

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 157m.

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 VI 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 157m turbines, then it simply arbitrarily excludes huge swathes of potentially impacted territory and residences.

## 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 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 visual impact.

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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*].

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**

In addition to the grossly inadequate ZVI, the maps of supposed visual impact appear to discount many viewpoints on the basis that only some part of the turbines will be visible. There is no empirical validity for this assumption.

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.

### **Inadequate Attention to VI of Increased Rotor Diameter**

The assessment blithely suggests that because the turbines are restricted to the same height as was previously proposed (*but not approved*) there will be no greater visual impact. This incredibly ignores the increase in blade size whose effect is to increase the rotor disc (or swept area) by 56%.

Most of the empirical studies of wind farm VI explicitly refer to the importance of blade movement in turbine visibility. They are clear this is a major factor. So a 56% increase in swept area has to have a significant impact on turbine visibility. It may not appear much in the static photomontages so beloved of wind farm VI consultants but, as empirical research has made clear, part of the reason those photomontages are so misleading is the absence of the essential element of motion.

### **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

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

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.

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.*

### **Reasons for Previous PAC Rejection Glossed Over**

The previous proposal for Crookwell 3 was recommended by DPE but then not accepted by the PAC. Clearly the PAC believed DPE got it wrong in some ways and was not prepared to accept DPE’s recommendations.

This version of the proposal plays up the prior recommendation by DPE and wants to claim this second go should be accepted as consistent with the previous recommendations. It ignores the PAC decision which, on some basis, repudiated the DPE recommendations and thereby invalidated those recommendations as any basis upon which this new proposal can rely for support.

In its recommendations on this proposal, DPE needs to come clean with the community and state the explicit basis upon which the PAC referred the last proposal back to DPE and explain how those reasons have been adequately addressed in the new proposal.

### **Inappropriate VI Assessment as though this is a Modification Proposal**

In addition, the revised VI Assessment attempts to position its evaluation as though it is a modification proposal against a previously approved wind farm. So, on page 21, it says

“The Amended C3WF wind turbines would extend to the same 157m tip height as the C3WF LVIA 2012 wind turbines. Consequently this Amended VIA has determined that the overall scale of the Amended C3WF wind turbines at a 5 kilometre (and over) view distance would be *very unlikely to result in an order of visual magnitude that is significantly above the visual magnitude of the original C3WF LVIA 2012 wind turbines.* (emphasis added)”

The assessments made in that previous submission are irrelevant because it was rejected by the PAC. This is not a modification to a previously approved wind farm. It is another go at a proposal that has yet to be officially accepted and, as such, VI has to be assessed wholly against the situation in the absence of this wind farm, not against the purported VI assessment of the previous failed proposal.

<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.

## **Inadequate Cumulative Impact Assessment**

The sketchy cumulative impact assessment is totally inadequate, in multiple ways:

- detailed assessment appears restricted to viewpoints within 2 kms of Crookwell 3 (p. 34 of report);
- it ignores cumulative impact with Gullen Range wind farm; and
- attempts to pass this assessment off as showing little change from cumulative VI in the earlier proposal – even though that proposal got rejected by the PAC and inadequate assessment of cumulative VI may have been a reason for rejection.

Any wind farm within the threshold for *visual pre-eminence* of a viewpoint should be considered as part of cumulative VI assessment where multiple wind farms, or parts of them, meet that condition. For 157m turbines, the threshold for *visual pre-eminence* is almost 20 kms. For 130m turbines (GRWF) the threshold is 16 kms. There are numerous locations which fall within those parameters for the combination of GRWF and C3WF. Most have not been considered. The cumulative VI assessment is essentially non-existent without their inclusion.

The VI Assessment (p. 34) says:

“As the Amended C3WF wind turbines are considered to result in low level visual effects, and introduce elements which are not prominent or out of character with the original C3WF LVIA 2012, the potential for the amended wind turbines to result in any additional significant cumulative visual effect is considered to be low.”

The previous C3WF proposal was not accepted by the PAC, and thus the cumulative VI assessment was not accepted by the PAC. Indeed submissions to the PAC at the time pointed out severe defects in the VI assessments included in that proposal. Pretending that the previous cumulative VI assessment was accepted as OK and thus all that is needed is to justify variations from it are simply ludicrous.

In addition, the empirical research cited above has become much more widely known and recognised since the previous C3WF PAC, such that defects are now more readily identifiable with the benefit of the research.

***Cumulative VI assessments for C3WF must be assessed and justified on a greenfields site basis and they must take account of GRWF as well. This assessment does neither.***

## **Summary**

On each of the 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.

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.***