



Glossy Black Cockatoo

Wind



EIS

Community Guide

windeis.com.au

## Plain English Guide to

### Wind Energy: Visual Impact Assessment Bulletin December 2016

#### Introduction

The Visual Impact Assessment Bulletin is a guide to assessment of visual impacts and gives a methodology for visual analysis which requires early consideration of visual impact, taking account of viewer sensitivity, scenic quality, and visibility zones based on distance to turbines. The intention is to avoid and minimise visual impact as much as possible.

This is a plain English guide for communities. We have been faithful in our attempts to summarise the Bulletin. Any issues we think warrant further consideration are summarised at the end of this document.

Wind turbines dominate the landscape, they are tall moving structures with a distinctive outline often located on high ridgelines and covering large areas unmatched by other forms of development in rural landscapes.

Visual assessment is a complex and subjective<sup>1</sup> process and should be conducted by suitably qualified professionals.

#### Stage 1: Preliminary Environmental Assessment (pre-lodgement)

At the scoping and design phase, the proponent must undertake a preliminary environmental assessment that considers the landscape in which a proposed wind energy project will be located. This analysis must include:

- community consultation involving people from the visual catchment (where turbines are theoretically visible) to:
  - inform the community about the proposed project area, turbine layouts and access routes
  - establish key landscape features (mountain peaks, distinctive buildings, tourist activity etc) valued by the community
  - assess key public viewpoints (lookouts) and private viewpoints (desirable views of landowners) in the area
  - gather information about the scenic quality of the area
  - let community rank views, landscape features and scenic quality into high, moderate or low visual significance
  - listen to concerns and suggestions for alternative siting of turbines
- a map detailing key landscape features (including information from community consultations and site inspections), the preliminary wind turbine layout, the location of dwellings<sup>2</sup> and key public viewpoints and an overlay of the wind resource

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1 Refer to Attachment 1 for a discussion of the subjectivity of visual impact

2 Refer to Attachment 1 for a discussion of the definition of dwellings and what properties should be included in the visual assessment.

- describe the magnitude of the visual impact in terms of distance and number of turbines
  - visual magnitude: the turbine height to blade tip determines the visual impact zone (distance to nearest turbine) which must be considered in detail: turbines, dwellings and public viewpoints within this sensitive zone should be identified and solutions for reducing the visual impact should be given otherwise further assessment and justification for placing turbines in the visual impact zone will be required in the EIS
  - multiple turbines: provide a sector analysis of every turbine in six sectors of 60° for each dwelling or public viewpoint up to 8 km away showing the cumulative effect of multiple turbines and provide details of which turbines are visible in 3 or more sectors and from which viewpoints; these turbines will be a focus for assessment during the EIS

## Request for SEARS

The Preliminary Environmental Assessment (PEA) described above goes to the Department with a request for SEARS.

The Department will issue the SEARs detailing EIS assessment requirements within 28 days.

## Stage 2: Assessment and determination

### Introduction

Visual assessment is a combination of on-site evaluation and desktop analysis of all viewpoints and individual dwellings from which turbines are theoretically visible.

Under some circumstances it may be possible to select and assess one dwelling from a relatively close clustering of houses as being representative of say a rural residential area, a village or urban area. This representative viewpoint must be based on the 'worst case situation' that is, it would be the closest to turbines or have the most panoramic view; the number and location of viewpoints being represented in that cluster must be identified.

Views to the turbines from the primary living areas – living, family, kitchen, dining, bedroom - of the dwelling would be considered more important than views from non-habitable areas like the garage.

The visual assessment, guided by the SEARS, must address the overall landscape impacts as well as potential cumulative impacts of wind farms in the region (existing, approved and proposed) with a focus on the public and private viewpoints, landowners in the sensitive zones (within a specified distance of turbines) and the turbines visible across 3 or more sectors identified by the preliminary assessment.

Ongoing consultation with the community is required during the EIS process to verify findings from scoping and design as well as provide input to the baseline study described below.

### EIS Elements

The EIS must include:

- the visual representation of the proposed wind turbine and ancillary infrastructure layout and the visual landscape, including written descriptions, photographs, maps and diagrams
- an assessment of the numbers of hours of potential shadow flicker (when sun flickers behind rotating blades)
- an assessment of the visual performance of the proposed wind farm (described below under the heading visual performance evaluation) with a discussion of whether each objective is achieved and how the standard set by the Bulletin has been achieved
- justification of proposed wind turbines that do not meet the visual performance objectives
- an outline of any mitigation and management options proposed, including consultation with affected property owners regarding the proposed mitigation works

## Steps in Visual Assessment

The three main steps in the visual assessment are:

- *Baseline study*: preliminary data collection involving maps, graphs, photographs and narratives describing the landscape in the visual catchment including:
  - Map of land uses eg national parks, rural residential, villages, heritage sites
  - Describe and photograph the landscape eg mountains, vegetation, waterways and waterbodies including areas of high scenic value or quality
  - An inventory of viewpoints and the importance people place on these views (sensitivity level of high, medium or low) which should be applied to each viewpoint eg a view from a village or lookout is rated high, a view from a dwelling is medium and from a train or a car is low
  - Map visibility distance zones from near foreground (up to 500m) to far background (32 km+) showing where turbines can be seen from and how much of each turbine can be seen (this is a complex GIS analysis requiring careful analysis to adequately represent the visual implications of the turbines)
  - Map the wind resources within the project area showing average wind strength in metres per second
  - Map(s) of the wind farm layout showing possible alternative scenarios for wind turbine and ancillary facility locations, heights and areas
- *Visual Influence Zones (VIZ)*: use the data collected from the baseline study to establish visual influence zones (VIZ1 is high, VIZ2 is moderate and VIZ3 is low) from each of the viewpoints using:
  - Its scenic quality class taking account of community values:
    - high scenic quality will be an isolated peak, forests, rivers, streams
    - medium scenic quality will be hills, outcrops, open woodland, intermittent streams and rivers
    - low scenic quality will be open space and extensive areas of similar vegetation
  - Viewer sensitivity eg a view from a village or lookout is rated high, a view from a dwelling medium and from a train or a car is low
  - Nine distance zones from near foreground (up to 500m) to far background (32 km+)

Example 1: turbines within 4km and within the visual catchment of the view of a mountain peak from a village will have a high impact rating.

Example 2: turbines within 20km and within the visual catchment of the view from a village of a mountain peak will have a moderate to high impact rating.

Example 3: turbines within 500m of a road will have a high visual impact in most circumstances and turbines within 8km of a road will have a moderate impact in most cases.

- *Visual performance evaluation*: takes the data collected from baseline studies and the visual influence zones to consider strategies for avoiding or minimising impacts with respect to:
  - *Visual magnitude*: is related to turbine height and distance and when the visual influence zones for a particular viewpoint is within certain distance thresholds there is a recommended strategy:
    - Example 1: if a 220m tall turbine is within 2.9 km of a viewpoint it should be removed, or a detailed justification given why it should remain
    - Example 2: a dwelling or public viewpoint within 4.4 km should be visually assessed
  - *Landscape scenic integrity*: is the extent to which the wind farm impacts the broader landscape. Each of the following examples is acceptable:

- Example 1: turbines in VIZ1 (in a high visual influence zone) must appear very small and/ or faint
  - Example 2: turbines in VIZ2 (medium) may be apparent but not a major element in the landscape
  - Example 3: turbines in VIZ3 (low) may be a major element in the landscape
- *Key Feature Disruption*: how wind turbines will disrupt line of sight to a key feature eg avoid placing wind turbines that block the views of key features like mountain peaks, rock outcrops, rivers or creeks, distinctive vegetation or cultural buildings
  - *Multiple wind turbine effects*: reapply the multiple turbine tool and map every turbine in six sectors of 60° for each dwelling or public viewpoint up to 8 km away from a level 1 (high sensitivity: residential, village or recreation area) or level 2 viewpoint (medium sensitivity: rural dwelling, tourist accommodation) eg avoid or justify views of turbines across 2 or more sectors for level 1 viewers and 3 or more sectors for level 2 viewers
  - *Shadow flicker and blade glint*: at certain times of the day or year the angle of the sun on moving blades will cause flickering shadows on dwellings and should be limited to 30 hours per year regardless of the visual influence zone, otherwise turbines need to be moved; blade glint is the sun reflecting off blades and must be reduced with low sheen or matt finishes
  - *Aviation hazard lighting*: CASA will determine if night lighting is required on certain turbines and the Department will consider if this will increase visual impacts; aviation hazard lighting should be shielded within 2 km of a dwelling and strobe lighting should not be used

## Assessment

The Department will assess and confirm the visual impact of the wind farm by considering the baseline studies and visual assessment described in the EIS, issues raised in submissions, the proponent's response to submissions, site inspections and desktop reviews.

Then the Department will take the visual impact assessment and other environmental, social and economic matters, taking into account the number of people impacted and the severity of the impact and balance these against the public interest for having a wind farm in this location.

## Mitigation and management options

In the first instance, the preliminary assessment early in the design phase is intended as a lead-in to the design of a wind farm setback from dwellings to minimise overall impacts. The siting of turbines causing medium to high visual impact must be justified and if the justification is sound, medium to high residual impacts should be mitigated. If no mitigation is possible/proposed a determination will be made considering all other factors.

Mitigation options include:

- *Re-siting or removal of turbines*: layout options which have different visual impacts should be the first point of consideration by the proponent
- *Re-sizing of turbines*: may work either way: reducing the size of turbines and associated infrastructure may reduce the visual impact and increasing the size of turbines and therefore reducing the number of turbines to generate the same amount of power may change the extent of the visual impact
- *Re-colouring*: to reduce hue and tonal contrast in the Australian landscape by avoiding white will reduce visual impact somewhat
- *Vegetation screening*: screening turbines behind trees and shrubs should not be the first option considered because people value desirable views from elsewhere on their properties not just from

dwellings; to be effective the vegetation must be close to the viewer and therefore may not be desirable; vegetation may die, be chopped down or burnt in bushfire<sup>3</sup>.

The Department may recommend that turbines causing significant impact which cannot be mitigated should be moved or removed or recommend for approval if a negotiated agreement for visual impact is made between the proponent and the landowner.

### Determination and conditions of consent

It is the consent authority's responsibility (either the Department or IPC) to determine the acceptability of those visual impacts when balanced against other social, environmental and economic considerations. The matters that the consent authority will consider in relation to landscape and visual assessment include, for example:

- the consistency of the proposal with the visual performance objectives
- the significance and acceptability of impacts on the overall landscape and the amenity of landholders and communities
- any cumulative environmental effects from the proposal along with other existing or proposed wind energy projects
- the adequacy of any mitigation and management measures proposed
- the objects of the EP&A Act, including the principles of ecologically sustainable development and the broader public interest

The consent authority may impose conditions for the proponent to implement a range of impact avoidance, minimisation and mitigation measures including:

- colouring wind turbine components and ancillary infrastructure so that they have minimal reflective properties and low visual contrast
- undertaking on-site and off-site landscaping where there are moderate to high visual impacts
- remove wind turbines that have a significant impact and there are limited options for reducing the impact
- not approving the most visually prominent turbines where the mitigation measures are insufficient, unless the proponent has developed a mitigating strategy including reaching an agreement with affected landowners regarding the impacts of those turbines
- voluntary acquisition for significantly affected landholders at the request of the affected landowner

### Monitoring and compliance

If a state significant wind farm is approved, the Department is responsible for ensuring that it is constructed and operated in accordance with the consent.

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3 Refer to Attachment 1 for a discussion of the vegetation screening.

## Attachment 1 Observations

### 1 Subjectivity of Visual Impact

Visual assessment is subjective, and the methodology outlined in the Bulletin involves many steps and judgement to arrive at an assessment as to whether the visual impact is high, medium or low. It is not unusual for 3 or 4 visual impact assessments to reach quite different conclusions.

The Bulletin does not make it clear how local values and desirable views should be factored into the assessment process, particularly since very detailed approach to establishing visual influence zones which seems to override community opinion about their views.

For these reasons, we have included the DIY Visual Assessment sheets in Attachment 2 for communities to do their own visual assessments of viewpoints around the project area.

### 2 Definition of Development

The Wind Energy Guide states that assessment of the EIS will include consideration of impacts on development within the vicinity of a wind farm for which a development application has been lodged, including with councils, but a determination is yet to be made; and existing dwelling entitlements (right to build).

Elsewhere the Guide mentions the need to consult stakeholders of other infrastructure.

Taken together the key phrases used throughout the Guideline - residents, all receivers, other relevant receivers, development including DA applicants, those with an existing dwelling entitlement and other stakeholders with infrastructure - refers to all dwellings and potential dwelling locations and including places of work. Therefore, noise and visual impact assessments should be made at all these places within the impact zone.

### 3 Vegetation Screening as Mitigation

The Bulletin is very clear that vegetation screening a dwelling is the mitigation option of last resort because to be effective the vegetation must be close to the viewer and therefore may not be desirable; vegetation may die, be chopped down or burnt in bushfire. Therefore, it should only be considered when a landowner has requested screening.

### 4 Associated versus Non-Associated

The Department makes a distinction between **associated landowners** – host and other landowners who have signed agreements with the proponent and **non-associated landowners** and in the past has treated these two groups differently for the purposes of impact assessment during the EIS and final assessment:

- Associated landowners within the impact zone have been noise assessed differently to non-associated landowners, with a noise threshold of 40 dB(A) versus 35 dB(A).
- Only non-associated landowners within the visual impact zone have been assessed in the EIS and been factored into the decisions affecting final recommendation determination. Associated properties including landowners who have signed agreements have been excluded from assessments from the point at which they signed the agreement.

The Wind Energy Guide states that the Department will consider the impacts of a proposal on all properties and there is no specific mention of associated and non-associated landowners in the Visual Assessment Bulletin. Therefore, noise and visual impact assessments should be made at all associated and non-associated dwellings.

We have repeatedly sought clarification from the Department on how benefit sharing agreements are factored into their assessment. Their responses are not clear.

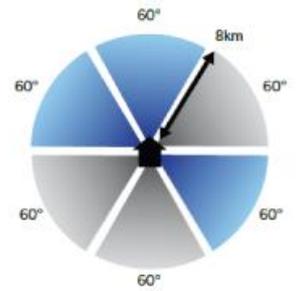
## 5 Cumulative Visual Impacts of Nearby Wind Farms

The Bulletin requires the proponent to address potential cumulative impacts of wind farms in the region (proposed, as well as existing and approved projects), but does not specify how.

The same methodologies as detailed in the Bulletin should be applied to the cumulative visual impacts of nearby wind farms. The multiple turbine tool and the sector analysis would be particularly useful in assessing the cumulative visual impacts of wind farms.

However, for cumulative visual impacts within and across wind farms to be properly assess the distances and intervening topography between ALL turbines and ALL dwellings within the impact zone must be provided. It is insufficient to say that two wind farms are say 6 km apart when logic tells you that there might residences 3 km from BOTH wind farms.

# DIY Visual Assessment



## Preliminary Environmental Assessment

When the PEA is published, you might like to do your own preliminary impact assessment of turbine views from dwellings and significant public places to validate the proponent’s findings and report any discrepancies to the Department (send them this report if you like).

Find in the PEA:

- The map which shows the location of dwellings and public viewpoints close to the project area.
- The distance from your chosen viewpoint to the closest turbine. If not get a ruler and estimate the distance on the map.

### Visual Magnitude of Impact Based upon Distance to Closest Turbine

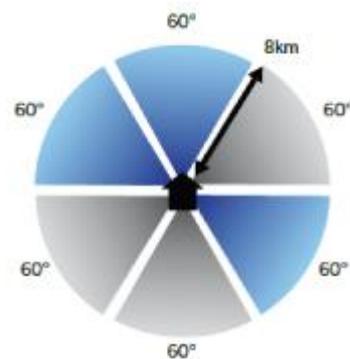
<b>ID and Description of viewpoint:</b> (dwelling, public view, desirable view)			
1	Distance to nearest turbine (Km)		
2	Turbine height to blade tip (m)		
3	Visual magnitude threshold (Km) (see the graph on the next page)		
4	<b>Visual assessment (see instructions on next page) (circle one)</b>	<b>HIGH</b>	<b>MEDIUM</b> <b>LOW</b>
5	Other factors to be considered		
	What do you value about the view?		
	Turbines potentially blocking a scenic view?		
	Is the viewpoint looking across or down or up at turbines?		
	Landforms or vegetation potentially blocking the view of turbines?		
	Other considerations?		
	<b>Revise your visual assessment (circle one)</b>	<b>HIGH</b>	<b>MEDIUM</b> <b>LOW</b>
<b>How does your assessment compare to the PEA?</b>			

### Multiple Wind Turbines

Have a look at the map in the PEA and for each of the 6 sectors, write down the number of turbines which are within 8 km of your chosen viewpoint (at this stage, don’t worry about whether you can actually see these turbines or not). You might like to cut out the circle at top right and place it on the map to help see the sectors.

If your chosen viewpoint has views of turbines in another wind farm within 8 km, also write down the number of turbines which are visible in each sector for that wind farm.

If there are turbines in 3 or more sectors the impact is potentially HIGH  
 in 2 sectors the impact is MEDIUM and 1 sector the impact is LOW



<b>Multiple turbine assessment (circle one)</b>	<b>HIGH</b>	<b>MEDIUM</b>	<b>LOW</b>
<b>How does your assessment compare to the PEA?</b>			

## Graph of Visual Magnitude Thresholds

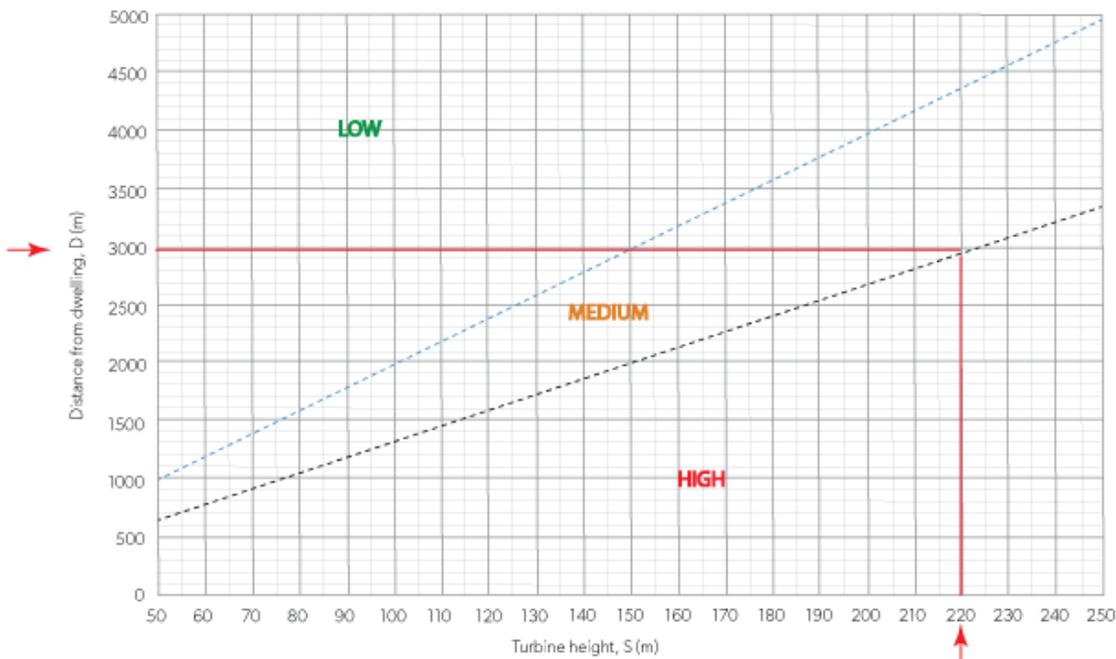
The following graph indicates the likely visual impact of turbines based on their height relative to their distance from a viewpoint. **Turbines below the black line will have a HIGH visual impact, between the black and blue line impact is likely to be MEDIUM and above the blue line likely impacts will be LOW.**

To work out the visual impact thresholds for your viewpoint:

- 1 Locate the turbine height on the horizontal axis and draw a line up to the black line
- 2 From that point draw a line horizontally across to the vertical axis on the left and read of that distance; write that distance down in question 3 on the previous page.

Example: Suppose the turbines are 220 m to the blade tip. Locate 220 along the horizontal axis (red arrow) and draw a line up to the black line. From that point draw a horizontal line across to the vertical axis on the left. Any turbines closer than 3000m to a dwelling or public view point potentially have a HIGH visual impact. MEDIUM impact might be 3000m to 4400m and LOW impact 4400m+ depending upon the terrain.

The proponent should avoid placing 220m tall turbines closer than 3000m and will have to develop an effective strategy to lessen the impact of turbines between 3000m – 4400m of the viewpoint during the EIS.



During the EIS phase, the proponent will be asked to conduct a more detailed assessment by visiting the sites of dwellings, proposed dwellings and public viewpoints. They will be asked to justify placing turbines closer to viewpoints indicated by the black line (HIGH impact) and to propose effective mitigation strategies for turbines between the black and blue lines (MEDIUM impact).

The most likely mitigation strategy offered will be vegetation screening which is usually ineffective:

- Trees are slow growing and fragile in a rural environment
- Tree planting cannot mitigate the view from multiple viewpoints
- Because of the size of wind turbines, trees must be planted close to houses, causing hazards including bush fire
- Trees planted to block the view, block all views
- Wind and fire can alter the vegetation over the life of the project
- When existing vegetation is said to screen views, the same issues apply