

PROPERTY

Hargreaves Land (HL)
Planning Application 1 at Lincolnshire Lake (North)
Scunthorpe

Energy Statement

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Energy Statement

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EXECUTIVE SUMMARY

This Energy Statement (ES) has been produced in support of a hybrid planning application for the Proposed Development at the Lincolnshire Lakes Site. The Statement has been prepared in accordance with North Lincolnshire Council's Adopted Core Strategy (2011) Policy CS18: Sustainable Resource Use and Climate Change, as well as Lincolnshire Lakes Area Action Plan Policy SD1 (Sustainable Building Design and Construction), following the guidance detailed in the Supplementary Planning Documents (SPD), including the Planning for Renewable Energy Development SPD.

This Energy Statement sets a framework for the energy strategy for the Proposed Development and outlines the approach to energy efficiency, and renewable energy generation. It summarises the key planning policy which is pertinent at the time of writing and is aimed at satisfying energy related requirements. The Proposed Development will follow the current Part L (2021) standard to ensure it is future proofed for the longer term and ready to meet the Future Homes and Buildings Standard from 2025.

ENERGY SUMMARY

The Proposed Development will adopt the use of an energy hierarchy to meet National best practice guidance and North Lincolnshire Councils' objectives for energy consumption reduction and carbon dioxide emissions [CO₂] reduction.

The energy hierarchy aims to reduce energy demand and CO₂ emissions through passive design measures and a 'fabric first' approach (Be Lean) before seeking to reduce the remaining demand by the cleanest means possible. This includes exploiting local energy resources/supplying energy efficiently and cleanly (Be Clean), and finally exploring the opportunities for producing, storing, and using renewable energy on-Site (Be Green).



Be Lean Summary: The Proposed Development envelope and services will be specified in accordance with Part L (2021) of the Building Regulations to ensure energy consumption via space heating and cooling is reduced. Passive solar consideration will also form an integral part of the Proposed Development design to ensure excessive solar gains and cooling loads are reduced, hence providing a more comfortable internal environment for occupants. The final fabric specification, building services specification and provision of energy efficiency measures will be confirmed at the Reserved Matters stage and via Part L 2021 energy modelling.

Be Clean Summary: A feasibility study on connecting to a district heating network has been conducted for the Proposed Development site. The results show that there are no operational district heat networks within 500m of the site. Consequently, connecting to an existing heat network is not a viable option for the Proposed Development. However, establishing a new heating network, such as a Centralised Energy Centre, could be considered for the site. The

feasibility and suitability of this option will need to be further evaluated during the Reserved Matters stage. If this solution proves to be the most carbon-efficient, cost-effective, resilient, and technologically feasible method of providing heat to the development, the applicant may choose to propose and adopt it.

Additionally, the Proposed Development site could incorporate spare valve connections, enabling a potential connection to the planned North Lincolnshire Green Energy Park heat network. This Energy Park is located near Flixborough Wharf on the River Trent and could be an option should the applicant wish to pursue it.

Be Green Summary: The feasibility of renewable energy generation concluded that the most appropriate recognised on-site renewable energy technologies with high opportunities for the Proposed Development site are Solar Photovoltaic (PV), Solar Thermal, Wastewater Heat Recovery System, Air Source Heat Pump and Ground Source Heat Pump.



Air Source Heat Pump External Condenser Example

Technologies with low to medium opportunities such as Wind Turbine, Biomass, Water Source Heat Pump, Small Scale Hydro Power, Geothermal, Transpired Solar Air Collector, Hydrogen Fuel and Wave/Tidal Power etc have been discounted at this stage based on a balanced consideration of the policy requirements, financial viability, and technical feasibility. The specified technology/technologies in line with the recommendations of the feasibility study will be confirmed at the Reserved Matters stage and via Part L (2021) energy modelling of the proposal.

The exact percentage reduction in terms of energy and/or CO₂ emissions will be in accordance with the National and the Local Authority (North Lincolnshire Council's) policy requirement/target. Energy storage will also be considered as part of the renewable energy technologies for optimising system performance and balancing surplus electrical/thermal energy production.

This Energy Statement presents a vision for the Proposed Development at Lincolnshire Lakes to deliver an energy efficient and low carbon design driven by innovative technologies, enabling the Proposed Development to achieve the National and Local ((North Lincolnshire Councils) carbon and energy targets whilst reducing its reliance on the UK National Grid.

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1. INTRODUCTION

Instructions

- 1.1 BWB Consulting Limited (BWB) was instructed by Hargreaves Land (HL) (the Client) carry out a Energy Statement (ES) for the Proposed Development at the Lincolnshire Lakes Site in Scunthorpe.

Proposed Development

- 1.2 The Proposed Development comprises a hybrid planning application as detailed below:

“Full planning application for the construction of a new vehicular access off the M181/A1077(M) roundabout, a pedestrian and cycle link to Scotter Road, a foul pumping station, earthworks and ‘off-plot’ drainage, ecological and associated landscaping and infrastructure works.

Outline planning application, with all matters reserved, for the development of up to 550 residential dwellings (Use Class C3), a local centre (Use Class E) and associated ‘on-plot’ landscaping, drainage and other infrastructure works.”

Site Description

- 1.3 The Planning Application 1 Site currently comprises agricultural land. The northern boundary is bound by existing woodland. The eastern boundary is bounded by existing open fields with woodland further east and the town of Scunthorpe. The southern boundary is bounded by the existing Brumby Common Lane which horizontally dissects the Lincolnshire Lakes Site from Scotter Road to the east and a bridge over the M181 to the west. The western boundary is bounded by the M181 / A1077 Motorway and a roundabout that has recently been constructed with vehicular access provided into the Planning Application 1 Site).
- 1.4 The Proposed Development Site Location Plan is detailed in **Appendix 1**.

Purpose of the document

- 1.5 The purpose of this ES is to demonstrate that climate change mitigation measures will be integrated into the scheme's design and that the proposed measures are appropriate to the Site environment and energy demands of the development.
- 1.6 This document will describe the policy context to which the Energy Statement responds, before demonstrating how it is proposed to reduce the Site's energy demand and CO₂ emissions through a: lean energy efficient design (Be Lean); clean energy supply (Be Clean); and green on-site renewable energy generation (Be Green).

Modelling Methodology (DSM Calculations)

- 1.7 DSM is one of the Government adopted methodologies for calculating the energy performance of non-domestic buildings within the UK. Unlike SBEM (Simplified Building Energy Model), DSM is a much more accurate tool.

- 1.8 Performing the DSM calculation involves creating a three-dimensional model of the proposed non-domestic development and then populating the model with the fabric and services specification. The DSM calculation is then run to simulate the Proposed Development energy consumption and resultant carbon dioxide emissions due to the predicted operation of the Proposed Development over a typical year.
- 1.9 DSM calculations have been performed to inform this Energy Statement and to produce the most accurate estimate of the site carbon dioxide emissions. Consequently, this report details the thermal element, controlled fittings and building services specification upon which the calculations have been performed. The baseline CO₂ emissions are equivalent to the Building Regulations Approved Document Part L worst allowable Target Emissions Rate (TER) calculated within DSM assessments of the Proposed Development.
- 1.10 Criterion 1 of Building Regulations Approved Document Part L (Volume 2) 2021 requires calculation of the Building Emission Rate (BER) / Primary Energy Rate (BPER) using Energy Model to demonstrate that the building will have a CO₂ emissions rate and energy rate of no more than the Target Emission Rate (TER) and Primary Energy Rate (TPER), which is also calculated within DSM using the building and a notional specification).

Modelling Methodology (SAP Calculations)

- 1.11 Energy models using the Standard Assessment Method (SAP) will be produced to predict the primary energy demand and carbon dioxide emissions from the Proposed Development. SAP is the Government adopted methodology for calculating the energy performance and carbon dioxide (CO₂) emission of domestic buildings within the UK. Its purpose is to provide accurate and reliable assessments residential buildings that are needed to underpin energy and carbon dioxide policy initiatives.
- 1.12 The SAP modelling tool uses building geometry (in terms of floor area, heat loss areas, thermal bridges etc), construction details (in terms of u-values, g-value, light transmittance value etc), specification of heating, ventilation, and lighting equipment to calculate the regulated CO₂ emission and primary energy consumption of residential buildings in compliance with Approved Document Part L Volume 1: Dwellings, 2021 edition incorporating 2023 amendments of the Building Regulations (England and Wales).
- 1.13 The SAP calculations have been performed to inform this Energy Statement and to produce the most accurate estimate of the site carbon dioxide emissions. Consequently, this report details the thermal element, controlled fittings and building services specification upon which the calculations have been performed.
- 1.14 The baseline CO₂ emissions are equivalent to the Building Regulations Approved Document Part L worst allowable Target Emissions Rate (TER) calculated within SAP assessments of the Proposed Development. Unregulated energy consumption due to appliances, cooking, and equipment, is also calculated, and provided for the end-use. Although this usage is unregulated within Building Regulations, for the purposes of determining a more accurate account of the site energy consumption, these end-uses could be considered if necessary.

2. POLICY BACKGROUND

Introduction

- 2.1 This section of the Energy Statement reviews relevant policies at the international, national, regional, and local levels in relation to energy efficiency and renewable energy generation and discusses key issues for this Statement.

Climate Change

- 2.2 Climate change is a long-term change in the average weather patterns that have come to define Earth's local, regional, and global climates. These changes have a broad range of observed effects that are synonymous with the term.



Figure 2.1: Climate Change (Fossil Fuel Combustion)

- 2.3 Changes observed in Earth's climate since the early 20th century are primarily driven by human activities, particularly fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere, raising Earth's average surface temperature. These human-produced temperature increases are commonly referred to as global warming. Natural processes can also contribute to climate change, including internal variability (e.g., cyclical ocean patterns like El Niño, La Niña, and the Pacific Decadal Oscillation) and external forcing (e.g., volcanic activity, changes in the Sun's energy output, variations in Earth's orbit).
- 2.4 Scientists use observations from the ground, air, and space, along with theoretical models, to monitor and study past, present and future climate change. Climate data records provide evidence of climate change key indicators, such as global land and ocean temperature increases; rising sea levels; ice loss at Earth's poles and in mountain glaciers; frequency and severity changes in extreme weather such as hurricanes, heatwaves, wildfires, droughts, floods, and precipitation; and cloud and vegetation cover changes, to name but a few (**Figure 2.1**).

United Nations Framework Convention on Climate Change

- 2.5 The international mechanism for addressing climate change is the United Nations Framework Convention on Climate Change (UNFCCC). Signed in 1992 at the United Nations Conference on Environment and Development, the Convention constitutes the foundational climate agreement that has provided the platform for most subsequent international climate agreements. The Kyoto Protocol, which was signed in 1997 and which entered into force in 2005, was the first implementation of measures under the UNFCCC until 31 December 2020. The protocol was superseded by the Paris Agreement. Its supreme decision-making body, the Conference of the Parties (COP), meets annually to assess progress in dealing with climate change.

The Paris Agreement

- 2.6 The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at the 2015 United Nations Climate Change Conference in 2015 and entered into force in 2016 (**Figure 2.2**). The 196 Parties to the UNFCCC reached a landmark agreement to combat climate change and to accelerate and intensify the actions and investments needed for a sustainable low carbon future.



Figure 2.2: United Nations Framework Convention on Climate Change (UN)

- 2.7 The Paris Agreement builds upon the Convention and for the first time brings all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.

- 2.8 To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century. The Paris Agreement works on a 5-year cycle of increasingly ambitious climate action carried out by countries. Countries are required to submit their plans for climate action known as nationally determined contributions (NDCs).

The Paris Agreement and Nationally Determined Contributions

- 2.9 Through the Paris Agreement, Parties also agreed to a long-term goal for adaptation – to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production. Nationally determined contributions (NDCs) are at the heart of the Paris Agreement and the achievement of these long-term goals.
- 2.10 NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of such contributions.

United Kingdom's (UK's) Nationally Determined Contributions

- 2.11 The UK's initial target under the Paris Agreement of 2015, when it shared a common plan on emissions with the EU, was a 53% cut by 2030. However, this was considered insufficient, and the UK also had a domestic carbon budget under the Climate Change Act, requiring a 57% reduction on average from 2028 to 2032.

United Kingdom of Great Britain and Northern Ireland's Nationally Determined Contribution



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Figure 2.3: United Kingdom's Nationally Determined Contribution (UK Gov)

- 2.12 In December 2020, the UK announced a significant increase in its carbon emissions reduction target, aiming for a 68% cut compared to 1990 levels before 2030. This represents the UK's nationally determined contribution (**Figure 2.3**) towards meeting the Paris Agreement.
- 2.13 The UK had already committed to reducing carbon emissions to zero by 2050, with an interim target of 53%. In April 2021, at the climate summit, the U.K. government confirmed its plan to put the U.K. on course to meet its target of reaching net zero carbon emissions by 2050. This commitment demonstrates the UK's dedication to addressing climate change and reducing greenhouse gas emissions.

Climate Change Act

- 2.14 The Climate Change Act (2008) sets a legally binding target for reducing UK CO₂ emissions by at least 80% on 1990 levels by 2050. It established the Committee on Climate Change, responsible for setting binding interim carbon budgets for the Government over successive five-year periods.



Figure 2.4: The Sixth Carbon Budget (UK Gov)

- 2.15 To meet these targets, the government has set five-yearly carbon budgets, which currently run until 2032. The carbon budgets restrict the amount of greenhouse gas the UK can legally emit in a five-year period. The UK is currently in the fifth carbon budget period (2028 to 2032).
- 2.16 The Climate Change Committee (CCC) published its recommendation on the level of the Sixth Carbon Budget in December 2020 (**Figure 2.4**).

Planning and Energy Act

- 2.17 The Planning and Energy Act (2008) allows local planning authorities' policies to impose reasonable requirements for a proportion of energy used in developments to be from renewable and low carbon sources in the locality of the development. This means local planning authorities have the power to set local energy efficiency standards for new homes that go beyond the minimum standards set through the Building Regulations.

UK Sustainable Development Strategy

- 2.18 The UK is committed to the delivery of the Sustainable Development Goals. The 2030 Agenda for Sustainable Development is a historic global agreement to eradicate extreme poverty, fight inequality and injustice and leave no one behind. Agreed by world leaders at the UN in 2015, the 17 Sustainable Development Goals (SDGs) succeed the Millennium Development Goals (MDGs).



Figure 2.5: The Sustainable Development Goals (UN)

- 2.19 It provides an ambitious, globally agreed, shared blueprint for the world to see by 2030 and is centred around the 17 Sustainable Development Goals (also known as the Global Goals or SDGs) – **Figure 2.5**.
- 2.20 The UK Sustainable Development strategy acts as an overarching document from which a range of specific policies and legislation was derived.
- 2.21 One of the keys aims of this strategy is to recognise the threats of climate change and ensure that the UK develops a strategy to mitigate and adapt to this phenomenon. The strategy will be implemented at a national level through the development of more specific strategies at a government department or sector level.

Building Regulations

- 2.22 Whilst not planning policy, the Building Regulations and specifically Approved Document Part L: Conservation of Fuel and Power has relevance to the requirements for energy efficiency and carbon emissions of new buildings. The primary mechanism for reducing carbon emissions in new residential and commercial development is progressive changes to Part L aiming to deliver zero carbon buildings.
- 2.23 On this basis, a minimum requirement for the reduction in carbon emissions to be delivered by new buildings' is set within the Building Regulations, with each update requiring lower carbon emissions than the previous version to achieve compliance.
- 2.24 The update in June 2022 required new residential and buildings other than dwellings to achieve 31% and 27% reduction in carbon emissions over the 2013 (with 2016 amendments) Regulations respectively. This uplift is regarded as a first step towards making all buildings 'net zero ready' from 2025 when the Future Buildings Standard comes into effect, mandating a 75% reduction in emissions.

Approved Document 2021 Part L Volume 1 and Volume 2

- 2.25 This approved document took effect on 15 June 2022 for use in England. Part L amendments introduce a new principal performance metric measuring energy efficiency. 'Primary energy' will be used in combination with CO₂ metrics to assess compliance with Part L. Primary energy calculations take into account factors such as the efficiency of the building's heating system; power station efficiency for electricity; and energy used to produce fuel and deliver it to the building.



Figure 2.6: Approved Document 2021 Part L Volume 1 and Volume 2 (UK Gov)

The Future Homes/Buildings Standard

- 2.26 The Future Homes/Buildings Standard: 2021 Consultation on changes to Part L is a document published by the UK government in January 2021, outlining proposed changes to Part L (Conservation of fuel and power) and Part F (Ventilation) of the Building Regulations. The main goal is to improve the energy efficiency of buildings and reduce carbon emissions.
- 2.27 The consultation sought feedback from industry professionals, architects, engineers, and other stakeholders to refine the proposed changes before implementing them as part of the 2025 Future Homes/Buildings Standard.

Clean Growth Strategy

- 2.28 The UK's Clean Growth Strategy is a government plan published in 2017, aimed at cutting greenhouse gas emissions while driving economic growth. The strategy outlines a comprehensive approach to decarbonise all sectors of the UK economy, including power, transport, and buildings, while ensuring a secure and affordable energy supply for businesses and consumers.
- 2.29 The Clean Growth Strategy is a critical component of the UK's efforts to meet its legally binding climate change targets, grow the low-carbon economy, and create new economic opportunities for businesses and workers across the country.

National Design Guide

- 2.30 The UK's National Design Guide is a government document published in 2019 and updated January 2021, which sets out the principles and standards for creating well-designed, sustainable, and beautiful places across the country. The guide aims to promote good design practices in the planning and development process, addressing various aspects of the built environment.

National Planning Policy Framework

- 2.31 The National Planning Policy Framework (NPPF) is a key document in England's planning system, first published in 2012 and updated several times since. It sets out the government's planning policies and provides guidance on how these should be applied in England. The NPPF covers various aspects of planning, including housing, the economy, transport, and the environment. Its core principles include: a presumption in favour of sustainable development, encouraging local authorities to plan for and approve new development where possible.

Draft National Planning Policy Framework

- 2.32 While currently at consultation stage, the draft National Planning Policy Framework (NPPF) 2024 is a comprehensive set of proposed reforms intended to address key challenges in England's planning system. These revisions are aimed at meeting the growing demand for housing, promoting economic growth, and enhancing environmental protections.

Planning Policy Guidance (The Guidance)

- 2.33 The UK's Planning Policy Guidance (PPG) is a collection of documents that provide detailed guidance on various aspects of the planning system in England. These documents support the National Planning Policy Framework (NPPF) and offer practical advice on implementing planning policies.
- 2.34 The Planning Policy Guidance plays a crucial role in supporting the effective implementation of planning policies and promoting sustainable development in England.

Net Zero Strategy: Build Back Greener

- 2.35 The UK's Net Zero Strategy: Build Back Greener (**Figure 2.7**) is a comprehensive government plan published in 2021, outlining the country's pathway to achieve net zero emissions by 2050. The strategy focuses on decarbonising all sectors of the UK economy while promoting sustainable growth and job creation. The Net Zero Strategy is a critical component of the UK's efforts to combat climate change and transition to a sustainable, low-carbon economy.

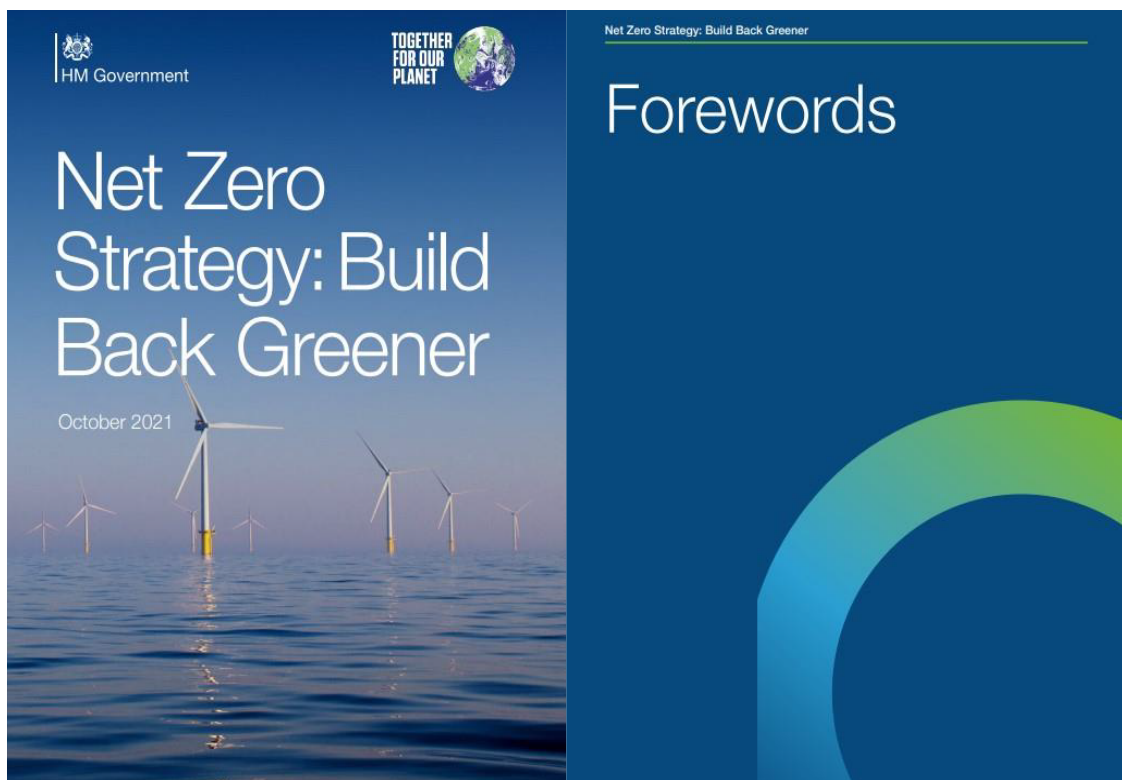


Figure 2.7: Net Zero Strategy: Build Back Greener (UK Gov)

Heat and Buildings Strategy

- 2.36 The UK's Heat and Buildings Strategy is a government plan published in 2021, outlining the country's approach to reducing emissions from homes and workplaces. The strategy focuses on improving energy efficiency and transitioning to low-carbon heating technologies

North Lincolnshire Council: Adopted Local Plan (2011)

- 2.37 Adopted in June 2011, North Lincolnshire Council's Adopted Core Strategy Local Plan (2011) (**Figure 2.8**) is a key planning document that outlines the long-term vision and strategic framework for development in North Lincolnshire up to the year 2026.
- 2.38 It sets out policies to guide sustainable growth, housing, infrastructure, and environmental protection in the region, ensuring that development meets the needs of both current and future residents.

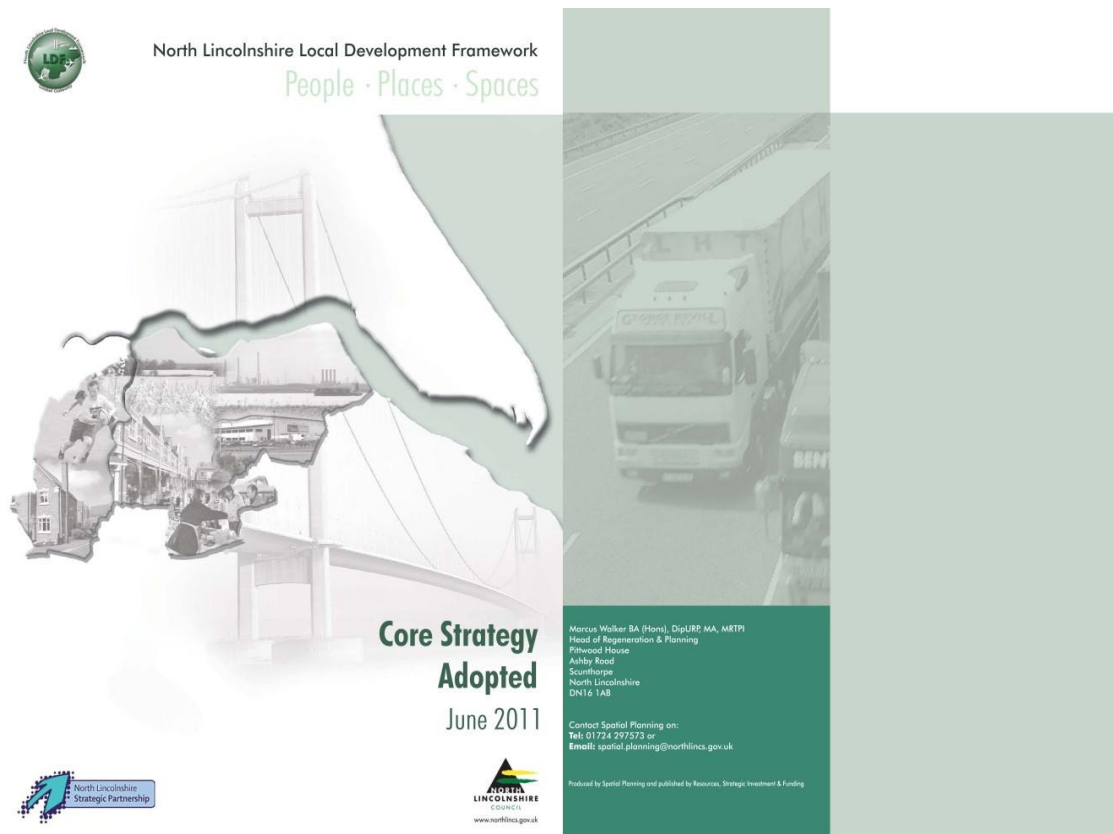


Figure 2.8: North Lincolnshire Council: Adopted Local Plan 2011 (NLC)

- 2.39 The North Lincolnshire Local Plan places a strong emphasis on supporting sustainable energy developments as part of its broader vision for growth and environmental protection. It recognises potential for renewable energy projects, particularly wind, solar, and biomass, and outlines policies to encourage their development in appropriate locations. The plan highlights the importance of transitioning to a low-carbon economy by promoting the use of renewable energy and energy-efficient technologies in new developments. It also includes measures to mitigate climate change impacts, such as sustainable building practices and integrating renewable energy systems into housing and commercial projects.
- 2.40 The main policy requirement regarding energy is CS18: Sustainable Resource and Climate, which focuses on promoting sustainable development and addressing climate change through energy-efficient measures and renewable energy initiatives requiring Industrial and commercial premises greater than 1000 sqm to provide 20% of energy demand from on-site renewables.

North Lincolnshire Council's Area Action Plan (2016)

- 2.41 Adopted in May 2016, Lincolnshire Lakes Area Action Plan (**Figure 2.9**) is a strategic framework for guiding the development of a significant area west of Scunthorpe in North Lincolnshire. Its vision focuses on creating six sustainable, well-connected villages that integrate housing, employment opportunities, and community facilities with green and blue infrastructure, including lakes and waterways.
- 2.42 The plan aims to deliver up to 6,000 new homes while fostering local economic growth and enhancing quality of life through high-quality design and environmental sustainability. It aligns closely with policies like CS18 of the North Lincolnshire Core Strategy, ensuring that developments contribute to sustainability, economic growth, and environmental resilience.

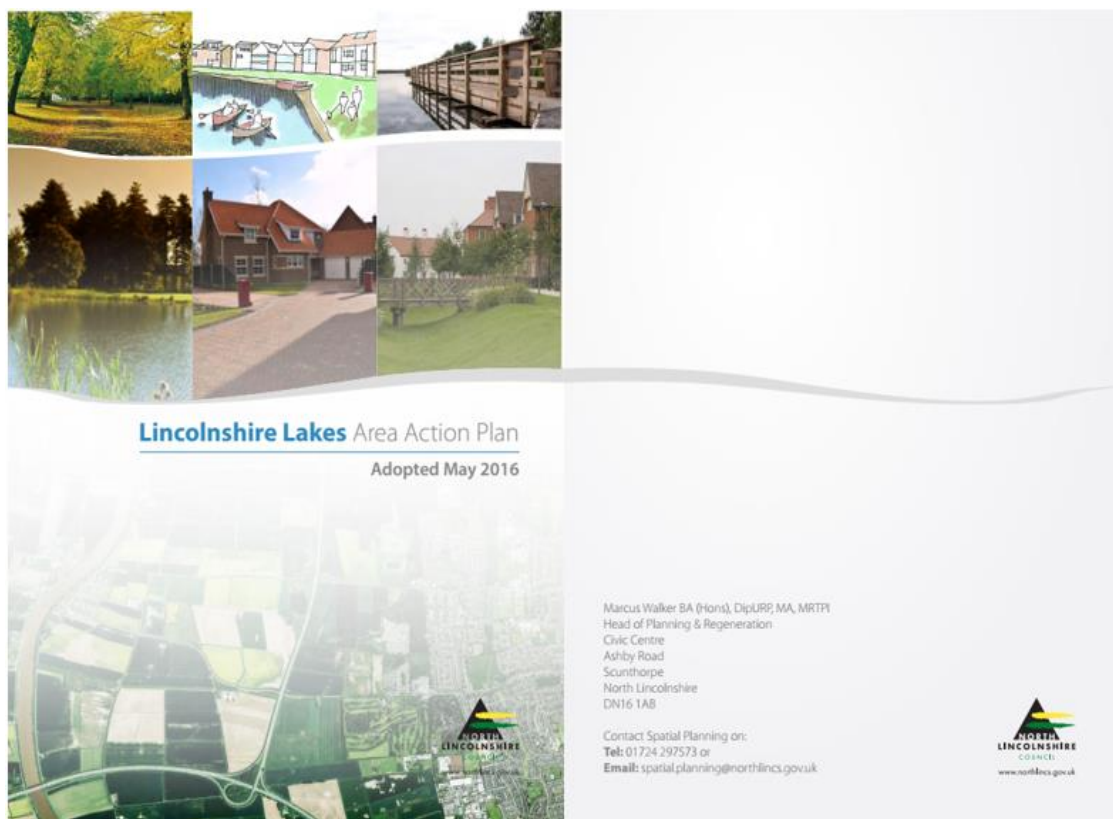


Figure 2.9: Lincolnshire Lakes Area Action Plan (NLC)

- 2.43 Energy efficiency and sustainability are central to the Lincolnshire Lakes vision. The plan encourages the use of renewable energy technologies, including solar, wind, and biomass, alongside decentralised energy systems and low-carbon heating solutions. Buildings are expected to meet high energy efficiency standards, incorporating designs that minimise energy demand through passive and technological measures.
- 2.44 With regards to energy, Policy SD1 establishes a presumption in favour of sustainable development, ensuring that planning decisions prioritise proposals that contribute to social, economic, environmental sustainability and for non-residential developments to achieve a minimum BREEAM rating of Very Good and/or an Energy Performance Certificate rating of 40 in the AAP area.

North Lincolnshire Council's Planning for Renewable Energy Development/Solar PV SPD

- 2.45 Adopted in November 2011, North Lincolnshire Council's Planning for Renewable Energy Development SPD (**Figure 2.10**) provides a framework to support the development of renewable energy projects while balancing environmental, social, and economic considerations.
- 2.46 This SPD outlines policies and guidelines to ensure that renewable energy developments, such as wind, solar, and biomass, are appropriately sited and designed to minimise impacts on the local environment, heritage assets, and residential amenity. It emphasises the importance of community engagement and ensuring that projects contribute to sustainability objectives, including reducing greenhouse gas emissions and supporting the transition to a low-carbon economy.

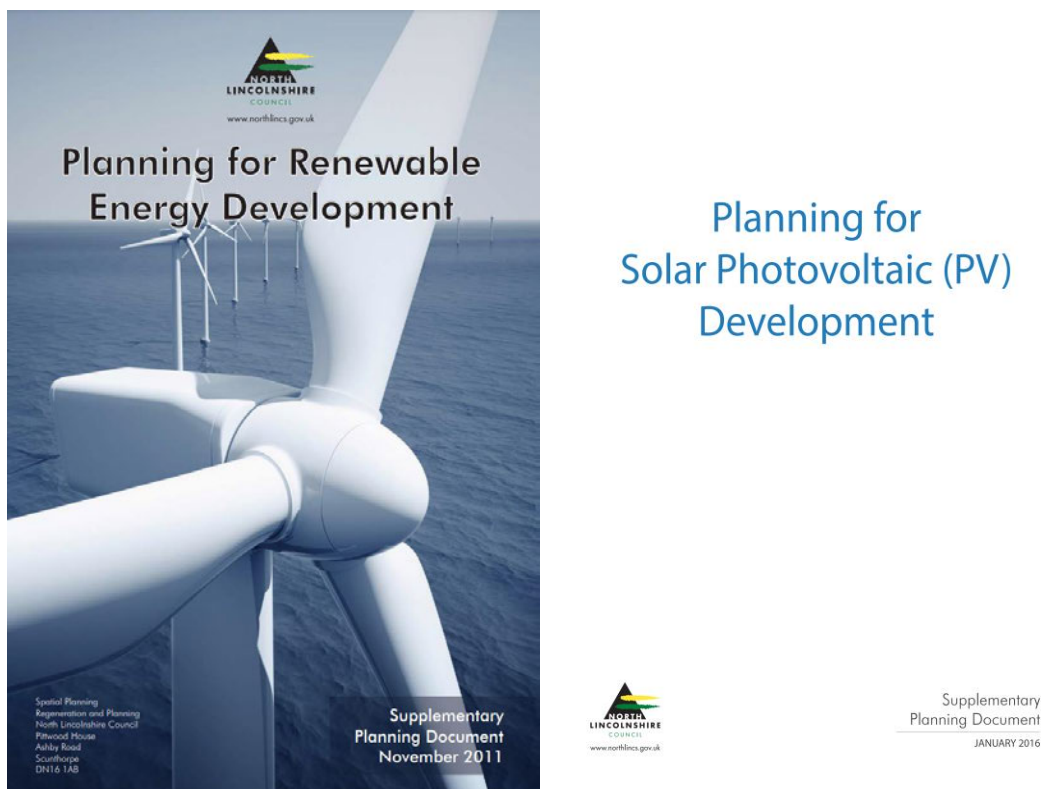


Figure 2.10: North Lincolnshire Renewable Energy Development and Solar PV SPD (NLC)

- 2.47 Adopted in January 2016, The Planning Solar Photovoltaic (PV) Development SPD (**Figure 2.10**) focuses specifically on facilitating the installation and development of solar PV systems within North Lincolnshire. It provides practical advice for developers and property owners, ensuring that solar projects align with local planning policies and environmental considerations.
- 2.48 This SPD highlights the need for careful site selection to avoid conflicts with sensitive landscapes, ecological habitats, and heritage sites. It also considers potential visual impacts, glint and glare issues, and impacts on agricultural land. The document encourages the integration of solar PV systems into existing buildings and infrastructure where feasible and promotes their role in contributing to renewable energy targets and climate change mitigation.

3. THE PROPOSAL'S ENERGY EFFICIENCY STRATEGY

Energy Hierarchy Introduction

- 3.1 The energy strategy for the Proposed Development will be established to achieve the baseline for energy consumption and CO₂ emissions. All options considered in preparation of the energy strategy and subsequent detailed development of the scheme will ensure that the baseline energy/CO₂ emissions are achieved.
- 3.2 The key energy/CO₂ target is for the Proposed Development to achieve Part L 2021 compliance. To achieve this, the development will adopt an energy hierarchy (**Figure 3.1**) approach to meet the North Lincolnshire Council's objectives for energy efficiency and CO₂ emissions reduction. The various economic, social, and environmental benefits are highlighted in this section and presented under the following headings:



Figure 3.1: Energy Hierarchy

Step 1: Be Lean (Minimising Energy Use)

- 3.3 Energy saving measures following the Fabric First Approach are encouraged. The Fabric First approach (Be Lean) provides protection against fluctuations in both gas and electricity supply tariffs by inherently reducing energy consumption, energy bills and expanding the number of suitable energy generation and delivery options. Further benefits include:
- i. Delivers carbon savings which are 'locked-in' the building for its lifetime (60 years or more) rather than the much shorter lifespan (around 25 years) of a renewable energy technology;
 - ii. Virtually no maintenance and/or replacement costs to maintain carbon reductions through improved fabric; and
 - iii. No reliance on an occupier's behaviour to deliver carbon reductions.
- 3.4 Based upon the energy hierarchy, the Proposed Development proposals will aim to reduce energy/CO₂ demand through a fabric first approach. At the Reserved Matters stage, energy modelling will be undertaken to demonstrate compliance with Part L 2021 Building Regulations demonstrating an improved performance where technically and commercially feasible.
- 3.5 The fabric first stage of the energy hierarchy will seek to minimise demand for heat and power from the outset through the optimisation of the building envelope. This includes ensuring suitable levels of fabric insulation (u-values), air tightness and thermal bridging, and the provision of energy efficiency measures. Passive solar design features to harness renewable sources of heat and light will also be considered.

3.6 The Proposed Development will target building element u-values and air tightness in accordance with Part L 2021 of the Building Regulations standards, including high performance glazing with appropriate window u-values and g-values to reduce heat loss and optimise positive solar gain while reducing the potential for overheating. **Table 3.1** and **3.2** shows Part L Volume 1 and 2 Limiting Fabric Specification.

Table 3.1: Part L 2021 Volume 1 (Residential) Specification

PART L 2021 LIMITING FABRIC SPECIFICATION (Residential)	
Element	Part L 2021 Worst Allowable U-values
Ground/Exposed Floor	0.18 W/m ² .K
External/Exposed Wall	0.26 W/m ² .K
Roof	0.16 W/m ² .K
Roof Light	2.20 W/m ² .K
Glazed Doors / Windows / Doors	1.60 W/m ² .K
Air Permeability	8.00 m ³ /(hr.m ²)

Table 3.2: Part L 2021 Volume 2 (Commercial) Specification

PART L 2021 LIMITING FABRIC SPECIFICATION (Commercial)	
Element	Part L 2021 Worst Allowable U-values
Ground/Exposed Floor	0.18 W/m ² .K
External/Exposed Wall	0.26 W/m ² .K
Roof	0.16 W/m ² .K
Roof Light	2.20 W/m ² .K
Glazed Doors / Windows / Doors	1.60 W/m ² .K
Air Permeability	8.00 m ³ /(hr.m ²)

3.7 Light and Solar Transmittance are factors that measure the amount of light and solar energy that pass through glazed openings. They are important as they affect the control of solar gains and availability of natural light into the building. Consequently, the development will target light and solar transmittance values in accordance with Part L of the Building Regulations standards as shown in **Table 3.3**.

Table 3.3: Part L 2021 Glazing Specification

PART L 2021 GLAZING SPECIFICATION			
Element	Description/ Notes	Solar Transmittance	Frame Factor
Glazing Element Window/Door	Proposed glazing specification	0.48	10.00%
Roof Window	Proposed glazing specification	0.42	15.00%

- 3.8 In addition to the Proposed Development improved envelope u-values, a key area of construction which could result in a significant reduction in heating demand are junction details where two elements of the development meet (thermal bridging).
- 3.9 Consequently, the Proposed Development will be designed to make use of best practice design (such as construction joint details calculated by a suitably competent person following the guidance detailed in BR 497 and Paper 1/06 or from a reputable non-government database containing independently assessed thermal junction details) to minimise thermal bridging, energy losses, and reducing CO₂ emissions.
- 3.10 In addition to this, an improved fabric specification and energy efficiency, sustainable design measure has/will be maximised on the Proposed Development site at all stages, and this will include the following measures, wherever feasible:
- i. Promotion of passive solar gains, maximising natural daylight, sunlight and ventilation whilst minimising the risk of summer overheating;
 - ii. Proportion and distribution of glazing to ensure good levels of daylight, helping to reduce electricity consumption through artificial lighting;
 - iii. Maximise the adaptability of design and internal arrangements to be sympathetic towards the council's relevant building standard;
 - iv. Maximise thermal mass allowing the Proposed Development to store and release heat gains from the sun and internal appliances;
 - v. Orienting roofs (wherever practicable), to be within 45° of south to allow for the incorporation of solar thermal or photovoltaic panels;
 - vi. Specifying high efficiency fabric insulation and high efficiency heating/cooling system such as heat pump, with appropriate controls to reduce energy consumption and CO₂ emissions;
 - vii. Incorporating the use of LED lighting;
 - viii. General lighting should have a minimum luminaire efficacy of 80 and 95 luminaire lumens per circuit-watt or the Lighting Energy Numeric Indicator (LENI) method as noted in Part L Building Regulations 2021;
 - ix. General lighting wherever applicable shall be provided with photoelectric dimming and/or PIR (passive infra-red) sensors with a parasitic power of no greater than 0.10 W/m².
 - x. This is to ensure that artificial lightings shall not be fully utilised when there is sufficient natural light or space is unoccupied in accordance with the NDBSCG and the Part L 2021 of the Building Regulations;
 - xi. Display lighting should have a minimum light source efficacy of 80 and 95 light source lumens per circuit-watt, have a rated power usage no greater than 0.10 W/m² in each space, or follow the LENI method as noted in Part L Building Regulations 2021;
 - xii. Maximise reusing/recycling opportunities during construction; and minimise pollution during the construction process and implement water conservation and recycling measures.
- 3.11 Through these energy efficiency measures, the Proposed Development will deliver energy and carbon savings beyond the requirements of the Building Regulations (2021).

Step 2: Be Clean (Supply Energy Efficiently)

- 3.12 The next stage in the energy hierarchy is exploiting local energy resources (such as secondary heat) and supplying energy efficiently and cleanly to reduce CO₂ emissions.

Heat Network

- 3.13 The growth of decentralised energy generation is a core component of decarbonising the energy supply. District heat networks are an important part of a sustainable and flexible energy system of which each building is a part, and which enables a more circular approach to energy use by storing, using, and reusing energy sources. This supports a more effective and efficient use of energy by reducing primary energy demand and minimising the amount of energy that is ultimately wasted within the system.
- 3.14 Heat networks (**Figure 3.2**) offer an efficient and competitive solution for heating buildings in areas with high heat density and provide the added benefit of enabling the use of secondary energy or waste heat sources. This allows useful, lower quality energy to be used and re-used within the system to meet lower quality energy demands, such as space heating and hot water, saving high quality energy sources and capacity to meet high quality energy demand. The inherent thermal storage capacity of heat networks helps to manage demand, supports balancing and the flexibility of the electricity network and the integration of renewable energy into the grid mix.



Figure 3.2: District Heating Network

- 3.15 By providing a system-level alternative to building-level solutions, heat networks help manage demand through their inherent storage provision whilst protecting existing capacity in the local electricity network to accommodate additional development and the integration of increasing volumes of renewable energy into the grid mix.

Existing Heat Network

- 3.16 Desktop study was undertaken to investigate whether an existing distribution network was in place close to the Site. However, there are no existing district heating networks within 500m of the Site, therefore, connection to an existing network is not feasible. As such, connection to an existing heat network is not proposed/recommended.

New Heat Network

- 3.17 A new heat network (such as a Centralised Energy) could be considered for the Proposed Development site and if applicable will incorporate good practice design and specification standards. Poorly designed heat network infrastructure within a scheme can contribute towards internal overheating problems, especially in communal areas, and high service charges.
- 3.18 If deemed feasible at the detailed design planning stage, the applicant will work closely with their chosen heat network operator from the pre-design stage and commit to designing and delivering communal heating systems in compliance with the relevant CIBSE/ADE Heat Networks Code of Practice for the UK. This will be done in partnership with energy services companies that are either registered or working towards being registered participants of the Heat Trust scheme. The goal is to support the development of high-quality networks, help network operators prepare for regulation, and ensure customers receive a reliable and cost-competitive service.

New Heat Network (Combined Heat and Power – CHP)

- 3.19 CHP systems (**Figure 3.3**) generate electricity from burning fossil fuels and capture the heat generated in the process for heating purposes. CHP can be used where there is a significant year-round need for heating, in addition to the electricity generated.



Figure 3.3: Combined Heat and Power (CHP) Plant

- 3.20 CHP requires significant capital investment in plant and resources. However, the high capital outlay is balanced by lower costs from energy bills. Though once the CHP package has been installed, it needs to be operated and maintained correctly if it is to provide the planned levels of any anticipated cost savings. CHP technology requires a suitable base-load heat demand. CHP works most effectively when it is operating consistently for long periods of the day throughout the year; therefore, a consistent year-round heat demand is required in order to avoid heat rejections during CHP operation.
- 3.21 Gas-engine CHP has been the primary technology for facilitating the development of district heat networks due to its high efficiency and better carbon performance compared to electrical systems utilising grid electricity. However, the rapid decarbonisation of the electricity grid means that technologies generating onsite electricity will not achieve the carbon savings they have to date.
- 3.22 As well as carbon dioxide emissions, all combustion processes (CHP now of particular concern) can emit oxides of Nitrogen (NOx) and, solid or liquid fuelled appliances (such as those using biomass or biodiesel) can also emit Particulate Matter. These pollutants contribute to poor air quality and can have negative impacts on the health of residents and/or occupiers of the Proposed Development.
- 3.23 To address air quality concerns and to continue to facilitate heat networks, only low emission CHP is suitable and only where it is facilitating an area-wide heat network. New gas-engine CHP at any scale is therefore not a suitable heating solution for the Proposed Development. However, new networks served by low emission CHP that complies with the ultra-low NOx emission standards could be explored as part of the detailed design planning stage if required.

New Heat Network - Heat Pump

- 3.24 Heat Pumps have emerged as a promising solution for powering district heating networks, offering numerous benefits in terms of energy efficiency and environmental sustainability. By integrating heat pumps into a centralised energy centre, it is possible to harness low-temperature waste heat sources and provide heating and cooling services to an entire community.
- 3.25 Heat pumps work by extracting heat from a source, such as the ground, water, or waste heat from industrial processes, and transferring it to a higher temperature level for use in heating. In a district heating network, this process is amplified, as heat pumps can tap into large-scale, low-grade heat sources and supply the extracted energy to multiple buildings via a network of insulated pipes. One significant advantage of using heat pumps in district heating systems is their ability to balance the electricity grid when production from renewable sources fluctuates.
- 3.26 Using heat pumps as an energy centre for district heating networks is an environmentally friendly and economically viable option that contributes to the phase-out of fossil fuels in the energy system. By integrating renewable energy sources, improving energy efficiency, and minimising heat losses, heat pumps can play a crucial role in shaping the future of sustainable and low-carbon heating solutions. Therefore, new networks served by heat pump could be explored as part of the detailed design planning stage.

North Lincolnshire Green Energy Park

- 3.27 The North Lincolnshire Green Energy Park (**Figure 3.4**) is an ambitious renewable energy project located near Flixborough Wharf on the River Trent, designed to support the North Lincolnshire's transition to a low-carbon economy. At its core is an Energy Recovery Facility (ERF), capable of converting up to 650,000 tonnes per year of Refuse Derived Fuel (RDF) into energy. This facility will generate up to 95 megawatts (MWe) of electrical output and/or 380 megawatts (MWt) of thermal energy, providing electricity, heat, and steam for both the park and surrounding areas.



Figure 3.4: North Lincolnshire Green Energy Park (North Lincolnshire Green Energy Park, 2024)

- 3.28 Energy Recovery Facility (ERF): The ERF will process non-recyclable waste to generate energy, significantly reducing landfill waste. The energy produced will help power over 221,000 homes, and thermal energy will be used for heating and industrial purposes on-site and nearby.
- 3.29 Battery Storage and Hydrogen Production: The project will incorporate battery storage to optimise energy use and integrate hydrogen production through the electrolysis of water, contributing to cleaner fuel alternatives. The park will also have facilities for hydrogen storage, providing future flexibility in energy storage and distribution.
- 3.30 District Heat Network: The project will extend a 5km district heating network, supplying low-carbon heat to nearby homes, businesses, and proposed housing developments. This will reduce reliance on traditional heating systems and help cut carbon emissions in the local area. Power and Gas Network: The park will also provide essential infrastructure, such as power and gas networks, to support the local economy and future housing developments in North Lincolnshire.
- 3.31 The Proposed Development site could incorporate spare valve connections, enabling a potential connection to the planned North Lincolnshire Green Energy Park heat network.

Step 3: Be Green (Renewable Energy Generation)

- 3.32 The next stage in the energy hierarchy is investigating opportunities for producing, storing, and using renewable energy on-Site. Generating low carbon energy on Site can reduce reliance on fossil fuels & minimises energy lost through transmission, contributing to security of supply and better connections between energy demand and generation.
- 3.33 An initial renewable energy options assessment has been undertaken using the Renewable Energy Sources Estimation Tool (RESET) – **Figure 3.5** which accompanies the CIBSE TM38 'Renewable Energy for Buildings' guidance document.
- 3.34 This toolkit is intended for use at the earliest stages of design, when ideas are being considered and the outline direction of the design is developed, to identify the most promising renewable technology options for a given development or building. This is the key stage for some of the most important decisions relating to overall appearance, orientation, building mass and ventilation strategy, which can also influence decisions about renewable energy sources.

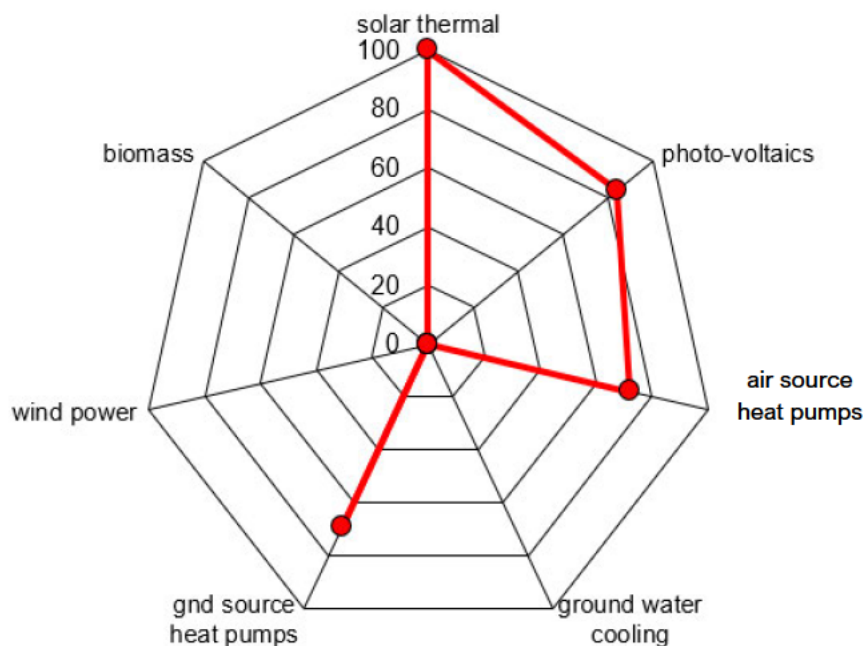











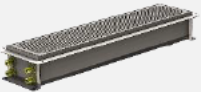


Figure 3.5: Initial Renewable Energy Feasibility

- 3.35 The initial assessment has been undertaken to judge the feasibility of renewable energy technologies from the outset, enabling viable technologies to be promoted and others to be ruled out from further consideration. The initial assessment demonstrates that Solar Thermal, Photovoltaic Panels, Ground Source Heat Pump, and Air Source Heat Pumps are all feasible technologies for the Proposed Development site.
- 3.36 A further detailed review (**Table 3.4**) of potential low carbon renewable energy technologies has also been carried out to determine potential technologies which could be incorporated into the Proposed Development site.

Table 3.4: Renewable Energy Feasibility Matrix

TECHNOLOGY		FEASIBILITY SUMMARY TABLE MATRIX								
LZC technologies	Description	Noise Issue	Visual Impact	Internal Space	External Space	Capital Cost	Maintenance Issue	Site Feasibility		
Solar PV Panels 	Solar PV are solar cell systems that convert sunlight directly into electricity. They should be installed within 45° of due south ideally at a 30-35° angle.	●	●	●	●	●	●	It is expected there is suitable shade free roof space available with sufficient electricity demand. This technology is considered suitable for the Proposed Development.	✓	
Solar Thermal Collector 	Solar Thermal are devices that uses energy from the sun to warm water for storage in a hot water cylinder. They should also be installed within 45° of due south ideally at a 30-35° angle.	●	●	●	●	●	●	This technology is considered suitable for the Proposed Development and could be mounted on the roof. This building type is anticipated to have significant hot water (DHW) demands.	✓	
Ground Source Heat Pump 	Ground Source Heat Pumps (GSHP) work by absorbing natural heat from the ground and transferring the heat into buildings to provide heating, cooling, and domestic hot water.	●	●	●	●	●	●	GSHP is considered suitable for the Proposed Development as there is a large area of land available. GSHP could be used for space heating and cooling, including DHW.	✓	
Air Source Heat Pump 	Air Source Heat Pump (ASHP) extracts heat from the outside air and transfer the heat into buildings to provide heating, cooling, and domestic hot water.	●	●	●	●	●	●	ASHP can provide simultaneous heating and DHW at a very high efficiency. There is suitable external space available. This technology is considered suitable for the Proposed Development.	✓	

<p>Water Source Heat Pump</p> 	<p>Water Source Heat Pump (WSHP) uses submerged pipework to absorb energy from water sources such as lakes, ponds, rivers, aquifers, mine water etc to provide heating and hot water into buildings.</p>	●	●	●	●	●	●	<p>There are no potential enough water sources (such as lakes, ponds, rivers, aquifers, mine water) on or nearby the Proposed Development site. Hence, this technology is not considered feasible.</p>	⊗
<p>Geothermal Energy Plant</p> 	<p>Geothermal energy is the heat that comes from the sub-surface of the earth. It is a reliable and constant source of low-carbon, renewable heat. The heat is then used to heat buildings and to generate electricity.</p>	●	●	●	●	●	●	<p>Large area of land required for pipework which is subject to a full ground survey to determine geology. More beneficial to large scale development proposal subsidised by the Government. Hence, this technology is not considered feasible</p>	⊗
<p>Wind Turbine</p> 	<p>A wind turbine turns wind energy into electricity using the aerodynamic force from the rotor blades. The electricity generated is then used to power building electricity demands including appliances.</p>	●	●	●	●	●	●	<p>The average wind speed in the area of the Site is 4.8m/s at 10m hub height (≥5.0m/s required for further investigation). Considering the Site location this technology is therefore not considered feasible.</p>	⊗
<p>Hydro, Wave & Tidal Power</p> 	<p>Hydropower – also known as hydroelectric power or hydroelectricity – harnesses energy from the natural flow of moving water, which can then be used to generate electricity to power building electricity demands.</p>	●	●	●	●	●	●	<p>The Proposed Development Site is not located within a reasonable distance to a coastal location or water source. Hence, this technology is not considered feasible.</p>	⊗

<p>Biomass Heating</p> 	<p>Biomass is a renewable energy source, generated from burning wood, plants and other organic matter, such as manure or waste. It releases carbon dioxide when burned, but considerably less than fossil fuels.</p>	●	●	●	●	●	●	<p>Biomass heating is not considered feasible for this development due to issues with fuel storage, access for delivery vehicles and Air Quality Management Area for Nitrogen Oxides (NOx) emissions.</p>	⊗
<p>Wastewater Heat Recovery (WWHRs)</p> 	<p>WWHR works by recovering from outgoing waste warm water to pre-heat the fresh cold mains water coming into the home. This means that the water heater requires less energy to heat the cold water up.</p>	●	●	●	●	●	●	<p>The Proposed Development is expected to have a high hot water demand, this technology is therefore considered to be suitable for the Proposed Development (such as the residential element of the proposal)</p>	✔
<p>Transpired Solar Collectors</p> 	<p>Transpired Solar Collector is a highly efficient solar air heating system that harnesses the sun's energy to heat fresh, outdoor air for building. It is installed as an 'additional skin' to a building's southerly facing façade.</p>	●	●	●	●	●	●	<p>Transpired solar collectors (TSC) are mostly used in industrial applications for industrial heating, cooling, and agricultural drying. Due to the ventilation equipment requirement, the Proposed Development is not expected to incorporate TSC, hence not proposed.</p>	⊗
<p>Hydrogen Fuel Cell</p> 	<p>Hydrogen energy storage is a form of chemical energy storage in which electrical power is converted into hydrogen. This energy can then be released again by using the gas as fuel in a combustion engine or a fuel cell.</p>	●	●	●	●	●	●	<p>There is limited market available, and the Proposed Development is not expected to incorporate hydrogen fuel due to technology issues including storage, transportation, & utilisation of hydrogen energy.</p>	⊗

Low and Zero Carbon Feasibility Study Summary

- 3.37 Renewable technologies encompass a range of innovative solutions aimed at harnessing natural resources to generate clean and sustainable energy. These technologies play a crucial role in reducing greenhouse gas emissions, mitigating climate change, and transitioning to a low-carbon future.
- 3.38 From the site-specific renewable energy feasibility assessment, it was found that the potentially feasible technologies for the Proposed Development are Solar PV, Solar Thermal, Wastewater Heat Recovery System, ASHP and GSHP.
- i. Solar PV: Solar photovoltaic systems generate electricity by converting sunlight into direct current (DC) using solar panels. The DC power is then converted to alternating current (AC) which could then be used in the Proposed Development for electricity and/or connection to the electricity grid.
 - ii. Solar Thermal: Solar thermal technology harnesses sunlight to generate heat, typically for hot water or space heating purposes. Solar collectors absorb sunlight and transfer the heat to a working fluid, which is then used for various heating applications. For the Proposed Development, solar thermal could be used for heating the domestic hot water tank.
 - iii. Wastewater Heat Recovery System: This technology captures and reuses heat from wastewater generated in commercial buildings. By recovering the heat energy, these systems help reduce energy consumption and lower greenhouse gas emissions associated with heating water. For the Proposed Development, wastewater heat recovery system could be used for heating the domestic hot water.
 - iv. ASHP: Air source heat pumps (ASHP) absorb heat from the outdoor air and transfer it indoors for space heating or hot water production. They work efficiently even at low ambient temperatures, making them a versatile renewable heating solution. For the Proposed Development, ASHP could be used for space heating and cooling, including water heating.
 - v. GSHP: Ground source heat pumps (GSHP) extract heat from the ground, which maintains a relatively stable temperature throughout the year. These systems use a series of buried pipes to circulate a working fluid, absorbing heat from the ground and transferring it to buildings for heating purposes. For the Proposed Development, GSHP could be used for space heating and cooling, including water heating.
- 3.39 In summary, these renewable technologies - Solar PV, Solar Thermal, Wastewater Heat Recovery System, ASHP, and GSHP offer diverse solutions for generating electricity and heat while reducing carbon emissions and improving energy efficiency. Their implementation supports the transition towards low-carbon energy systems stipulated by the local council.
- 3.40 Integrating any of these renewable technologies into Proposed Development offers numerous benefits, both economically and environmentally. These systems also promote social well-being and quality of life by providing cleaner air, reduced noise pollution, and a more resilient energy infrastructure.

4. CONCLUSION

- 4.1 This Energy Statement (ES) has been produced in support of a hybrid planning application for the Proposed Development at the Lincolnshire Lakes Site. The Statement has been prepared in accordance with North Lincolnshire Council's Adopted Core Strategy (2011) Policy CS18: Sustainable Resource Use and Climate Change, as well as Lincolnshire Lakes Area Action Plan Policy SD1 (Sustainable Building Design and Construction), following the guidance detailed in the Supplementary Planning Documents (SPD), including the Planning for Renewable Energy Development SPD.
- 4.2 This Energy Statement sets a framework for the energy strategy for the Proposed Development and outlines the approach to energy efficiency, and renewable energy generation. The Proposed Development will follow the current Part L (2021) standard to ensure it is future proofed for the longer term and ready to meet the Future Homes and Buildings Standard from 2025.

ENERGY SUMMARY

- 4.3 The Proposed Development will adopt the use of an energy hierarchy to meet National best practice guidance and North Lincolnshire Councils' objectives for energy consumption reduction and carbon dioxide emissions [CO₂] reduction, through passive design measures and a 'fabric first' approach (Be Lean), (Be Clean), and finally (Be Green).
- 4.4 Be Lean Summary: The Proposed Development envelope and services will be specified in accordance with Part L (2021) of the Building Regulations to ensure energy consumption via space heating and cooling is reduced. Passive solar consideration will be considered to ensure excessive solar gains and cooling loads are reduced.
- 4.5 Be Clean Summary: A feasibility study on connecting to a district heating network has been conducted for the Proposed Development site. The results show that there are no operational district heat networks within 500m of the site. Consequently, connecting to an existing heat network is not a viable option for the Proposed Development. However, establishing a new heating network and/or exploring opportunities to collaborate with the North Lincolnshire's Green Energy Park could be considered.
- 4.6 Be Green Summary: The feasibility of renewable energy generation concluded that the most appropriate recognised on-site renewable energy technologies with high opportunities for the Proposed Development Site are Solar PV, Solar Thermal, Wastewater Heat Recovery System, ASHP & GSHP. The specified technology/technologies in line with the recommendations of the feasibility study will be confirmed at the Reserved Matters stage and via Part L (2021).
- 4.7 This Energy Statement presents a vision for the Proposed Development at Lincolnshire Lakes to deliver an energy efficient and low carbon design driven by innovative technologies, enabling the Proposed Development to achieve the National and Local ((North Lincolnshire Councils) carbon and energy targets whilst reducing its reliance on the UK National Grid.

APPENDICES

APPENDIX 1: Site Location Plan

Architects are to be notified of any discrepancies.
 Contractors must check all dimensions on site.
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