Fosse Green Energy

EN010154

7.1 Statement of Need

VOLUME

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Regulation 5(2)(q)

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Fosse Green Energy

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7.1 Statement of Need

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Abbreviations

Abbreviation	Definition
°C	Degrees Celsius
AC	Alternating current
BEIS	Department for Business, Energy and Industrial Strategy
BESS	Battery energy storage system
CB7	Seventh Carbon Budget
CBDP	Carbon Budget Delivery Plan
CCC	Climate Change Committee
CCGT	Combined cycle gas turbine
CCS	Carbon capture and storage
CdTE	Cadmium Telluride
CfD	Contracts for Difference
CIGS	Copper Indium Gallium Selenide
CNP	Critical national priority
CO_2e	Carbon dioxide equivalent
DC	Direct current
DCO	Development Consent Order
DESNZ	Department for Energy Security and Net Zero
EV	Electric vehicle
ETYS	Electricity Ten Year Statement
FES	Future Energy Scenarios
g	Gram
GB	Great Britain

Abbreviation	Definition
GSP	Grid supply point
GW	Gigawatt
IEA	International Energy Agency
km	Kilometre
kV	kilovolt
kWh	Kilowatt-hour
kWp	Kilowatt-peak
m^2	Square metres
m/s	Metres per second
Mt	Metric tonne
MW	Megawatt
NDCs	Nationally determined contributions
NESO	National Energy System Operator
NETS	National Electricity Transmission System
NGESO	National Grid Energy System Operator
NOA	Network Options Assessment
NPS	National Policy Statement
NSIP	Nationally Significant Infrastructure Projects
PV	Photovoltaic
TWh	Terawatt-hour
UK	United Kingdom
UNFCCC	United Nations Framework Convention on Climate Change

1. Executive Summary

1.1.1 This Statement of Need has been prepared on behalf of Fosse Green Energy Limited (the ‘Applicant’) to support an application for a Development Consent Order (DCO) for Fosse Green Energy (the ‘Proposed Development’). The Proposed Development will comprise the construction, operation (including maintenance) and decommissioning of a ground-mounted solar photovoltaic (PV) electricity generating station with battery storage, Onsite Substation, and associated infrastructure to generate and export/import electricity.

1.1.2 Decarbonisation of power supplies must occur alongside the substantial increase in the overall demand for electricity, as sectors such as heat and transport are progressively electrified. Ground-mounted solar has a key role to play in providing additional generation capacity and supporting grid decarbonisation, while also contributing to security of supply and the overall affordability of electricity.

1.1.3 This Statement of Need concludes that the decarbonisation, security of supply and affordability benefits delivered by the Proposed Development should be attributed substantial weight when assessing the planning balance.

1.1.4 Solar generation is a critical part of the UK’s strategy to achieve net zero by 2050 and is a key step towards the UK Government’s objective of reducing the carbon intensity of grid electricity to well below 50 g CO_2e/kWh by 2030, as described in its Clean Power 2030 (CP2030) Action Plan (Ref 1).

1.1.5 The current suite of energy-related National Policy Statements (NPSs) makes a compelling case for the urgent need for additional low-carbon electricity generation technologies, including gas with carbon capture and storage (CCS), new nuclear, but particularly for both onshore and offshore wind, or solar photovoltaics.

1.1.6 The NPSs, particularly NPS EN-1 (Overarching National Policy Statement for Energy) (Ref 2) and NPS EN-3 (National Policy Statement for Renewable Energy Infrastructure) (Ref 3) clearly indicate that utility-scale[1] ground-mounted solar farms have a critical role to play in delivering the government’s objectives for the energy system:

“… to ensure that our supply of energy always remains secure, reliable, affordable, and consistent with net zero emissions in 2050 for a wide range of future scenarios, including through delivery of our carbon budgets and Nationally Determined Contributions” (Ref 1, para 3.2.1)

1.1.7 NPS EN-1 establishes a critical national priority (CNP) for the provision of nationally significant low-carbon infrastructure. For electricity generation, this includes all onshore and offshore generation that does not involve fossil fuel

[1] Defined as a solar installation that is connected directly into the transmission or distribution network. Solar installations above 100 MW are classified as Nationally Significant Infrastructure Projects (NSIPs).

combustion, low-carbon energy from waste plants, and natural gas-fired generation that is carbon capture ready. The CNP, therefore, explicitly includes large scale solar projects such as the Proposed Development.

1.1.8 The NPSs also state that assets which provide flexibility to the national electricity system are also needed to achieve both national decarbonisation and energy security aims. The NPSs state that government is supportive of solar that is co-located with storage to maximise the efficiency of land use. The Proposed Development is a 'Nationally Significant Infrastructure Project' (NSIP) solar plus energy storage scheme (currently defined as any solar scheme with a generating capacity over 50 MW[2]). The Proposed Development is therefore fully aligned with the government's aims.

1.1.9 Decarbonisation of the UK economy will increase demand for electricity, as fossil fuels are displaced by low-carbon electricity, particularly in areas such as heat and transport. Electrification policies are increasing, or are set to increase, electricity demand. This is due to the fact that sectors like buildings and transport (among others) were previously fuelled by fossil fuels and will in the future be electrified, placing significantly increased demand on the grid. Therefore, a significant number of new low-carbon electricity schemes, including the Proposed Development, are required to meet that demand and support the delivery of net zero.

1.1.10 The NPSs explain that the availability of suitable grid infrastructure into which a connection can be made, suitable irradiance levels, and local topography are key inputs to the selection of sites suitable for large-scale solar generation developments. The number of locations within the UK at which large-scale solar generation is suitable is therefore limited, and this is a material issue when considering how the UK is to meet the urgent need for low-carbon generation as set out in the NPSs.

1.1.11 Progress has been made in the development of different low-carbon electricity generation technologies. However, many of the technologies with the potential to play a role in the delivery of a net zero energy system have uncertain delivery timescales, while others are yet to achieve full commercial maturity. Developments with the proven ability to achieve carbon savings comfortably within the next decade are essential to keep the UK on its legally binding carbon reduction path. NPS EN-3 notes that solar farms can be built quickly (Ref 3, para 2.10.14), while the UK Government recognises the challenges associated with bringing longer lead time technologies on stream within the timescales necessary to support the urgent need for low-carbon technology (Ref 1, p35). Utility-scale solar, therefore, is one of the most likely technologies to be deliverable against the timeframes required to support net zero.

1.1.12 Many factors are important in the design of a large-scale solar development within the context of a particular location, and flexibility in design is important to allow for the Proposed Development to optimise its benefits. Optimising the use of existing and planned grid infrastructure into which a grid connection can be made is necessary over the next decade to achieve the government's

[2] The capacity threshold for solar NSIPs will increase from 50 to 100 MW on 31st December 2025.

national mission for ‘Clean Power by 2030’ and to meet future electricity demand growth and achieve essential wider societal carbon savings beyond 2030.

1.1.13 Solar generation contributes to security of supply. Aggregated generation output from portfolios consisting of multi technology systems, including solar, is more predictable and less variable than single-technology portfolios. Solar generation is needed to support a high level of generation adequacy within the GB electricity system.

1.1.14 Energy storage facilities, such as the Battery Energy Storage System (BESS) included in the Proposed Development, also contribute to security of supply by storing energy when it is generated in abundance and releasing it to the grid when it is needed. Energy storage facilities also provide grid balancing services which are essential for the safe and secure operation of the National Electricity Transmission System (NETS).

1.1.15 Solar facilities are already among the cheapest form of electricity generation in the UK (see Section 6.3 below) and previous government department forecasts indicate that costs will continue to reduce in the future (Ref 4). By generating low carbon electricity at a low marginal cost, large-scale solar power reduces the energy generated by more expensive and more carbon intensive forms of generation. Solar not only contributes to the decarbonisation of the electricity system but also can help to lower the market price of electricity.

1.1.16 The proposed connection point is suitable (evidenced by National Grid offering a point of connection, further information on which is provided in the **Grid Connection Statement [EN010154/APP/7.5]**) and the Proposed Development will not cause any grid constraints or curtailment in this area of the NETS as a result of connecting at the proposed National Grid substation near Navenby. The Proposed Development will deliver against the urgency of need, in relation to decarbonisation, security of supply, and affordability.

1.1.17 In summary, significant additional capacity of utility-scale solar generation is urgently needed in the UK. The Proposed Development will, if consented, provide an essential contribution to meeting the governmental objectives of delivering utility-scale infrastructure to enable decarbonisation. By doing so, the Proposed Development will address the climate emergency that affects everyone’s lives and the environment, by ensuring the UK's energy supply is secure, low-carbon and low-cost.

1.1.18 As articulated by CP2030, significant effort will be needed to meet the above governmental ambition, citing the need for as much as 45-47 GW of solar generation capacity by 2030. Thus, given that, as established by NPS EN-1, there is significant need for projects that fit the description of the Proposed Development, commensurate significant weight and consideration should be given to need for the Proposed Development in decision making.

2. Overview

2.1 Document Purpose

2.1.1 Fosse Green Energy Ltd (the Applicant) is seeking a DCO for Fosse Green Energy (the Proposed Development). The Proposed Development will comprise the construction, operation (including maintenance) and decommissioning of a ground-mounted solar photovoltaic (PV) electricity generating station with battery storage, Onsite Substation and associated infrastructure to generate and export/import electricity.

2.1.2 This Statement of Need describes how the Proposed Development is consistent with the relevant aspects of UK Government policy as it relates to the provision of energy infrastructure. In particular, the Proposed Development complies with the requirements of National Policy Statements EN-1 and NPS EN-3, which were designated in January 2024, and were revised in draft form in April 2025.

2.1.3 NPS EN-1 establishes a critical national priority (CNP) for nationally significant low-carbon infrastructure, a definition that includes utility-scale ground-mounted solar PV. NPS EN-1 notes that:

"*Subject to any legal requirement, the urgent need for CNP Infrastructure to achieving our energy objectives, together with the national security, economic, commercial, and net zero benefits, will in general outweigh any other residual impacts not capable of being addressed by application of the mitigation hierarchy. Government strongly supports the delivery of CNP Infrastructure, and it should be progressed as quickly as possible.*" (Ref 2, Paragraph 3.3.63)

2.1.4 NPS EN-3 describes the policy framework for the development of renewable energy infrastructure, including solar PV. NPS EN-3 states that:

"*The Government has committed to sustained growth in solar capacity to ensure that we are on a pathway that allows us to meet net zero emissions by 2050. As such, solar is a key part of the government's strategy for low-cost decarbonisation of the energy sector*" (Ref 3, Paragraph 2.10.9).

2.1.5 In accordance with s.104 of the Planning Act 2008 (PA 2008), any decision to consent the Proposed Development must be taken in accordance with the NPSs. (Ref 1, Paragraphs 3.2.6 – 3.2.8)

2.1.6 This Statement of Need demonstrates the contribution the Proposed Development will make to the three national energy policy aims:

a. Net zero, and the importance of deploying low-carbon generation assets at scale to achieve the UK's clean power target.

b. Security of supply, and the need for a resilient electricity generating system that can meet the needs of current and future electricity consumers.

c. Affordability, and the need for an energy system that is decoupled from unpredictable fossil fuel prices and volatile international markets.

2.1.7 The Statement of Need not only shows how the Proposed Development helps to achieve each of these policy aims, but also why the proposed location is highly suitable for the siting of this project. A Site Selection Report has been prepared for the DCO application as Appendix A to the **Planning Statement [EN010154/APP/7.2]**.

2.1.8 The Statement of Need therefore provides evidence that utility-scale ground-mounted solar is a key part of the government's strategy for a secure, affordable and decarbonised energy system. The Proposed Development is required to support the delivery of the UK's legally binding emissions reduction targets, while maintaining national security of supply, improving the overall affordability of the energy system, and providing value for money to end-use consumers.

2.2 Document Overview

2.2.1 **Chapter 3** of this Statement of Need outlines the international and national legislative framework that requires the UK to decarbonise all elements of its economy, including the electricity generation system. Signatories to the Paris Agreement of 2015 agree to work to limit global warming to well below 2° Celsius, and to aim to remain within 1.5°C of warming. Within the UK, there is a legally binding target to achieve net zero emissions by 2050.

2.2.2 **Chapter 4** describes the key energy-related National Policy Statements that are most relevant to the Proposed Development, specifically NPS EN-1 and NPS EN-3, and shows how the Proposed Development is compliant with applicable policies. NPS EN-1 establishes a critical national priority for low-carbon infrastructure, including utility-scale ground-mounted solar. NPS EN-3 notes the need for a five-fold increase in solar generation capacity by 2035 and sets out the policy requirements for new renewable energy infrastructure in support of the UK's clean power target. Chapter 4 also discusses the Clean Power 2030 Action Plan that was published in December 2024, and which represents the energy policy ambitions of the current UK Government.

2.2.3 **Chapter 5** describes the need for substantial additional electricity generation capacity to meet increased demand resulting from the anticipated electrification of heat and transport. In short, decarbonisation of key areas of the economy requires the development of large amounts of additional low-carbon generation capacity.

2.2.4 **Chapter 6** discusses the specific role of solar generation in supporting the UK Government's policy objective of developing an electricity generation system that simultaneously:

a. Delivers net zero;

b. Provides security of supply; and

c. Maintains an energy system that is affordable to end users.

2.2.5 **Chapter 7** provides evidence on the technical considerations associated with the development of utility-scale ground-mounted solar PV installations, including considerations around the siting and location of such installations, and describes factors that are important in the design of a scheme including overplanting and the connection of a battery energy storage system (BESS).

2.3 Description of Proposed Development

2.3.1 The Proposed Development will comprise the construction, operation and maintenance, and decommissioning of a solar photovoltaic (PV) electricity generating facility, with a total capacity exceeding 50 MW together with a battery energy storage system (BESS), export and import connection to the NETS via the proposed National Grid substation near Navenby, and associated infrastructure.

2.3.2 A full description of the Proposed Development is included in **Chapter 3: The Proposed Development** of the ES **[EN010154/APP/6.1]**.

3. Legislative Background

3.1 International Legislation

3.1.1 The Paris Agreement (Ref 5) is an international treaty on climate change that was drafted at the 2015 United Nations Climate Change Conference. The treaty was signed in April 2016 and came into force in November of that year. 195 members of the United Nations Framework Convention on Climate Change (UNFCCC) are parties to the agreement.

3.1.2 The Paris Agreement has a long-term goal to keep the rise in global surface temperature to well below 2°C above pre-industrial levels, with an ambition to limit this rise to no more than 1.5°C.

3.1.3 To stay within the 1.5°C temperature increase, global emissions must be reduced by around 50% by 2030, with emissions falling to net zero by mid-century.

3.1.4 Parties to the Paris Agreement are required to make commitments to reduce their overall emissions; these commitments are known as nationally determined contributions (NDCs). Collectively, these NDCs are not currently sufficient to limit warming to the Paris Agreement's 2°C target. The United Kingdom has agreed to be bound by the terms of the Paris Agreement. More needs to be done by all Parties to the agreement at a faster pace to ensure that the above overarching target is met.

3.1.5 **Figure 3-1** below illustrates the gap between current policies, pledges and targets, and the global emissions reductions required to achieve the Paris Agreement goals (Ref 6).

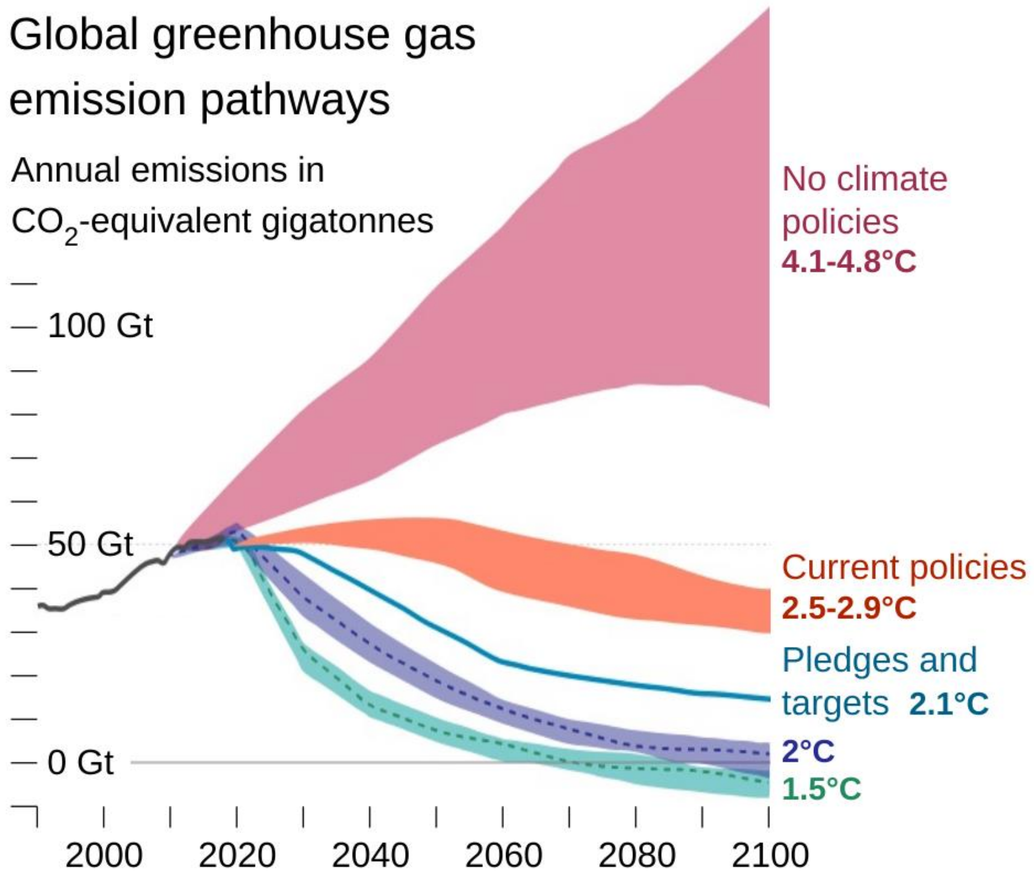

Figure 3-1: Global GHG Emissions Pathways (Ref 6)

3.1.6 The UK Government recently published its 2035 NDC, targeting a reduction in national emissions of 81% by 2035, relative to a 1990 baseline (Ref 7). This reduction can only be achieved with further, substantial emissions reductions across all sectors of the UK economy, including the generation of electricity.

3.1.7 While the UK's NDC is consistent with the requirements of the Paris Agreement, analysis shows that collectively emissions reduction pledges must be increased by 80% to be aligned with the Paris 2°C ambition (Ref 8).

3.2 National Legislation

3.2.1 Within the United Kingdom, the Climate Change Act 2008 (Ref 9) became law in November of that year. The Act set a legally binding target to reduce national emissions by 80% by the year 2050, relative to a 1990 baseline.

3.2.2 The legislation also established the Committee on Climate Change (Ref 10) to act as the government's independent statutory advisers and set up a system of legally binding five-yearly carbon budgets.

3.2.3 On the advice of the Committee on Climate Change, the previous 80% reduction target was amended in 2019 to become a 100% national emissions reduction target by 2050, i.e. net zero emissions must be achieved by that date (Ref 11).

3.2.4 The Committee on Climate Change provides advice to the UK Government on a range of climate-related issues, including the total emissions that may be emitted during five-yearly carbon budget periods. To become legally binding, these budget totals must be ratified by parliament.

3.2.5 The first five budgets were set based on an 80% reduction pathway by 2050; the sixth (and subsequent) budgets take account of the 2050 net zero target. The Committee on Climate Change advised on the 7th Carbon Budget (CB7) in February 2025 (Ref 12), but this has yet to be approved by government or ratified by Parliament.

3.2.6 The government has published a Carbon Budget Delivery Plan (CBDP) (Ref 13) setting out a range of policies and proposals to enable the delivery of the 4th, 5th and 6th Carbon Budgets. The CBDP also includes sectoral budgets covering different parts of the economy including electric power supply, but these are indicative and not legally binding. These are also consistent with the above mentioned NDCs. The UK is currently not on track to meet its 2030 NDC targets, and accelerated action, particularly on clean power, energy efficiency, and transport decarbonisation, is urgently needed.

3.3 Conclusion of Legislative Background

3.3.1 The UK is required by the terms of the Paris Agreement to prepare and maintain its nationally determined contribution outlining its climate action plans. Collectively, parties to the Paris Agreement have committed to keep the rise in global temperatures to below 2°C above pre-industrial levels, and to pursue efforts to limit the temperature rise to 1.5°C.

3.3.2 The UK has passed national legislation setting legally binding emissions reductions targets, with a net zero target of 2050. A framework of five-yearly carbon budgets acts to maintain the UK on a pathway to net zero; these budgets are set on the advice of the Climate Change Committee (CCC).

4. Policy and Guidance

4.1 National Policy Statements

4.1.1 In November 2023 the UK Government published an updated suite of National Policy Statements related to energy, with these NPSs coming into force in January 2024. Of most significance to the Proposed Development are Overarching National Policy Statement for Energy (EN-1) (NPS EN-1) and National Policy Statement for Renewable Energy Infrastructure (EN-3) (NPS EN-3).

4.1.2 The Overarching National Policy Statement for Energy (EN-1) (Ref 2) outlines the policy context for the development of nationally significant energy infrastructure, and explains the urgent need for significant amounts of utility-scale energy infrastructure to meet the government's energy objectives. NPS EN-1 goes on to set out the general policies for the submission and assessment of different types of energy infrastructure application.

4.1.3 NPS EN-1 is very clear about the need for new energy infrastructure to achieve the UK's net zero commitments:

"*Our objectives for the energy system are to ensure our supply of energy always remains secure, reliable, affordable, and consistent with meeting our target to cut GHG emissions to net zero by 2050, including through delivery of our carbon budgets and Nationally Determined Contribution. This will require a step change in the decarbonisation of our energy system.* (Ref 2, Paragraph 2.3.3)

"Meeting these objectives necessitates a significant amount of new energy infrastructure, both large nationally significant developments and small-scale developments determined at a local level" (Ref 2, Paragraph 2.3.4)

4.1.4 NPS EN-1 goes on to say:

"*We need to dramatically increase the volume of energy supplied from low carbon sources"* (Ref 2, Paragraph 2.3.5).

4.1.5 NPS EN-1 is also clear about the role of electrification in decarbonising different sectors of the economy:

"*Using electrification to reduce emissions in large parts of transport, heating and industry could lead to more than half of final energy demand being met by electricity in 2050, up from 17% in 2019, representing a doubling in demand for electricity*" (Ref 2, Paragraph 2.3.7).

4.1.6 NPS EN-1 acknowledges the role of low carbon renewable generation in dramatically reducing emissions in the power sector over the period from 2011 (when the original NPS EN-1 national policy statement was designated) and 2019. Over this period emissions from the power sector fell from around 145 $MtCO_2e$ to less than 60 $MTCO_2e$:

"*This can be mainly attributed to the proportion of renewable generation more than quadrupling from 10 per cent to 43 per cent between 2011 and 2020, whilst the share of electricity generation from coal reduced from 29 per cent to 2 per cent over the same period*" (Ref 2, Paragraph 2.4.1).

4.1.7 NPS EN-1 establishes a CNP for low carbon infrastructure by confirming the urgent need for such projects, requiring substantial weight to be given to meeting this need in decision-making, and removing the obligation to assess each project's specific contribution to meeting that need. It states:

"*Government has committed to fully decarbonising the power system by 2035, subject to security of supply, to underpin its 2050 net zero ambitions. More than half of final energy demand in 2050 could be met by electricity, as transport and heating in particular shift from fossil fuel to electrical technology"* (Ref 2, Paragraph 4.2.1).

"Ensuring the UK is more energy independent, resilient and secure requires the smooth transition to abundant low-carbon energy. The UK's strategy to increase supply of low carbon energy is dependent on deployment of renewable and nuclear power generation, alongside hydrogen and CCUS [Carbon Capture Usage and Storage]. Our energy security and net zero ambitions will only be delivered if we can enable the development of new low carbon source of energy at speed and scale" (Ref 2, Paragraph 2.4.2).

4.1.8 It goes on to say that:

*"Government has therefore concluded that there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure." (*Ref 2, Paragraph 4.2.4).

4.1.9 The definition of low carbon infrastructure, for the purposes of the CNP, include utility-scale, ground-mounted solar PV generation projects such as the Proposed Development. (Ref 2, Paragraph 4.2.5)

4.1.10 NPS EN-1, therefore, clearly lays out the requirement for substantial amounts of additional low-carbon infrastructure to be delivered, at speed and at scale, to help achieve the government's objectives of achieving net zero emissions while maintaining an energy system that is secure, resilient and affordable.

4.1.11 Building on NPS EN-1, National Policy Statement for Renewable Energy Infrastructure (EN-3) (Ref 3) goes into greater detail about the role of renewables in achieving the government's policy objectives, and describes the factors that should be considered by applicants when submitting applications for development consent, and by the Secretary of State when considering such applications.

4.1.12 NPS EN-3 takes as its starting point the need for new major renewable electricity infrastructure, as established in Overarching National Policy Statement for Energy EN-1. NPS EN-3 is clear that:

"In light of this, the Secretary of State should act on the basis that the need for infrastructure covered by this NPS has been demonstrated" (Ref 3, Paragraph 2.1.6).

4.1.13 NPS EN-3 provides additional detail in support of the need for specific technologies, including utility-scale ground-mounted solar PV generation:

*"The government has committed to sustained growth in solar capacity to ensure that we are on a pathway that allows us to meet net zero emissions by 2050. As such, solar is a key part of the government's strategy for low-cost decarbonisation of the energy sector (*Ref 3, Paragraph 2.10.9).

*"Solar also has an important role to play in delivering the government's goals for greater energy independence." (*Ref 3, Paragraph 2.10.10).

4.1.14 This NPS is clear about the scale of additional solar PV generation capacity that the government anticipates will be needed to achieve the government's goals as set out in the CP2030

4.1.15 As noted above, the Proposed Development is co-located with a battery energy storage system to provide additional resilience, in line with the government's stated policy of supporting projects that deliver improved system flexibility.

4.1.16 NPS EN-3 notes the relatively low cost, and high speed of deployment, of utility-scale ground-mounted solar farms:

*"Solar farms are one of the most established renewable electricity technologies in the UK and the cheapest form of electricity generation" (*Ref 3, Paragraph 2.10.13).

*"Solar farms can be built quickly and, coupled with consistent reductions in the cost of materials and improvements in the efficiency of panels, large-scale solar is now viable in some cases to deploy subsidy-free." (*Ref 3, Paragraph 2.10.14).

4.1.17 NPS EN-3 discusses the various factors that are likely to influence the selection of a suitable site for a utility-scale solar PV installation. The key factors are likely to be:

a. Irradiance – the intensity of incoming solar energy experienced at a site over the course of the year; this will directly affect the amount of electricity able to be generated.
b. Topography – flat or gently sloping terrain lends itself to the installation and maintenance of solar arrays; topography also directly influences irradiance.
c. Grid connectivity – proximity to a suitable connection point into NETS, allowing power to be exported and imported as required, maximising the use of exiting grid infrastructure.

4.1.18 Sites within the UK that are suitable for utility-scale solar PV generation are therefore likely to be limited. Identification of a suitable location, as in the case of the Proposed Development, should be a material factor when considering how the five-fold increase in solar PV capacity by 2035 may be achieved.

4.1.19 The location of the Proposed Development has been identified as being suitable in terms of both irradiance and topography, and will connect into NETS via the proposed substation to be constructed near to Navenby, which is the subject of a separate Town and Country Planning Act (TCPA) application by National Grid, to be determined by North Kesteven District Council.

4.1.20 The location of the Proposed Development, therefore, is suitable for a utility-scale solar PV installation when assessed against the site selection factors discussed in NPS EN-3. A Site Selection Report has been prepared for the DCO application as Appendix A to the **Planning Statement [EN010154/APP/7.2]**.

4.2 Other relevant policy documents

4.2.1 Successive governments have published policy documents that provide valuable guidance on how they anticipate delivering a secure, affordable and substantially decarbonised energy system. This policy landscape has consistently called for ongoing electrification as a key method of decarbonising many sectors of the economy, and for a substantial increase in renewable electricity generation not only to decarbonise the existing electricity supply but also to meet the increased demand for power that will result from the electrification of sectors such as transport and heat.

4.2.2 The current administration's energy policy is represented by the Clean Power 2030 Action Plan (CP2030) that was published in December 2024 (Ref 1). This document builds upon earlier policy documents, but it contains a more urgent tone to the underlying message around the delivery of low-carbon energy infrastructure:

"Ultimately, we need to move fast and build things to deliver the once-in-a-generation upgrade of our energy infrastructure Britain needs. In our first five months, we've already lifted the onshore wind ban, established Great British Energy, consented almost 2 GW of solar, delivered a record-breaking renewables auction and kickstarted our carbon capture and hydrogen industries. This is the speed at which we will continue to work" (Ref 1. p7)

4.2.3 This urgency becomes clear when the scale of the challenge is put into context. **Figure 4-1** illustrates the gap between the 16.6 GW of installed solar capacity in 2024 and the Clean Power Capacity Range of 45-47 GW of solar capacity identified for 2030.

4.2.4 This gap, taking account of capacity already committed or under construction, is greater than the all the solar capacity currently installed across the UK. Current UK energy policy requires the consenting, construction and connection of over 20 GW of additional solar capacity in the next five years. It is important to note that the Government acknowledges in CP2030 that not all technologies may deliver in full, meaning that a degree of optionality must be retained; this in turn may require additional solar capacity over and above that provisionally identified in the Clean Power Capacity Range for 2030.

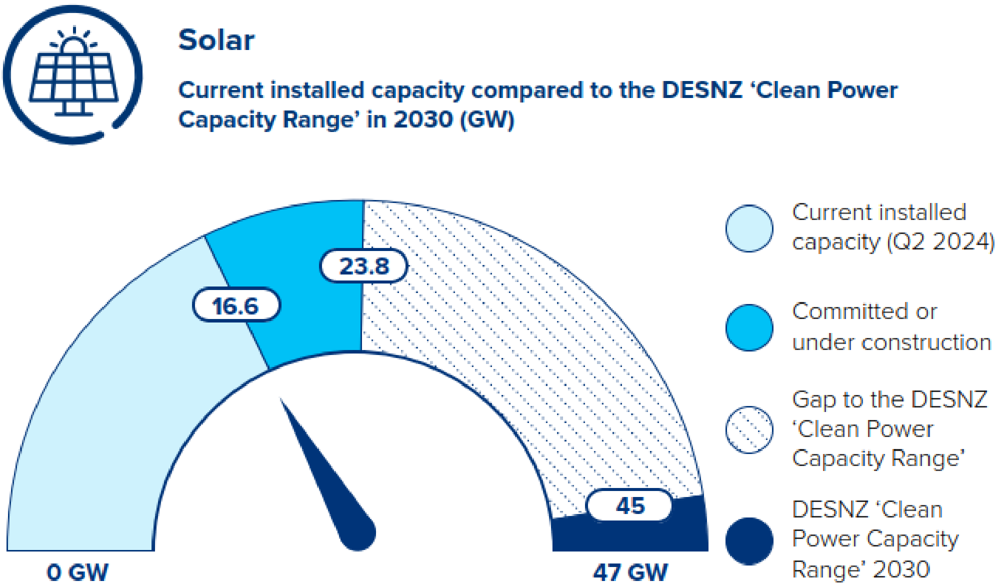

Figure 4-1: Installed Solar Capacity, Relative to 2030 Capacity Range (Ref 1)

4.2.5 CP2030 repeats earlier messages about the role of renewables in providing energy security and affordability. On energy security, it notes that:

"In an era of heightened geopolitical risk, switching fossil fuelled generation for homegrown clean energy from renewables and other clean technologies offers us security that fossil fuels simply cannot provide." (Ref 1. p23)

4.2.6 On overall affordability, CP2030 notes that:

"By producing the clean energy we need at home, and being more efficient in how we use it, we can boost our energy independence. This transition is the only way to protect businesses and families from increased energy bills resulting from volatile global gas markets" (Ref 1 p21)

4.2.7 The Clean Power 2030 Action Plan consolidates the ambitions of earlier policy documents, but with a renewed sense of urgency. The action plan leaves no doubt that UK energy policy requires a substantial increase in the consenting and installation of new solar power to provide the three-way benefits of a decarbonised energy system, enhanced security of supply, and improved affordability for businesses and households.

4.2.8 The UK Government published the UK Solar Roadmap in June 2025 (Ref 42). Prepared in collaboration with the solar industry, the Roadmap sets out a strategy and action plan to deliver the substantial increase in solar generation capacity to meet the Clean Power Capacity Ranges specified in CP2030.

4.2.9 The multiple benefits of solar power are restated in the Roadmap:

"Solar energy is one of the cheapest forms of electricity generation and will play a key role in reaching clean power. It will enable cheap, efficient electricity to drive other sectors of the economy" (Ref 42, p15)

4.2.10 In relation to ground-mounted solar (as opposed to rooftop solar), the Roadmap is equally clear:

"Ground-mounted solar is one of our cheapest electricity sources to build and operate at scale, with costs falling by around 50% since 2016, enabling the supply of low-cost power directly to the grid … The deployment of solar also boosts the UK's energy security, through diversifying the energy mix and reducing exposure to international fossil fuel markets" (Ref 42, p15).

4.2.11 Regarding the deployment of solar power in support of the Clean Power Capacity Ranges, the Roadmap is explicit about the vital role of ground-mounted solar in achieving these goals. It notes that large-scale ground-mounted projects are likely to make up around 60-65% of total installed capacity in 2030, with the remainder accounted for by commercial rooftop and small-scale ground-mounted installations (between 10 kW and 5 MW) and domestic rooftop installations (smaller than 10 kW) (Ref 42, p18).

4.2.12 The continued deployment, therefore, of large-scale ground-mounted solar installations such as the Proposed Development is critical in achieving the UK Government's CP2030 ambitions.

4.2.13 Another recent publication is the Climate Change Committee's (CCC) Report to Parliament 2025. The CCC is the UK Government's statutory advisor on emissions reduction targets and policies. (Ref 43) One of the CCC's roles is to assess the status of plans and policies required to achieve the UK's legally binding emissions reduction targets and budgets.

4.2.14 In their 2025 Report to Parliament, the CCC assesses that 39% of the emissions reductions required to achieve the UK's Nationally Determined Contribution for 2030 (discussed in Section 3.1 above) have significant risks associated with them, or have insufficient or unquantified plans. They note that the greatest risks are associated with the scale of deployment of heat pumps, and with the support for industrial decarbonisation. As noted in Section 5 below, each of these initiatives requires the roll out of significant additional low-carbon electricity generation capacity in order to support the ongoing electrification of sectors including heat and industrial processes (Ref 43, p11).

4.2.15 The CCC repeats this point later in their report:

"Over 80% of the required emissions savings between now and 2030 need to come from sectors other than energy supply … The majority of this required reduction in emissions comes from the electrification of key technologies, including in surface transport, buildings and industry … The continued decarbonisation and expansion of the electricity system will play a key role to enable this widespread decarbonisation." (Ref 43, pp11-12)

4.2.16 The report is blunt about the rate of deployment of renewable generation needed to achieve the Clean Power Capacity Ranges as described in CP2030 discussed above. Onshore and offshore wind require a tripling of annual installations, relative to the rate seen since the start of this decade, while solar installations require a four-fold increase. The pipeline of wind power projects indicates that the deployment of this technology is broadly on track, while the rate of deployment of solar installations is currently judged not to be on track. As such, a substantial increase in solar installations, particularly large-scale ground-mounted solar projects, is required to meet the Clean Power Capacity Ranges set out in CP2030.

4.3 Revised Energy National Policy Statements

4.3.1 The Government published for consultation revised Energy National Policy Statements on 24 April 2025, including NPS EN-1 (revised NPS EN-1) and NPS EN-3 (revised NPS EN-3). The proposed amendments effectively embed the Government's ambition and commitments in the Clean Power 2030 Action Plan into the revised NPS EN-1 and revised NPS EN-3. Accordingly, revised NPS EN-1 recognises at paragraph 2.3.4 that:

"*We need to rapidly increase deployment of all relevant infrastructure to meet the Clean Power 2030 Mission capacity ranges and decarbonise the power sector"* and *"Whilst the expansion of renewables in the power system has reduced the share of fossil fuel generation to date, all routes to a clean power system will require mass deployment of offshore wind, onshore wind, and solar".*

4.3.2 Although revised NPS EN-1 and NPS EN-3 have limited weight in decision making currently, they indicate the direction of national policy on renewable energy. As the revised NPSs progress through consultation they are potentially capable of being important and relevant considerations in the decision-making process and will be addressed further in the Applicant's submissions should the application be accepted for Examination.

4.4 Conclusion of Policy Context

4.4.1 Successive UK Governments have adopted a consistent series of policies to achieve their net zero commitments; these include policies to continue the ongoing decarbonisation of the UK's electricity generation system.

4.4.2 In addition to the need for any future energy system to be low carbon, it must also be resilient and affordable. Multiple policy documents have identified large scale solar power as being vital for a decarbonised grid; it is among the cheapest forms of electricity, able to be deployed at speed and at scale, and can support security of supply as part of a portfolio of different generation technologies.

4.4.3 The Government's recent suite of energy-related NPSs (2024 version) is explicit about the need for a substantial amount of new solar capacity to be deployed in support of multiple government policy objectives. CP2030 sets a capacity range for solar of 45-47 GW by 2030, and 45-69 GW by 2035. In the five years to 2030, the installation of new solar totalling more than double the existing solar capacity will be required to meet UK policy ambitions.

5. Role of Electrification in Net Zero

5.1 Introduction

5.1.1 This chapter provides information to support the policy position that future electricity demand will need to double to achieve net zero. As stated in NPS EN-1:

"[Government] analysis suggests that even with major improvements in overall energy efficiency, and increased flexibility in the energy system, demand for electricity is likely to increase significantly over the coming years and could more than double by 2050 as large parts of transport, heating and industry decarbonise by switching from fossil fuels to low carbon electricity." (Ref 2 Paragraph 3.3.3*).*

5.1.2 Overall demand for electricity has been falling in recent years, largely due to the impact of energy efficiency measures in the residential and industrial sectors (Ref 39), with end user demand dropping by around 20% between 2005 and 2023. Furthermore, this reduction took place alongside increases in both population and economic activity.

5.1.3 However, without a substantial increase in additional low-carbon electricity generating capacity, the urgent requirement for decarbonisation of transport, heating, and industry infrastructure is unlikely to be achieved, threatening the UK's ability to achieve its legally binding target of net zero by 2050. Increasing solar generation is critical to the provision of adequate low-carbon electricity to meet increasing demands.

5.2 Drivers for Electrification

5.2.1 The National Energy System Operator (NESO; formerly known as the National Grid ESO [NG ESO]) releases an annual report documenting Future Energy Scenarios (FES) through which to achieve net zero (Ref 20).

5.2.2 Across all decarbonisation scenarios identified in the FES, deep electrification is required to transition away from fossil fuel consumption and achieve net zero. However, as further explained in the Energy System Catapult's Innovating to Net Zero Report:

"Net zero narrows the set of viable pathways for the future energy system. Where an 80% target allowed considerable variation in relative effort across the economy, with some fossil fuels still permissible in most sectors, net zero leaves little slack." (Ref 21 p5).

5.2.3 In particular, surface transport, space heating, and industrial processes require significant intervention to reduce carbon emissions, and the reduction of emissions from these energy end uses will be critical if net zero 2050 is to be reached (as required by law). Decarbonisation of these end uses completely relies upon the availability of sufficient quantities of low-carbon electricity as a substitute for carbon-emitting fuels in addition to the quantities of low-carbon electricity that will be required to decarbonise existing electrical loads, in total resulting in a significant increase in demand for low-carbon electricity. It therefore follows that the development of new low-carbon electricity generation infrastructure also needs to accelerate.

5.2.4 Surface transport is currently the largest source of UK GHG emissions, accounting for just under one quarter of the UK's 2023 emissions (Ref 12. Figure 1.4). Growth in the use of electric vehicles (EVs) will be necessitated by bans on the sale of all new petrol and diesel vehicles from 2030 and the sale of new hybrid vehicles by 2035. Alternative pathways for EV adoption are provided in **Figure 5-1** below (Ref 12, Figure 7.1.3). Vehicle electrification will create a significant new demand on the electricity network.

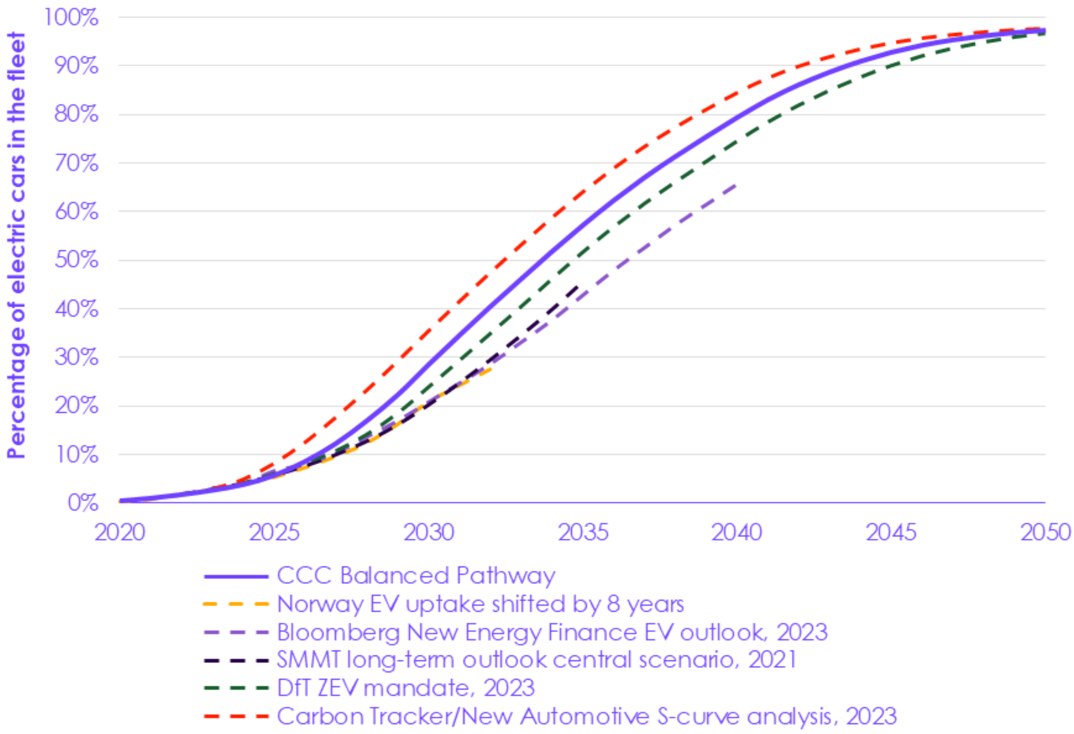

Figure 5-1: EV Adoption Scenarios (Ref 12, Figure 7.1.3)

5.2.5 In 2023, the domestic and commercial sectors collectively accounted for 40% of total annual demand (Ref 22, Table 4.1). Heating is the primary use of natural gas in domestic and commercial buildings. The British Energy Security Strategy intends to phase out the sale of gas boilers by 2035 and ensure that by 2050 all UK buildings have low-carbon heating (Ref 16).

5.2.6 As shown in **Figure 5-2**, most homes are expected to decarbonise with electrically-powered heat pumps, with the CB7 scenario for 80% adoption by 2050 (Ref 12, Figure 7.2.4). To be considered low-carbon, heat pumps need to be powered with low-carbon electricity. The additional electrical demand from widespread residential adoption of heat pumps will be significant, necessitating significant development of low-carbon electricity generation, reaching 30TWh by 2050 (Ref 20, slide 77).

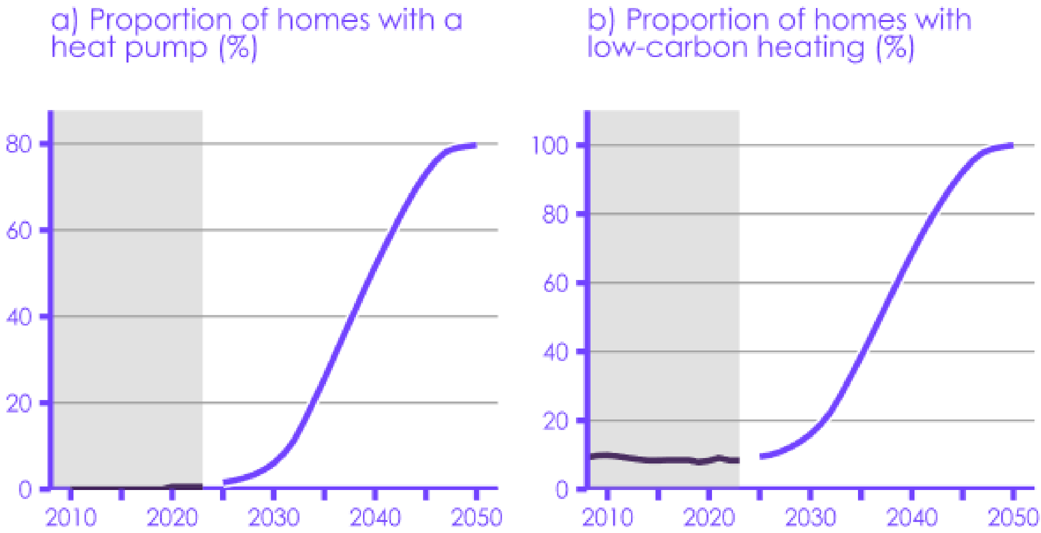

Figure 5-2 - Projected Residential Heat Pump and Low-carbon Heating Adoption (Ref 12, Figure 7.2.4)

5.2.7 Low-carbon heating also will be the greatest contributor to non-residential building decarbonisation, as illustrated in **Figure 5-3** (Ref 12, Figure 7.9.2). As with residential buildings, heat pumps are expected to be the primary low-carbon heating technology adopted for non-residential buildings, compounding the forecasted increase in low-carbon electricity demand from heating decarbonisation.

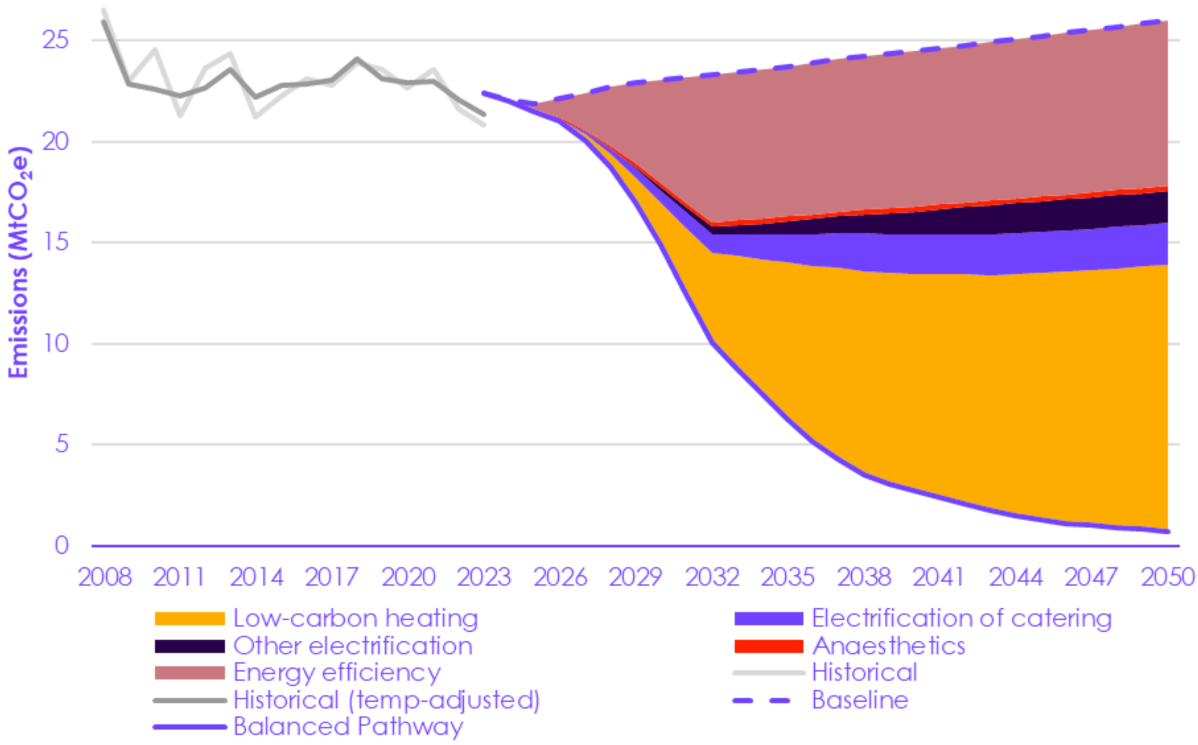

Figure 5-3: Non-residential Building Decarbonisation Pathway (Ref 12, Figure 7.9.2)

5.2.8 As shown in **Figure 5-4** below, CB7 anticipates that electrification will be the greatest source of industry decarbonisation (Ref 12, Figure 7.3.2). In addition to increased electric consumption from directly electrified industrial processes, additional electric capacity for hydrogen production is likely required for full industrial decarbonisation. Hydrogen is an important energy vector which may be able to help decarbonise hard to reach sectors of transport, space heating, and heavy industry.

5.2.9 Green hydrogen is produced via electrolysis from renewables and requires substantial amounts of low-carbon electricity. Should there be a significant role for green hydrogen in decarbonisation routes for aviation and shipping fuel, for instance, this will require substantial growth in low-carbon power generation capacity through the 2030s and 2040s (Ref 1, p39). Hydrogen, therefore, is by no means a substitute for electrification, but it can provide additional flexibility in decarbonisation while increasing the overall demand for low-carbon electricity generation.

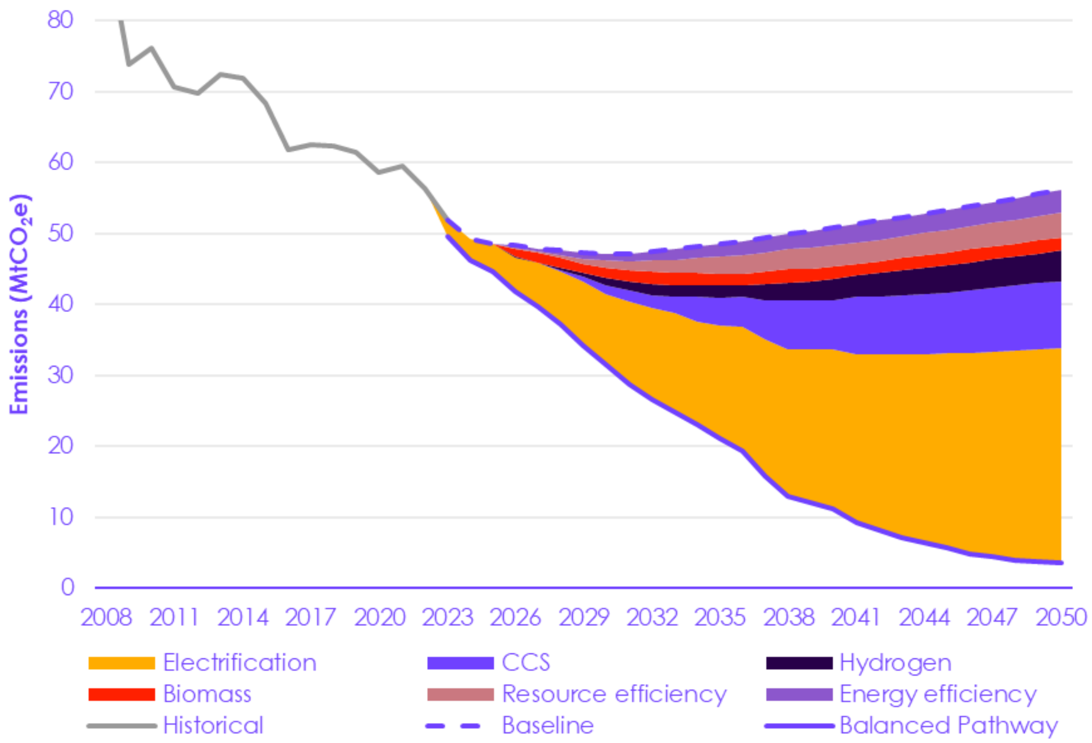

Figure 5-4: Industrial Decarbonisation Pathway (Ref 12, Figure 7.3.2)

5.3 Expected Impact of Electrification

5.3.1 Forecasts for future electricity demand have increased significantly. Increased electrification of transport, heat, and industrial processes is essential for the achievement of net zero and is a key driver for the increase in future electricity demand.

5.3.2 Reviewed government and industry documents agree that full-scale electrification is expected to significantly increase annual electricity demand by 2050. Projections have converged towards a range from 650-700 TWh, but vary:

a. The NPSs foresee a doubling of current demand (Ref 2, Paragraph 2.3.37), i.e. to circa 600 TWh;

b. NESO present a range between 667-700 TWh for the three net zero pathways (Ref 20 p26);

c. The National Infrastructure Commission (NIC) forecasts 465-595 TWh (Ref 23 p35);

d. The Energy Systems Catapult forecasts 525-700 TWh (Ref 21, p23&27);

e. CB7's Balanced Pathway estimates demand will reach 692 TWh (Ref 12 Table 7.5.1);

f. The 2020 Energy White Paper presents a range from 575-665 TWh (Ref 14 p42);

g. Mission Zero suggests that "electricity demand by 2050 could be roughly double today's level of total electricity demand" (Ref 19, Paragraphs 287 & 299); and

h. The Connections Action Plan projects electricity demand of between 570-770 TWh by 2050 depending on how net zero is met (Ref 23, p68-70).

5.3.3 Peak demand (the maximum instantaneous demand for electricity), while more difficult to forecast, is also expected to dramatically increase due to electrification. All net zero pathways in the NESO FES show an increase in peak demand as early as 2030, driven by underlying industrial and commercial demand growth (through substitution of other energy sources) and the electrification of heating and transport. Relative to a peak demand of 58 GW in 2023, the FES scenarios for peak demand will reach 62-65 GW by 2030, 76-81 GW by 2035, and 104-119 GW by 2050 (Ref 20, p26).

5.4 Role of Solar PV in Achieving Electrification

5.4.1 Sufficient electricity generation capacity will need to be deployed to be able to meet instantaneous demand, as well as forecasted annual demand, under normal and unfavourable weather conditions. The UK's Clean Power Target for 2030 is an electricity system where, in a typical weather year, clean sources generate at least 95% of total electricity and produce as much power as Great Britain consumes (Ref 1, p.25).

5.4.2 Growing the UK's low-carbon electricity generation capacity further will enable electricity to be used instead of carbon emitting fuels so further decarbonisation can be achieved. The decarbonisation of all sectors is essential for the UK to meet net zero.

5.4.3 To decarbonise the UK's electricity system, less electricity must be sourced from carbon emitting generation capacity. Low-carbon generation capacity must therefore be developed both as a substitute for carbon emitting capacity, and to increase the amount of electricity generated to meet additional, non-traditional demand.

5.4.4 In 2023, 285 TWh of consumer demand was met by 166 TWh of low-carbon generation (58%) and 119 TWh of carbon intensive generation. Consumer demand across the three net zero FES pathways in 2030 averages 331 TWh (Ref 20, p26). Therefore, low-carbon generation will need to increase by approximately 165 TWh between 2024 and 2029 to deliver 'Clean Power by 2030'. To put this number in context, that would require a doubling of current capacity to facilitate this urgent and unprecedented need.

5.4.5 Consumer demand across the three net zero pathways in 2050 averages 679 TWh (Ref 20, p26). Therefore, low-carbon generation will need to increase by approximately a further 348 TWh between 2030 and 2050 to keep power clean through the net-zero target date.

5.4.6 As well as providing estimates of future national electricity demand, the FES pathways provide projections for how that demand will be met. The ‘Holistic

Transformation' pathway projects that wind generation will increase from 96 TWh in 2023 to 460 TWh in 2050, nuclear generation will more than double from 42 TWh to 96 TWh, and solar generation will increase approximately seven-fold, from 16 TWh to 115 TWh (Ref 20, ES.01). However, these are simply topline aspirations and cannot be realised without actual implementation of projects exactly like the Proposed Development.

5.4.7 To achieve this level of solar generation, the FES net zero pathways for solar identifies 28-40 GW of installed capacity in 2030, 50-85 GW in 2040, and 72-108 GW in 2050 (Ref 20 Table ES.14). For points of comparison:

a. CB7 requires that 37.8 GW of solar to be operational by 2035, 82.1 GW to be operational by 2040, and 106.4 GW to be operational by 2050 (Ref 12, Figure 5.1).

b. CP2030 sets capacity ranges of 43-50 GW of offshore wind, 27-29GW of onshore wind, and 45-47 GW of solar by 2030, and 72-89 GW of offshore wind, 35-37 GW of onshore wind, and 45-69 GW of solar by 2035.

5.4.8 In every scenario, a pathway to net zero includes a significant future increase in solar capacity beyond that which is installed or in development today (Ref 1, p73). **Figure 4-1** is taken from the UK Government's CP2030 Action Plan (Ref 1) and clearly illustrates the scale of the increase in solar generation required over the coming decade.

5.4.9 Further, to achieve the government's aim to achieve CP2030, an even more aggressive deployment rate is needed over the next five years. Solar capacity will have to increase by over 4 GW each year. New installations in every year will have to be higher than the UK's previous single highest record of annual installations.

5.5 Conclusion

5.5.1 Though electricity demand has fallen over recent years through the widespread implementation of low-cost energy efficiency measures, such as introduction of low-voltage LEDs for lighting, across residential and non-residential buildings, the use of electricity in place of carbon emitting fuels by surface transport, heating systems, and industrial processes is projected to drive a resurgence in demand.

5.5.2 A substantial quantity of additional generation capacity will need to come online to meet this growth in demand. To be aligned with net zero targets, new generation capacity should be low carbon, with a particular focus on wind and solar. As NPS EN-1 points out:

"Our analysis shows that a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar." (Ref 2, para 3.3.20)

5.5.3 Government forecasts and other policy guidance highlight the important role of solar in decarbonising the country's electricity supply and increasing generation capacity.

5.5.4 Rapid deployment of solar will help generation capacity to keep pace with growing electricity demand. The Proposed Development will contribute to meeting growing electricity demand and therefore will be a critical enabler of achieving the UK's decarbonisation aims.

6. The Importance of Solar Power

6.1 Delivering Net Zero

The role of solar in meeting the UK's Carbon Targets

6.1.1 The UK Government has committed to achieving Net Zero greenhouse gas emissions by 2050 under the Climate Change Act 2008 (as amended). Solar generation plays a vital role in this transition. According to CB7, over 60% of emissions reductions required between now and 2050 must come from electrification and low-carbon electricity production, enabling a rapid shift toward clean electricity and electrification of other sectors such as transport and heating (Ref 12).

6.1.2 Solar power is a key enabler of this shift. It is a proven, scalable technology capable of rapid deployment with minimal environmental impact and low operational emissions. As the UK decarbonises its economy, demand for electricity is projected to double by 2040. With the Clean Power Target of 45-47 GW of solar generation capacity by 2030, and 45-69 GW by 2035, large-scale projects such as Fosse Green Energy will be crucial to meeting this benchmark.

Strategic Deliverability and Scalability of Solar

6.1.3 Unlike other low-carbon technologies that face long lead times, complex consenting, or dependency on supply chain development (such as nuclear or CCS), solar PV benefits from a short construction window and scalability due to modularity. This enables near-term capacity additions which are essential to closing the UK's emissions gap in the 2030s.

6.1.4 The Government's commitment to 'Clean Power by 2030' reducing grid carbon intensity to below 50 gCO_2/kWh, requires material increases in low-carbon generation within this decade (Ref 12).

6.1.5 Consistent with global trends identified by the International Energy Agency (IEA), solar PV is now the globally leading technology for new generation growth, with falling costs and rapid scalability making it a critical tool for achieving the UK's Clean Power by 2030 objective (Ref 25).

Alignment with National Policy

6.1.6 NPS EN-1 confirms that there is a critical national priority for the development of low-carbon electricity generation, including solar.

6.1.7 NPS EN-3 provides specific policy support for ground-mounted solar infrastructure, noting its importance for meeting decarbonisation targets, and recognising its minimal operational emissions and scalability in the required timeframes.

6.1.8 Solar PV developments are therefore not only consistent with national energy policy but are essential to its successful delivery. A review of the Proposed Development against planning policy is presented in the **Planning Statement [EN010154/APP/7.2]**.

6.2 Supporting Security of Supply

Reducing Fossil Fuel Dependency

6.2.1 The UK's recent historical reliance on fossil fuel imports (being a net importer since 2003) has exposed the energy system to international supply shocks and price volatility.

6.2.2 Recent geopolitical events, including the global energy price crisis of 2022–2023, have underscored the need to enhance domestic energy resilience. Solar generation strengthens energy security by producing electricity close to demand, using a UK-based, renewable resource that is not subject to global fuel markets. Unlike gas or coal-fired generation, solar is less reliant on continuous fuel supply chains.

6.2.3 As stated in CP2030, recent years have demonstrated the risks of relying too heavily on increasingly volatile fossil fuel markets; with a homegrown renewable dominated power system positioned as the solution (Ref 1, p.18).

Generation Diversity and Complementarity

6.2.4 Solar generation provides complementary output to other renewable sources, particularly wind. While solar output is diurnal and seasonally variable, typically with more abundant wind in the winter and solar in the summer. This generation diversity improves the overall reliability of the renewable fleet.

6.2.5 When solar is deployed as part of a geographically dispersed portfolio, its output becomes more predictable and contributes to the adequacy of the national electricity supply. The integration of solar into the broader energy system therefore somewhat strengthens supply-side resilience and reduces dependence on individual technologies such as onshore and offshore wind.

The Role of Storage and Flexibility

6.2.6 The inclusion of energy storage within the Proposed Development enhances its contribution to system security. Battery storage enables time-shifting of solar output, absorbing energy when generation exceeds demand and discharging it during system peaks. This reduces curtailment, increases utilisation of solar capacity, and can provide ancillary services to the power grid.

6.2.7 The NPSs support such co-located infrastructure. NPS EN-1 explicitly identifies the need for assets that increase flexibility and stability, while NPS EN-3 encourages the efficient use of land through combined generation and storage projects where such a project configuration is feasible (Ref 2, para 3.3.3). By enabling dispatchability and grid services, the Proposed

Development will not only contribute clean electricity but actively support the secure operation of the NETS. As outlined in CP2030, "*Flexible technologies can, and will, play a critical role in enabling the safe transition away from gas to clean power … Rapid progress will need to be made to ensure that the electricity system can be operated securely and cost effectively using zero carbon ancillary services*" (Ref 1, p88 & 89).

6.3 Contributing to affordability

Market Competitiveness of Solar

6.3.1 Solar PV is one of the most cost-effective electricity generation technologies available in the UK today. The Government's Electricity Generation Costs report and analysis by independent institutions consistently show that utility-scale solar has a lower levelised cost of energy than fossil gas generation, new nuclear, offshore wind, or emerging technologies such as hydrogen-fired turbines.

6.3.2 This competitiveness continues to improve due to declining module (a single panel composed of solar cells that convert sunlight into electricity) costs, improved efficiencies compared to previous generation modules, and operational simplicity. Solar projects benefit from low running costs and no fuel inputs, enabling them to offer long-term price stability and reduced exposure to commodity price risk.

Price Suppression and System Savings

6.3.3 As solar displaces higher-cost marginal generators during daylight hours, it exerts a downward influence on wholesale electricity prices. This 'merit order' effect reduces the clearing price in energy markets, delivering consumer savings and reducing the cost of decarbonisation (Ref 25). Furthermore, storing when power is abundant and dispatching when needed also exerts downward pressure on power prices.

6.3.4 In addition to energy market savings, solar contributes to lower ancillary service costs by reducing peak demand and enhancing system flexibility when paired with storage. These benefits are magnified when solar deployment is coordinated at scale, as is proposed under the Proposed Development.

6.3.5 Reflecting IEA analysis of European market trends, solar generation is increasingly associated with lower wholesale electricity prices. In the UK context, utility-scale solar contributes to long-term affordability by reducing reliance on expensive fossil generators and offering stable, low-cost energy when paired with storage (Ref 25).

7. Technical Considerations

7.1 Chapter Overview

7.1.1 The purpose of this chapter is to provide an overview of the characteristics of solar power and the development and delivery of utility-scale projects in the UK.

7.2 Utility-Scale and Small-Scale Generators

7.2.1 In the drive toward a net-zero electricity system, investment is required in both centralised and decentralised generation assets, as well as in both transmission and distribution networks.

7.2.2 In the UK, projects with a capacity of above 50 MW are considered Nationally Significant Infrastructure Projects (NSIP). These projects require a Development Consent Order (DCO) in order to be progressed, while projects below the 50 MW threshold secure planning permission via the Town and Country Planning Act (TCPA) administered by a local authority.

7.2.3 The UK Government has introduced legislation that will increase the capacity threshold for solar generation installations considered as NSIPs from 50 to 100 MW, with this change due to come into force on 31st December 2025 (Ref 41). This change in threshold for solar NSIPs does not affect the Proposed Development as it would be categorised as an NSIP in either case.

7.2.4 Electricity generation assets can be described as centralised and connect to the NETS, or decentralised and connect to the distribution grid or are used in behind-the-meter applications, where the asset supplies electricity direct to the end user without being supplied to the grid.

7.2.5 Small-scale solar can be installed on rooftops of industrial or domestic buildings or on smaller parcels of land within an industrial site. This is known as behind-the-meter solar, as the energy is used directly at the point of generation. CP2030 capacity ranges are exclusive of small scale solar, thus both large and small scale are required.

7.2.6 In addition, having more decentralised energy, such as industrial and domestic rooftop solar, reduces the overall demand on the transmission network. The installation of decentralised solar generation, however, is unlikely to replace the need for new, large-scale grid connected generation capacity, since such large-scale centralised generation offers benefits such as the ability to transfer power over longer distances and balance supply and demand more generally. (Ref 2, Paragraph 3.3.12)

7.2.7 Utility-scale solar contributes significantly to clean electricity generation. Compared to small-scale, behind-the-meter systems, utility-scale solar offers greater benefits when connected to the grid due to its higher generation capacity. The larger the size of the plant, the larger the scale of the associated benefit. As the grid transitions away from large synchronous fossil-fuel generators, utility-scale solar can help address challenges in system stability and reliability.

7.2.8 Typically, utility-scale front-of-meter solar projects have been connected to the distribution grid. These distribution networks tend to be more densely spread across the UK to serve end users such as homes and businesses, and land availability for large-scale solar projects is likely to be more challenging in these areas. Schemes such as the Proposed Development are therefore more likely to connect to the transmission network than to a distribution network (Ref 24, Chapter 4), meaning they are more likely to be located further from demand centres.

7.2.9 The requirement for additional solar capacity to meet the CP2030 Clean Power Capacity ranges for 2030 and 2035 means that there are substantial advantages in developing larger developments, rather than multiple smaller schemes. Such large-scale developments are constrained in where they can be located due to the availability of suitable land and other factors including the availability of suitable grid infrastructure. This means that in those locations that are suitable for large-scale solar, and that are also adjacent to grid infrastructure with adequate capacity, these sites should be used to the greatest effect in support of the UK's net zero targets. The site of the Proposed Development has access to the transmissions network, and as such is taking advantage of a transmission network connection. (Ref 2, Paragraph 3.3.12)

7.2.10 Grid congestion is a key issue, particularly at the distribution level. One advantage of connecting to the transmission network is the ability to bypass, rather than contribute to, any further distribution network congestion. Transmission at higher voltages also results in lower electrical losses. These benefits are especially relevant for NSIPs, where generation capacity may justify a transmission-level connection.

7.2.11 The Applicant proposes to connect to the NETS at a proposed National Grid substation near Navenby, circa 10km from the Principal Site. The Proposed Development has a grid connection agreement for 240 MW ac, as described in the **Grid Connection Statement [EN010154/APP/7.5]**.

7.3 Site Selection and Land Use for Utility-Scale Solar

7.3.1 Development of utility-scale solar is dependent on selection of a suitable site. The main criteria determining the suitability of a site for utility-scale solar include the availability of land at the required scale, access to a grid connection point, and sufficient solar irradiation levels to ensure the project effectively contributes to system decarbonisation and security of supply. While other factors also play a significant role in determining success, a site lacking any of these three criteria is unlikely to be pursued.

7.3.2 While smaller solar schemes can be developed independently, consolidating multiple land parcels into a single, large-scale project enables a more strategic and efficient deployment of renewable energy capacity. By using a single grid connection, this approach avoids the need for multiple connections and associated infrastructure for each parcel, thereby maximising the use of limited and valuable grid connection capacity.

7.3.3 Although the total land area for solar arrays may remain similar, combining parcels reduces complexity across planning, environmental management, and construction. This, in turn, minimises the burden on local stakeholders and the planning system, ensures optimal use of grid infrastructure, and delivers a more coherent and impactful contribution to the energy system.

7.3.4 Overall, this consolidated approach facilitates the addition of much-needed renewable capacity in a more streamlined and effective manner than deploying multiple smaller, standalone schemes. The total indicative area of land used for PV arrays within the Proposed Development is 1,127 acres, and total peak generation capacity for fixed south facing panels is 384 MWdc.

7.3.5 The Proposed Development therefore uses 2.94 acres per MW of capacity. It would increase to 3.53 acres per MW for the single axis tracker arrangement, which has a lower MW generation peak than fixed south facing. Although the single axis tracker arrangement has a lower installed capacity compared to fixed south facing, its yield is higher due to its greater efficiency. Both panel arrangements are in line with the indicative range provided in NSP EN-3.

7.3.6 Land conditions are also crucial when identifying suitable sites. Flat terrain is generally preferred.

7.3.7 Current and alternative land uses must be considered during site selection. While NPS EN-3 does not prohibit solar farms on agricultural land, lower-grade land is generally preferred. For land classified as Grade 3a or higher, justification is required to demonstrate why higher quality land is being used. (Ref 3).

7.3.8 Photovoltaic power potential, measured in kWh/kWp, estimates the yield of a Solar PV development. It represents the amount of energy (in kWh) produced per kWp of installed capacity.

7.3.9 **Figure 7-1** is a map showing photovoltaic power potential throughout the UK (Ref 27). Using this map and the online mapping tool equivalent, Fosse Green Energy has a photovoltaic power potential of circa 1,000 kWh/kWp. The power potential may vary based on the system design. The specific yield is 916 kWh/kWp for a fixed south-facing system, and 1,021 kWh/kWp for a single-axis tracking system.

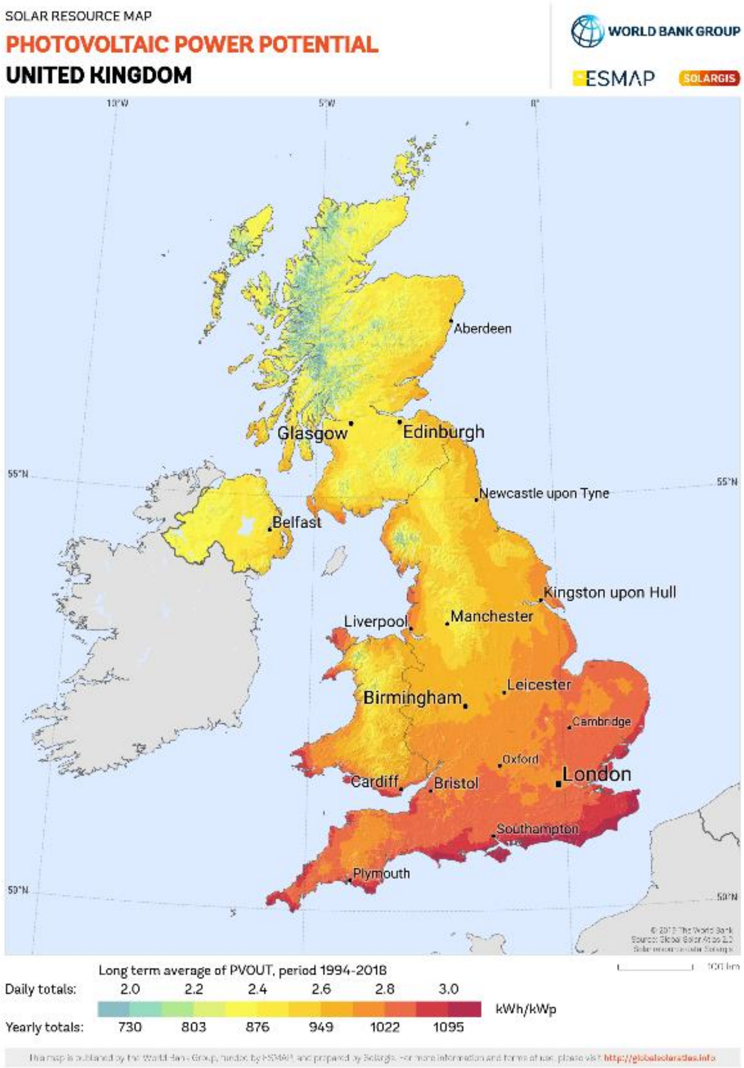

Figure 7-1: United Kingdom Photovoltaic Power Potential (Ref 27)

7.3.10 Locating solar PV installations in close proximity to grid connection points with sufficient capacity reduces the overall environmental impacts associated with cabling, and is likely to support a project's overall commercial viability. However, with increasing constraints on the grid and ongoing renewable rollout, it is unrealistic to assume all new developments will be near viable grid connection points.

7.4 Technology Selection/Orientation

7.4.1 The proposed development retains flexibility to utilise the two types of design configurations/orientation options shown in **Figure 7-2**, which represent typical configurations used in solar projects across the UK.

7.4.2 Fixed south facing panels are the usual approach, where PV panels are arranged in rows from east to west, at a fixed tilt, typically between 15-40°, and generally facing south depending on site characteristics.

7.4.3 The alternative configuration considered is single axis tracker technology, whereby the PV panels are aligned in rows from north to south and track the angle of the sun throughout the day. **Figure 7-2** below illustrates each of these arrangements.

South Facing Array

Single Axis Tracker

Figure 7-2: Ground-mount Solar Design Configurations

7.4.4 The two design configurations under consideration: single-axis trackers and fixed south-facing arrays, each offer their own distinct advantages.

7.4.5 Single axis trackers can have higher capacity factors than fixed south facing arrays due to the ability to track the maximum irradiance of the sun throughout the day, as outlined in the yield assessment. However, such trackers are likely to require more complex installation and maintenance. Furthermore, the use of single axis trackers also requires greater spatial allowance, which may not be available in all locations.

7.4.6 South-facing solar arrays typically have a high generation peak around midday, whereas single axis tracker arrays may deliver a more balanced and potentially greater yield through adjusting to maximise generation during the morning and evening hours, but also tilting to receive maximum irradiation during the mid parts of the day.

7.4.7 Fixed south-facing arrays, by contrast, are simpler to install and require less complex foundation requirements, and can lend themselves to uneven or constrained sites. They may be preferable where maintenance access, ground conditions, or visual impact are more sensitive considerations. Furthermore, due to their fixed, south-facing solar arrays can be installed with tighter spacing than single-axis trackers, as they do not require additional clearance to accommodate daily rotation and prevent shading. This allows a greater number of panels to be installed within the same land area, which can result in higher overall energy generation in certain land-constrained scenarios, despite producing less energy per panel compared to tracking systems.

7.4.8 Retaining flexibility to utilise either configuration allows the final design to respond appropriately to site-specific conditions, planning and environmental considerations, and ongoing technological or commercial developments.

7.5 Overplanting

7.5.1 NPS EN-3 defines overplanting in the context of solar development as:

"The situation in which the installed generating capacity or nameplate capacity of the facility is larger than the generator's grid connection" (Ref 3, Paragraph 2.10.55).

7.5.2 The Proposed Development will have an overplanting ratio of up to 1.6 for fixed south facing PV arrays. This means that for an indicative grid connection capacity of 240 MWac, the Proposed Development with fixed south facing arrays would have an installed capacity of 384 MWdc. The ratio is likely to be 1.33 for a single axis tracker arrangement, equating to approximately 319 MWdc peak generation for a 240 MWac export capacity.

7.5.3 There are a number of reasons why a PV installation may benefit from overplanting to this extent, in addition to compensating for a loss of generation capacity due to PV module degradation over time. One key reason is that the generation profile for a solar installation means that overplanting makes much better use of the grid connection and transmission infrastructure. It would have a substantially higher output over the course of a day than would be the case for an installation with the same grid connection that was not overplanted.

7.5.4 An April 2025 High Court ruling in the case of Ross v Secretary of State for Housing, Communities and Local Government and Renewable Energy Systems Ltd [2025] EWHC 1183 (Admin), concluded that overplanting of solar farms was justified for reasons not only of offsetting panel degradation over time but also to account for real-world performance vs. lab-rated capacity, and to maximise energy export to the grid during peak sunlight hours. The ruling further concluded that a potential loss of energy due to clipping (when generation exceeds grid connection capacity) is not a material planning issue.

7.5.5 **Figure 7-3** illustrates how a solar installation with an overplanting ratio of 1.33 makes substantially better use of a limited grid connection capacity relative to one that is not overplanted.

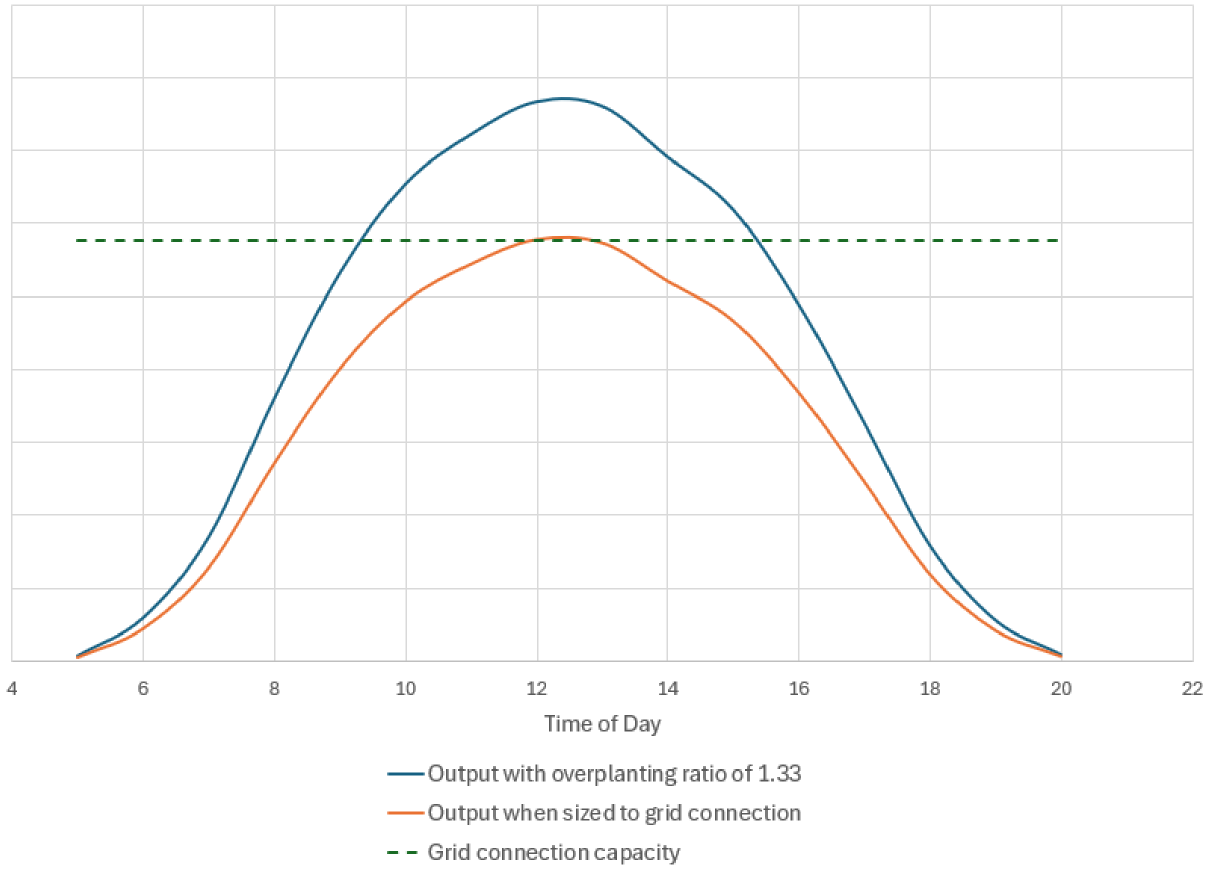

Figure 7-3: Comparison between an overplanted solar installation, and one that is sized to its grid connection

7.5.6 Overplanting can also mean that when irradiation is lower the solar plant generates more than it otherwise would. It can also act to mitigate the reduction in output from a solar installation as PV modules degrade over the course of their operational lives. As module degradation occurs over time, the installation can continue to operate at or near its grid export limit for longer, maintaining optimal use of a limited grid connection.

7.5.7 Co-locating a PV installation with a BESS (as is the case with the Proposed Development) allows for electrical generation in excess of the grid connection capacity (so-called “clipped energy”) to be stored for later supply into the grid. The area above the dashed horizontal line in Figure 7-3 above represents clipped energy that can be stored in a BESS for later export to the grid.

7.5.8 Often Solar PV installations are rated in terms of both DC (Direct Current) and AC (Alternating Current) capacity. Solar panels generate DC electricity, which must then be converted to AC by an inverter for connection to the grid. AC power is more efficient for transmission and is the standard for electrical systems.

7.5.9 Co-location with DC (distributed) and AC-coupled (centralised) BESS is discussed further in Section 7.6.

7.5.10 In DC coupled systems, the PV and BESS share the same inverter and thus do not need to be converted to AC for export the grid and then back to DC, for use in a battery. This can possess benefits over AC coupled systems, through reduced double inversion increasing system efficiency and overall reduced inverter numbers and associated costs.

7.5.11 The distributed BESS is therefore potentially more efficient, although flexibility is sought in the DCO application to also allow for a centralised BESS at the detailed design stage in case a decentralised BESS is found not to be viable, for instance due to fire safety guidance.

7.5.12 AC-coupled BESS offers additional advantages, as outlined in Section 7.6, including greater suitability for providing grid services, the ability to operate independently as a standalone system, and reduced risk of simultaneous downtime of both the PV and battery systems, furthering the need for retained flexibility in utilising either scenario.

7.5.13 Single axis tracker arrays may be particularly advantageous in overplanting scenarios. These configurations distribute generation more evenly across the day, rather than peaking sharply at midday like traditional south-facing arrays. This reduces the likelihood and magnitude of inverter clipping, making better use of the available inverter and grid connection capacity, while still enabling a higher overall DC-to-AC ratio. Such advantages of single axis trackers must be balanced against the disadvantages discussed above, including technical complexity and space constraints.

7.5.14 The DCO application retains flexibility for fixed south-facing arrays, in case changes in procurement factors such as panel costs or lead times, render a single-axis tracker scheme technically unviable, or cause delays to the development. This flexibility also reflects the benefits outlined in Paragraph 7.4.7, including better suitability for certain land conditions and reduced structural support requirements.

7.5.15 Given the constraints within the UK in relation to the availability of grid connection points and overall grid connection capacity, developing a solar installation with an appropriate overplanting ratio can significantly increase the potential generation over the course of its operational design life, as illustrated in Figure 7-3 above. The High Court recently ruled that overplanting of solar farms was justified for reasons including accounting for real world performance vs. lab-rated capacity and to maximise energy export to the grid during peak sunlight hours.

7.5.16 As discussed, excess “clipped” generation, if not diverted to storage, is valuable generation lost, bringing less clean renewable energy onto the grid. The scale of overplanting needs to be considered as the higher the ratio of DC – AC capacity, the more likely curtailment would occur. Inverter costs for utility-scale solar are significant, and if overplanting occurs, they will be running closer to peak output more frequently, thus, potentially reducing the lifespan. This is one reason why it is not effective to increase the overplanting ratio for the Proposed Development above 1.6.

7.5.17 Site-specific factors, particularly land availability and layout, also constrain the feasibility of overplanting. Where land is limited, it may not be possible, or cost-effective, to install additional PV capacity beyond the grid export limit.

7.6 Co-Location

7.6.1 Colocation is *"the process of developing multiple generation projects (including energy storage) or when combining different technology types at the same grid connection point"* (Ref 3, Paragraph 2.10.10).

7.6.2 Colocation can possess a range of benefits which help bring more renewable energy onto the electricity network.

7.6.3 By co-locating technologies which are complementary to each other, (e.g. solar and storage), a greater quantum of decarbonisation and system security benefits can be provided to the grid through one connection, as opposed to two (or more). This is important because the availability of suitable grid connection points in GB is currently low and projects are having to wait a long time to get connected. Co-location increases utilisation of available and suitable grid connection points and reduces the total number of connections required to bring forward multiple projects. This goes towards delivering CP2030 and ensures that GB's electricity infrastructure is utilised to the greatest extent possible.

7.6.4 The transmission line from West Burton to Bicker Fen to which the Proposed Development will connect is a major artery of the existing NETS. It is far away from areas of the NETS which are currently constrained. This means that system curtailment of the Proposed Development (i.e., generators being instructed to turn their generation down because the NETS cannot accept their energy) is expected to be low during its operational lifetime.

7.6.5 However, commercial curtailment (i.e. generators turning down at times of an abundance of power supply compared to demand) is a reasonably foreseeable phenomenon as GB energy supply becomes more heavily renewable. Under either of these circumstances, the co-located BESS at FGE would be instructed by the Asset operator to store energy which would otherwise be wasted. Stored energy can then be exported to the grid at a later time, when renewable supplies are lower and/or demand is higher.

7.6.6 The co-location of a BESS within the Proposed Development could therefore deliver greater low-carbon energy to the NETS over its lifetime, than would be delivered by a stand-alone scheme in the same location.

7.6.7 A BESS co-located with a solar installation can either be connected on the DC side of the system, or on the AC side. Each arrangement has advantages and disadvantages. Should a BESS be installed at the same time as the solar PV array, then it may be preferable to connect it on the DC side, while if it is not possible to install the BESS until later (for instance due to fire safety guidance from the National Fire Chiefs Council, or the ongoing NESO Connections Reform process) then it may only be technically viable to connect a BESS on the AC side of the system. The selection between AC- and DC-connected

BESS may also be affected by grid dynamics, operational strategy and project-specific objectives. The option to have either an AC- or DC-connected BESS is therefore retained to provide maximum flexibility.

7.7 Conclusion of Technical Considerations

7.7.1 The development of utility-scale solar projects in the UK presents a complex set of technical considerations that must be addressed to ensure projects are both viable and effective contributors to the national decarbonisation agenda. Key technical factors include the differentiation between utility-scale and small-scale generators, the critical importance of site selection, orientation and technology choices, and the role of strategic infrastructure planning for grid connectivity.

7.7.2 As discussed, the transition to a low-carbon electricity system requires not only the expansion of solar PV capacity, while optimising land use, accommodation future improvements in system efficiency at the consent stage, and constraints such as grid congestion and limited opportunity to connect to NETS. The Proposed Development has been designed with these considerations in mind. Site selection and layout have been optimised to maximise solar gain and land productivity, including the use of advanced overplanting strategies to enhance energy yield within a constrained grid capacity. The electrical design supports efficient export and integration with available grid infrastructure. In addition, the project incorporates flexibility in technology choice, allowing for either fixed south-facing panels or single-axis trackers, depending on site characteristics and market conditions. Together, these measures ensure the Proposed Development makes an effective and resilient contribution to decarbonisation goals.

7.7.3 Furthermore, the co-location of a BESS with solar PV introduces opportunities for improved grid stability, storing excess power instead of curtailment, peak shaving, price arbitrage, and the provision of ancillary services enhancing grid stability, particularly in an increasingly competitive grid access environment. Both an AC- and a DC-connected BESS arrangement are viable for the Proposed Development, and flexibility is retained in the DCO application to allow either configuration to be utilised.

7.7.4 The inclusion of a BESS as Associated Development to the main solar installation will support the operation of the Proposed Development and will be able to store energy generated by the main solar installation and export it to the NETS when it is needed.

7.7.5 The Proposed Development considers an appropriate level of overplanting given the land area, grid connection capacity and the selection of fixed south facing or single axis tracker panel orientation. The characteristics of the Proposed Development, including BESS, seek to optimise the annual average generation from the Proposed Development over its operational life at its specified location.

8. Conclusion

8.1.1 Decarbonisation is a legally binding climate change target for the UK and is of global significance. It cannot be allowed to fail, and urgent actions are required in the UK and abroad to keep decarbonisation on track to limit global warming.

8.1.2 The NPSs establish a critical national priority for the provision of nationally significant low-carbon infrastructure, which includes utility-scale solar farms, because a combination of many or all types of such infrastructure is urgently required for both energy security and Net Zero.

8.1.3 NPS EN-1 states that

"For projects which qualify as CNP Infrastructure, it is likely that the need case will outweigh the residual effects in all but the most exceptional cases" (Ref 2 Paragraph 4.1.7).

8.1.4 The Proposed Development is CNP Infrastructure; therefore, it follows that the urgent need for the Proposed Development in achieving the UK's energy objectives, together with the national security, economic, commercial and net zero benefits, will outweigh any other residual impacts not capable of being addressed by application of the mitigation hierarchy (Ref 2, Paragraph 3.3.63).

8.1.5 The Proposed Development is required to ensure that the UK remains on track to meet its legally binding carbon emissions reduction targets, while enhancing national security of supply, and at a cost which, in relation to other electricity generation infrastructure developments, provides value for money for end-use consumers.

8.1.6 This Statement has shown that utility-scale solar generation is economically and technically viable in the UK, and that it is an economically and technically preferable source of low-carbon energy for electricity consumers.

8.1.7 New solar developments such as the Proposed Development are not only needed to decarbonise electricity supply but also ensure generation capacity keeps pace with the expected growth in demand, as surface transport, heating and industrial process energy end uses will be required to be electrified. Government and industry forecasts expect UK annual electricity demand to approximately double by 2050.

8.1.8 Enabling electrification also supports security of supply by helping reduce the national dependency on imported hydrocarbon source fuels. As such, the Proposed Development will therefore also help reduce the UK's exposure to volatile international energy prices.

8.1.9 Inclusion of a BESS within the Proposed Development will help it operate flexibly as an essential part of a zero-carbon electricity and energy system. The Proposed Development will provide opportunities for NESO to manage any potential power flow constraints on the NETS in the vicinity of the Proposed Development over its operational life.

8.1.10 The meaningful and timely contributions offered by the Proposed Development to UK decarbonisation and security of supply, while helping lower bills for consumers throughout its operational life, will be critical on the path to net zero beyond delivery of the government's 'Clean Power by 2030' mission.

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