

Submission on
Draft NSW Planning Guidelines: Wind Farms
from **Climate Change Balmain-Rozelle Inc.** <http://www.climatechangebr.org/>

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We find that the guidelines would raise unwarranted barriers to wind farm deployment. The noise limits are as restrictive as any in the world, the health provisions conflict with advice from the government's own advisers, the processes unduly time-consuming, and the standards go beyond those applied to conventional power generators.

I. Comments

Planning Authority

The \$5m threshold (section 1.2) at which the JRPP becomes involved is very low by today's standards. Even a community wind farm like that at Hepburn would exceed this. It is perhaps derived from the references to \$5m in the cited 1979 act. In 2011 the CPI was more than four times its 1979 value¹.

Noise

The noise standards are draconian. As Figure 2 on page 29 of the draft guidelines illustrates, the general 35dBA "limit"² is lower than that applied elsewhere in Australia, in Western Europe or the US. (For a larger sample see Appendix A below.) No good reason is given for setting it lower than the existing NSW limit for rural areas at night. The principle offered under Table 1 on page 28

"5dB(A) below the lowest acceptable noise criteria for [the area]"

is arbitrary. Adding a sound source 5dBA below the background raises the total noise by 1dBA; the minimum perceptible change is generally agreed to be 3dBA.

Does the Planning and Infrastructure Department have evidence of residents who raised no objection to a wind farm beforehand later finding 40dBA to be a nuisance?

Merely raising the limit to 40dBA, which would still be at the low end on the international range, would tend to reduce the buffer zone area by 75%. Even compromising at 38dBA would allow the government to show a tough stance against wind farm annoyance while usefully easing the constraint.

Blade Glint

Modern wind turbine blades have a low reflectivity finish. The inherent curvature in the blade makes the effect very small within a short distance. According to the EPHC³ the risk of blade glint from modern wind turbines is considered to be very low.

Shadow Flicker

At the 15-20 rpm of typical large 3-bladed wind turbines, the flicker rate is at most 1Hz. At that frequency there are no health implications from a stroboscopic effect³, so the issue is annoyance. For most of the day, the shadow could only reach 1km away if the turbine is at the top of a ridge and the observer below.

That leaves early morning and late afternoon. At those times, with the sun low in the sky, the direct light is weak. Ambient light becomes more illuminating than direct sunlight.⁴ The contrast between shadow and non-shadow is correspondingly weaker.

Large blades may be up to 2m at the widest point, but that is near the hub, where the angle of the blade is steepest. The head-on projection is about 80cm. A more oblique view casts a wider blade

1 <http://www.rateinflation.com/consumer-price-index/australia-historical-cpi.php?form=auscpi>

2 The complete formula is $\max\{35, L_{90}+5\}$

3 *National Wind Farm Development Guidelines - Public Consultation Draft*. C of A, Adelaide 2009

4 http://wiki.naturalfrequency.com/wiki/Daylight_Sunlight

shadow but with less variation as the blades rotate.

At 500m, the fraction of the sun's disc obscured by an 80cm wide strip would never exceed 1/5th, so the dimming with each blade pass would be less than 1/10th.

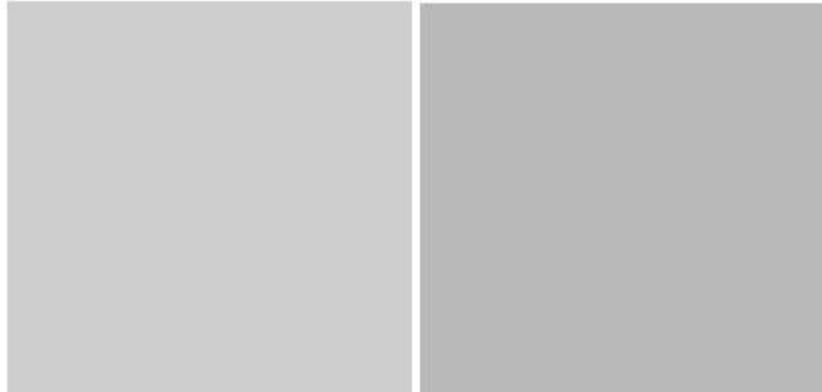


Illustration 1: Right-hand square is 90% as bright as the left

Blade Throw

Modern turbines are well designed to shut down automatically when stress, such as overspeed operation or vibration, is detected. Anti-wind farm activists have exaggerated the issue by using data from early models and ignoring air resistance in the trajectory.

A 2007 report⁵ by a US engineering consultancy found that

“The setbacks of 1,200 feet from off-site residences, trails, and recreational areas, 1.5 times the Total Height of the WECS (615 feet) from structures, and 500 feet from the nearest public roads would prevent blade throw onto adjacent property or public roads”

A 2008 UK Council report⁶ found

“600m from any residential or institutional zone, which would include schools, provides ample setback in the unlikely event of a turbine failure”

A 2008 US environmental report⁷ noted

“To date, no injuries or fatalities have occurred in North America due to blade or turbine breakage and/or collapse, or with fragments and pieces found between 100-200 meters from the turbines”

The chances of anyone being injured by blade throw are clearly minuscule. Every driver on the road has a greater chance of injuring someone in their lifetime. The normal free market mechanism whereby actuaries set insurance premiums is adequate.

In Europe and the US, the main safety concern is ice-throw.

Electromagnetic Interference

The blades of modern wind turbines are made exclusively of synthetic materials, so cause less interference than older models⁸. In Europe, wind farm masts often serve as transmitter towers⁸. Radar is a concern; the UK guidelines⁹ indicate consultation is appropriate for any radar operating within 24km.

TV reception is much less likely to be affected since the roll-out of digital services¹⁰.

The field generated by the turbine itself is negligible at ground level directly below it⁸.

5 http://www.horizonwindfarms.com/northeast-region/documents/under-dev/arkwright/Exhibit14_IceSheddingandBladeThrowAnalysis.pdf

6 <http://www.apfo.org.uk/resource/view.aspx?RID=111670>

7 AMEC Earth & Environmental, (2008). Environmental Impact Assessment City of Summerside Wind Farm: Final Report

8 <http://www.cres.gr/kape/publications/papers/dimosieyseis/CRESTRANSWINDENVIRONMENT.doc>

9 <http://www.caa.co.uk/docs/33/Cap764.pdf>

10 http://licensing.ofcom.org.uk/binaries/spectrum/fixed-terrestrial-links/wind-farms/tall_structures.pdf

The grid connection would be covered by existing standards.

Consultation

While empowering local communities is important, the draft guidelines require a level of community consultation and consent that is inconsistent with the potential impacts of a wind farm development and much more stringent than the requirements for coal mines, coal seam gas or minerals processing. The increase from 30 days to 60 days is quite without justification and imposes a significant delay on the developer. The process as a whole is an encumbrance on the developer and appears disproportionate for small installations (under \$5m).

The requirement to consult with holders of exploration licences is inappropriate. Such licences exist for vast swathes of NSW; landowners do not consult them every time they wish to construct a barn. There is little likelihood that a miner would be interested in the high ground suitable for a wind turbine, but there is the potential for objection from a mining company wishing to protect its fossil-fuel interests from competition.

The overall level of prescription in the consultation process is onerous both for the developer and other interested parties. In consequence, it is more likely to be attended by those opposed to the development than those who are in favour but who do not stand to gain significant advantage from it.

Consultative committee for an SSD

- "neighbours along the transport routes" does not appear to be defined. How far away can a property adjacent to a transport route be and still be considered a neighbour?
- Including
"organisations that represent those with a state, national or global interest, e.g. peak environment groups and national industry associations"
would appear to invite competing power generators. This hardly seems appropriate. Where such competitors have a valid concern over operational impact they can lodge a submission, but they should not be entitled to sit on the committee.

Birds & Bats

The "bird and bat" clauses are ill-founded.

A 2009 study¹¹ found wind farms are responsible for 0.3 to 0.4 fatalities per GWh, while fossil-fuelled power stations are responsible for about 5.2 fatalities per GWh.

A 2007 study by the US National Academy of Sciences found wind farms responsible for less than 3 deaths per 100,000 killed by man-made structures and activities. Wind power already accounted for 1% of US power generation at that time.

In the absence of any stronger data to suggest that wind farms are more injurious to birds and bats than conventional power sources, there is no basis for imposing requirements those conventional sources do not face.

Health

The claim that the guidelines were developed "in consultation with the NSW Ministry of Health" is prevarication. As revealed by an FOI action¹², it would be more accurate to say they were developed in spite of advice from the NSW Ministry of Health.

Noise

Despite the complete lack of credible evidence of any physiological consequences of wind

¹¹ Sovacool, B. K. (2009). "Contextualizing avian mortality: A preliminary appraisal of bird and bat fatalities from wind, fossil-fuel, and nuclear electricity". *Energy Policy* 37 (6): 2241–2248. doi:10.1016/j.enpol.2009.02.011.

¹² <http://yes2renewables.org/2012/01/24/time-to-stop-listening-to-front-groups-junk-science/>

farm noise beyond a "nocebo" effect¹³, the guidelines would require developers to 'consider health issues' and in some cases be referred to the Department of Health. Under the guise of the precautionary principle, the guidelines lend government credibility to the myth that wind farms meeting existing general standards on noise are detrimental to human health.

According to Professor Simon Chapman at the University of Sydney¹⁴ :

"The British Acoustics Bulletin has just published what is now the 10th independent review of the evidence on wind farms causing annoyance and ill health in people. And for the 10th time it has emphasised that annoyance has far more to do with social and psychological factors in those complaining than any direct effect from sound or inaudible infrasound emanating from wind turbines.

"Two factors repeatedly stand out. The first is being able to see wind turbines, which increases annoyance particularly in those who dislike or fear them.

"The second factor is whether people derive income from hosting turbines, which miraculously appears to be a highly effective antidote to feelings of annoyance and symptoms."

Electromagnetic Fields

There is no basis for considering electromagnetic fields to be any more of a health issue than with any other transmission network of similar load. As mentioned, there is no risk from the generator itself.

Shadow Flicker

As mentioned, the frequency is too low for there to be any health implications from a stroboscopic effect³

Aesthetics

No wind turbine is likely to improve the view; anyone living within sight of it and not deriving direct benefit from it will be motivated to object. Research has shown that subjective assessments of aesthetic impact correlate strongly with unrelated considerations by the same individuals, including whether the individual agrees there is a need to reduce GHG emissions, and whether the individual anticipates financial advantage from the development⁸.

Over the years, such objections generally decline; the Eiffel Tower was vigorously opposed on aesthetic grounds when mooted.

It would be unjustified to apply standards that go beyond whatever exists today for other assets, such as power stations, transmission lines and farm infrastructure.

Property Values

While sympathy may be felt for anyone who perceives a drop in their property's value from a nearby development, it should not be an automatic ground for objection. Anti-wind-farm groups, funded by climate-change deniers, and so indirectly by the fossil fuel lobby¹⁵, have run a scare campaign. Insofar as wind farms do depress nearby values, it is likely to be more a result of that campaign than of any intrinsic nuisance. Over time, the fear will abate and property values recover.

In 2007, the US NAS noted that several studies have been unable to find a correlation between wind farms and lowered property values within a 10-mile radius of their sites¹⁶.

Strategic Justification

13 <http://en.wikipedia.org/wiki/Nocebo>

14 <http://www.smh.com.au/opinion/politics/much-angst-over-wind-turbines-is-just-hot-air-20111220-1p3sb.html>

15 <http://www.crikey.com.au/2011/10/13/the-web-of-vested-interests-behind-the-anti-wind-farm-lobby/>

16 National Academy of Sciences, *Environmental Impacts of Wind-Energy Projects*, p. 2.

It is generally up to the free market to decide whether a development is economically justified. A strategic justification could be taken into account when balancing against what may otherwise be reasonable grounds for objection, but should not be a requirement where no reasonable objections exist.

The justification of benefit to the local economy is, strangely, only mentioned under "alternatives considered".

Alternatives Considered

The scope of this subsection is unclear. From the text, it appears to be saying that the proposal has to be evaluated in comparison to all possible alternative renewable energy projects anywhere in the state(!) If the intent is only to compare within the same local area, why the reference to "benefits on the local and strategic scale"?

Decommissioning

In what regards would wind farms require rules on decommissioning beyond those that would apply generally to structures erected on private property? Unmaintained towers and blades would become a hazard, as might any toxic materials within the generator. But there seems to be no reason to pay special attention to anything below 1m in height unless the installation is in an area designated for its natural beauty or environmental sensitivity.

Moreover, the steel and copper components will continue to be valuable, more than covering the cost of their removal.

Appeals procedure

There appears to be no arrangement for an appeals procedure.

II. Recommendations

1. *Planning Authority*

Raise the thresholds in the table in section 1.2 to

- (a) less than \$20m
- (b) \$20m-\$30m
- (c) over \$30m, or over \$10m in an environmentally sensitive area

2. *Noise*

Increase the noise limit to at least $\max\{38, L_{90}+5\}$. Apply a 5dBA penalty for pure tones.

3. *Blade Glint*

- (a) Set a surface reflectivity level which all or nearly all modern blades come under.
- (b) Establish, by experiment, a distance beyond which a conforming blade can be assumed not to create a glint issue. (We anticipate this would be rather less than 1km.)
- (c) Further assessment would then only be required for a non-conforming blade or a distance less than the established one.

4. *Shadow flicker*

Allow shadow flicker to be discounted as an issue unless shadow would fall on a neighbour's property within 50m of a dwelling thereon either

- (a) between the hours of 9am and 3pm AEST for dwellings beyond 500m, or
- (b) at any time for dwellings within 500m

5. *Blade Throw*

Specify an international standard against which the equipment must have been certified by the manufacturer. The only further provisions which should be needed are in relation to inspection and maintenance.

6. *Electromagnetic Interference*

Publish a distance beyond which radar operators need not be consulted. Following the UK standard, 24km is suggested.

7. *Setbacks*

- (a) Split the zone presumed to be affected into two ranges, up to 1.5km and 1.5-2km.
- (b) Require the additional upfront assessment when there are homes within 1.5km.
- (c) If the noise assessment indicates that the limit would be breached within 1.5km (whether at a habitation or not) then the assessment should be extended to the geographic limit of that noise threshold.
- (d) Between 1.5km and 2km, homeowners must be explicitly notified and given time to draw up and lodge objections; for this outer ring, the onus is more on the objectors to make their case than on the proposer.

8. *Consultation*

- (a) Reduce the geographic range for objections triggering the gateway process and for automatic inclusion in a consultative committee from 2km to 1.5km, except as noted in recommendation 7.(c) above.
- (b) Limit "neighbours along the transport routes" on any given route to be those nearer than the nearest of:
 - i. 20km
 - ii. a 100kph or more road, or intersection therewith
 - iii. the first 10 properties
- (c) Allow the proposer to exclude from the consultative committee any group, company, association or individual with a demonstrable conflict of interest, such as a pecuniary

- interest in a competing production of electricity.
- (d) Drop the requirement to consult with mineral exploration licence holders.
- (e) Develop a simpler process for small installations

9. *Birds and bats*

Since the existing evidence is that bird and bat mortality is low, the base requirement for bird and bat assessments should consist of establishing the presence or otherwise of threatened species or migration routes in the vicinity. Only where such are present should it be necessary to make further study.

10. *Health*

Health considerations are adequately covered by the noise constraints and standard regulations on electromagnetic fields.

11. *Aesthetics*

There is no known way to assess aesthetic impact objectively. Those who oppose the development will hold that there is an aesthetic impact, and most likely be sincere in doing so. The standards should not go beyond whatever exists today for other assets, such as power stations, transmission lines and farm infrastructure.

One possibility is only to entertain the notion of such impact at a location

- (a) of, say, 100 sq m of contiguous extent, and
- (b) at each point of which the visible part of the development would subtend a solid angle which
 - i. exceeds 10^{-3} steradians, and
 - ii. exceeds the sum total of solid angles subtended by visible parts of existing man-made structures and developments in any direction

Some research would be needed to establish appropriate numbers.

12. *Property Values*

Property values should only be accorded consideration where tourism makes up at least 5% of the local economy.

13. *Strategic Justification*

- (a) Make this optional
- (b) Allow local economic benefits as part of a justification
- (c) Rewrite the "Alternatives Considered" clause to something practical

14. *Decommissioning*

Other than in areas designated as being of particular natural beauty or environmental sensitivity:

- (a) Only require that the structures be removed above 1m height;
- (b) Consider the recycle value of the materials as contributing to the bond.

15. *Provide an appeals procedure.*

- (a) Independent of the State government and its bureaucracies.
- (b) In relation to the appointment of the chair of the committee.
- (c) In relation to decisions of the JRPP.
- (d) In relation to consideration of objections by parties having competitive interests.

Appendix A: Existing noise regulations around the World

| Authority | Date ¹⁷ | dB(A) ¹⁸ | Pure tone penalty | During | Zone | At | Remarks |
|--------------------------------|--------------------|---|-------------------|-----------|---------------|----------------------------------|--|
| Michigan | 2007 | max{55, L ₉₀ +5} | | | | property line | guideline |
| Pennsylvania | | 55 | | | | outside a home | guideline |
| WHO | 1999 | 45 | | night | | inside home | averaged overnight |
| Centerville Township, Michigan | 2010 | max{35, L+5} | | 0600-2200 | | property line (or?) within 1.6km | |
| | | L+5 | | 2200-0600 | | | |
| Denmark | 1995 | 40 | | | re-sidential | | |
| | | 45 | | | rural | | |
| Netherlands | 2001 | 50-? | | day | | | Depends on wind speed according to a published curve |
| | | 45-? | | eve | | | |
| | | 40-50 | | night | | | |
| Germany | 1995 | 55 | | day | re-sidential | | |
| | | 40 | | night | | | |
| | | 50 | | day | rural | | |
| | | 35 | | night | | | |
| Mass. | 1990 | L ₉₀ +10 | 7 | | | | |
| Ontario | | 40 | | | | 30m from a home | Also complex rules re #turbines, intrinsic noise and distance to a home ¹⁹ |
| Sweden | 2003 | 40 | 5 | | | outside a home | |
| France | 1992 | L+3 | | | | | |
| UK | 2011 | max{35-40, L ₉₀ +5} | | day | | outside a home | Range allows tolerance for small number of people affected and/or large power benefit. |
| | | max{43, L ₉₀ +5} ²⁰ | | night | | | |
| Oregon | 2006 | L ₅₀ +10 | | | | | |
| ISO | 2006 | 35 | | 0700-1900 | Rural; +5 for | | |

17 Date of information, not of law

18 'L+' denotes excess over ambient.

19 <http://www.ene.gov.on.ca/en/news/2009/060901mb2.php>

20 Possibly unique in having a higher nighttime limit than daytime; perhaps assumes windows closed at night

| Authority | Date | dB(A) | Pure tone penalty | During | Zone | At | Remarks |
|-----------|------|-----------------------------|-------------------|--------------|--|--------------------------|-----------------------|
| | | 30 | | 1900-2300 | suburban, +10 for urban | | |
| | | 25 | | 2300-0700 | | | |
| Maine | 2006 | 45 | | night | | | Proposed to cut to 42 |
| Rhode I | 2009 | min{45, L+3} | | day | | (residential?) structure | Proposed |
| | | min{35, L+3} | | even'g/night | | | |
| Ireland | | min{45, L ₉₀ +5} | | day | Suburban ; fixed 35-40 if L ₉₀ < 30 | | Guideline |
| | | 43 | | night | | | |

Glossary

| Term | Description |
|-------------|--|
| <i>AEST</i> | Australian Eastern Standard Time |
| <i>CPI</i> | Consumer Price Index |
| <i>EPHC</i> | Environment Protection and Heritage Council |
| <i>GHG</i> | Greenhouse Gas |
| <i>GWh</i> | Gigawatt-hour |
| <i>JRPP</i> | Joint Regional Planning Panels |
| <i>NAS</i> | National Academy of Sciences |
| <i>SSD</i> | State Significant Development |
| <i>WECS</i> | Wind Energy Conversion System (i.e. a turbine) |