

The VI Assessment depends on so many assumptions, all of which serve the interests of the developer, as to render it irrelevant as a proper evaluation of the VI of the proposed project.

## ZVI

The ZVI (called a ZTV) of 5 kms used in the assessment is ridiculously small.

- For turbines of around 45m to tip height, based on a study of 8 existing wind farms Stevenson & Griffiths<sup>1</sup> recommended a ZVI of 10 kms.
- For turbines of around 63m to tip height, the Bishop study<sup>2</sup> indicated a ZVI of 20 kms.
- Based on a review of 8 wind farms in Scotland, with tip heights around 65m, the University of Newcastle study<sup>3</sup> recommended a ZVI of 30 kms for 100m turbines.
- The US Bureau of Land Management (BLM)<sup>4</sup> study of wind farms with turbines around 120m recommended a ZVI of 48 kms.

All of the empirical studies of wind farm VI either explicitly recommend or in other ways indicate a ZVI **vastly more** than 5 kms for turbine heights of even 100m, let alone 160m.

Even the threshold of *visual pre-eminence*, as delineated by the Argonne National Laboratory BLM and Offshore<sup>5</sup> studies is 16 kms for 120m turbines and 20 kms for 160m turbines, while the threshold of *visual dominance* is around 6 kms for 120m turbines and 8 kms for 160m turbines.

The threshold of *visual pre-eminence* is certainly pertinent for cumulative IV assessments from more than one wind farm or when properties are surrounded by a wind farm.

Unless a VI assessment is done consistent with what the empirical research shows is appropriate for 160m turbines then it simply arbitrarily excludes huge swathes of potentially impacted territory and residences.

And since the research has shown that all the thresholds are essentially linearly related to turbine height, whatever ZVI was appropriate for 128m turbines will be substantially too small for 160m turbines and whatever lines a consultant draws on paper does not change the empirical research findings.

## **Failure to Acknowledge and Allow for Extent to which Photomontages Underestimate VI**

The Argonne National Laboratory BLM and Offshore studies both drew attention to the extent to which photographs, and by implication photomontages, consistently under-represent

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<sup>1</sup> Discussed in University of Newcastle (2002) *Visual Assessment of Windfarms Best Practice*. Scottish Natural Heritage Commissioned Report F01AA303A.

<sup>2</sup> Bishop, Ian D, 2002. "Determination of Thresholds of Visual Impact: The Case of Wind Turbines", *Environment and Planning B: Planning and Design* Vol. 29: p. 718.

<sup>3</sup> University of Newcastle (2002) *Visual Assessment of Windfarms Best Practice*. Scottish Natural Heritage Commissioned Report F01AA303A.

<sup>4</sup> Sullivan, Robert G., et. al., 2012. *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 [**BLM Study**].

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

the degree of visibility of wind farms. The University of Newcastle specifically referred to the extent to which photomontages prepared for the wind farms reviewed also generally under-represented the extent of actual impact.

As those studies made clear, this is partly due to the inability of photographs to fully represent what the eye sees and partly because of the absence of movement which is a very important factor in turbine visibility.

### **Inadequate Attention to Impact of Partially Visible Turbines**

On page 15 of the VI Assessment it is stated “However, when compared to the approved C2WF Mod-1 wind turbines, the increase in wind turbine visibility would be restricted to the upper sections (hubs and rotors) of wind turbine structures, rather than whole wind turbines”.

This suggests to the reader that the impact can be discounted because only part of the turbine is visible. However, the University of Newcastle study reported “The appearance of just the rotors, or the nacelle and rotors, above the horizon produces a disconcerting effect when they are moving that we would describe as less visually coherent”<sup>6</sup>

That study has made clear that impact of partly visible turbines cannot be discounted because aside from the eye being drawn to movement, the movement in such cases appears unnatural and disconcerting.

### **Biased Scale**

The VI Assessment uses an arbitrary 4 point scale, structured so 3 points on the scale allow the VI in particular instances to be readily dismissed. Scale construction is biased and inadequate.

### **Substitution of Consultant’s Visual Values for those of Affected Residents**

The *Evaluation of Methodologies for Visual Impact Assessments* review draws on peer-reviewed research which demonstrates that professional ratings of VI have low validity in predicting the VI actually experienced by people who live near a development. There are two reasons discussed in the review:

- 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<sup>7</sup>; and
- “The difference between what professionals value and what the public values is profound.”<sup>8</sup>

Indeed the rating given in the VI Assessment document appear difficult to reconcile with the thresholds for *visual pre-eminence* (20 kms) and *visual dominance* (8 kms) for wind farms with 160m turbines.

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<sup>6</sup> *University of Newcastle Study*, p. 52.

<sup>7</sup> *Evaluation of Methodologies for Visual Impact Assessments, NCHRP Report 741*, Transportation Research Board of the National Academies, Washington DC, 2013, pp. 34-37 and 39-40.

<sup>8</sup> *Op cit*, p. 139.

Since research shows that inter-rater reliability is low for professionals assessing what this report is supposed to assess AND the visual values of employed professionals on such tasks is *profoundly* different from those of the public, the assessments provided in this way are inherently both inappropriate and highly unreliable and therefore can have no merit in making a judgment of VI.

### **Summary**

On each of the 5 points raised above, the VI Assessment fails. The methodology is inherently inadequate and inconsistent with empirical research findings in relation to wind farm VI. To which is added the problem of consultant's visual values which are highly unlikely to correspond to those of the people who will experience the impact and, as research shows, are also beset with the problem of low reliability.

It is also worth noting that because someone claims in a document that they are using "best practice" does not make it so, and the points raised here make it plain that the VI Assessment cannot be classed as "best practice".

The document tries to claim a benefit for affected parties in having a lesser number of larger turbines. This is like saying to someone: "Instead of shooting you 10 times with a .22, I'll only shoot you 8 times with a .303" and expecting them to be grateful.

The VI Assessment needs to be rejected.