Written Notes from The Cambrian Mountains Society for deadline VI - 26th March 2015

The worst case

At the ISH on 18th March it became clear that the answer to the ExA's question about the 'worst case' was that the use of 52.5m radius blades on a 72.5m hub to still give a tip height of 125m was a far worse-case than the 80 + 45m blades on which all assessment in the ES had been done. We referred to the table and text of the CMS WR - *extract below* - which we assume to be the spur for the Question.

2 The proposal

2.1 The proposed turbines

2.1.1 As noted at the ExA's Question 2.17, ES 2.7 refers to the possibility that a larger-rotor turbine of 105m diameter may be deployed, and hub height reduced to retain an overall tip of 125m. However, this would require a tower of no more than 72.5m with the result that the lower 52.5m blade tip would only be - at its greatest - 20m above ground level (as opposed to the original specification of 35m at that point. That would produce turbines with quite different visual proportions, and potentially different implications for air-borne species and recreational users who would simply be much closer to the larger blades at ground level or lower elevations. The alternative turbine would in all probability have different rotational speeds and noise characteristics. It would also have different shadow-producing properties. The alternative would be to apply retrospectively for the use of 80m towers, which in turn would raise the tip height of the turbines to 132.5m and also have different properties in terms of noise and shadow effects.

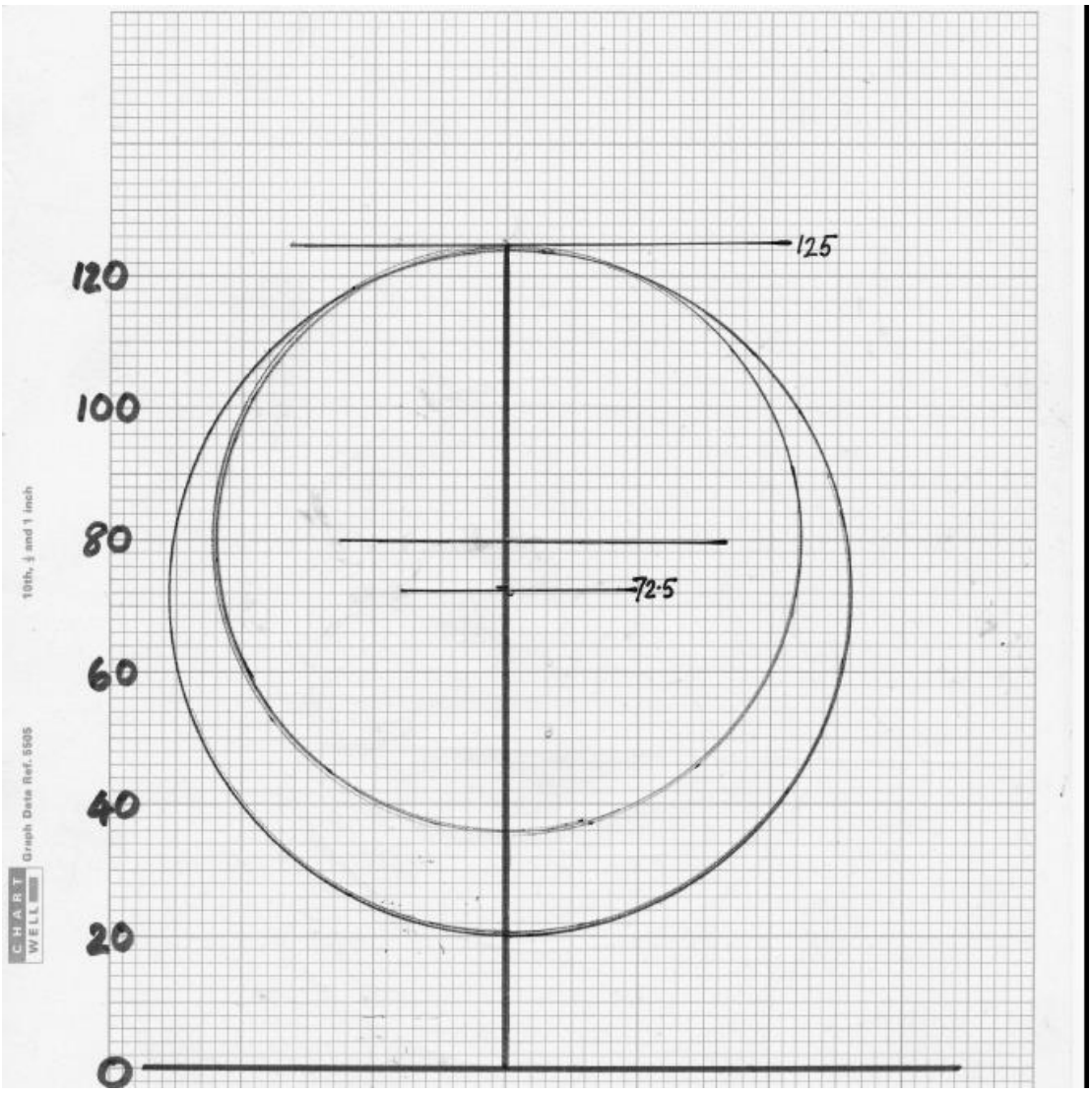
In this context it is necessary to consider the following:

Nº	**Hub pivot height**	**Blade-sweep radius**	**Ground to lower blade tip**	**Blade-swept area per turbine**	**Max tip-height**	Turbine Capacity	Total Capacity
27	80m (262ft)	45m (148ft)	35m (115ft)	6,361m² (1.6 acres of sky)	125m (410ft)	3 - 3.3 MW Possibly greater	81 - 89.1 MW Possibly greater
	At the most 72.5m (262ft)	52.5m (172ft)	20m (66ft)	8,659m² (2.1 acres of sky)	125m (410ft)		
	Alternatively 80m (262ft)	52.5m (172ft)	27.5m (90ft)	8,659m² (2.1 acres of sky)	132.5m (435ft)		

The salient differences are highlighted in red, above.

At section 2.7 the ES provided a schematic drawing, but this is imprecise and misleading. The rough sketch below is sufficiently accurate to demonstrate the differences.

The CMS would particularly draw the ExA's attention to the increased swept area of the 52.5m radius blades, which is 36% greater than that for the standard 45m blades. The recently produced revised visualisations are configured in such a way that even where the additional blade length is discernible and correctly shown, this massive increase is not fully apparent. Moreover, the blade-sweep, while reaching to the same tip height, is only 20m from the ground at its base, thus creating a more complex and visually intrusive visual network of movement, with greater potential for overlap and interplay between the turbines when seen as a moving mass.



The larger-bladed turbines do not just represent a different case, but the worst case **and a far worse case**, considering the changed visual characteristics of the 52.5m radius, key distances and dimensions, and shown in the drawing above.

Given that none of this has been discussed, illustrated or assessed, they cannot be considered as an alternative, and accordingly that option (or any including these significantly larger blades) cannot be included within the terms of the DCO. The CMS submits that the applicants should therefore withdraw such an option in order to proceed, or that the ExA should require that the Order only applies to the 80 + 45 = 125m turbines as assessed in the ES and considered by the public, consultees and relevant planning authorities.

In the context of its disagreement with the applicants' assessment in terms of landscape and visual impact as comprehensively described in its 'negative' Statement of Common Ground, the CMS stresses that this was based on the primary proposal for 80 + 45 = 125m machines as shown in the ES. All its concerns would be increased were this worst case to be incorporated into the DCO. Further, it is not aware that the responses of any other party, whether statutory, third sector, or individual, were made on any but the 45m blade basis.

Finally, the CMS regards the combination of very large 52.5m blades on relatively modest 72.5m towers as ill-matched and improbable, and has not been able to find a precedent for the permutation. These proposed worst-case blades are normally found in combination with an 80m tower or larger. In these circumstances CMS suspects that in the event of a consent including a 52.5m blade option, a modification to the DCO could be sought by the applicants in order to deploy a larger-blade and larger-power option using towers of around or greater than 80m.