BEP - Asland Walks Feasibility & Optimisation

Non-technical summary

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1.1 Report Scope

This document presents a concise, non-technical overview of the latest report prepared by 8 Minute Energy Ltd, with support provided by Hydrock (now Stantec) - BEP - Asland Walks Feasibility & Optimisation P02. Its purpose is to summarise the key findings and conclusions of the technical and economic optimisation calculations done to size the hybrid Wind, PV and battery storage plant proposed at the Asland Walks site, Eyes Lane Bretherton PR4 6FS.

The summary has been produced specifically to support the forthcoming planning application in December 2025 and should be read alongside the accompanying detailed report (BEP - Asland Walks Feasibility & Optimisation) and planning documentation submitted.

1.2 Project Introduction

Asland Walks Energy Park is a proposed hybrid energy project designed to supply power to the GA Pet Food Partners facilities at Plocks Farm as well as to the village of Bretherton.

The proposal is a joint venture between GA Pet Food Partners Ltd and Bretherton Energy Co-op - Bretherton Energy Partnership (BEP). Bretherton village currently uses approximately 756 MWh annually, a figure that may rise if heat supply in the village is decarbonised. GA Pet Food is a major electricity user, consuming around 23 GWh of electricity per year. Similarly, GA has a large thermal load of 32 GWh of gas per year for further decarbonisation via thermal electrification

The generation facilities at Asland Walks Energy Park, which will supply both GA and Bretherton, will consist of a 4.2 MW wind turbine, 12.47 MW solar plant and a 5 MWh battery system. The report details how the applicant arrived at these figures by calculating the technical and economic impact of the proposal.

The purpose of developing this renewable energy park is to reduce energy costs for GA and Bretherton residents, providing economic benefits to the area while supporting progress toward net-zero emissions for all parties.

1.3 Optimisation Introduction

Optimising any hybrid energy system requires detailed technical and economic analysis and draws on input from multiple disciplines, including technical, economic, geographical, and practical considerations. 8 Minute Energy Ltd was commissioned to carry out a techno-economic assessment for the site, evaluating energy production across various configurations of solar capacity and battery storage. The assessment used advanced modelling tools (Gridcog and PVsyst software packages) to optimise the balance between technical performance and economic viability for the proposed energy park.

Although power modelling exercises are inherently complex, there are four main categories of input parameters considered in the current analysis:

- **Technical characteristics** of the proposed plant (parameters of PV modules, Wind Turbine, inverters, transformers, cables).

- **Demand data** for the facilities being supplied (electrical load profile of the GA facilities).
- **Generation data** for the hybrid system (generation data is determined based on multiple inputs like local solar radiation and wind profile, temperature, system losses).
- **Economic data**, including CAPEX, OPEX of the plant, and electricity price assumptions.

The next step in the optimization process involves running iterative software simulations using these parameter sets, exploring different plant sizes, and optimizing for the objectives described below.

1.3.1 Modelling Process and Inputs

Each category of modelling inputs mentioned above are detailed in the main report, but the most important details used in sizing the Asland Walks Energy Park are listed below.

The technical design characteristics of the plant incorporated into the modelling include the selection of the PV module, wind turbine, battery system and their performance characteristics. A 700 W RISEN 132-8-660 BMGD bifacial module was chosen for its high efficiency and ability to capture reflected light from both sides. Parameters such as module efficiency, panel technology, and long-term degradation rates were all integrated into the performance modelling.

To convert the PV module output into grid-compatible power, 8 Minute Energy utilised the SMA SC 2660 UP inverter, a leading utility-scale solution. A DC-coupled architecture was adopted, meaning the PV array and the battery storage system both connect to the grid through the same centralised inverter. This configuration improves conversion efficiency and minimises the impact on the local electricity network.

The solar photovoltaic farm was designed with an East–West orientation, whereby half of the PV plant is oriented 15 degrees east and the other half 15 degrees west. This arrangement produces a flatter daily generation profile and increases energy output during morning and evening demand periods, as well as being much more space efficient in comparison to south facing PV panels

The wind generation component considered is a fixed Enercon E138 4.2 MW turbine, while the energy storage system is a containerised battery solution.

In terms of generation and demand data, 8 Minute Energy visited the site in 2022, to inspect the existing 11 kV main panel, review metering details for GA Pet Food’s electricity consumption, and complete an aerial survey of the Asland Walks site. The site’s annual electricity demand, MPAN 1640000121439, is 23,381 MWh per year. The data considered in the modelling is a half hourly profile.

1.3.2 Modelling results

All modelling calculations have constraints and are designed to optimize for specific objectives. In the main report, 8 Minute Energy proposed three primary optimization options: maximizing the economic performance (IRR), maximizing CO_2 emissions reductions, and maximizing self-sufficiency (the amount of GA electrical demand covered by the generating plant). Not all of these can be achieved simultaneously. Regarding constraints, in addition to technical and economic data, the report considers two main scenarios: one in which export grid capacity is available, and one with no export options.

The calculation results present eight different hybrid plant options. They indicate a wide range in PV farm size, from 1.7 to 16.46 MW, and battery storage capacity, from 0 to 15 MWh (the wind turbine was considered fixed). The resulting economic results (IRR) also varies between 7% and 17%, depending on the plant configuration. This variation is expected, as different optimisation objectives lead to different outcomes. For example, if maximising self-sufficiency is the primary goal, the plant size tends to increase, but the economic performance is generally lower.

The preferred option, selected for the current planning application, is optimised for maximum self-sufficiency and carbon emission reductions, assuming no grid export is available through the GA connection. The main resulting hybrid plant parameters are as follows:

- Wind capacity: 4.2 MW.
- Solar capacity: 12.46 MW.
- Battery storage capacity: 5 MWh.
- Self-sufficiency: 70.6%.
- Carbon savings: 421,917 t CO_2/year.

The optimised 12.46 MW solar capacity can be sited anywhere within the development. The proposal assumes that 11 MW will be ground-mounted, with the remaining capacity installed on rooftops.

1.3.3 Observation and Conclusions

The 8-Minute Energy optimisation calculations for the proposed energy park at the Asland Walks site demonstrate an ideal application for renewable energy generation.

Firstly, GA Pet Food, as a major electricity off-taker, could achieve approximately 70.6% electricity self-sufficiency. This is a remarkable result for renewable energy applications for large consumers. Typically, the natural variability of renewable generation combined with fluctuating electrical demand reduces self-sufficiency. However, in this case, the operational load profile of the GA plant, together with the wind and solar generation profiles and the battery storage system, creates a steady flow of electricity that closely matches demand—something rarely achieved. This means that the electricity generated locally is also consumed locally, which should be the primary goal of all renewable generation projects. Not all PV, wind, and storage plants in the UK operate this efficiently, many function similarly to traditional generation, sending energy over large distances through distribution and transmission networks - sometimes tens or even hundreds of kilometres. This increases losses and reduces available capacity on these networks. This is not the case with Asland Walks Energy Park, where most of the generation is expected to be consumed locally.

Secondly, the optimisation calculations indicate clear economic benefits for all parties involved: GA, the Bretherton Energy Co-operative, and Bretherton's residents and businesses. While not addressed in detail in this report, additional advantages arise from community engagement, partnerships, and local job opportunities. The reduced electricity costs for local businesses and residents are not just a temporary benefit, they provide a reliable, locally generated energy source for decades to come. This will help shield the area from global energy price fluctuations, such as those seen during the recent energy crisis triggered by the war in Ukraine.

Thirdly, the proposal significantly reduces carbon emissions, supporting progress toward net-zero emissions for all stakeholders.

Fourthly, the optimised renewable plant can be sited on the lowest soil grade area of the field, thereby protecting the land's most fertile and versatile soil. The land can still be used for grazing, and the solar tables can provide additional shading for the animals.

Finally, less tangible benefits include a reduction in power flow across the wider electricity network. Lower electricity consumption by GA, Bretherton residents and businesses relieves capacity constraints in the Distribution Network Operator (DNO) network. As previously mentioned, because a large percentage of the electricity generated by the Asland Walks Energy Park will be consumed locally, the system places less strain on the wider electricity network compared with plants of a similar size. The benefit is twofold: first, it reflects good design practice for renewable energy projects, and second, it reduces the amount of power that needs to be imported from the grid, thereby freeing up capacity on the electricity network for additional users. While this is difficult to quantify and not monetised, benefit is nonetheless significant.