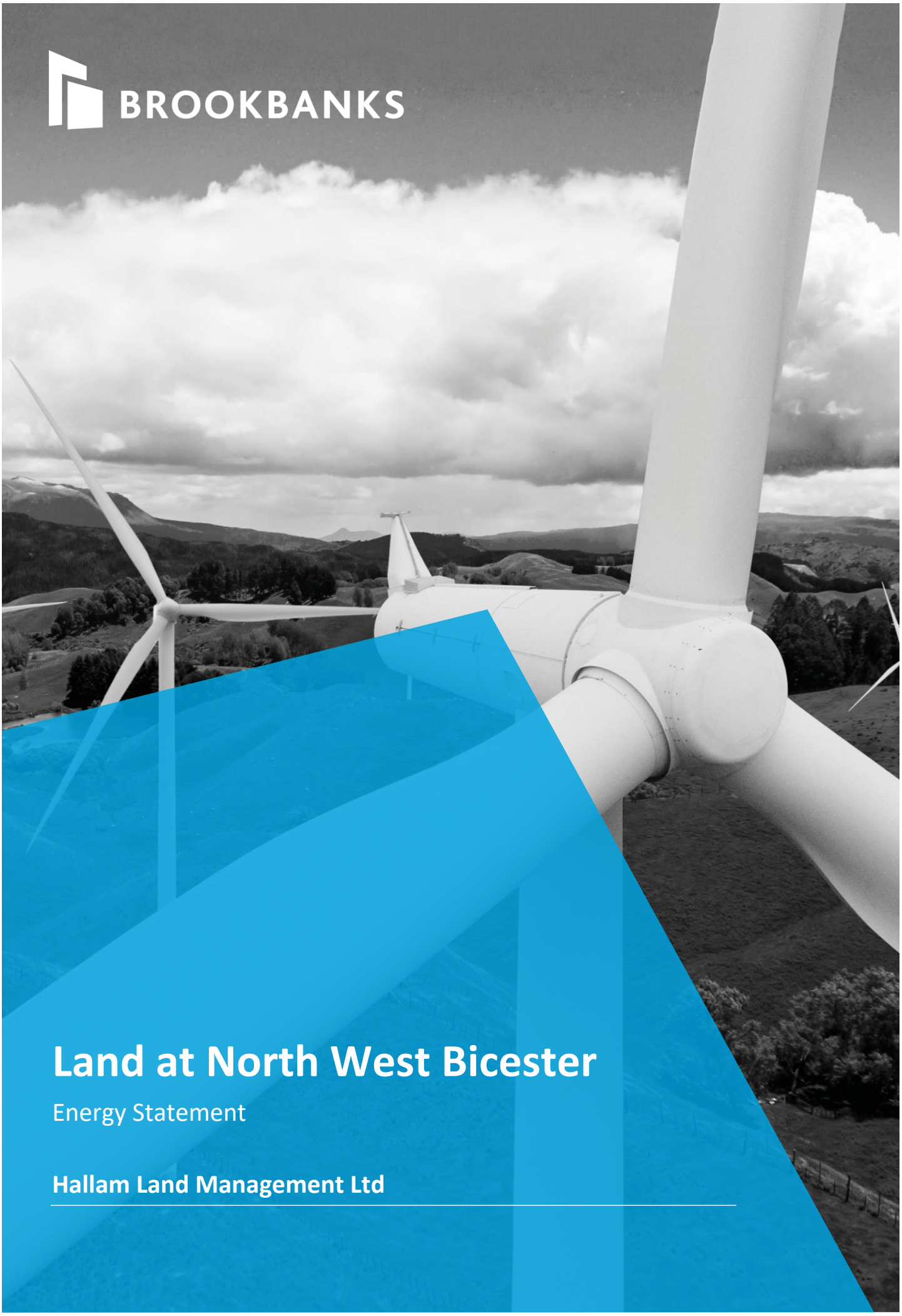
BROOKBANKS



Land at North West Bicester

Energy Statement

Hallam Land Management Ltd

Document Control Sheet

Document Title	Energy Statement
Document Ref	10663 EN01 Rv5
Project Name	Land at North West Bicester
Project Number	10663
Client	Hallam Land Management Ltd

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1.2 An energy strategy is set out for the development based on Future Homes Standard (FHS) for predicted regulated energy demand, due for implementation on from 2025. Carbon emission will be offset through a range of measures including Photovoltaic Cells on each dwelling. Any remaining carbon emissions will be offset through initiatives such as a PV arrays, carbon offsetting and carbon sequestering schemes.

1.3 Consideration has been given to the practicality, deliverability and certainty of proposed measures and strategies to ensure that they adhere to the overarching aim; **to deliver a zero-carbon development.**

1.4 This report contains the following Chapters:

- **Section 2 –** Background Information and development criteria
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2 Background Information

2.1 The proposed development lies to the northwest of the Bicester in the Cherwell District of Oxfordshire and is currently comprised of largely undeveloped farmland.

2.2 The proposed site lies north of a railway line and A4095 Lords Lane and West of B1400 Banbury Road, surrounding Lords Farm and Hawkwell Farm. A river runs through the site to the north which falls short of Bucknell Village.

2.3 The site location and boundary is shown indicatively on **Figure 2-1**, below:

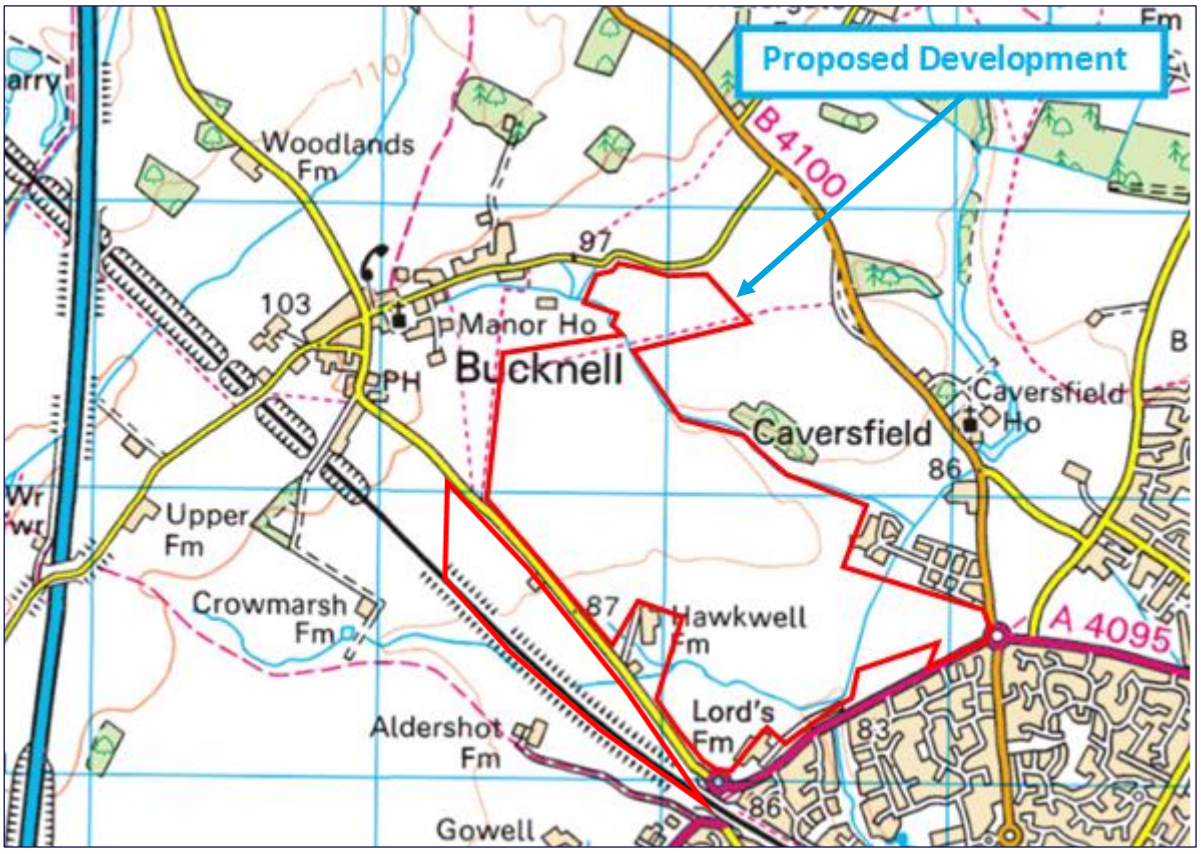

Figure 2-1: Site Location

2.4 The site was first proposed and adopted as one of the original four proposed eco-towns under the then Planning Policy Statement 1 (PPS1) eco-town supplement, discussed in **Section 2: Policy Review**.

Development Criteria

The following development is proposed at the site:

- Up to 3,100 new homes
- A mixed-use local centre
- A school Site
- A school playing field extension to the existing Gagle Brook Primary School
- Extensive green area to the north comprising sports, recreation and play areas and a country park

- Allotments and community farm
- Burial ground
- 4 LEAPs, 2 NEAPs and a MUGA across the Site
- Employment/business use area
- Retention and enhancement of existing hedgerows
- Green corridor alongside the river
- Primary Street

3 Policy Review: National Policy

3.1 National Policy for Low Carbon and Renewable Energy technology is informed by:

- NPPF (2019) published by the UK Government.
- Local Planning Policy
- UK Building Regulations Part L (2010/2013/2016) published by the UK Government.

3.2 The main aim of these documents is to inform policy and provide guidelines to reduce UK CO2 emissions, as this is currently considered to be the largest man made contributor to climate change. The Climate Change Act 2008 (CCA08), is the first statutory legislation limiting CO_2 emissions anywhere in the world. CCA2008 mandates that carbon emissions are reduced by 80% by 2050 (against a 1990 baseline), with targets set at 34% by 2020 and 60% at 2030. It is this primary legislation that drives local planning policy.

National Planning Policy Framework (NPPF)

3.3 The National Planning Policy Framework (NPPF) was first published in March 2012 and was last updated in July 2021. It defines the overarching aims of the Government's sustainable development strategy.

3.4 The NPPF outlines that local authorities should adopt proactive strategies to mitigate and adapt to climate change and that to support the move to a low carbon future new development should be planned in ways that:

- "Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
- Can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards."

3.5 Within the Achieving Sustainable Development section the following objectives have been identified:

a) ***an economic objective*** *– to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;*

b) ***a social objective*** *– to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and*

c) ***an environmental objective*** *– to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.*

These objectives should be delivered through the preparation and implementation of plans and the application of the policies in this Framework; they are not criteria against which every decision can or should be judged. Planning policies and decisions should play an active role in guiding development towards sustainable solutions, but in doing so should take local circumstances into account, to reflect the character, needs and opportunities of each area.

3.6 Furthermore, The NPPF outlines that local authorities should adopt proactive strategies to mitigate and adapt to climate change and that to support the move to a low carbon future new development should be planned in ways that ***"can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards."***

3.7 The NPPF stresses that the importance of sustainability in new developments is to ensure that during construction and operation the development minimises environmental impact. The Government is keen to limit the environmental impact of new construction projects through the reduction of CO_2 emissions.

Part L and F Step Changes and the Future Homes Standard

3.8 With the abandonment of the Code for Sustainable Homes (CfSH) and the Zero Carbon Homes, national standards are now defined largely by the UK Building Regulations.

3.9 In June 2019, the Government set a commitment in the Climate Change Act 2008 for the United Kingdom to reach 'net zero' greenhouse gas emissions by 2050.

3.10 As part of the Government's intention to lead all future improvements through the UK Building Regulations, in October 2019, the Ministry of Housing, Communities and Local Government issued a Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings.

3.11 This consultation sets out the Government's plans for achieving the Future Homes Standard (FHS) by 2025, to provide low carbon heating and high levels of energy efficiency, including proposed options to increase the energy efficiency requirements for new homes through a step change to Part L of the Building Regulations.

3.12 The consultation considered two options for the proposed step changes to Part L, which are set out below:

- **Option 1:** 20% reduction in carbon emissions compared to the current standard for an average home. It is anticipated that this could be delivered by very high fabric standards (typically with triple glazing and minimal heat loss from walls, ceilings, and roofs).
- **Option 2:** 31% reduction in carbon emissions compared to the current standard. It is anticipated that this could be delivered based on the installation of carbon-saving technology such as photovoltaic (solar) panels and better fabric standards, though not as high as Option 1.

3.13 Following a second consultation carried out by Future Home Standards (FHS) from 18 January to 13 April 2021, 'Option 2' is the confirmed route forward, with all new homes required to have a 31% reduction in CO_2 emissions from 2022 in comparison to current standards.

3.14 In order to deliver the 31% reduction, new homes will be assessed against four performance metrics:

- Primary energy
- Minimum standards for fabric and fixed building services
- The Fabric Energy Efficiency Standard (FEES)
- Carbon dioxide emissions

3.15 New interim Part L and Part F legislation will be released from December 2021 and enacted from June 2022, before more significant changes in 2025 that will require a 75% reduction is CO_2 emissions, in line with FHS.

3.16 It is evident that a fabric first approach will be pivotal to the future construction of housing, with new builds 'future-proofed' to be able to achieve carbon zero and have low carbon heating initiative. However, the Government's response to the FHS consultation suggests that the interim December 2021 uplift to Part L will not see an immediate rush to do so, with the skills and supply not yet of high enough standard.

3.17 Launch of a technical consultation is planned for Spring 2023 on the proposed specification for the FHS, with regulations to be developed in 2024 for implementation in 2025.

3.18 The timescales set out above make it clear that these more stringent and more demanding Building Regulations standards will apply to the construction of the majority of the proposed development, meaning that a range of low carbon and resource efficiency measures will be a requirement as the scheme is delivered.

3.19 Part of this strategy is the reliance of low carbon heating, specifically heat pumps, to deliver heat to homes and remove the reliance on gas heating. Heat networks are referred to, but only because of the potential ability to move to low and zero carbon technologies with minimal disruption to homeowners.

3.20 While emphasis on energy efficiency is made within the consultation document, the proposals, as currently written, could allow for inefficient buildings with compensatory technologies as opposed to the previous strategies to achieve Zero Carbon, which relied on fabric improvements first, with low and zero carbon (LZC) technologies to bridge the gap.

3.21 There is an undoubted reliance on the future de-carbonisation of the grid electricity to do the "heavy lifting" and provide the remaining 25-30% carbon reduction over and above the FHS to achieve the zero-carbon target by 2050.

3.22 It should be noted that the Part L and FHS is only concerned with an individual dwelling for assessment and not the development as a whole.

UK Building Regulations Part S: Electric Vehicle Charging Points

3.23 As part of the Government's aims to achieve net zero greenhouse gas emissions by 2050, policies are being put in place, including Regulations that state all new cars and vans should be fully zero emissions, which will see Electric Vehicles (EVs) become increasing common.

3.24 Consultation took place in July 2019 for proposals to alter existing residential and non-residential building regulations to include electric vehicle infrastructure requirements. The Government outlined that:

- Proposed new residential buildings with more than 10 parking spaces, must have ducting infrastructure installed for every parking space
- Proposed non-residential buildings with more than 10 parking spaces must have at least one ChargePoint installed and ducting infrastructure should be installed for at least 1 in every 5 spaces
- From 2025, existing non-residential buildings with more than 20 parking spaces will require at least 1 charge point

3.25 Easy access to chargers will be essential for the mass transition to Electric Vehicles (EVs) for personal transportation. Alongside the decarbonisation of the national grid (discussed in the next section), increased uptake of EVs will significantly lower carbon emissions from transportation.

3.26 The Government has confirmed that it expects all chargers to be "Smart" devices, which will ensure charging will be available without the electricity network being overloaded.

3.27 The changes are expected to be implemented predominantly through amendments to the Building Regulations 2010 and will be enacted through the Electric Vehicle Charging Points (New Buildings) Bill.

3.28 The Bill has passed its first reading in the House of Commons in June 2021 and is scheduled for its second reading in October 2021. It is anticipated that by the end of 2021, the Government will look to have this bill passed as legislation.

3.29 Although it is not yet clear when this legislation will be enacted, the development will comply with Building Regulations at the relevant time and therefore will be reviewed further at detail design stage.

Decarbonisation of the National Grid

3.30 Decarbonising the National Grid is an essential element to achieving the Government's targets for reducing emissions, with a view to establishing net zero by 2050.

3.31 Clean energy will be required to power increases in electric vehicles, home heat pumps as well as a range of other sustainable initiatives.

3.32 In October 2021, the Government announced significant funding in support of generating more nuclear power, marking twelve months since the publication of the Prime Minister's *10 Point Plan for a Green Industrial Revolution*.

3.33 The ten-point plan, released in November 2020, set out the approach that the Government intends to take to *"build back better, support green jobs, and accelerate our path to net zero"*.

3.34 The 10 points are:

- **"Offshore wind**: Producing enough offshore wind to power every home, quadrupling how much we produce to 40GW by 2030, supporting up to 60,000 jobs.
- **Hydrogen**: Working with industry aiming to generate 5GW of low-carbon hydrogen production capacity by 2030 for industry, transport, power and homes, and aiming to develop the first town heated entirely by hydrogen by the end of the decade.
- **Nuclear**: Advancing nuclear as a clean energy source, across large-scale nuclear and developing the next generation of small and advanced reactors, which could support 10,000 jobs.
- **Electric vehicles**: Backing UK car manufacturing bases to accelerate the transition to electric vehicles and transforming our national infrastructure to better support electric vehicles.
- **Public transport, cycling and walking**: Making cycling and walking more attractive ways to travel and investing in zero-emission public transport of the future.
- **Jet Zero and greener maritime**: Supporting difficult-to-decarbonise industries to become greener through research projects for zero-emission planes and ships.
- **Homes and public building**s: Making UK homes, schools and hospitals greener, warmer and more energy efficient, while creating 50,000 jobs by 2030, and a target to install 600,000 heat pumps every year by 2028.
- **Carbon capture**: Becoming a world-leader in technology to capture and store harmful emissions away from the atmosphere, with a target to remove 10MT of carbon dioxide by 2030, equivalent to all emissions of the industrial Humber today.

- **Nature**: Protecting and restoring the natural environment, planting 30,000 hectares of trees every year, while creating and retaining thousands of jobs.
- **Innovation and finance**: Developing the cutting-edge technologies needed to reach these new energy ambitions and make the City of London the global centre of green finance. "

3.35 Although not all of the above principles are applicable or feasible within the proposed development, where possible initiatives will be integrated into the development to enable lower carbon usage and emissions.

3.36 While the above is a national level list of agendas and actions, there is a strong degree of overlap and synergy between this ten-point plan and many of the Parameters and features proposed at Bicester. Section 5 of this Statement also helps identify the ways in which the scheme will directly respond to, and integrate, many elements of this national plan to decarbonise development.

4 Policy Review: Local Policy

The Cherwell Local Plan 2011-2031

4.1 The Local Planning Authority for the Site is Cherwell District Council and the Local Policy for Low Carbon and Renewable Energy Technology is informed by the Local Plan 2011-2031 (2015), Parts 1 and 2.

4.2 The Cherwell Local Plan 2011-2031, adopted 20th July 2015, sets out the strategic objectives and policies for the district and highlights the proposed site as suited to an eco town development

4.3 The wording forPolicy Bicester 1: North West Bicester Eco-Town is set out in **Figure 4-1** below.

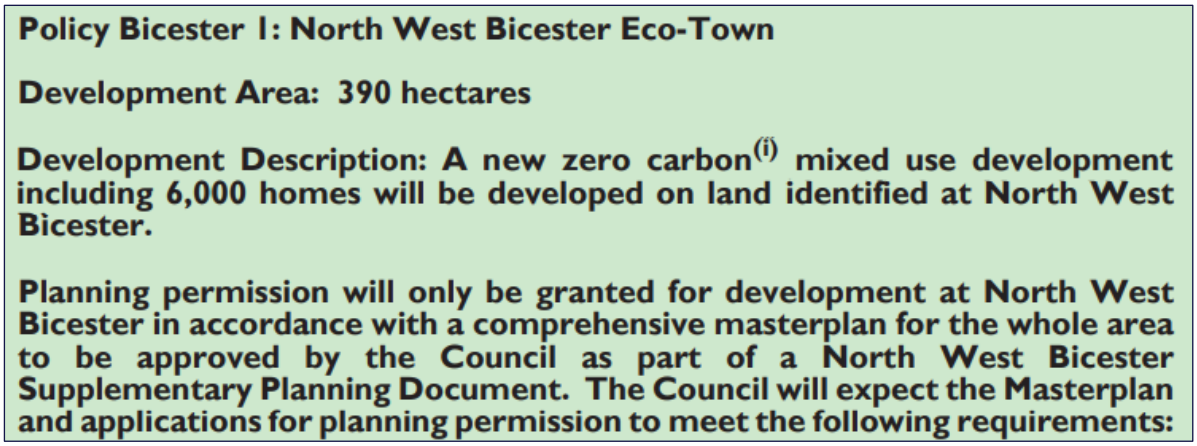

Figure 4-1: Policy Bicester 1: North West Bicester Eco-Town

4.4 The Plan defines true carbon zero as all net carbon dioxide emissions from all energy use within buildings on the eco-town development as a whole are zero or below over a one year period. It excludes embodied carbon and emissions from transport but includes all buildings. The definition is said to have derived from the EcoTowns Supplment to PPS1, which was to endure until the Local Plan was adopted. The Local Plan is now adopted and this does not refer to true or other definitions of zero carbon.

4.5 Also not included in the development plan the previous Ecotowns supplement sought in relation to buildings "through a combination of energy efficiency and low and zero carbon energy generation on the site of the housing development… carbon reductions (from space heating, ventilation, hot water and fixed lighting) of at least 70% relative to current Building regulations (Part L2006)" (ET9.1f). Equally the Ecotowns supplment recognised that there was a need for reasonableness and flexibility: "The intent of the energy efficiency and on-site carbon reduction standards is to ensure that, without being too prescriptive as to the means employed to achieve the overall zero carbon standard, reasonable opportunities for energy efficiency and on-site carbon mitigation (including directly connected heat systems) are utilised" (ET9.2).

4.6 Local Plan Part 1 Policy Policy ESD 2 sets out the Energy Hierarchy requirements, shown in **Figure 4-2.**

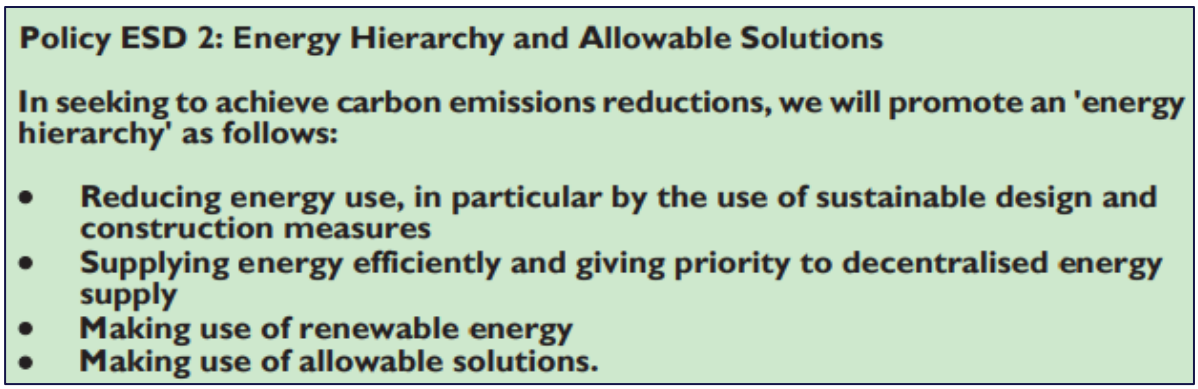

Figure 4-2: Policy ESD2

4.7 ESD 5 sets out the key issues relating to renewable energy development in the Cherwell District, stating that renewable energy developments will be encouraged.

4.8 The Plan states the following in relation to sustainable energy development:

- "We will promote the use of alternative energy sources where appropriate and reduce the impact of development on the natural environment"
- **A25:** "There is a need to maximise opportunities for the use of renewable energy, efficient buildings for using resources such as energy and water more efficiently"
- **A26:** "Cherwell's Environmental Strategy for a Changing Climate (2008) highlights the common need to improve energy efficiency, reduce carbon emissions, encourage the take of low carbon and renewable energy technologies"

4.9 Specific strategic objective 11 (SO11), set out in the Plan, seeks to incoprorate the principles of sustainable development to mitigate and adapt to climate change impacts through increasing local resource efficiency, minimising carbon emissions and promoting decentralised and renewable or low carbon energy where it is appropriate to do so.

4.10 In relation to the production of an energy statement for the proposed site, pargraph B.185 of The Plan states that:

- "An energy statement will be required for major residential developments and all non-residential developments to demonstrate how the energy hierarchy will be applied"

4.11 Paragraphy B.186 explains that carbon emissions reductions can be achieved through application of "allowable solutions" which allow for carbon savings to be secured off site. Although these are yet to be defined by the government, this could include the investment in off site low carbon and zero carbon technologies.

4.12 Although allowable solutions is a relatively new topic, this allows for developments to be carbon neutral where it is not always possible to deal with carbon emissions through on site measures due to technical infeasibility or it is not cost effective.

4.13 Chewell District Council supports the implementation of this national approach to allowable solutions once they have been further defined. Further guidance is set out in the Local Plan Part 2 and the Sustainable Buildings in Cherwell Supplementary Planning Document (SPD).

Eco-Towns Planning Policy in relation to the proposed development

4.14 North West Bicester Supplementary Planning Document (SPD) (2015) expands on Policy Bicester 1 of the Adopted Local Plan.

4.15 The Government introduced the Eco-Towns Planning Policy Statement in 2009. This was to set challenging sustainability standards to contribute to meet the UK's 2050 carbon zeo targets.

4.16 This Eco-towns policy was withdrawn in 2015 along with the Zero Carbon standards, and the only development to go through the planning process to meet this requirement was the Bicester Eco-town.

4.17 The PPS Supplment was to endure at Bicester (unlike the other locations) but only until the Local Plan was adopted which was in 2015.

4.18 While the SPD provides some additional detail it is the Local Plan that has been the subject of an examination and forms the development plan document.

4.19 The principal policy in relation to North West Bicester is Bicester1 which allocates a site of 390 hectares for for a new zero carbon mixed use development including 6000 new homes at North West Bicester. Among the additional expectations set out in the policy are the Following:

- At least 3,000 jobs (approximately 1,000 jobs on B use class land on the site) within the plan period
- Up to four primary schools and one secondary school;
- Forty percent green space, half of which will be public open space;
- Pedestrian and cycle routes;
- proposals to include appropriate crossings of the railway line to provide access and integration across the North West Bicester site. Changes and improvements to Howes Lane and Lords Lane to facilitate integration of new development with the town.
- Good accessibility to public transport services should be provided for, including the provision of a bus route through the site with buses stopping at the railway stations and at new bus stops on the site
- New links under the railway line and to the existing town;
- Local Centres to serve the new and existing communities; and
- Integration with existing communities."
- Contributions to improvements to the surrounding road networks, including mitigation measures for the local and strategic highway network,
- Measures to prevent vehicular traffic adversely affecting surrounding communities.

4.20 The SPD, in more detail advises that:

- "As well as being zero carbon as part of the whole built environment, homes in eco-towns should:
    - (a) achieve Building for Life Silver Standard and Level 4 of the Code for Sustainable Homes 10 at a minimum…
    - (f) achieve, through a combination of energy efficiency and low and zero carbon energy generation on the site of the housing development and any heat supplied from low and zero

carbon heat systems directly connected to the development, carbon reductions (from space heating, ventilation, hot water and fixed lighting) of at least 70 per cent relative to current Building Regulations (Part L 2006)."

4.21 In context, Level 4 of the Code would achieve a 44% reduction over Part L 2006 and Level 5 a 100% reduction. Therefore, the eco-towns standard would require a dwelling to be midway between Code Levels 4 and 5.

4.22 However, there is also a requirement that the development as a whole would be "zero carbon", an individual building would only need to achieve the 70% reduction in carbon emissions.

5 Energy Hierarchy

5.1 With the abandonment of the Code for Sustainable Homes and the Zero Carbon Homes along with the array of local policies on energy and sustainable development, national standards are now defined largely by the UK Building Regulations.

5.2 The Building Regulations outlined in Part L1A, relate to energy used in providing space heating and cooling, hot water and fixed lighting, and follow the energy hierarchy below (**figure 5-1**) in determining the methodology to reduce the energy demand, and therefore carbon emission reductions, necessary to comply with the Building Regulations.

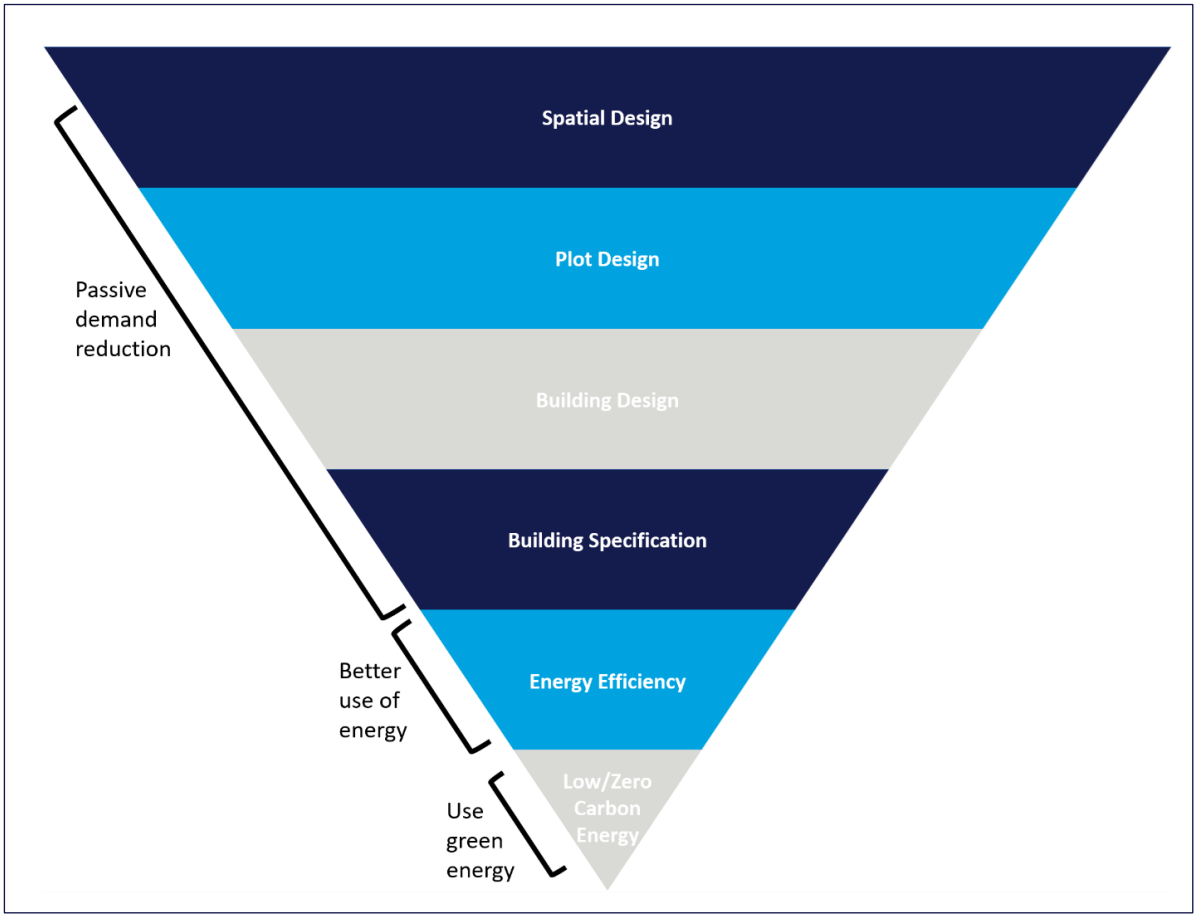

Figure 5-1: Energy Hierarchy

5.3 It is important to recognise that there are a number of different approaches to achieving the required carbon and energy targets. As a result, rather than defining a singular approach that may not be resilient to changes in technology, policy and market conditions, the approach to energy supply should consider all viable options and opportunities at the time when detailed design is being developed.

6 Energy Strategy

6.1 This section outlines a range of technologies and efficiencies that will allow the development to become a zero carbon scheme in the future.

6.2 The strategy set out for the development is based on the anticipated Future Homes Standard (FHS) for predicted regulated energy demand, due for implementation on from 2025. As the standard has yet to be fixed, the strategy will need to be reviewed on a phase by phase basis to take into account the best technology as the time.

6.3 Air Source Heat Pumps (ASHPs) are anticipated to be installed in each dwelling based on the considerations of the FHS. This will be reinforced by carefully considered solar masterplanning, to reduce the regulated energy demand from space heating.

6.4 The residual carbon emissions will be offset through a range of measures including Photovoltaic (PV) Cells on each dwelling. Any remaining carbon emissions, which cannot be mitigated within the individual dwelling may be offset through initiatives such as a PV arrays identified within a 10Ha area of the site, carbon offsetting and assessing the carbon sequestering of the landscaping planting.

6.5 Full predicted energy demand data for the development can be found in **Appendix A.**

Future Homes Standard

6.6 The proposed energy strategy is based on the indicative proposed FHS due to be implemented by 2025. This standard reduces energy demand by 70% from current Part L demand and will build on the 31% reduction over current energy demands on the new Part L, due to be introduced in 2022. The FHS would exceed the old Ecotowns Standard ET9, which required a 70% reduction, when compared to the 2006 Building Regulations.

6.7 Currently, it is anticipated that this energy reduction will be achieved predominantly through Fabric Energy Efficiency, the first element of the zero carbon homes policy hierarchy and makes up part of the Government's wider strategy for achieving a national 80% reduction in carbon emissions by 2050.

6.8 Passive measures are design features from architectural and building fabric selection that reduce the building energy requirement. Active measures are associated with the specification, control and use of building services that will increase the efficiency of the energy used, hence reducing the building energy requirements.

6.9 Lighting is a regulated energy demand and has been assumed to require 5kWh/m^2 constantly across all upcoming standards.

6.10 The Energy Efficiency in Buildings Chartered Institution of Building Services Engineers (CIBSE) Guide F (2016) explains that building design should adopt energy efficiency lighting principles:

- "Energy efficient lighting should:
    - Maximise natural daylight
    - Avoid unnecessarily high illuminance
    - Incorporate the most efficient luminaires, control gear and lamps
    - Include effective lighting controls"

6.11 These principles should be used in the design of the proposed development in order to optimise natural

daylight and reduce regulated electricity demand.

6.12 Passive measures such as the above improve energy efficiency in a building, complying with the second stage of the hiearchy, 'better use of energy'.

Solar Master planning

6.13 The masterplan will be designed to optimise the solar gains through design. Units shall be aligned to maximise the solar gain with a minimum angle of 22 degrees to the south, with approximately a third maximising the solar gain, with an alignment of 44 degrees to the south.

6.14 Roofs of buildings shall be orientated South where feasible for solar thermal/photovoltaic installation. PV is most efficient when positioned south facing at a pitch of 30-35 degrees from horizontal, limiting shading, according to the Energy Saving Trust.

6.15 Additionally, houses will benefit from solar heating and lighting through passive gains. Whilst it is not feasible to ensure all units achieve an East to West orientation, it is still possible to provide renewable/solar panels to roofs running North to South and still benefit from renewable energy although at a reduced rate.

6.16 As well as orientation, consideration will be given to density and the potential for overshadowing. Building levels will be arranged to minimise large steps between units.

6.17 These initiatives will allow for a circa **10% reduction** is space heating demand in the first instance before any further technologies are installed.

6.18 Through solar masterplanning, space heating efficiency is designed into the development, robustly ensuring space heating requirements are minimised and a carbon neutral development can be delivered alongside a number of other initiatives.

Air Source Heat Pumps

6.19 Air source heat pumps (ASHPs) provide an active, mechanical mechanism for reducing space heating demand.

6.20 It is widely acknowledged that for every 1kWh of electricity inputted to ASHPs, approximately 3kWh of heat can be delivered, generating an approximate Coefficient of Performance (CoP) of 3. This reduces space heating requirements by approximately one third.

Roof Mounted Solar Photovoltaics (Use of Green Energy)

6.21 PV arrays are connected to the electrical system of a building via inverters. The electricity generated by PV can be used on site and and when not required, can be exported to the National Grid. This process needs no user intervention. Further use on site can be accommodated with the use of battery storage to minimise the exporting of electricity.

6.22 Cherwell Supplementary Planning Document (SPD) states that proposed developments should support the installation of solar power generation through:

- "Orientation: for pitched roofs, all roofs should have at least one pitch facing within 45 degrees of due south. Mono-pitch or flat roofs should be used to increase PV provision. A mix of orientations ranging from +45degrees to -45 degrees of south will reduce peak export and contribute to meeting peak demands.
- Avoiding overshadowing/overshading – buildings should avoid or at least minimise shading to roofs. Shading of south facing roofs by trees or other buildings should be avoided."

6.23 Suitability for roof mounted PV will be ultimately be dependent on the final masterplan and the housing types.

6.24 Pure PV generation to offest the remaining demand for FHS construction would require significant installed roof mounted PV per dwelling, above the average roof area for a standard dwelling.

Solar Array

6.25 Land to the north of the proposed development site has been identified for as potentially suitable for the installation of Solar arrays to assist in offsetting shortfalls in carbon emissions from the proposed development.

6.26 Calculations suggest circa 10ha of solar farm would offset the remaining carbon emissionof energy demand from the proposed development.

6.27 A combination of roof mounted PV and solar farms provides a useful strategy for offsetting carbon emissions, but other options for generating renewable energy will be considered as and when they become technologically and commercially suitable for inclusion.

6.28 Use of smart grids and low carbon energy storage solutions may provide an opportunity to manage demand and supply of PV in the future, particularly due to its' seasonality and unreliability. These solutions should be further explored to support planning applications and master planning delivery.

Carbon Sequestering

6.29 Carbon sequestering strategies shall be implemented across the proposed developmennt to contribute to offsetting any remaining carbon emissions.

6.30 Solar masterplanning elements such as solar shading can reduce carbon emissions by 5% and carbon sequestering can also be applied as a carbon sink. This can be evaluated to identify areas of potential planting, density and species mix to calculate an approximate carbon reduction over 30 years.

6.31 Green infrastructure will make up a large percentage of the proposed development, allowing for carbon sequstering on site.

6.32 Substantial planting will be undertaken across the development for which a review of the carbon sequestering can undertaken. Planting could include a mix of whips, trees and street trees all of which will sequester carbon from the atmoshpere on site and act as a carbon sink.

6.33 However, a high level analysis suggests an average of 25kg of CO_2 could be sequestered annually per tree (Wild Cherry 34 kg/yr, Oak 29 kg/yr).

6.34 Carbon sequestering will be reviewed as the scheme develops to keep continuous monitoring of the overall impact the tree planting on the development.

Further considerations

Sustainable transport initiatives Car charging facilities

6.35 Sustainable transport initives will lower the amount of carbon emitted to the environment in the first instance.

6.36 In line with the upcoming Part S of the Building Reuglations, each dwelling shall be installed with EV charging points. This will support sustainable travel in and around the proposed development.

6.37 Additionally, the development has been designed to minimise walking distance and maximise accessibility of amenities, thus lowing demand for carbon emitting transportation.

Wind Turbines

6.38 Wind turbines and farms were evaluated for feasibility based for the proposed development. However it was determined that the allowable sized wind turbines permitted within the local area would not be practical in terms of meeting the anticipated carbon reductions.

6.39 Cherwell District Council published Planning Guidance on the Residential Amenity Impacts of Wind Turbines Development in 2011. This states a distance of no less that 800m for a large turbine (1MW +) to dwellings. The guidance suggests that the same distances “could” be applied for medium scale turbines 100kw to 1MW. However, below this scale there is no real benefit in installing widescale wind due to the scale and relative cost.

6.40 The smaller turbines are increasingly expensive and less efficient and would not be recommended to deliver the energy offsetting required at the proposed development.

6.41 The government has pledged that offshore wind will produce “more than enough electricity to power every home in the country by 2030, based on current electricity usage”. Therefore, further investigation into the impact of further decarbonisation of the grid may be necessary as more information is released. This will be dependent on government policies over the next 10-15 years that may introduce more offshore windfarms and remove polluting power stations.

Carbon Offset and Allowable Solutions

6.42 Allowable solutions such as investment in carbon offsetting schemes could be considered to make up any shortfall in onsite energy generation and demand.

6.43 Carbon offsetting schemes allow for investment in environmental projects either locally or around the world in order to balance out a development’s carbon emissions, highlighted as a viable way for new developments to achieve carbon neutrality by the Centre for Sustainable Energy

6.44 In the case of the proposed development, this would allow for the remainder of carbon emissions not offset on site to be offset through investment in external schemes.

6.45 Engagement with local firms and enterprises will allow for further exploration of deliverability of off site wider benefits as well as identification of land elsewhere where further PV and tree planting may be suitable.

6.46 Liason with Oxfordshire County Council (OCC) may be beneficial for co-ordination of allowable solutions initatives and the opportunity to invest in more cost effective solutions to deliver the necessart carbon savings.

7 Summary

7.1 This document sets out an energy strategy that could be implemented at the proposed development at North West Bicester, in order to meet national and local policy requirements in accordance with NPPF and Future Homes Standard, whilst adding value to the local area, in line with the Local Plan 2011-2031.

7.2 The proposed development will look to reduce energy demand on the site initially through fabric improvements in individual dwellings before offsetting remaining carbon emissions with a mixture of PV, Allowable Solutions and Carbon sequestering.

7.3 *Solar masterplanning* can reduce carbon emissions by *10*% and carbon sequestering can also be applied as a carbon sink. This can be evaluated to identify areas of potential planting, density and species mix to calculate an approximate carbon reduction over 30 years.

7.4 ASHPs are considered suitable technologies to be installed into each dwelling of the proposed development in order to reduce space heating energy demand by approximately one third.

7.5 Roof mounted Solar PV may offset a proportion of the proposed development's carbon emissions. This report suggests that the development should seek to deliver a maxiumum of 3Kw of PV per roof, with the remainder of the necessary carbon reduction derived from a combination of PV solar farm, solar masterplanning, carbon offsetting and carbon sequestering.

7.6 This strategy has not explored the potential decarbonisation of the national grid, with a potential reduction in carbon factor from the assumed 0.223kg/CO_2/kWh for Part L 2020 (currently 0.519kg/CO2/kWh) to a figure closer to 0.120kg/CO_2/kWh over the lifetime of the proposed development. This could reduce carbon emissions from the development by 50% and will ultimately deliver a Zero Carbon development by 2050, the the grid is expected to be fully decarbonised. This timetabe may be brought forward with recent Government announcements.

7.7 The strategy outlined in the report sets out how the proposed development could achieve a zero carbon development in line with national and local planning requirements.

Limitations

7.8 The conclusions and recommendations contained herein are limited to those given the general availability of background information and the planned usage of the Site.

7.9 Third party information has been used in the preparation of this report, which Brookbanks by necessity assumes is correct at the time of writing. While all reasonable checks have been made on data sources and the accuracy of data, Brookbanks accepts no liability for same.

7.10 The benefits of this report are provided solely to Hallam Land Management Ltd for the proposed development North West Bicester only.

7.11 Brookbanks excludes third party rights for the information contained in the report.

Head Office Address
6150 Knights Court,
Solihull Parkway,
Birmingham Business Park,
Birmingham.
B37 7WY

T +44(0)121 329 4330
mail@brookbanks.com
brookbanks.com