EIA Quality Mark Case Study

Visible Aviation Warning Light Trials During EIA

### Key Issues:

- Twelve of the twenty proposed turbines will have blade tip heights in excess of 150 metres above ground level.
- The legal requirement for lighting on structures 150m or greater in height is contained in Article 222 (1) of the Air Navigation Order (ANO), which states:

  > The person in charge of an en-route obstacle must ensure that it is fitted with medium intensity steady red lights positioned as close as possible to the top of the obstacle and at intermediate levels spaced so far as practicable equally between the top lights and ground level with an interval of not more than 52 metres.

- The CAA published a Policy Statement in June 2017 that provides guidance as to the application of Article 222 with relation to onshore wind turbines with a maximum blade tip height at or above 150 m AGL. The Policy Statement contain the following provision:

  > the intensity of the 2000 candela lights may be reduced to 10% of their peak intensity (i.e. 200 candela) when the meteorological visibility at the wind farm is measured as exceeding 5 km.

### Purpose of the project:

The purpose of the project was to complete an EIA for an application seeking consent for Windy Standard III; a wind farm comprising of up to 20 turbines consisting of 8 turbines with a maximum height from base to tip not exceeding 125m and 12 turbines of an overall height from base to tip not exceeding 177.5m.

As the project went to inquiry, effective assessment of aviation lighting was needed to address uncertainty in significance of effect of the visibility of the lights.

### Description of the project:

Windy Standard III is a proposed extension to the operational Windy Standard Wind Farm and the under construction Windy Standard II Wind Farm.

The proposed development is located within Carsphairn Forest north of Carsphairn village, in Dumfries and Galloway and is currently commercial forestry plantation. The proposed development consists of two development areas, Meaul Hill Cluster and the Waterhead Hill Cluster and together form the proposed development area.

The proposed development was designed and assessed by the applicant, Fred. Olsen Renewables Limited (FORL). Natural Power were appointed to coordinate and produce the ES and the associated EIA documentation.

Larger onshore wind turbines have only recently become commercially accessible, therefore there is a lack of information available pertaining to aviation lights on structures and how the effects of which are dealt with within EIA and the decision-making process.
Lessons learnt:
The lighting of turbines 150m in height and greater is a legislative requirement for the purposes of aviation safety. The lights are produced to international standards. The location and type of lighting on wind turbines is dictated by CAA policy, which provides for reduction of light intensity in specified conditions. Due to careful siting during the design process that took into account the surrounding landscape and visibility from key receptors, only a single proposed turbine (T16) with an installed aviation light would be visible from one of the principal viewpoints (VP10) within the nearby Dark Sky Park. Given the potential sensitivity of the viewpoint location to light effects, there was a requirement to determine how significant the presence of aviation lighting would be at VP 10.
A real-life scenario was therefore implemented to determine the significance of effect. A direct line of sight was taken from VP 10 through to where the hub of T16 would be present, which coincided with the level of the base of an existing turbine on the operational Windy Standard Wind Farm. The placement of an aviation light at this location, in different weather conditions, allowed an assessment of operating characteristics at dusk and in full darkness at light intensities of both 2000 candela and 200 candela.
The relevant statutory consultees and reporters were invited to VP 10 to witness the aviation light relative to other lights within the environment including nearby house lights, headlights of passing cars, lights on aircraft overhead, stars and sky glow from urban areas.

Lessons learnt continued:
The lights on turbines would operate during night-time hours only and the emissions can be controlled through design of the light unit, including physical shielding to limit angle of intensity within -1° of the horizontal, level of intensity by angle and reduction of intensity to 200 candela in good visibility conditions.
Assessment of effects of aviation lighting is highly complex due to the wide range of operational conditions. The assessment needed to consider the likely scenario, as well as the worst-case scenario as our experience shows that impacts have been overestimated by third parties when not properly understood.
As light intensity is measurable, lighting of turbines needs to become a quantifiable assessment adopted by consultees. Lessons learnt from this aviation lighting exercise have already been used to inform the design and EIA of other developments where proposed turbines are greater than 150m. The approach was especially valuable as it allowed consultees to witness the effects of the lighting for themselves, in a real-life scenario, rather than relying on computer generated images.

Contact details
Author – Kirsty Clarke
Registrant – Tamia Germaine-Tack
Company – Natural Power
Email – kirstyc@naturalpower.com

For access to more EIA case studies and hundreds of non-technical summaries of Environmental Statements visit:
https://www.iema.net/eia-quality-mark/eia-quality-mark-case-studies