BATTERY BOX
GARN BOX
ENERGY STORAGE SYSTEM

PLANNING STATEMENT

AMP ENERGY SERVICES LTD

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1.0 Introduction

1.1 Overview

This application seeks permission for a 200kW (400kWhr) Energy Storage System (ESS) ('Battery Box') ("the proposed development") at Garn Transport, Wardentree Lane, Pinchbeck, Spalding, PE11 3DQ. AMP Clean Energy is developing Battery Boxes across the UK to provide a low carbon, flexible and de-centralised source of electricity that benefits local communities, businesses, and homes.

AMP Clean Energy build, fund, own and operate renewable and low carbon energy facilities and flexible power assets across the UK. We have over 160 assets and provide service and maintenance to over 1,000 customer sites and have 175 staff nationwide.

1.2 What is a Battery Box?

A Battery Box is an ESS that imports electricity from the local electricity network when demand for electricity is low or when there are high levels of renewable energy available. It then exports that electricity back to the grid when required in periods of high demand. This provides a solution to the growing need for flexibility and helps address concerns regarding grid reliability prompted by an increase reliance on intermittent generation of the electricity system.

Battery Boxes connect into the low voltage (LV) network, this is the lowest and most local point in the system where there is an increasing demand for electricity with the electrification of transport and heating systems. Stored electricity from the Battery Box will be exported and consumed in the locality of the box (when it is required).

1.3 Why do we need Battery Boxes?

The UK's electricity system was traditionally dominated by a small number of large power stations fuelled by fossil fuel (namely coal and natural gas). However, the system is now becoming increasingly supplied by intermittent sources of renewable energy such as wind and solar power.

Renewable power generation does not always match when the demand for electricity is highest. To overcome this, we need a more flexible energy system that allows to shift renewable energy to the periods of the day when the demand for power is at its greatest. And as the UK builds more and more renewable projects, increasingly there are times when the amount of renewable electricity on the system is greater than the demand for it.

ESS's allow this 'excess' renewable electricity to be stored and used later when low carbon sources are unable to generate enough electricity (i.e., when it isn't windy and sunny). By doing so ESS's can prevent the need to turn on fossil fuel generators and allow the UK to maximise the use of renewable power and to facilitate the UK's transition to net-zero.

1.4 The Benefits of Battery Box

Urban, suburban, and industrial areas consume large amounts of energy, however, are not well suited for large scale storage assets (typically requiring one acre or more), solar farms (typically requiring 25 acres or more) or large wind turbines. Battery Boxes have a comparative small footprint and connect into local Low Voltage networks making them uniquely suited to these areas.

In doing so they can provide the following benefits:

1.4.1 Reduce carbon emissions

By charging the ESS during periods of high renewable generation you charge up the Battery Box with low carbon energy. When demand is high and renewable power is not otherwise available, rather than turn on a fossil fuel power plant, ESSs can export the stored energy. This reduces the amount of carbon used on our energy system.

Whilst the amount of carbon saved each year will vary with changing weather and demand patterns, AMP Clean Energy expect each Battery Box will save 40 tonnes of Carbon each year and 1,200 tonnes of carbon over the project Lifecyle.

1.4.2 Improve energy security

ESS can displace the need for fossil fuels and in doing so reduce the need to important natural gas from other parts of the world, meaning the UK is less reliant on foreign energy sources.

1.4.3 Reinforce local electricity networks

An average home may use up to 1kWh in any given hour. A battery box stores 400kWh and has the potential to power 400 homes for one hour where there is a disruption to the supply to an area.

Also, as people electrify the heating in their homes and switch to Electric Vehicles the demand on local networks has never been greater. ESS's can provide additional capacity to those local networks when demand is high.

2.0 Site Information and Background

2.1 Location and Planning History

The proposed development is located on Wardentree Lane, Pinchbeck, Spalding, PE11 3DQ. The grid reference of the site is TF 26005 25229 and the site location is shown on drawing reference BB00385-01 accompanying the application.

The site is a flat unused grass verge situated next to an existing secondary substation.

An online search of South Holland District Council planning showed the following applications associated with the site and surrounding area:

Reference	Proposal	Date / Decision
H16-0241-09	Proposed 900MW CCGT Electricity Generating Station	Approved – 28/01/10
H14-1027-15	Erection of signage	Withdrawn
H14-0165-21	Erection of 96 dwellings and associated works	Approved – 12/01/22
H14-0071-22	Installation of Glen Farrow 210 Biomass boiler to replace existing biomass boiler	Approved – 24/03/22

2.2 Development Drawings

The planning application is accompanied by the following drawings:

- Site Location Plan
- Site Layout Plan
- Battery Equipment – Plans and Elevations
- Electrical Cabinet – Plans and Elevations
- Paladin Fence Elevations

2.3 Site Selection

Suitable available land for energy development is not easy to find. A suitable site must be within 50m of an existing substation or a large 3 phase low voltage cable to allow for a viable electrical connection.

Sites must also have available space and a landowner who is prepared to host a battery box. However, having a small footprint makes battery boxes ideal for urban and built-up areas in which other renewable technologies are not suited.

This site has been carefully selected for the following reasons:

- Proximity to local grid.
- Development land available.
- Suitable flat industrial land.
- Near local electricity demand.

2.4 Development Description

The proposed development will consist of:

- Installation of a concrete plinth foundation;
- Installation of the battery containerised units and associated equipment;

- The construction of a new fence surrounding the Battery Box;

Full site layout and equipment drawings accompanying the application.

2.4.1 Construction

The construction of the site would take approximately 2 weeks. The electrical equipment is manufactured off site and is lifted in to position on the concrete plinth before the electrical connection is complete.

2.4.2 Operation

Battery Boxes provide additional power and flexibility to the local electricity networks when it is needed most; typically, during periods of high demand (typically know as 'peak periods'). The ESS imports electricity when there is a surplus, for example a sunny and windy day during summer when electricity produced by wind turbines and solar panels exceeds real-time demand. Stored energy is then exported back to the local networks at peak periods (typically evenings between 16:00 and 20:00, Monday to Friday).

3.0 Policy Review and Context

The below highlights the governments support for flexible energy developments and specifically Energy Storage and highlights their importance in the ever-changing energy system as we move to a more renewables dominated electricity network.

3.1 National Grid Future Energy Scenarios

Nations Grid's Future Energy Scenarios[1] clearly set out that flexibility is crucial to operating the energy system where the supply and demand of energy needs to be balanced.

In July 2021, National Grid Electricity Systems Operator (ESO) published its Future Energy Scenarios (FES) report in which flexibility and energy storage are predominant themes and point to the need to develop both small-scale localised ESS (like the proposed development) and larger storage. This will then in turn reduce the overall dominance of large-scale transmission connected generation (traditionally coal-fired power stations), through the storage of renewable energy at times of lower demand, to then be used at peak times.

ESS's respond rapidly to changing supply and demand conditions which is what a system with a high level of intermittent (renewable) generation needs. Battery Boxes ability to store and provide peak / flexible services is key to enabling the growth of renewables and therefore helps to achieve the phase-out of out-dated technologies such as coal at the same time as minimising the risk of electricity shortages.

The FES expands on the role that storage will play in the UK's energy portfolio, specifically stating:

> *"Falling costs of batteries and changing system needs mean we expect a greater use of batteries that can deliver maximum power output for two to four hours. This increases the use of battery storage for shifting demand within the day and managing constraints on the network.*
>
> *Storage will play a key role in managing renewable generation output and meeting peak demands on the electricity system…"* (p.201)

3.2 Transitioning to a net zero energy system – Smart Systems and Flexibility Plan 2021

The Department for Business, Energy, and Industrial Strategy (BEIS) and Ofgem published in July 2021 a paper called Transitioning to a net zero energy system – Smart Systems and Flexibility Plan 2021[2].

The paper sets out that the electricity system will need significant levels of flexibility *"… so that it can be almost entirely run-on low carbon energy sources. The need for flexibility will rapidly increase as variable renewable power replaces fossil fuel sources… Around 30GW of low carbon capacity in 2030, and 60GW in 20250 may be needed to maintain energy and security, and cost effectively integrate high levels of renewables".* The report further estimates flexibility will reduce the costs on our energy system by up to £10bn a year.

Regarding consumer costs, the paper states *"Battery storage can be deployed on the grid, and also at a domestic and commercial scale enabling consumers to reduce their energy bills and support the integration of low carbon transport and heating"* (p. 38). It is therefore vital for the proliferation of renewable and the net zero target that we build and develop flexible, local energy storage systems.

[1] National Grid ESO, *Future Energy Scenarios,* 2021. *Available at:* *Future Energy Scenarios 2021 | National Grid ESO*

[2] https://www.gov.uk/government/publications/transitioning-to-a-net-zero-energy-system-smart-systems-and-flexibility-plan-2021

3.3 National infrastructure Strategy

In November 2020 the Government published its National Infrastructure Strategy[3]. On page 50, it states *"To achieve net zero by 2050, the power system will need to be virtually carbon free and significantly larger to cope with the additional demand from electrification in transport heading, and some industrial processes. This expanded system will require increase investments in networks infrastructure, sources of flexibility, such as interconnection, demand response and storage, and enough low carbon generation capacity to provide the vast majority of the UK's electricity needs."*

3.4 Energy White Paper: Powering Our Net Zero Future

The government published its Energy White Paper: Powering Our Net Zero Future[4] (published December 2020), where it states, on page 72, that *"Gas-fired power stations have traditionally provided the flexibility needed to match supply to demand at peak hours, or when renewable output is low. Increasingly flexibility will come from new, cleaner sources, such as energy storage in batteries."*

3.5 National Planning Policy Framework

The National Planning Policy Framework (NPPF) (revised July 2021)[5] seeks to achieve sustainable development and set three overarching interdependent objectives for the planning system of: building a strong, responsive, and competitive economy; supporting strong, vibrant communities; and contributing to protecting and enhancing the natural, built, and historic environment (para 8).

Paragraph 152 highlights the need to support energy development that contributes to security and stability of supply:

> *"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contributed to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversation of existing buildings; and support renewable and low carbon energy and associated infrastructure."*

Paragraph 155 also states:

> *"To help increase the use and supply of renewable and low carbon energy and heat, plans should:*
>
> *a) Provide a positive strategy for energy from these sources, that maximises the potential for suitable development;*
> *b) Consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*
> *c) Identify opportunities for development to draw its energy supply from decentralised renewable, or low carbon energy supply systems for collocating potential heat customers and suppliers."*

The UK's electricity generation mix continues to diversify, which means the need for flexibility is growing The UK is becoming increasingly reliant on intermittent sources of electricity generation such as wind, hydro and solar. In 2020, a record 59.3% of electricity was generated from low carbon sources[6]. By enabling the storage, and future flexible use

[3] HM Treasury, *National Infrastructure Strategy*, 2020. *Available at:* National Infrastructure Strategy - GOV.UK (www.gov.uk)
[4] Department for Business, Energy & Industrial Strategy, *Energy white paper: Powering our net zero future,* 2020.*Available at:* Energy White Paper (publishing.service.gov.uk)
[5] Ministry of Housing, Communities & Local Government - *National Planning Policy Framework, 2012 (revised 2021*). *Available at:* National Planning Policy Framework - GOV.UK (www.gov.uk)
[6] Department for Business, Energy & Industrial Strategy – *Digest of UK Energy Statistics Annual data for UK, 2020. Available at:* Digest of UK Energy Statistics (DUKES) 2020 - GOV.UK (www.gov.uk)

of electricity when renewable generation output is high, but demand is low, the proposed development is designed to further promote the penetration of renewables into the UK's electricity networks.

In turn this support allows inflexible fossil-fuel fired plants to be decommissioned; thereby reducing Greenhouse Gas emissions and furthering Climate Change mitigation efforts.

3.6 National Policy Statement for Energy

The overarching National Policy Statement for Energy (EN-1)[7] which sets out national policy for energy infrastructure in the UK, similarly, echoes support for the development of Energy Storage infrastructure by also seeking to promote resilience in the supply of energy. Paragraph 2.2.20 states:

> *"It is critical that the UK continues to have secure and reliable supplies of electricity as we make the transition to a low carbon economy. To manage the risk to achieving security of supply we need:*
>
> > *Sufficient electricity capacity (including a greater proportion of low carbon generation) to meet demand at all times… Demand for it [electricity] must be simultaneously and continuously met by its supply. This requires a safety margin of spare capacity to accommodate unforeseen fluctuations in supply or demand."*

As the grid becomes greener, and the UK becomes increasingly reliant on intermittent sources of electricity generation, such as wind and solar, the system needs flexible dispatchable technologies, like energy storage, in order to maintain network stability and security of supply. Paragraph 3.3.12, recognises that:

> *"…there are a number of other technologies which can be used to compensate for the intermittency of renewable generation, such as electricity storage…"*

However, EN-1 also acknowledges that:

> *"although [the] Government believes this technology will play important roles in a low carbon electricity system, the development of these technologies [such as commercial batteries] at the necessary scale has yet to be achieved."*

Tremendous advances have, and continue, to be made in energy storage technology since the publication of the Nation Policy Statements. Yet there remains a strong and recognised need for more storage infrastructures, like the proposed development, to enable an increase in the storage of excess renewable generation. In turn, this allows a greater number of renewables to penetrate the UK's electricity networks and facilitate a swifter transition towards net-zero. Battery Boxes therefore play a key role in the ongoing rollout of renewable, intermittent, technologies.

The Office of Gas and Electricity Markets (Ofgem) and Business Energy and Industrial Strategy (BEIS) published an open letter in July 2019[8] about the importance of connecting flexibility capacity at distribution level. The opening paragraph notes:

> *"To remain fit for purpose in this transforming system, energy networks will need to evolve too. Flexibility will be crucial, facilitating significant deployment of renewables, electrified transport and, potentially, electrified heat. A smarter and more flexibly system could save the UK £17-40bn by 2050, and many of these benefits will be realised at the distribution level."*

[7] *Department of Energy & Climate Change – Overarching National Policy Statement for Energy (EN-1), 2011. Available at:* National Planning Policy Framework - GOV.UK (www.gov.uk)

[8] Business, Energy & Industrial Strategy and Ofgem - *Letter from BEIS/Ofgem to Energy Networks Association, 2019. Available at:* *Open Networks project: letter from BEIS and Ofgem to the Energy Networks Association (ENA) - GOV.UK (www.gov.uk)*

This letter makes it clear that flexibility in the networks is essential in supporting the on-going deployment of renewable generation resources. Battery Box provides the network with this flexibility.

3.7 Local Planning Policy

In 2020, Lincolnshire County Council launched its Green Masterplan[9] to advise on how to meet the challenges presented by Climate Change. The report sets out the council's initial action plan in how they are actively trying to reduce carbon emissions. The proposed development will help the council work towards this aim. AMP Clean Energy expects each Battery Box to save ~40 tonnes of carbon each year, and 1,200 tonnes of carbon over the project lifecycle.

[9] *South and East Lincolnshire Councils Partnership - Climate Change Strategy, Spring 2022. Available at: Climate Change Strategy 2022*

4.0 Environmental Review

A Battery Box is a small development and appears much like other utility structures, such as small substations, gas kiosks, and telephone exchanges. As such, alongside careful site selection, the potential impacts are very limited, and are offset by the significant benefits the projects offers.

4.1 Impacts

Aspect	Comment
Landscape	Impacts on landscape and visual amenity are not considered to be significant due to the nature of the surrounding area and the small-scale nature of the development. The proposed development is located on an unused parcel of land next to existing electrical infrastructure (secondary substation).
Ecology	The site is located near a Local Wildlife Site. The site is within an existing developed area and no significant demolition or site clearance is required. No impacts on ecology or nature conservation are anticipated as a result of the proposed development.
Land Quality	As the application site is within an existing developed area and minimal ground-breaking is required, there is no anticipated land quality issues.
Cultural Heritage	As the development involves minimal sub-surface construction work, no sub-surface archaeological concerns are therefore anticipated. Given the location and small-scale nature of the development, it is not envisaged that there will be any wider heritage issues from this proposal.
Hydrology	See attached FRA.
Traffic and Transport	The development will be using the existing accessway. Traffic generation during construction and operation of the development will be minimal. Construction is anticipated to last for approximately 2 weeks. A total of 6 HGV movements (3 arrival, 3 departures) are expected to site. Consequently, the volume of trips generated by the site during construction will be negligible. The ESS is controlled remotely, therefore during the operational phase visits to site are only anticipated to response to a fault or maintenance activities. The additional road traffic cause by the development is negligible.
Air Quality	The battery units do not produce any air emissions and therefore do not impact air quality.

Noise	There will be no impact in terms of Noise and Vibration, any noise arising from the equipment will be minimal and indistinguishable from the background levels.
Health and Safety	The energy storage systems are based on highly stable Lithium Iron Phosphate battery cell and include a battery management system that monitors the system 24 hours a day. An AI-powered internal short circuit detection system, temperature sensor and built in current and voltage sensors all provide early warning of a malfunction and permit automatic or switch off. The system is capable of operating in extreme temperatures between -30°C and 55°C well within the normal climatic environment of the UK.

5.0 Conclusion

The proposed development is for a 200kW Energy Storage System and would be one of many ESS's being developed by AMP Clean Energy around the UK. Battery Boxes provide a flexible and decentralised additional source of local grid capacity to address the growing need for flexibility as the UK's generation mix continues to diversify and rely on intermittent renewable energy generation.

The growth of intermittent renewables signifies the need for greater system flexibility to ensure the stability and security of our electricity supply. The ability to dynamically respond to changes in supply and demand is paramount to the resilience of our electricity networks. The proposed ESS will provide resilience to the local grid network by providing a secure and stable electricity supply and emergency backup power which will support and benefit local homes and businesses.

The location and small footprint of the proposed development means it will have no impact on the surrounding site, it will however benefit the local area and national energy network. The overall contribution of the development towards the delivery of the social and economic benefits to the site and the wider surrounding area is in compliance with local and national policies.

Accordingly, South Holland District Council is respectfully requested to approve this Planning Application.