2012

4 Answer to Questions on Notice from Professor Simon Chapman, received 21 November 2012

5 Answer to Questions on Notice from Public Health Association of Australia, received 22 November 2012

6 Answer to Questions on Notice from Clean Energy Council, received 22 November 2012

7 Answer to Questions on Notice from Professor Peter Seligman, received 23 November 2012

8 Answer to Questions on Notice from Dr Michael Nissenbaum, received 23 November 2012

9 Answer to Questions on Notice from Waubra Foundation, received 23 November 2012

10 Answer to Questions on Notice from Energy Supply Association of Australia, received 23 November 2012

11 Answer to Questions on Notice from Pyrenees Shire Council, received 23 November 2012

12 Answer to Questions on Notice from Infigen Energy, received 23 November 2012

13 Answer to Questions on Notice from Infigen Energy, received 23 November 2012

14 Answer to Questions on Notice from Infigen Energy, received 25 November 2012

15 Answer to Questions on Notice from Mr Steven Cooper, received 25 November 2012

Appendix 2
Public Hearings

Wednesday, 14 November 2012 - Canberra

REpower Australia Pty Ltd

Mr Michael Bagot, Project Manager, Development

Professor Simon Chapman

The Acoustic Group

Mr Steven Cooper, Principal Engineer

Energy Supply Association of Australia

Mr Kieran Donoghue, General Manager, Policy

Mr Ben Pryor, Policy Adviser

Mr Matthew Warren, Chief Executive Officer

Acciona

Ms Lisa Francis, Senior Manager, Institutional Relations and Media

Mr Jamie McGilp, Manager, Environment and Planning Team

Pyrenees Shire Council

Mr Chris Hall, Senior Town Planner

Dr Christopher Hanning

Professor Colin Henry Hansen

Waubra Foundation

Dr Sarah Elisabeth Laurie, Chief Executive Officer

Clean Energy Council

Mr Russell Marsh, Director of Policy

Vestas, Asia-Pacific

Mr Ken McAlpine, Director, Policy and Government Relations

Dr Michael Alexander Nissenbaum

Dr Carl Phillips

Doctors for the Environment Australia

Dr James Ross, Member

Professor Alec Nicholas Salt

Melbourne Energy Institute, University of Melbourne

Professor Peter Seligman, Honorary Professor

Dr Daniel Shepherd

Alstom Wind, Asia-Pacific

Mr Josef Tadich, Technical Manager

Public Health Association of Australia

Dr Peter Tait, Convenor, Ecology and Environment Special Interest Group

Ms Melanie Jayne Walker, Acting Chief Executive Officer

Dr Robert Thorne

Infigen Energy

Mr Jonathan Upson, Senior Development and Government Affairs Manager

Appendix 3

Snapshot of NHMRC Wind Farms and Human Health Project

Snapshot of NHMRC Wind Farms and Human Health Project

Indicative timeframes for the systematic review of the potential health impacts of wind farms and update of the Public Statement: Wind Farms and Health. Timeframes are dependent on contractor availability and will be updated as necessary.

Timeline for future tasks	
Date	**Action**
Early August 2012	NHMRC to contract a systematic reviewer
Mid- late August 2012	NHMRC to call for stakeholder submissions of non-peer reviewed literature for consideration in the Literature Review
August – February 2012	Reviewer conducts the Systematic Review with input from the NHMRC Wind Farms and Human Health Reference Group
November 2012	NHMRC to select and engage peer reviewers
December - January 2012	Peer review of the Systematic Review to be conducted
February 2013	Reviewer to submit final Systematic Review document to NHMRC
February 2013	Reference Group to advise on what revisions the *NHMRC Public Statement: Wind Turbines and Health* are required in light of new evidence
February - March 2013	Reference Group to submit recommendations made in the Review Report to NHMRC Prevention and Community Health Committee (PCHC) and Council (PCHC and Council dates will be advised shortly)
March 2013	NHMRC to publish results of the review
March 2013	NHMRC to revise the *NHMRC Public Statement: Wind Turbines and Health* as required
March 2013	Revised Draft *NHMRC Public Statement: Wind Turbines and Health* to be considered by PCHC and then Council for release for public consultation
March/ April 2013	NHMRC to advertise public consultation on the revised *NHMRC Public Statement: Wind Turbines and Health*
April - May 2013	Public consultation period
May 2013	Consider submissions and provide revised final draft to PCHC and then Council for recommendation for CEO release
May 2013	*Revised NHMRC Public Statement: Wind Turbines and Health Public Statement* published on NHMRC website following CEO approval
June 2013	NHMRC Wind Farms and Human Health Reference Group terms to be reviewed by NHMRC CEO