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Our comments relate to renewable energy – in particular wind farms.

We live on a farm neighbouring one of the host farms for the proposed Twin Creek wind farm which is currently under consideration by SCAP. This has motivated us to find out more about the possible effects of a wind farm and the processes by which they are approved.

### **1. Noise limits**

We were indignant to find that the noise limits for Rural Living (35dB(A)) and Primary Production (40 dB(A)) were different. Given that the background noise level in rural areas likely to be lower one might expect any differential would be the other way round (to equalise any increase in noise level).

### **2. Setback distance between turbines and residences**

We were equally indignant to find that the setback distance between turbines and residences was 2 km in townships and 1 km for rural residences. Again, comparison of the likely impacts (both visual & noise) would suggest any differential would be the other way round. Bob Thorne, in his 2014 paper “Propagation thresholds and measurement of infrasound to establish separation distances from wind farm turbines to residences”, found the threshold for annoyance under temperature inversion conditions to be 4.4 km.

### **3. Use of dB(A) measurements**

Recent research into wind turbine noise emissions seems to have reached a consensus that characteristics other than average sound intensity are real and responsible for much of the “annoyance” reported. Amplitude modulation, tonality, low frequency emissions and infrasound are among such characteristics. Given this consensus in both scientific forums and legal cases it is embarrassing that our current guidelines continue to use dB(A) measurements. WHO guidelines (1999) state “*when prominent low-frequency components are present, measures based on A-weighting are inappropriate.*”

### **4. Size and height of turbines**

As turbine size and height increase so does their sound intensity. In addition the proportion of low frequency & infrasound emissions also increases. This means that guidelines put in place in 2012, when turbine sizes & heights were significantly less, are no longer appropriate.

### **5. Risks from microclimate change**

Anecdotally, cereal farmers and vigneron adjacent to recently constructed windfarms have reported a dramatic increase in the incidence of severe and devastating frosts. Research shows that wind farms do affect microclimate and that further research is required before putting at risk large areas of cereal & grape production.

A comprehensive summary of the current state of scientific knowledge of how wind farms may impact local atmospheric daily minimum temperature variability is contained in the 2018 University of Canterbury paper by Marwan Katurji (Physical basis of the effect of wind farms on downstream atmospheric conditions).

## **6. “Envisaged” form of development**

To avoid noise, amenity and microclimate impacts on rural residents and primary production, wind farms should not be an “envisaged” form of development in closely settled rural areas. It seems likely that pastoral properties adjacent to the proposed NSW interconnector could be suitable for such development.

## **7. Noise impacts inside dwellings**

It is claimed that noise impacts from windfarms are particularly acute inside residences. This may be due to sleep disruption although research indicates that low frequency and infrasound may set up resonances within buildings. WHO Environmental noise guidelines for Europe 2018 Page 85 states - *“The noise emitted from wind turbines has other characteristics, including the repetitive nature of the sound of the rotating blades and atmospheric influence leading to a variability of amplitude modulation, which can be a source of above average annoyance (Schäffer et al., 2016). WHO (2018/ Page 86 summary states “there are serious issues with noise exposure assessment related to wind turbines”*

Guidelines for the impact of noise emissions should address impacts within residences as well as outside them.

## **8. Classification as “Category 3”**

Wind farm developments have implications and effects on whole communities as well as on immediately adjoining landholders. They should be subject to full public scrutiny. Many of the technical & ecological aspects of such a development require specialist expertise for thorough scrutiny. They should be classified as “Category 3” to enable broader notification, a wider range of submissions and appeal rights.

## **9. Independence of critical reports**

Wind farm applications typically include a range of “independent” expert reports (eg. Sound, visual impact, ecology, heritage, ...). It may be argued that the companies providing these reports

- Derive most of their income from contracting their services to wind farm developers
- Are briefed by wind farm developers on the scope of their reports
- Provide draft reports to the wind farm developers for revision prior to a final report.

Clearly such reports are necessary but could development approval processes be set up in such a way as to make their independence more transparent and unchallengeable? Could they be contracted by and accountable to the approving authority (SCAP)?

## **10. Time for scrutiny & response**

A wind farm development application, including the accompanying reports, can amount to several thousand pages. It may have taken years to prepare. For thorough scrutiny, all documents (including reports, submissions & referral agency responses) should be available on line for an extended period of time. The current allocation of 10 business days is completely inadequate.