

This article mentions effects of noise and flicker on people, but does not mention the effect on wildlife.

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Turbines do more than produce power

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At Tipapa woolshed on a Thursday evening last month wind turbine researcher Bruce Rapley painted a picture of a cavalier attitude by wind farm developers towards the health of people living within earshot and sight of the turbines.

Having examined the science for several years, Rapley no longer believes that critics of turbines can be dismissed as "environmental jandal-slappers". While there would always be people adamantly for and against wind farms, he hoped his audience would be prepared to "learn and not to take sides". "Tonight, we've been given such a small amount of time to talk to you, all we can do is open the door to research here and around the world," he told the Greta Valley meeting. In fact, by the end of the night Rapley was confident enough to say: "Belief is not required ... don't believe me, I could be telling you any load of bollocks. Go and find out for yourself. Go and look at the internet."

Rapley's broad agenda was to explain the impact of wind farms on visual amenity and land values and to provide a sample of research on the effects of turbines on human health. Terms such as blade and shadow flicker dominated the evening, as the audience heard that turbines could potentially do more than blot the landscape or create incessant background noise. Rapley, a published author on wind farms and a resident of Palmerston North, said the problems they create are either annoying or bad for your health. However within the health spectrum there was also a "grey area" between that physiological and mental harm. An example of a physical reaction to the effect of light passing through turbines' sequences was the risk of photo-sensitive epilepsy. While this was a risk only for "some" and was generally unlikely to cause an attack, it was possible if two or more turbines were in line. "It's not a huge risk but the important thing is to know the risk. If I get on an aeroplane I want to know the risk. It's about being honest and telling people what the risks are ... you need to know where the hazards exist."

Shadow flicker could also be debilitating for some people living nearby, as was sunlight glint from turbine blades, which could cause migraines. Drivers were also potentially at risk from glint, just as they would be from "target fixation", whereby people are helplessly drawn toward objects that catch their attention. (think of the dangerous distraction of a driver seeing an attractive man or woman, Rapley suggested). He suggested "remedial action" such as ensuring that turbines were placed more than 5km from buildings or people, coating blades with low reflectivity paint and shrouding safety lights on the turbines to prevent a flashing effect.

Rapley accepted that some problems cited overseas such as shadow flicker may not cause the same trouble in New Zealand but turbine sound was likely to be similar, he

said. He was disturbed by the current NZ standards for measuring noise from turbines, which wrongly assumed, he said, that sound was a "smooth, progressive contour of receding noise". In reality, the distribution of such sound was more like a spiky hedge. Based on the experience of residents at Makara, the site of a Meridian wind farm in the Wellington region, "the current acoustic modelling is really well out of date", Rapley said. "The science is not settled" on NZ's sound modelling and noise standards, he added, saying humans can hear at very low frequencies which the current NZ turbine standards don't account for. Rapley, a showman throughout his presentation, was keen to highlight information which he said was being deliberately overlooked or understated by wind farm developers, such as the degree to which turbine sites vibrate - and indicator of the energy they release. "Wind farms, if you don't know, are simply tuning forks on a hill. They vibrate the ground. But they don't tell you that." There were multiple paths for this energy release: Air (acoustic), ground (seismic) and building resonance (sound and vibration). Some people affected by turbine noise talk about "pillow transmission", whereby a person with their head on a pillow can not only hear the sound transmission, they can also feel it. The effect could turn a house into a "low frequency loudspeaker".

Rapley acknowledged that as far as turbine sound was concerned, the type of noise reported varied from "having a tumble-dryer in your house" to a buzz or drumming. However, cases of nausea and confusion related to turbine action had been documented world-wide. "What's more, a low frequency, low amplitude sound can activate a 'flight or fight' response, triggering the brain's fear receptors to affect blood pressure, heart rate, sweating and digestion. "Long-term effects of this response include anxiety, disturbed sleep, fatigue and general tiredness, increased irritability and an increased risk of accidents. The human body's response to the sort of low frequency sound that turbines produce is "system hardware...not something you can do anything about", Rapley said. Based on reports from overseas and elsewhere in NZ, Rapley predicted people living near the proposed wind farms in North Canterbury would experience a loss of "visual amenity", noise pollution that affects sleep and well-being, health effects related to stress and "social disruption and community polarisation". His prognosis is that "for some bizarre reason, turbines will continue to be built", forcing nearby communities to suffer. He also predicts that residents' complaints will continue to go largely unaddressed.

Many of Rapley's concerns were shared at Greta Valley by fellow guest speaker, Philip Dickinson, an acoustics expert from Massey University who was the only dissenter on the 12-person panel that created a NZ standard for wind turbine noise.

Dickinson said a single loud sound is most unlikely to do a person harm, but prolonged sound was another matter. He dismissed suggestions from wind farm promoters that it was possible to accurately predict how sound travels from turbines from a particular site. "We can predict the sound just about as well as we can predict the next total eclipse of Jupiter", he said. Computers could not predict every scenario and as it stands the measurement of background sound levels were "subject to very large error" in that measurements were often taken using standard commercial equipment. These industrial devices could not read lower than 40 decibels, so this figure has become the default measurement for any lower-level sound. Council consent officers and regulators were

therefore not receiving the information they needed to make informed decisions, Dickinson said. "The thing that annoys me most of all is that the local authority under the RMA is responsible for consenting and measuring compliance". This was despite there being no easy way for regulators of district plans to measure sound accurately.

Dickinson said the prediction for wind farm noise in the NZ standard will always under-predict the noise by 20 decibels, adding that the ISO standard for this noise was written for application in buildings, not specifically for wind farms.

However, the final word goes to Rapley, who suspects that the country's noise standards have been made as "blindingly, scientifically stupid as practically possible to make it as confusing as possible to regulate, which allows people to make it as noisy as they want".
Something too stupid for people to see the sense? Only a wind farm could present a paradox like this one.