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Urban & Renewables

Shadow Flicker Technical Note

Bretherton Energy Co-Operative and GA Pet Food

Asland Walk Energy Park, Lancashire

April 2026

ADMINISTRATION PAGE

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1	April 2026	Initial issue

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TECHNICAL NOTE

1 Introduction

This Technical Note has been prepared by Pager Power on behalf of Bretherton Energy Co-Operative and GA Pet Food to respond to public consultations raising shadow flicker matters relating to the proposed development at proposed wind turbine (4.2MW), solar (12MW), battery storage (5MW) and the transmission infrastructure at land at the Asland Walks Energy Park site, Bretherton, Lancashire (25/01256/FULMAJ).

Pager Power was previously retained to assess shadow flicker impacts towards dwellings in the vicinity of the proposed wind turbine. This technical note it to demonstrate that the approach accords with statutory duties and industry best-practice. This document should be read alongside the submitted Shadow Flicker Impact Assessment which provides a detailed assessment of significance and the potential effects of the proposed development on the dwellings surrounding the Asland Walks Energy Park (Pager Power, 2025).

We, therefore wish to provide a further technical response to matters raised in planning comments regarding the Shadow Flicker Assessment.

2 Exclusion Zone

Available industry guidance on the assessment of shadow flicker recommends that dwellings are assessed within a distance of 10 times the rotor diameter of the turbine, as has been done in this case. This assessment area is where significant effects may arise, further to this geometric modelling was carried out to determine the extent of any impacts. The assessment area should therefore not be treated as an 'exclusion zone' but as a starting point for assessment subject to the assessed geometric modelling.

3 Mitigation Reliability

Where significant impacts are predicted, the industry-standard mitigation measure is to implement a shutdown scheme whereby the turbines are programmed to stop rotating at set times in order to avoid shadow flicker. These shutdown schemes utilise light sensors to determine whether the sun is out at the time when shadow flicker is predicted towards a receptor and, if so, the turbine stops rotating. This is a reliable and proven technology, which has been used on numerous wind farms in the UK, including nationally significant projects, this shutdown mechanism is also cited within many international guidance documents such as those in Germany[1] and Ireland[2,3] as a recommended mitigation measure.

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[1] Notes on the Identification and Evaluation of the Optical Emissions of Wind Turbines, States Committee for Pollution Control – Nordrhein-Westfalen (2002)

[2] Planning Guidelines. Department of Environment, Heritage and Local Government

[3] Best Practice Guidelines for the Irish Wind Energy Industry, Irish Wind Energy Association and Sustainable Energy Ireland (2008)

Shutdown schemes can be set up to either reduce shadow flicker down to the allowed thresholds of 30 minutes per day and 30 hours per year, or to completely avoid shadow flicker. In this case, the developer is committing to implement a full shutdown scheme if both the shadow flicker is geometrically possible and if light intensity is above the required threshold, this is in order to prevent any shadow flicker impacts on the assessed dwellings.

4 Road Users

Shadow flicker impacts towards dwellings occur due to sunlight incident on a window being repeatedly obstructed by a turbine blade. If a window is the primary or sole source of light in the room, this leads to a 'flickering effect' not dissimilar to intermittently switching off electric lights. This effect occurs due to the shadow falling upon a small aperture and therefore someone who is standing outside would not experience effects in the same manner.

Similarly, a car driver would not experience significant shadow flicker as cars have windows on all sides of the vehicle, allowing diffuse light to continue to fall on the unaffected windows which significantly decreases the significance of the shadow flicker effect. Further, drivers already experience flickering shadows from other sources due to their movement relative to vegetation, buildings, road infrastructure and street furniture which project shadows onto roads. It is not typical to assess shadow flicker towards road users in the UK[4] and this is not a requirement of formal guidance in Germany and Ireland. Accordingly, shadow flicker impacts on road users were excluded from the formal assessment. The combined effect of multi-directional cabin light and existing roadside obstructions renders any potential impact negligible, especially in the context of Bank Bridge.

[4] An industry questionnaire in 2010 indicated that only 2 of 13 industry respondants would assess shadow flicker impacts towards road users and this is not a typical requirement of Local Planning Authorities.

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