



Fosse Green Energy

EN010154

6.1 Environmental Statement

Chapter 4: Alternatives and Design Evolution

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Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009 (as amended)

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Fosse Green Energy
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6.1 Environmental Statement

Chapter 4: Alternatives and Design Evolution

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4. Alternatives and Design Evolution

4.1 Introduction

- 4.1.1 This chapter of the Environmental Statement (ES) describes the consideration of alternatives, the design evolution of the Proposed Development and provides a summary of the site selection process undertaken. A full explanation of site selection is set out in the **Planning Statement (Appendix A: Site Selection Report)** submitted with the Development Consent Order (DCO) application **[EN010154/APP/7.2]**.
- 4.1.2 A glossary and list of abbreviations for the ES is provided in **Chapter 0: Table of Contents, Glossary and Abbreviations** of this ES **[EN010154/APP/6.1]**.
- 4.1.3 This chapter is supported by the following figures **[EN010154/APP/6.2]**:
- Figure 4-1: EIA Scoping Site Boundary;**
 - Figure 4-2: Cable Corridor Planning Constraints;**
 - Figure 4-3: Cable Corridor Option Heatmap;**
 - Figure 4-4: Non-Statutory Consultation Site Boundary;**
 - Figure 4-5: PEI Report Boundary; and**
 - Figure 4-6: Summary of Order Limit Changes from Scoping to ES Stage.**
- 4.1.4 The **Design Approach Document** **[EN010154/APP/7.3]** submitted as part of the DCO application sets out the Design Vision and Design Principles that have been adopted to ensure that good design has been embedded within the Proposed Development from inception and to explain how the design has evolved having regard to national and local planning policy, the characteristics of the DCO Site, and the feedback received from non-statutory and statutory consultation.
- 4.1.5 The Design Vision for the Proposed Development, as set out in the **Design Approach Document** **[EN010154/APP/7.3]** is: *“To seek to maximise the renewable energy generation across the site for the agreed export capacity with National Grid Electricity Transmission, whilst aligning with national planning policy and aiming to minimise environmental effects, supporting the delivery of the Government’s objectives and commitments for the development of a secure, reliable, and affordable supply of energy while also meeting decarbonisation targets”*.

4.2 Legislation and Policy

- 4.2.1 In accordance with Paragraph 2 of Schedule 4 of the EIA Regulations (Ref 4-1), this chapter of the ES includes: *“A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the*

proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.”

- 4.2.2 Regulation 14(2)(d) of the EIA Regulations (Ref 4-1) identifies the requirement to present alternatives where these have been considered by the Applicant. It states that the ES should include: *“A description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.”*
- 4.2.3 Whilst there is no general requirement in national planning policy to consider alternatives, the energy National Policy Statements provide some useful context. Overarching National Policy Statement (NPS) for Energy EN-1 (Ref 4-2) paragraph 4.3.9 states that *“As in any planning case, the relevance or otherwise to the decision-making process of the existence (or alleged existence) of alternatives to a proposed development is in the first instance a matter of law. This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option from a policy perspective.* The same paragraph goes on to explain that *“Although there are specific requirements in relation to compulsory acquisition and habitats sites, the NPS does not change requirements in relation to compulsory acquisition and habitats sites.”* Regarding compulsory acquisition, the Applicant has sought to enter into voluntary agreements with landowners at an early stage, with a view to reducing the need to rely upon compulsory acquisition powers in the DCO. The **Statement of Reasons [EN010154/APP/4.1]** explains the compelling case in the public interest which would justify the Applicant’s exercise of powers of compulsory acquisition in order to acquire land and rights permanently and to use land temporarily to enable it to construct, operate and maintain and decommission the Proposed Development.
- 4.2.4 Paragraph 4.3.16 of NPS EN-1 (Ref 4-2) states that the NPSs may impose a policy requirement to consider alternatives. These include biodiversity and geological conservation interests, flood risk and development within nationally designated landscapes. Sections 5.4, 5.8, and 5.10 of NPS EN-1 (Ref 4-2) explain these policy requirements. Paragraph 4.3.17 of NPS EN-1 (Ref 4-2) states *“where there is a policy or legal requirement to consider alternatives the applicant should describe the alternatives considered in compliance with these requirements.”*
- 4.2.5 Paragraph 4.3.22 of NPS EN-1 (Ref 4-2 Ref 4-7) states that *“Given the level and urgency of need for new energy infrastructure, the Secretary of State should, subject to any relevant legal requirements (e.g. under the Habitats Regulations) which indicate otherwise, be guided by the following principles when deciding what weight should be given to alternatives:*
- a. The consideration of alternatives in order to comply with policy requirements should be carried out in a proportionate manner; and*

- b. *Only alternatives that can meet the objectives of the proposed development need to be considered.”*
- 4.2.6 Paragraph 4.3.24 of NPS EN-1 (Ref 4-2) refers to site selection alternatives, stating: *“The Secretary of State should not refuse an application for development on one site simply because fewer adverse impacts would result from developing similar infrastructure on another suitable site, and it should have regard as appropriate to the possibility that all suitable sites for energy infrastructure of the type proposed may be needed for future proposals.”*
- 4.2.7 This ES demonstrates that the Proposed Development will not cause significant harm to biodiversity and geological conservation interests or nationally designated landscapes. The alternatives analysis presented in this chapter details the different solar infrastructure layouts, sizing, technologies and design parameters; cable corridor routes and cable connection locations; and site locations considered in the design process of the Proposed Development.
- 4.2.8 Consideration of ‘no development’ as an alternative to the Proposed Development has not been considered further. This is because ‘no development’ is not considered to be a reasonable alternative to the Proposed Development as it would not deliver the renewable electricity generation capacity or storage proposed. Paragraph 4.3.27 of NPS EN-1 (Ref 4-2) states *“Alternative proposals which mean the necessary development could not proceed, for example because the alternative proposals are not commercially viable or alternative proposals for sites would not be physically suitable, can be excluded on the grounds that they are not important and relevant to the Secretary of State’s decision.”*
- 4.2.9 Other generation schemes, such as wind power, nuclear, coal, or gas fired power stations, have not been assessed due to their unsuitability at the Site (in the case of a large-scale wind project and nuclear energy) or their inability to contribute to the UK’s need for low carbon electricity (in the case of coal or gas).
- 4.2.10 A ‘smaller development’ as an alternative to the Proposed Development has also not been considered further as Paragraph 4.3.23 of NPS EN-1 (Ref 4-2) states the decision maker *“...should be guided in considering alternative proposals by whether there is a realistic prospect of the alternative delivering the same infrastructure capacity (including energy security and climate change benefits) in the same timescale as the proposed development.”*
- 4.2.11 Paragraph 5.10.26 of NPS EN-1 (Ref 4-2) provides that *“Reducing the scale of a project can help to mitigate the visual and landscape effects of a proposed project”* but goes on to recognise that *“However, reducing the scale or otherwise amending the design of a proposed energy infrastructure project may result in a significant operational constraint and reduction in function – for example, electricity generation output”*. A smaller scheme would not deliver the same generation capacity or energy security and climate change benefit as the Proposed Development and, as such, would not represent a reasonable alternative.

4.3 Need for the Proposed Development

- 4.3.1 Part 3 of NPS EN-1 explains why the government has determined the need for significant amounts of new large-scale energy infrastructure to meet its energy objectives and why the government considered that the need for such infrastructure is urgent.
- 4.3.2 Paragraph 3.2.1 of NPS EN-1 makes clear that the government's objectives for the energy system are to ensure the supply of energy always remains "*secure, reliable, affordable and consistent with net zero emissions in 2050 for a wide range of future scenarios*". It is recognised in Paragraph 3.2.2 of NPS EN-1 that a range of different energy types are required to deliver the government's objectives.
- 4.3.3 For decision making, paragraph 3.2.6 of NPS EN-1 states that the Secretary of State should assess "*all applications for development consent for the types of infrastructure covered by this NPS on the basis that the government has demonstrated that there is a need for those types of infrastructure, which is urgent*".
- 4.3.4 Section 3.3 of NPS EN-1 sets out the need for new nationally significant electricity infrastructure. Paragraph 3.3.1 of NPS EN-1 recognises that electricity meets a significant proportion of overall energy needs and the reliance on electricity will increase as the energy system transitions in response to net zero targets. Paragraph 3.3.3 of NPS EN-1 describes the outcome of analysis undertaken by the government which 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.*"
- 4.3.5 Paragraph 3.3.4 of NPS EN-1 explains that there are several types of electricity infrastructure that are needed to deliver the government's energy objectives, including generating plants and storage. Paragraph 3.3.5 of NPS EN-1 goes on to state that generating plants are needed to deliver a low carbon and reliable system and storage is required to provide flexibility, as energy can be stored or exported when there is excess production.
- 4.3.6 Paragraph 3.3.8 of NPS EN-1 sets out that the government has considered alternatives to new large scale energy infrastructure and "*concluded that these would be limited to reducing total demand for electricity through efficiency measures of through greater use of low carbon hydrogen in decarbonising the economy; reducing maximum demand through demand side response; and increasing the contribution of decentralised and smaller-scale electricity infrastructure. In addition, there are alternative ways of decarbonising heating and transportation, which are being developed alongside electrification of these sectors.*"
- 4.3.7 In delivering affordable decarbonisation, paragraph 3.3.19 of NPS EN-1 concludes that due to the changing nature of the energy landscape, a diverse mix of electricity infrastructure is needed to come forward, so that a secure,

reliable, affordable, and net zero consistent system can be delivered during the transition to 2050 for a wide range of demand, decarbonisation, and technology scenarios.

- 4.3.8 In terms of the role of solar, paragraph 3.3.20 of NPS EN-1 recognises that solar (alongside wind) is the lowest cost way of generating electricity, and that analysis shows that “*a secure, reliable, affordable, net zero consistent system in 2050 is likely to be composed predominantly of wind and solar*”.
- 4.3.9 Paragraph 4.1.3 of NPS EN-1 recognises the urgent need for the delivery of low carbon energy infrastructure, stating that “*Given the level and urgency of need for infrastructure of the types covered by the energy NPSs set out in Part 3 of this NPS, the Secretary of State will start with a presumption in favour of granting consent to applications for energy NSIPs. That presumption applies unless any more specific and relevant policies set out in the relevant NPSs clearly indicate that consent should be refused.*”
- 4.3.10 NPS EN-1 (Ref 4-2) confirms at paragraph 4.2.5 that “*there is a critical national priority (CNP) for the provision of nationally significant low carbon infrastructure.*” This sets out a policy presumption in favour of CNP infrastructure, such as solar, to achieve energy objectives to decarbonise the energy sector by 2035 and to achieve net zero by 2050. Paragraph 4.2.7 of NPS EN-1 makes clear that the CNP policy does not create an additional or cumulative need case or weighting to that which is already outlined for energy infrastructure. Paragraphs 4.2.10 to 4.2.14 of NPS EN-1 explain that the CNP presumptions apply where it can be demonstrated that applications meet the requirements in NPS EN-1, have applied the mitigation hierarchy, and compensated residual impacts as far as possible. The **Planning Statement [EN010154/APP/7.2]** considers the application of the CNP presumptions in the planning balance, and **Chapter 5: EIA Methodology** of this ES [EN010154/APP/6.1] sets out the mitigation hierarchy approach adopted by the Proposed Development.
- 4.3.11 The Proposed Development’s principal objective is to generate low-carbon electricity for an operational period of 60 years, to meet the UK’s urgent need for low carbon electricity. The inclusion of electricity storage assets as ‘associated infrastructure’ to the principal solar development provides a means of further enhancing and stabilising the utility of the power generated by the Proposed Development by providing energy balancing capabilities and other services to support the decarbonisation and operation of the National Electricity Transmission System.
- 4.3.12 The need for the Proposed Development is set out fully in the **Statement of Need [EN010154/APP/7.1]**.

Policy Promotion of Renewable Energy Development

- 4.3.13 Government policy set out in the Energy White Paper (December 2020), the Net Zero Strategy (October 2021), the British Energy Security Strategy (September 2022), Powering up Britain (March 2023) and the Clean Power 2030 Action Plan (December 2024) establishes the foundations to transform the energy sector, tackle emissions while also ensuring a secure and reliable

supply, achieve affordable bills for households and businesses and deliver net zero commitments. To achieve these ambitions, the Government is promoting a range of technologies including renewables, nuclear, hydrogen and carbon capture and storage. This is reflected in paragraph 2.5.6 of NPS EN-1 (Ref 4-2) which also recognises that to achieve energy security, and address the UK's vulnerability to international energy prices and improving energy efficiency, it is important to accelerate the "*deployment of renewables, nuclear, hydrogen, CCUS, and related network infrastructure, so as to ensure a domestic supply of clean, affordable, and secure power as we transition to net zero*".

- 4.3.14 The Clean Power 2030 Action Plan addresses the challenges of creating an affordable and secure energy source, creation of new energy industries and reducing harmful emissions which contribute to climate change. Page 28 of the report references how a clean power system will require the mass deployment of offshore wind, onshore wind and solar. Page 73 of the report illustrates how the current installed capacity of solar is at 16.6 GW, and the target is 47 GW by 2030 and 45-69 GW by 2035.

The Need for Battery Storage

- 4.3.15 Paragraph 3.3.25 of NPS EN-1 (Ref 4-2) recognises the role of electricity storage in meeting the need for nationally significant electricity infrastructure stating that "*Storage has a key role to play in achieving net zero and providing flexibility to the energy system, so that high volumes of low carbon power, heat and transport can be integrated.*" Paragraphs 3.3.26 to 3.3.27 of NPS EN-1 (Ref 4-2) describe the benefits of storage which include a reduction in electricity system costs, increased reliability through storing surplus electricity in periods of low demand to provide when demand is higher and maximising the usable output from intermittent low carbon generation, such as solar, thereby reducing the total amount of generation capacity needed on the system. Paragraph 3.3.27 of NPS EN-1 (Ref 4-2) goes on to state that storage can provide a range of balancing services to help operate the system and reduce constraints on the networks, helping to defer or avoid the need for costly network upgrades as demand increases. Battery storage therefore plays an important role in the transition to net zero and provides additional storage capacity to benefit the wider electricity system.

4.4 Site Selection

- 4.4.1 The identification of the site for the Proposed Development was driven by the availability of deliverable land and site suitability in accordance with the requirements of policy. In recognition of the need to consider reasonable alternatives, as required by the EIA Regulations (Ref 4-1), the site for the Proposed Development was assessed against other potential alternative sites to ensure it was the most suitable taking into account operational requirements, national and local planning policy, and planning and environmental constraints. The **Planning Statement Appendix A: Site Selection Report [EN010154/APP/7.2]** sets out the approach to assessing the suitability of the site for the Proposed Development and potential

alternative sites against a range of planning, environmental, and operational criteria for a generating station with capacity of more than 50MW.

- 4.4.2 National planning policy does not set out a requirement to consider alternative sites, stating at Paragraph 4.3.9 of the Overarching National Policy Statement for Energy EN-1 (NPS EN-1) (Ref 2) "*This NPS does not contain any general requirement to consider alternatives or to establish whether the proposed project represents the best option from a policy perspective*". Furthermore, paragraph 2.3.5 of the National Policy Statement for Renewable Energy Infrastructure (EN-3) (NPS EN-3) (Ref 3) provides that "*It is for applicants to decide what applications to bring forward. In general, the government does not seek to direct applicants to particular sites for renewable energy infrastructure*". Paragraph 2.3.9 of NPS EN-3 also recognises that "*most renewable energy resources can only be developed where the resource exists and where economically feasible, and because there are no limits on the need established in Part 3 of EN-1, the Secretary of State should not use a consecutive approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments)*". As a result, there is no standard methodology for site selection of solar energy farms.
- 4.4.3 Paragraph 2.3.5 of NPS EN-3 (Ref 4-11) states that "*the government does not seek to direct applicants to particular sites for renewable energy infrastructure.*" Instead, NPS EN-1 focuses on the general presumption in favour of granting consent for applications for renewable energy where there is an urgent need for CNP infrastructure stating at paragraph 4.2.15 that where the CNP presumption applies and residual impacts remain after the mitigation hierarchy has been applied, "*these residual impacts are unlikely to outweigh the urgent need for this type of infrastructure*".
- 4.4.4 The National Planning Policy Framework (Ref 4-12) also sets out that significant weight should be given to low carbon renewable projects stating at paragraph 168 that "*When determining planning applications for all forms of renewable and low carbon energy developments and their associated infrastructure, local planning authorities should: a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and give significant weight to the benefits associated with renewable and low carbon energy generation and the proposal's contribution to a net zero future*".
- 4.4.5 Section 2.3 of NPS EN-3 (Ref 4-11) however sets out general considerations relating to site selection for renewable energy projects. Paragraph 2.3.6 of NPS-EN3 refers to the need for the Secretary of State to consider national designation tests set out in NPS EN-1 related to potential impacts upon biodiversity, landscape and visual considerations and the need to demonstrate that any significant effects on qualities for which the area has been designated are clearly outweighed by the urgent need for the Proposed Development. Paragraph 2.3.7 of NPS EN-3 sets out that the Secretary of State should also have regard to the aims, goals and targets of the Government's Environmental Improvement Plan (Ref 4-14) and other existing and future measures and targets in England, as well as compliance with the Environment Act 2021. Specific reference is also made in Paragraph 2.3.8 of NPS EN-3 (Ref 4-11) to

the historic environment with the Secretary of State required to be satisfied that the '*substantial public benefits would outweigh any loss or harm to the significance of a designated heritage asset*'.

- 4.4.6 Paragraph 2.3.9 of NPS EN-3 (Ref 4-11) recognises that "*most renewable energy resources can only be developed where the resource exists and where economically feasible, and because there are no limits on the need established in Part 3 of EN-1, the Secretary of State should not use a consecutive approach in the consideration of renewable energy projects (for example, by giving priority to the re-use of previously developed land for renewable technology developments).*"
- 4.4.7 Paragraphs 2.10.18 to 2.10.48 of NPS EN-3 (Ref 4-11) set out the key considerations which influence the location of a solar farm, including:
- Irradiance and site topography;
 - Network connection;
 - Proximity to residential dwellings;
 - Agricultural land classification and land type;
 - Accessibility;
 - Public Rights of Way; and
 - Security and lighting.
- 4.4.8 These considerations have informed the location of the Proposed Development as set out in Section 2 of the **Planning Statement (Appendix A: Site Selection Report) [EN010154/APP/7.2]**.

4.5 Alternative Solar Infrastructure Technologies and Storage Arrangements

- 4.5.1 As described in **Chapter 3: The Proposed Development** of this ES [EN010154/APP/6.1], the parameters of the DCO application will maintain some degree of design flexibility to allow the latest technology to be utilised at the time of construction. Notwithstanding this, several technological design options have been considered and preferred options taken forward taking into consideration environmental effects, the Design Vision of the Proposed Development and the need for optimal functionality. **Table 4-1** summarises the technological design alternatives considered in the design evolution of the Proposed Development.

Table 4-1: Technological Alternatives

Design Element	Technology Considerations
Solar PV technology and arrangement	The solar PV technologies considered are south facing fixed arrays and single axis tracking arrays. Both technologies are included within the parameters of the Proposed Development that have been assessed. East-west fixed arrays were discounted by the Applicant early in the process as not being suitable for the Site.

Design Technology Considerations Element

	East-west fixed arrays are associated with lower renewable energy generation yield; they require denser ground coverage resulting in less sunlight reaching the ground, lower biodiversity gain, and reduce the opportunity for sheep grazing. The east-west fixed option would also generate more construction traffic due to the larger volume of panels needing to be installed.
BESS arrangement	The BESS technologies considered are a 'distributed' BESS arrangement system with units distributed around the Principal Site, and a 'centralised' BESS arrangement system grouped within one area of the Principal Site. Both technologies are included within the parameters that have been assessed.
Arrangement of transformers, switchgear and inverters	The exact size and arrangement of the inverter and transformer stations would be determined at detailed design stage and a suitable area has been left for the flexibility of options. The maximum parameters (height, size and noise etc.) of the equipment have been used for the assessment. The options and maximum parameters are discussed in Chapter 3: The Proposed Development of this ES [EN010154/APP/6.1].
PV height	The height of the modules will vary between the fixed south arrangement and the single axis trackers. The maximum required height has been outlined in Chapter 3: The Proposed Development of this ES [EN010154/APP/6.1] and set out in the Proposed Development Parameters [EN010154/APP/7.4]. Shorter panels were discounted because of the lower energy yield they would generate, whilst higher panels would be more difficult to screen and would likely lead to greater visual impacts, and were therefore also ruled out.
Grid connection option – cabling technology	At the EIA Scoping Stage consideration was given to the provision of either overhead or underground cabling to provide a connection from the Onsite Substation to the point of connection at the proposed National Grid substation near Navenby. The Proposed Development now comprises solely underground cables within the Cable Corridor, with overhead lines no longer being considered. The decision was taken to avoid likely significant effects on landscape and visual associated with overhead cables.

4.6 Alternative Layouts within the Principal Site

4.6.1 The Proposed Development Principal Site was informed by a preliminary constraints mapping exercise. Site-wide constraints considered during the mapping exercise included the Site's Agricultural Land Classification; Flood Risk Zones (associated with the River Brant and River Witham); and statutory designations, specifically landscape (National Parks or National Landscapes), ecology (Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas, or Local Wildlife Sites), and heritage (Schedule Monuments or Listed Buildings) designations.

- 4.6.2 In addition to the above, buffers/offsets have been implemented throughout the design to minimise the impact of the Proposed Development on local features including (but not limited to): ecological habitats (badger setts, bat roosts, otter holts), ancient woodland, hedgerows, individual trees, watercourses and waterbodies, residential properties, scheduled monuments and listed buildings. These buffers/offsets are detailed within the **Environmental Commitments Register [EN010154/APP/6.5]**, **Framework Construction Environmental Management Plan (CEMP) [EN010154/APP/7.7]**, **Framework Operational Environmental Management Plan (OEMP) [EN010154/APP/7.8]**, and **Framework Decommissioning Environmental Management Plan (DEMP) [EN010154/APP/7.9]** as relevant, and are secured by the Design Commitments set out in Appendix A in the **Design Approach Document [EN010154/APP/7.3]**.
- 4.6.3 The layout of the Proposed Development Principal Site has evolved iteratively taking into consideration the outcomes of environmental assessment, the Design Vision and Design Principles, the functionality of the Proposed Development, and feedback from stakeholders during both the non-statutory and the statutory consultation process. **Table 4-2** sets out the layout iterations for the Principal Site and Cable Corridor from EIA Scoping to submission of the DCO application.
- 4.6.4 The **Design Approach Document [EN010154/APP/7.3]** explains the Design Vision and Design Principles that were developed at an early stage, and which provided a framework for evolution of the design of the Proposed Development. The Design Principles were informed by site context, national and local planning policy and the outcomes of environmental assessment. The **Design Approach Document [EN010154/APP/7.3]** summarises the main design layout iterations considered for the Proposed Development. **Table 4-2** references the Design Principles that framed design changes made at various stages of evolution of the Proposed Development. **Figure 4-6 [EN010154/APP/6.2]** illustrates the changes in terms of land area through EIA scoping, non-statutory consultation, PEI report, statutory consultation and the ES.

4.7 Alternative Cable Corridors

- 4.7.1 As described in **Chapter 3: The Proposed Development** of this ES **[EN010154/APP/6.1]**, the electricity generated by the Proposed Development is to be imported and exported via interface cables from the Onsite Substation. The Cable Corridor therefore needs to connect the Onsite Substation to the proposed National Grid substation near Navenby. Three Cable Corridors (A, B, and C) were considered at EIA Scoping (June 2023). The three corridors considered are shown in **Figure 4-1 [EN010154/APP/6.2]**.
- 4.7.2 To inform the identification of a preferred grid connection corridor, a desktop analysis of known planning and environmental constraints within the three potential cable route corridors (C - northern, A - central and B - southern) was undertaken to identify areas of high, moderate or low risk. Potential planning constraints affecting each of the cable route corridor options were considered,

specifically local planning applications, site allocations, and mineral safeguarding areas as shown in **Figure 4-2 [EN010154/APP/6.2]**. None of the three options were significantly constrained by other local planning applications or site allocations at the time the analysis was conducted. All three cable corridor options will equally impact on both the Limestone Mineral Safeguarding Area and the Sand and Gravel Minerals Safeguarding Area.

- 4.7.3 The following criteria were applied to create a heatmap of the cable corridor options, shown in **Figure 4-3 [EN010154/APP/6.2]**.
- a. Red – high risk area
 - i. Listed Buildings
 - ii. Residential properties + 15m buffer
 - iii. Ecological designations
 - iv. Areas of woodland (Ancient woodland and National Forest Inventory)
 - v. Ponds / lakes
 - b. Amber – moderate risk area
 - i. 50m buffer around red areas
 - ii. Non-residential buildings + 15m buffer
 - iii. Non-designated heritage assets
 - c. Green – low risk area
 - i. All other areas within the route corridor not identified as either red or amber
- 4.7.4 To support the exercise the following were also considered:
- a. Rivers;
 - b. Transport infrastructure (A and B Roads, Railways); and
 - c. Public Rights of Way (PRoWs).
- 4.7.5 Taking the factors above into account, a preferred grid connection corridor was devised within the corridor route options, with the aim of achieving a corridor width of 250m. This exercise considered the following:
- a. Overall length of the cable route;
 - b. Ability to avoid high risk and low risk areas;
 - c. Minimise river crossings (and to some extent also minimise road crossings);
 - d. Minimise PRoW crossings; and
 - e. Consideration of land registry data, for example should it be easy to avoid a small corner of a landowners' land parcel.
- 4.7.6 For all three grid connection corridor options, it was not possible to create a 250m wide corridor that was entirely within the low-risk areas (green), as the cable route options have moderate (amber) and high (red) risk areas where

they pass the residential areas of Harmston, Coleby, Boothby Graffoe, Navenby and Wellingore. To the west of the A607 / Grantham Road / Cliff Road, all three options also cross non-statutory sites designated for nature conservation. In addition, all three grid connection corridor options would require crossing under the road network and would be required to cross at least two public rights of way (northern route (C) – two crossings, central route (A) – three crossings and southern route (B) – five crossings) and on this basis all options are considered comparable, with a slight preference to the northern and central route options.

- 4.7.7 The northern (C) grid connection corridor had a number of areas noted as amber, which predominantly comprised non-designated heritage assets, including residential properties and RAF Coleby Grange. This option would also result in the longest cable route of the three options. Similarly, both the central (A) and southern (B) options include some amber areas associated with non-designated heritage assets, with the southern (B) route identified as having additional non-designated assets present when compared to the northern (C) and central (A) options.
- 4.7.8 Given the constraints in the northern (C) corridor, following EIA Scoping stage the northern (C) corridor was discounted, and the central (A) and southern (B) corridors were taken forward to the non-statutory consultation stage. This resulted in a reduction of the Cable Corridor options, with the two most southerly possible alignments considered at non-statutory consultation (September 2023), as shown in **Figure 4-4 [EN010154/APP/6.2]**.
- 4.7.9 The central (A) grid connection corridor required fewer water course crossings in comparison to both the northern (C) and southern (B) options as the watercourses present within this route predominantly run in an east-west direction, aligning with the cable route.
- 4.7.10 The southern (B) grid connection corridor option is intersected by a large number of river crossings (both main rivers and ordinary watercourses) which would result in a shorter route when compared to the northern (C) grid connection corridor, however, would likely be slightly longer when compared to the central (A) route option.
- 4.7.11 Overall, the central (A) grid connection corridor presented the favoured route based on the environmental information available. The central (A) grid connection corridor created a relatively direct route that was largely through low-risk areas whilst this was not considered as feasible on the two other route options.
- 4.7.12 The next stage of the analysis considered land ownership information for the potential grid connection corridor options with an aim to minimise the number of landowners and the number of parcels affected by the corridor. Based on this analysis, the central grid (A) connection corridor was considered to be the most favourable.
- 4.7.13 Non-statutory consultation feedback on both grid connection corridor options did not indicate a clear preference but included concern that their installation would cause significant upheaval to local nature, agriculture and the road

network. Non-statutory consultation feedback on the southern (B) grid connection corridor included additional concerns regarding its use as the overspill flood plain for Anglian Water. Following non-statutory consultation, the Cable Corridor was refined from two options down to a single corridor, the central (A) grid connection corridor.

- 4.7.14 No relevant statutory consultation feedback was received regarding the Cable Corridor. Following statutory consultation, the Cable Corridor was further refined to minimise its width, where possible, as illustrated in **Figure 1-2 and Figure 4-6 [EN010154/APP/6.2]** and described in **Chapter 3: The Proposed Development** of this ES [EN010154/APP/6.1]. The original aim was to refine the Cable Corridor to 100m width, but with a 3rd party BESS scheme now proposed within the Cable Corridor (with its own cable corridor to the proposed National Grid substation near Navenby), the need to cross the existing overhead line, and not yet having certainty which bay the Proposed Development will connect to at the proposed National Grid substation near Navenby, it has been necessary to retain flexibility with the Cable Corridor.

4.8 Alternative Cable Connections

- 4.8.1 At EIA Scoping stage the Proposed Development considered the provision of underground cabling or overhead lines. The overhead line option was discounted in order to avoid significant landscape and visual effects. As a result, the Proposed Development comprises solely underground cabling within the Cable Corridor to the point of connection at the proposed National Grid substation near Navenby.

4.9 Alternatives proposed at Statutory Consultation

- 4.9.1 An alternative layout and access point were proposed in responses to statutory consultation by Thorpe on the Hill Parish Council and a Thorpe on the Hill resident. The alternative layout proposed solar infrastructure north of the A46, and the alternative access arrangement proposed access direct from the A46.

Alternative Layout of Solar Infrastructure North of the A46

- 4.9.2 The alternative layout of solar infrastructure proposed north of the A46 comprised solar development areas directly adjacent to the A46, from the former Dovecote pub located just off the Halfway House roundabout to the southern boundary of North Hykeham. The Cathedral View Caravan Park was excluded from the layout. It was proposed that all land outside the solar development area would be left as countryside. Access points were also proposed from the A46 and off Fosse Lane. **Plate 4-1** shows the alternative layout of solar infrastructure north of the A46.
- 4.9.3 The alternative layout was considered by the Applicant, but has been discounted for the following reasons:

- a. The area north of the A46 within the DCO Site Boundary as proposed in the Application is approximately 350 hectares with a generation capacity of approximately 175MW (on the basis of a fixed south facing panel arrangement and incorporating land for mitigation). In contrast, the area of the alternative layout proposed is approximately 160 hectares with a generation capacity of approximately 90 MW (using the same panel and mitigation assumptions, or approximately 130MW excluding land for mitigation). Given the need for mitigation land, the alternative layout results in a reduced generation capacity. This does not align with the urgent need for renewable energy generation acknowledged in NPS EN-1 given its contribution to decarbonisation, security of supply and affordability. Whilst excluding land for mitigation in the alternative layout would lead to greater generation capacity, a large mass of solar panels would result in likely significant effects in relation to ecology receptors (notably trees and hedgerows) leading to a reduction in biodiversity net gain outcomes, landscape and visual amenity, and the public rights of way network.
- b. The alternative layout does not align with the Design Vision, which is to maximise the renewable energy generation across the site, as large areas of the land within the DCO Site would not be utilised for solar generation.
- c. Some of the proposed solar development area is not within the DCO Site Boundary, therefore this section of the alternative layout could not be delivered within the Proposed Development. As a result, the proposed access from Fosse Lane is not required and has not been considered further.
- d. The access from the A46 is considered below.

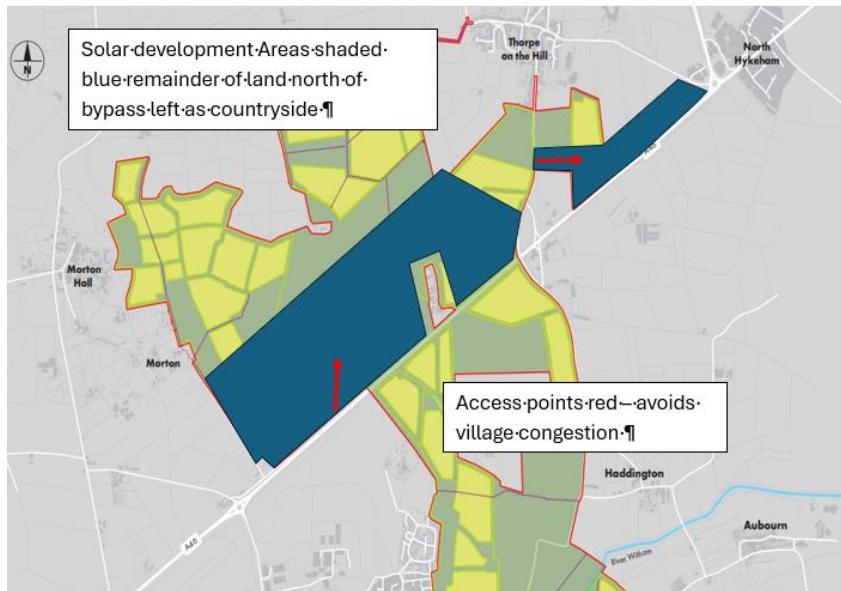


Plate 4-1: Alternative layout north of the A46 proposed at statutory consultation (overlaid on the layout plan provided by the Applicant at Non-Statutory consultation)

Alternative Access from the A46

- 4.9.4 An alternative access from the A46 was proposed by stakeholders in order to avoid Thorpe on the Hill and Clay Lane (in Thorpe on the Hill). **Plate 4-2** illustrates the proposed alternative access from the A46.
- 4.9.5 The A46 forms part of the Strategic Road Network (SRN) under the jurisdiction of National Highways. The potential for a construction access in this location was discussed with National Highways in November 2024¹ who addressed the matter in its response to the statutory consultation. National Highways considers that the layout of the alternative access does not comply with its Design Manual for Roads and Bridges requirements. Furthermore, the current design of the existing access does not physically prevent vehicles from turning right out of the site onto the A46 carriageway, so utilising it for the Proposed Development would pose a safety risk to motorists on the SRN.
- 4.9.6 National Highways also stated that its policy and operational preference is for development traffic to use the local road network access points and that these access points provide access to the A46 Fosse Lane/Haddington Lane grade-separated junction, which is of a higher design standard and provides safer access to both carriageways of the A46.
- 4.9.7 On this basis, an alternative construction access onto the A46 was discounted.

¹ The meeting with National Highways took place before the statutory consultation as access onto the A46 at this location had also been raised by another group.

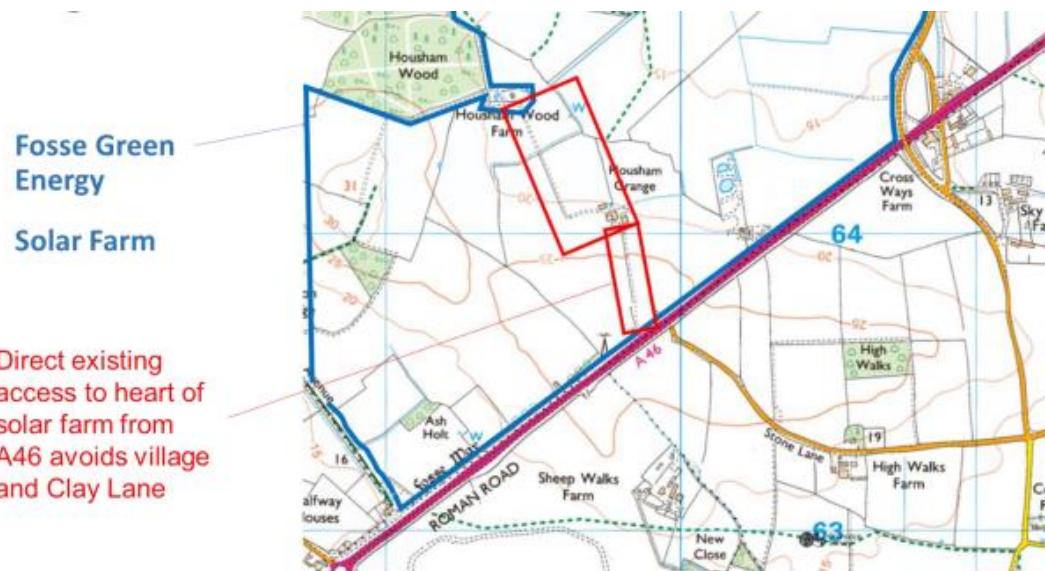


Plate 4-2 - Alternative access from the A46 proposed at statutory consultation

4.10 Overview of Design Development

4.10.1 Table 4-2 provides an overview of the Proposed Development in the different stages of the design process, including the key design decisions that have been made between each and how the design has evolved in accordance with the design principles. The **Design Approach Document [EN010154/APP/7.3]** explains in more detail how the design of the Proposed Development has evolved.

Table 4-2: Design Layout Iterations for the Principal Site and Cable Corridor

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
EIA Scoping Layout (June 2023)	<p>Principal Site The Principal Site comprised of several parcels of land (1,060ha)</p> <p>Cable Corridor Three grid connection cable corridors were shown.</p> <p>The Scoping Report Boundary had an area totalling 4,410ha.</p> <p>Shown on Figure 4-1 [EN010154/APP/6.2].</p>	The EIA Scoping layout was defined prior to extensive consultation with relevant stakeholders and therefore was not influenced by external parties.	The EIA Scoping boundary was produced with data from desk based and preliminary environmental surveys and was adopted with a view to including in the Scoping Report any land that could ultimately be within the Site. The intention was that the area would be further refined following surveys, environmental assessment, and consultation.	N/A
Non-Statutory Consultation Layout (September 2023)	<p>Principal Site The Principal Site comprised of several parcels of land (1,003ha).</p> <p>Cable Corridor Two grid connection cable corridors were shown.</p>	Landowner discussions and agreements. Environmental surveys and desktop study, including landscape and visual, ecology, heritage, noise, transport, water and flood risk.	The layout of the Principal Site at non-statutory consultation stage was informed by feedback from the following: the EIA scoping process including the Scoping Opinion, the design team, preliminary environmental mitigation recommendations and ongoing landowner discussions. Whilst similar constraints were identified for the cable corridors, the northern (C) cable corridor was removed from the	N/A

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
	<p>The non-statutory consultation boundary had an area totalling 3,498ha.</p> <p>Shown on Figure 4-4 [EN010154/APP/6.2].</p>		<p>Proposed Development as it resulted in a longer cable route affecting additional land owners and resulting in additional temporary impacts.</p>	
PEI Report Layout (October 2024)	<p>Principal Site The Principal Site comprised of several parcels of land (1,065ha).²</p> <p>Cable Corridor One Cable Corridor was shown which partially overlapped the Principal Site (407ha).</p> <p>The PEI Report boundary had an area totalling 1,426ha.</p> <p>The PEI Report boundary is shown on Figure 4-5 [EN010154/APP/6.2].</p>	<p>Landowner discussions and agreements.</p> <p>Non-statutory consultation feedback.</p> <p>Agricultural Land Classification Surveys.</p> <p>Environmental surveys and desktop study, including landscape and visual, ecology, heritage, noise, transport, water and flood risk.</p> <p>Grid connection options analysis.</p>	<p>Principal Site</p> <ul style="list-style-type: none"> The boundary of the Principal Site was refined to exclude individual residential properties. Areas were identified for centralised and decentralised battery storage. The design evolved further in response to: <ul style="list-style-type: none"> environmental opportunities and constraints for the Site non-statutory consultation feedback, including, amongst others, minimising visual impacts, creating links across the Principal Site and reducing potential operational noise impacts associated with solar infrastructure. 	<p>Design Principle 1 - The Proposed Development will be sensitively integrated into its landscape setting, to minimise adverse landscape and visual effects as far as possible.</p> <p>Design Principle 3 - The Proposed Development will respond sensitively to its proximity to residential dwellings, communities and village settlements with regard to visual impact, noise and lighting.</p> <p>Design Principle 5 - The Proposed Development will be sensitive to heritage assets, providing suitable offsets, and including protecting views to Lincolnshire Cathedral.</p>

² Principal Site area increases to 1,065ha as at PEIR stage land that was previously in the Cable Corridor is counted within the PEI Report Principal Site boundary.

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
			<ul style="list-style-type: none"> The Proposed Development located all Solar Station Compounds away from Flood Zones 2 and 3. The larger elements of the Proposed Development, such as the Onsite Substation and battery storage were carefully located in areas at lower risk of flooding and in locations with screening from existing vegetation and topography. An area of land previously containing solar infrastructure south of Moor Lane was removed to reduce the impact on ground nesting birds habitat located on this land. As a result of landowner discussions and further environmental assessment an area to the north of the A46 was included for the deployment of solar panels to maximise the opportunities to maximise renewable energy generation. Additional changes were made in the vicinity of Cathedral View Holiday Park and in land southeast of Thorpe on the Hill to provide additional buffers from the Solar PV Array Areas. 	<p>Design Principle 6 - The Proposed Development will be designed to be resilient to flood risk now and in the future, with close engagement with the Environment Agency.</p> <p>Design Principle 8 - The Proposed Development will be designed to align with field boundaries and existing landscape features. It will seek to retain any existing vegetation and avoid watercourses where practicable.</p> <p>Design Principle 9 - The Proposed Development will seek to avoid adverse impacts and to enhance existing biodiversity through the creation of new green infrastructure and the creation of new habitat for wildlife to achieve a minimum 10% in Biodiversity Net Gain.</p> <p>Design Principle 10 - The Proposed Development will enhance, where possible, the existing connectivity within the network of PRoW through the provision of permissive</p>

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
			<ul style="list-style-type: none">• The Solar PV Array Areas located around River Farm (Grade II listed) were arranged to follow historic field boundaries and maintain intervisibility between River Farm and Church Farm (non-designated monument) which forms the setting of these two heritage assets.• The design of the Solar and BESS Stations has been optimised to aggregate these as much as possible to minimise the number of water tanks that may be requested by the local fire and rescue teams should the distributed BESS arrangement be selected for development.• Permissive paths were included to accommodate greater connectivity between local villages and provide opportunities for shorter circular walks.• Proposed planting was added. <p>Cable Corridor</p> <p>Further refinement to the Cable Corridor was undertaken, with a single, approximately 250m wide route included within the Site. The refinement of the Cable Corridor considered:</p>	paths and circular routes to be available for public use during the operation of the Proposed Development to improve accessibility.

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
			<ul style="list-style-type: none"> Feedback received from the non-statutory consultation including concerns related to the provision of additional overhead lines. The likely point of connection at the proposed National Grid substation near Navenby. Optimisation of the corridor to enable the cable to be laid in a straight line or in shallow curves minimising the total length of the cabling and allowing it to be pulled through the ducting effectively which reduces the installation complexity and time period. Provision of adequate space to allow for crossing of existing utilities such as the existing overhead lines and the new Anglian Water main. Access to the corridor during construction. Provision of adequate space required to undertake the works to lay the cable. 	
ES Layout (July 2025)	Principal Site The Principal Site comprised of several parcels of land (1,070ha).	Landowner discussions and agreements.	Principal Site The design of the Principal Site evolved in response to ongoing survey and assessment and the feedback from the statutory consultation, and through the	Design Principle 1 - The Proposed Development will be sensitively integrated into its landscape setting, to minimise adverse

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
	<p>Cable Corridor</p> <p>One Cable Corridor which partially overlaps the Principal Site (351ha).</p> <p>The DCO Site has an area totalling 1,368ha.</p> <p>The DCO Site is shown on Figure 1-2 [EN010154/APP/6.2].</p>	<p>Statutory consultation feedback.</p>	<p>application of the design principles. The Proposed Development evolved as described below.</p> <ul style="list-style-type: none"> Centralised battery compound design developed and footprint reduced, allowing for increased perimeter landscaping. Removal of parcels for the development of solar infrastructure in the following locations in response to comments from the local community and councils: <ul style="list-style-type: none"> One parcel to the west of Bassingham. One parcel to the southeast of Thorpe-on-the-Hill. One parcel east of Morton Lane. Refinement of the DCO Site Boundary to remove areas where no works are proposed e.g. woodland blocks, unsuitable arable land. Provision of additional permissive paths north of the A46 to provide connectivity around the caravan park. Modified permissive paths in response to community and feedback from the Lincolnshire Wildlife Trust. 	<p>landscape and visual effects as far as possible.</p> <p>Design Principle 3 - The Proposed Development will respond sensitively to its proximity to residential dwellings, communities and village settlements with regard to visual impact, noise and lighting.</p> <p>Design Principle 5 - The Proposed Development will be sensitive to heritage assets, providing suitable offsets, and including protecting views to Lincolnshire Cathedral.</p> <p>Design Principle 6 - The Proposed Development will be designed to be resilient to flood risk now and, in the future, with close engagement with the Environment Agency.</p> <p>Design Principle 8 - The Proposed Development will be designed to align with field boundaries and existing landscape features. It will seek to retain any existing</p>

Stage	Proposed layout	Layout considerations and consultation at this stage	Design evolution to this Stage	Relevant Design Principle
			<ul style="list-style-type: none"> Removed the orchard at Morton in response to community feedback. Revised siting of distributed battery compounds to mitigate noise impacts by increasing offsets. Minor amendments to account for root protection areas and watercourse offsets. Application of a 30m offset at the location of a badger sett. <p>Cable Corridor Further refinement to reduce the width of the Cable Corridor where possible.</p> <p>Further detail on the changes made as a result of statutory consultation is provided in the Consultation Report [EN010154/APP/5.1] and the Design Approach Document [EN010154/APP/7.3].</p>	<p>vegetation and avoid watercourses where practicable.</p> <p>Design Principle 9 - The Proposed Development will seek avoid adverse impacts and to enhance existing biodiversity through the creation of new green infrastructure and the creation of new habitat for wildlife to achieve a minimum 10% in Biodiversity Net Gain.</p> <p>Design Principle 10 - The Proposed Development will enhance, where possible, the existing connectivity within the network of PRoW through the provision of permissive paths and circular routes to be available for public use during the operation of the authorised development to improve accessibility.</p>

4.11 Summary

- 4.11.1 The Design Vision of the Proposed Development is to seek to maximise the renewable energy generation across the site for the agreed export capacity with National Grid Electricity Transmission, whilst aligning with national planning policy and aiming to minimise environmental effects, supporting the delivery of the Government's objectives and commitments for the development of a secure, reliable, and affordable supply of energy while also meeting decarbonisation targets.
- 4.11.2 The technical design of the Proposed Development has evolved during the pre-application stage taking into consideration feedback from Non-Statutory and Statutory Consultation, environmental effects and exploring different solar PV technology, location, height and arrangement (south-facing fixed and single axis tracking arrays); technology and arrangement of the BESS (centralised or distributed); arrangement of transformers, switchgear and inverters; and the grid connection cabling technology (overhead and underground cabling). The consideration and use of alternative technologies and the technical specification flexibility included within this Environmental Statement will improve the Proposed Development's efficiency and capacity to generate energy, reduce fire risk and allow the inclusion of embedded design to reduce landscape and visual effects.

4.12 References

- Ref 4-1 The Infrastructure Planning (Environmental Impact Assessment) Regulations (2017).
- Ref 4-2 Department for Energy Security & Net Zero (2023). Overarching National Policy Statement for Energy (EN-1).
- Ref 4-3 Intergovernmental Panel on Climate Change (IPCC) Synthesis Report of the IPCC Sixth Assessment Report (2023). Available at: https://report.ipcc.ch/ar6syr/pdf/IPCC_AR6_SYR_SPM.pdf
- Ref 4-4 The Climate Change Act 2008 (2050 Target Amendment) Order 2019. Available at: <https://www.legislation.gov.uk/ukdsi/2019/9780111187654>
- Ref 4-5 The Climate Change Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/27>
- Ref 4-6 European Parliament (2023). COP28 climate talks agree on transitioning away from fossil fuels.
- Ref 4-7 Climate Change Committee (CCC) (2024). Progress on reducing emissions. 2023 Report to Parliament. Available at: <https://www.theccc.org.uk/wp-content/uploads/2024/07/Progress-in-reducing-emissions-2024-Report-to-Parliament-Web.pdf>
- Ref 4-8 Department of Energy and Climate Change (DECC) (2011). Overarching National Policy Statement for Energy (EN1). Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf
- Ref 4-9 Department for Business, Energy and Industrial Strategy (2022). British Energy Security Strategy. Available at: <https://www.gov.uk/government/publications/british-energy-security-strategy/british-energy-security-strategy>
- Ref 4-10 Department for Energy Security & Net Zero (2023) Electricity Generation Costs 2023. Available at: <https://assets.publishing.service.gov.uk/media/6556027d046ed400148b99fe/electricity-generation-costs-2023.pdf>
- Ref 4-11 Department for Energy Security & Net Zero (2023). National Policy Statement for Renewable Energy Infrastructure (EN-3). Available at: <https://assets.publishing.service.gov.uk/media/65a7889996a5ec000d731aba/nps-renewable-energy-infrastructure-en3.pdf>
- Ref 4-12 Ministry of Housing, Communities and Local Government (2023). National Planning Policy Framework. Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

- Ref 4-13 National Energy System Operator (2025). Next steps in grid connections reform. Available at: <https://www.neso.energy/news/next-steps-grid-connections-reform>
- Ref 4-14 Department for Environment, Food & Rural Affairs (2023). Environmental Improvement Plan 2023.