

Bango Wind Farm Visual Impact Assessment Grossly Misleading

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28th November 2016

ABSTRACT

The VI Assessment submitted for the Bango wind farm:

- Is dramatically inconsistent with all published research on the height-distance-visibility relationship and thus massively underestimates visibility magnitude for affected residences and other viewpoints.
- Relies on photomontages to advance the developer's case while ignoring the consistent research evidence of the way that tends to under-represent visual impact.
- Substitutes the consultants' values for those of affected residents despite the research showing that to be completely inappropriate.

The document is consequently wholly unsuitable for the Department to evaluate actual visual impact from the Bango wind farm and needs to be rejected.

The VI assessment provided with the EIS appears to be simply an advocacy report on behalf of the developer rather than a clearly impartial assessment. As such, DPE therefore has no way of determining which statements constitute a valid assessment and cannot rely on any part of it.

The assessment of visual impact on residents from the Bango wind farm both alone and cumulatively with other wind farms in the area appears to be simply an assembly of the opinions of the consultant unsubstantiated by any reliable measures and contrary to empirical studies.

It ignores well substantiated research on wind farm visual impact while citing discredited surveys.

Like most VI assessments it has maps and photomontages, but they in themselves are not objective indicators of visual impact on residents and indeed can be presented in ways that misrepresent the actual impact on residents.

Turbine height, distance and visual impact

The VI Assessment document includes Table 13 which purports to show a relationship between distance from turbines and visibility and scale of impact. On page 52, the report claims this is “based on empirical research conducted by the University of Newcastle (2002).”

In fact the University of Newcastle did not produce any such table and would not have done so for the simple reason that the authors of that study made clear the distance-visibility thresholds depend on turbine height and thus it is a nonsense to produce something like Table 13 in the VI Assessment document which presents a “one size fits all” set of distance-visibility thresholds for wind farms.

Based on its research, the University of Newcastle study did, however, recommend a height-distance relationship for ZVI as shown in the following table¹.

Height of turbines (total including rotors)(m)	Recommended ZVI distance (km)
50	15
70	20
85	25
100	30

Note the essentially linear relationship between threshold distance and turbine height. Note also that this table goes only up to 100 metres in turbine height because of the size of turbines in the wind farms included in the University of Newcastle study. Most of those turbines were less than 65m high, i.e. less than one third of the height of the wind turbines proposed for Bango wind farm.

Later research involving wind farms with taller turbines has extended appropriate ZVIs in a way that is consistent with the University of Newcastle study recommendations.

¹ University of Newcastle (2002) *Visual Assessment of Windfarms Best Practice*. Scottish Natural Heritage Commissioned Report F01AA303A [*University of Newcastle Study*], p. 58.

Even the University of Newcastle study, with its recommendation of a 30 km ZVI for 100m turbines demonstrates that the comparatively minute ZVI used in the VI Assessment for 200m turbines is woefully inadequate.

Table 13 in the VI Assessment bears some relationship in visibility threshold descriptions to the Sinclair-Thomas matrix, which was published in the University of Newcastle study. However the Sinclair-Thomas matrix explicitly shows varying distances for the thresholds dependent on turbine height (and that is included the University of Newcastle study).

The Sinclair-Thomas matrix defined the most intrusive zone as:

Dominant impact due to large scale, movement, proximity and number

GBD's most intrusive zone is defined as:

Wind turbines would dominate the landscape in which they are situated due to large scale, movement and proximity

The description of the zones is almost identical. Yet GBD in Table 13 claims the threshold for this zone is 1 km while the Sinclair-Thomas matrix gives a threshold of 4 kms and that is for turbines 90 – 100m in height. Subsequent research such as the Bureau of Land Management (BLM) study² extended that to 6 km for 120m turbines and collectively the empirical research³ on wind farm VI indicates around 10 km for 200m turbines such as proposed for Bango.

The University of Newcastle study stated “In general our onsite assessments were in agreement with Sinclair-Thomas at viewpoints near to a windfarm”⁴. That is confirmed by the combination of the BLM and Offshore⁵ studies (120m turbines) and the Stevenson & Griffiths study which, examining wind farms with turbines *mostly under 45m* reported⁶:

“In most situations turbines dominated the view up to a distance of 2 km (zone (i)).”

So GBD's Table 13 threshold for dominant visual impact is *one tenth of the threshold established by the actual empirical studies*.

In fact, the research based threshold for dominant visual impact includes all of the GBD zones marked as having:

Moderate to High visibility
Moderate visibility
Low to Moderate visibility

Therefore all of the residences so scored need to be rated as having **High visibility**. This destroys the impact ratings provided by GDB for most of the properties mentioned in the VI

² Sullivan, Robert G., et. al., *Wind Turbine Visibility and Visual Impact Threshold Distances in Western Landscapes*, Argonne National Laboratory and the U.S. Department of the Interior, Bureau of Land Management, USA, 2012 [**BLM Study**].

³ *What Empirical Research has Established about Wind Farm Visual Impact*, Dr Michael Crawford, 6th November 2016.

⁴ *University of Newcastle Study*, p. 61.

⁵ Sullivan, Robert G., et. al., “Offshore Wind Turbine Visibility and Visual Impact Threshold Distances”, *Environmental Practice* 15(01):33-49, March 2013 [**Offshore Study**].

⁶ *University of Newcastle Study*, p. 14.

Assessment as well as indicating that many other residences not explicitly included in the document are also likely to be subject to high VI.

Additional ways empirical research repudiates this VI Assessment

Photomontages under-represent visual impact

Since GBD is aware of the University of Newcastle study, they should also be aware of the following statements in that study:

“We found that there was a general tendency to underestimate the magnitude of visibility in the ES descriptions compared to our judgements on site. This may be related to the frequent under-representation seen in photomontages (paragraphs 6.1.16 – 6.1.17).” ⁷

“Many anecdotal and derivative distance-significance judgements may therefore need to be lengthened to compensate for underestimation caused by reliance on photomontage.” ⁸

“A photomontage can imply a degree of realism that may not be robust, and can seduce even a critical viewer into investing more faith in that realism than may be warranted. Certainly our case-study analyses confirm a widespread belief that photomontages almost always underestimate the true appearance of a windfarm from most viewpoints. This is in contrast to statements in some ESs that overestimation occurs because of the technique used to produce the photomontage.” ⁹

“The limitations of photomontage should be recognised and acknowledged, especially a tendency for photomontage to consistently underestimate the actual appearance of a windfarm in the landscape.” ¹⁰

The BLM study report stated:

“In the authors’ judgment, based on the many observations for this study, and comparison of the corresponding photographs and narrative records from the observations, the photographs consistently under-represent the degree of visibility observed in the field. While true to some degree for all of the photographs, this is particularly true for photographs of the facilities taken from longer distances.” ¹¹

and the Offshore study reported:

“Our informal, qualitative opinion is that the photographs taken in the field generally show lower visual contrast levels than were actually observed during the visibility ratings. The photographs show lower contrast and less detail than

⁷ University of Newcastle Study, p. 55.

⁸ University of Newcastle Study, p. 55.

⁹ University of Newcastle Study, p. 60.

¹⁰ University of Newcastle Study, p. 67.

¹¹ BLM Study, p.43.

was actually apparent in the naked-eye observations, and they do not capture the blade motion that attracted the visual attention of observers in the field.”¹²

Thus there are consistent, strong comments from the authors of multiple empirical studies of wind farm impact that photomontages tend to systematically under-represent the actual visual impact.

The GBD document relies heavily on photomontages to “make its case” without warning of the extent to which that device almost certainly under-represents what would be the real impact.

Advocacy statements by consultants

The University of Newcastle made another important statement relevant to this VI Assessment:

“This may also be an appropriate point to raise a subtle presentational point about visibility assessment. Because many factors act to decrease or increase apparent magnitude (and therefore potential significance), there is a tendency in all the ESs examined (and in guidance such as is shown in Table 3) to adopt what might be termed the “half-empty” rather than the “half-full” approach to assessment. For example, guidance and assessment often emphasises the factors that decrease visibility (“only prominent in clear visibility”) rather than the factors that increase visibility (“always prominent in clear visibility”). Although both statements are in one sense identical, a different adverb produces a different impression.”¹³

Reading the VI Assessment it is obvious that there are numerous instances of statements that present a “half-empty” rather than the “half-full” exposition of the visual impact on affected parties. It is subtle use of wording whose purpose is to diminish the reader’s sense of the magnitude of visual impact and thus adopts an advocacy position rather than presenting impartial evidence to the Department.

Substitution of irrelevant consultant visual values for those of residents

In making judgements about visual impact, the GBD paper consistently substitutes the landscape values of GDB for those of the residents who chose to live in the locality and who would have to live with the wind farm. Published research shows that this GBD approach is untenable.

A *very* extensive review of visual impact assessment¹⁴ ***conducted for the US Government*** made a number of pertinent points. There is no visual quality independent of the people who view the landscape, as is well established in related research.

“Without exception, peer-reviewed literature reviews characterize visual quality as an interaction between viewer and landscape. This characterization contrasts

¹² *Offshore Study*, p. 45.

¹³ *University of Newcastle Study*, p. 55.

¹⁴ *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, Transportation Research Board of the National Academies, Washington DC, 2013.

with artistic characterizations of landscape based on assumptions of intrinsic landscape qualities.”¹⁵

“Existing visual quality is the value placed on the existing landscape by those people who currently have views of the environment.”¹⁶

and

“The differences between what professionals value and what the public values is profound.”¹⁷

It is worth paraphrasing those quotes. While there are some features that people commonly find attractive in landscapes (e.g. land-form relief; vegetation, particularly woodland presence; water bodies; apparent naturalism of land use; length or area of view¹⁸) in any particular situation there is not some objectively definable level of visual quality in the landscape. The actual value comes from the combination of what physically exists and the way individual viewers relate to it – and the viewers that matter are those who normally live with the landscape.

Thus the only visual values relevant to determining VI are those of residents in the potentially affected area – not those of professionals hired to perform a process, or officials living in totally different environments. Therefore GBD’s opinions of visual intrusion or the fit of an industrial structure within a rural area are irrelevant.

One of the absolutely critical elements for most residents in rural areas is that the landscape is **NOT** urban and **NOT** industrial. Wind farms impose massive industrial structures and yet somehow VI consultants like GBD claim that change in character is not a great detriment to those affected.

In addition, peer-reviewed research studies show that the inter-rater reliability of professionals (i.e. the consistency between different individuals) when assessing the various factors commonly used to rate visual character is low, and ***the reliability of assessments about the difference between before and after a development are even lower***¹⁹.

Summary

As demonstrated here, the VI Assessment submitted for the Bango wind farm:

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- Relies on photomontages to advance the developer’s case while ignoring the consistent research evidence of the way that tends to under-represent visual impact.
- Substitutes the consultants’ values for those of affected residents despite the research showing that to be completely inappropriate.

¹⁵ *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, p. 44.

¹⁶ *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, p. 142.

¹⁷ *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, p. 139.

¹⁸ *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, p. 140.

¹⁹ *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, pp. 34-37 and 39-40.

There is no way the Department can somehow adjust the EIS assessments of VI to reliably determine what would be the real VI on each residence. In addition, the Department will need to identify all of those residence erroneously excluded from specific assessment and evaluate the VI for them also.

The document is consequently wholly unsuitable for the Department to evaluate actual visual impact from the Bango wind farm and needs to be rejected.