

Rossendale BESS

Sustainability, Energy & Climate Change Statement

Cubico UK Developments Ltd

March 2025



Contents

Executive Summary..... 3

1. Introduction 5

2. Policy Context 8

3. Sustainability, Energy & Climate Change Performance 14

Client Cubico UK Developments Ltd

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Executive Summary

Cubico proposes to develop a new 85 megawatt (MW) Battery Energy Storage Scheme (BESS) at land at Rochdale Road and Bamford Road in Turn Village, Rossendale. By locating the BESS next to the existing Scout Moor Wind Farm, the proposal will help to balance shortfalls and over-production to smooth the export of clean power.

The proposed BESS is forecast to deliver 105,485 megawatt hours (MWh) of zero carbon electricity each year, powering the equivalent of over 39,000 UK homes. It is forecast to deliver greenhouse gas (GHG) emissions savings of up to 53,481 tonnes of carbon dioxide equivalent (tCO₂e) each year, comparable with taking 28,444 cars off the road, or 87% of electricity-related GHG emissions that occur within Rossendale Borough.

Regarding potential environmental effects of the proposals, a detailed intrusive site investigation will be undertaken to fully delineate potential geotechnical and ground contamination risks that may be present, and to ensure that any such risks are appropriately mitigated as part of the development proposals.

This site has a low potential for any previously unrecorded heritage assets of any period to be present within the site, the exceptions being evidence for post-medieval agricultural in the form of an unidentified building, possibly a farm building, and former road and former field boundaries noted on historic

maps. There may potentially also be remains of a Tollhouse present around the A680 road along the proposed cable route. Any such remains would likely be considered of low importance due to their prevalence in the archaeological record.

Given the potential for encountering archaeological remains any archaeological investigation could initially be limited to the archaeological monitoring of the proposed geotechnical investigations, or assessment of the geotechnical reports to determine which areas, if any, may require further mitigation. Potential further mitigation could take the form of a programme of archaeological works to record any archaeological remains that would be impacted and consult with Lancashire County Council's Archaeology team.

No significant air quality impacts are predicted during the construction or operation of the proposed development, which is therefore consistent with the NPPF and also Local Plan Policy TR1 Strategic Transport as it will support economic growth while improving air quality and tackling climate change.

The Committee on Climate Change report *Delivering a Reliable Decarbonised Power System (March 2022)*¹ highlights the importance of developing storage solutions and capacity to provide storage services on an hours to days basis. Short term priorities include lithium ion BESS to provide increased

¹ <https://www.theccc.org.uk/wp-content/uploads/2023/03/Delivering-a-reliable-decarbonised-power-system.pdf>

grid flexibility and to grow the UK's current 2 GW of grid connected battery storage.

The proposals will directly support UN Sustainable Development Goals (as recognised by the NPPF) including Goal 7 'Affordable and Clean Energy', Goal 9 'Industry Innovation & Infrastructure', Goal 13 'Climate Action' and Goal 12 'Responsible Consumption & Production'.

The appropriate re-use / recycling / disposal of the various BESS components at their end of life, including lithium-ion, will be undertaken in accordance with the Waste Batteries and Accumulators Regulations 2009, or any relevant superseding legislation.

The proposed development is therefore demonstrated to comprise sustainable development which accords with national and local objectives and Climate Change Committee recommendations for grid flexibility and decarbonisation, a critical requirement for the UK's legally-binding net zero 2050 target. As such the application should be approved in accordance with Local Plan Policy SD1: Presumption in Favour of Sustainable Development.

1. Introduction

1.1 Introduction

This Sustainability, Energy & Climate Change Statement has been prepared by Turley Sustainability & ESG ('Turley') on behalf of Cubico UK Developments Ltd ('Cubico' / 'the Applicant'). It supports a full planning application to Rossendale Borough Council ('the Council / RBC') for the installation of an 85 megawatt (MW) Battery Energy Storage System ('BESS' / 'the Development') at land at Rochdale Road and Bamford Road, Turn Village, close to the existing Scout Moor Windfarm, Rossendale ('the Site').

The Statement sets out the planning policy context for sustainable development at the national and local levels, together with the recognised need to rapidly deploy battery storage at scale in order to meet the UK's grid decarbonisation, electricity market reform, Clean Power 2030 and legally-binding net zero 2050 target. It then reports the various measures incorporated into the construction and operation of the proposed development in order to maximise its sustainability, energy and climate change performance in response to its policy context.

The terms "carbon", "carbon dioxide (CO₂)", "carbon dioxide equivalent (CO₂e)" and "greenhouse gases (GHGs)" are used interchangeably reflecting the varied terminology of referenced documents.

1.2 Application Site and Surroundings

The Site is located approximately 2.8km west of Ramsbottom, 3.5km south of Edenfield and 6km south of Bury. It is situated to the south of the A680 (Rochdale Road), which runs from the A58 in central Rochdale, through Accrington, and terminates at the A671 (Burnley Road) to the east of Whalley. To the south of the site, Bamford Road provides a connection from the A680 to the hamlet of Shuttleworth.

The surrounding area is primarily characterised by open agricultural fields, with sporadic built development dispersed throughout. To the south and west of the Site, there are several residential properties and farms, with Rossendale School situated further west along Blacks Lane.

The Site can be accessed by foot via the footpath along the A680. Additionally, several public rights of way are located along Black Lane and along the northern boundary of the Site. Countryside Right of Way Section 15 also passes along Bamford Road. The surrounding area comprises predominantly open agricultural land and moorland with scattered farmsteads and other small clusters of buildings.

The site slopes from the north-west at 299m Above Ordnance Datum (AOD) to the south-east at 290m AOD. The slope is steeper in the north and becomes a more gradual incline from the centre of the site.

It lies within an area of undulating topography on the eastern side of a river valley which is traversed by a number of brooks and streams feeding the River Irwell. Fletcher Bank Quarry and the village of Ramsbottom are located in the lower valley to the west of the Site. To the north and east, the land rises steeply towards the ridges of Scout Moor and Knowl Moor which are lined with wind turbines.

A Site Location Plan is presented at **Figure 1**.

1.3 Proposed Development

The Applicant is seeking planning permission for the construction, management and operation of a Battery Energy Storage System (BESS) with associated infrastructure including access, drainage, security measures and landscaping and provision of a connecting cable to Croston Close Road substation. The proposed site layout is presented in **Figure 2** overleaf.

Refer to the *Planning Statement* and *Design & Access Statement* for further details of the development proposals.

Figure 1: Site Location

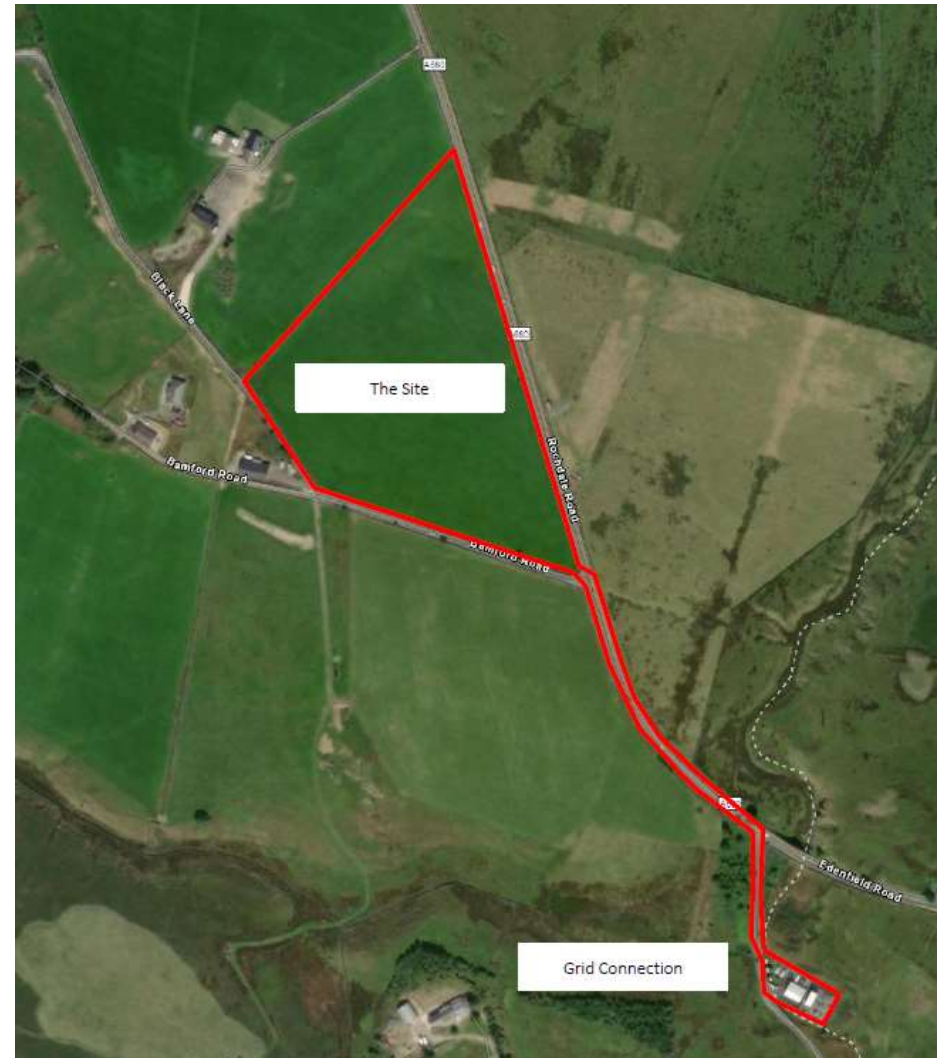


Figure 1: Proposed Site Layout Plan (Overall). This plan shows the overall site layout with a dashed box indicating the area detailed in Figure 2. It includes a north arrow, a scale bar (0 to 200m), and a title block with the following information:

- Project: Rosendale BESS
- Location: Rosendale Road, Turn Village
- Client: Cubico Sustainable Investments
- Design: CADmando
- Scale: 1:2000 @ A1

Figure 2: Proposed Site Layout Plan (BESS). This plan provides a detailed view of the BESS site layout, showing the arrangement of battery units, access roads, and surrounding infrastructure. It includes a north arrow, a scale bar (0 to 50m), and a title block with the following information:

- Project: Rosendale BESS
- Location: Rosendale Road, Turn Village
- Client: Cubico Sustainable Investments
- Design: CADmando
- Scale: 1:500 @ A1

2. Policy Context

2.1 National Policy

2.1.1 National Planning Policy Framework

Paragraph 7 of the *National Planning Policy Framework*² (NPPF) explains the purpose of the planning system is to contribute to the achievement of sustainable development. Paragraph 8c) goes on to explain that, in order to deliver sustainable development, three overarching objectives should be pursued in mutually supportive ways, with the environmental objective (to which this Statement primarily relates) including protecting and enhancing the natural, built and historic environment, mitigating and adapting to climate change and supporting the transition to a low carbon economy.

NPPF paragraph 163 explains the need to mitigate and adapt to climate change should be considered in preparing and assessing planning applications, taking into account the full range of potential climate change impacts.

The NPPF recognises the key role of planning in supporting the UK's pursuit of the 17 *United Nations Sustainable Development Goals (UN SDGs)*³ which address social progress, economic wellbeing and environmental protection. Example UN SDGs relevant to the development proposals are presented in **Figure 3**.

Figure 3. Applicable UN Sustainable Development Goals



In relation to climate change, NPPF paragraph 161 explains the planning system should support the transition to net zero by 2050, and support renewable and low carbon energy and associated infrastructure. Paragraph 168 further explains that, when determining planning applications for renewable and low carbon energy development and their associated infrastructure, local planning

² https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf

³ <https://sdgs.un.org/2030agenda>

authorities should give significant weight to the benefits of utilising an established site.

2.1.2 Planning Practice Guidance

*Planning Practice Guidance (PPG)*⁴ provides guidance on various planning issues associated with development, underpinning policies within the NPPF including those linked to sustainability, energy and climate change.

PPG is a material consideration in planning decisions and should be followed unless there is clear justification not to do so. It sets out how Local Authorities should include policies that protect the local environment, mitigate climate change and support developments that are functional and adaptable for the future.

In relation to energy infrastructure, PPG highlights the importance of maximising the supply of renewable and low carbon technologies to ensure the UK has a secure source of energy whilst reducing GHG emissions. PPG advises local authorities not to rule out renewable and low carbon energy based on inflexible rules on buffer zones and separation distances.

2.1.3 Climate Change Act

The *Climate Change Act (2008)* as amended⁵ sets a legally binding target for the UK to reduce CO₂ emissions to net zero by 2050, the world's first major economy to do so. The Act requires Government to set legally-binding 'carbon budgets' to act as stepping-stones towards the 2050 target, establishing a cap on the amount of greenhouse gases emitted over a five-year period. Six carbon budgets have been put into law to date and run up to 2037, aiming to have reduce GHG emissions by at least 78% by 2035 compared to 1990 levels.

⁴ <https://www.gov.uk/government/collections/planning-practice-guidance>

⁵ <https://www.legislation.gov.uk/ukdsi/2019/9780111187654>

⁶ <https://questions-statements.parliament.uk/written-statements/detail/2024-11-12/hcws206>

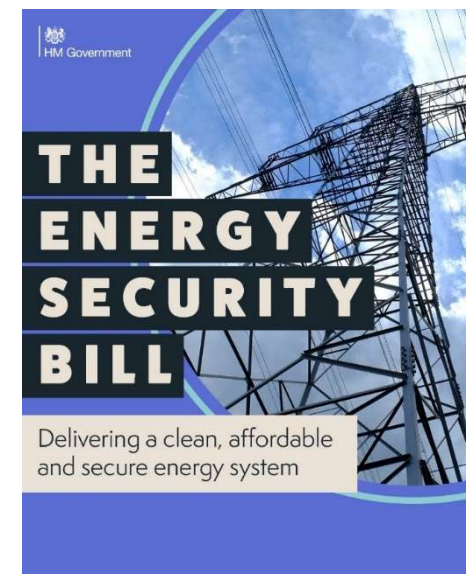
⁷ <https://www.gov.uk/government/collections/energy-security-bill>

⁸ <https://www.gov.uk/government/publications/energy-security-bill-factsheets/energy-security-bill-factsheet-defining-electricity-storage>

In November 2024, the new Labour Government announced a new higher target of an 81% reduction in GHG emissions by 2035, excluding emissions from international aviation and shipping⁶.

2.1.4 Energy Security Bill

The *Energy Security Bill (2022)* was introduced to Parliament on 6 July 2022 with the aim of delivering a cleaner, more affordable, and more secure energy system⁷. The *Energy Security Bill factsheet: Defining electricity storage (June 2023)*⁸ explains that flexibility from technologies such as electricity storage could save up to £10 billion per year by 2050 by reducing the amount of generation and network needed to decarbonise whilst creating 24,000 jobs.



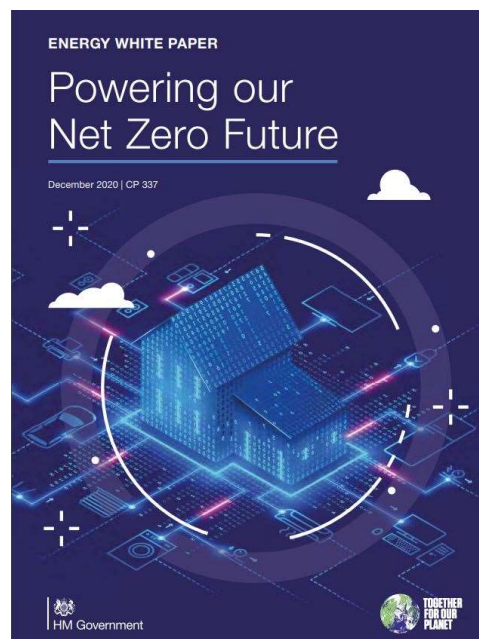
Government is legislating to clarify electricity storage as a distinct subset of electricity generation in the 1989 Electricity Act. Formalising electricity storage as a distinct subset of generation removes current ambiguities and provides long-term clarity and certainty over its treatment within the existing frameworks (e.g. planning and licensing) and possible future frameworks.

Government is facilitating the deployment of electricity storage at all scales through the joint Ofgem and BEIS Smart Systems and Flexibility Plan. This

focuses on actions to create a best-in-class regulatory framework by removing regulatory and policy barriers to the implementation of storage, ensuring that markets reflect the value of flexibility to the system and investing in innovation. Defining electricity storage in primary legislation is central to this approach.

2.1.5 Energy White Paper

The *Energy White Paper - Powering our Net Zero future (2020)*⁹, sets out a long-term strategic vision for the UK energy system and its transition to net zero emissions by 2050. The paper indicates that electricity demand could double as a result of the future electrification of heat and transportation and recognises battery storage of clean energy as a low-cost solution for meeting the demand for energy storage and flexibility which has traditionally been met by natural gas with associated climate change impacts.



2.1.6 Smart System and Flexibility Plan

The *Smart System and Flexibility Plan: Transitioning to a net zero energy system (2021)*¹⁰ published by UK Government and Ofgem explains how a smart and flexible energy system is essential to achieving the UK's net zero climate goal while keeping energy bills affordable for everyone. This Plan is an important step in transforming not just how electricity is generated, but also how it is used and paid for, and for which removing barriers to electricity storage is a critical component.

2.1.7 Make Britain A Clean Energy Superpower

*Make Britain A Clean Energy Superpower (2024)*¹¹ sets out the Government's plans to cut energy bills, create jobs and deliver energy security with cheaper, virtually zero carbon electricity by 2030.

2.1.8 National Energy Systems Operator (NESO)

The National Energy System Operator (NESO) is the nationalised energy system operator for the UK. Previously owned by National Grid plc, it is a public corporation which operates both the electricity and gas distribution systems from 1 October 2024.

NESO's Strategic Priorities¹² including enabling a zero carbon electricity system by adopting a whole system approach, encouraging innovation and collaboration. Whilst acknowledging it is a "huge challenge", NESO has prepared Clean Power 2030 Pathways to establish the location and type of new investment and infrastructure needed to deliver Labour Government's ambition for a virtually zero carbon national electricity grid by 2030.

⁹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/945899/201216_BEIS_EWP_Command_Paper_Accessible.pdf

¹⁰ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1003778/smart-systems-and-flexibility-plan-2021.pdf

¹¹ <https://labour.org.uk/wp-content/uploads/2024/03/Make-Britain-a-Clean-Energy-Superpower.pdf>

¹² <https://www.neso.energy/about/strategic-priorities>

2.1.8 Clean Power 2030 Action Plan

UK Government's Clean Power 2030 Action Plan¹³ accepts the independent advice from NESO regarding the energy infrastructure required to deliver Clean Power 2030. In a typical weather year, the 2030 power system will see clean sources produce at least as much power as Great Britain consumes in total over the whole year, and at least 95% of Great Britain's generation; reducing the carbon intensity of our generation from 171gCO₂e/kWh in 2023 to well below 50gCO₂e/kWh in 2030.

The Clean Power 2030 Action Plan emphasises the importance of BESS in achieving a sustainable and clean energy future by 2030, and sets out the requirement for an additional 22.5GW BESS by 2030, 5 times the capacity already built.



2.2 Local Policy

2.2.1 Rossendale Local Plan 2019 to 2036

Environmental Objectives of the Rossendale Local Plan 2019 to 2036 (2021)¹⁴ include (page 8) the need to reduce impacts from, and adapt to, climate change including through 'green energy projects'. Strategic Priorities (page 9) of the Local Plan similarly include the need to address the climate change emergency through measures including 'renewable energy projects'. Key Local Plan policies relating to environmental sustainability are summarised below.

Strategic Policy SD1: Presumption in Favour of Sustainable Development

When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the NPPF. Planning applications that accord with the policies in this Local Plan will be approved without delay, unless material considerations indicate otherwise.

Strategic Policy ENV1: High Quality Development in the Borough

All proposals for new development will be expected to take account of the character and appearance of the local area, including, as appropriate:

- Safeguarding and enhancing the built and historic environment;
- Being sympathetic to surrounding land uses and occupiers, and avoiding demonstrable harm to the amenities of the local area;
- Not having an unacceptable adverse impact on neighbouring development by virtue of it being over-bearing or oppressive, overlooking, or resulting in an unacceptable loss of light;

¹³ <https://assets.publishing.service.gov.uk/media/677bc80399c93b7286a396d6/clean-power-2030-action-plan-main-report.pdf>

¹⁴ https://www.rossendale.gov.uk/downloads/file/17076/rossendale_local_plan_2019_to_2036_-_written_statement

- Providing landscaping as an integral part of the development, protecting existing landscape features and natural assets, and habitat creation;
- There is no adverse impact to the natural environment, biodiversity and green infrastructure unless suitable mitigation measures are proposed, and the Council will seek biodiversity net gain consistent with the current national policy;
- That proposals do not increase the risk of flooding on the site or elsewhere, where possible reducing the risk of flooding overall, having regard to the surface water drainage hierarchy;
- Designs that will be adaptable to climate change, incorporate energy efficiency principles and adopting principles of sustainable construction including Sustainable Drainage Systems (SuDS); and
- Ensuring that contaminated land, land stability and other risks associated with coal mining are considered and, where necessary, addressed through appropriate investigation, remediation and mitigation measures.

Strategic Policy ENV2: Historic Environment

The Council will support proposals which conserve or, where appropriate, enhance the historic environment of Rossendale.

Strategic Policy ENV3: Landscape Character & Quality

The distinctive landscape character of Rossendale, including large scale sweeping moorlands, pastures enclosed by dry stone walls, and stonebuilt settlements contained in narrow valleys, will be protected and enhanced. The Council will expect development proposals to conserve and, where possible, enhance the natural and built environment, its immediate and wider environment, and take opportunities for improving the distinctive qualities of the area and the way it functions.

Strategic Policy ENV4: Biodiversity, Geodiversity and Ecological Networks

Development proposals that have potential to affect a national or locally-designated site, as shown on the Policies Map and its immediate environs, or on protected habitats or species, will be expected to be accompanied by relevant surveys and assessments detailing likely impacts. A sequential approach should be followed to avoid harm and where possible enhance biodiversity, and where not possible, provide appropriate mitigation and, as a last resort, on and off-site compensatory measures to offset the impact of development. Any development that adversely affects or damages a Site of Special Scientific Interest (SSSI) will not normally be granted permission.

Strategic Policy ENV5: Green Infrastructure Networks

Development proposals will be expected to support the protection, management, enhancement and connection of the green infrastructure network, as identified on the Policies Map. Proposals which enhance the integrity and connectivity of the green infrastructure network will be supported. Development proposals should seek first to avoid or, if not feasible, mitigate biodiversity impacts on-site.

Strategic Policy ENV6: Environmental Protection

Development which has the potential, either individually or cumulatively, to result in pollution that has an unacceptable impact on health, amenity, biodiversity (including designated sites), air or water quality, will only be permitted if the risk of pollution is effectively prevented or reduced and mitigated to an acceptable level.

Strategic Policy ENV8: Other forms of Energy Generation

The Council will take a positive approach to renewable energy proposals in the Borough, such as solar and hydro-electric schemes, including community led initiatives, subject to the Authority being satisfied that any negative impacts, including of any supporting infrastructure, can be minimised. Proposals for

decentralised energy generation and distribution will be given positive consideration subject to their wider environmental impacts.

Strategic Policy ENV9: Surface Water Run-Off, Flood Risk, Sustainable Drainage and Water Quality

All development proposals will be required to consider and address flood risk from all sources. A sequential approach will be taken and planning permission will only be granted for proposals which would not be subject to unacceptable flood risk, or materially increase the risks elsewhere, and where it is a type of development that is acceptable in a Flood Risk location.

Strategic Policy ENV10: Trees and Hedgerows

Development proposals must seek to avoid the loss of, and minimise the risk of harm to, existing trees, woodland, and/or hedgerows of visual or nature conservation value. Any harm to ancient and veteran trees should be avoided unless wholly exceptional circumstances can be demonstrated.

2.2.2 Rossendale Climate Change Strategy

RBC's Climate Change Strategy (2020)¹⁵ explains that the Council declared a Climate Change Emergency in September 2019 and committed to taking urgent action. The Council's aims are to make their own activities net-zero carbon by 2030, and to work in partnership to reduce carbon emissions for the whole of Rossendale.

The Strategy recognises that the generation of more renewable energy is key to tackling climate change, alongside a reduction in the overall consumption of energy.

2.2.3 Rossendale Climate Change SPD

RBC's Climate Change Supplementary Planning Document (SPD) (2022)¹⁶ explains that climate change is a significant issue which requires urgent action, including new development which mitigates GHG emissions and is itself resilient to the impacts of climate change. The SPD covers four key principles, including the promotion of renewable energy generation within the Borough, and for which 'battery storage' is identified as a relevant technology *"to help overcome fluctuations in the generation of [zero carbon] electricity from wind or solar energy"*.

2.3 Policy Summary

The key planning policy context for the proposals from an environmental sustainability perspective can be summarised as follows:

- Recently updated NPPF which now aligns with the UK's legally-binding net zero 2050 target, re-iterates the importance of mitigating GHG emissions, and establishes the significant weight to be given to the use of established sites as part of planning applications for new energy infrastructure;
- Various national initiatives which seek to enhance energy flexibility and security whilst reducing GHG emissions towards Government's aspiration for a virtually zero carbon electricity grid by 2030; and
- Local policy support for increased renewable energy generation to help meet the Council's climate commitments, provided that unacceptable environmental impacts such as increased flood risk or pollution are avoided and that such projects are themselves resilient to climate change impacts.

¹⁵ https://www.rossendale.gov.uk/downloads/file/16648/rossendale_council_climate_change_strategy

¹⁶ <https://www.rossendale.gov.uk/downloads/file/17881/climate-change-spd>

3. Sustainability, Energy & Climate Change Performance

3.1 Introduction

This chapter summarises the sustainability and energy strategy and performance of the proposed development under each of the following topic headings:

- Grid services
- GHG emission savings
- Climate resilience
- Ground conditions
- Archaeology
- Air quality
- End of life recycling

3.2 Grid Services

3.2.1 Introduction

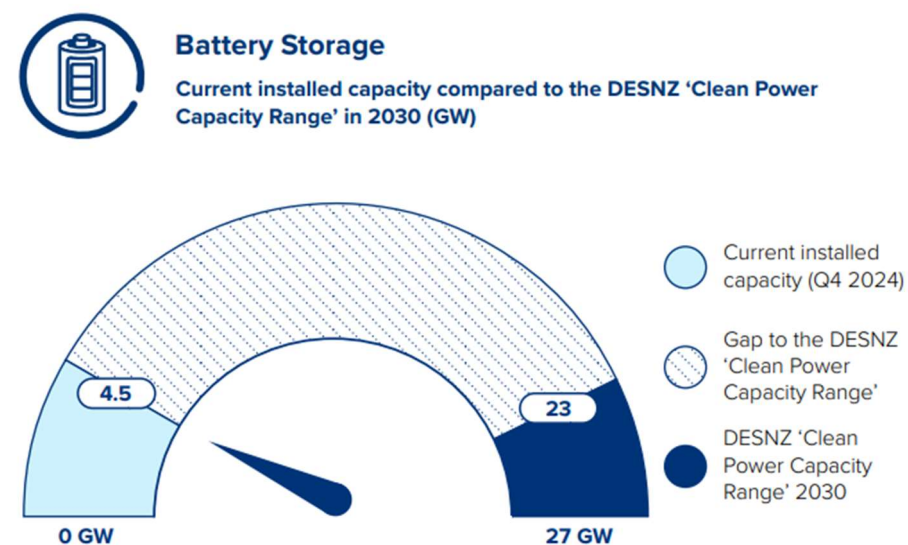
Battery storage enables power system operators and utilities to store energy for later use. A battery energy storage system (BESS) is an electrochemical device that charges from the grid then discharges that energy at a later time to provide electricity or other grid services when needed.

Increasing needs for system flexibility, combined with rapid decreases in the costs of battery technology, have enabled BESS to play an increasing role in the power system in recent years.

As prices for BESS continue to fall and the need for system flexibility increases with wind and solar deployment, policymakers, regulators, and utilities are continuing to develop policies that ensure BESS projects are able to facilitate the transition to a clean power system.

DESNZ's recent Clean Power 2030 Action Plan sets out the need for an additional 22.5 GW of BESS by 2030, 5 times that already delivered (**Figure 4**).

Figure 4. Clean Power 2030 Action Plan BESS Deployment Target [DESNZ]



3.2.2 What services can batteries provide?

In many cases, a BESS will be technically capable of providing a broad range of services as summarised below.

1. **Grid Stability and Reliability:** BESSs help in balancing supply and demand, ensuring a stable and reliable power grid. Because BESS can respond incredibly quickly, this can be done across a range of timescales from intra-day (hours and days) to fast response (milliseconds). This means that the NESO can ensure that the generation always meets the demand on the system, under a wide range of circumstances. The NESO and the Regional Distribution System Operators procure these services to ensure that they have the energy they need to keep the system reliable, resilient and safe at a national level and at a local level. Services include but are not limited to frequency response, inertia services, voltage regulation, flexibility and blackstart;
2. **Integration of Renewables:** By storing energy, BESS facilitates the integration of intermittent renewable energy sources into the grid. This helps in reducing reliance on fossil fuels and moving towards a cleaner energy mix. It also helps to avoid curtailment of renewable energy resources due to network constraints or low demand – allowing the excess renewable energy to be stored and used later;
3. **Peak Shaving and Load Management:** BESS can be used for peak shaving, which involves reducing the load on the grid during peak demand times. Because the electricity grid's transmission and distribution infrastructure must be sized to meet peak demand under outage conditions, which may only occur over a few hours of the year, when anticipated growth in peak electricity demand exceeds the existing grid's capacity, costly investments are needed to upgrade equipment and develop new infrastructure. Deploying BESS can help avoid or defer the need for new grid investments by meeting peak demand with energy stored from lower-demand periods (sometimes

called peak-shaving or flexibility services), thereby reducing congestion and improving overall transmission and distribution asset utilisation;

4. **Support for Decentralized Energy Systems:** BESS supports decentralized energy systems by enabling local storage and use of renewable energy. This can lead to more resilient and self-sufficient communities meaning that they do not have to rely on the build-out of wider network infrastructure to service increased demand. Ensuring demand can be served from local generation + storage as much as possible leads to the most efficient use of the network, reducing costs and electrical losses; and
5. **Arbitrage:** By reducing the need for expensive peak power plants and improving the efficiency of the grid, BESS can lead to significant cost savings. This makes the transition to clean energy more economically viable. BESS operators use arbitrage – charging the BESS when energy prices are low and discharging during more expensive peak hours to create a source of income. This price differential is driven by demand so the price is higher when the demand is high or the renewable energy availability is low and the price is lower when the demand is low or the renewable energy availability is high.

3.2.3 Value Stacking

BESS can maximise their value to the grid and project developers by providing multiple system services. As some services are rarely called for (i.e., black start) or used infrequently in a given hour (i.e., frequency response), designing a BESS to provide multiple services enables a higher overall battery utilisation. This multi-use approach to BESS is known as value-stacking. For example, a BESS project can help defer the need for new transmission or distribution infrastructure by meeting a portion of the peak demand with stored energy during a select few hours in the year. When not meeting peak demand, the BESS can earn revenue by operating in the day ahead or intra-day markets to provide energy when it is most needed to ensure the generation meets the demand.

3.2.4 Rossendale BESS

By locating the Rossendale BESS next to Scout Moor Wind Farm, the proposal will help to balance shortfalls and over-production to smooth the export of clean power. It will utilise existing infrastructure and be close to the existing 33kV Scout Moor substation (on Croston Close Road), thereby minimising construction requirements and the need for an additional transformer or long cables, helping to also limit associated materials consumption and embodied carbon.

3.3 GHG Emissions Savings

BESS save GHG emissions through three different sources¹⁷:

1. **Energy actions** - BESS save emissions directly through their energy actions, by importing low-carbon energy when demand is low and exporting it when demand is high and there are not enough low-carbon resources available on the network;
2. **Frequency response services** - BESS perform dynamic frequency response services which help keep the grid frequency at 50Hz. This means fewer carbon-emitting plants are used for Mandatory Frequency Response (MFR), a service with the same purpose; and
3. **Inertia management savings** - BESS provide fast-acting post-fault frequency response which means the grid is less reliant on gas generation to maintain high inertia, which also helps maintain grid frequency.

Indirect GHG savings through BESS frequency response services and inertia management can be significant, with NESO estimating that 30% of inertia management currently avoided on the grid is due to batteries providing this service. Direct GHG savings from BESS are more easily quantified however, as set out below.

The proposed 85 MW BESS facility has a 0.5 'C Rate' (meaning it can discharge its capacity across two hours, and hence has an energy capacity of 170 MWh), and is assumed to cycle twice a day and have a 'round trip' efficiency of 85% (i.e. 15% loss of energy when converting from DC to AC power during discharge). Based on these figures, the proposed BESS has annual energy capacity of 105,485 MWh as shown in **Table 1** overleaf.

Table 1. Estimated Energy Capacity

Parameter	Value
Power capacity	85 MW
C Rate	0.5 (2 hours)
Energy capacity	170 MWh
Cycles per day	2
Annual capacity (charging)	124,100 MWh
Round trip efficiency	85%
Annual capacity (discharging)	105,485 MWh

Based on the average UK home typically consuming 2,700 kWh of electricity each year¹⁸, this annual discharge capacity is sufficient to provide clean electricity to circa 39,068 typical UK homes.

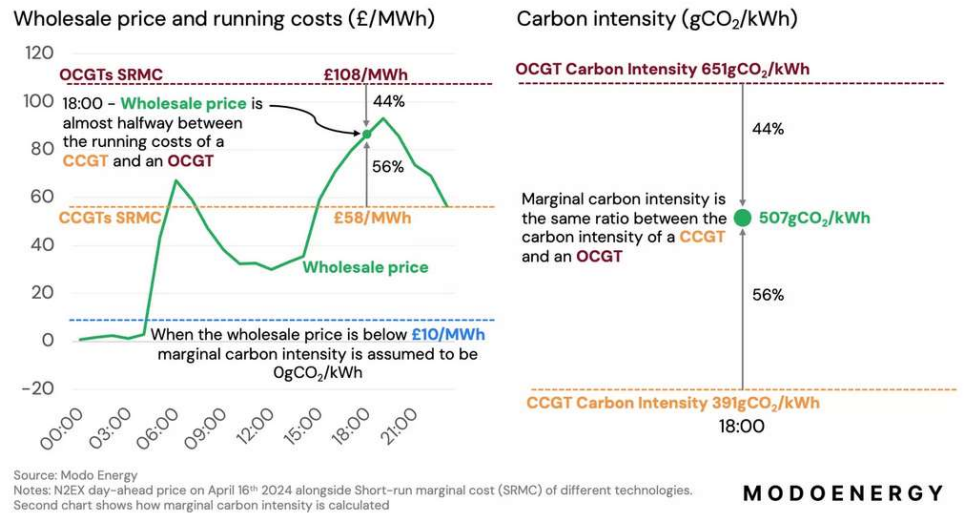
Estimating GHG savings from BESS is complex due to high variability during day to day grid operations, including the carbon intensity of power used to charge the BESS, as well as the carbon intensity of power that would be avoided during BESS discharge. An example calculation is however provided below based on methodology published by ModoEnergy. At 6pm the wholesale electricity price is above the run cost of a typical Closed Cycle Gas Turbine (CCGT) and below that of an Open Cycle Gas Turbine (OCGT). By interpolating between the carbon intensity

¹⁷ <https://modoenergy.com/research/carbon-benefit-battery-energy-storage-avoided-co2-emissions>

¹⁸ <https://www.ofgem.gov.uk/average-gas-and-electricity-usage>

of power generated by CCGT (651 gCO₂/kWh) and OCGT (391 gCO₂/kWh) based on the power price gives an ‘avoided’ carbon intensity of 507 gCO₂/kWh as shown in **Figure 5**.

Figure 5. Marginal carbon intensity is determined using the wholesale price as an indicator of marginally priced plant [ModoEnergy]



By assuming the proposed BESS is charged with renewable power from the Scout Moor Wind Farm, and avoid marginal emissions of 507 gCO₂/kWh established above, its potential annual GHG emissions savings can be calculated as shown in **Table 2**.

Table 2. Estimated GHG Savings

Parameter	Value
Charging carbon intensity	0.0 kgCO ₂ e/MWh
Annual capacity (charging)	124,100 MWh
Charging emissions	0.0 tCO ₂ e
Discharging carbon intensity counterfactual	507 kgCO ₂ e/MWh
Annual capacity (discharging)	105,485 MWh
Discharging emissions savings	53,481 tCO₂e / year

On these assumptions, the proposed BESS will save circa 53,481 tCO₂e each year. Based on the average UK car mileage in 2023 of 7,000 miles¹⁹ and the latest (2024) UK Government emissions factor for average car and fuel (0.2686 kgCO₂e/mile)²⁰, this annual GHG saving is equivalent to taking 28,444 cars off the road.

These forecast GHG savings are also equivalent to 87% of the electricity-related GHG emissions of 61,476 tCO₂e which occurred from within Rossendale Borough in 2022²¹.

It should be reiterated that these estimates take no account of further GHG benefits that will result from the proposed BESS, such as from reducing renewable energy curtailment, and the actual GHG savings that will be achieved will depend on the specifics of its operation and value stacking.

¹⁹ <https://www.gov.uk/government/statistical-data-sets/nts09-vehicle-mileage-and-occupancy>

²⁰ https://assets.publishing.service.gov.uk/media/6722567487df31a87d8c497e/ghg-conversion-factors-2024-full_set_for_advanced_users_v1_1.xlsx

²¹ <https://assets.publishing.service.gov.uk/media/667ad5b45b0d63b556a4b305/2005-22-uk-local-authority-ghg-emissions.xlsx>

3.4 Climate Resilience

3.4.1 Thermal Management

Lithium-ion, the battery technology proposed for the Development, accounts for more than 90% of large-scale battery energy storage systems around the globe. In general, it is best to keep batteries at a moderate, consistent temperature to ensure their optimal performance and longevity. Exposure to extreme temperatures, either hot or cold, can damage batteries and potentially cause hazardous events.

The specific temperature range that batteries require to operate safely varies depending on the type of battery and its design. The safe operating temperature range for lithium-ion batteries is typically between -20°C and 60°C, with an optimal temperature range of between 15°C and 35°C²².

Within applications that require rapid charging / discharging, internal resistances to higher currents can result in the generation of heat. Operation of lithium-ion batteries in high ambient temperatures can also accelerate the aging process and lead to degradation of performance.

Low ambient temperatures can also cause problems with internal overheating due to increased viscosity in the electrolyte which leads to sluggish ion transport, resulting in higher resistance and heat generation.

The location of the proposed development at a minimum altitude of 290m AOD should help ensure that the risk of unsuitably high operating temperatures is minimised.

3.5 Ground Conditions

A *Phase 1 Ground Conditions Desk Study* has been prepared for the application by Stantec to provide a preliminary assessment of potential environmental and geotechnical risks to the proposed development.

Regarding the site history, the earliest mapping (1851) shows the site as undeveloped and divided into separate agricultural fields until 1891 where the site is no longer divided up. The site has remained unchanged since.

Earliest mapping shows the wider area as undeveloped agricultural fields with sporadic farmhouses and related buildings. Sandstone and unspecified quarries are noted in the vicinity of the site, the closest being c. 120m to the west. Cotton mills with associated sluice reservoirs and coal pits are located between 250m and 500m to the south-east. By 1908, the cotton mills and coal pits are primarily disused or no longer present on mapping.

Regarding geology, the site is underlain by Glacial Till and Millstone Grit (Mudstone and siltstone), with Holcombe Brook Grit (sandstone) in the far north. Regarding hydrology, an unnamed river is located 125m south-east of the site and Cheesden Brook is located between 167m and 175m to the south-east.

There are no Sites of Special Scientific Interest (SSSI) within 1km of the site, however the site is situated within an SSSI impact risk zone and green belt land. There are two Open Access Land classifications on site which give a public right of access to land without having to use paths. The site is within a Network Enhancement Zone 1 for habitat networks and an agricultural area, which is primarily pastoral. A non-specialist assessment indicates a low risk of unexploded ordnance. The following plausible geotechnical risks are identified:

- Soft / loose compressible ground (low strength and high settlement potential);

²² <https://www.ien.com/operations/article/22820306/thermal-management-solutions-for-battery-energy-storage-systems>

- Shrinkage/swelling of clay – settlement/heave of foundations, especially where located within the influence of trees and vegetation;
- Existing slopes and depression onsite may require regrading or in filling with cut to allow for a flat development platform to be formed;
- Instability of slopes and impact on foundations, floor slabs, roads and infrastructure; and
- Potential for unforeseen ground conditions and the risks associated with limited data.

The site is considered unlikely to be classified as Contaminated Land under Part 2A of the Environmental Protection Act 1990. The overall risk from land contamination at the site is considered to be low for the current development, as the site history suggests minimal former contaminative land uses. The overall risk for a redeveloped site is assessed to be low with one specific potentially high risk (relating to the fly tipping of potential asbestos-containing materials within the north of the site as noted during the July 2024 site walkover), however this would need to be confirmed with by an appropriate testing and specialist assessment.

In order to confirm the actual risks to receptors and confirm the ground conditions with respect to potential geotechnical and geo-environmental risks, an appropriate intrusive investigation will need to be undertaken. This investigation will need to:

- determine the soil strength/density profile beneath the site;
- determine the depth/level of groundwater beneath the site;
- determine the ground gas concentrations beneath the site;
- determine California Bearing Ratios (CBRs) to assist with pavement design;
- determine the ground conditions within the depressions/ collapsed ground adjacent to the eastern boundary and the depression/ hollow in the north-western corner;

- assess trench stability, over break potential and ease of excavation;
- allow soil infiltration rate testing;
- allow sampling for chemical and geotechnical laboratory testing;
- allow soil classification to allow geotechnical characterisation and determine suitability for reuse of soils within earthworks (if required); and
- obtain information in terms of Aggressive Chemical Environment for Concrete Class (ACEC Class).

Following investigation, assessment will be required to;

- update the ground model;
- update the Geotechnical Risk Register;
- provide Geotechnical Design recommendations;
- update the Conceptual Site Model (CSM), including identification of plausible pollution linkages;
- undertake generic quantitative risk assessment of potential chemical contaminants to establish 'suitability for use' under the current planning regime; and
- provide outline mitigation recommendations to ensure the site is 'suitable for use'.

Refer to the *Phase 1 Ground Conditions Desk Study* for further details on potential geotechnical and ground contamination risks and how these will be mitigated as part of the development proposals.

3.6 Archaeology

An *Archaeological Desk-Based Assessment* has been prepared by AOC Archaeology Group. This assessment has identified a low potential for any previously unrecorded heritage assets of any period to be present within the Site, due to the paucity of recorded archaeological remains in the 1km Study Area. The exception to this is evidence for post-medieval agricultural in the form of an unidentified building, possibly a farm building, and former road and former field boundaries noted on historic maps.

There may also potentially be remains of a Tollhouse present around the A680 road along the proposed cable route. Any such remains would likely be considered of low importance due to their prevalence in the archaeological record. The current design of the proposed development focuses all infrastructure in the south of the site and as such there would be no impact on the heritage assets recorded in the north of the Site as part of this assessment.

Given the potential for encountering archaeological remains it is advised that any archaeological investigation could, in the first instance, be limited to the archaeological monitoring of any proposed geotechnical investigations within the site, or assessment of the geotechnical reports. With this information it would be possible to determine which areas, if any, of the site would require further mitigation.

Potential mitigation may take the form of a programme of further archaeological works to record any archaeological remains that would be impacted and would be subject to consultation with the Archaeology team in the Lancashire County Council's Planning and Environment Service

3.7 Air Quality

An *Air Quality Assessment* has been undertaken by Air Quality Consultants in order to establish potential air quality impacts from the proposed development.

The site is not located within an Air Quality Management Area (AQMA), the nearest being the Greater Manchester Combined Authority's AQMA (within the Bury Metropolitan Borough Council administrative area), declared for exceedance of the annual mean nitrogen dioxide (NO₂) objective, located 2 km west along the M66 and around 800m beyond that along the A676.

The potential exists for the construction of the proposed development to impact upon existing properties, the main pollutants of concern related to construction activities being dust and PM₁₀. Regarding the operational development, no combustion plant or back-up generators etc are proposed and there will therefore be no significant point sources of operational emissions.

The assessment has therefore considered the potential impacts of the proposed development on local air quality in terms of dust and particulate matter emissions during construction, and also emissions from road traffic generated by the completed development on the local road network.

During construction a package of mitigation measures to minimise dust emissions will be applied as part of the Construction Environmental Management Plan (CEMP). With these measures in place, it is expected that any residual effects will not be significant.

The traffic generated during operation of the proposed development will be below industry screening thresholds, and therefore the proposed development will have a negligible impact on air quality conditions at all existing receptors.

In conclusion therefore, the proposed development is consistent with NPPF paragraph 198, being appropriate for its location in terms of its effects on local air quality, and also paragraph 199 as it will not affect compliance with relevant air pollutant limit values or national objectives. The proposed development is also

consistent with Policy TR1: Strategic Transport in RBC's Local Plan as it will support economic growth while improving air quality and tackling climate change.

3.8 End of Life Recycling

Utility-scale energy storage batteries such as BESS fall under the scope of the Waste Batteries and Accumulators Regulations 2009²³, a piece of EU-derived legislation which provides a system for the separate collection, treatment and recycling of waste batteries. These regulations form part of the 'producer responsibility' regime, which aim to minimise the impact of batteries on the environment by encouraging re-use / recycling and ensuring that those who place battery products on the market bear the associated cost.

Batteries used in BESS projects are likely to be classed as 'industrial batteries', where producers must take back (or collect) waste batteries free of charge from end users in any of the following circumstances:

1. Where it has supplied the end user with new industrial batteries during the compliance year;
2. Where, although it did not supply the end user with the battery, the end user is unable to return the waste battery to the original producer and the battery is of the same chemistry type as batteries placed on the market by the producer; or
3. Where, although it has not supplied to the end user, the end user is not able to return the waste battery to another producer for any other reason (i.e., where the end user is unable to dispose of the batteries under either option (1) or (2) above).

The Waste Batteries and Accumulators Regulations 2009 ban the disposal to landfill or incineration of industrial batteries. In addition to the obligation to take

back or collect batteries in the above three circumstances, industrial battery producers must also:

- Ensure that all waste batteries they take back or collect are delivered for treatment and recycling to an approved battery treatment facility (ABTF) or an approved exporter for treatment outside the UK;
- Keep records and report on the amount (in tonnes) of batteries placed by them on the market for the first time in the UK and the amount of waste batteries collected by them and delivered for treatment and recycling in each compliance period; and
- Be registered with the Department for Business, Energy and Industrial Strategy (BEIS, now DESNZ).

²³ <https://www.legislation.gov.uk/uksi/2009/890/contents/made>

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