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SENATE

SENATE SELECT COMMITTEE ON WIND TURBINES

WEDNESDAY, 10 JUNE 2015

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SENATE

SENATE SELECT COMMITTEE ON WIND TURBINES

Wednesday, 10 June 2015

Members in attendance: Senators Back, Canavan, Day, Leyonhjelm, Madigan, Urquhart, Xenophon.

Terms of Reference for the Inquiry:

To inquire into and report on:

The application of regulatory governance and economic impact of wind turbines, with particular reference to:

- a. the effect on household power prices, particularly households which receive no benefit from rooftop solar panels, and the merits of consumer subsidies for operators;
- b. how effective the Clean Energy Regulator is in performing its legislative responsibilities and whether there is a need to broaden those responsibilities;
- c. the role and capacity of the National Health and Medical Research Council in providing guidance to state and territory authorities;
- d. the implementation of planning processes in relation to wind farms, including the level of information available to prospective wind farm hosts;
- e. the adequacy of monitoring and compliance governance of wind farms;
- f. the application and integrity of national wind farm guidelines;
- g. the effect that wind towers have on fauna and aerial operations around turbines, including firefighting and crop management;
- h. the energy and emission input and output equations from whole-of-life operation of wind turbines; and
- i. any related matter.

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TONIN, Dr Renzo, Representative of the Wind Farm Subcommittee of the Association of Australian Acoustical Consultants

TURNBULL, Mr Christopher, Director, Sonus; and Chair, Wind Farm Subcommittee of the Association of Australian Acoustical Consultants

Evidence from Dr Tonin was taken via teleconference—

Committee met at 09:01

CHAIR (Senator Madigan): Good morning. I declare open this fifth public hearing of the Senate Select Committee on Wind Turbines and welcome everyone here today. We acknowledge the traditional owners of the land on which we meet and pay our respects to elders past and present. This is a public hearing and a *Hansard* transcript of the proceedings is being made. Before the committee starts taking evidence, I remind all present here today that, in giving evidence to the committee, witnesses are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to the committee. Such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to the committee. The committee prefers all evidence to be given in public, but under the Senate's resolutions witnesses have the right to request to be heard in private session. We ask that witnesses give the committee notice if they intend to give evidence in private. There will be an opportunity at 4.30 pm today for people who are not listed as witnesses on the program to give a short statement to the committee. This session will run for 30 minutes. There will be a strict three-minute limit on these statements. To participate in this session I would ask that you register with the secretariat. The order of speaking will be on a first-come, first-served basis.

I welcome representatives from the Association of Australian Acoustical Consultants. I note that information on parliamentary privilege and the protection of witnesses and evidence has been provided to you. The committee has your submissions, and I now invite you to make a brief opening statement and, at the conclusion of your remarks, I will invite members of the committee to put questions to you.

Mr Turnbull: Thank you, Senator. The Association of Australian Acoustical Consultants, the AAAC, is a not-for-profit peak body which represents 33 member firms of professional consulting acousticians. We offer unbiased advice in accordance with our code of ethics. We are passionate about the science of acoustics. Our members consult in a broad area of acoustics with wind farms being a small component. There has been a lot of debate in the community about wind farm noise. In those circumstances it is important that the view of the majority of professionals working in the area be heard rather than just those with the loudest voices.

At our AGM in 2012 a subcommittee was formed to prepare a position statement. Today we have four members of that wind farm subcommittee who are available for questions that you may have. The four of us have a broad experience in acoustics, not just in wind farms, but including a combined experience of more than 100 wind farm projects. The experience includes assessment prior to development, measurement of background noise levels, measurement of and prediction of noise from wind farms, assessment during construction, during commissioning and post-construction measurements. We have worked, not just for developers and operators, but directly with councils, government departments and courts. For example, Renzo Tonin, who is on teleconference today, has worked with government departments and conducted independent research without any commissions from developers or operators.

The AAAC position statement on wind farm noise has been provided to the committee. It represents the view of the overwhelming majority of our members. With respect to infrasound it states:

Infrasound ... is generated by both natural sources ... and mechanical sources Investigations have found that infrasound levels around wind farms are no higher than levels measured at other locations where people live, work and sleep. Those investigations conclude that infrasound levels adjacent to wind farms are below the threshold of perception and below currently accepted limits set for infrasound. The AAAC encourages members to continue to contribute to new research and review research in the technical literature.

Generally our members are not experts in health and therefore primarily rely on the view of government bodies, such as the NHMRC, and conduct our assessments in accordance with state guidelines.

Given the public debate, we have conducted a review of the Cape Bridgewater study by the acoustic group. Contrary to some media reporting, the overall conclusion we have drawn is that the report provides no new

credible scientific evidence. The study measures infrasound at residences. The level and character of infrasound that has been measured is similar to that that has been measured by others and is well below the threshold of human perception which has been established for many years. Notwithstanding, the study includes a hypothesis that reported sensations might be related to the level of infrasound.

Since the study a wind turbine noise conference was held in Glasgow earlier this year. At that conference several researchers presented their research which simulated the character and level of infrasound measured at wind farms. The character and level of infrasound was played back to a number of people to see what their reaction was and to see whether there were any sensations. This research was conducted by Colin and Kristy Hansen, Renzo Tonin and Associates and Channel Island Acoustics. That research, so far, has shown no symptom or sensation associated with the level and character of infrasound which is found at wind farms. Really, these studies are telling us what we have known for many years.

The study also suggests there is a pattern of high-severity disturbance associated with four turbine operating modes. There is no statistical analysis supporting the claim. Contrary to the pattern, there were many occasions when residents at all the three residences reported sensations when the turbines were shut down. This has not been concluded in the report. As well, there was a period of 11 days when the turbines were shut down. One of the residents said, 'During the shutdown we slept.' What that resident was unaware of was that the turbines were shut down during the day but continued to operate at night. When all of the data are considered, the results do not support the description of a pattern which has been provided. Thank you for your attention and we are happy to answer any questions you have.

Senator CANAVAN: In your evidence you mentioned the level of infrasound at wind turbine facilities is below the level of human perception. What is that level of human perception?

Mr Turnbull: It is different at different frequencies, but below five hertz it is certainly above 110 decibels. I think the study at Cape Bridgewater found that the levels were between about 40 and 70—

Senator CANAVAN: 110 decibels—what filter was that using?

Mr Turnbull: No filter; an unweighted filter. At different frequencies, there are different levels of perception, but below five hertz the level is above 110 decibels. Going down to one hertz, it certainly goes up well above that.

Senator CANAVAN: When you say human perception, obviously this is inaudible sound—is that correct? What do you mean by 'perception'?

Mr Turnbull: Infrasound is all frequencies below 20 hertz. If the level is loud enough, it can be heard through the ears. That level is around 110 decibels at five hertz and higher at lower frequencies. Although it is called infrasound, it can be heard.

Senator CANAVAN: That level of 110 you have just provided is about whether it can heard or not?

Mr Turnbull: It is whether it can be heard; it is also whether it can be perceived. There have been studies also of deaf people which have found that their level of perception is well above the level at which people with full hearing can detect the sound. So these studies which have been conducted recently play the level of infrasound to a person and they see whether there is any sensation or reaction to the sound, whether that be through the ears or any other part.

Senator CANAVAN: Sorry, I am struggling, Mr Turnbull. I am not an acoustician. Are you talking about perception through the ears, through someone being able to hear a noise rather than perception through some physiological effect it might have on the body or a sense of balance et cetera? The evidence we have heard and indeed the primary concern this committee has heard it that it does not seem to be connected to audible sound—something that can be perceived through one's ears. It is about balance, ability to sleep and to feel human, I suppose. I want to be absolutely clear. When you say humans cannot perceive below a certain threshold, is that term used in relation to audibility or all our senses—touch, feel, sensation et cetera?

Mr Turnbull: Yes, I agree there are two different perceptions. There is the audibility perception and any other perception. For infrasound, studies have shown that they are at the same level—that is, there is no other perception other than hearing which enables people to sense infrasound below the audibility threshold. We are talking about perception in all senses and many of the studies that have been conducted include infrasound being played within a room, so it includes any other perception or any other physiological effect on the body. It is the same character and level of infrasound which is reported at wind farms.

Senator CANAVAN: So is this a dose-response type test—basically, you provide a dose and then you ask people if they have felt a response?

Mr Turnbull: There are a number of tests, but that is certainly the way that some of them are conducted, yes.

Senator CANAVAN: When you say there is no perception of that, what test are you trying to use? Are you trying to say that 50 per cent of people need to have a perception—20 per cent? Because the other thing we have heard is that it is not something that affects everybody—just like motion sickness, for example. It might only affect a subpopulation. So what sort of thresholds do you use in these tests to be sure that there is a not a statistically significant issue?

Mr Turnbull: I guess, the perception thresholds that you normally use—the 110 that Chris was talking about there—is a mean perception threshold. It is the mean of all the individuals they have tested during these tests.

Senator CANAVAN: It is a mean.

Mr Cooper: Exactly. There is a deviation around that—there is a standard deviation. Testing of that has shown that it is about five decibels of standard deviation. So when you look at extreme individuals—the absolute extreme of the population—you are looking at about three standard deviations below that 110. Three standard deviations below the most sensitive of people will be about 15 decibels below 110, which is the mean level. So the absolute most sensitive person might detect something at about 95, at five hertz. It will be higher at lower frequencies.

Senator CANAVAN: This is all very interesting. You said in your evidence that you would have to refer to some of the advice from the NHMRC as well because there are medical issues here that your members are not qualified to look at—primarily or generally they are not qualified. They have obviously said that there is a need for more science, particularly for people living within 1,500 metres of the turbine. Is that your view too—that there needs to be more work done here in this area?

Mr Cooper: We think that if the work is to be done, it ought to be done based on the measured levels of infrasound that have been recorded at wind farms and by playing it back to a wider variety of people. As you say, some of these studies are a relatively small sample size. Perhaps they could be extended, but that should not be done on the basis of asking people at wind farms what they think of wind farms. We think that that is not necessarily the correct approach to take. We know what level of infrasound turbines produce. It has been measured by a number of people over a number of years, so we know the level of infrasound. What we need to do is to play that infrasound back to a wider variety of people to see what their reaction might be; to extend the time over which that is played back them; to play it back in different circumstances in their home and in other locations to see whether there is any reaction; and to see whether there is any sensation or any other things that are associated with it. I understand that there are some tests that are planned in that area. We would encourage further testing in that area.

Senator CANAVAN: This would be played back through headphones or some—

Mr Turnbull: It would be played back through particular speakers. You cannot go and buy a speaker off the shelf but you can go and make one up so that it can produce infrasound at the levels of a wind farm.

Senator CANAVAN: Thank you.

Senator BACK: Thank you, gentlemen. The position statement that you mentioned—did that have the unanimous support of your members before it went out?

Mr Turnbull: No, not the unanimous support—it was the vast majority of the members but it was not unanimous.

Senator BACK: You mentioned 100 projects that you or your members have participated in. You mentioned proponents, developers, councils and government departments. Can I ask if any of your members have undertaken acoustical work on behalf of people who would say that they have been adversely affected by industrial wind turbines, please?

Mr Turnbull: Renzo, would you like to answer that from your experience. I think that you would be the closest to that.

Dr Tonin: I have worked with the residents at Taralga at the proposed Taralga Wind Farm in New South Wales and presented for them in court.

Senator BACK: You have mentioned Cape Bridgewater. From your professional backgrounds, correct me if I am wrong—I think that represents the first time that a wind farm operator has actually cooperated in a study with a member of your group and with people who would claim to be affected. In terms of trying to get to the bottom of it in a wider experimental program, would it be your recommendation as members that operators of wind farms around Australia would, could or should participate in a wider program to see if we can get to the level of statistical significance that I am about to ask you about?

Mr Turnbull: We believe that the level of noise and infrasound from wind turbines has been well measured over a number of years. We know the level of infrasound they produce. What is important to understand is what effect that might have on people.

Senator BACK: Yes.

Mr Turnbull: All of the research so far suggests that there is no effect but we would encourage further research. That does not need to be done at wind farms; it can be done in other locations where infrasound from wind turbines can be played back to people.

Senator BACK: If it can be done in the environment of wind farms then it removes the possible anomaly of saying, 'We have replicated something somewhere and therefore our conclusion is X?' If indeed it is done in the environment where people are complaining then it removes the possibility of an erroneous outcome, doesn't it?

Mr Turnbull: On the contrary, I would say that by doing it in the field you have all of the other potential compounding issues—

Senator BACK: But aren't they important also?

Mr Turnbull: If we are looking to find out what the impact of noise and infrasound is we need to make sure all other factors are taken out of it. If people can look out their window and see the turbines turning, we need to make sure that that is not the reason why people are feeling ill. We need to exclude shadow flicker and anything else associated with turbines. If we put all these compounding factors together in the mix, we will never understand what the true aspects are.

Senator BACK: So really what you are talking about is a control situation and a field situation. I understand exactly what you are saying. In your submission to us you made the observation with regard to Cooper's work:

There is no statistical analysis supporting this claim. For the claim to be made, an expert in statistics should have been retained ...

I agree with that. There were six residents in that event. When the first six ladies who had been given thalidomide during pregnancy produced foetally abnormal children it would have also been reasonable to say at that time, 'This is not statistically significant because we do not have enough of the population'—and I agree 100 per cent with that. This is where my plea comes. We need to widen the actual survey group and indeed the locations because we have been learning—as you gentlemen would know vastly better than us—it is not just distance but topography, valleys, environmental effects and cloud cover. All those factors seem to come into play, don't they?

Mr Turnbull: They do but we know very well what the level of infrasound is close to turbines as well as at distances. We know that. To use your example of thalidomide, the infrasound or the thalidomide is being provided to a number of people in scientific surveys outside of the wind farm environment. So we take the particular element that might be associated with any effects to see whether it is. We provide that to people in a controlled environment and see what the impact is. It is very early at this stage but if we continue those studies we will then find out about that particular element, which is infrasound, and not have it confused with other factors.

Senator BACK: As turbines sizes and the area affected as a result of the turbine get bigger are you of the view that infrasound does not change? Do you know that? You say we do not need to do it in the field and we can replicate it elsewhere, but aren't there factors coming into account that need to be tested in the field environment?

Mr Turnbull: There will always be a need to test further the noise from wind farms but that can be done scientifically with instruments and will always be done, but the level of infrasound is generally known. What we have found is that, as the turbines get larger, the technology is improving which reduces the noise. So there are two things. If you had used the same technology from many years ago as the turbines got larger that would have resulted in higher noise levels, but at the same time the technology has been improving which has reduced the noise levels. So what we have found over a number of years is that, although the turbine size is increasing, the level of noise has not increased in any significant way.

Senator BACK: You mentioned Professor Hansen in your opening comments. I understand he and his team have conducted acoustic field research under an ARC grant in which they measured the full spectrum of wind turbine noise at the Waterloo facility. Are you familiar with that work?

Mr Turnbull: Yes, I am.

Senator BACK: My understanding is that that group was able to determine excessive levels of noise out to 8.7 kilometres from the nearest turbine at Waterloo which could be expected to regularly disturbed sleep. Is that an understanding you also have?

Mr Turnbull: No, that is not the understanding of that conclusion that I had. With respect to the infrasound in particular, the group who conducted that research were involved in playing back the sound to people outside of

the area of a wind farm, including people who are particularly sensitive to the sound. They found that there was no reaction to that level of infrasound.

Senator BACK: I think we will have the opportunity at some time to chat with Professor Hansen, so I would like to get a further explanation from him.

Senator URQUHART: In your opening statement you mentioned other sources of infrasound, Mr Turnbull. How does infrasound from wind farms compare to other sources like ocean roads, aircraft, industrial activity and those types of things?

Mr Turnbull: Certainly the level of infrasound from wind turbines is very similar to the level of infrasound from other sources. I have personally measured the noise from waves at beaches and at cliffs in the city and in other areas; other members of this panel have, for example, measured the infrasound produced by the change in pressure as people walk; and the levels of infrasound from a wind farm are very similar to those levels that we have just described.

Senator URQUHART: The committee has heard about the paucity of research showing health impacts of wind farms. In one list of peer reviewed articles claiming health effects of wind turbines that was published on an anti-wind website, every single paper listed came from the *Bulletin of Science, Technology and Society*. Why do you think we would be seeing such a preponderance of articles here and few in other peer reviewed journals with a higher impact factor?

Mr Turnbull: I am not aware of that article, I am sorry, or that publication.

Senator URQUHART: Does anyone else wish to comment?

Mr Cooper: I suspect it might be the case that some other publications require higher standards of articles that are published.

Mr Turnbull: From our perspective, when there are any issues regarding health, we refer to government agencies—certainly the NHMRC, as well as a very comprehensive study conducted by Health Canada recently. They presented that at the recent wind turbine noise conference in Glasgow. That included over 1,200 participants and found that there was no link between noise and health effects.

Senator URQUHART: And that is in your submission.

Mr Turnbull: Yes, it is.

Senator URQUHART: I have had a look at that. How do you characterise the quality of the research that has found a link between wind turbines and health?

Mr Turnbull: I am not aware of any that has found a link between wind turbines and health. I have certainly read some articles which indicate that there is a hypothesis that there might be, but I have certainly not seen any direct link in any paper that I am aware of.

Dr Tonin: All of the research articles that have been published claiming links between wind farm noise and health basically set a hypothesis for a connection between infrasound and the ability of the human body to respond to that infrasound. They do not prove a connection in any way between adverse health and infrasound. On the other hand, there has been some recent work, including mine, on actual exposure of people to simulated infrasound in a laboratory environment and it is reporting the health symptoms of that exposure. The first study I am aware of that did this was a study in New Zealand by Crichton. What she did was to simulate infrasound using a loudspeaker in a laboratory and then with quite significant statistical prowess determined whether people exposed to this had all of the health symptoms or any of the health symptoms that were reported in the literature, including nausea, headache or backache. There was a whole list of them. What was found with that study was that the level of infrasound that was presented to those participants was far too low. Therefore, what I did in my research last year, presented at the Wind Turbine Noise conference just recently, was to take the highest level of measured infrasound, which to date has been at the Shirley Wind Farm and which I believe the senators would be aware of, and consented to 72 participants ranging in age from about 18 to the late 60s I think it was. What we found was that in presenting that level, which is at a level of 90 decibels at 0.8 Hz and the highest measured anywhere in the world to date, there was no correlation between that level of infrasound and a person's reported symptoms—and there were about 20 different symptoms—and I think this goes to the previous senator's questions. My experiment builds on the Crichton experiment. There is another experiment coming, hopefully, with the NHMRC funding to be announced later this year which will expand the number of people involved. We are looking at over 100 people in their normal environments and in a laboratory environment. In other words, we are going to have control groups and we are going to have exposed groups, and they will not know which they

are. They will be exposed to infrasound in their home and also in the laboratory. We will measure using electroencephalographs and all your fancy medical equipment to find out exactly what is going on.

Senator URQUHART: Thank you, Dr Tonin. I have hundreds of more questions, but the chair is winding me up. I have had five minutes, but the chair is winding me up.

CHAIR: No, you have had seven minutes like everybody else, Senator Urquhart. Senator Leyonhjelm.

Senator LEYONHJELM: Mr Turnbull, you said below 110 decibels is below human perception.

Mr Turnbull: Yes, at a frequency of five hertz that is correct and below that frequency it is even higher.

Senator LEYONHJELM: How does that compare with the WHO standard which says 40 decibels I think.

Mr Turnbull: That is an A-weighted level at different frequencies. The threshold of perception at other frequencies is zero decibels and that is what zero decibels is based on, but when you get to these infrasonic frequencies you get to a level where perception does not occur below 110 at five hertz and even higher at lower frequencies.

Senator LEYONHJELM: In Steven Cooper's study, what decibels was he measuring?

Mr Turnbull: At those frequencies he measured between about 40 and 70 decibels.

Senator LEYONHJELM: And yet he got human perception?

Mr Turnbull: I do not believe he has shown that at all.

Senator LEYONHJELM: You do not believe that he showed human perception?

Mr Turnbull: No.

Senator LEYONHJELM: What did he record?

Mr Turnbull: He certainly recorded a number of noise levels of between 40 and 70 decibels. He recalled instances where people determined sensations, but there was no statistical assessment of how that related to the level of infrasound.

Senator LEYONHJELM: It is a bit hard with a sample size of six, but are you suggesting that there are no conclusions or that he drew invalid conclusions?

Mr Turnbull: I am suggesting that there are no valid conclusions regarding the correlation of sensations with infrasound.

Senator LEYONHJELM: We have heard that the methodology of recording and playing back infrasound is potentially invalid because the sound emitted by a single turbine may not be an issue. It may be when more than one turbine is operating in synchrony there are hot spots created. Do you have any thoughts on that?

Mr Turnbull: Yes, I do. The recordings that have been done and the assessments over a very long period of time by a number of different researchers are at wind farms where there are a number of turbines. They are not recordings of a single turbine. Mr Cooper's own study was based on a number of turbines, so if there was anything special occurring between the turbines it would have been recorded during those measurements and those recordings.

Senator LEYONHJELM: Provided those recordings have occurred at a hot spot—don't you think?

Mr Turnbull: There have been so many different measurements done at a number of different locations, and Mr Cooper put his microphones in a number of different locations looking for the so-called hot spots that he would have found it in amongst those. He found levels between 40 and 70 decibels. The agreed threshold of perception is 110. Even if there were additions of up to six, which Dr Bell has suggested, that is still well below the threshold of perception.

Senator LEYONHJELM: Another issue that has come up in evidence—I am sorry gentlemen, but we are talking about extending our time, which is potentially useful from your perspective—is that there is no settled means by which very low frequency sound can be measured and that it requires instrumentation. In fact, we heard from one witness who said he used a microbarometer. Have you any thoughts on that?

Mr Turnbull: The instrumentation for measuring infrasound is well developed and has been for many years. Infrasound can be measured. It can be measured much more easily than it can be sensed, and there is certainly equipment around to measure it. There are now methods also of calibrating those instruments to make sure that what you are measuring is actually what is in the environment. The measurement of infrasound is not a problem. It is not easy, but it is certainly not a problem with the instrumentation available.

Senator LEYONHJELM: I am interested in what I interpret as a lack of scientific curiosity from what is an association of scientific people. There was a paper by Inagaki where he found a relationship between sound

emitted by wind turbines and the health of wind turbine workers. How does it compare with those that you supplied in your submission?

Mr Cooper: I am not aware of the entire contents of that paper, but, having seen a previous version, I believe it was lacking in scientific rigor. There was no control. I think it was based on sleepiness, how sleepy those people were, and there was no control between office workers, security workers and technicians working on the site. It was lacking in all scientific rigor, and I was surprised it was published.

Senator XENOPHON: Mr Turnbull, do you suffer from motion sickness?

Mr Turnbull: No, I do not.

Senator XENOPHON: Mr Cooper, do you suffer from motion sickness?

Mr Cooper: Not badly.

Senator XENOPHON: Mr Delaire, do you suffer from motion sickness?

Mr Delaire: I do.

Senator XENOPHON: You do suffer from motion sickness like me?

Mr Delaire: Yes.

Senator XENOPHON: What about you, Dr Tonin, do you suffer from motion sickness?

Dr Tonin: Yes, I do.

Senator XENOPHON: Four questions and four different responses, to varying degrees. Do you accept, Mr Turnbull, that when it comes to sound—infrasound for instance and audible noise—people do respond differently to it?

Mr Turnbull: Yes, they do, but only above the threshold of perception. Below the threshold of perception there is no change to the way people react.

Senator XENOPHON: But there are some people who are more sensitive than others with respect to this?

Mr Turnbull: There are. There is a range, and, as was previously said, that range might take us, at the infrasonic levels below five hertz, from 110 down to 95. That is still well above the levels that are experienced at wind farms.

Senator XENOPHON: Can I put to you—and time is short, so do not take my terseness as temperament; it is a function of time—that there is a real concern that there is not adequate measuring being carried out. Residents I have spoken to who say they have been affected by wind turbines would be reassured if there were some objective, independent and constant measuring so that they know that if they do have a complaint it can be measured against an objective standard. That is not an unreasonable request in your view—is it?

Mr Turnbull: The difficulty with measuring wind farms is that the noise from wind farms is often much lower than the noise from other things in the environment. Where you have continuous noise monitoring—for example from aircraft, when an aircraft goes over, the noise level goes up by a very significant amount. But when you are at a wind farm, it is very difficult to measure the noise from the wind farm alone. For example, in Mr Cooper's study at Cape Bridgewater he measured for in the order of eight weeks, and he says he was not able to detect the noise from the wind farm in the audible frequency range. There is a real difficulty in putting out a microphone or a monitor and trying to look at the noise levels to say one part is associated with the wind farm and another part is not.

Senator XENOPHON: But surely it is better, for all parties concerned, to have some objective measurement rather than no measurement at all—is it not?

Mr Turnbull: If you do not know what the noise levels are from, it is better to have nothing than to have something.

Senator XENOPHON: Seriously?

Mr Turnbull: Yes. If you have a noise level of 40 dB(A) or 45 dB(A) and you do not know where it is coming from then it is of no value.

Senator XENOPHON: But if you are able to measure near the source of the wind turbine, assuming that there is no other source of noise near the wind turbine, that is a good starting point to see how far that sound, audible or infrasound, could travel.

Mr Turnbull: I think you hit the nail on the head when you said 'when you assume there is no other sound'. There is other sound in the environment, and that is the problem and the difficulty with it.

Senator XENOPHON: But, Mr Turnbull, you helped write and then amend the South Australian EPA wind farm noise guidelines—correct?

Mr Turnbull: No, not correct.

Senator XENOPHON: Were you involved in the process at all?

Mr Turnbull: I did not write the guidelines, no. There was a group who—

Senator XENOPHON: But you consulted in respect of the guidelines—is that a fair statement?

Mr Turnbull: EPA consulted a wide variety of people, and I was one of those people.

Senator XENOPHON: Right. So how do you comply with EPA guidelines, such as they are, in the absence of some objective noise measurement?

Mr Turnbull: The noise measurements are done over a long period of time. You look at the noise levels measured before the wind farm is constructed and then you compare those to after the wind farm is constructed. By doing that, you are able to statistically determine whether there has been a change and, if that change has occurred, whether it is significant and whether it is above the guidelines. The difficulty with trying to do it on a continual basis, as you are suggesting, is that at one moment in time if you look at the noise level you cannot determine whether that noise is from a wind farm or from another source.

Senator XENOPHON: And that one moment in time could be the moment when a resident is woken up?

Mr Turnbull: That could well be the case.

Senator XENOPHON: Do you accept that being kept awake, being woken up, can have adverse health effects? If you do not sleep well, it can have adverse health effects. It is pretty axiomatic—isn't?

Mr Turnbull: Well the South Australian EPA guidelines—

Senator XENOPHON: Hang on. Answer my question. If you are woken up by noise, if your sleep is interrupted, that can have adverse health effects—can it not?

Mr Turnbull: Of course it can, and that is why the World Health Organization sets guidelines for limits for sleep disturbance. The South Australian guidelines were based on those limits set by the World Health Organization.

Senator XENOPHON: And you do not think those guidelines need to be modified, calibrated or continually reviewed as the science improves?

Mr Turnbull: All guidelines should be monitored as science changes, but I have seen nothing to suggest that those guidelines are—

Senator XENOPHON: I am running out of time. I do have questions for Mr Cooper and Mr Delaire, but, Chair, can you give me a one-minute gong? I just want to get more questions out. When did you first become aware of the adverse health effects from wind turbines being reported, Mr Turnbull?

Mr Turnbull: If you are talking about the self-reported effects, I do not know the date.

Senator XENOPHON: Right. So are you saying that self-reported effects should be dismissed?

Mr Turnbull: No, I am not saying that.

Senator XENOPHON: What are you saying?

Mr Turnbull: You asked me a question about when I first became aware of it, and I do not recall when that was. What I am saying is that there should be scientific studies conducted, and many of those have already been conducted.

Senator XENOPHON: But you have just said there is a problem with scientific studies because if you monitor then it is very hard to monitor the actual noise levels.

Mr Turnbull: That is not what I have said. What I am saying is that for continuous monitoring, without someone being present, you do not know necessarily at any particular moment in time whether the noise is from the wind farm or not. If you do it over a long period of time and take averages, you can statistically determine whether there has been any change, but you cannot determine at a particular moment in time whether it is the wind turbine making that noise. You have now asked me about scientific studies to determine the level of noise, in particular infrasound, from wind farms. That can be determined and measured and has been, and research in that area is continuing.

Senator XENOPHON: Did you work on the Uranquinty gas-fired power station planning?

Mr Turnbull: Yes I have. Sorry, did you say 'planning'?

Senator XENOPHON: Yes.

Mr Turnbull: No I did not.

Senator XENOPHON: Or on the sound issue aspects of it?

Mr Turnbull: Not prior to construction.

Senator XENOPHON: But you are aware of the issues involving Uranquinty?

Mr Turnbull: Yes.

Senator XENOPHON: We are not talking about wind turbines. This is a gas-fired power station. There was an issue there about sound and noise coming from that power station?

Mr Turnbull: Yes there has been.

Senator XENOPHON: And there was a lot of controversy. Local residents had real issues about the noise coming from that power station?

Mr Turnbull: Yes.

Senator XENOPHON: What was your role in that? What advice did you give on that?

Mr Turnbull: I provided advice—

Senator XENOPHON: To whom?

Mr Turnbull: to Origin Energy regarding that. That advice was initially that they were not compliant with the requirements. That was told to the residents. It was told to the departments.

Senator XENOPHON: Was that audible sound or infrasound?

Mr Turnbull: It was audible noise.

Senator XENOPHON: And that has since been rectified? Is that your understanding?

Mr Turnbull: It is a continuing issue. I spoke to the residents a week or two ago.

Senator XENOPHON: And they are still not happy with the result?

Mr Turnbull: I do not think that that would be the way that I would put it.

Senator XENOPHON: They still have issues?

Mr Turnbull: The noise is still there.

Senator XENOPHON: So clearly it is still not complying?

Mr Turnbull: That is not what I would say about that.

Senator XENOPHON: What would you say?

Mr Turnbull: I would say they are working with the community to work through things.

Senator DAY: Are you familiar with the work of Dr Andrew Bell on this?

Mr Turnbull: I have some familiarity with it. He did put a paper or a technical note in the Australian Acoustical Society paper.

Senator DAY: He gave evidence to this committee. I will quote him, so I get it right. He said:

I think there are real effects of sound. So far as that study is concerned, I think it is not correct to try to replicate wind sound using any acoustic generating equipment such as loudspeakers. To be able to generate 0.8 hertz cannot be done. I point out in my paper that the South Australian EPA tried to hear what was happening when the noise conditions happened by replaying a digital recording of the wind turbines. I am not sure how much hi-fi knowledge one has, but to reproduce low-frequency sound down to 0.8 hertz is not possible.

Dr Tonin: That is incorrect. It is certainly not possible with standard hi-fi speakers, but it is possible with special purpose speakers. I have done that with what is called pneumatic headphone apparatus, which comprises a headphone with an air pump which generates the required sound. I think Andrew Bell was talking about how 0.8 hertz cannot be replicated using a hi-fi speaker. But there are ways of generating it. I have done it. Also, Bruce Walker has done it with very big speakers that he specially constructed. So it is not correct to say it cannot be done.

Senator DAY: There is obviously some dispute amongst the experts. You said earlier in your evidence, Mr Turnbull, that all of the research—and 'all' is quite a definitive word—shows no link or no adverse health effects related to infrasound. Do you stand by that?

Mr Turnbull: That comment was in relation specifically to the group of research which was presented at the wind turbine noise conference in Glasgow earlier this year. It was regarding the research that Dr Tonin has

recently been speaking about, where sound was played back to people. It particularly related to the research conducted in that field which was presented earlier this year, and there were no adverse effects found from sound played back at those levels—from each of those studies I mentioned.

Senator DAY: Just yesterday we had evidence from physicist Dr Huson, who presented a paper at that very conference in Glasgow, who disputed that. He said that he did find that there was a connection between wind turbine infrasound and health.

Mr Turnbull: I did not hear that testimony yesterday.

Senator DAY: You went to Glasgow to the conference?

Mr Turnbull: I certainly did.

Senator DAY: You did not hear his—

Mr Turnbull: He did not give a presentation at that conference; he provided a poster.

Senator DAY: You said earlier that infrasound levels are no higher near wind farms than they are in other areas.

Mr Turnbull: That is correct.

Senator DAY: So what do you say to the hundreds, thousands of people, many of whom we have heard from in our travels, who were perfectly healthy and happy and welcoming of wind farms, but who, once the wind turbines started, suffered extremely severe health impacts that have been traced back to the infrasound?

Mr Turnbull: It is that last comment that I disagree with: that it has been traced back to infrasound. We would say that it is not infrasound.

Senator DAY: When you say, 'we would say', you are referring to your 2012 committee statement?

Mr Turnbull: That is correct.

Senator DAY: 2012 is three years ago. I have a scientific background. I presume that you have an open mind, as someone with a scientific bent would hopefully have. Do you think there could have been some developments in this area in the last three years?

Mr Turnbull: If you look at the panel members here, each of us have been to overseas conferences regarding wind turbine noise where we have been well and truly kept up-to-date on the latest findings in that area. If we see any need to change the statement, we would do it.

Senator DAY: So in the last three years you are saying that you have not seen or heard anything that changes your view that there is a direct link between infrasound and health impacts on human beings?

Mr Turnbull: Let us be clear in the wording. When you say the 'link between infrasound and health effects', at the levels produced from wind farms, we agree with that.

CHAIR: Mr Delaire, I believe you undertook preconstruction noise assessments for both the Waubra and the Cape Bridgewater wind farms. Is that correct?

Mr Delaire: That is correct.

CHAIR: Your predictions I believe were that 50 of Waubra's 128 turbines and 13 of Cape Bridgewater's turbines needed to operate in noise reduced mode in order to comply with NZS 6808:1998. Could you please explain why these adjustments were necessary.

Mr Delaire: At the time of the noise assessment for planning purposes, the predictions showed that some of the wind turbines—and I do not recall the exact numbers—would need to be operated in noise reduced mode to achieve the noise limits. That was for both Cape Bridgewater and Waubra.

CHAIR: If the relevant turbines were not adjusted to noise reduced mode, it would be reasonable to suggest there would likely be reduced amenity and disrupted sleep for those exposed?

Mr Delaire: I cannot comment on how it would affect people's sleep. But in terms of compliance with the New Zealand standard, which is what I was assessing, and what I assessed as well in post-construction, it was found for Waubra, for example, that the turbines would have had to have been turned down in noise reduced mode, which is what happened at a later stage. But for Cape Bridgewater, for example, it was found, based on measurements at the wind farm, that those turbines did not need to be operated in noise reduced mode to comply with the New Zealand standard.

CHAIR: When the committee visited the Cape Bridgewater wind farm, the site manager was not aware of the requirement to noise optimise the 13 turbines. If the wind farm manager did not know this was necessary for the facility to comply with the standard that that permit was issued under, who polices it?

Mr Delaire: I am not aware of the communications within the company in terms of who told who what the operating mode should be. The fact is that, at the time of the assessment for planning, it was recommended that those turbines may need to be turned down to comply with the New Zealand standard, but, following measurements on site, it was found that it was not required.

CHAIR: Mr Delaire, should all SCADA data and power output be provided to an independent auditor to guarantee that the turbines are operated as required?

Mr Delaire: The data is provided to the acoustic experts that are employed by the wind farm companies to assess the noise in accordance with the standard, as required by the planning permit. Those assessments are generally peer reviewed as well. Therefore, that data is provided, I suppose, in the form of our reports to the broader community.

CHAIR: If permits are to be issued on the condition or premise of noise adjustments, should all SCADA data and power output be provided to an independent auditor to guarantee that the turbines are operated as required?

Mr Delaire: I am not aware of a planning permit that actually requires turbines to be operated in certain noise reduced modes. If it was the case, it would be reasonable for the relevant authority to be satisfied that it was the case. It would be to the satisfaction of the relevant authority.

CHAIR: Thank you.

Senator URQUHART: Mr Cooper told the committee in Portland that his work had been hailed around the world as finding new information and material previously not put together or understood with regard to wind farms. Would you agree with this statement?

Mr Turnbull: No, I would not. What Mr Cooper has done is measure the infrasound from a wind farm. He has measured levels that have been measured similarly by many other researchers. There was no statistical analysis that went with the assessment, so there is very little to take from it other than those measured levels.

Senator URQUHART: What is your understanding of the national and global industry response to this study?

Mr Turnbull: I do not know that really there has been a response to the study. It really just tells us what we have always known—the level of infrasound from wind farms can be measured. There are many reactions from different people but there is no correlation between those levels of infrasound and the reactions.

Senator URQUHART: What is your response to Mr Cooper's assertion of a unique wind turbine signature?

Mr Turnbull: Certainly the level of infrasound can be measured at different frequencies. It has been measured by people over a long period of time. Going back decades, people have been able to measure the level of infrasound at various frequencies, at the blade-pass frequencies. That level is known; there is nothing new there. It has been measured by others and we know the level.

Senator URQUHART: Some have suggested that Mr Cooper's work should form the basis on which much more work should be done. Do you think he has provided a solid methodological and acoustical framework that that could be built on?

Mr Turnbull: I do not think there is any purpose in continuing with that—

Dr Tonin: Chris, do you mind if I answer that question. What Mr Cooper has done is nothing new. He has measured what is called the wind turbine signature, which, as Mr Turnbull has said, has been around for decades. We all know about that. In fact, if you look at the Shirley wind farm it presents the same information. So there is nothing new about that. Mr Cooper suggests that what he has done should form the basis of monitoring at all wind turbines. I do not agree with that. What we need to get to the heart of are the claims that link infrasound and health. You do not do that by following Cooper's methodology. You do that by exploring the next step of the Creighton/Tonin and hopefully NHMRC methodology, which is to expose people to exactly what some people complain of and to scientifically and medically measure the health responses and the symptoms to that exposure. That is the way forward. I would hopefully suggest that senators give support to the NHMRC funding to come on-stream later this year to do just that.

Senator URQUHART: From my reading of Mr Cooper's work, he seems to start with the underlying assumption that wind farms are the cause of residents' health concerns and work backwards from there, ignoring contradictory evidence. Is this a fair characterisation?

Mr Cooper: Yes.

Mr Delaire: I think it is, yes.

Senator URQUHART: In his report, Mr Cooper mentioned significant issues with his own measuring instruments and went so far as to say, 'One can, from similar and the same instruments, obtain conflicting data in

the infrasound region.' He even went as far to say that 'issues emerge that question the validity of the results due to differences in the performance of instrumentation'. So did Mr Cooper choose the wrong information or do we face real issues in actually measuring infrasound?

Mr Turnbull: There are no issues in measuring infrasound; there are issues to do with Mr Cooper understanding what needs to be done to measure infrasound. Mr Cooper presented a paper at a conference in Denver in 2013. At that conference, he criticised a particular sound level meter which had been used to measure infrasound. Eighteen months later, he used exactly the same equipment.

Senator URQUHART: Mr Cooper's study also found that participants registered sensations on many occasions when the turbines were turned off—you mentioned that in your opening statement—for up to 12 hours at a time. One analysis found this occurred around a third of the time. I think, from what I picked up in your opening statement, that is certainly problematic.

Mr Turnbull: The problem is that those occasions when people felt these sensations when the turbines were off were simply ignored in any analysis that was conducted. If you are to conduct analysis, it needs to be done on a statistical basis by a statistician who understands all of the compounding factors and has a scientific approach rather than simply ignoring things and choosing the data that suits the theory they might have.

Senator URQUHART: Do you have any comments to make on the acoustic set-up or methodology used by Mr Cooper in his work at Cape Bridgewater?

Mr Turnbull: Essentially what we take from it is that he has been able to measure the level of infrasound at times. It has not been all the time but at times. That level of infrasound is similar to what others have measured. There is really not a lot in it that is new.

Senator URQUHART: I understand that Mr Cooper is also undertaking similar work at Waterloo Wind Farm. Is that correct? Are you aware of that?

Mr Turnbull: Yes, I am aware of that.

Senator URQUHART: Do you have any comment to make on this work from an acoustical perspective?

Mr Turnbull: I do not think he was as successful in measuring the level of infrasound at Waterloo. He may have measured it on some occasions, but he certainly measured no levels which were higher than others have previously measured.

Senator URQUHART: You mentioned earlier that the Health Canada report and the large epidemiological study, which you also mentioned in your submission, also incorporated acoustic analysis along with medical data. I understand that this study found no evidence of a link between wind turbines and health. Do you have any comment to make on the strength of the study in relation to its acoustical dimension? How does it compare with the work of Mr Cooper?

Mr Turnbull: Certainly it was a very large study. There were over 1,200 participants, in comparison to the six in Mr Cooper's study. It was a very wide-ranging study. They found no correlation between health effects and the noise from wind turbines. They did find a correlation between annoyance and the noise from wind turbines. But the other thing to take into account is that some of those wind turbines were in the order of 300 metres from residents. With the set-back distance generally found in Australia, the noise would be much lower.

Senator URQUHART: When you say 'annoyance', what were the types of issues that were raised?

Mr Turnbull: I think it is just that people are able to hear the sound and they do not like it. I think that would be classified as annoyance.

Senator URQUHART: The committee has heard that in some countries communities co-exist well with wind turbines with very few complaints about health impacts. Does that match with your understanding?

Mr Turnbull: Certainly worldwide there are many turbines which are closer to residents than in Australia and they do co-exist. But that is not to try to suggest that all turbine noise is acceptable and there should be no limits. There must be limits, and these limits must be set by the authorities and regulators in each state and they must be adhered to.

Senator URQUHART: Which countries have very few complaints about health impacts from infrasound?

Mr Turnbull: I think there have been some complaints in the UK in the past, but they really do not exist all that much anymore. They have really got to the point now where they have moved on and are looking to try to assess the audible noise, because they believe that that is what is of potential concern rather than the infrasound.

Senator URQUHART: What do you think are the factors that might be at play here? Why is it different in Australia?

Mr Turnbull: To be honest, people's reactions are probably outside my field of expertise. But certainly the studies that have been conducted indicate that a person's perception of a wind farm and what they think about the wind farm is one of the most important factors in determining whether they self-report health effects.

Senator LEYONHJELM: Is there a different organisation called the Australian Acoustical Society?

Mr Turnbull: Yes, there is. The Australian Acoustical Society is a much broader group of acoustic professionals. The Association of Australian Acoustical Consultants represents firms that are consultants in the field of acoustics. I am a member of both.

Senator LEYONHJELM: Does the society have a position on this issue?

Mr Turnbull: No, it does not.

Senator LEYONHJELM: Do you know why that is?

Mr Turnbull: I suppose it is mainly because there has been no-one who has gone ahead and tried to put one forward.

Senator LEYONHJELM: You people are consultants who are employed by the wind-generating companies.

Mr Turnbull: Some of us are and some of us are not. We are employed by a broad range of people, including by government departments, directly by courts, by councils and by developers and operators.

Senator LEYONHJELM: Is there anybody in your organisation involved in developing your submission on this issue who has not been employed by wind turbine generators?

Mr Turnbull: I think Dr Tonin has answered that question, but I will give him an opportunity to answer that again. It seems his connection has dropped out. But certainly Dr Tonin has not been engaged by any developer or operator.

Senator LEYONHJELM: A colleague of yours, Dr Geoffrey Leventhall, informed the 2011 Senate inquiry that:

... as environmental noise control criteria are A-weighted, they tend to under-rate potentially problematic low frequency environmental noise. This has led low frequency problems to be left to continue, whilst higher frequency problems are fixed more quickly. As a result, where genuine low frequency noise problems have occurred, their continuance leads to the development of undue stress in those affected. There is also a body of very stressful, unsolvable noise problems, described as "low frequency" by those affected, where detailed investigations cannot discover a specific noise source.

That was four years ago.

Mr Cooper: I would suggest you have a look at Dr Geoff Leventhall's most recent submission to this committee, which I think might have been submission No. 379. He makes it pretty clear in there that he does not agree with this suggestion that infrasound is a big issue for wind farms.

Senator LEYONHJELM: What has changed in that period?

Mr Turnbull: I think the difference is between the definitions of the terms 'low-frequency sound' and 'infrasound'. When he talks about low-frequency sound, he is still talking about audible noise. If we are talking about audible noise, we all agree that there should be limits set on it at all frequencies.

Senator LEYONHJELM: Being acousticians, I assume you do not consider yourselves competent to assess human reactions to noise and human perceptions of noise?

Mr Turnbull: We certainly have expertise in interpreting perceptions of sound, but we have no experience or expertise in health.

Senator LEYONHJELM: You rely on the NHMRC, I think you mentioned?

Mr Turnbull: We rely on government bodies in relation to health, yes.

Senator LEYONHJELM: The NHMRC former CEO, Professor Warwick Anderson, told Senate estimates, in relation to wind turbines, 'We do not say there are no ill effects.' In that context, are you confident that you can say there are no ill effects from infrasound?

Mr Turnbull: I think you might have just changed slightly the context of what was said. He said there were no ill effects, and now you have asked me a question about ill effects from infrasound, which I do not think was what his statement was.

Senator LEYONHJELM: It was in relation to sound in general.

Mr Turnbull: It was in relation to wind farms, not necessarily to infrasound.

Senator LEYONHJELM: Well, sound.

Mr Turnbull: We will always rely on what the NHMRC do as their position statement. They currently say there is no credible evidence to link the health effects with sound.

Senator LEYONHJELM: No 'direct' evidence is the word, not 'credible'. The question we are wrestling with as a committee is this: people get sick, when they were not sick before, when turbines go up in their neighbourhood. They then get sick after they start operating. They move away and they get better. That is the issue we are wrestling with. It is difficult to say that we know enough to say that it cannot be the sound from the wind turbines that is responsible for that effect. It is difficult for me to sit here and hear a group of scientific people say, 'No, it can't be that.' Don't you acknowledge that there are unknown aspects to this that require further investigation?

Mr Turnbull: The further investigation that is being conducted at the moment is on replaying that level of infrasound to a wider range of people in different circumstances and different environments. We believe that is very important and should continue. But we know the level of infrasound at wind farms. It has been measured a number of times for decades. We know that level, and if we replay that level or a level higher than that, at the same characteristics, at the same frequencies, to a range of people, we will be able to find out whether it is that infrasound which causes any problems. So far there has been no reaction to that level of infrasound.

Senator CANAVAN: I just want to go back to something that the chair raised earlier—the scatter data, the wind speed data that we heard yesterday. I am not too sure, but I think it was Dr Hewson who said to us that he has been trying to get some of that data from operators, with no luck. In your view, would having that information provided publicly to everybody facilitate further research and studies in this field?

Mr Turnbull: It really depends on the circumstances and the circumstances under which it is provided. I think you cannot say more broadly, 'It ought to be provided to everyone', because there is a difficulty that it can be used in the wrong way. But certainly, as an organisation we would support any research being conducted which helps to assist in the understanding of noise from wind farms.

Senator CANAVAN: What are those wrong ways?

Mr Turnbull: For example, if there is a study which has no scientific basis and uses the data to provide inaccurate conclusions, we would have some concerns about that.

Senator CANAVAN: But we require companies to provide public listed data on lots of things that could be abused by scientists or other. You mentioned aircraft noise, I think. Certainly coal dust monitoring at mines is another example. I do not understand why that is different from those. There is always that risk, but that is why you have yourselves and other bodies who can point up that. What is the problem in having the information out there for all to see?

Mr Turnbull: As a group we do not object to it. It is a matter of how it is used that we think is the most important.

Mr Delaire: If I can just follow up on that, I think it is definitely up to the individual operators to supply the data or not. I am definitely aware of some operators who have been supplying measured noise data, and associated wind-speed data as well, for residents to have as a record—as, I suppose, a sign of transparency that we have done measurements in your backyard and here is the data. If you want to have someone else look into it and redo what other companies have done, please go for it. Therefore I do not think it would be accurate to say that no operators provide this kind of data. It has definitely been provided. I definitely would be supporting some transparency on that.

Senator CANAVAN: I was not trying to suggest that at all. I was not aware of other companies doing it. The government provides a lot of subsidies to these operators so there are some requirements for transparency, and the points that Senator Xenophon was making about trying to ease community concerns would seem to be of some benefit. Just moving on, do you have a position on what the safe distance is for a turbine to be from a residence?

Mr Turnbull: We rely on noise levels rather than distance, and the setback distance from a turbine is one factor. There are a number of other factors: the type of turbine, the height of the turbine and the number of turbines. We would say that it is the noise level which should be required. That should be set by the relevant state authorities, which it currently is.

Senator BACK: You are regarded as the experts. You mentioned to us the level of sound, and yet we have the perverse situation here in eastern Australia where Queensland, I think, has a setback of two kilometres; New South Wales has 1.5 kilometres; and Victoria has now moved to one kilometre. I do not know what South Australia's setback is, and, to my shame, I do not know what it is in Western Australia—our industrial wind turbines are 35 to 40 kilometres from town, so we do not yet have the problem. Your group would have advice, would it not, if, as you say, distance is the factor? Have you given advice to each or any of the three states as to

which is the appropriate distance? Clearly it is not the same, is it? You cannot sit at Tweed Heads and have a different level at Coolangatta and south of the border. So what is it?

Mr Turnbull: We would say that the distance is one factor, but it is the overall noise level which should be taken into account. The noise level should be based on scientific research about health and annoyance. The various authorities should set the limits on that basis, and on the basis of the recommendations of the world—

Senator BACK: They are acting on your advice, surely?

Mr Turnbull: No, not on our advice. We cannot provide advice on health impacts.

Senator BACK: You can provide advice on acoustical noise, or sound, can't you?

Mr Turnbull: Yes.

Senator BACK: Do they seek that advice?

Mr Turnbull: We have not been asked as a group, certainly, about—

Senator BACK: Are you asked individually, as consultants?

Mr Delaire: I am not aware of any acoustic consultants who have been asked about safe distances from wind farms and to comment on that.

Senator BACK: I think you mentioned earlier that you do advise governments and councils. How can approvals be given prior to the final sitings for wind farm turbines being confirmed? We heard instances yesterday and at other times, where approvals are given before the final siting or before distances between turbines is actually determined. Based on your advice about sound and your comments that sound can, in fact, cause annoyance or whatever the health effect is—and we do not know it—how can an approval be given for an industrial wind farm without you being able to be told where the turbines are going to be, how high they are going to be, what the megawatts are going to be and what the topography of the area is?

Mr Turnbull: It is really a matter of the conditions. The conditions have to make sure that the criteria are achieved in the long term. Without any conditions, I agree that it would be completely inappropriate—

Senator BACK: Are you, as consultants, called on in advance? Are you given the layout? Do you have a position to be able to say, 'You can't put those three turbines in relation to each other, because they are likely to have some sort of interference effect'?

Mr Turnbull: That is exactly what we would do in terms of assessing layouts prior to development approval. Following development approval, it is common practice that there will be some change to the layout. Because these things take a number of years, there are changes and improvements to turbine designs and there will be changes. It is appropriate though that the conditions be put in place such that there is another assessment done on the final layout prior to any construction. That is the important thing, that there must be a condition put on these wind farms to make sure that any micro-siting, or changing of locations, or changing of turbine types does not prejudice the ability to achieve the criteria.

Senator BACK: The one kilometre, as I now learn it, is in South Australia or the one in Victoria—really, those setbacks are meaningless in the context of what you have just told us.

Mr Delaire: We believe it is. We believe it is the noise—

Senator BACK: Thank you.

Senator XENOPHON: Mr Turnbull, perhaps I misunderstood you earlier, but are you saying that there is no accurate way of measuring the noise of a wind farm once it is operating?

Mr Turnbull: No, that is not what I am saying. What I am saying is that if you want to do continual monitoring, such that you say at 9.30 pm on Tuesday, whatever date, and you want to determine the noise from a wind turbine, you cannot do that by simply looking at the noise level at that time.

Senator XENOPHON: What do you do?

Mr Turnbull: You do it over a longer period of time and you statistically average the levels over that period of time such that you can understand what the change has been from before the turbines until—

Senator XENOPHON: But if there is a peak in noise, which is what causes sleep disturbance, isn't that more relevant than a statistical average?

Mr Turnbull: It is very unlikely that you have a peak in noise from a continuously operating wind turbine.

Senator XENOPHON: Couldn't that be, for instance, the direction of wind, or topography, or if there is a pick-up in the operation of the turbine? They operate at different speeds, don't they?

Mr Cooper: Wind direction does definitely affect the noise propagation to houses. But in many of the states, South Australia for example, you have to assess the noise from the wind farm under downwind conditions. So that is taken into account, yes.

Senator XENOPHON: Mr Turnbull, is a statistical average cold comfort to residents who say, 'At this particular time I was woken up because of a peak in noise or because of the combined effect of the wind turbines operating together'? I think Senator Leyonhjelm has made reference to this, that it depends how they are synchronised and how they are operating together. Isn't that rather glib to say you just refer to a statistical average rather than the specific noise at a period of time when there could be sleep disturbance?

Mr Turnbull: There is a number of assessments done, and there have been a number of studies undertaken, about the measurement of wind turbine noise in specific circumstances so that there can be a correlation between the measurements and predictions. It is important to understand that we have the predictions right and that can be done, and has been done, for a number of different wind farms. Once you are confident in those predictions and understand under what conditions, in particular the worst-case conditions, the noise at a residence might be, then you can have an understanding about the noise levels at a residence.

If you wanted to find out under worst-case conditions what the level of noise is from a wind farm you would go there on a particular occasion, in person, and measure the noise under those wind conditions. You would then be able to, by listening, understand whether there was any other noise—an aircraft going overhead, or wind in the trees—which might interfere with your measurement of the wind turbines, so you could understand exactly what contribution the wind turbines are making. That is quite a valid way of doing it, to do it in that way and to understand, under those conditions that the neighbour might say is causing problems, what the noise is.

Senator XENOPHON: What I am trying to understand is this: you have residents who have made complaints; there has been quite a derisory reaction to that—and I am not saying any of you gentlemen have been part of that—but shouldn't there be an objective reasonable standard so that noise infrasound can be measured? If you are saying that the only way to measure compliance is to physically be there, have an acquisition there, from a regulatory point of view that sounds incredibly onerous. Surely there must be a better, easier way that is fair to both the residents and the wind turbine operators to measure this?

Mr Turnbull: I think there are three potential methods. One would be to be there in person at a particular moment in time, under those worst-case conditions.

Senator XENOPHON: Not very practical.

Mr Turnbull: Well, it can be done from time to time, and certainly during commissioning it is not out of the question that it be done. You need to make sure you do it at particular conditions so that you get the worst-case conditions. There are the predictions, which assist in understanding the noise under those worst-case conditions, and those predictions can be calibrated against actual measurements at particular times. If your predictions are telling you that the noise level should be 35 dB(A) at this location and you go out in the worst-case conditions and measure 38, then you have a problem, and you need to resolve it. But if you predict 35 and you go out and measure 32 or 33, then you are appropriately conservative at that time. So, it is the combination of the predictions with the measurements and the calibration of those predictions that gives you an understanding of the noise from the wind farm.

Senator XENOPHON: Perhaps I could just go to you, Mr Cooper. Are you familiar with the situation of Andy Thomas, the farmer from Mt Bryan near Burra?

Mr Cooper: Yes, I am.

Senator XENOPHON: I think it has been quite public. I do not think there are any privacy issues. Do you think the years of interrupted sleep that Mr Thomas has reported are caused by a nocebo effect?

Mr Cooper: No, not at all. I suspect that it is due to audible noise.

Senator XENOPHON: From wind turbines as the primary source?

Mr Cooper: Yes.

Senator XENOPHON: If the measurements at Mr Thomas's residence really are compliant with the SA EPA now—and apparently they were not for a period of time that led to the AGL turbines being turned off and some resident dampers being installed—that is correct, isn't it?

Mr Cooper: Yes.

Senator XENOPHON: Do you think the SA EPA wind farm noise guidelines are adequate to protect public health in their current form?

Mr Cooper: I guess it was identified that there was an issue there with tones—an audible tone, which is a really annoying sort of low-frequency character to the noise.

Senator XENOPHON: It is an audible tone.

Mr Cooper: Yes, an audible tone. This was about 120 hertz. When we are talking infrasound it is zero to 20 hertz—very, very different, these audible tones. You can actually hear the noise.

Senator XENOPHON: I am going to be wrapped up by the chair, but do you acknowledge that Mr Thomas's situation indicates if not a failure then a gap or inadequacy in the guidelines because he was not protected by the guidelines as they stood, and the planning approvals?

Mr Cooper: Unfortunately there are always, for all types of noise, going to be a few individuals who can hear the noise and who find that noise annoying. It does not matter if it is road noise, rail noise, aircraft noise—it does not matter what it is—there is always a small number of people who can hear that noise and find that noise annoying.

Senator XENOPHON: That could be the 10 or 15 per cent, 20 per cent?

Mr Cooper: In that order—sometimes less. I think the guidelines are normally set for about 10 per cent of the population.

Senator XENOPHON: But those people have rights as well.

Mr Cooper: I guess the point is that it does not matter how quiet the noise is; there will be some people, regardless of the level of that noise. If you can actually just hear that noise, then some people will find that noise annoying, regardless of level. So it is impossible to protect every single person in society from annoyance from a noise source, regardless of what that noise source is.

Senator XENOPHON: But conservatively, even 10 per cent is quite a significant cohort of the population, is it not?

Mr Cooper: It is a number of people, yes, but I guess it is a reflection of the reality that it is not possible to prevent annoyance in every single individual. To prevent annoyance in every single individual from noise, it has to be completely inaudible, and that is just not practical.

Senator XENOPHON: That is 2.4 million Australians. Anyway, thank you.

Senator CANAVAN: I am just trying to get to the bottom of this 110-decibel threshold. Steven Cooper, in his study, said:

From the resident's subjective observations a wind turbine signature rating curve has been derived that indicates an unacceptable presence of sensation inside a dwelling (for those 6 residents)—

and I take your point about statistical significance, and Dr Cooper did mention that too—that there are only six residents—

occurs at a level of 51 dB(WTS)—when assessed at rms values 400 lines for analysis range of 25 Hz. Utilising PSD values (400 line 25 Hz range) the unacceptable level for the 6 residents occurred at 61 dB(WTS).

I am just trying to square this with your evidence that people cannot hear things below 110, and your three standard deviations, which is 95. If that is correct, why was there this evidence in the Cooper study that people seemed to be feeling a sensation at lower decibel levels?

Mr Turnbull: There is just no statistical rigour to that assessment.

Senator CANAVAN: Is that because there are only six people?

Mr Turnbull: No, not because there are six people but because it excludes the times when, for example, people had those sensations and the turbines were off. Mr Cooper was not able to measure the level of infrasound when the turbines were off, yet there were those sensations at that time. You could say that the limit should be zero, because they found sensations at those times. You must consider all of those occurrences if you want to put some statistical significance to the measurements that were being taken and any correlation or otherwise that there is with sensation or any other perception.

Senator CANAVAN: I am still struggling to square it with what you said earlier. Are you saying that people can feel annoyance or sensation at 61 or 51 decibels, or not?

Mr Turnbull: No, I am saying that they cannot feel sensation or anything else at those levels and that if a proper statistical analysis had been done then that is what Mr Cooper would have found.

Senator CANAVAN: This is not about the statistical correlation. I think you are slightly misinterpreting my question. It is not about the correlation with the infrasound emitted by a wind turbine; it is whether or not it can be felt or have a bodily impact on a human being at those levels.

Mr Turnbull: That is right.

Senator CANAVAN: Your answer did not actually go to that question. This has nothing to do with the Cooper study per se, but are you completely dismissing that as a scientific possibility—that at those decibel ratings or levels it will not have any impact on people?

Mr Turnbull: In every study that has been conducted to date that has been the case. We would encourage further research, and we have spoken about that—about replaying infrasound at those levels and at higher levels to confirm those levels of perception. We do not expect that there will be any change, but, if there is—

Senator CANAVAN: But you do feel that there needs to be more research.

Mr Turnbull: We think there ought to be more in that particular field.

Mr Cooper: I think it is probably also worth noting that the levels of infrasound we are talking about here—50 or 60 or 70 dB—from the wind farm at these frequencies are not actually all that unique; they are from every other source in the environment, from transport to the wind. It is not just a wind farm thing. A lot of other sources produce this infrasound at exactly the same frequencies.

Senator CANAVAN: I do not have the data in front of me, though. What he is saying there in the quote I gave is that that is when the sensation starts, not necessarily when it peaks.

Mr Delaire: But how would you then reconcile the fact that those sensations have also been recorded when the wind farm was turned off?

Senator CANAVAN: Well, we did hear evidence—and of course I am not an expert, and usually it works the other way: we ask you questions, because we are complete ignoramuses in these areas!—yesterday from Mr Huson, and you might want to look at the transcript. He said that there have been recordings of infrasound at similar levels when turbines are off because of the structure of the blades and their very large—

Mr Delaire: I listened to that evidence yesterday and was in Glasgow as well at the time that poster was displayed. And yes, there are levels of infrasound that are recorded during the times that the turbines were turned off. Whether that infrasound was actually coming from the stationary turbines or not, I do not believe that Huson's paper actually can accurately come to that conclusion. And again it comes down to the level. There may be infrasound; there will be infrasound everywhere, all the time. It just comes down to the level, and the level of wind turbine that had been recorded in the infrasound range has always been below the level of perception.

Senator CANAVAN: I have a final question, and you may have to take some of this on notice. I do think it is important, given that you are all consultants, to have on the record who you have worked for, given your evidence. Could you detail for me which wind turbine projects you have worked on individually? Dr Tonin apparently has not, but if the other three could do that for us, that would be very useful.

Mr Turnbull: It will be a long list.

Senator CANAVAN: Okay. Well, take that on notice and provide it to us. Thanks.

Senator URQUHART: Yesterday the committee heard from an acoustician, Mr Les Huson, who said that non-moving wind turbines can emit almost identical levels of infrasound to non-rotating wind turbines, with both being problematic. Is that correct?

Mr Turnbull: It is certainly not something that we have found—that I have found in my studies. It is not something that was found by the acoustic group and Mr Cooper at Cape Bridgewater. He was not able to measure any infrasound when the turbines were not spinning. I certainly have not come across it. Based on the study or the review of that study, we do not think there is any basis for saying that it is at a similar level.

Senator URQUHART: Do you want to add to that, Mr Cooper?

Mr Cooper: Yes. Mr Huson, I guess, was using a home-made infrasound detector at one house alone. He has measured something which has not been measured by anyone else at any other location. I am not sure the evidence is really there to suggest that the infrasound was from the turbines. There were potential other sources of that.

Senator URQUHART: An article by Daniel Shepherd, Chris Hanning and Bob Thorne in the *Encyclopedia of Environmental Management* asserts:

... wind turbine noise has characteristics sufficiently different from other, more extensively studied, noise sources to suggest that pre-existing noise standards are not appropriate.

Would you have any comment to make on that statement?

Mr Turnbull: I would certainly say that the noise from wind turbines is studied more than any other noise source in Australia, and the degree of assessment of wind turbine noise is far greater than any other industry or noise source, certainly from my experience. I have not read the study, but certainly to suggest that wind turbines are not studied to the same degree—I do not accept that.

Senator URQUHART: Mr Bob Thorne produced a paper in 2012 entitled 'Wind farm generated noise and adverse health effects', which reported links from wind farms to panic attacks, balance problems, high blood pressure and nausea. Are you aware of that paper?

Mr Turnbull: I am not aware of it.

Mr Delaire: I am aware of the existence of that paper, and I looked at it at the time, but—excuse me—I would not remember the details of that paper.

Senator URQUHART: I was going to ask you if you had any comments to make on it, but maybe you could take that on notice. Yesterday in Melbourne we heard from Vestas that none of their 5,500 workers are reporting ill effects, despite working directly on wind turbines. The suggestion was made that it might be safe to be right next to the wind farms but unsafe a few kilometres away in residential houses. Is that possible, and does sound actually work that way?

Mr Cooper: No.

Mr Turnbull: No, I do not accept that. Certainly the level of noise, audible and infrasound, is higher closer to the turbines than it is at residences. If you actually think about it, if there were a problem such that at greater distances the noise was a problem but close it was not, a worker working on one turbine is still a fairly large distance from the most distant turbine. Even though they can be inside one turbine, they are still in the order of a kilometre or so from other turbines—in fact, all distances, ranging from 200 to 400, right up to kilometres from other turbines in a wind farm.

Senator URQUHART: Mr Geoff McPherson, who appeared before the committee in Cairns, has done work on infrasound underwater. Does sound function in the same way underwater as it does through the air, and can the effects be reasonably translated between the two?

Mr Turnbull: Sound does travel underwater and does travel in a similar way. I am not aware of that particular study, but certainly studies that I have seen regarding the potential effects of underwater acoustics from wind farms have been in the construction of offshore wind farms. Where you have an offshore wind farm, where piling occurs to fix the turbine to the bottom of the sea floor, there have been studies about the potential noise and vibration from that and the impacts on marine fauna.

Senator URQUHART: My final question is: are Australian acoustic standards for wind farms appropriate, in your opinion? I know you have touched on this. I would just like you to expand on that.

Mr Turnbull: The criteria for wind farms in Australia are at least as stringent as anywhere else in the world. They are based on the World Health Organization guidelines for annoyance and sleep disturbance. We have not seen any evidence to suggest that they ought to be changed, but really it is a matter for the authorities to determine those criteria.

Senator URQUHART: Thank you.

Senator LEYONHJELM: In the Australian sound guidelines for wind farms there are no criteria for infrasound, are there?

Mr Turnbull: In any wind farm guidelines?

Senator LEYONHJELM: Yes.

Mr Turnbull: There was in a draft New South Wales guideline—I think that is the only one where it was considered. It had a level of 85 dBG, but that is the only one I am aware of.

Senator LEYONHJELM: The South Australian guidelines, I think, say wind farms do not emit infrasound, from memory.

Mr Turnbull: That is what they say, yes.

Senator LEYONHJELM: You say that they are as stringent as anywhere in the world. The rest of the world must have a problem.

Mr Turnbull: The rest of the world does not provide criteria for infrasound because the level of infrasound from a wind farm is well below the threshold of perception.

Senator LEYONHJELM: We have heard that before. In your opinion, irrespective of what you just said, is it possible to design a wind turbine which emits substantially less infrasound than current designs?

Mr Turnbull: I am sure the research is continuing, but it is continuing into audible noise. I do not think there is any impetus to try to reduce the infrasound from wind turbines, because the level of infrasound from wind turbines is below the threshold of perception at residences. If there were a requirement, if it were found in further studies that the level of infrasound which is emitted from turbines—and we know what that level is—is causing problems, then perhaps there might be research into it, but I am not aware of any research to reduce the infrasound from wind turbines.

Senator LEYONHJELM: Residents are telling us differently. This is my final question. There is a standard in South Australia for frost fans?

Mr Turnbull: Yes, that is correct.

Senator LEYONHJELM: And the separation distance—is it two kilometres or four kilometres?

Mr Turnbull: No, there is no separation distance for frost control fans. There is a limit set to the noise from frost control fans. The limit is set—this is my recollection—at 55 dBA, so that is 15 decibels above the level that there is for wind turbines.

Senator LEYONHJELM: There is no separation distance?

Mr Turnbull: No, there is not.

CHAIR: Gentlemen, yesterday we heard evidence—I think, if I recall correctly, it was from Mr McAlpine from Vestas. I think it was to the New South Wales government's inquiry into turbines, where he or Vestas said that infrasound should be removed from the guidelines. Have you any thoughts on that?

Mr Turnbull: It is at the level which certainly has never been measured from a wind farm. The question is whether the effort involved in taking those measurements ought to be taken, given that we know what the level of infrasound from wind farms is generally, and that level is well below that threshold and well below the threshold of perception. If it comes about through some of this additional research that the threshold of perception is changed or that that ought to be changed, maybe that level ought to be changed as well, but the noise from wind turbines will always achieve that criterion because it is set at the threshold of perception. The question that arises is: is there any benefit in having that limit there or not?

CHAIR: Mr Turnbull, we have heard evidence from people over the last four hearings of the committee that they are experiencing problems in the community. There seems to be something wrong when people leave their homes. Would you agree that people do not leave their homes for no reason?

Mr Turnbull: I have met some of these people. I understand their concerns. Our concern is that the focus on infrasound in particular does not assist them. If you focus on one area—that is, infrasound—and that is not what is causing them the concern then you are ignoring everything else. That is our concern.

CHAIR: Mr Turnbull, I have repeatedly, over several years now, because we hear different evidence, called for multidisciplinary research. Would you support multidisciplinary research?

Mr Turnbull: Yes. I understand that that is what the NHMRC is looking to do. I agree that 'multidisciplinary' is important, because effectively we know what the noise from wind turbines is. We know what the infrasound is. That has been measured a number of times. We agree that the impact of that infrasound should be played back to others, a larger group in different situations, so that is understood, and then the potential health effects of that should be studied as well. That is, as you suggest, a multidisciplinary group, so I think we would support that.

CHAIR: Earlier, I think Dr Tonin was speaking about infrasound. Could you explain to me: if infrasound passes through buildings, how can a simulation in one room have the same effect?

Mr Turnbull: Essentially all sound passes through buildings at various degrees. We can measure the level of infrasound at a wind farm, and we understand what that is, and we can measure it inside rooms, and that has been done on a number of occasions. If we replicate that same level at the same character and the same frequencies, that person is essentially exposed to the same level of infrasound in terms of character and level, so that is what we need to replicate—and it has been replicated and should continue to be replicated—such that we understand exactly what that does. To date, all of the studies have suggested that there is no reaction to that level of infrasound.

CHAIR: Finally, if you are a person who is exposed to infrasound or any sound or noise for an ongoing period of time, it is different to being only exposed to infrasound or noise for a short period of time. So, if you are living on a property and you are exposed to it continually, isn't it going to have a different effect than for a person who is only exposed to it for a short period of time?

Mr Turnbull: Yes. I do not think there is any research that suggests that, if you are exposed to infrasound below the threshold of perception, that might change over time. But one of the studies that is currently being considered to be done is to play infrasound at the levels of a wind farm inside people's homes for a long period of time, as you suggest, to see whether there is any reaction to that. I think that is a useful thing, and I think this panel would support that.

Dr Tonin: Can I say something about that?

CHAIR: Yes, Dr Tonin. You are back with us, Dr Tonin?

Dr Tonin: I am now back. I have been away for about 45 minutes. The phone dropped out.

CHAIR: Okay.

Dr Tonin: Yes, I am involved in one of those proposals to the NHMRC, where we are proposing to put specially designed loudspeakers in the bedrooms of 100 people's homes for a period of six months. That should give us very, very good data. What I proposed to the committee preparing the tender is that we try and see if we can get some of the people involved from wind farms who are said to be extremely sensitive, and I hope we might be able to do that.

CHAIR: Thank you, Dr Tonin.

Senator LEYONHJELM: Mr Turnbull, I just checked with my office. The South Australian EPA guidelines specify a separation distance of two kilometres for frost fans.

Mr Turnbull: I do not accept that. I have recently worked on perhaps 50 frost fans, in the last year. None of those have a separation distance of two kilometres.

Senator LEYONHJELM: I actually think it is in one of our submissions here. I found it the other day.

Senator URQUHART: Dr Tonin, when you were talking earlier you mentioned that you were doing some new work, when will that be available?

Dr Tonin: At the moment we are doing auditability testing using the special apparatus that I have designed to enable us to get the audibility level of the 0.8 hertz infrasound that Cooper has measured. Hopefully that will be available in a couple of months.

Senator URQUHART: Thank you.

Dr Tonin: The early indications are that the mean level of 0.8 hertz is 120 decibels.

Senator URQUHART: Thank you very much.

Senator XENOPHON: I will just go through a few questions. Due to time constraints, you might want to elaborate on them on notice if that is okay. To your knowledge, did the health candidate study measure the full spectrum of wind turbine sound inside people's homes?

Mr Delaire: I believe that the health candidate study included infrasound measurements as well.

Senator XENOPHON: Inside people's homes?

Mr Turnbull: That is my understanding.

Senator XENOPHON: Okay. Do you mind taking that on notice? Is the issue of chronic exposure and sensitisation a cumulative effect? My opening question to all of you was about motion sickness. With motion sickness it is the cumulative exposure, which is important. Can it be the same thing with infrasound or other audible sounds, in terms of cumulative exposure?

Mr Turnbull: My understanding with motion sickness is that it is actually the opposite. To desensitise people from motion sickness they are exposed to conditions which produce the motion sickness and in doing so they are desensitised to it. Notwithstanding that, the studies that we have talked about today—

Senator XENOPHON: That is not my experience from when I have been on light planes throwing up. Usually the longer it is—

Mr Turnbull: I am talking about, for example, air force pilots who have that experience.

Senator XENOPHON: Short of air force pilots and in terms of most people, is sensitisation cumulative?

Mr Turnbull: I am certainly not an expert in that field. What we are saying is that the additional research, which we are suggesting would be a good idea, should include exposure over a long period of time for some people and over a much greater range of the population.

Senator XENOPHON: Is it not preferable to have full-spectrum measurements inside homes together with physiological data, such as blood pressure and EEGs, to get the gold standard of testing.

Dr Tonin: That is exactly what we are going to do in our proposed study.

Senator XENOPHON: Okay.

Mr Turnbull: I think the Senator was talking about potentially doing that at a wind farm site.

Dr Tonin: We discussed that in our project planning, it is just too complicated. We need to narrow out all of the confounding factors so we can arrive at a conclusive result. It has to be done—

Senator XENOPHON: Is it correct that the ear and brain reacts to the peaks not the averages?

Mr Turnbull: The playing back of the sound includes the peaks and averages, so that is why—

Senator XENOPHON: Do the ear and the brain react to the peaks not the averages?

Mr Turnbull: I think they react to everything, and I think there are different descriptors which describe those things.

Senator XENOPHON: Senator Lines, help me say you react to both.

Senator LINES: No, the peaks.

Senator XENOPHON: To all of you and you, Mr Turnbull—since you have take the brunt of the questions this morning—do you support the direct investigation of serious noise complaints inside the homes of the people affected together with the direct medical investigation of those people reporting the symptoms? Is that the way to settle this once and for all?

Mr Turnbull: No, we do not believe that it is because we believe there are too many confounding factors when it is done in the homes in that way. We believe that in particular with respect to infrasound—

Senator XENOPHON: How do you do it?

Mr Turnbull: We know the level of infrasound is produced from wind farms, it has been measured and can continue to be measured. But we need to play back that level of infrasound to a wide range of the population over varying environments in varying places so that it is understood what the reaction to the infrasound is. The problem with doing it in the manner you suggest is that there are compounding factors such as having a line of sight to the wind farm and being able to see whether it is turning, and many other compounding factors.

Senator XENOPHON: Let's say you block the windows. Let's say people cannot see whether the wind turbine is turning.

Mr Turnbull: There is audible noise from the wind turbines and you cannot separate one from the other. The only way to do that is to separate it then to play it back in a simulated situation.

Senator XENOPHON: So you are saying that measuring inside the homes, with direct medical investigation of those people reporting the symptoms, is not the way to do it?

Mr Turnbull: No, because it will not provide you any evidence about infrasound. It will provide you evidence about a number of other factors, but not about the infrasound, because there are too many compounding factors.

Dr Tonin: When you do a study like this it is an extremely difficult study to do; there are a lot of people involved, it has got to be controlled, you have got to have a control group—in other words people who are exposed to sham as well as people who are exposed to the actual infrasound. Doing it at a wind farm site, you just cannot do that—you will not get a reliable answer.

Senator XENOPHON: Even if it is a source of noise, including infrasound?

Dr Tonin: Well, that is exactly what we are generating. We have measured the infrasound, the exact time signature of the infrasound. Bruce Walker has measured it at Shirley, Cooper has measured it—we have all measured it. It is there; we can simulate it. There is nothing special about the signature that requires one to be at the wind farm site; it can be replayed at any location.

Senator DAY: How do you simulate living there with something for a year?

Dr Tonin: That is a good question. In the Crichton study they exposed simulated infrasound to people for 20 minutes in total—10 minutes with the sound and 10 minutes without the sound. There was a criticism of that, saying that it was not long enough. Okay, fair enough. I come along with my study and I expose people to 23 minutes of infrasound, so that doubles Crichton's. I am sure that people will say, 'That is not long enough.' Sure, but what we are doing is getting together the tools to do the next phase, and the next phase is six months of this. Six months should be enough time to resolve the question one way or the other.

Senator DAY: But people are not going to live in your laboratory for six months or a year.

Dr Tonin: No, we are going to do two phases: an intensive study including brain scanning, EEG, ECG—everything—over a period of two weeks within the laboratory, so that we can actually see if there are any reactions within the brain to this exposure; that is part 1 of the study. Part 2 is that we are going to bring out our instruments and the generator into people's homes, so that they are exposed to this study all night long for a period of six months.

The NHMRC are going to fund that and, as I said before, this is where I suggest that you senators support them. I think that they need more money than what they have got. They have got, I think, \$2.5 million in total; I think that they need twice that. You senators, I would suggest, need to put the pressure on the government to give these people more money so that we can do proper studies.

Senator BACK: It was at my insistence that we went to the election in 2013 to say that the \$2.5 million would be allocated by the government through the NHMRC, so I assure you that, as I understand it, there is nobody at this table in any disagreement. My only point would be that, in addition to what you are saying, there may be other factors associated with this whole exercise. You have mentioned brain testing and you have mentioned people in their homes. I would urge, if the opportunity presents, that a third variable which would be interesting to examine would be people in their homes in locations where these turbines are placed—especially at night, when they cannot see turbines turning et cetera. It seems to me that would be a third and valuable input to help come to some realisation.

Yesterday, we had evidence from a man who was on his farm all of the time. His partner spent nine to 10 hours a day away from the farm because she worked in Bendigo. Both were affected, but he much more severely at the time. They were forced to sell and move, and she recovered much more quickly than he did. I think that anecdotal incidence can be resolved by adding that third element, which I would urge.

Dr Tonin: I support that, but we need more money to be able to do that.

Senator BACK: If that is the case, then I will go back into bat again. But that is the genesis of the \$2½ million.

Dr Tonin: Yes, please, because our study is probably going to consume a lot of that \$2½ million. I am not sure what the NHMRC are going to do with that. If they cut our study down it would be an extreme pity. Therefore I implore you, Senators, to go and find some more money to ensure that a number of people, including Hansen—I know Hansen has put in for this study as well, and he should be able to have whatever money he wants to do his study properly as well.

Senator CANAVAN: Dr Tonin, obviously you are heavily involved in this study. Are you other three gentlemen involved in any way with the NHMRC study?

Mr Turnbull: No.

Mr Delaire: No.

Mr Cooper: No.

Senator CANAVAN: Okay, thanks.

Senator XENOPHON: I might put some questions on notice, Chair. I will put some questions to you, Mr Delaire, about wind farm approvals you may have been involved in or provided research for. That might be useful. Also, Mr Turnbull, you mentioned that the infrasound from wind turbines has been 'well measured over a number of years'. It might be helpful if you can refer to the article; I think I would find that quite useful in terms of the peer reviewed articles.

CHAIR: Thank you for your appearance here today, gentlemen. I am sure there will probably be some other questions tabled on notice to you. Thank you.

Proceedings suspended from 11:01 to 11:14

DELMARTER, Mr Clayton Douglas, Engineering Manager, Trustpower Limited**VAN ZYL, Mr Rontheo, Wind Generation Development Manager, Trustpower Limited**

CHAIR: I welcome representatives from Trustpower Limited. Could you please confirm the information on parliamentary privilege and the protection of witnesses and evidence has been provided to you?

Mr Delmarter: Yes.

CHAIR: Thank you. The committee has your submission. I now invite you to make a brief opening statement. At the conclusion of your remarks, I will invite members of the committee to put questions to you.

Mr Delmarter: Firstly, thank you for the opportunity to make a submission to the Senate Select Committee on Wind Turbines. By way of introduction, Trustpower, with a history dating back to 1924, is a New Zealand-based renewable energy generator and multiproduct retailer, offering electricity, gas and telecommunication services in the New Zealand market. We own and operate 41 hydro stations, 38 in New Zealand and three in New South Wales, Australia, along with six wind farms. In the past 10 years, Trustpower has invested in the order of A\$1 billion in new generation development, the majority of which has been in wind power, most of which is located in Australia.

Trustpower's wind portfolio comprises 307 wind turbines with a total capacity of 582 megawatts. This includes the recent Snowtown stage 2 wind farm located here in South Australia, a 270-megawatt \$440 million investment. In conjunction with stage 1, this 371 megawatt development is the largest in South Australia and one of the largest operating wind farm developments in Australia. Trustpower also owns two small wind farms in New South Wales and some 200 megawatts of capacity in New Zealand, including the Tararua Wind Farm which has been operating since 1999—in excess of 15 years. This makes us one of the most experienced developers, owners and operators of wind farms in Australasia.

Trustpower acknowledges that the projects it has developed, or proposes to develop, do impact local communities in a number of ways, including positively, and there are a diverse range of views to consider which we must address, both at the outset of a project and over the many years that it operates. Trustpower is aware that a number of health concerns have been raised by individuals living in the vicinity of some wind farms and draws on independent expert advice and proven findings both locally and internationally to inform the company. As a number of other submissions have highlighted, the recent NHMRC study concluded that there is currently no consistent evidence that wind farms cause adverse health effects in humans.

Trustpower's environmental management philosophy, as established within its strategic plan, requires the company be a prudent, responsible and effective generator in applying best industry practices. Environmental compliance and performance remains an essential component of Trustpower's continued operation. As described in our submission, we believe that wind farms in Australia are governed by well-established robust compliance requirements—and some states are amongst the most stringent in the world—and that the monitoring and governance arrangements currently in place are adequate. In addition, Trustpower undertakes annual reviews of its compliance record and monitoring methods and, where any trends and areas for improvement are identified, puts in place further procedures to improve management processes and site compliance controls.

There has been much discussion and evidence presented, including the case study for our Snowtown 2 project, as set out in appendix A to our submission, demonstrating the wide-ranging long-term economic, cultural and environmental benefits that can be achieved when a project is developed responsively. The benefits to regional Australia are particularly significant, diversifying landowner income, providing long-term local employment opportunities and supporting community projects and initiatives, to name a few. Strong enduring relationships with the community are vital to the success of any project, and Trustpower goes to great lengths to forge and maintain these relationships at all of its developments.

In conclusion, Trustpower believes that there are clear benefits to the continued investment and operation of renewable generation in Australia, and wind farms in particular. Wind power, along with other forms of renewable generation, is vital to changing and diversifying the future of Australia's energy mix. We respectfully urge the select committee to consider the findings of previous inquiries and studies which have explored many of the topics set out in the terms of reference and have consistently found that the sector is well regulated, key policies are working effectively and that the sector delivers real and significant benefits at a very low cost to consumers.

Senator LEYONHJELM: Good morning, gentlemen. Were you here when the chair made his opening remarks and gave advice as to the rules relating to Senate inquiries and it being contempt of the parliament to make a misleading statement?

Mr Delmarter: Yes, we were here.

Senator LEYONHJELM: In your submission you said:

Wind farms are governed by robust and well-established compliance requirements. The earlier 2011 Senate Inquiry has concluded in its findings that there are adequate compliance mechanisms and audit process in place.

In fact, the 2011 Senate inquiry's published report drew no such conclusions in its findings, comments or recommendations. Would you like to withdraw that statement from your submission?

Mr Van Zyl: As you know, we reported the Clean Energy Council as well. We obviously support their submission. That relevant statement was also taken from their submission. That is where we got that from.

Senator LEYONHJELM: Well it is still wrong. It is an inaccurate statement. Would you like to withdraw it?

Mr Van Zyl: What I can do is take that on notice and have a look, if you want.

Senator LEYONHJELM: All right. You have said also in your submission:

A number of reviews on the effect of wind turbines on human health have been undertaken by the National Health and Medical Research Council (NHMRC) and other reputable international organisations. These reviews have found repeatedly and consistently that there is no link between the two.

Yet NHMRC former CEO Professor Warwick Anderson speaking to Senate estimates said, 'We do not say there are no ill effects.' In the 2015 public statement the NHMRC said:

Given ... the limited reliable evidence, NHMRC considers that further, higher quality, research is warranted.

Will you cooperate in those additional studies that the NHMRC is proposing to undertake and that are clearly called for, including releasing your data, your sound information and your wind speed information?

Mr Delmarter: Trustpower has always taken the view that it will cooperate with any investigation that is considered and appropriately targeted. As we have demonstrated compliance of all our operating assets, which, as I pointed out, we have been operating for over 15 years now, we will do whatever is required to demonstrate that we are operating appropriately and in compliance with our conditions of approval.

Senator LEYONHJELM: Will that include releasing your sound data and your wind speed data?

Mr Delmarter: As we have always done with our previous projects, yes that is the case. When we have undertaken independent noise studies we have made whatever data is available from our SCADA system, if you like, to facilitate those studies. We do not undertake the noise data capture. That is done by independent experts but obviously they need to rely on power output and metre mast data to validate their findings.

Senator LEYONHJELM: You have good neighbour agreements with people in proximity to your turbines; is that correct?

Mr Van Zyl: That is correct. On one of our projects you are referring to we have taken the initiative to provide those voluntary agreements to ensure that some of the neighbours to the host land owners can also benefit from the wind farm and get direct benefits.

Senator LEYONHJELM: We have had some submissions in relation to those good neighbour agreements. Some of them are not that complimentary. Do the agreements result in a caveat on the title of the land in question?

Mr Van Zyl: Yes, they do.

Senator LEYONHJELM: What does that caveat entail?

Mr Van Zyl: Those neighbouring agreements are very similar to the host landowner agreements, which, of course, also have caveats that go on the title. Those agreements are in place to also have restrictions on activities on the land to not interfere with wind farm and wind flow activities which are very similar to the host landowner agreements. We believe that those agreements should go with the land and the occupier of that land; hence the reason for the caveats.

Senator LEYONHJELM: Correct me if I am wrong, but that caveat forbids the neighbour from complaining about a Trustpower project for any reason. Is that correct?

Mr Van Zyl: No, that is not correct. What the agreements do include is that they will provide a letter of no objection to the wind farm if required. Again, they are voluntary agreements. There is no pressure to enter into those agreements, similar to host landowner agreements, and by no means do any of the confidentiality restrictions in those agreements prevent anybody from complaining or raising concerns, particularly around health or any other compliance issues, to any medical authority or any government authority.

Senator LEYONHJELM: Could they write a letter to a newspaper and complain about the farm?

Mr Van Zyl: I am assuming they can. There is nothing specific in it that prevents them from doing it.

Senator XENOPHON: With Senator Leyonhjelm's indulgence, can you provide us—obviously not with the names of the people—with a copy of these agreements, please.

Mr Van Zyl: I can provide you a copy of the draft template agreement, which has been provided to the neighbours to look at.

Senator LEYONHJELM: So you are saying that the only obligation of these agreements is to write a letter of no objection.

Mr Van Zyl: There are obligations not to object to the wind farm, as there would be in any host landowner agreement. Again, we can provide a copy for the Senate committee to look at.

Senator LEYONHJELM: Once the wind farm is operating, are there any further obligations?

Mr Van Zyl: There are ongoing restrictions on the land—hence the caveats again—to not interfere with wind flow activities or to undertake activities on the properties that could interfere with the wind farm.

Senator LEYONHJELM: You pay some money in exchange for this, presumably.

Mr Van Zyl: Yes, we do.

Senator LEYONHJELM: You would not characterise that as hush money?

Mr Van Zyl: No, I will not.

Senator URQUHART: Do you undertake research into community attitudes regarding your wind farms? You talked extensively during your opening statement about the relationships that you have with your communities, so do you undertake research into community attitudes?

Mr Van Zyl: Trustpower has always prided itself in taking its community relationships very, very seriously. In all the projects that we have proposed or are operating, we see ourselves as being a long-term part of the community. We are not a pure developer; we are owner-operator of the wind farm, so we will be in the community for 20-plus years—up to 50 years—and hence we have that approach to all our community relations from the beginning. Our consultation practice continues to evolve and improve, but I would have thought that our consultation processes are of a high standard. We make a lot of effort and put a lot of emphasis on talking to individuals associated with wind farms and neighbours close to wind farms. We place an emphasis on one-on-one discussions with individuals to understand any concerns and make sure that we provide factual information where we can. From that perspective, I do not think we have done formal surveys, but we gauge—in our view, quite effectively—the attitude towards our projects and the concerns that people may have through individual discussions.

Senator URQUHART: Professor Chapman has found that the majority of Australian wind farms have not led to any complaints and that most of the complaints that have been recorded related to just five wind farms. Snowtown has been reported as having a large level of community support. Why do you think that it differs from a number of other wind farms in Australia in this regard?

Mr Van Zyl: Trustpower can only really talk about our experience on our projects. We are aware that there have been concerns raised on other projects. We have not had operational concerns raised on any of our projects in New Zealand or South Australia, as far as I am aware. As to the reason why others may have experienced it, in my experience, when you go through project proposals, the development stage of a project is quite different to an operational stage of a project. As I said, we take that quite seriously as far as our relationships are concerned. Yes, I have seen during proposal stages of projects that people obviously are concerned about potential impacts that the projects may have which I can only assume could lead to health concerns, and they may well be true. In our experience, we have not had health concerns raised at any of our operating projects. We have seen that that level of uncertainty reduces quite a bit once the projects get operational.

Senator URQUHART: Is there anything different about the Snowtown Wind Farm in terms of the turbines that are used or, in fact, the geographical landscape compared to other Australian wind farms?

Mr Delmarter: No, we would consider that the technology that is deployed at that project is representative of what we are likely to see at other projects that we have proposed in Australia or elsewhere.

Senator URQUHART: How many residents live within 10 kilometres of the Snowtown Wind Farm?

Mr Van Zyl: I am going to have to take that one on notice and get back to you on the exact details. I will have to come back to you. I think there are certainly more than 20 people within two kilometres.

Senator URQUHART: If you need to take it on notice, that is fine. When you take that on notice—I think you said before that you were not aware that any residents have put in complaints.

Mr Van Zyl: Yes.

Senator URQUHART: The state government has recognised Trustpower's positive practices, including those which allow non-hosts near the wind farm to benefit financially from the wind farm. Can you elaborate on that.

Mr Van Zyl: I suppose that can only be associated with what we have offered at our Palmer Wind Farm, which is the neighbouring benefit agreement. Again, we take our community consultation very seriously. The reason why we implemented that particular option at the Palmer Wind Farm was primarily an issue raised quite repeatedly through our extensive pre-lodgement consultation, around the issue of neighbouring properties not benefiting directly from turbines or from the wind farm. That is something we have done voluntarily to try to overcome a concern raised.

Senator URQUHART: How much does Trustpower pay in rates to local councils for wind farm operations?

Mr Van Zyl: That varies on the legislation and on a state-by-state basis. It is in the order of hundreds of thousands in South Australia. New Zealand I cannot comment on; I am not familiar with that.

Mr Delmarter: We can take that on notice and provide some details.

Senator URQUHART: Yes, maybe you can take that on notice. I think the other thing that I am interested in, if you take that on notice, is: what is the likely rates revenue to local councils from your wind farms over their life span? So a projection.

Mr Van Zyl: Sure.

Mr Delmarter: That is fine.

Senator URQUHART: Have you done any monitoring on bird and bat fatalities at your wind farms?

Mr Van Zyl: Yes, we do. Part of the conditions of approval at our Snowtown Wind Farm—again, I can talk from our South Australian or Australian experience—is that we have ongoing monitoring, some of it actually voluntarily and not necessarily strictly according to planning approval conditions. We do annual surveys of, for example, wedge-tailed eagle breeding sites and mortality. There is an obligation to report on any mortality findings.

Senator URQUHART: What have been the results in terms of fatalities per turbine per year?

Mr Van Zyl: I am going to have to get back to you on the exact numbers, but what I do know is that I am not aware of any high numbers of mortalities. From the perspective of the breeding of the wedge-tailed eagles, for example, we know there are two or three pairs that continue to breed in the area, and there may have been one fatality of a fledgling in the last year from my understanding. But I will confirm that.

Senator URQUHART: Are you aware of any negative impacts on stock or other animals that are near the wind farms?

Mr Delmarter: No, our experience is—

Senator URQUHART: Are there stock that run around?

Mr Delmarter: Yes, there are, and obviously in New Zealand there is probably a much greater density of livestock on farms than you see in Australia—certainly South Australia—and our experience has been that there have been no adverse effects. We have a large number of landowners across all of our projects, and there have been no concerns raised by them or neighbouring properties as far as I am aware. We have horse tracks, operated by non-project landowners, that go through the middle of wind farms et cetera. So, from our perspective, we do not have any concerns in that regard.

Senator URQUHART: What are the potential risks but also benefits to regional firefighting efforts from wind turbines?

Mr van Zyl: Again, we can talk from our personal experience. We also rely on the advice of the relevant firefighting agencies. We consult heavily with those agencies prior to and during the operation of our projects. They have access to all our sites. Our experience has shown that the access roads provide quite increased access for firefighting in the sites. Our feedback from the CFS in the different states is that they do not see the turbines posing any additional risks to aerial firefighting compared to other tall structures. I can say from personal experience that when stage 2 of our Snowtown Wind Farm was constructed a grass fire went through the site. It started from a lightning strike. The fact that the roads had been completed—and we have evidence that we can provide to the Senate about that—resulted in the fire being able to be stopped, whereas it would have gone over and completely burned the other side of the site as it had in previous years without them. They also acted as a natural firebreak. We have references from the local CFS that can validate that.

Senator URQUHART: That would be great. So you have not had any issues or concerns raised about the activities of firefighting authorities due to wind turbines?

Mr Delmarter: Again, there is that separation between a proposed project and an operating project. Certainly for proposed projects it has been raised as a concern. In terms of our operating projects, our experiences with both landowners and local firefighting agencies is that there are no concerns.

Senator URQUHART: How would fire risk from wind turbines compare to fire risk from other forms of energy, such as coal generation? Do you think there is a comparison that can be made?

Mr Delmarter: I am not sure I am qualified to speak to that. I guess our view is that the fire risk associated with wind turbines has been scrutinised by a number of parties, including here in Australia, and we certainly see it as no greater than any other form of generation.

Senator URQUHART: Do you have any comment to make on the general quality of the research that puts forward the proposition that wind turbines are dangerous to human health as a result of infrasound?

Mr Delmarter: We are clearly not experts. As suggested in our opening statement, we rely on independent expert advice and our long-term experience in operating assets to inform the company's view on these matters. To date, we have not seen anything which would indicate that there is any link between the two. Therefore, that is the basis for our view at this time. I think we cannot articulate anything more on infrasound and links between turbines and health than has been discussed for the last couple of hours with the acoustic experts. In fact, we have relied on some of those experts that presented this morning to provide us with a review of Mr Cooper's report and help us make an informed decision about the level of risk and the concern we should have in relation to those matters.

Senator URQUHART: There have been a number of claims made to the committee about the variability and intermittency of wind power. How well is this managed within the national electricity grid, and have spinning reserves increased significantly with the growth in wind energy?

Mr Delmarter: We could perhaps take on notice to give you the change in spinning reserve capacity. We do not have that information to hand. But I think there has been plenty of work done by AEMO in New Zealand and certainly by Trustpower in the New Zealand context looking at any potential issues around wind integration into the system and what level of penetration might or might not be problematic. I think it is safe to say that in both countries we are nowhere near that level where there would be any concern. It is clearly indisputable that wind is an intermittent form of generation with a non-dispatchable load, but I think both locally and internationally numerous studies have shown that it is certainly possible and technically and economically feasible to successfully integrate an intermittent source of generation into the transmission network system.

Senator XENOPHON: Trustpower has an employee involved with community engagement for the Palmer wind farm—is that right? Michael Head?

Mr Van Zyl: Yes, we do.

Senator XENOPHON: Which is laudable that you do that. Was Mr Head the manager of the Waterloo wind farm up until June 2013?

Mr Van Zyl: I am not sure he was the manager. I know he was involved in that project.

Senator XENOPHON: So he was involved in that project?

Mr Van Zyl: That is my understanding, but you need to ask him.

Senator XENOPHON: He would be well acquainted with the Waterloo residents group and the problems they reported with the wind farm. He had to deal with them—is that right?

Mr Van Zyl: That is my understanding, but I cannot comment.

Senator XENOPHON: Which makes sense if you have someone on community engagement who has had experience in dealing with communities—I am saying it is a good thing. Has Mr Head communicated his experience with the affected Waterloo residents to Trustpower? Are you aware of what his experience was with that? Has he reported back to you, saying, "This is what was told to me, this was my interaction with the residents in relation to Waterloo"?

Mr Van Zyl: Some of the interactions, yes, he would have. But I would not have a complete knowledge of all of his involvement in that project. It was obviously part of discussions.

Senator XENOPHON: This is completely relevant. This is not a criticism of Mr Head. On the contrary, it is to say here is a man who had experience dealing with one group of residents and he is now working with another

group of residents. Do you think it is relevant to hear from him specifically and in detail about his experiences with the Waterloo residents who made complaints about the wind turbines?

Mr Van Zyl: I am not sure if that would be relevant. I am assuming it is up to the Senate to ask for it.

Senator XENOPHON: You are not saying it is irrelevant, are you?

Mr Van Zyl: Probably not, no.

Mr Delmarter: I think at a high level we are familiar with some of the issues that were raised, not just from Mr Head but also from some of the issues that have been raised—

Senator XENOPHON: I do not understand. What does 'high level' mean?

Mr Delmarter: We are familiar with the nature of some of the concerns and we have certainly used that to help inform our application for projects like Palmer going forward. To be honest, many of the issues that we see at wind farms are similar in nature.

Senator XENOPHON: Presumably, there would have been memos from Mr Head to Trustpower in respect of his experiences at Waterloo? Was it produced in writing or was it just oral?

Mr Van Zyl: It would only be oral discussions.

Senator XENOPHON: Can I switch to the issue of neighbour D. I managed to get a copy of it from the Waubra Foundation website. We are just running off copies of that. In terms of the letter of no objection in schedule 4 of that document—would it be helpful if I gave you a copy of the document?

Mr Van Zyl: I do not have a copy with me, but I reviewed it recently.

Senator XENOPHON: The secretariat is just getting something for us. It is a document prepared by Finlaysons. It says, 'Subject to the wind turbines comprising the wind farm being more than one kilometre away from any dwelling constructed on the land'—and that is right, it has to be more than one kilometre under South Australian regulations; that is axiomatic.

The agreement says, 'Subject to the wind turbines comprising the wind farm being more than one kilometre from any dwelling constructed on the land as at the date of this letter of no objection.' The two dot points are, firstly, 'I agree'—and this is the resident, presumably, or the neighbour—'to not take any action that will cause detriment to the development, construction or operation of the wind farm' and, secondly, 'I agree to not object to the establishment, operation, maintenance or use of the wind farm or activities related or incidental to the wind farm.' Earlier on in your evidence, my understanding was that you raised, as you say, that this does not stop anyone from objecting to the operation of a wind farm making a complaint. Just on a plain reading of it, on a plain English interpretation of that document, if I were advising, as a legal practitioner, someone who came to see me about this, I would say: 'On the face of it, you have some issues there as to whether you can actually speak out about the wind farm. I'm actually quite concerned about that clause.' How do you reconcile those two statements? Have I misunderstood something about how it operates?

Mr Van Zyl: I am not sure if you misunderstood anything.

Senator XENOPHON: I often do!

Mr Van Zyl: What we have done to clarify that issue as well—and we are part of a signed statement with a number of other parties at the Clean Energy Council, which I am happy to provide a copy of to the Senate.

Senator XENOPHON: Please do.

Mr Van Zyl: In that, we have clearly articulated that any of our confidentiality restrictions do not prohibit anybody from raising complaints about health, noise or compliance issues.

Senator XENOPHON: Will there therefore be an addendum to the contract to make it clear that people can do that? On the face of it, that could act to gag people making a complaint. I think it is very good if you could do that. Could you undertake, consistent with the Clean Energy Council's guidelines or formulation in respect of this, to contact all the people that have signed this agreement to make clear there is an addendum to the contract and that they will not be constrained in making a complaint?

Mr Van Zyl: My understanding was that that issue was communicated to individuals prior to signing the agreement.

Senator XENOPHON: In what form?

Mr Van Zyl: In discussions with them—

Senator XENOPHON: Orally?

Mr Van Zyl: Orally, in going through—

Senator XENOPHON: There is an old rule. Going back 39 years to law school, my recollection of contract law is that what is in writing trumps what is said orally.

Mr Van Zyl: We do not have an issue with the concept. We have made a written statement that it does not prohibit anybody from making those claims.

Senator XENOPHON: So what I am asking, as an act of good faith on the part of your company, given your acknowledgement—I am very grateful for that acknowledgement and what the Clean Energy Council is saying—will you now communicate with all the neighbours in writing so that there is no ambiguity and say, 'You are not precluded from making a complaint about these matters'? As I read the final two clauses in schedule 4, it does seem to indicate to me that it could constrain people from speaking out, because there are some fairly significant sanctions in the agreement if people do speak out, including injunctive relief, which itself is quite an onerous issue. I am not suggesting any conspiracy; I am just saying that this could be cleared up fairly well. Could you get back to us on that?

Mr Van Zyl: I can answer it now: yes, I am happy to write to anybody that has signed an agreement to clarify that issue.

Senator XENOPHON: And could you provide a copy of that letter?

Mr Van Zyl: Sure.

Senator XENOPHON: That is terrific. Thank you.

Senator BACK: I will have to put most of my questions on notice, but I do want to go to a couple of issues of the economics and your submission. Are residential domestic power prices in South Australia the most expensive of all states and territories?

Mr Delmarter: To be honest, I cannot answer that question; we will have to take it on notice.

Senator BACK: I would be appreciative if you would. To help my understanding, are you willing or able to provide the committee with your power purchase agreement so that we can come to some understanding?

Mr Delmarter: I believe that we would be restricted from doing so under our confidentiality provisions with the counterparty to that PPA, but we can again take on notice some—

Senator BACK: Even if you redact those elements that are commercial-in-confidence, I would be keen to have some comprehension.

Mr Delmarter: I believe that will be difficult, but we will see what we can do.

Senator BACK: Sure. Going to your New Zealand experience, is there an equivalent of the renewable energy certificates in New Zealand?

Mr Delmarter: No, there is not. New Zealand is very much a free market, if you like. There are no subsidies or any other forms of incentive for renewable generation.

Senator BACK: Can you advise the committee when you think the situation will emerge in Australia where it is no longer necessary to provide renewable energy certificates as an incentive to this form of renewable energy generation?

Mr Delmarter: The first point to make is that there are substantial differences in the markets. New Zealand is very much dominated by hydro, which is a fairly expensive form of generation. It does not have more inexpensive baseload coal and other thermal generation that Australia enjoys. So it will be sometime in the future. I think as we noted in our submission and briefly touched on in our opening statement, there would need to be a reasonably significant change in Australia's energy mix to see that realised.

Senator BACK: I will ask you to take this on notice. I tried to do some figures and I was hoping to go through them with you, but time is not going to allow that. Your Snowtown No. 1 project is 47 turbines, 2.1 megawatts, I understand.

Mr Delmarter: That is correct. We did actually add one more turbine in 2011.

Senator BACK: At \$43.50 per certificate, I made an estimate that your annual revenue just from RECs alone is about \$16½ million. If I am accurate or if I am way out, I wonder if you would come back to me on notice and let me know whether that is the case.

Mr Delmarter: Yes, we can do that.

Senator BACK: In terms of No. 2, which I understand is 90 turbine three megawatt capacity, my estimate from your figures was about \$76½ million per annum, but that was RECs and revenue from electricity generated.

I wonder if you can come back to me with some advice as to whether those figures are right and, if so, what the mix of that \$76½ million was between RECs and electricity? Is that possible to tell us that?

Mr Delmarter: Effectively that is very much tied to the PPA question because, ultimately, I think we have publicly disclosed that all of the stage 2 volume is contracted to an energy retailer in Australia. We will see what we can do to broadly assist the project's economics, I guess.

Senator BACK: I will have to ask you some questions on notice because time does not permit us to deal with capacity factors on different dates. My final question is going back to something I asked earlier which are the caveats for good neighbours. Philosophically, if a project is a good idea, why is it of any value at all to even approach neighbours, let alone to request that they do become bound to you in some contractual way? You have mentioned the business about not putting up objects that are going to interfere with wind flows. We are talking about rural communities now, so where is the benefit? If a project is beneficial, where is the need to have neighbours in some way bound to you?

Mr Van Zyl: As I said, we are always trying to improve our community consultation and relations. This is an issue that has come up repeatedly on this particular project, and we have seen this issue grow on other projects. This was an attempt by us to try to improve the way we approach our projects. On all our projects we always have a community benefit scheme of some sort, of which our Snowtown 1 and 2 projects are no different. We run a lend-a-hand foundation there. We see ourselves as part of the community, and we make sure we participate and give back to the community. You have to recognise that every project is different with different pressures and issues. In this particular project we decided to explore that aspect as a part of the community benefit as well.

Senator BACK: Thank you. Finally, because the chair is no doubt winding me up, as part of those contractual agreements is there any capacity for compensation for decreased land values if a neighbour determines that they want to sell out and can demonstrate to you a reduction in land value as a result of the projects next door?

Mr Van Zyl: No, I do not think there would be.

Senator BACK: Or changes in rates?

Mr Van Zyl: No.

Senator BACK: Thank you.

CHAIR: Thank you, gentlemen, for your appearance here today, and I am sure you will get some more questions on notice.

MATTEY, Councillor Peter, Mayor, Regional Council of Goyder

[11:53]

CHAIR: I welcome the representative from the Regional Council of Goyder. Could you please confirm that that information on parliamentary privilege and the protection of witnesses and evidence has been provided to you?

Councillor Matthey: Actually, it has not been. My CEO is probably remiss there and probably did not provide it last night. I am pretty well aware of what it would say.

CHAIR: You are going to be given a copy of it now.

Councillor Matthey: I probably do not have time to read it now.

CHAIR: The committee has your submission. I now invite you to make a brief opening statement, and at the conclusion of your remarks I will invite members of the committee to put questions to you.

Councillor Matthey: I do not think you actually have any written submission from me at all. The first I heard of this was at about 10 o'clock on Friday night, given it was a long weekend. I assumed that the mayor of Clare and Gilbert Valleys would attend today because he chaired our regional committee on wind farms. It was only yesterday while I was marking lambs that my CEO advised me that he was not going to attend, and I believe that local government should be represented here today, given the amount of wind farms we have got, particularly in the regional Council of Goyder. I certainly thank you for the opportunity to be here. We also had a council meeting last night. I have had very little time to prepare for this, but I will basically off the top of my head—not off the top of my head, but it will be a pretty freely spoken outline that I am going to give you.

When it first became apparent that there was going to be wind farm development in South Australia, I was part of the development assessment panel of the Goyder Council. We had five applications lobbed on us and none of us knew anything about wind farms whatsoever. We got a pile of stuff about that high which we tried to consume as best we could, and the end result of that was that we approved four of those wind farms, or banks of wind turbines, and we left the final one laying on the table. We declined to make a decision on it because we thought there were too many open-ended factors we were not advised about, and those proponents went away and never came back and asked us to hear it again. Subsequent to that I became mayor of Goyder and, for reasons of my own personal belief on conflict of interest, I have not sat on a development assessment panel since then. However, that application did come back several years after I became mayor, and the development assessment panel chose to approve that development. That was subsequently tested in court by a group of local residents, and unfortunately there was never a resolution because the proponents withdrew their application at a point in time during the court process. I found that rather disappointing, because we did not get an external ruling about it.

Subsequent to that and during that period of time there was a further development proposed south of Burra, and our state government chose to bring in some interim development rearrangements that could only exist for one year without becoming law. That created a loophole, in my view, for wind farm proponents to sneak through; it certainly made it a lot easier for them to get their development applications up. Our development assessment panel chose to reject that initially. They probably did not have the grounds to do so, but what it did was it forced the proponents to come back to council and discuss what we would like to see. Eventually we reached an agreed arrangement. Council was very concerned that that wind farm could go up with wind turbines virtually within one kilometre of farm homesteads, which we thought was inappropriate. After some negotiation with the proponents we have managed to get the turbines readjusted so nobody was, basically, within two kilometres.

Local government has a responsibility, in my view, to care about the welfare of its community, and I think the steps we took were quite reasonable. Having given you all that background, perhaps I will go back a bit and say this to you: in my view, in South Australia we got it all wrong from day one. With most forms of development—and there is a lawyer or two around the table here; they would understand all this—there is a prearranged development assessment plan under which things must operate. If you want to go outside that, then you have a fairly serious program to get something approved. What we should have done in South Australia before we even put one wind farm up is that we should have had a serious debate, state wide and community wise, as to where wind farms were appropriate and where they were not. Once that had been resolved, it would have made it a lot clearer not only for communities but for those people who were looking to invest money into them as well, because they went in fairly blind not knowing for certain what would come out at the other end. If we had had some clear guidelines on clear areas where you could go with them and where they were a no-go, I think it would have made it a lot simpler for everybody.

I am well aware that the federal government is providing incentives for sustainable energy production, and I think the federal government probably had a part to play in this as well. It should have basically said that, unless

certain guidelines are met and you take these developments into appropriate areas, then that funding and those incentives will not be available.

It has been a very difficult time for local government. We have had to listen to a lot of people and we are always the first port of call. Everybody who is close to a wind farm perceives the problems of wind farms differently. It is very difficult to assess exactly what you are hearing and to make sense of it at times. I have travelled around with you, Mr Chair, probably 18 months ago and we talked to some people there who, I believe, were pretty genuine and who had some genuine problems. I do not know how we resolve that now. The horse has bolted to some extent. It is pretty difficult. I think that is where we went wrong in South Australia. We should have cleared all of these issues up earlier. In defence of the state government, who were hell-bent on the developments, we probably did not know as much about acoustics and we still do not know enough about acoustics. I did not hear the acoustics experts this morning.

I should have told you right from the start—I live about 30 miles, I guess, from the nearest wind turbines and I own a property that borders them.

Senator XENOPHON: You are a miles man, are you?

Councillor Matthey: The nearest one is 35 or 40 kilometres—

Senator XENOPHON: You can do imperial, that is okay.

Councillor Matthey: I do not hear them at home, let's put it that way, but I own a property that adjoins one of the wind farms in Goyder, and I hasten to add that I have never been offered any inducements to be quiet. I have had a little bit of personal experience when I have gone there as to what sort of noise they make. I have to say that, depending on the conditions, it varies quite markedly. There are times when the noise they are producing is quite horrendous and there are other times when you cannot hear a thing. That is what makes it all so very difficult.

I am not quite sure what other areas you want me to address—I assume that it was more the human side of it and the local government side of it that you were hoping I would address. I will have a quick look—I have a few notes—on whether I have anything else that I want put to you.

I guess that I would have to say that, economically, wind farms have been quite good for sparsely populated country regions. During the construction phase, they have certainly produced quite bit of economic activity. A lot of people have rented houses and achieved rents that they have never achieved before because, once the construction phase was gone, that all fell away.

The other thing I would say is that local government was pretty naive to start with. We had no real idea of the amount of heavy stuff that was going to be brought in and the damage it was going to do to our road structures. Now, if anybody is proposing these sorts of things, we ask for the roads to be put back in the same condition they were in prior to construction beginning. The rating processes in South Australia do not allow us to recoup very much at all through the rating process for wind farms, which is something that you probably cannot deal with but it is something that we have to try and deal with state wise. It certainly is a bone of contention in local government—the noncontribution of these organisations.

I think that is about all I need to put to you. I am happy to take questions on anything that I can answer. I am not an acoustics expert, and there are some fields I cannot answer questions on, quite obviously.

Senator CANAVAN: Thank you for appearing today. I am from Queensland, so can I clarify how it works in South Australia, in terms of local and state government approval of wind turbine projects. We heard in Victoria yesterday that there have been some recent changes over who is responsible for approving the projects. Could you also outline what role local government has in South Australia in terms of enforcing compliance with any approval conditions?

Councillor Matthey: In South Australia, unless the state government overrides it and causes a major development then the approvals are left to the local development assessment panels to actually give or deny approval. They obviously have to operate within pretty strict guidelines and within the guidelines that are set by the state, which at one point in time was changed. Those changes were in place for only 12 months, because that is as long as you can have an interim development variation to the arrangements, but that can only sit in place for 12 months. After that it either has to become law or it lapses. In this case at that point in time it did lapse because the state government did not proceed. Does that answer your question, or was there a second part?

Senator CANAVAN: The approval conditions say that to the extent that these projects have to be in compliance with the guidelines—presumably the South Australian guidelines, which we have heard a great deal of evidence about—those guidelines go to the noise that is allowable and the set-back distances from residences.

That is my understanding. Who is responsible for enforcing compliance to make sure that after they begin operating the operators are in compliance with those conditions?

Councillor Matthey: Perhaps I will just go back a bit. The development assessment panel can actually set additional conditions on any approval of any development application, be it wind turbines or anything else. As far as the enforcement goes, that is basically left to the EPA in South Australia, which—perhaps I should not say it here—seems to me to be fairly poorly funded. I would like to see a lot more monitoring of noise levels at specific points. We have strips of wind farms that run along three adjoining ranges. It would certainly be very interesting to have a lot more monitoring of the noise levels between those wind farms. It is left to the EPA. If we have a problem then we ask them to put a monitoring device in there to try to get some sort of idea as to whether or not the noise levels are being exceeded.

Senator CANAVAN: So they do that. So at times you have asked the EPA—

Councillor Matthey: They have done it for us at times, yes.

Senator CANAVAN: Over what period do they monitor.

Councillor Matthey: I cannot actually tell you that, but it would be a reasonable length of time I would assume. I know there are quite significant differences at different points in different climatic conditions. We have had situations where we have had complaints and things have been fairly borderline, but very rarely exceeded, as far as I understand anyway.

Senator URQUHART: You may need to take some of this on notice, given that you have come at very short notice. So I will understand if you cannot answer these questions now. How many residents in your council area live within 10 kilometres of a wind farm.

Councillor Matthey: I could not tell you exactly, but it would probably be in the area of a couple of thousand.

Senator URQUHART: In your opening statement you talked local government being the first point of call for people. How many individuals have put in formal complaints to the council about the wind farm?

Councillor Matthey: I could not answer that. Not a huge number. There are activist groups who have actively opposed the Stony Gap Wind Farm, which has recently been approved.

Senator URQUHART: Are they residents of the area.

Councillor Matthey: Some would be residents of Goyder and some would probably be residents of Clare and Gilbert Valleys.

Senator URQUHART: Are you able to take that on notice and provide further information.

Councillor Matthey: I can try to get the answer for you. I am not certain that I can get it but I can certainly have our CEO look into it.

Senator URQUHART: Thank you. Property values have been raised as an issue from a number of different areas throughout the course of this hearing. Are you aware of any studies that show a causal link between declining property values and wind farm placement?

Councillor Matthey: That is a very vexed question. I think it depends where you are talking about. I have had some involvement with one on the Fleurieu Peninsula, only by virtue of granting an easement to get the power back into the grid, so I have spoken to some people down there. In a more highly populated area I think if you get a bank of wind turbines up against your property, I know of people down there who firmly believe they have lost value because they adjoin the wind farm. In our area it is slightly different.

Senator URQUHART: I am interested in whether there have been any studies, and what do council valuation notices show?

Councillor Matthey: They show absolutely nothing at all. There could even be an argument for increased values in some areas. Even though you have not got the turbines there might be an extension if you have the appropriate landscape.

Senator URQUHART: What about sales data on properties. I understand that it may not be within your area of expertise, but are you aware of any sales data that shows that values have decreased more within a certain distance?

Councillor Matthey: I am not aware at all, and I would be surprised if that were the case.

Senator URQUHART: I want to have a look at the impact of wind farms. You mentioned that you do not recoup much in rates.

Councillor Matthey: That is correct.

Senator URQUHART: So I would like to look at the impact of wind farms on council rates revenue. Do you know how that is calculated?

Councillor Matthey: How the rating we receive is calculated?

Senator URQUHART: Yes.

Councillor Matthey: My understanding is that the valuers are not allowed to take into account the wind turbine itself, because it is regarded as plant and not as a capital improvement. Therefore, we get very little extra rates at all. There might be a slight increase in the value of the property upon which the turbines are sitting, but it would basically bring us no relevant or useful revenue whatsoever.

Senator URQUHART: Is that paid by the proponents or by the landowners?

Councillor Matthey: That would depend on the agreement between the landowners and the proponents. My understanding is that they lease that little portion of land, so it would probably be paid by the wind farm operator I would assume.

Senator URQUHART: Are you aware of how much wind farms contribute to council rates revenue each year?

Councillor Matthey: I could not put an exact figure on it because it is all bound in the valuation, and there could be other factors in that valuation.

Senator URQUHART: So you are not able to disaggregate that from the information you have from rates from properties?

Councillor Matthey: No, it would be a pretty hypothetical exercise. But we know that we do not get huge increases in valuations where the wind turbines are.

Senator URQUHART: Would you be aware of what the likely rates contribution of wind farms in your region would be over the lifespan of the wind farm—25 years?

Councillor Matthey: No. You would not be able to put your finger on it.

Senator URQUHART: Could you calculate that out?

Councillor Matthey: It is not going to be much help to us—I can tell you that.

Senator URQUHART: It is not going to build too many roads, you don't think?

Councillor Matthey: Not unless the state government feels inclined to change the legislation to enable us to put a value on the turbines. Then, obviously, we could get substantive revenues from that.

Senator DAY: Was Stony Gap originally rejected by Goyder Council because of the noise complaints? Is it correct that the original planning application was rejected?

Councillor Matthey: I hasten to add it was not rejected by the council. It was rejected by a development assessment panel. In South Australia councils and development assessment panels are supposed to be at arm's length, but some councillors can be members of the development assessment panel.

Senator DAY: But it was subsequently approved when there was an agreement that the turbines would be placed no closer than two kilometres from residents. Is that right?

Councillor Matthey: What happened was that the development assessment panel rejected the applications. The proponents made it very clear that they would take the matter to court. The council then becomes the respondent for its development assessment panel's decision. What we did was sit down with the proponents and said, 'Look, we are not going to have this business of coming within two kilometres of a farm house. You have to get that rectified. If we go to court it is going to take a long time before you can get your development up.' So they sat down with us and we nipped out a solution. That is what happened.

Senator DAY: Are you aware of complaints and adverse health effects on people who live more than two kilometres from these wind turbines?

Councillor Matthey: I have heard it alleged. I cannot say that for certain, no.

Senator DAY: Do you think that two kilometres is an appropriate distance from a wind turbine?

Councillor Matthey: I think it is fairly borderline. It certainly takes out things like shadow flicker and that sort of thing. We had one farmhouse at the Stony Gap development that was going to get shadow flicker morning and afternoon. That was unacceptable in my book.

Senator DAY: Would it surprise you to hear that we have had evidence that infrasound can affect people up to 10 kilometres away depending on the terrain?

Councillor Matthey: It would not surprise me. Again, I would imagine it probably depends on the individual. We are all different. Some people seem to be adversely affected by things and others are not. I know one gentleman with a home in another council area who is getting significant revenue out of these turbines. He permitted one within 0.8 kilometres of his house and he wishes he had not.

Senator LEYONHJELM: Why does he regret it?

Councillor Matthey: Just the noise at times. He does not get it all the time.

Senator LEYONHJELM: Audible noise, or he felt noise?

Councillor Matthey: Both I think, in relation to that turbine. There are people around who quite clearly are adversely affected by it. There is no question about that. As a council, going back to what Senator Day asked a moment ago, we have to try to look at things on balance as well. It is very difficult to know where to strike that balance—it really is. We believe that if we pushed it any further than two kilometres the matter probably would have gone to court and we probably would have lost out. We try to get the best result we can for people. That is what we are trying to do.

Senator LEYONHJELM: I understand. It is a difficult situation. I want to turn to these approvals that Senator Canavan raised with you before. In South Australia the council has approval authority over whether a wind farm gets established, unless it gets called in. Is that right?

Councillor Matthey: That is correct. But the state government can call these things in as a major development as well, and they could override councils at that point.

Senator LEYONHJELM: I understand. Once its operational, compliance with development conditions is a matter for council to enforce?

Councillor Matthey: Yes. It is certainly a matter for council to see that it becomes enforced. We probably lack the expertise to deal with some of it, and that is where the EPA comes into the arrangement.

Senator LEYONHJELM: Does the EPA get involved of its own initiative or only at your instigation?

Councillor Matthey: I cannot really answer that. They may do so. We have asked them to become involved on occasions to get some feedback on what the noise levels are at a certain point. That is something you would have to ask them as to whether they actively monitor it themselves.

Senator LEYONHJELM: Have you ever felt that you are more or less helpless to resolve these complaints, or that the EPA is not helping you to resolve it?

Councillor Matthey: I think the EPA has done the best it can within limited circumstances. I am reasonably satisfied with what we have got from them. I think they have tried to help as much as they can.

Senator LEYONHJELM: In an earlier hearing, we heard a witness say that his livestock had been adversely affected by proximity to turbines. You were saying you were marking lambs or you run sheep near turbines. Have you observed anything similar or have you heard of anything similar?

Councillor Matthey: I do not run sheep near those turbines; I run cattle near those. As I said, I live about 35 miles away from that property. I certainly have never seen anything adverse in livestock recently. Cattle seem to fatten just the same as they do anywhere else.

Senator LEYONHJELM: You do not have sheep in proximity?

Councillor Matthey: I do not have sheep, but other people have. I have not seen any ill effects there.

Senator BACK: How was your lamb marking percentage yesterday?

Councillor Matthey: About 98 per cent.

Senator BACK: Well, I'll be buggered! What are you running?

Councillor Matthey: Merinos.

Senator BACK: Ninety-eight per cent!

Councillor Matthey: Probably up to 106 this year—in big mobs too. It is a very good season.

Senator BACK: WA might get a bit of its GST money back if you blokes keep doing that! There is a proposed wind farm at Robertstown, I understand, which is reasonably close to Waterloo. The advice to me is that the company has pulled down its monitoring masts. Are you aware of that? If they have, why would they do that?

Councillor Matthey: When a wind farm proponent wants to examine wind velocity, they actually have to get development approval to put up a wind monitoring mast. That approval is generally only granted for three or five years or whatever term is seen fit by both parties. I assume the term had run out. I cannot give you any other answer than that.

Senator BACK: It may be that the monitoring program concluded and they got adequate information.

Councillor Matthey: I would think so.

Senator BACK: What has been the impact on your community generally as a result of the Waterloo project? It is the role of all local councils to look after community amenity. Is there a community perception to you, as the mayor, as to how that project has been for the community?

Councillor Matthey: I would probably be hesitant to answer that, because the Waterloo wind farm is not in our council area.

Senator BACK: But it is not far from where you are.

Councillor Matthey: It is not very far. It is pretty close to our border, but I have not had the same dealings that Mayor Aughey, say, would have had with the Waterloo community. While I have been there and had a look, it is a pretty difficult question for me to answer. I can certainly answer in regard to our community as to how they have got on with wind farm proponents. They have actually put quite a bit of money into public things in our communities. I think that by and large they are reasonably well thought of. But we are a sparser population. I think that helps a fair bit. Perhaps I should go back and also say that it seems to me that when wind farms first started we should have sorted out where they were acceptable and where they were not. Where they actually finished up was where they could get reasonable wind velocity in close proximity to existing infrastructure to get their power into the grid. In Goyder, they were able to find areas that have very low population density. We did not get much opposition at all. We still do not get very many complaints about the ones in Goyder. We had a lot of opposition to the Stony Gap development from the southern part of Goyder. I think a lot of that has come out of the bad experiences from Waterloo, because they are in quite close proximity into each other. But I am afraid I am not completely au fait with the actual complaints and the whole process in Waterloo.

Senator BACK: You made the point earlier, and it sounded like eminent common sense, going back to 2004 when this issue first came out—that is the time, isn't it, that the federal government was going to be putting money in through these renewable energy certificates to states and territories—is it too late, given the fact that this 33,000 gigawatt hours gets signed up in the parliament in the next short period of time, and there will be somewhere between a thousand and 1,200 turbines likely to be put around the countryside—is it too late now? Is now a better time for that process to take place, because we have the experience of where there are turbines in places that would be seen to be inappropriate? Would it take long? Is the expertise around now to be able to identify locations where turbines should not be put and where turbines can be put?

Councillor Matthey: I think there are probably better people than me to ask about that, because I am not an acoustics expert, for a start.

Senator BACK: I am not talking about experts—I am talking about people who have oversight of communities. That is you.

Councillor Matthey: I think you are going to get a lot of complaints from proponents, because they started to make their investment in one climate, and now you are suggesting that we might have a review of that climate. In my view, yes, it would be appropriate to review the whole thing as to where it is up to, where it is at, how it got there and what improvements can be made. There is no reason to perpetuate mistakes just because somebody else has made them. And to make a level playing field—I think we have to make some progress in this country in all fields, and that is one that we could make some progress in.

Senator XENOPHON: So, Mayor Matthey, you have serious concerns about the way it has been set up in terms of the approval of wind farms. Your concern is that there has been insufficient community consultation and insufficient safeguards from a planning point of view.

Councillor Matthey: I am concerned that we did not have the community consultation up front.

Senator XENOPHON: There was not community consultation.

Councillor Matthey: There was not. Initially, when the first wind turbines were proposed in our area, they were basically lobbed on us as a development. What should have happened was the state government should have gone out to the regional communities, had some consultation and then gone away and put up a proposition. It should have then had further negotiations so that it was clearly defined to communities and proponents where wind farms would be accepted, and under what conditions, and where they would never be accepted. That gave everybody some certainty. You let us have the debate once and for good, and then get one with it.

Given that we understand a lot more about the effects of wind farms, and the impacts they have on communities, there is no reason why we cannot have a further debate now along the lines of what the senator on my left—I am not sure of his name—was talking about to set some better guidelines going forward.

Senator XENOPHON: You might want to take this on notice, but could you give your views as to what you think those better guidelines would be? That would be quite useful, from that practical perspective of being involved in local government and hearing firsthand from residents. You might not want to give us an instant answer now.

Councillor Matthey: I can give you a very broad answer. The things you need to take into account are: impacts on communities, what is regraded by experts as a reasonable stand back distance from farm houses and townships, what areas provide sufficient wind velocities to be cost-effective, and what existing infrastructure is currently available and what new infrastructure would need to be built. They are all the factors that you would take into account. I am no expert. I cannot tell you—

Senator XENOPHON: It can rip up roads and cause infrastructure damage to local government areas.

Councillor Matthey: The first couple, when we were naive, cost us a fortune. We woke up after that. We said, 'If you want your application approved you will restore the road structure and'—

Senator XENOPHON: You got duded on those?

Councillor Matthey: We were naive, yes. We did not realise the amount of heavy equipment that was going to come in.

Senator XENOPHON: You obviously have very close connections to your community. You know pretty much most of the people who are in your local government area. You have heard complaints from people directly about wind turbines once they have been established. You are not an expert on noise, but you do have expertise in listening to your community. Can you tell us what you have heard from people, in broad terms, and are you surprised at some of the people who have complained to you? Without mentioning people's names, can you make an assessment of your impression of people who have made complaints? In other words, are some of them the sorts of people that you would not expect to hear a complaint from generally?

Councillor Matthey: Absolutely. I have been in local government for 37 years. We have been an amalgamated council now for 17 years. I know a lot of people in the community very well. You learn that there are some people in your community who complain about almost everything. There are other people who never complain. I certainly have number of instances of people who never complain normally who have registered their discomfort at their close proximity to them. The noise factor seems to be the serious one.

Senator XENOPHON: You put it quite fairly: you said on some occasions you go there and there is really nothing to notice but on other occasions it is quite noisy.

Councillor Matthey: That is something I cannot throw any light on. As I said, I have got a property—

Senator XENOPHON: But you said what you have experienced when you have been within the proximity of wind turbines on some occasions has been very quiet and on other occasions it can be quite—

Councillor Matthey: On other occasions the noise would be quite horrendous if you had to put up with it all the time. What I am talking there about is probably within a kilometre of the turbines, but you would certainly hear it further than a kilometre away too.

Senator XENOPHON: At the moment you say the horse has bolted in many respects?

Councillor Matthey: It is pretty difficult to move them now, I think.

Senator XENOPHON: What about monitoring them using some objective system of monitoring? Not just relying on people's individual complaints but also some scientific method of measuring them so that if there is undue noise it can be measured and correlated with the effects complained of by residents.

Councillor Matthey: I would probably go a step further than that. What I would like to see, and I have outlined this in other forums, is that where there are persistent complaints about noise there should be a full-time monitoring arrangement, probably financed by the owners themselves, and where noise exceeds a certain level in certain conditions, then those turbines should be shutdown for a period of time. They do not like that idea, but it is a cheaper way than actually removing or shifting the turbines altogether.

Senator XENOPHON: I might put some questions on notice and I might invite Mayor Matthey to provide some further information on notice.

CHAIR: Thank you for your appearance here today, Mr Matthey. As Senator Xenophon said, you will most likely receive some questions on notice.

Councillor Matthey: Thank you very much, Senators.

GOLAND, Mr Gary, Public Officer, Noise Watch Australia Inc

[12:30]

CHAIR: I welcome Noise Watch Australia. Do you have any comments to make on the capacity in which you appear?

Mr Goland: The capacity in which I am here is to represent the voice of the community as part of our group regarding complaints of noise per se in our community and the system.

CHAIR: Could you please confirm that information on parliamentary privilege and the protection of witnesses and evidence has been provided to you?

Mr Goland: Yes, it has.

CHAIR: Thank you. I now invite you to make a brief opening statement and at the conclusion of your remarks I will invite members of the committee to put questions to you.

Mr Goland: Noise Watch Australia is a community organisation that was formed to raise everyone's voice about the unheard impact of uncontrolled noise in our community. We are most appreciative of the invitation to present to you. We are supportive of the many aspects that your review is undertaking and do understand the complexity of the different parts of the discussion identified in the terms of reference. It means that you need to consider significant policy and regulatory change, and the present system fails in our view and has no accountability. Our submission and comment here will relate more specifically to part (c) to part (i).

Noise and vibration from every source is ignored by our planning and regulatory authorities. The acoustic studies undertaken by Steven Cooper and staff and Emeritus Professor Colin Hansen and his colleagues, identifying linear noise emissions from the turbines and some correlation with community stress responses to the turbine omissions exposes for us the failure of duty of care by our EPA and planning authorities. I have to say too that, without any precautionary principle, the system ignores different levels of vulnerability in our community that are exposed to environmental hazards.

The cost of this negligent noise regulation and its flawed legislation is billions of dollars a year. It destroys confidence in our planning system when they refused to understand public health risks. 'If you don't like it, move,' is the primary advice we receive from the authorities. I have had someone from Hong Kong, studying at Sydney university, tell me that she was looking forward to leaving Australia and going home. The local noise was from high-rise construction and it was literally unbearable for her and her family.

Deloitte Access Economics did a report on the cost of hearing loss in 2005-06. It was \$11.75 billion a year connected directly to deafness plus a further \$11.3 billion annually with other health services. Thirty-seven and a half per cent of this was directly associated with poorly managed noise. The authors of the investigation whom I spoke with while they were undertaking it said that that estimate was conservative. How many billions does the Treasurer and state governments want to reduce public spending by? How much do they want to reduce health service overload by? Unless the attention is given to causes of poor health, then the cost will increase.

How much subsidy is given to construct the industrial turbines? Could we put some of the subsidy to a national commission for noise control? Such a commission could deliver evidence of negligence and failing duty of care by a simple community survey in a short space of time. They could consider alignment of noise management with what is happening in other parts of the world. We have strong connections to eco-mapping specialists in Europe and in South Australia. We have had good communications with Birgitta Berglund of the World Health Organization and others who have been involved with the review of noise policies in Europe. They experienced political misunderstanding of the significance of the health effects of intruding noise. But information support from academic colleagues who were able to undertake studies and provide the evidence of the health effects did gather the recognition of benefits of avoiding harm. From this, too, noise mapping began in Europe. We have noise mapping in the hands of the community today with free iPhone apps that have been developed to allow people on the street to measure noise and air quality. An app is available also for low-frequency noise. We have countries such as Sri Lanka undertaking traffic noise mapping. But yet in Australia we do nothing.

We are aware that many aspects of a review of industrial turbine placement do not contain a great detail in identifying health risk associated with noise and vibration. Such environmental hazards have many sources. Additionally, other pollutants in our community are ignored by the same regulatory system that is in charge of assessing the environmental hazards of turbines. We do appreciate this is not part of the discussion that you look for. But we mention it here to emphasise just how significant the review is that you are undertaking. Absolutely no public authority is making any direct assessment of local public health risks. When we asked both the chief scientist and the head of the public health branch in South Australia to consider using the health mapping records

that have been initiated and developed by the University of Adelaide to identify local risk locations, they refused. Additionally, academic staff involved in public health projects that we have approached have also refused the suggested alignment as well. This has been on the grounds that they would lose research funding. Yet this is the sort of activity that is identified nationally by N Health, or was identified by N Health, in its reports on the *Health Impact Assessment Guidelines* published in 2001.

Perhaps I should not go on too much longer and take up too much of your time. But, honestly, there is lots out there from all sorts of sources. Our system is not looking at the presence of noise of any sort and what can be done to abate it.

Senator URQUHART: You say in your submission that it is very important to recognise the existence and harm of noise and vibration from every source of intruding noise and vibration. I think you have reinforced that in your opening statement. In your view, how does the noise from wind farms compare with other industrial noise?

Mr Goland: The noise from wind farms lined up. This is harking to Steven Cooper's and John Hanson's measurements. They said, 'Let's get some actual measurements and see what is there.' They have done that and they have shown that there is a significant level of low-frequency noise and other noise that exists. Low-frequency noise, unlike the noise that we hear, travels kilometres. Why else would whales use it in the ocean to communicate with other whales on the other side of the planet? It travels a long way.

Senator URQUHART: Are you saying it is about frequency?

Mr Goland: Yes.

Senator URQUHART: You also mentioned hearing loss in your submission. Are you saying that wind turbines lead to hearing loss? I did not quite understand how it was phrased. I wanted to ask in what context you actually referred to that. I could not quite work it out.

Mr Goland: I appreciate your reference there. No, I am not suggesting that hearing loss is an issue with turbines at all. What I simply point to is that hearing loss is so high and costs billions of dollars a year. It is caused by noise and potentially a lot of it low-frequency noise. I will actually mention another little physiological reference. It is a part of the broader system. The broader system is failing to address the very obvious causes of hearing loss. I am suffering it myself. Our regulatory system is not going to do anything about noise from other sources. That is just the connection.

I will briefly make a point about hearing loss, dizziness, nausea and these sorts of things. They are some of the symptoms that people near the turbines have complained about. That is to do with the vibration of the inner ear particles—calcium carbonate in the inner ear. If it is dislodged, that destabilises people's balance. Dizziness, inability to stand up and nausea are directly correlated. They are some of the symptoms of people who have complained about turbines.

Senator URQUHART: Mr Goland, what are your qualifications?

Mr Goland: I am a medical researcher. My qualifications are in laboratory science. I have been involved with studies at the cellular level in gastroenterology and also kidney function and active transport there.

Senator URQUHART: Great—thank you very much.

Senator CANAVAN: Mr Goland, were you here for the evidence provided earlier by the Association of Australian Acoustical Consultants?

Mr Goland: No, I was not here earlier.

Senator CANAVAN: I will briefly paraphrase what they said. The evidence they provided was that there is no credible evidence linking infrasound or low-frequency sound with adverse health effects. What would your view of their conclusion be?

Mr Goland: I have actually submitted a number of peer-reviewed journal references, but I will point directly to a study by Mariana Alves-Pereira entitled *Vibroacoustic disease: biological effects of infrasound and low-frequency noise explained by mechanotransduction cellular signalling*. It deals with aspects that the acoustic engineers are going to be familiar with. Briefly, given the ubiquitous nature of infrasound and low-frequency noise and the absence of legislative concern for it, this disease is increasingly being diagnosed among members of the general population, including children. It is associated with the abnormal growth of extracellular matrices, collagen and elastin in the absence of an inflammatory process. The end product of the collagen and elastin is reinforcement of structural integrity in the vessels and whatnot. This is seen in the blood vessels, cardiac structures, trachea, lungs and kidneys of both VAD patients and animals exposed to infrasound and low-frequency noise.

VAD is essentially a mechano-transduction disease. Inter and intra cellular communication is achieved through both biochemical and the transductional signalling. When the structural components of the tissue are altered—it is seen in infra low-frequency noise exposed specimens—the mechanical mediated signalling is at best impaired. Common medical diagnosis tests, such as EKG, EEG as well as many blood chemistry analyses, are based on the malfunction of biochemical signalling processes. VAD patients typically present normal values for these tests; however, the electrocardiogram, brain MRI or histological studies are performed where structural changes can be identified.

Senator CANAVAN: I am just wondering how much time—

Mr Goland: I can stop there.

Senator CANAVAN: That is okay. I and others will have questions.

Mr Goland: I won't go on. It just relates to the level of detail that is involved that is not part of the acoustic engineers' vocabulary.

Senator CANAVAN: Because they are all relating to health issues, the impact on cells et cetera?

Mr Goland: Yes.

Senator CANAVAN: I did have a look at some of the papers you referred to in your submission. One you referred to was titled 'Industrial wind turbines and adverse health effects'. It was published in the *Canadian Journal of Rural Medicine* last year. It was authored by Jeffrey, Krogh and Horner. They concluded:

There is sufficient evidence to support the conclusion that noise from audible IWTs is a potential cause of health effects. Inaudible low-frequency noise and infrasound from IWTs cannot be ruled out as plausible causes of health effects.

Do you think that is a fair summary of the state of the science right now? Is it that audible sound can clearly cause adverse health effects and inaudible sound may but we do not know?

Mr Goland: I think it is an introduction. I think we need linear noise measures to identify what is there and then following that the correlation of public health incidents in the area.

Senator CANAVAN: Earlier the acoustical consultants association did not dismiss the need for more science, despite the conclusions I mentioned earlier. Their view was that we need to test levels of infrasound almost in a laboratory environment—putting people in a home and playing through speakers the level of infrasound we know is generated by a wind turbine. Is that the appropriate way to test for adverse health effects or do you think we need to do in field testing as well?

Mr Goland: I think we should do in field testing as well because the connection that the turbines have to the people is through the ground and the geography of the local area changes the levels of vibration that is transmitted through the ground up through the foundations of the homes. So, yes.

Senator CANAVAN: You did mention that you have tried to raise this with the Chief Scientist and others and you are not happy or comfortable with the state of inquisition I suppose on these issues by these groups. What about the NHMRC? Have you looked at the work they have done and are doing? What is your assessment of their work?

Mr Goland: I did actually make a submission briefly to the NHMRC. I did actually speak directly with one of the people involved in the process through invitation. Quite honestly, they are not looking in the right direction. I will give you an example of that. When I did offer references to health effects of noise from any other source or the physiology of it they said: 'No, we are not interested in that information. Do not submit it.'

Senator CANAVAN: When did you have that discussion? Who made that statement?

Mr Goland: That was prior to the last report they handed out.

Senator CANAVAN: Who made that statement to you?

Mr Goland: It was a lady.

Senator CANAVAN: Could you take on notice to provide us with further information? I think we have the NHMRC next week on Friday so, if you can provide that information as soon as possible, that would be great.

Mr Goland: You need to appreciate that it was a phone conversation for half an hour or more, but I am happy enough to—

Senator CANAVAN: If you could take that on notice—

Mr Goland: Yes.

Senator XENOPHON: Are you familiar with the 2004 enHealth report: *The health effects of environmental noise - other than hearing loss*?

Mr Goland: Yes I am, and that came from that report by enHealth. There was then the study by Access Economics with the people in the hearing loss area of Melbourne University.

Senator XENOPHON: From your point of view, do you see that as a significant report?

Mr Goland: I see it as a significant report, but it was simply a starting point. The people in that report said that we need to do more to evaluate and understand the—

Senator XENOPHON: Due to time constraints can I put this to you: from your recollection did the report make reference to the following adverse health effects from excessive environmental noise—we are not just talking about wind turbines, we are talking about a whole range of factors, which includes infrasound and low-frequency noise as well the higher frequencies—sleep deprivation, mental health problems, cardiovascular disease, neurophysiological stress, problems with the learning of children, and annoyed symptoms? Are you broadly familiar with that?

Mr Goland: Yes, it did make reference to those.

Senator XENOPHON: You saw that as a starting point?

Mr Goland: I did and they too said that it was a starting point. From that report in 2006 there was a parliamentary review—

Senator XENOPHON: From your recollection did the report—and I guess we can check what the report said—have much emphasis on the nocebo effect?

Mr Goland: No. They focused on the science.

Senator XENOPHON: Earlier today we heard from a number of acousticians—Jon Cooper, Christophe Delaire and Chris Turnbull—and it was good of them to appear. I do not want to be misquoting Mr Turnbull, but I think he, or some of the witnesses, made reference to the fact that you need to look at the average noise and not the peaks. What do you say about that, because it seems to me that it is the peak and not the average that is going to wake you up for instance?

Mr Goland: Appreciating the reference, the complexity of it is not one answer, it is a number. It is the peaks that will wake you up and cause you not to sleep, but it also the droning that will cause you not to be able sleep in the first place. The other part, which I referred to a little earlier, was the long-term chronic exposure to low frequency—the biochemical, or the physical changes, to your system as they evolve over time that lead into hypertension and heart disease, and all these sorts of things. I could perhaps mention that I have suffered heart disease myself. The causes that it comes back to, was it this or was it that—it is impossible to say. Along those lines, we need to look at it all.

Senator BACK: What is your experience with your state EPA regulatory systems in South Australia? It seems in contrast to Victoria, where the state planning authority has taken over from local councils. We have just heard from Mr Matthey that here in South Australia that up to a certain level local governments are still involved. There seems to be a role for the EPA, and I just wonder if you could tell us where you think the EPA is? At the moment how do they deal with the incidents and recognise the extent and severity of harm associated with industrial noise? Where might this committee recommend the EPA should work if it is going to have an involvement?

Mr Goland: That is a big question. The EPA do not function very well here in relation to noise. In fact Suzanne Edge, who has come along with me today, was an example of that. Suzanne had a neighbour a few doors down with a very old air conditioner that was emitting lots of noise and droning through the night in the summer, and she could not sleep. I assisted her with trying to get people involved—the council and the EPA—and eventually they did come along and were willing to measure noise. The sort of emissions from the old air conditioner were a lot of low frequency noise, so I suggested to Suzanne that she ask the EPA to perhaps also conduct a linear noise measure of what was there and what she was coping. They refused her request and told her to be quiet and sit down. When Suzanne did not quite do that, they threatened her with police action and said, 'Go out of the house'. So I mention that as an example of the level of communication and the level of willingness to understand community concern. With how the EPA communicate with us—going on from that to my own situation—I was told by an EPA staffer to simply sell the property and go away; that was his solution to what was occurring. We cannot do that.

Senator BACK: Yet here in South Australia—and I will ask you to comment on it—I recall being told that the EPA had done some form of a study and concluded that there are no adverse health effects from industrial wind turbines. It is quoted very widely around Australia as being sort of authoritative and recent work. You have a background in medical research, and you obviously have an interest in industrial noise, can you briefly summarise that work done by the EPA and what credibility you would give the outcome of that report please?

Mr Goland: I will not summarise it, but I will reflect, as a medical researcher, that you need all of the detail to tell the story, and you need to look at what has been done in other places by other people and see the relevance of it. They were commenting directly on the health effects, yet they did not have any strict involvement of health experts or audiologists. Indeed, I did suggest to them at one stage that that would be an informative way of better understanding what is happening. An audiologist has some understanding of the physiology of it.

Senator BACK: What was their response to what I would have thought was a reasonable suggestion?

Mr Goland: No, they were not interested.

Senator BACK: They are not interested in having audiologists associated with a study into sound effects?

Mr Goland: Yes, not interested.

Senator BACK: In your submission, you mention Birgitta Berglund, head of the World Health Organization noise review of the EU in the 1990s. Do you believe that she would be of any value in terms of this proposal that the government has now to spend some funds on doing some independent research?

Mr Goland: I do, but my understanding is that Birgitta has retired now, and it is very hard to track. What is happening in Europe in relation to noise mapping can help us not only with wind turbines but with all sorts of other noises to better manage them. Because our EPA is not doing local measures. They are not evaluating what levels are out there, nor the connection to the public health incidents. Without going on too long, because we had a recent incident here with TCE contamination in Clovelly Park, there was an involvement of EPA and their failure to measure the TCE in public houses. In relation to the public health aspect of that, at a public meeting I put to Dr Kevin Buckett a request to align the incidences of diseases associated with the TCE in the air quality with the locality. Again, he refused and was not interested at all in looking at the causes.

CHAIR: I note that you have offered many peer reviewed scientific journal article references to the health effects of noise. Is there any particular line of investigation that you think should gain funding support?

Mr Goland: I think that we need a starting point. We need to know what noise is out there, so I think perhaps noise mapping is a primary area. But to get to noise mapping we need an office—I think a commission for noise pollution—not set up in the NHMRC structure but perhaps in Health. This is a request that we have put to the present health minister at the national level—that the government consider re-establishing a national project on evaluating the health effects of noise across Australia.

CHAIR: There being no further questions, thank you, Mr Goland, for your appearance here today before the committee.

Proceedings suspended from 13:01 to 13:46

PHILLIPS, Professor Paddy, Chief Medical Officer and Acting Chief Public Health Officer, SA Health

CHAIR: I now call Professor Paddy Phillips, Chief Medical Officer for South Australia. Could you please confirm that information on parliamentary privilege and the protection of witnesses and evidence has been provided to you.

Prof. Phillips: Yes.

CHAIR: Thank you. The committee has your submission. I now invite you to make a brief opening statement, and at the conclusion of your remarks I will invite members of the committee to put questions to you.

Prof. Phillips: SA Health contributed to the submission to the inquiry that was put forward by RenewablesSA. I would just like to reiterate that we support the stance from the recent NHMRC document on the health effects of wind turbines: that, at this point in time, there is no evidence to suggest there are direct effects on health from wind turbines. I think we and others are awaiting the outcome of the calls for research in this area, because the quality of the research that the NHMRC systematic review found was suboptimal. I understand that that call for research closed in May and that they will then be going through the process of assessing the applications for funding for research in that field.

CHAIR: Thank you.

Senator URQUHART: Thanks very much, Professor Phillips. The recent NHMRC review found that there is no increased risk of health impacts for residences further than 500 metres away from wind farms, but despite this it has recommended further research at distances up to 1,500 metres. It has been reported that this recommendation was based on a macro-policy environment rather than the scientific report they commissioned, ignoring objections from senior officials in the New South Wales and Victorian governments. Do you share the concerns of Victoria's Chief Health Officer and New South Wales's Director of Health Protection that the decision to recommend further research was based on policy rather than science?

Prof. Phillips: No, I cannot comment on that decision. I support the call for further research. I should state that I am a member of the council of the NHMRC and was part of the process that approved that call for research. The reason being that a lack of evidence does not mean that there is no effect; it just means that we have no evidence of an effect. The quality of the research that has been done so far has been suboptimal, and the NHMRC felt that it was important to put out a call for research to try to improve the quality of that evidence to determine if there was any evidence to suggest there are health effects of wind farms.

Senator URQUHART: Professor Wittert's study of medical prescriptions of more than 10,000 people found that there is no greater incidence of prescription of sleeping pills or heart or blood pressure medication for people who lived close to wind turbines compared to those who lived further away. If there were a link between the wind farms and health, is there any way it would not show up in the population-level data?

Prof. Phillips: When there are small effects, you often need very large sample sizes to demonstrate a clear effect. If there are very large effects, you might only need a small sample size. It is part of the statistical evaluation of research. A particular sample size will only have, if you like, confidence in demonstrating a statistically valid effect. There may be effects that a sample size of 10,000 does not show up. That is one of the methodological issues that, I suspect, the NHMRC systematic review raised. I cannot comment on that particular study. In the past I have seen press about that study, but I have not read it.

Senator URQUHART: Fiona Crichton's work in New Zealand seems to provide strong evidence that exposure to negative messages about infrasound is highly linked to people's perception of the health impacts that wind turbines are having on them. Is it possible that people might be misattributing their health concerns to wind turbines as a result of exposure to anti-wind messages?

Prof. Phillips: I think annoyance is quoted as one of the factors that might have a potential link to any health effects of wind farms, but that has not been studied in specific detail. The NHMRC statement makes the point that there are a number of factors that could link to potential health effects, but the studies are not strong enough or of high enough quality to document that. There are a number of hypotheses that could be raised about potential links, such as stress, annoyance, sleep disturbance and so on, but at the moment the studies do not convincingly demonstrate those links.

Senator URQUHART: Professor Chapman has found that the majority of Australian wind farms have not led to any complaints and that most complaints that have been recorded related to just five wind farms. What is your understanding of the South Australian experience?

Prof. Phillips: I cannot comment specifically on that, in that SA Health does not get specific complaints around that. I am not aware of, and certainly have not received in either of my roles, specific complaints about wind farms. I think you might need to ask the EPA that question, I am afraid.

Senator BACK: Are you familiar with the fieldwork of Mrs Mary Morris here in South Australia, which I understand was the only Australian study included in the NHMRC's systematic literature review? I think it was done by the University of Adelaide.

Prof. Phillips: No, I am not familiar with that particular study.

Senator BACK: I think it has been reported that sleep disturbance effects are being reported out to at least 10 kilometres, even by people who cannot see the turbines, and yet they have still been claiming to experience these impacts. I understand that they can record when the turbines are operating without being able to see them. Are you familiar with any of that sort of work that has been undertaken, or suggestions that have been made?

Prof. Phillips: I have had meetings with members of the Waubra Foundation in the past, and they referred to those studies or reports. One of the things that is important to recognise is that the issue of annoyance and stress can play on one's mind even when the source of that annoyance and stress may be in the very far distance, or may not even be real. I think Dr Chapman has also been quoted in the media as saying that, potentially, the most likely hypothesis is that it is those factors that may have any effect on health—although, as the NHMRC statement says, the evidence for that is still not definitive. That is again where the NHMRC felt that there would need to be very high-quality further evidence to try to demonstrate those effects.

Senator BACK: I will come back to those again in a moment. Professor Colin Hansen's work at the Waterloo facility, showing excessive levels of wind turbine noise out beyond 8½ kilometres—is that work with which you are familiar?

Prof. Phillips: I am not familiar with that specific work, no.

Senator BACK: A masters student at Adelaide university back in 2011, a Mr Wang, showed the same effects on sleep disturbance out to eight kilometres, showing that half of those surveyed described themselves as severely or moderately to severely affected by wind turbine noise. Is that a work you are familiar with?

Prof. Phillips: I have read the systematic review that the NHMRC has put forward. I have not read the individual studies and I am not familiar with Mr Wang's work.

Senator BACK: Just mentioning, as you have, annoyance and stress; obviously we are most appreciative of having your medical expertise. Can the sorts of sensations or clinical signs that are reported—nausea, tinnitus, sleeplessness, headaches—be consistent with a person who finds themselves in a stressed or annoyed situation?

Prof. Phillips: Potentially, yes.

Senator BACK: So annoyance and stress, which Chapman admits to and others state, are of themselves adverse health effects, aren't they?

Prof. Phillips: They could be. The analogy might be that of other environmental factors—flight paths, those sorts of things—that might cause similar sorts of things. That is not to say that there is a direct effect on the health of the individual; it is an indirect effect through causing stress.

Senator BACK: Yes. In populations of people in different geographic locations around Australia—again, recognising they are in rural communities, so they are not going to be subject to the same sort of stress we have got outside here in a city environment—would you agree that it is probable to be able to eliminate those other effects like aircraft noise going over the top and road noise—the sort of extraneous noises that I think would have been consistent in the lives of those people for many years prior to industrial wind turbines?

Prof. Phillips: I do not want to seem difficult but I guess it depends on where you are and what particular situation you are talking about. In some situations, yes; in others, possibly no. It would depend on the specific situation.

Senator BACK: Has the department, under your guidance, done any work on the ground? Have you been asked to investigate any of these possible relationships between sound or infrasound, annoyance, stress and then the signs that people are reporting?

Prof. Phillips: I have been acting chief public health officer for only a few weeks now, so certainly not in that role and not in my previous role. I am not aware of any specific requests for studies. They may have been made, if at all, through the EPA.

Senator BACK: I have no medical background—I am a veterinarian by profession—but I have developed, over time, a fairly keen interest in serotonin depletion in people subjected to sleeplessness for a range of reasons.

Again I would be relying on your greater knowledge here: are some of the signs that are being reported by people consistent with serotonin depletion caused by interrupted sleep or long periods of sleeplessness, not just in one acute event now, but extracted over a period of time?

Prof. Phillips: I am afraid that your knowledge may be greater than mine in that area in that it is not an area that I have great expertise in in terms of the neuroscience of stress and so on. I do know that serotonin as a neurotransmitter is important in emotional pathways and stress pathways but I could not comment on any impact of noise or sleep disturbance specifically on that.

Senator BACK: I cannot recall, but I did ask you about Mrs Morris's work. I am just wondering if you have seen that documentation from her in which residents are reporting these sleeplessness events in relation to turbines being turned on or off. I just cannot recall what your response was.

Prof. Phillips: I do not remember seeing that specifically. When the Waubra Foundation came to visit South Australia some years ago, they did provide a number of documents. I cannot recall if that was one of the specific documents included. I do remember them reporting—I think it was Dr Laurie—who reported sleep disturbance and a number of other factors involved in that. That certainly is one of the things that is reported by residents who are reporting health effects from wind farms. The issue again is that the quality of the studies that show a direct effect of the wind farm itself.

Senator BACK: Lastly, from a personal point of view, have you been to any dwelling and visited a person or a family who are reporting suffering these adverse health effects at a time turbines are working?

Prof. Phillips: No, I have not.

Senator LEYONHJELM: Do you know of adverse health effects being reported by South Australian residents living near wind turbines in your role? I appreciate you have not been in it long.

Prof. Phillips: I am not aware of specific issues but I am aware that there have been concerns raised with the EPA and others. But I am not aware of specific names or instances.

Senator LEYONHJELM: Would you and your office in your role expect to hear of them if they came up?

Prof. Phillips: Not necessarily. It depends on who makes the complaint and who it is to—so not necessarily.

Senator LEYONHJELM: Given that you have learnt of them from secondary sources, is there any intention by you, your office, or the department to pursue them—investigate them and inquire further?

Prof. Phillips: We would liaise with the EPA as the body who has a role in environmental protection. We have a lot of relationships through our public health branch with the EPA around a variety of environmental factors and health. In a lot of those, where there are environmental exposures, the EPA takes a lead and we provide advice around the health effects.

Senator LEYONHJELM: I thought you might say that. The only thing is some people have commented to us that the EPA does not have any expertise in health, unlike you, and also does not actually have any specific expertise in acoustics, either. Is that accurate, do you think?

Prof. Phillips: I cannot comment on what expertise the EPA has, specifically.

Senator LEYONHJELM: Fair enough. You are on the NHMRC?

Prof. Phillips: Yes.

Senator LEYONHJELM: The council, as you know, recently called for research on wind turbines. I am not sure if the committee has received or individual senators have received it. There are comments to the effect that the NHMRC, in relation to noise complaints, has difficulty in finding impartial experts in that the ones that they have used so far all have a history of relationships with wind turbine manufacturers. Do you have any thoughts on that?

Prof. Phillips: Whenever the NHMRC uses experts, including the council members, everyone has to declare a conflict of interest and has to make that public within the NHMRC processes. If they have a relationship with industry, that is required to be declared to that in NHMRC. That would, depending on what that conflict was, have the potential to exclude them from any significant role in making decisions or recommendations. That includes on the council. I cannot comment specifically on the issues of any individuals involved in the wind farm assessment process, but I do know that there have been other guidelines where there have been declared conflicts of interest where those guidelines have not been supported by the NHMRC.

Senator LEYONHJELM: Does a conflict of interest declaration only relate to current activities, or history as well?

Prof. Phillips: It relates to the last few years. My memory says the last five years.

Senator DAY: Are you familiar with the work and research by Adelaide University masters student Frank Wang?

Prof. Phillips: No; I mentioned that before. I am not specifically familiar with that work.

Senator DAY: You do not know about the public release, or the availability, of that work at all or why it was restricted?

Prof. Phillips: No, I cannot comment on that.

Senator DAY: I also understand the health department were given the diaries kept by Waterloo residents from their experiences of the wind farm. Do you know what happened to those diaries or what departments—

Prof. Phillips: No, I am not aware of that. As I mentioned before, I have been the Acting Chief Public Health Officer for the last few weeks. They may have been submitted to the Department of Health through my predecessor. We can find out.

Senator DAY: Could you take that on notice and see if you could find out what has happened to those diaries and what became of them?

Prof. Phillips: Certainly.

Senator DAY: Lastly, I want to ask you about standard notification processes and procedures from general practitioners when patients present to them with symptoms and complaining about adverse health effects caused by wind turbines. Is the department doing anything, or do you know what sorts of protocols are being put in place regarding procedures and processes for reporting of these presentations?

Prof. Phillips: I am unaware of any requirement for general practitioners to report such issues. There are certain notifiable illnesses. They are infectious diseases that have the potential to cause serious illness and outbreak in the community. But I am not aware that wind turbine noise is a notifiable illness.

Senator DAY: That is my whole point. Given the amount of evidence that is coming forward and the lack of understanding of the effect that low-frequency infrasound has on physiological and neurological—and all sorts of other 'ogical'—aspects of anatomy and physiology, do you think it might be a good idea to start a reporting procedure of wind turbine—

Prof. Phillips: At the moment there is no evidence that there is a direct effect of wind turbines on health. Until there was a demonstrable effect, there would be no benefit of reporting such issues. Even if there were a demonstrable effect, the issue of the notifiable nature of it would only be useful insofar as one might be acting upon it. If there were regulations around siting of wind farms and so on, one would expect that they would have taken into account that other evidence that might be impacting on health. Notifiable illnesses are generally around illnesses that cause spread of illness, such as—

Senator DAY: Contagious, yes.

Prof. Phillips: infectious diseases, further in the community to stop the spread of that illness or for the department to take action to reduce the spread of that illness.

Senator DAY: How many people would need to be presented to you, for example, before you perhaps acknowledge that there is a link between wind turbine infrasound and adverse health effects?

Prof. Phillips: I would need to see the evidence, as assessed through a proper systematic review of high-quality studies before I would say there is any evidence. I am not saying that I do not believe; I am saying I do not know. A systematic review is the best way to assess the totality of evidence because it takes into account all of the evidence, not just the positive or not just the negative, to support a particular argument. I would be keen to see a high-quality systematic review, with a number of high-quality studies that all came to similar conclusions, before I would be taking any further stance or action.

Senator XENOPHON: Have you seen a copy of Withert's study in relation to wind turbines and noise?

Prof. Phillips: No I have not seen a copy of that study.

Senator XENOPHON: Is it available anywhere?

Prof. Phillips: It is available, as are the other thousands of studies. In terms of assessment of studies, systematic reviews, in the hierarchy of evidence, are the highest quality of evidence. They bring together all of the evidence on a particular subject, assess it for its validity and quality and then come to a conclusion about which of the studies should be evaluated further. If there are a number of very high quality studies that come to similar conclusions, such that the systematic review can beyond statistical doubt suggest that there is a particular effect, then that is very good evidence for that effect.

Senator XENOPHON: Do you see any benefit in looking at the Withert study?

Prof. Phillips: Certainly, as part of a systematic review. I am sure that any further reviews will take that into account. If I was to look at one study, it would not help to sway my opinion, because I would need to look at a whole variety of studies. To review 4,000 studies is a big job, and that is why the NHMRC employ people to do it.

Senator XENOPHON: But isn't there a catch 22 here? You say that there is no demonstrated health effects. But in order to demonstrate health effects you need to have the evidence for them, don't you?

Prof. Phillips: Yes.

Senator XENOPHON: And if there aren't the resources to gather the evidence in a systematic way, then it falls short, does it not?

Prof. Phillips: The NHMRC did that with the systematic review of the available evidence.

Senator XENOPHON: But that was of the existing material, was it not?

Prof. Phillips: That is right. There is a further call for research. Given that this is an unresolved issue, it would, in my opinion—and I cannot speak for the NHMRC—be likely that there would be further reviews of the evidence as further evidence was made available.

Senator XENOPHON: But are you aware of some of the criticisms from residents, who felt they were not appropriately consulted, and that what was reviewed in the literature review, for want of a better word, by the NHMRC was not itself comprehensive, given that what they reviewed did not look at specific complaints. Are you aware of those broad criticisms?

Prof. Phillips: I am not aware of those specifically. But the research methodology pulls together the research, which should have contacted individuals. The primary research, the papers that are published for the research, gather the evidence and, for example, compare people who have versus people who have not had exposure. Then that is summarised, and then those summaries are brought together. The issue about a systematic review is that it then brings together the experiences of not just a few people but thousands of people, potentially, who have been the subject of those studies.

Senator XENOPHON: Dr Sarah Laurie met with you and two medical practitioners, Dr Kevin Buckett and—

Prof. Phillips: Dr Buckett is not a medical practitioner.

Senator XENOPHON: Sorry. She met with you and Dr Kevin Buckett and Dr Stephen Christley on 21 March 2011. Do you have any recollection of the meeting?

Prof. Phillips: Yes.

Senator XENOPHON: I think it was after Dr Laurie gave evidence in the first Senate inquiry. Do you recollect recommending to Dr Sarah Laurie that she get in touch with a medical researcher at Baker IDI experienced in looking at blood pressure problems?

Prof. Phillips: Yes.

Senator XENOPHON: My understanding is that that researcher was initially enthusiastic but then did not go through with it, for whatever reason. Are you aware of what happened there? I am not suggesting you should. It just seems a bit inexplicable.

Prof. Phillips: No. I have no knowledge of that.

Senator XENOPHON: This is not a criticism—on the contrary—but the fact that you recommended that indicates that you think there needs to be some more work done on this to establish a link between potential health effects and wind turbines?

Prof. Phillips: I think that when there is a question that remains unresolved, and especially where there is a lot of community concern and where there are studies that have been assessed as not being of high quality, then it would be of value to have high quality studies done by highly respected researchers such as Professor Esler, who was the researcher I referred her to to do that.

Senator XENOPHON: I want to put these questions on notice, so please do not answer them. It is just so they are in *Hansard*. Do you consider sleep disturbance from excessive noise a direct effect? Are you aware that Emeritus Professor Alan Evans has said that these distinctions about direct and indirect are irrelevant for those who are not able to sleep and who are getting symptoms from wind turbine noise which they do not have when they are not at home? Secondly, do you support a direct investigation inside people's homes of the full acoustic exposures and the physiological impacts being objectively measured, again, inside homes? The EPA I think has said they are not a health organisation and have flicked it back to your department. But if you could take those on notice, I would be grateful.

Prof. Phillips: Sure.

CHAIR: Thank you for your appearance here today, Professor Phillips.

ARNEY, Mr Darren Grant, Chief Executive Officer, Grain Producers SA

HUCZKO, Mrs Trudy, Policy Officer, Grain Producers SA

[14:16]

CHAIR: I welcome representatives from Grain Producers SA. Do you have any comment to make in relation to the capacity in which you appear today?

Mrs Huczko: I am an observer today.

CHAIR: Could you please confirm that the information on parliamentary privilege and the protection of witnesses and evidence has been provided to you.

Mr Arney: Yes it has.

CHAIR: The committee has your submission. I now invite you to make a brief opening statement, and at the conclusion of your remarks I will invite members of the committee to put questions to you.

Mr Arney: I would like to thank the Senate for the opportunity to present today in front of the Select Committee on Wind Turbines. Grain Producers SA is a peak industry body which represents grain growers in South Australia. We represent those growers to industry, to government and to the community. There are around 3,000 grain producing businesses in South Australia producing, last year, around 7.63 million tonnes of grain with a farmgate value of around \$1.8 billion and an export value of \$2.2 billion.

The role of Grain Producers SA is to promote a sustainable and profitable industry for grain producers. In mid-2013 we were approached by some grain producers on Yorke Peninsula who had concerns around the Ceres wind farm. There are a number of issues that we would like to raise that they raised with us that cause concern. One was around the fact that the location of the wind turbines on adjacent farming lands—land that is leased to locate the turbines on—will have a significant impact on the neighbouring farm businesses to carry out the practice of profitably growing crops. Two is that the farmers adjacent to the wind turbines will experience significant financial loss due to a decrease in the value of their farmland due to changes in the way they are able to go about farming. Three is that the loss of their ability to undertake profitable agriculture and the devaluation of farmland is a direct result of government policy and government subsidy, and the Ceres wind farm would not be proposed or proceed without significant financial support from government. No. 4 is the inequity of the process of subsidisation of neighbours, who benefit from the subsidies that go to the company that then provide financial support to lease land, whereas the neighbouring farmers have had their properties devalued by not being able to carry out the same practices that they could in the past. No. 5 is that there has actually been significant community conflict created by the proposed Ceres wind farm. The sixth point that they raised with us was that the citizens in that local vicinity must expend their own time, energy and resources to counter claims put forward by wind farm proponents, particularly when the proposed project is given support by government via major project status. There are some other key points that I can address, but I will just have those as the opening remarks.

CHAIR: Thank you.

Senator CANAVAN: Can that be tabled at all?

CHAIR: Yes.

Senator CANAVAN: Thank you.

Senator URQUHART: Thanks, Mr Arney. You said that there were 3,000 grain businesses in South Australia. How many of those do you represent?

Mr Arney: There are 3,000 grain-farming businesses, of which we have 1,200 signed up as members. We are funded by a primary industries funding scheme, and that is a 20c levy collected on every tonne of grain. That is forwarded to the minister for agriculture, who funds GPSA's activities.

Senator URQUHART: Is that levy on your members or the whole 3,000 businesses?

Mr Arney: That is the whole 3,000, and it is a voluntary contribution scheme in that they can write to the minister and request their funds back if they feel that is necessary.

Senator URQUHART: Who did you consult with in putting together your submission?

Mr Arney: We consulted with a number of farmers from the Yorke Peninsula region.

Senator URQUHART: That is in terms of the Ceres Project.

Mr Arney: As part of the Ceres Project. We have spoken to other farmers as well, but we represent grain producers. There are other wind farms.

Senator URQUHART: How many are down on the Yorke Peninsula?

Mr Arney: I would have to get the number of farmers on the Yorke Peninsula from the PIRSA *Crop and pasture report*. My understanding is that on our database we have around 294 farmers in total identified on the Yorke Peninsula, of which around 193 members.

Senator URQUHART: So you have about 400 members. Through the process of putting together your submission, did you consult with the 400?

Mr Arney: No, we have not consulted with every farmer.

Senator URQUHART: How many?

Mr Arney: I would have to go back through my notes, but there would be around 60 farming businesses.

Senator URQUHART: If you could confirm that on notice, that would be great. When you talk about the Ceres Project, you talk about the effect on land, cropping and a whole range of things. Are you aware of any farms that have been shut down or any decrease in volumes of produce with the growth of wind farms?

Mr Arney: I am not aware of that, no.

Senator URQUHART: Across South Australia or particularly in the—

Mr Arney: Across South Australia. The predominant location for wind farms has been on grazing land, and so grain producers would not be involved in concerns around that. This wind farm is proposed for an area that is highly productive in cropping. I refer to the council valuation from the central Yorke Peninsula council district, on page 2 of our notes today.

Senator URQUHART: The graph?

Mr Arney: Yes, the graph. You can see there that the land values from 2001 to 2013 have increased from just over \$2,000 a hectare to just under \$9,000 a hectare, and that has primarily been a shift into cropping rotations, and primarily into the growing of lentil crops.

Senator URQUHART: What evidence are you able to provide to substantiate some of the comments in your submission about what this might affect?

Mr Arney: Lentils are grown in a rotation, so 25 per cent or 30 per cent of the farm might be sown to lentils. The gross margin for lentil production is about \$1,700 a hectare. Wheat is around \$1,200 a hectare as a gross margin.

Senator URQUHART: So you are referring to chart 1.

Mr Arney: Yes, just above chart 1. Sheep gross margins—there are not a lot of sheep on the Yorke Peninsula anymore. In South Australia we have had an increase in cropping area of one million hectares over the last 15 years. That has not been from the clearing of trees; it has been primarily a move from pasture based agriculture to cropping based agriculture. Part of the reason for that is that the gross margin for sheep in a high-rainfall area is around \$400 a hectare from the PIRSA crop and pasture gross margin guide.

Senator URQUHART: Thank you very much.

Senator LEYONHJELM: Thank you, Mr Arney. In your speaking notes there is a change in property values—what do you attribute that to?

Mr Arney: There would be capital gain there. Also, if you have a look at chart No. 1, which is the changes in crop type and area sown in South Australia, you will see that there has been a significant increase in the area sown to crops in South Australia, but primarily on the Yorke Peninsula the land type is suitable for the production of lentils, so it has a suitable soil type and a suitable rainfall. So growers have moved out of cropping enterprises that might be wheat, which have a gross margin of \$1,200 a hectare, to a more profitable crop, which is a lentil crop, which produces a gross margin of \$1,700 a hectare. If you can do that, then you are going to pay more for acquiring the next piece of land.

Senator LEYONHJELM: So that difference in property values is attributable to the fact that some land can grow lentils and some land cannot. Is that right?

Mr Arney: Some land can grow lentils, and the technology to grow lentils and the movement away from cultivation to direct drilling has also increased the crop yields. So there is a multiplying effect there in increased productivity and also increase in crop choice.

Senator LEYONHJELM: Okay. You seem to be making a novel argument here that that profitability and those increased land values are somehow threatened by wind farms. What is the connection?

Mr Arney: To be able to grow lentil crops, you have to be right on top of the management of those crops. You need to be able to control weeds, fungus and insects, and you need to do that rapidly when it is required.

Currently, what is being used to apply crop protectant products—so fungicides and insecticides—is aviation. With the wind turbines, the aviators who are prepared to apply those products have indicated that they are looking at a set-off buffer of around 500 metres away from turbines when they fly parallel to the turbines and that they are looking at a three kilometre buffer zone when they fly towards them. Effectively, if you are not able to treat your lentils for insect damage—and I have included the receival standards for lentils a bit further back in the submission—and if you have one per cent that has poor seed coat colour due to disease, frost or water staining then you are downgraded.

Senator LEYONHJELM: If you do not control the pests, you do not get as much money for it.

Mr Arney: Correct.

Senator LEYONHJELM: Then you also argue for a biofuel mandate, so that is, essentially, the government telling people what to put in their fuel tanks?

Mr Arney: It would be, yes—just like they do in the United States, Europe and Brazil.

Senator LEYONHJELM: I guess I am having difficulty here seeing the consistency. On the one hand you are saying that your members should not be disadvantaged because of the restrictions that would apply to aerial application from the wind turbines, but you are also arguing for an advantage by biofuel mandate.

Mr Arney: Some growers in that Yorke Peninsula area—and this is where the conflict comes from—are advantaged by being able to lease their land and by receiving income for leasing the wind turbines, so there is an advantage there for some of the farmers in that district, but it disadvantages—

Senator LEYONHJELM: Is there a problem with that?

Mr Arney: It is at the expense of their neighbours who are disadvantaged by not being able to go about their way of carrying out agriculture. There is a problem with that. If they were able to carry out their agriculture without being impeded by the wind turbines, there would not be an issue with that.

Senator LEYONHJELM: I see; I get your point.

Mr Arney: When it comes down to biofuel, it provides equity for all farmers to choose whether they grow a biofuel crop or whether they grow a lentil crop. That is where that argument extends from.

Senator LEYONHJELM: Okay.

Mr Arney: South Australian farmers are involved in biofuel production at the moment in that the majority of the canola grown here is exported to Europe for biofuel consumption.

Senator LEYONHJELM: Yes, I understand. I am not sure I agree with you about the biofuel, but I understand your point.

Senator XENOPHON: In terms of the concerns you expressed in your submission and in your evidence, what response have you had from the state government, from the minister for agriculture, for instance, about the impact this is having on farmers—that effectively some farmers are subsidising others because their productivity has been affected?

Mr Arney: We have only supported the Heartland Farmers, so this is effectively our first approach to government, plus we made a submission earlier. We provided support to the Heartland Farmers group for their initial submission against, so we have not spoken to the minister for agriculture on this.

Senator XENOPHON: Do you intend to in due course?

Mr Arney: Yes, we will.

Senator XENOPHON: Is there any study or estimate by your members about the sorts of losses they have experienced or will experience as a result of some of these developments?

Mr Arney: You are looking at losses—if you head from lentils back to wheat, you are looking at \$500 a hectare; if you go from lentils back to sheep, you are heading back \$1,300 a hectare. The calculations from the Heartland group have been in the tens of millions of dollars, and that is just in that local area for one wind farm.

Senator XENOPHON: You do not have to answer this, because it relates to legal advice, but will your association be looking at legal advice for any potential claims there may be against developers or any other action in respect of the significant prospective losses for some of the farmers?

Mr Arney: That is where we are trying to effect change within government around regulation. We do have an ASAP committee which looks at not just this issue of the effect on growers around wind turbines but also mining and the encroachment of residential areas.

Senator XENOPHON: If you could keep us posted on that, I think it is quite a live issue.

Mr Arney: Yes.

Senator XENOPHON: Sorry, I did not mean to interrupt.

Mr Arney: That is okay. Within that committee we do seek expert legal advice around what we should put in place for farmers when they are dealt these situations.

Senator XENOPHON: I visited a community up in the mid-north where, in the bushfires at the beginning of last year—you may remember those—an iconic winemaker nearly lost their vineyard. Fortunately, they were not smoke affected. The issue there was that, if not for the aerial firefighters, they would in all likelihood have lost their property. What feedback do you have about the possibility of fire and the difficulties of aerial firefighting? I know that Senator Back has a particular expertise with the CFS in WA. Is that an issue as well? If there is a fire, you will not be able to fight it as effectively, with wind turbines?

Mr Arney: I am fortunate enough to live in the Adelaide Hills. Within 12 kays of my property are firefighting water bombers located at Woodside that are the first to respond to put a fire out before the CFS trucks actually leave the building. The CFS do a great job, but to have those aerial firefighting aircraft available to put fires out would also be a godsend for the farmers around the Yorke Peninsula should a fire get underway. It is a very quick way of responding and putting a fire out.

Senator XENOPHON: Thank you.

Senator CANAVAN: Mr Arney, in terms of the impact you described to Senator Leyonhjelm on grain or legume production, are there other examples in the world of wind turbines being sited close to that form of agriculture and having negative impacts?

Mr Arney: Not that I am aware of. My understanding is that, in Australia in particular, the sites of the wind turbines have been primarily around grazing land, which does not require that level of sophistication of application of crop protectants.

Senator CANAVAN: But there is no evidence to your knowledge in other countries?

Mr Arney: Correct.

Senator CANAVAN: In terms of the people in these farm operations, presumably people live there as well in their households?

Mr Arney: Yes.

Senator CANAVAN: What is the distance from the closest turbines for certain farm households?

Mr Arney: I am not aware of that. I have not looked into that. I have looked at the grain production side of the effects that this is having.

Senator CANAVAN: You are an industry association for grain producers here, is that right?

Mr Arney: That is correct, yes.

Senator CANAVAN: Is this something of interest to grain growers nationally—or to the GRDC? Is there any type of further research or people interested in this issue in your sector?

Mr Arney: There is always interest around application technology for applying crop protecting products. As it stands, there are other methods of applying products but the most efficient way for this particular crop is using aerial agriculture. There are big ground rigs that can travel over country quite quickly but they do knock down some of the crop in achieving that. The farmers are not using that technology at the moment. They are using the aerial application technology. If they have to change, they have to finance that change somehow or change their crop type.

Senator DAY: You mentioned farmers who feel disadvantaged because their neighbouring farms have a wind farm and it prevents them cropping. We have heard evidence from other farming communities how there is division within their communities and it sets farmer against farmer and family against family. There is a whole list of not just adverse health impacts but adverse community effects. Have your members reported any of those things to you?

Mr Arney: Yes they have. The community could be described as quite divided around the ceres wind farm proposal in that some farmers will benefit. They have actually welcomed the fact that they will be paid rental for land that they own. I do not have a problem with that other than the fact that it is disadvantaging other farmers that are choosing to go around a different way of agriculture and advancing into new crops and new technology. They are being disadvantaged. That is creating conflict. A farmer down there with 1,000 hectares has \$10 million worth of land. If you go and effect that and reduce the value of that property by 50 per cent, they have lost \$5

million of what they have been working and trying to get up and improve for the future generation. So that is going to create conflict.

Senator DAY: More than just the commercial aspects, we have heard evidence in other communities where farmers and residents have been driven out of their homes and it has split communities. Are there any particular towns or communities in South Australia that you are aware of?

Mr Arney: I am aware that it has affected the area of the Heartland Farmers, south-west of Ardrossan. There is community angst there. One of the persons who has prepared the counter argument to the ceres wind farm has put in an enormous amount of her own time gathering information that has taken a toll on her family life and on her ability to go out and do another job. She is pulling together a lot of information to counteract some of the claims put forward to support the proposed farm.

Senator DAY: Given the importance in rural communities of people—it is different in the suburbs where most neighbours do not even know each other—and community capacity and community building in rural areas, people depend on each other.

Mr Arney: They are. They support each other. The CFS is a classic example where people will get on the truck together a go and put a fire out. Now the farmers are investing in their own technologies. They are quite aware that the truck can take eight people and be full of people. So they will have their own standby units because they know that the truck will be full by the time they get there. They are quite prepared to go in there, do the hard yards and work as a community. Part of the reason why our ASAP committee has been established is we are starting to see an encroachment now with other industries coming into primary production areas and causing this conflict, because some are benefiting and some are missing out.

Senator DAY: You can hardly say that wind farms united communities.

Mr Arney: It has not in this case.

CHAIR: There being no further questions, we thank you for your appearance here today, Mr Arney. I now ask that the room be cleared as we having an in camera hearing. Once that is over, people can come back in.

HANSEN, Emeritus Professor Colin Henry, Private capacity

CHAIR: I declare open this in camera hearing. Welcome. I must advise you that it is not the intention of the committee to publish or present to the parliament all or part of the evidence you are about to give. However, you need to know that it is within the power of the committee to do so and the parliament has the authority to order the production and publication of undisclosed evidence. You should also note that an individual committee member may refer to in camera evidence in a dissenting report to the extent necessary to support the reasoning of the dissent. However, the committee would try to seek your view prior to any such proposed disclosure.

Could you please confirm that information on parliamentary privilege and the protection of witnesses and evidence has been provided to you.

Prof. Hansen: Yes, it has.

CHAIR: Thank you. The committee has your submission. I now invite you to make a brief opening statement. At the conclusion of your remarks I will invite members of the committee to put questions to you.

Prof. Hansen: Thanks for inviting me here today. By way of introduction, I have been consulting, teaching and researching in acoustics for all of my professional life, which is 40 years. I retired three years ago, but in 2012 I was awarded an Australian Research Council grant to investigate the effects of wind farm noise on rural communities. I first became interested in wind farm noise in 2010 when I was asked by legal counsel acting for residents if I would be willing to review a report on noise level predictions for a new wind farm. The report had been prepared by a consultant engaged by the wind farm industry, and I noticed that there was no mention of noise character in the report or any assessment of potential annoyance of residents or the accuracy of the noise predictions. This sort of reporting has continued on to the present day.

I became familiar with current wind farm noise guidelines as part of my work and I have read work from many other researchers who have assessed the effects of noise from various wind farms in a number of different countries. Based on my own experience measuring wind farm noise as part of my Australian Research Council grant and all the other literature I have seen, I have no doubt in my mind that wind farm noise has serious adverse health effects for some people, resulting in some of them having to leave their homes. Whether or not the noise causes direct physiological responses or any adverse effects are due to stress arising from audible noise causing sleep disruption and annoyance has not been definitively proven either way. However, there have been two separate theories published that could explain a direct physiological effect of infrasound produced by a wind farm. There is also a theory that could explain why low-level audible noise produced by wind farms is disturbing to some people.

The percentage of people affected by wind farm noise is dependent on the wind farm and seems to be very difficult to quantify; you see lots of different percentages. There is anecdotal evidence that suggests that, for affected people, the symptoms become worse over time and seem to disappear when they leave the vicinity of the wind farm for an extended period. It is not surprising that wind farm noise affects some people and not others, because hearing thresholds and sensitivity to infrasound can vary considerably from one person to another. It is interesting to note that hearing threshold values are measured for tonal noise, which has a small ratio of peak noise to average noise level. It is also published for the 50th percentile level of the population. If the hearing threshold follows a normal distribution—and many people think it does—that means between two and three per cent of people would have a threshold level 10-12 decibels lower than the published levels. Wind farm noise also has much higher peaks than normal tonal noise used for threshold-level measurements, so it is very likely that people can detect wind farm noise when the average level is below the threshold of detection for normal people.

Another thing we do not understand is what prolonged exposure to annoying sound does to some people's hearing threshold or to their ability to detect infrasound without actually hearing it by experiencing symptoms such as pressure in their ears or nausea.

I would like to go now to World Health Organisation publications of 1999 and 2009. The night-time guidelines for Europe recommend much lower indoor night-time noise levels than are achieved by following current wind farm noise guidelines in Australia. The World Health Organisation recommendations for maximum night-time outdoor noise levels are based on traffic noise in urban and suburban areas in Europe and are designed for people living in these areas. The World Health Organisation document states that their recommended levels should be considerably reduced in situations where the noise is dominated by low frequencies, which is the case for wind farm noise.

An important point made on page 105 in that document is that guidelines for acceptable outdoor noise levels assume there is a 21 A-weighted decibel noise reduction from outside to inside when windows are open. The actual noise reduction is dependent on house construction as well as the frequency content of the noise incident on

the house and may be approximately correct for urban noise in a European city. However, it is a gross overestimation of the noise reduction that we achieve with wind farm noise in rural communities in Australia.

We have collected a large amount of data for rural residences in South Australia near wind farms and, when wind farm noise is the intruding noise, the outside-to-inside noise reduction is closer to seven A-weighted decibels with windows open compared to the World Health Organisation's 21 and 15-18 A-weighted decibels when the windows are closed. We also have data that shows much smaller noise reductions at low frequencies and have even measured higher noise levels inside the house than outside the house for some infrasound frequencies. There is a technical reason for that which I can explain later if you wish.

On page 109 in the World Health Organisation document the recommended outdoor night-time noise level is 40 A-weighted decibels, and that assumes outdoor-to-indoor noise reduction of 21 with windows open. There is also an interim recommendation of 55 in situations where it is not possible to achieve 40. However, the World Health Organisation document points out that this interim level will not protect vulnerable groups of people. What is worse for rural residents living near wind farms in Australia is that background noise levels are much lower than they are in urban areas, so any additional noise source is going to be much more intrusive even if it is at very low levels.

There are a number of problems with existing wind farm guidelines. According to the South Australian guidelines, an intrusive noise can be 40 A-weighted decibels for rural communities because they are classified as rural industry. Anyone that sells any product is an industry, so they have a 40 A-weighted decibel level. If you live in a rural town environment, you have a 35 A-weighted decibel maximum allowed level. For the reasons that I have just mentioned, according to the World Health Organisation, these noise levels will result in interior noise levels that are much higher than are recommended.

Another problem with current guidelines is that they do not address the character of the noise. This includes the frequency content as well as the variability in a repeating periodic wave—often referred to as amplitude modulation. Noise varying in this way is far more annoying than randomly varying noise and, when it is infrasound, some researchers have postulated the effect on the vestibular system could be similar to motion sickness even at levels below the threshold of hearing. Noise dominated by low frequencies is more annoying than noise with a balanced spectrum, and low-frequency noise from wind farms is particularly intrusive in rural residences due to the lack of other background noise in the area.

Lastly, I would like to talk about compliance checking. According to guidelines, it is sufficient to acquire a large number of data points each representing a 10-minute average. Then the data are plotted on a graph of noise level versus wind speed and a line of best fit is drawn through these data. We have many data points that are 10-minute averages that are above the line, so there are many 10-minute periods where the noise levels exceed the guidelines. Not only that; a 10-minute average has lost all the peak levels. On top of that, we use an L90 level. L90 means a level that is exceeded 90 per cent of the time. If noise is going up and down all over the place, all these high levels are completely removed and all you are measuring is what is there 90 per cent of the time.

In summary, I think there is a case for a complete and independent review of wind farm noise guidelines in Australia. I would be happy to answer any questions on what I have just said or my submission.

CHAIR: Thank you. Senator Leyonhjelm.

Senator LEYONHJELM: Did you hear the evidence from the group of acoustics people this morning?

Prof. Hansen: No, I was not here this morning. I am sorry.

Senator LEYONHJELM: It will be on *Hansard*. It was not in camera, so you had better read it. They kind of disagreed with almost everything you just said, so there is clearly more than one school of thought in the acoustics world. Is your school in the majority or minority?

Prof. Hansen: I would have to say a minority. A lot of these acoustic consultants have been working for the wind farm industry for some time. I do not know why they are doing things how they are. Perhaps they are doing things how they are asked to do things rather than how they should be doing things.

Senator LEYONHJELM: You were involved in the NHMRC review, I think.

Prof. Hansen: That is right.

Senator LEYONHJELM: What was your role?

Prof. Hansen: I was asked to review the draft report.

Senator LEYONHJELM: What was your view on that?

Prof. Hansen: I have my review I submitted as part of my submission, but it is a bit hard to summarise; it is quite detailed. It is attached to the back of my submission.

Senator LEYONHJELM: Could you give me a quick verbal summary of it?

Senator CANAVAN: Could I follow up? In your submission you have said that many reports were not included in their literature review and others that were were poor in quality. Could you expand on that point?

Prof. Hansen: Certainly. I have read a lot of the literature, and there are many well-known researchers who have published papers. Some of the papers do not follow the gold standard of epidemiology studies. That means you have to have a control group and another group and that thousands of people should be involved. Because they did not follow that process, they would seem to be disregarded. There are lots of case studies where people have looked at individual cases. As you accumulate lots of case studies, you get an idea that there are not just one or two people; there are hundreds and hundreds of people who have been studied individually and have been affected. But none of that seems to have been accepted as good evidence by the NHMRC even though the researchers doing this are medical researchers who have good reputations. It seems that the NHMRC were a little bit stringent on what they accepted as evidence.

Senator LEYONHJELM: You are not the first to have said that. You said there needed to be a review of wind farm guidelines, which I think I probably agree with. The question would be: if you were to nominate a standard for noise, including low-frequency and infrasound, what would that standard be? The reason I ask is that we have heard very little agreement on what a 'safe'—for want of a better word—level is.

Prof. Hansen: Yes. It depends on how you measure it, as you see. Thirty-five is way too high. Thirty A-weighted decibels is sort of okay provided there are other things like a maximum low-frequency limit. You would look at all the noise below 160 hertz, for example, and have a limit. You might even divide that up into frequency bands, have a limit for each frequency band below 160 hertz and say you cannot exceed that limit.

Senator LEYONHJELM: So 30 A-weighted decibels is for audible noise.

Prof. Hansen: That includes the entire frequency range. If you restrict the allowed level to 30 A-weighted decibels then it is likely that lower frequencies might be reduced to an acceptable level, but we do not really know that yet. We do not have enough data for that. We would really have to go through all the data we have recorded in the last three years, look at everything and come to some conclusion.

Senator LEYONHJELM: The acoustics consultants this morning did not think much of the fact that we were a little sceptical. Is measurement of infrasound and low-frequency sound a technical problem? Is there an issue with accurate measurement?

Prof. Hansen: No, there is no issue with measuring infrasound low-frequency sound, but there is an issue with measuring low-level sound. When consultants go out and do a background noise measurement, they have instrumentation that cannot measure below about 18 or 20 decibels. If you have electronic noise of 18 decibels in your instrumentation and you have actual real noise of 18, the noise that you will see on the dial will be 21. Any noise below 28 decibels will have a ½-decibel error or more. That means that, when you look at this plot of all this data of noise level versus wind speed, right down at the bottom end it starts to flatten out because their instruments cannot measure the low-level noise. Then they do a curve fit on their data. When you curve fit wrong data, the curve ends up being in the wrong place, so they do this very complicated polynomial fit for the data, and it is just wrong.

Senator LEYONHJELM: We heard from the Mayor of Goyder this morning, and one of his lines was, 'If we were doing it again'—in relation to wind turbines—'we wouldn't do it the way we've done it.' On that basis, given what we know now about wind turbines, if you were going to write national guidelines in relation to sound, what would you put in them?

Prof. Hansen: Right now I would say there could be no noise more than 30 A-weighted decibels and there should be a five-kilometre buffer zone. If it could be proven that noise levels between four and five kilometres were not going to be a problem, then maybe that is acceptable.

Senator LEYONHJELM: Would you have a different standard below 160 hertz?

Prof. Hansen: Yes. There is a Danish standard that says you should not exceed 20 decibels in that low-frequency range, but I am not sure whether or not that is adequate. There are no studies being done on that. There is also a DEFRA standard from the UK which also talks about allowable levels below that, but I cannot remember offhand what the number is.

Senator LEYONHJELM: Right.

Senator DAY: I must confess I have a bit of a science background—not quite of your stature in that area. I find it fascinating to listen to our opening panel and then hear you say almost the complete opposite of what they were saying.

Senator Leyonhjelm asked if you were in the majority or the minority. I recall the famous case when Albert Einstein was approached by 100 scientists to say that he was wrong, and they had signed a petition. He said: ‘What do you want 100 for? I only need one to prove that I’m wrong.’ Sometimes the opinion of the majority is not necessarily correct. We had evidence yesterday from a Dr Huson, and he talked about instrumentation and measurement using, not microphone, but microbarometers. Do you want to comment on whether you agree?

Prof. Hansen: Yes, I am familiar with his work. I agree that he is getting good data with his microbarometer survey. There is no reason why they would not work. In fact we have been using similar microbarometers, not the one he has designed and used. You can purchase them from the US for about \$1,000. We have been using one of them to back-up our low-frequency measurements with microphones.

Senator DAY: We also had evidence from Andrew Bell who talked about measuring infrasound, recording it and then playing it back to people in a simulated kind of environment. He said that it is not possible to properly replicate or simulate infrasound when you are playing it back.

Prof. Hansen: I do not know that I agree with him that it is not possible, but is difficult. There are now two devices on the market that produce infrasound at levels that would be easily sufficient for wind farm noise investigations in a room, but it requires setting up the room. You cannot have the door open and get the same noise level or frequency content as when the door is shut, for example.

Senator DAY: The reason I ask is it seems that, with a lot of witnesses that have appeared before us, it would not matter how many hundreds or thousands of people we presented before them that had experienced severe adverse health effects, they will not believe them unless they can prove it and replicate it in a laboratory. It is a bit like the old economists’ joke that they see something in practice but do not believe it will work in theory.

Prof. Hansen: We are hoping to get the NHMRC to fund the project and actually do that through sleep studies. One thing that worries me a bit about that is that some problems develop over a period of time in people. Some people can put up with it for a night and not be bothered, but if it goes on for week after week they start to become sensitised to it and then their reaction becomes even worse.

Senator DAY: People living near wind farms year in and year out exhibit these symptoms of all types. Obviously there are not just connections with the ears but with the heart and other organs and so on. How one attempts to reproduce, replicate or test that on somebody in a laboratory or in some other kind of controlled experiment is beyond me.

Prof. Hansen: We could take some of these people who have been sensitised and put them in a laboratory, and test other people who have not been sensitised and put them in a laboratory and see the difference in response.

Senator DAY: One of the great principles of our jurisprudence and justice system is the fact that a person can testify, ‘This is what I experience.’ It is considered in Supreme Courts and in judicial forums around the world that when a person giving personal testimony says, ‘This is what I saw, this is what I felt, this is what I experienced,’ it is normally given credibility and I have been quite surprised. It is a bit like the blind man story in the Bible who was cured and the Pharisees would not accept it until he could explain what happened. He said, ‘Look, all I know is this. One thing I know is whereas once I was blind now I can see. Don’t ask me how it happened. I just know.’ When we hear testimony from people who say, ‘We were healthy, we welcomed these wind farms, and now we are all sick.’ I am interested in getting some of your ‘colleagues’ to try to see this and what your view is of how your colleagues have responded to this.

Prof. Hansen: I think they have the problem of, ‘If I don’t experience it when I go near a wind farm—and I have been measuring lots of wind farms—then it can’t be a problem’.

Senator DAY: Exactly, yes.

Prof. Hansen: They do not seem to be able to accept that everyone is different and that what is not a problem for some people is a problem for others and that, maybe, if you live there it gets worse.

Senator DAY: They would not live there. If you said, ‘Well, if it’s not a problem, go and live there yourself.’ Thank you.

Senator LEYONHJELM: You are with a project under NHMRC work?

Prof. Hansen: Yes, I am part of a team of nine people on a current NHMRC. Peter Catcheside is the leader. He is a sleep studies expert. I am just providing some acoustics expertise in terms of generating and reproducing the wind farm noise in the lab.

Senator LEYONHJELM: This was an issue that we wrestled with with the acoustics consultants this morning. You are confident that reproduction of the acoustic effect of a wind farm can occur in a room, are you?

Prof. Hansen: Yes.

Senator LEYONHJELM: You are quite sure of that.

Prof. Hansen: It is going to be a challenge. Put it this way, there are sound sources that are capable of it, but whether we can do it in a room without too much leaking out is yet to be seen. I am pretty sure we can otherwise I would not have applied.

Senator LEYONHJELM: What about the claim that a single turbine is not the issue, in fact multiple turbines are not necessarily the issue, it is only when they are rotating in synchrony that there is an issue and you can get hot spots.

Prof. Hansen: You can. The hot spots will depend on which direction the wind is blowing as well. There will be times when it will be a hot spot and it will be loud for a while and then it will die off for a while, because you have very low-frequency, in-phase noise.

Senator LEYONHJELM: Two questions arise out of that. How do you replicate a hot spot in a room with recorded sound?

Prof. Hansen: You just record the sound at the hot spot and then play that in the room.

Senator BACK: It was put to us this morning by, I think, Mr Turnbull from the acoustical consultants—and I wrote it down—who said, ‘The level of infrasound from a wind farm is below the level of human perception.’ Do you agree with that statement?

Prof. Hansen: No, because the infrasound he has been measuring is random infrasound from a number of different sources. He produced a report showing infrasound from a number of different sources and then showing infrasound from wind farms. His wind farm infrasound seems to be within that range he measured.

The problem is that wind farm infrasound is periodically varying, regularly varying. It seems to be more perceptible to some people than random infrasound. That is why I do not necessarily agree that just because it is at a low level it is not detectible.

We have measured infrasound levels in people’s houses when the wind farms are going. They are much higher than the levels he presented. He presented levels outside of someone’s house. We have measured inside and outside, and we found in both cases at Waterloo that levels have been higher than what he showed.

Senator BACK: The work of Cooper—and I regard Cooper’s work as having been only a pilot, nothing more than a pilot—had cooperation from Pacific Hydro, with terms dictated by Pacific Hydro: three dwellings, six people. Do you think there is enough in Cooper’s pilot conclusions to suggest that the work should be extended further, including other wind farm operators and including other physical locations, so that we get to a level of statistical significance whose absence Mr Turnbull and others are so critical of Cooper for?

Prof. Hansen: Yes, I think it would be very helpful to extend it to other wind farms, but we also need to be cognisant of the fact that at the same time as infrasound is affecting people there is also maybe audible low-frequency sound. So, we still do not know whether it is the infrasound causing the problem or the audible low-frequency sound causing annoyance and causing lack of sleep and then causing the stress and health problems. I think the more data we have the better off we are going to be, and we would need to try to separate out those two effects where we can.

Senator BACK: That certainly is a view that I have formed on this committee. I do not know about others. You mentioned that a question was asked of you about the NHMRC review of literature. It was put to us yesterday that on the review panel there was one audiologist, an acoustician and three epidemiologists. What confidence can we have, because some of us have been associated with the move to make sure there are some funds to properly independently do this work, that the party or consortium selected to do this work is going to be independent?

Prof. Hansen: I think the NHMRC has very good procedures to make sure things are independent. They get independent reviews from people, a range of reviews. And I am sure that the committee that is deciding on who gets the funding is a medically based committee; it is not going to be anyone in my discipline. So, I do not see how it is going to be prejudiced from the acoustics point of view.

Senator LEYONHJELM: Medically based, did you say?

Prof. Hansen: Yes, medically based.

Senator BACK: So people with the capacity. I am encouraged by that, because I have spoken more than once in the Senate about my concerns about the bias of people who have been involved on review panels. And I do not want to go through this exercise, be it \$2½ million or more—and I do not care where the bias is, whether it is one side or the other—and then see a situation in which there is a credible argument at the end of the day that the group that gets to do the work was biased one way or the other.

Again, it was put to us this morning that there has been no new credible scientific evidence in the last few years so as to even bother looking at the possible adverse health impacts of infrasound—certainly in the audible sound, but not infrasound. Do you agree with that summary?

Prof. Hansen: I find it puzzling, that summary, because there is no evidence, according to their strict guidelines on what constitutes good evidence, but there is no evidence the other way either. So I do not know how anyone can come to that conclusion that it is not worth doing any more study if you say that the evidence that is there is not good enough to point to a problem—

Senator BACK: ‘We haven’t found it, so stop looking!’

Prof. Hansen: Yes. I do not understand that.

Senator BACK: I think Senator Day was getting at the same point a little bit earlier. Thank you, professor Hansen; it has been very interesting to listen to you.

Proceedings suspended from 15:20 to 16:02

FAINT, Mr John, Chair, Waterloo and District Concerned Citizens Group

GARE, Mr Clive Donald, Private capacity

GARE, Mrs Petrina Mary, Private capacity

MORRIS, Mrs Mary Louise, Private capacity

QUAST, Mrs Julie Ann, Secretary, Waterloo and District concerned Citizens Group

SCHAEFER, Mr Colin Russell, Waterloo and District Concerned Citizens Group

CHAIR: Welcome. Do you have any comments to make on the capacity in which you appear?

Mr Gare: I am a host of a wind farm.

Mrs Gare: I am also a host of a wind farm.

Mr Faint: As well as being Chair of the Waterloo and District Concerned Citizens Group, I am a farmer who lives in the area.

Mrs Quast: I am Secretary of the Waterloo and District Concerned Citizens Group.

Mr Schaefer: I am a farmer and a concerned citizen for our people in the Robertstown and Waterloo districts.

CHAIR: Could you please confirm that information on parliamentary privilege and the protection of witnesses and evidence has been provided to each of you. Yes? Thank you. The committee has your submissions. I now invite you to make brief opening statements. At the conclusion of your remarks I will invite members of the committee to put questions to you. Mr Schaefer, as you have to leave soon, we will start with you.

Mr Schaefer: Thank you very much for slotting me in where you have, and I will get to it straightaway. I am just wondering why our country is so hell-bent on having so many wind farms scattered over the country. I do make an exception about where these things are placed and what is best for the people. However, there seem to be double standards in this country—one for the multinationals and one for the common people. In our area the wind farm companies are allowed to do what they like, how they like. Yet when people want to use a small area of two designated cemeteries they are stopped because of so-called endangered native vegetation, when there is the same stuff growing on our road sides. Are our people in some instances less important than native fauna and flora and in other instances with the big multinationals the fauna and flora are less important? Why is that?

My second point is health issues. Health effects have been known in Holland for many years, according to two men from Holland living at Port Pirie who I met when I was in the Lyell McEwin Hospital. I am sure these men could be contacted if they were still alive and tracked down to give their statements as to the effects of what those Dutch windmills cause.

My third statement is about the effects on wildlife. Jays in our area are moving away from the ranges out onto the plains. This has never happened before. My son is involved in an organised local farmers' fox shoot in the area, and when they did the Waterloo Range the members commented of that shoot that the area along there was absolutely barren of wildlife or anything else apart from farm animals.

Where is the common health and wealth for our people? And why is solar not being pushed a bit more? East of where I live there are thousands of acres that are of very low productivity, and it would impact on no-one. That is about it. If there are any questions I am more for you to ask me.

Senator URQUHART: Perhaps I could just clarify one point. I thought I heard you say jays were coming down—

Mr Schaefer: Yes. We call them black magpies.

Senator URQUHART: Right—black jays. Thank you.

Mrs Morris: Perhaps I could just point out that Mr Schaefer's house was one of the sites for the EPA testing. It is his house that is 8.7 kilometres away from the Waterloo wind farm. He also was signed up to be a host for the Robertstown wind farm, and together with his neighbours—this is in his submission—they refused to host the turbines. So, there is no Robertstown wind farm now. It is not going ahead now because the hosts refused to have it.

Senator LEYONHJELM: The 8.7 kilometre distance from the farm—and your farmhouse was tested for that—why were you tested? We have had hundreds of submissions, so it is a bit difficult for me to remember everything and know all the details. So, assume no prior knowledge. What were the circumstances that led to you having that testing done in your house? And has anything changed?

Mr Schaefer: It was the realisation that I was having a lack of sleep, and that was having an effect on my health. Unfortunately the doctors do not seem to want to accept that as an excuse, because, as you may have read in my submission, I was unfortunate enough to have a heart attack, and that led to serious implications. Fortunately I am back to good health now, but we have since moved to alongside Robertstown, where we can still hear them, but only to a minor extent compared with what we did where we lived at Brady Creek.

Senator LEYONHJELM: Take me through the circumstances in relation to your health that led to the testing in your house.

Mr Schaefer: It was mainly the lack of sleep, and also—

Senator LEYONHJELM: How long after the turbines went in?

Mr Schaefer: Yes. There were times when we would have a fortnight straight of wind noise, and that made me get very nervy, jittery and uneasy within myself. Strangely enough, it was through a meeting that I was invited to at Waterloo that, all of a sudden, the penny dropped as to why this was occurring.

Senator LEYONHJELM: How long after the turbines became operational did you notice any effect on you?

Mr Schaefer: I cannot honestly say that exactly because, when you are not aware of why these things are occurring, you think, 'Oh, well, something's a bit wrong.'

Senator LEYONHJELM: Weeks? Months? A year?

Mr Schaefer: It was less than that. It would have been within months.

Senator LEYONHJELM: Thank you.

CHAIR: Would you like to continue, Mrs Morris?

Mr Schaefer: May I leave?

CHAIR: Yes, you may.

Mr Schaefer: Thank you very much for listening.

Mrs Morris: I will not go over what is in my submission too much. I was the person who was initially documenting residents' complaints around the Waterloo wind farm, and that is what led me to investigate it with the survey that I did, which the NHMRC accepted as evidence of health effects from wind turbines. Following on from that, the EPA decided they would investigate the noise concerns. I documented nearly all the houses in the area and provided them with a database of which houses are affected, and that is why they chose their six sites. I have a handout showing some of the noise graphs from the EPA testing.

The main thing is that I want to back up Colin Hansen's view that the conclusions drawn by the EPA from their results are not logical. They did 10 weeks of testing, which was fantastic. It produced heaps and heaps of data which should take probably a couple of years to go through, not a few months. I think they whacked their report out very quickly to get a predetermined outcome. They say that the wind farm is compliant with their guidelines, and, despite the fact that people are still complaining, cannot sleep and cannot live in their houses, they say that there is no need to review the guidelines. I think the one thing they cannot conclude from their study is that there is no need to review the guidelines, because people cannot live in their homes. I know those people and I believe them to be genuine. If you look at the graphs I have given you, there is a graph that has a blue line that dips. I think it is on page 8; I do not have a copy.

Senator LEYONHJELM: That is page 10.

Mrs Morris: Thank you. This top graph shows what is happening at the north house, where the two black arrows are. That is when the turbines have been turned off for 50 minutes and then turned on again. You can see that the infrasound level drops quite substantially, which, to me, says those turbines are producing infrasound and for the EPA to say modern turbines do not produce infrasound is quite clearly incorrect.

The other thing you notice about this graph is that it is in dBG, where they have applied a weighting to the noise levels. If they had used dB linear, which people are saying should be used for infrasound, those differences would have been much more marked. I have a question for the EPA: why didn't they express that in dB linear instead of dBG?

On the second graph down the bottom, this is outside a house, the south-east house—this is the house that the EPA acknowledged was the worst affected. Since then that farmer has sold his farm, because he cannot stand it anymore. So those ones down the bottom are the outside, and you can see that the levels drop really significantly and rise again. I think some comments were made this morning by acousticians that you cannot actually tell what contribution the turbines make to the environment. To me it is blindingly obvious as a layperson that there is definitely something going on there.

I have written quite a lot in my submission about what I think is wrong with the EPA study. It is great that they did it, but I think they have come to some really illogical conclusions.

CHAIR: Thank you.

Mr Gare: Thank you for inviting me to present my submission today. My submission deals with the impact on my health and lifestyle living in close proximity to a wind farm. Let me say from the outset that we were excited about the prospect of being part of the renewable electricity industry. I am a host to wind towers on my property, the nearest being about 800 metres away with three towers within approximately one to 1.5 kilometres away.

We were not made aware of the impacts of noise on our health or lifestyle. Fortunately, we had heard from others that they were quite noisy. Luckily, in our contracts we inserted clauses about the need for noise mitigation. I do wonder why though the wind tower operators inserted the following clause in all the hosts' contracts section 77C, which is on the memorandum of lease which I will table: 'The landlord acknowledges and agrees that it is adequately compensated for any noise or inconvenience caused as a result of the permitted use of the site or the land and that it will not seek any further compensation from the tenant in relation to such matters.' If the wind tower operators were confident of their impact studies, that clause would not be necessary.

After a short period of living with an operating wind farm, we had these products installed. I find that, because I work and reside in close proximity to the wind farm, I suffer sleep interruption, mild headaches, agitation and a general feeling of unease; however, this occurs only when the towers are turning, depending on the wind direction and wind strength. My occupation requires that I work amongst the wind towers during the day which means I suffer the full impacts of noise for days at a time without relief. The impacts are that we are not able to open our windows because of the noise at night and we are not able to entertain outside because of the noise.

In conclusion, if we did not have soundproof batts in VLam Hush windows, our house would not be habitable. In my opinion, towers should not be within five kilometres of residences, and I would personally not buy a house within 20 kilometres of a wind farm. Thank you.

Mrs Gare: Good afternoon Senators, and ladies and gentlemen. Thank you for letting me speak to the committee today. I would like to open my statement with the following: developers and construction. In the beginning, I was excited about the wind farm and of course the financial security for our property and family. The process began with high-pressure consultations, negotiations for weeks on end, numerous phone calls and face-to-face meetings with the developers. We seemed to be under constant pressure to agree to their wishes and, if we wanted any changes, it took a lot of negotiation.

We had to try and foresee any problems that may impact on our lifestyle for the next 25 years plus. With little or no previous information to go on, this was a very taxing time. Having gone through this, I would like to see that a person or persons—probably with a legal background and well-schooled in wind turbine information—be contactable for future wind farm hosts for advice and even to help with negotiations with the development companies.

Construction was also a very stressful and challenging time. The landowners are up against not only the power company but also all the big contractors and civil works companies. Any meetings with the above parties had to be attended by both of us with me taking notes so that we had some kind of record of what was said and what matters needed to be addressed at the time.

We had a lot of erosion problems from the pads and roadways, which we had to chase up with the power company to get them to address. During construction there were lots of problems with gates left open, boxing up mobs of cattle which then took a full day of redrafting and settling back into their paddocks. We also had gates opening onto public roadways. We have a main bitumen road that goes past our property. This caused great angst as far as public liability is concerned, if our stock got out into the roads. We also had lots of rubbish scattered around the property. We witnessed one of our cattle eating a one metre by one metre piece of plastic sheeting.

Living with wind turbines. Our house is solid sandstone, built for the late Charles Hawker in the 1920s, with concrete internal walls and a steel roof. The house is surrounded by a lot of vegetation and trees. I have brought some photos to show the Senate. In the months after the towers started in October 2010, the noise was unbearable, especially when two towers became in sync. A loud thumping would radiate throughout the house. Even watching TV in the furthest room from the towers, you could hear them. Sleeping was most difficult. I use, and still do, an earpiece radio every night, which helps block out the noise to a certain degree. If they are really going I have to up the volume.

After some time, due to a very slow installer, the house was finally insulated: sonobatts in the ceiling cavity; all our outside air vents blocked; a special American glass called VLam Hush, which is two sheets of glass with a

special gel between, were installed in every door and window of the house. This has improved the situation for me considerably, but at times the noise still penetrates into the house.

Ongoing issues. Due to the house being sealed we have refrigerated air conditioning, because we cannot open windows because of the noise. A separate meter was installed on the wind farm operator's advice, so that they could pay the cost of the air conditioning usage. That went in over 12 months ago and we are still chasing payment. Another issue is the increase in our emergency services levy. The value of our property has increased by double, which has had a major increase in the levy. The power company pay council rates on the land that they lease, and we pay rates on the rest. We brought up the issue of the increased ESL with the power company, but they have not addressed it. We feel they should be responsible due to the increase in our land value. I have the value difference here: I think it is about \$1.6 million increase. I quote from the contract, 6.1, rates and taxes, section B:

However, during each year of this lease the tenant must pay any increase in rates and taxes above the rates and taxes that were payable immediately before the start of the agreement to lease, if the increase is directly attributable to the works or the use of the site for the permitted use.

We also have ongoing problems with the cables which run across our property and connect into the individual towers to transport the power to a substation. There seem to be constant cable breakages, which have to be dug up and fixed. This, of course, happens all over the property. Having 19 towers, it has quite a big impact. Quite a large area is disturbed and then has to be recovered with sand or soil. We have asked for compensation concerning this, as we have numerous cable breaks on the property with disturbance to our pastures, which interferes with our stock grazing. This was discussed at a meeting back in August 2014. We are still waiting for compensation, which is agreed by the wind operators. As you can see, they are not fast movers.

The land owners need to know their rights in regard to their property and how it is treated during and after construction of towers. Land owners with residences close to towers need to be made aware of the noise impact and there should be discussion of how close towers should be permitted to their premises. In my opinion, towers should not be any closer than five kilometres to a dwelling. If we had to buy another property, it would not be within a 20-kilometre distance to a wind farm. I think that says it all.

We have a son who will come home in a couple of years, and I have concerns for him and a family that he might have in the future, with regard to any health problems that may arise. Having lived with towers now for five years, in my opinion future hosts should glean as much information as they can and find out their rights so they can fully understand what they are taking on.

Senator XENOPHON: I would just like to ask some questions to Mr and Mrs Gare. I think the fact that you are hosts of wind turbines and you are giving evidence is significant. How many turbines are there on your property?

Mr Gare: Nineteen.

Senator XENOPHON: How long have you had them there?

Mr Gare: Five years.

Senator XENOPHON: And when did you start complaining about the turbines in terms of the adverse impacts?

Mr Gare: Straightaway.

Senator XENOPHON: Is it AGL that you are dealing with?

Mr Gare: Yes.

Senator XENOPHON: You may want to provide us with any documents in respect of this. How did they deal with the process? Once you raised the issue, what happened?

Mr Gare: We had it in our contract that if we found there was a problem they would put in noise mitigation products. We said: 'You will have to do it. We cannot bear it.' Because it was in the contract they went along with it, but I am sure, Nick, that they would not have if they did not have to.

Senator XENOPHON: It is a contractual relationship so it is under the terms of the contract. Are you able to say—and you may not want to—what level of payment have you been getting? If you do not feel comfortable saying how much you are being paid for the 19 turbines on an annual basis, you do not have to.

Mr Gare: All up, in total, about \$200,000, so there is not a lot of advantage for us in coming here today.

Senator XENOPHON: When you experienced the noise, could you stay in the property or did you have to move out?

Mr Gare: If we did not have the noise mitigation products put in, we would have moved out.

Senator XENOPHON: Prior to the noise mitigation products being put in, how did it affect your sleep? Did you spend more time away from home?

Mr Gare: Fortunately, we have eastern rangeland country where I could go to get away from it. As I said in my submission, I am there 24 hours a day in amongst it. I had to go away to wind down. What was your question, sorry?

Senator XENOPHON: What period of time was it from the time the noise affected you until the time you had the noise mitigation—several weeks or several months? How long was it?

Mrs Gare: I reckon it took about 15 months or more. We had a very slow installer of the batts and things.

Senator XENOPHON: You are protected by parliamentary privilege when speaking out here today. Did AGL say to you: 'Sometimes this happens. It is just one of those things'? Did they give an explanation as to the level of disruption? Did they say, 'This has not happened before'?

Mr Gare: No. It was all glossed over right from the start. We were given no information. One of their little tricks is to take people right up to the towers and say, 'This is how noisy they are.' But that is not so. The further you get away from the tower the noisier they are. That is a funny thing, to a point I guess. When you are right underneath them and they are 80 metres up in the air there is very little noise. There is just a bit of wind noise. As you go away one or two kilometres it actually gets worse.

Senator XENOPHON: Before the noise attenuation or noise suppression in your home what was your quality of life like?

Mr Gare: Crap, to put it honestly.

Senator XENOPHON: You got a bit of sleep each night, didn't you?

Mr Gare: With earplugs, yes. I wore earplugs constantly—only while they are turning, mind you, and providing they are in the right direction and have the right wind strength. Frosty nights are the worst because the sound tends to travel so much clearer and further on a frosty night. But earplugs.

Senator XENOPHON: Anything else, Mrs Gare?

Mrs Gare: No. Pretty much what Clive has said.

Senator XENOPHON: Do you sleep okay now?

Mrs Gare: No, they were waking me up on the weekend. You wake up to the thumping. This is with all the soundproofing in the house. As I said, I sleep with the radio on every night. If they are really cranked up I have to turn the volume up, so I will probably just go slowly deaf.

Senator DAY: I just want to clarify something. Frosty nights are normally not very windy.

Mr Gare: That is a funny thing. Our country is very hilly, and they put wind farms on top of hills. It can be blowing an absolute gale on the top of the hills and you can have frost in the valley.

Senator DAY: It is just that we have heard evidence that, even when the blades are not turning, they do have a similar infrasound impact on people because of the effect of the wind across the blades, across the aerofoil.

Mr Gare: Yes, but if there is that much wind the blades are turning, aren't they?

Senator DAY: That is right.

Senator LEYONHJELM: If you had your time over again, would you host a wind farm?

Mr Gare: No, absolutely not. If I were a rich man, I would not have a wind farm on my property.

Senator LEYONHJELM: And you said it was \$200,000 over five years approximately?

Mr Gare: No, 12 months.

Senator LEYONHJELM: Per year.

Mr Gare: Yes.

Senator LEYONHJELM: That is a fairly healthy income.

Mr Gare: Absolutely.

Senator LEYONHJELM: In spite of that, you would say that you would not have them.

Mr Gare: Absolutely, if I were a rich man, but unfortunately I am a farmer and there are not many rich farmers around.

Senator LEYONHJELM: What sort of farming?

Mr Gare: We are grazing, we can be cropping but we—

Senator LEYONHJELM: Sheep or cattle?

Mr Gare: Mostly cattle.

Senator LEYONHJELM: Has there been any effect on your cattle from the wind farms?

Mr Gare: No.

Senator LEYONHJELM: Okay, thank you.

Mr Faint: Thank you for this opportunity. I am speaking on behalf and as the chair of the Waterloo and District Concerned Citizens Group, so I will speak broadly. I also have personal issues and I want to inform the committee that I have left the area. I now sleep and live in Kapunda but I still come up to the farm and work during the day. Like other people, I was having lots of sleep issues so we decided to move from Waterloo.

Obviously you have our submissions in front you, but I will add a couple of later things that we have done since we submitted them. We who live in the shadow of these enormous industries clearly have been impacted, and the consequences have been devastating. These include the splitting of the community, noise and health issues, and in four cases already families have been forced to leave the area. There is numerous environmental damage. It was mentioned before about the fox cull—in fact I conducted that fox cull—and we were alarmed at the loss of native birds and animals in the Waterloo wind farm area. There has also been a significant drop in property value.

The most serious thing now is the link between turbines and frost severity. Turbines cool the air and in our situation at Waterloo it is now causing a huge loss in food production and the viability of farms up to 10 kilometres and further away. We have been lobbying for a long time to have a setback of at least 10 kilometres from towns, farmhouses, frost-prone areas, cropping and vineyard land. Clearly changes have to be made and future locations carefully assessed. What is more important to Australia—the protection of our food bowl or the construction of costly and inefficient wind farms? I think the answer is obvious.

Senator DAY: That is first time that we have heard the cooling of the air effect resulting in a decrease in crop production. Do you have any estimates of the percentage of crop production or productivity declines as a result?

Mr Faint: Yes. We did a survey together with Mary. Of at least nine farmers within a five-kilometre radius of Waterloo, collectively there was a 70 per cent loss in our average cropping. This has happened for three consecutive years in the Waterloo area, and this is since the commissioning of the wind farm. We are in a frost-prone area, that is acknowledged, but we have never had such severe frosting. Normally, we would expect an area probably 100 or 200 metres from a creek bed but we have had our whole paddocks wiped out. After two years of frost damage we contacted the University of Adelaide to do a test. They were good enough to build a model wind farm and there they proved that turbines cool the air. They also established that the turbines at Waterloo were too close together—they are only 250 metres apart and they were in a continuous line—so this is causing a huge mass of cold air to form in the valley.

Senator DAY: If you could provide us with any documentation or any of your results, both from the university and from your own local studies, that would be very helpful to the committee.

Mr Faint: We have related that.

Mrs Quast: I will keep mine very brief. We are very concerned about the health issues of people living in the vicinity of wind farms. Having experienced them first hand, we do not wish anybody else to suffer as we are. We feel that the guidelines set by NHMRC need to be addressed. I was fortunate enough to attend a forum there a few years ago and they were not really very interested so I am happy to see that they are at least taking some notice now. The EPA has done lots of testing in the Waterloo area—we acknowledge that, as Mary did—but the results were certainly circumspect and I think they need to be addressed and investigated properly. As I stated in my submission, they put turbines in the most stupid places—under trees and other things.

The health issues could all stem from sleep deprivation from the noise and from the infrasound. Also, I have two dogs who have both been affected by the turbines. I take them for walks and they will stop and they will look at the turbines because they are making so much noise. They also bark at night because they think it is thunder. It is very loud, my house is not insulated and over the TV you can hear it. It is like a jet engine coming but that never gets there. Unlike traffic and planes, it does not stop. It is continuous 24-hours a day. I have kept a health diary from day 1 of the operation of the wind farms, and I have stated in there that I felt the effects immediately, and it gets worse. It is now quite a few years on and I am a lot worse than I was when I first noticed them operating. We have property we cannot build on because we would be 1,200 metres from the nearest turbines in a

line of 30. We are 2½ kilometres from the turbines in open farmland. I am glad to see that somebody is taking notice and we can maybe change some guidelines so that people do not have to suffer this. Thank you.

CHAIR: Thank you, Mrs Quast. I will just say that we are right on time so we need to make it very quick.

Senator URQUHART: I have two questions. I will try and make them very quick if you can make your answers really quick. Mr Faint, you talked about loss of native animals in the Waterloo area.

Mr Faint: Yes.

Senator URQUHART: You can do it on notice if you like—you do not need to go through it today. Can you provide some details of what you are talking about and how that has been collated?

Mr Faint: Yes, I can do that.

Senator URQUHART: Mrs Quast, you said that you had been keeping a health diary since day 1. How long is that?—sorry, I missed the start.

Mrs Quast: Since September 2010.

Senator URQUHART: You mentioned that you had health issues. Have you sought medical—

Mrs Quast: Yes.

Senator URQUHART: You have? Do you have some confirmation from doctors, specialists or whatever to look at the causation link between what your health diary says and what you believe is the turbines?

Mrs Quast: I have not actually taken my health diaries to the GPs. They are not very interested I have to say.

Senator URQUHART: You have not taken them, or you have, and they are not interested?

Mrs Quast: No, I have not, but when I speak to them they are not very interested in my problems.

Senator URQUHART: So you have not actually taken your diary and shown them?

Mrs Quast: No, I have not. But I have serious health issues.

Senator URQUHART: Have you considered doing that?

Mrs Quast: Well, I can—yes. I have an appointment soon so I can take them, but they are reluctant to put their hands up and discuss it or put it because they are ridiculed by their peers if they do, which we have been told by doctors. You feel like you are batting your head against a brick wall basically.

Senator URQUHART: My initial concern is that if you have health issues—

Mrs Quast: I do.

Senator URQUHART: then you should have them looked at. It is quite sad that your doctor does not take it seriously. I suggest that you should enforce that on them.

Mrs Quast: I now have serious health issues—diabetes and quite a number of other things.

Senator URQUHART: Thank you.

CHAIR: There being no further questions, I would like to thank you all on behalf of the committee for your attendance here today.

HOPKINS, Dr Gary Douglas, Private capacity

ROVENSKY, Mrs Jacqueline, Private capacity

NELSON, Ms Tracey, Private capacity

VOUMARD, Mr John Francis, Private capacity

WEBSTER, Ms Natalie, Private capacity

[16:41]

CHAIR: We have come to the part of the program where there are three-minute statements. It will be a strict three-minute statement. Could you please confirm that the information on parliamentary privilege and the protection of witnesses and evidence has been provided to you.

Dr Hopkins: Yes.

CHAIR: The committee now invites your evidence.

Dr Hopkins: I have nearly 40 years experience as a physician. I speak not only as a physician but also as an individual living in Palmer and facing the possibility of 114 55-storey-high wind turbines, 80 of which will surround my property. That is from an individual's point of view.

From a physician's point of view, I am amazed by the fanaticism of our young physicians, which is promulgated by their colleges and also the NHMRC, on evidence based medicine. Somewhere along the line, doctors have forgotten the art of medicine. If a patient presents and says, 'I am ill,' you treat the patient with respect and treat that illness.

Rural GPs are in a unique position, because there may not be another doctor for 50 to 100 kays. They, more than any other doctor, need to take their patients seriously. However, in 2012 AGL wrote to clinics in western Victoria. As Senator Madigan said in the Senate:

... the letter aims to discredit and discount any patient visiting any doctor with any claims of ill health brought about by living near the Macarthur wind farm.

It is absolutely outrageous that an organisation would seek to influence doctors in the diagnosing of their patients.

It is also interesting to note the change in the NHMRC. The NHMRC are generally very conservative. In 2010, after their rapid review, they issued a statement saying there was no association. After their more formal review in 2014, they said there was poor evidence. Then in 2015 they start to ask for targeted research. They are changing their thoughts, and the question is: why? Why did AGL see the need to visit GPs? Why are the NHMRC changing their attitude?

Epidemiological studies have been done over the world showing that there are people who suffer a group of symptoms. This group of symptoms, if presented to a normal GP, would be looked at earnestly to look for a cause. It does not matter that we do not know the direct causation at this time. What we need to know as physicians is that there are people who are ill. However, if we are looking for a direct cause, following on from the NHMRC, Cooper and the Japanese group have demonstrated that there are EEG changes, that there are tools available that can be used in conjunction with this. We can also look at the work by Professor Salt on the cochlear hair cells. However, I should say we need to stop these things now, because once they are up even an authoritative body is just going to monitor the continuing ill-health.

Ms Nelson: I live on the same hill that he lives on. In essence, I am a criminal lawyer in Adelaide and so I am quite used to and comfortable with advocacy, debate and argument. My experience with Trustpower—and that is one of the things I want to focus on in my three minutes—has been mind-bogglingly disgusting. I cannot give you anecdotes; it is the whole conversation.

We found out in September 2013 that this 165-metre turbine development, which was then 144 turbines, I believe, was going to go up around us. As Gary said, we are flanked by them. We are on a very high hill and we will look out at 40 of these 165-metre monstrosities. The closest, I believe, is 1.2 kilometres away from us. The back of our property will have the same number, and then it will continue on through the range. We have a 10-year-old daughter and we are extraordinarily concerned about what this will do for her.

I cannot say anything that you have not already heard. What concerns me in Australia and worldwide is the vilification that people like me experience. I work in the city. I travel 60 kilometres to Palmer because I think it is worth it. In the city I am sensible, I am rational and I am respected. Once I step out of that paradigm and go to Palmer I am treated as an idiot by Trustpower, I am treated as someone who does not understand and I read the likes of Annabel Crabb, who describes people like me as 'dickbrains' because we say that people are affected by

turbines. The social ramifications beyond the construction of turbines frightens me, because what it says to me is that as a society we actually do not care about what happens to individuals. More importantly, we do not care what happens to rural communities.

For me the great divide is in coming into town, working in the courts and hearing all my friends talk about how fabulous renewable energy is. To my mind, this is not about renewable energy. It is not about being green. We live off the grid, with the exception of electricity, as do most of our neighbours. We want to conserve the land and we are conserving our 80 acres, but when my friends talk about renewable energy, to my mind and in my experience with Trustpower, which has been deceptive, you never know where firm ground is. You get told story after story. Every employee has a script. It is the same script and it does not matter what you say to them—you will get the same response.

As one of their henchmen said to one of our local members at an information session, it will happen because it is the law. So it beggars belief to me as a solicitor that there are no regulatory protections, either state or federally, which guard against this. When I first heard about this, I thought: 'As a lawyer, what do I need to do?' There is nothing I can do. In South Australia, as you know, there is not a damn thing I can do. We have provided a submission to council but we know that, post Paltridge, and given the DPA, we are powerless. We know that this will happen. As Gary said, once these go up it is too late for all of us. Thank you for listening.

Mr Voumard: I have a legal practice in Jamestown. I initially had an open mind to wind towers. I encouraged Suzlon to base their operation at Jamestown several years ago. Clive and Petrina Gare have been clients of mine, friends of mine, and I absolutely know that what they experienced has happened.

My wife and I live 15 kilometres north of Jamestown. We are about to be impacted by the Hornsdale wind farm development, which has done a side deal with the ACT government. So north of Jamestown is providing green power to Canberra so they can all feel wonderful. The cost of doing that is to destroy remnant native vegetation. South Australia has less than 10 per cent of its native vegetation. The remnant vegetation, the grasslands in the ranges where these towers are being built, is responsive to unseasonal rainfall events. It is why my wife is a merino breeder and sheep grower/wool grower has a viable merino flock because it is excellent grazing country.

Farmers under pressure, took the 30 pieces of silver. They signed up years and years ago. They now cannot get out of these arrangements. They are locked in. There are varying degrees of interest and ignorance in the community. Many of those who are addressing you this afternoon have been involved in this debate for years and I admire those who stick to it like Jacqui and Mary here.

We were all so-called consulted by the state government. The voluminous submissions to that consultation were ignored. We now have a development plan. The minister trumpeted the fact that he had given the power back to local government authorities. But the plan says that if you live in a rural environment, a wind farm is an ordinary incident of the rural environment—just complete and utter rubbish. Places like the Barossa ranges and the ranges north of Jamestown are sensitive places. As I said to the two Frenchmen who turned up in my office last week from their office in Park Street in Sydney, having just blown in from France because they are the latest bunnies to have bought the approvals from Investec: 'You haven't lived in this landscape. I've only lived in it for 30 years. My wife and her family have been there since 1872.'

We have strong relationships with the Ngarrindjeri community, the traditional owners, and we've spent the last 10 years reintroducing them to their country. They make the point that things like the state Aboriginal heritage legislation, when it talks of sacred sites, does not take account of the fact that the dreaming stories are in the entire landscape; they are in the ranges. Peppering the ranges with towers is destroying the stories.

From our Anglo-Saxon perspective, to us it is also destroying the landscape that we are familiar with. There has been no study done to look at the loss of production of grazing enterprises where you are building permanent roads like the south-east freeway through the ranges between the towers. No individual farmer has had the capacity to fund themselves. That work has not been done. My greatest objection is the fact the state government simply imposes this and says that in a country community we have to put up with towers within one kilometre of our homesteads. We have an 1854 homestead and have spent hundreds of thousands of dollars on it.

The Frenchman thought he was being a good bloke saying that it would be at least two kilometres between that homestead and the nearest tower. I said, 'If you do that, I'll be giving you notice. If we suffer adverse consequences, you and the hosts will be sued.' You can imagine the reaction in the local community will be when we have to send those letters to our neighbours.

Mrs Rovensky: First of all, the environment belongs to us all. It does not belong to a state government and it does not belong to the federal government. Here in South Australia, we are being disenfranchised from ownership

of that environment by not being given a say in what is going on in it. As has been pointed out, the ministerial changes after Richard Paltridge won an ERD court case against ACCIONA prompted the former state Premier Mike Rann to make changes. The fact that they already had those changes written up prior to that court case is, I suppose, irrelevant to one extent. Anyway, these changes have really meant that wind farm companies now have the right to do whatever they want with the sanction of the government. The people only have a say if a turbine is going to be placed within one kilometre from their home. I could end up with a turbine being placed near me. There has to be a boundary. There is a road between my home and the place opposite me. Because of that road, I will not get a say. I will not even need to be notified. So we are being disenfranchised, and I can see this happening elsewhere. In New South Wales, where a wind farm company re-sites turbines on a plan, they are told by the courts, 'You can't do that,' and then the government comes in and says: 'That's all right. They said they're going to sue us, so we'll let them do it.' Where are the people? Where are the people of this nation? Where do we have a say in the environment? They ask us to look after the environment, and then they come in and destroy it.

With the NHMRC, I personally cannot see any difference in their recent review from the one they did previously. They have still wiped out a lot of information they should have included. But, in their call for research, they have said that the broader social circumstances should be researched. We all know what they mean by that. Anything to do with that should come later, once the research has been done to establish whether there are—and I believe there are—affects from industrial wind turbines on people's health. Why waste money on doing something that is irrelevant or could be irrelevant?

Finally, on the EPBC, they have to start taking their role more seriously. We now know, after years of being told that there is no such thing as infrasound and turbines do not produce it, that they are now admitting they do. They have to start listening to what is going through the soils, the ground, and how that is affecting the creatures. I will finish there.

Ms Webster: I live in Palmer. In late 2013, I received a letter from the company about the proposed Palmer wind farm. My son was initially jubilant, and I was crestfallen, because I have an environmental science background and I could foresee what the impacts of such a development would be. It is 114 turbines divided into areas A, B and C within a 30-square-kilometre radius. This is the east side of the Mount Lofty Ranges. I have lived in Canberra. I spent five years in Canberra, and I know that the Adelaide Hills are a pimple compared to the Great Dividing Range, but that is all we have here. I have lived there for 18 years now, studying part-time and trying to rehabilitate the property that I am on in an environmentally sustainable and ecologically sensitive way.

I contributed to the development application opposition to the Palmer wind farm by the East Hills Landscape Guardians. I did the geology section, the geomorphology and also the hydrological effects. If you can imagine, this is a cross-section from Adelaide, which is on the coast, to the top of the Mount Lofty Ranges, and then the pronounced fault zone which is Palmer, and then Mannum, down to the river flats. It is a zone that is on the ecotone, which means on the edge of the vegetation and the ecological communities of the Mount Lofty Ranges and then those of the river flats. So it is a narrow belt of fragile, very thin soils mounted on rock, with particular plant and animal communities, most of which are listed, actually. There are at least seven listed communities with listed species. That means they are classed as either threatened or rare et cetera under the EPBC Act, which is the federal act, as well as under state legislation.

With this company coming in, there is a whole raft of environmental impacts—and I did talk about it in my submission—that a project of this nature would have. I had extensive discussions with the company in the initial stages, because they wanted to do noise monitoring on my place. I have 130 acres. That is a section of my place that I am indicating in the document I have here. This is the back of my place. It has a lot of tree lucerne that was planted by the previous owner. I said, 'What's the point of doing noise monitoring on my property? I have a lot of trees.' They said, 'No, we need a cross-section of different properties.' So I just wanted to point out the deception of the company. I had a half hour to three quarters of an hour conversation with the proponent from the company, and he said, 'Isn't it wonderful that it's renewable energy?' Well, I went into a lot of depth looking at even their own material. This is an extract from their own montage, which downplays the background and highlights the foreground. I have compared it to photos which I will pass around, from a similar aspect and distance as you can tell from vegetation and fence posts, et cetera, as a reference point. The deception of the company of the visual impact—I will be surrounded by 61 turbines within a 4½ kilometre radius. The drying effects, as we have heard from the previous person, the frost effects—it is basically changing the regional climate of the area. If it goes ahead here, it opens up open slather to the whole of the Adelaide Hills, which is unacceptable. It is right adjacent to the Barossa Protection Zone. I could go on and on. I will pass these on, if I can.

CHAIR: Thank you for your attendance here today. We will now adjourn the committee hearing.

Committee adjourned at 17:01