Designing and building your net-zero future

Asland Walks Energy Park

Wind Feasibility Study – Non-technical Summary

Document Control

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Renewables First – Company

Renewables First is one of the UK's leading hydro, wind power and water source heat pump specialists and have been delivering these projects for nearly two decades, now also providing services in solar PV and energy storage. We provide all of the services from in-house resources to take a project from initial feasibility stage, through all of the consenting and engineering design stages and on to construction and commissioning. We use our experience of the installation and operational phases to provide feedback into the design stages of the next projects, ensuring that our customers benefit from our whole-project exposure.

We are independent of hardware suppliers, so we only recommend the most appropriate hardware to maximise energy production and return on investment, and to ensure a long and reliable operational life. We only recommend the best quality hardware from established manufacturers, and design good quality systems that will be reliable in the long-term. Our designs focus on maximising renewable energy production whilst applying best practice in regards to ecological protection or enhancement.

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1. Introduction

1.1. The applicant, 'The Bretherton Energy Co-operative and GA Pet Food', has explored the potential for on-site wind generation as part of a wider sustainability programme. A detailed feasibility study by Renewables First Ltd assessed whether wind energy could make a meaningful and environmentally responsible contribution to the company's electricity demand and the decarbonisation objectives of the proposed Asland Walks Energy Park. This document provides a non-technical summary of that feasibility process, its findings, and the evolution of the preferred design leading to the current single-turbine proposal.

2. Feasibility Study Review

2.1. Feasibility Study Overview

2.1.1. The purpose of the wind feasibility study is to initially assess the viability and financial performance of a wind turbine installation at a proposed site, to identify the key risks of proceeding to a planning application, and to propose possible mitigation options that may reduce the impact of these risks.

2.1.2. The feasibility study assessed three locations under GA Pet Food ownership:

- Haunders Lane
- Carr Brook (north of factory)
- Eyes Lane, Bretherton (south of factory)

Each area was reviewed for both physical and planning constraints including: proximity to housing, noise, shadow flicker, ecology, heritage, landscape, access and grid connection potential.

2.1.3. The outcome of this review led to the identification of potential Developable Areas for a range of turbines with differing dimensions and power outputs. For each potential turbine option, national wind-resource datasets and local energy-demand data were used to estimate potential generation, carbon savings and financial performance.

2.2. Summary of Findings

2.2.1. Turbine Selection

2.2.1.1. Six turbine models were considered for potential development, with power outputs ranging from 0.9 MW – 4.2 MW and hub heights ranging from 75 m – 135 m. Haunders Lane was ruled out early due to proximity to overhead cables, nearby housing and potential noise exceedances. Carr Brook and Eyes Lane both offered viable potential for single turbines. Multiple turbine arrangements were not considered due to cumulative noise impacts on nearby residential property.

2.2.1.2. Further analysis led to a single Enercon E-138 4.2 MW turbine with a 131m hub height emerging as the optimal technical solution in terms of power output and cost. This turbine

was predicted to provide up to 25 GWh of electricity per year, saving the equivalent of approximately 7,000 tonnes of carbon dioxide.

2.2.2. Planning and other initial considerations

2.2.2.1. **Noise & Shadow Flicker**: Turbine predicted to remain within accepted thresholds. Any limited flicker can be mitigated via programmed turbine shutdowns at specific times of year.

2.2.2.2. **Aviation**: Turbine predicted to be visible to Ministry of Defence radar and National Air Traffic System radar. Turbine also within consultation zones for Blackpool Airport and Warton Airfield. Recommendation to consult with all three stakeholders to gauge impact.

2.2.2.3. **Fixed Link Communication Systems**: The Joint Radio Company, one of the main operators of Fixed Links in the UK, objected to the turbine proposal due to the proximity of its location to two of its fixed link systems. Recommendation to engage with JRC to determine possible mitigations.

2.2.2.4. **Ecology**: A number of sites designated for their ecological interest are located in the area, although at a significant distance from the proposed turbine site. Existing bird surveys conducted on the proposed site have identified the presence of a number of species of conservation concern. Recommendation for discussion with Local Planning Authority on scope of further surveys required.

2.2.2.5. **Landscape**: The proposed site is located within the Green Belt. Recommendation to discuss impact with Local Planning Authority and to determine whether generating renewable electricity can be considered a 'very special circumstance' allowing for development within the Green Belt.

2.2.2.6. **Heritage**: A number of listed buildings were identified within 1 km of the proposed turbine location, with predicted visibility towards the turbine, potentially affecting their character and setting. Recommendation to discuss potential impact with Local Planning Authority.

2.2.2.7. **Grid Connection**: Potential lack of local network capacity for export of generated electricity, suggesting requirement for network reinforcement. To enable on site usage of the generated electricity, agreements with local landowners would be required for hosting the necessary cabling.

2.2.2.8. **Access**: No significant obstacles identified, subject to outcome of transport survey.

2.3. Further Turbine Feasibility

2.3.1. A wind turbine feasibility study was requested for 3 sites owned by GA Pet Food. Of these, the Carr Brook and Eyes Lane sites both offered viable potential for single turbines. The Enercon E-138 4.2 MW turbine was identified as the optimal technical solution. It is predicted

to provide 25 GWh of electricity per year, saving the equivalent of approximately 7,000 tonnes of carbon dioxide annually.

2.3.2. Key risks to the project were identified from Aviation (due to the proposed turbine's visibility to both MoD and NATS radar, as well as its proximity to Blackpool Airport and Warton Airfield) and Fixed Link Communication Systems (due to a link operator, JRC, objecting to the proposal based on predicted interference with one of their nearby links). Planning sensitivities were also identified in the key areas of Ecology, Heritage and Landscape. Engagement with these key stakeholders at an early stage was recommended.

2.3.3. Renewables First were tasked by the applicant with investigating the Aviation and Fixed Link Communication Systems concerns. Other third parties were tasked by the applicant with carrying out the investigations relating to the Ecology, Landscape, Heritage, Access and Grid Connection concerns.

3. Site Finalisation and Design Evolution

3.1. The Carr Brook site was then removed from consideration due to the necessary proximity of any potential turbine located there to nearby gridlines, nearby housing and noise exceedances. This left the Eyes Lane site as the preferred location, with its developable area determined such that setbacks relating to noise and physical constraints were at recommended levels. This site would later be termed 'Asland Walks Energy Park'.

3.2. As stated above, the preferred wind turbine solution was the Enercon E-138 4.2 MW turbine with a hub height of 131 m. However, subsequent engagement with aviation stakeholders led to BAE Systems Warton identifying potential interaction of the proposed turbine with their Instrument Flight Procedures (IFP). If no mitigation were found, this would provide grounds for the MoD objecting to the proposal.

3.3. Subsequent consultation with an aviation consultant (Osprey) suggested that reducing the turbine hub height to 111 m would provide the necessary clearance for the IFP, with little predicted adverse impact.

3.4. Given the modest reduction in expected annual electricity generation from this reduction in hub height (20 m), the decision was taken to accept this change. The modification significantly reduces aviation risk, while improving the likelihood of planning acceptance.

3.5. Consultation with Blackpool Airport and a subsequent technical assessment by their aviation consultant (Cyrrus) showed that the proposed turbine would not impact Blackpool Airport's IFPs.

3.6. Consultations were also conducted with the Joint Radio Company who had objected to the proposal based on the proximity of the fixed link systems they owned to the proposed turbine. Upgrades to the potentially impacted systems meant that while an easement was required, only a minor adjustment of the location of the turbine to the present position was necessary to

bring the impact on their systems within acceptable levels and subsequently for JRC to remove their objection to the proposal.

4. Summary

4.1.1. A wind turbine feasibility study was commissioned for 3 sites owned by GA Pet Food, with the aim of assessing the viability and financial performance of a wind turbine installation, identifying the key risks of proceeding to a planning application, and proposing possible mitigation options that may reduce the impact of these risks.

4.1.2. Following a review of the relevant physical constraints, the Carr Brook and Eyes Lane sites were both found to offer viable potential for single turbines. The Enercon E-138 4.2 MW turbine was identified as the optimal technical solution. It is predicted to provide 25 GWh of electricity per year, saving the equivalent of approximately 7,000 tonnes of carbon dioxide annually. Due to nearby housing causing noise exceedances and gridlines close to the Carr Brook site, the preferred location of the turbine was determined to be within the Eyes Lane site. This Eyes Lane site would later be termed 'Asland Walks Energy Park'.

4.1.3. Following a review of relevant planning constraints, key risks to the project were identified from Aviation (due to the proposed turbine's visibility to both MoD and NATS radar, as well as its proximity to Blackpool Airport and Warton Airfield) and Fixed Link Communication Systems (due to a link operator, JRC, objecting to the proposal based on predicted interference with one of their nearby links). Planning sensitivities were also identified in the key areas of Ecology, Heritage and Landscape. Engagement with these stakeholders at an early stage was recommended.

4.1.4. Engagement with BAE Systems Warton identified possible interference of the proposed turbine with their Instrument Flight Procedures, providing possible grounds for an MoD objection to the proposal. Subsequent consultation with an aviation consultant suggested reducing the hub height of the turbine by 20m to 111 m would provide the necessary clearance with the IFP to significantly reduce the aviation risk, with only a modest reduction in expected annual electricity generation.

4.1.5. Engagement with Blackpool Airport identified possible interference with their Instrument Flight Procedures, providing possible grounds for an objection to the proposal. However, subsequent consultation with an aviation consultant showed that there would be no such interference, such that Blackpool Airport have not objected to the proposal.

4.1.6. Engagement with the Joint Radio Company determined that changing the position of the proposed turbine slightly to the present location would ensure any impact on their Fixed Link systems would be within acceptable levels. They therefore removed their objections to the proposal.

4.1.7. Following the findings of the wind feasibility study and mitigations for an identified aviation impact, the final turbine model proposal is for an Enercon E-138 4.2 MW with 111 m hub height.