

## Lesson 6: Why the NZS has set Wind Farms up to Fail

### The Bald Hills judgement:

- Identified that the NZS is not written to readily identify short periods of noise nuisance that may impact sleep.
- Determined that demonstration of permit compliance does not necessarily establish that noise from time to time does not cause a nuisance.

The New Zealand Standards (NZS) assumes wind farm noise is constant – it is not – it is intermittent.

The NZS was written when turbines were small and located in the far off hills of New Zealand, many kms from towns and homes.

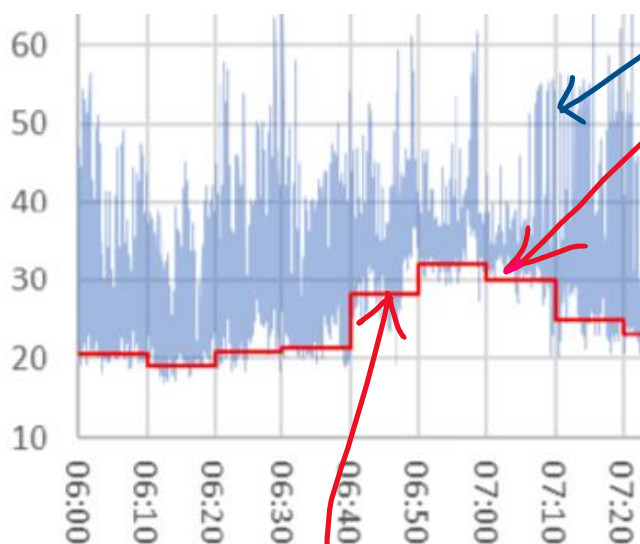
From a distance, these smaller turbines were heard as a constant low hum, like the hum of road traffic noise from a distant highway.

Now modern turbines are six times the size and located distances of only 1-2 kms from homes.

The LA90 statistical calculation in the NZS is based on noise being received as a constant continuous stream.

The NZS was not written to analyse intermittent noise or noise on individual nights. Intermittent noise on individual nights is a major cause of nuisance.

### Here is a graph of noise from a wind farm monitor



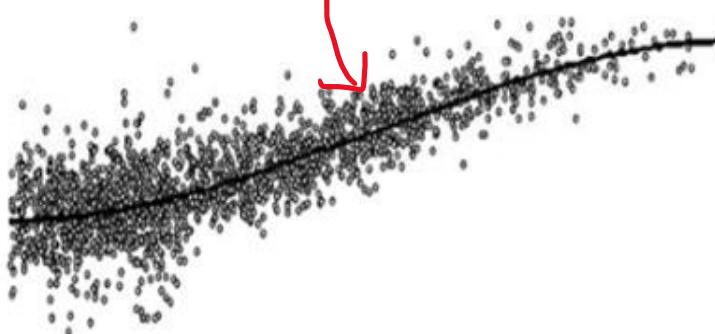
**Noise Recordings** - *These are the Noise Levels you hear.*

**The LA90(10min) level** - *This Is the Noise they say you hear.*

The LA90 (10min) statistical level is the lowest 10% level of the noise measured for that 10 minute period.

The LA90(10min) statistical level hides 90% of the noise.  
***It hides the high noise you hear.***

- \* This hidden noise occurs in each 10 minute period.
- \* This is the noise that wakes people up at night.
- \* This is the noise that causes the nuisance.



The LA90(10min) statistical level is plotted as a data point (dot) on a graph.

A data point is the quietest 10% of noise in a 10 min period of noise monitoring.

90% of the noise in any 10minute period is hidden behind every data point.

*The noise you hear is hidden in every data point.*

### Using a Wind Farm's compliance graphs as Noise Nuisance Evidence

In a common law case it is up to the defendant to disprove the nuisance.

Given that a data point hides the high noise spikes, it could be said that every data point is evidence of noise nuisance.

*It is up to the wind farm to prove that a data point does not contain the high noise that causes the nuisance.*

## You don't have to be an acoustician to know how to calculate an LA90.

Once you know how a LA90 calculation works you realise how deficient it is in protecting people from sleep disturbance, and why intermittent periods of substantial unreasonable annoying noise can be generated by a wind farm that claims compliance with the NZS.

### **This is how it works:**

An LA90 calculation comprises a re-sorting of a unit of noise recordings into two groups. A 90% group and a 10% group.

### **In an LA90 calculation:**

- \* A continuous unit of noise is recorded usually at a rate of 1 reading per second.
- \* The noise levels are sorted from highest to lowest
- \* Then split into two groups in a 90:10 split.
- \* 90% of the noise samples are above the split and 10% are below the split.

### **In a 40dB LA90(10min) calculation the following occurs.**

- \* 10 minutes of continuous noise levels are recorded in each unit of data or data point.
- \* The 90:10 split point is 40dB.
- \* In 10 minutes of continuous noise recording - 9 minutes (90%) of the noise is above 40dB, and
- \* 1 minute (10%) of the noise is below 40dB.

### **In a LA90 calculation, the noise held within the measurement is never the same.**

Unlike speed limits on roads, where 100km/hour in a truck is the same as 100km in a car, an LA90 calculation always holds different noise levels.

Every 40dB LA90 calculation is different.

The hidden noise levels within a LA90 calculation always vary. For example,

- \* one 40dB LA90 could hold hidden noises of 50-70dB for 90% of the time.
- \* Another could hold hidden short bursts of intermittent high noises between 45 and 60 dB for 90% of the time.

The very nature of a 40dB LA90 calculation requires that the majority of noise is above 40dB and there is no maximum level.

The problem for neighbours is that a measurement of 40dB LA90 can hold hours and hours of substantial unreasonable annoying noise that causes them sleep disturbance.

This explains why Justice Richards Justice Richards (Uren v Bald Hills Wind Farm Pty Ltd [2022]) was able to determine that intermitting unreasonable and annoying noise can occur from a wind farm that demonstrates compliance with the NZS.

[The judgement can be found here](#)

### **In summary the deficiencies of the 40dB LA90(10min) calculation are:**

- The formulae assumes a constant noise stream, yet noise from turbines is not constant. Noise from wind turbines is intermittent and the LA90 formulae does not identify intermittent noises
- The nature of a LA90 calculation means that any intermittent high noises are not identifiable and don't effect or adjust the 40dB split.
- Special audible characteristics are not identified.
- Annoying intermittent high noises that wake people up at night are not identified.
- There is no maximum level. Noises of 50-70dB and above can be generated by a wind farm for most of the night and the wind farm can still claim compliance.
- In every 10minutes of continuous noise recording, 9 minutes of the noise must be greater than 40dB with no maximum level.

### **Both noise and wind data is crucial for the Regression Line analysis required in the NZS**

Different acousticians will use different software programs, and different software programs will generate different regression lines.

But the overriding assumption is - the higher the wind speed - the higher the noise that can be emitted.

### **It is the speed of the wind that determines if the data point on the regression line is compliant or not.**

Using the fast wind from outside the wind farm corrupts the regression line graphs, because it allows a higher noise to be generated and still show compliance.

Wind masts outside and up wind of the turbines record wake free, fast, smooth flowing air.

As wind passes through the wind farm, the air is churned up – speed energy is lost turning the blades, the air is slowed, and the turbulent air is noisier.

Taking the faster air from outside and upwind of a sensitive dwelling corrupts the graph, because it allows the noisy turbulent air at the dwelling to be replaced with the wrong wind speed. It's matched with the faster air coming into the wind farm instead of the slow, turbulent, noisy air at the sensitive dwelling.

This corruption of the LA90 graph can be easily overcome by using the average wind speed measurements from the anemometers on the nacelles of the wind turbines.

Each turbine has an anemometer housed on top of the nacelle.

The wind companies should provide this wind speed data to the public, but they don't and the permit doesn't require them to do so.

I wonder why??