The Great Grid Upgrade

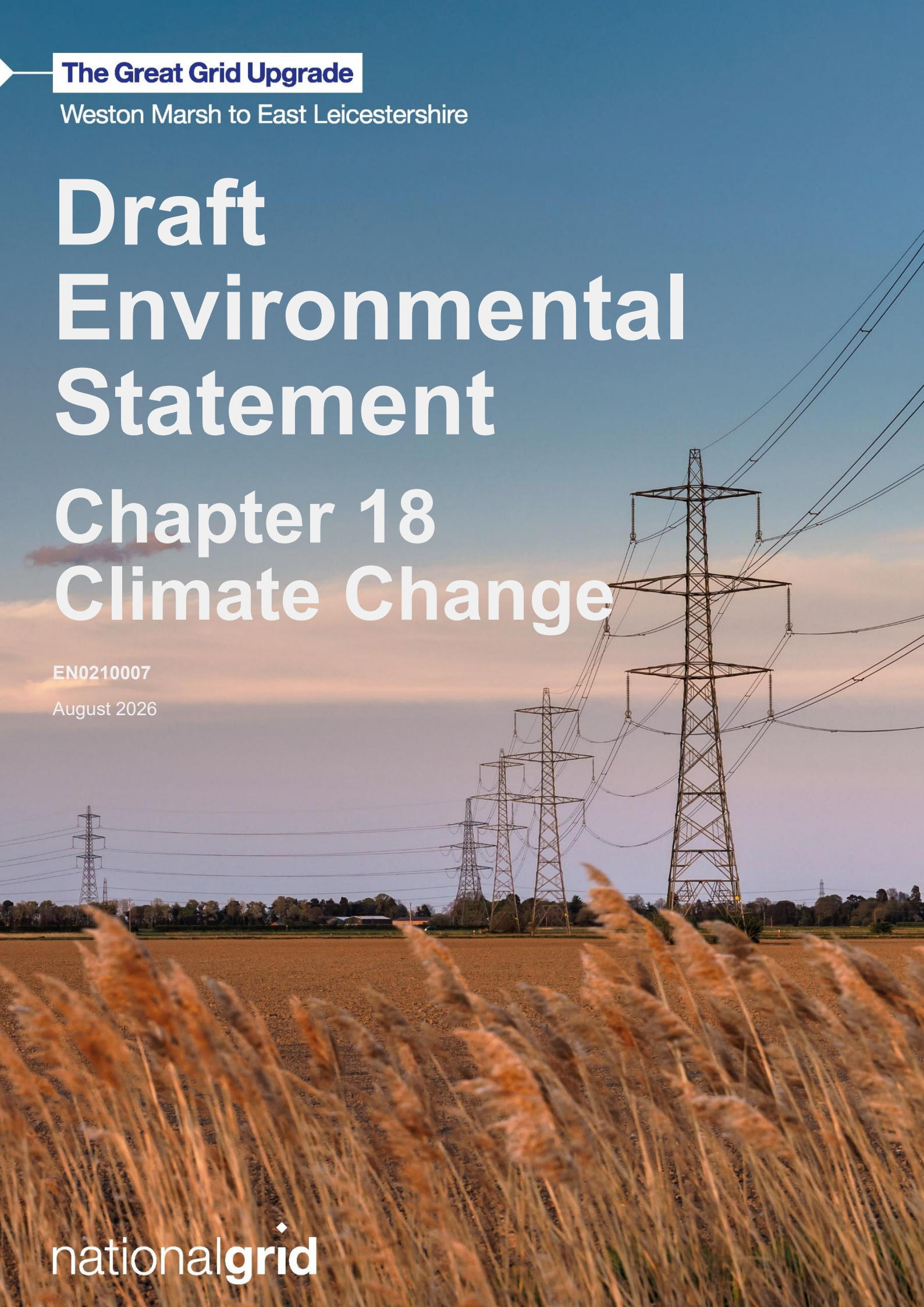
Weston Marsh to East Leicestershire

Draft Environmental Statement

Chapter 18 Climate Change

EN0210007

August 2026



nationalgrid

18. Climate Change

18.1 Introduction

18.1.1 This chapter reports the preliminary assessment of the potential effects on the climate, that could result from the Weston Marsh to East Leicestershire Project (Project).

18.1.2 This chapter includes consideration of the following matter:

- Lifecycle greenhouse gas (GHG) impact assessment: the impact of GHG emissions arising from the Project on the climate over its design life (construction, operation and maintenance).

18.1.3 This chapter should be read in conjunction with the following chapters which provide the Project context and approach to Environmental Impact Assessment (EIA):

- **Chapter 2 Regulatory and Planning Policy Context**;
- **Chapter 3 Main Alternatives Considered**;
- **Chapter 4 Description of the Project**; and
- **Chapter 5 EIA Approach and Methodology**.

18.1.4 There are interrelationships with other disciplines. Therefore, this chapter should also be read in conjunction with the following chapters:

- **Chapter 8 Ecology and Biodiversity** – outputs from the biodiversity assessment will be used in the land use GHG assessment;
- **Chapter 13 Traffic and Transport** – GHG calculations may use outputs from the traffic and transport assessment;
- **Chapter 14 Air Quality** – there is a strong relationship between GHG emissions and air quality; similar inputs will be used in the assessment; and
- **Chapter 19 Cumulative Effects** includes consideration of the potential for in-combination and cumulative effects on climate.

18.2 Legislation, Policy Framework, and Guidance

Legislation and National Policy

18.2.1 Legislation and national policy relevant to the Project and this chapter are described in **Chapter 2 Regulatory and Planning Policy Context**, and supporting appendices **Appendix 2A Key Legislation**, **Appendix 2B National and Regional Policy** and **Appendix 2C Local Policy**.

Regional and Local Policy

18.2.2 **Chapter 2 Regulatory and Planning Policy Context** sets out relevant regional and local policy. Regional and local plans or policies relevant to this assessment are as follows:

- South East Lincolnshire Local Plan 2011-2036, Policy 31: Climate Change and Renewable and Low Carbon Energy (Ref 18.1);
- Melton Local Plan 2011-2036, Policy EN8 – Climate Change and Policy EN9 – Ensuring Energy Efficient and Low Carbon Development (Ref 18.2);
- Harborough Local Plan 2011-2031, Policies CC1 Mitigating climate change and CC2 Renewable energy generation (Ref 18.3);
- North Northamptonshire Local Plan Joint Core Strategy, Policy 26 Renewable and Low Carbon Energy (Ref 18.4);
- West Northamptonshire Local Plan Objective 1 Climate Change, Policy S10 Sustainable Development Principles, Policy S11 Low Carbon and Renewable Energy (Ref 18.5); and
- South Kesteven District Council Local Plan 2011-2036, Policy SD1: The Principles of Sustainable Development in South Kesteven and RE1: Renewable Energy Generation (Ref 18.6).

Guidance

18.2.3 Relevant guidance, specific to climate change, that has informed this non-statutory Draft Environmental Statement (referred to in this document as “DES” and “non-statutory DES”) and will inform the assessment within the Environmental Statement (ES), comprises:

- The Institute of Sustainability and Environmental Professionals (ISEP) (formerly Institute of Environmental Management and Assessment (IEMA)) Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance – Second Edition (Ref 18.7);
- The GHG Protocol (World Resources Institute and World Business Council for Sustainable Development GHG Protocol guidelines) (Ref 18.8);
- Ministry of Housing, Communities and Local Government, Planning Practice Guidance, Climate Change (Ref 18.9); and
- Publicly Available Specification (PAS) 2080:2023 - Carbon management in buildings and infrastructure, updated Guidance document (2023) (Ref 18.10).

18.3 Scope of Assessment

18.3.1 The scope of the assessment has been informed by **Appendix 5B Scoping Opinion** (adopted by the Planning Inspectorate on behalf of the Secretary of State on 17 December 2025) and ongoing engagement with relevant technical consultees.

18.3.2 A full summary of all issues raised relevant to climate change in the Scoping Opinion and National Grid’s response is provided in **Appendix 5C Preliminary Scoping Opinion Response**. Further details of engagement undertaken to date are provided in Section 18.4.

Matters Scoped Out of the Assessment

18.3.3 The following matters have been scoped out, as agreed with the Planning Inspectorate through the EIA scoping process:

- In-combination Climate Change Impact assessment: the combined impact of future climate conditions and the Project on receptors in the surrounding environment.
- Climate Change Risk Assessment: the resilience of the Project to future climate change impacts, including damage to the Project as a result of climate change. As set out in the Climate Change Resilience Screening Assessment conducted at the EIA Scoping stage, no further assessment of the Project's vulnerability to climate change is required in the ES beyond that considered within the Flood Risk Assessment and associated analysis presented in **Chapter 10 Water Environment**.
- Impacts from decommissioning of the Project (as noted by the Planning Inspectorate ID 3.14.5, **Appendix 5B Scoping Opinion**).

18.3.4 The design life of the Project is assumed as 40 years for the purposes of the carbon assessment, and this period is also assumed as a standard operational project lifespan for carbon assessments across other Great Grid Upgrade projects. However, with regular maintenance it is likely to extend further. At the end of design life, the Project may be decommissioned or remain in an idle state (refer to **Chapter 4 Description of the Project**).

18.3.5 If the Project is required to be decommissioned, activities associated with the decommissioning phase may result in GHG emissions, including use of on-site equipment, transport, and waste disposal. However, due to the unpredictability of the decommissioning phase at this stage, these emissions cannot be meaningfully quantified. In addition, should decommissioning occur and design life extend beyond the 40-year period, the design life would be well beyond the timeline of alignment to the UK Net Zero by 2050 targets. Therefore, any emissions associated with decommissioning would be assumed as negligible in alignment to this regulation.

18.3.6 Emission factors for the disposal of wastes are typically significantly lower than the emission factors for the production of the same materials (the embodied carbon). Decommissioning activities are also envisaged to take place over a much shorter period of time compared to the construction phase.

18.3.7 As also indicated in **Chapter 4 Description of the Project**, at the point where the Project requires decommissioning, National Grid would consider and implement a written scheme of decommissioning at least six months prior to any decommissioning works. However, as per Scoping Opinion ID 3.14.5 it was agreed that climate impacts related to decommissioning can be scoped out of the ES.

18.3.8 When interpreting the requirements of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017, the judgment of the Supreme Court in R (Finch on behalf of the Weald Action Group & Others) v. Surrey County Council (& Others) (Ref 18.11) has been considered, with particular attention to potential upstream and downstream direct and indirect effects. These principles set out in Finch have been considered in the preparation of this DES. Finch was a case in which the likely downstream impacts could be assessed, because it was inevitable that the oil produced would be refined and as an end product, would undergo

combustion. This combustion would produce GHGs into the Earth's atmosphere which could readily be calculated.

18.3.9 On a macro level, the Project would increase capacity in the electricity network, meaning that, in theory, more electricity can be transported and used, increasing the potential for additional activities requiring electricity. It is not considered that the Project, as electricity transmission infrastructure, will be the direct or indirect cause of either upstream electricity generation or downstream electricity consumption. Rather, the Project will facilitate the transport of electricity on the network in response to an increase in electricity generation and in the demand for electricity. Hence, it will not be the direct or indirect cause of GHG emissions from upstream or downstream activities.

18.3.10 It is recognised, however, that following Finch there is some uncertainty as to what is to be regarded as the direct and indirect environmental effects of a project in relation to GHG emissions. Accordingly, consideration has been given to whether increases in the capacity of the electricity network, and the potential for additional activities requiring electricity should be treated as direct or indirect effects arising from the Project. The Project would support the UK's net zero target to achieve net zero emissions by 2050 through the connection in the East Midlands to new low carbon energy generation sources, and by reinforcing the transmission network. Therefore, the operational, medium- to long-term benefits of delivering the Project on a national level are considered to outweigh any short-term impacts of GHG emissions because of material use and construction activities.

18.3.11 Having considered various potential scenarios, it was concluded that in the case of the Project, it is not possible to calculate the likely upstream or downstream direct or indirect effects. This is in contrast with the Finch case, where downstream emissions were inevitable when the oil extracted was combusted. As stated, the Project would increase capacity in the electricity network, meaning that, in theory, more electricity can be transported and used, increasing the potential for additional activities requiring electricity. However, whilst information is available at a high level regarding the amount of electricity that could flow as a result of an enhanced transmission network, it is impossible to quantify the amount of either the increase, or more likely decrease, in GHGs that could result from the use of that additional electricity capacity. This is because the transmission network, which is owned by National Grid within England and Wales and which is provided as the connection point for electricity and demand, consists of a number of different elements including overhead lines, cables, substations and more recently, high voltage direct current systems. National Grid Electricity Transmission does not control which generators are generating electricity at any one time nor does it control which demand is connected to the system and therefore it is not known where or how the power being transmitted by this project will be generated. This approach to interpreting Finch has also been taken on the National Grid Electricity Transmission Sea Link Project.

18.3.12 As a result, National Grid Electricity Transmission has no way of assessing where the power is generated (and by what means) or more significantly where the power is going (i.e. who will be the end user of or what the ultimate use of that electricity might be) and consequently, any related emissions arising from its use. The end use of the electricity is unknown and may even be used in a way that reduces GHG emissions that would otherwise be emitted, for example when used to charge electric vehicles, or for powering heat pumps that replace gas central heating.

18.3.13 The Scoping Report for the Project (**Appendix 5A EIA Scoping Report**) indicated that a quantitative assessment of GHG impacts would be undertaken, where information is not available, and industry benchmarks and conservative assumptions applied. Therefore, consideration has been given to the availability of evidence and information necessary to support such an assessment, e.g. whether the Project would be the direct or indirect cause of either upstream electricity generation or downstream electricity consumption. As set out in paragraphs 18.3.8-18.3.12 above, insufficient evidence is available to enable a meaningful qualitative assessment of these matters. As such, it is not possible to reach a reasoned conclusion that a possible effect is 'likely', and there is therefore no requirement for that effect to be identified and assessed.

18.4 Stakeholder Engagement

18.4.1 Given the nature of the Project and its direct contribution towards supporting the UK's net zero target by connecting low carbon infrastructure to the National Electricity Transmission System (NETS), no specific future engagement is currently planned for climate change over and above the Stage 1 and Stage 2 Consultations for the Project.

18.5 Assessment Methodology

18.5.1 This section describes the methodology used to establish the existing and future baseline together with the methodology/approach used to undertake the preliminary assessment on climate change. The overarching approach is also described in **Chapter 5 EIA Approach and Methodology**. This section also identifies further assessment needed to be undertaken as part of the ES.

Study Area

18.5.2 The Study Area for the GHG impact assessment covers all direct GHG emissions arising from activities undertaken within the draft Order Limits during the construction, operation and maintenance phases of this Project. It also includes indirect emissions arising outside the draft Order Limits, for example emissions embedded within the construction materials arising because of the energy used for their production, as well as emissions arising from the transportation of materials and waste.

18.5.3 The Study Area also considers how the Project contributes to decarbonisation of the electricity grid in the UK.

Data Collection

Desk study

18.5.4 At this stage, detailed materials and construction information is not yet available, so Project information, including overhead line length and transmission capacity has been used together with representative project templates developed by National Grid

within the Moata Carbon Portal (MCP)[1] to develop a carbon baseline for typical construction, and operation and maintenance emissions.

18.5.5 This baseline will be updated for the ES as more detailed information becomes available.

Impact Assessment Methodology

18.5.6 This section sets out the methodology for the assessment of effects on the climate associated with the Project. It builds on the general assessment methodology presented in **Chapter 5 EIA Approach and Methodology**.

18.5.7 All conclusions and assessments are preliminary. All assessment work has applied, and continues to apply, a precautionary principle, in that where limited information is available (in terms of the proposals for the Project), a realistic worst-case scenario is assessed.

18.5.8 The lifecycle GHG assessment follows a project lifecycle approach to calculate estimated GHG emissions arising from the construction, operation and maintenance phases of the Project (**Table 18.1**). The calculation outputs are used to identify GHG 'hot spots' (i.e. emissions sources likely to generate the largest amount of GHG emissions). This enables the identification of priority areas for mitigation where adverse climate effects are identified at the ES stage, in line with the principles set out in ISEP guidance (Ref 18.7).

18.5.9 In line with the World Business Council for Sustainable Development and World Resources Institute GHG Protocol guidelines (Ref 18.8), the GHG assessment is reported as tonnes of carbon dioxide equivalent (tCO_2e) and will consider the seven Kyoto Protocol gases:

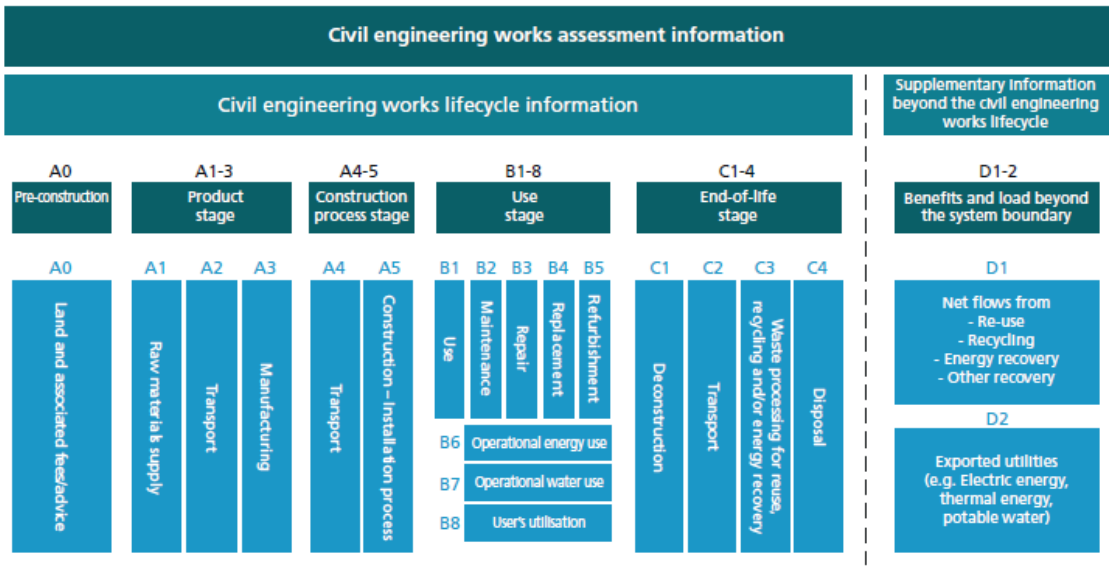
- carbon dioxide (CO_2);
- methane (CH_4);
- nitrous oxide (N_2O);
- sulphur hexafluoride (SF_6);
- hydrofluorocarbons (HFCs);
- perfluorocarbons (PFCs); and
- nitrogen trifluoride (NF_3).

18.5.10 These GHGs are broadly referred to in this chapter under an encompassing definition of 'GHG emissions', with the unit of tCO_2e (tonnes CO_2 equivalent) or $MtCO_2e$ (mega tonnes of CO_2 equivalent).

18.5.11 GHG emissions have been calculated according to PAS 2080:2023 Carbon management in buildings and infrastructure (Ref 18.10). PAS 2080 sets out lifecycle modules for assessing GHG emissions across the Project lifecycle. The PAS 2080 lifecycle modules are illustrated in **Image 18.1**.

[1] MCP was adopted by National Grid to replace the existing Carbon Interface Tool (CIT) approach to measure the carbon impact of projects. Aligned to PAS 2080 it allows for greater collaboration and deeper analysis of carbon impacts.

Image 18.1 PAS 2080:2023 lifecycle modules



18.5.12 **Table 18.1** summarises the key anticipated GHG emissions sources associated with the Project by lifecycle stage, in accordance with PAS 2080 lifecycle modules.

Table 18.1 Anticipated lifecycle GHG emissions sources associated with the Project by lifecycle stage

Phase	Activity	Primary Emission Sources
Production phase A1-3	A1-3: Raw material extraction and manufacturing of products required to build the equipment for the Project; Transportation of materials for processes/manufacturing (where available).	Embodied GHG emissions from energy use in the extraction of materials and manufacture of components and equipment. GHG emissions from the transportation of products and materials during their processing and manufacture. Due to the nature of the equipment, this could require shipment of certain aspects over significant distances.
Construction phase A4-5	A4: Transportation of construction materials to the site.	GHG emission from the transportation and installation of materials to and from the site.
	A4: Transportation of construction workers to the site.	GHG emission from the transportation of workers to and from the site.
	A5: On-site construction activity including emissions from construction compounds.	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on-site, and construction worker commuting. SF_6 in switchgear may also be an emissions source, although this is likely to be low, in line

Phase	Activity	Primary Emission Sources
		with NGET's commitment set in RIIO-ED2.
	A5: Disposal of any waste generated by the construction phase.	GHG emissions from disposal and transportation of waste.
	A5: Land use change.	GHG emissions from net loss/gain of sequestered carbon.
	A5: Water use.	Provision of potable water, and treatment of wastewater.
Operation and maintenance phase	B1: Use	Fugitive gases arising from the Project.
	B2-5: Maintenance, repair and replacement.	Embodied GHG emissions from energy use in the extraction of materials and manufacture of components and equipment for replacement.
	B6: Operational Energy	Substations consume some energy to power safety and control equipment.
	B8: Operational processes.	Network losses: electricity purchased from the power generators will be consumed during its transmission and distribution to end-customers due to electrical resistance.

18.5.13 The total expected lifecycle GHG emissions across construction (inclusive to the embodied carbon in materials), as well as at the operation and maintenance stages of the Project, have been quantified using a calculation-based methodology as per the following equation, and aligned with the GHG Protocol (Ref 18.8):

Activity data x GHG emissions factor = GHG emissions

18.5.14 Due to limited data availability at this preliminary stage, a high-level assessment (**Table 18.5**) has been undertaken to estimate the lifecycle (construction and operation) GHG emissions for the Project based on emissions associated with typical projects using representative templates developed by National Grid within the Moata carbon tool. Using data from these templates a carbon baseline for PAS 2080 modules A1-3, A4, A5, and B2-5, B6 and B8 (construction and operation) has been developed.

18.5.15 When evaluating the significance of the GHG emissions, all new GHG emissions contribute to a negative environmental impact in line with ISEP GHG Assessment Guidance (Ref 18.7). The significance of a project's emissions should therefore be based on its net impact over its design life, which may be positive, negative or negligible. The crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.

18.5.16 The Project is anticipated to support the UK transition to net zero by 2050 by increasing the capability of the UK national electricity grid to transmit low carbon energy. The associated GHG benefits are outside of the system boundary and fall under Module D as per PAS 2080 lifecycle modules (**Image 18.1**). Module D is not within the scope of this assessment and, therefore will not be formally assessed. However, the potential benefits of the Project associated with the UK transition to net zero will be described qualitatively to inform the evaluation of significance of impact.

18.5.17 The sensitivity of the receptor (i.e. the global climate) to increases in GHG emissions is always defined as high, as any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future five-year carbon budgets. Also, the extreme importance of limiting global warming to below 1.5 °C in line with and as asserted by the international Paris Agreement (Ref 18.12) and the climate science community.

Significance criteria

18.5.18 For the GHG impact assessment, the magnitude of impact considers the output of the GHG quantification process, i.e. the Project's GHG lifecycle footprint, in the context of its contribution to the UK's carbon budgets and the possible impact of the Project on the UK meeting its net-zero target. Emissions from the Project are presented as a percentage of the carbon budget period under which they fall.

18.5.19 According to the ISEP guidance on assessing GHG emissions in EIA (Ref 18.7), '*GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such any GHG emissions or reductions from a project might be considered to be significant*'.

18.5.20 As discussed, the significance of a project's impact on the climate is not based solely on the magnitude of emissions. The ISEP guidance (Ref 18.7) describes five distinct levels of significance which are given in **Table 18.2.** These are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5 °C aligned transition towards net zero.

18.5.21 A 'minor adverse' or 'negligible' effect is considered not significant. This does not necessarily refer to the magnitude of GHG emissions being carbon neutral (i.e. zero on balance) over its lifespan, but refers to mitigation of emissions to a relative baseline, aligning Project emissions with a science-based 1.5 °C compatible trajectory and achieving net zero by 2050.

18.5.22 A project's impact can shift from significant adverse to not significant effects by incorporating mitigation measures that substantially improve on the baseline. In this case, the baseline is the 'business-as-usual' scenario in which the Project is not constructed and operated and so has no effect on the science-based emissions trajectory of ongoing but declining emissions towards net zero.

Table 18.2 Definition of levels of significance

Significance level	Effects	Description
Significant	Major adverse	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
	Moderate adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Not significant	Minor adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with the measures necessary to achieve the UK's trajectory towards net zero.
	Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Significant	Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

18.5.23 The ISEP guidance (Ref 18.7) also states it is down to the professional judgement of the practitioner to determine how best to contextualise a project's GHG impact and assign the level of significance. It is suggested that sectoral, local, or national carbon budgets can be used, as available and appropriate, to contextualise the magnitude of a project's GHG impact. To determine the level of significance, the magnitude of impact against carbon budgets, alignment with the UK's trajectory to net zero, and how the Project aligns and contributes to UK policy is considered. The approach adopted for the purposes of this assessment is outlined below.

18.5.24 Where available, UK national carbon budgets (listed in **Appendix 2A Key Legislation**), have been used for the purposes of this assessment to represent future emissions inventory scenarios for the UK. These legally binding targets, which outline the total amount of GHGs that the UK can emit over a five-year period, are currently available for the sixth carbon budget period (2033–2037). The UK is currently in the fourth carbon budget period, which runs from 2023 to 2027. The third, fourth and fifth carbon budgets reflect the previous 80% reduction target by 2050. The sixth carbon budget aligns with the legislated 2050 net zero target. These are presented in **Table 18.3**.

18.5.25 The construction programme of the Project (anticipated to be 2030 to 2035 including any reinstatement required) spans the fifth and sixth carbon budgets. The annual average GHG impact of the Project has been compared against the annualised carbon budget for the period in which the emissions arise to allow separate assessment of each lifecycle stage.

18.5.26 Operation and maintenance GHG emissions as a result of the Project (assumed to be fully operational by 2035) have been compared to all the appropriate and available carbon budgets within the design life of the Project: sixth, seventh, eighth and ninth carbon budgets (2033 to 2037, 2038 to 2042, 2043 to 2047 and 2048 to 2050 respectively).

18.5.27 To illustrate the Project's contribution towards the wider net zero by 2050 trajectory, the Climate Change Committee's (CCC) balanced net zero pathway is utilised post-2037 (Ref 18.13), in the absence of any nationally legally binding carbon budgets after the sixth carbon budget. The CCC advised the UK government on the level of its seventh carbon budget in early 2025 but it is not yet ratified into law. Beyond 2050, it is implied that the UK will remain at net zero. Therefore, the seventh, eighth and ninth budgets are indicative, and may be subject to change. The proposed budgets up to 2050 are in line with the UK's 1.5-degree trajectory (**Table 18.3**).

18.5.28 However, it should be noted that the CCC's proposed budgets beyond 2037 have not been formally adopted by the government or legislated for by parliament and can therefore only be used as an indicative measure to contextualise the Project's contribution towards the national net-zero trajectory.

Table 18.3 UK carbon budgets and indicative carbon budgets based upon the CCC's balanced net zero pathway

Carbon Budget	Cumulative UK Carbon Budget ($MtCO_2e$)	Cumulative Indicative Carbon Budget Totals Based upon the CCC's Balanced Net Zero Pathway ($MtCO_2e$)
Fourth (2023–2027)	1,950	-
Fifth (2028–2032)	1,725	-
Sixth (2033–2037)	965	-
Seventh (2038–2042)	-	535
Eighth (2043–2047)	-	220
Ninth (2048–2050)	-	23

18.5.29 In addition to providing advice that underpins the setting of national carbon budgets, the CCC also provides sector-specific decarbonisation pathways (Ref 18.13). **Table 18.4** presents the electricity supply balanced pathway sector-specific carbon budgets as further context to the GHG emissions assessment; however, it should be noted that these are not legislated like the national-level budgets.

Table 18.4 Sector-specific electricity supply carbon budgets based upon the CCC's balanced net zero pathway

Carbon Budget Period	Recommended Carbon Budget ($MtCO_2e$)
2033–2037	29
2038–2042	22
2043–2047	10
2048–2050	3

Assessment Assumptions and Limitations

18.5.30 The GHG impact assessment presented in this chapter has relied on currently available information as described in **Chapter 4 Description of the Project**, and relevant data from the templates found within the Moata carbon tool. An initial assessment has been conducted using the tool and evaluated for significance using sectorial and national carbon budgets. This information is likely to develop further in response to ongoing design, assessment and stakeholder feedback, and will be updated for the ES.

18.5.31 GHG emissions associated with the decommissioning phase are scoped out of the assessment, as previously identified in this DES.

18.5.32 Overall, this is a conservative assessment, as emissions have been calculated without accounting for decarbonisation. Using current technology, the Project in its current form would continue to contribute to impacts on the climate beyond the national net zero target of 2050, as the Project's operational lifespan is likely to exceed 40 years.

18.6 Baseline Conditions

Existing Baseline

18.6.1 The current (existing) and future baseline for the GHG assessment of the impact of the Project on climate is a 'business-as-usual' scenario where the Project is not constructed and operated and therefore, no new emissions that may have been produced as a result of the Project will occur. The baseline comprises existing carbon stock and sources of GHG emissions within the draft Order Limits and the existing site activities within them.

18.6.2 The draft Order Limits include land required to deliver approximately 60 km of new overhead 400 kV line, the new WMEL-A and WMEL-B Substation Siting Areas, and reconductoring of approximately 66 km of the existing network. The surrounding landscape is predominantly arable land, intersected by various water bodies, and towns such as Melton Mowbray and smaller villages. The Project does not directly

impact designated habitat sites but would impact linear tree belts and hedgerows. Nearby infrastructure includes the Grendon 400 kV substation. The vegetation within the draft Order Limits suggests a carbon sequestration potential.

18.6.3 Current land use within the draft Order Limits has limited levels of associated GHG emissions as the land use is largely agricultural. Baseline agricultural GHG emissions are dependent on soil and vegetation types that are present, as well as the fuel used for the operation of vehicles and machinery.

18.6.4 As it is not possible to accurately calculate a GHG baseline, in line with ISEP guidance, the baseline is assumed to be zero. This approach represents a worst-case scenario as all GHG emissions associated with the Project are additional to the baseline.

Future Baseline

18.6.5 The future baseline for the GHG assessment is a business-as-usual position whereby the Project is not implemented. This includes the operational emissions from the generation of electricity that would occur should the Project not go ahead but which will be displaced in the case of the Project being delivered.

18.6.6 The current land use within the draft Order Limits will have limited levels of associated GHG emissions from agricultural activities and minor carbon sequestration from vegetation. Therefore, for the purpose of the GHG assessment, embodied GHG emissions are considered zero in the future baseline.

18.7 Design, Standard, and Additional Mitigation Measures

18.7.1 Mitigation measures to avoid, reduce, manage, or control potential impacts and resulting effects of the Project are typically described and considered in assessment in three groups or types as defined in **Chapter 5 EIA Approach and Methodology** of this DES. Each measure considered in this preliminary assessment is described in the relevant section below.

Design Measures

18.7.2 The Project and draft Order Limits have been designed to avoid sensitive receptors as far as practicable. This is in accordance with the Holford Rules (Ref 18.14) applicable to routeing of new overhead lines and the Horlock Rules (Ref 18.15) which apply to the design and siting of substations.

18.7.3 Environmental appraisal has been an integral part of the Project design from the outset, which has meant that the Project has been able to avoid environmentally sensitive features as far as reasonably practicable.

18.7.4 National Grid has embedded measures into the design of the Project to avoid or reduce significant effects that may otherwise be experienced during the construction and operation (and maintenance) of the Project. There will be ongoing consideration of the contributions that this Project can make towards National Grid's overarching ambitions for net zero emission by 2050 (Ref 18.16), aligned with the Science Based Targets initiative.

18.7.5 Design measures are those that are intrinsic to, and built into, the design of the Project; these are presented in **Table 4.2** in **Chapter 4 Description of the Project**. Measures of relevance to the climate change chapter include:

- Sensitive routeing and siting to develop the draft overhead line alignment, siting of substations and draft Order Limits.
- The Project will be designed to comply with design safety standards including NETS Security and Quality of Supply Standard and the suite of National Grid policies and processes which contains details on design standards required to be met when designing, constructing and operating its projects.

Standard Measures

18.7.6 Standard measures are those that would be implemented on a project of this scale and nature regardless of being subject to statutory assessment. As such, it can be assumed these measures will be implemented and therefore included in the assessment.

18.7.7 A range of standard measures for the Project will be adopted throughout the duration of the construction phase. A Draft Outline Code of Construction Practice is provided in **Appendix 4A Draft Outline Code of Construction Practice**. Measures relevant to the control and management of impacts that could affect the climate (specifically, GHG levels) include (refer to **Appendix 4A** for the full description of each measure):

- GG08: The Construction Environmental Management Plan shall include measures to manage dust, waste, water, noise, vibration and soil during construction. The contractor(s) shall undertake daily site inspections to check conformance to the Environmental Control Plan.
- GG15: Materials and equipment will not be moved or handled unnecessarily. When loading and unloading materials from vehicles, including excavated materials, drop heights will be limited.
- GG21: Bonfires and the burning of waste material will be prohibited.
- GG22: Construction lighting will be of the lowest luminosity necessary to safely perform each task.
- GG23: It will be required to follow the guidance in the Code of Practice developed by Contaminated Land: Applications in Real Environments (CL:AIRE) ‘A Definition of Waste: Development Industry Code of Practice (DoWCoP)’.
- CC01: The contractor(s) would develop and implement a Carbon Efficiency Plan as part of their Environmental Management System, to manage carbon emissions from construction activities.
- CC02: Sets out mitigation measures which may be included within the Carbon Efficiency Plan.

Additional Mitigation Measures

18.7.8 Additional mitigation measures are those identified through assessment to reduce likely significant adverse environmental effects which may still occur despite the inclusion of the embedded design and standard measures described above.

18.7.9 No additional mitigation measures have been identified at this stage beyond the embedded design measures and standard mitigation measures detailed above. However, additional mitigation measures will continue to be reviewed as the design develops and assessment progresses to the ES.

18.8 Preliminary Assessment of Effects

18.8.1 A summary of potential impacts and mitigation measures identified in this preliminary assessment, and likely significance of the resulting effect with that mitigation in place, is provided in **Table 18.9.** Where appropriate for likely significant or notable effects, further explanation is provided in the following sections on construction, and operation and maintenance effects.

18.8.2 This section first identifies the potential effects that could occur as a result of the construction, operation and maintenance of the Project where effects relate to the lifecycle GHG assessment.

18.8.3 The preliminary assessment takes into account the design and standard mitigation measures as set out in Section 18.7.

Potential Effects

18.8.4 The potential for the Project to result in likely significant effects on climate was determined through the EIA Scoping process. This section lists those effects identified in the EIA Scoping Report (**Appendix 5A EIA Scoping Report**) as having potential to be significant and therefore scoped into the assessment.

18.8.5 At the time of developing this DES, the Project design is still in the early stages, and the lifecycle GHG assessment is based on standard packages provided by National Grid rather than specific detailed design data. This allows robust conclusions on the likely significance of effects based on available design information at this early stage when using ISEP methodology. Assumptions will be checked with design teams prior to the ES stage.

18.8.6 The GHG emissions of this Project have been estimated using the templates available within Moata and presented in **Table 18.5.** This gives an estimation of the total whole lifecycle GHG emissions (tCO_2e) for the Project of 131,178 tCO_2e.

18.8.7 The GHG assessment assumes the construction phase of the Project is five years from 2030 to 2035. The GHG assessment assumes the operational and maintenance phase is from 2035 until the end of the design life in 2074, approximately 40 years.

Table 18.5 Carbon assessment

PAS 2080 Lifecycle Stage	Total for Each Phase (tCO_2e)
Construction	**63,852**
Operation	**62,326**
Total	**131,178**

Construction

Magnitude of impact

18.8.8 The GHG emissions associated with the construction phase of the Project are estimated to be 63,852 tCO_2e. The majority of these construction phase emissions are likely to be embodied carbon in construction materials, particularly for new overhead lines (refer to **Chapter 4 Description of the Project**). Other construction emission sources are likely to include emissions associated with transport and construction and installation processes.

Significance of effect

18.8.9 To contextualise this impact, these estimated construction emissions are compared in **Table 18.6** to the total UK carbon budgets, which coincide with the construction period. Estimated construction emissions are assumed to be distributed evenly across the years of the construction period.

Table 18.6 Comparison of potential construction phase GHG emissions with the total UK carbon budgets

UK Carbon Budget Period	UK Carbon Budget $MtCO_2e$	Potential Construction Emissions ($MtCO_2e$)	Percentage Contribution of Potential Construction Emission to the UK Carbon Budget
Fifth (2028–2032)	1,725	0.0383	0.00222%
Sixth (2033–2037)	965	0.0255	0.00265%

18.8.10 The potential GHG emissions related to the construction phase of the Project are estimated to contribute less than 0.01% of the respective fifth and sixth UK carbon budgets. In accordance with the ISEP guidance (see Section 18.5), the effect of GHG emissions associated with the construction of the Project is deemed to be not significant as it is less than 1% in each carbon budget, so is consistent with reducing GHG emissions in a trajectory towards net zero by 2050.

Operation and maintenance

Magnitude of impact

18.8.11 The operational phase of the Project is currently anticipated to begin in 2035. The GHG emissions associated with the operational phase of the Project are estimated to

be approximately 67,326 tCO_2e, assuming a reference lifespan of 40 years. These emissions are likely associated with maintenance; energy use (for substations); transmission losses; and fugitive gases.

Significance of effects

18.8.12 To contextualise this impact, these estimated operational emissions are compared to the respective UK carbon budgets, which coincide with the operational period. This comparison is presented in **Table 18.7**. For the sake of this comparison, the estimated operational emissions are assumed to be distributed evenly across the years of the operational period. The sixth carbon budget is legally binding, and the seventh, eighth and ninth budgets are indicative and not yet ratified into law.

Table 18.7 Comparison of potential operation phase GHG emissions with overall UK carbon budget, as well as sector specific ('electricity generation') carbon budgets.[2]

UK Carbon Budget Period	UK Carbon Budget $MtCO_2e$	Potential Operational Emissions ($MtCO_2e$)	Percentage Contribution of Potential Operational and Maintenance Emissions to the Overall UK Carbon Budget (%)
Sixth (2033–2037)	965	0.00505	0.0005
Seventh (2038–2042)	535	0.00842	0.0009
Eighth (2043–2047)	220	0.00842	0.0009
Ninth (2048–2050)	23	0.00505	0.0005

18.8.13 The potential GHG emissions related to the operational and maintenance phase of the Project are estimated to contribute to less than 0.1% of each respective UK carbon budget.

18.8.14 To ensure robustness of the assessment and allow for temporal flexibility, the annual operational emissions have also been compared to the sector-specific carbon budgets for electricity generation as identified in the database associated with the seventh carbon budget (Ref 18.13); these are detailed in **Table 18.8.**

Table 18.8 Sector-specific electricity generation carbon budgets relevant to the operational period of the Project.

UK Carbon Budget Period	UK Sectorial Carbon Budget $MtCO_2e$)	Potential Operational Emissions ($MtCO_2e$)	Percentage Contribution of Potential Construction Emission to the UK Carbon Budget (%)
Sixth (2033–2037)	29	0.00505	0.0174
Seventh (2038–2042)	22	0.00842	0.0383

[2] The sixth budget is legally-binding, and the seventh, eighth, and ninth budgets are indicative and not yet ratified into law.

UK Carbon Budget Period	UK Sectorial Carbon Budget $MtCO_2e$)	Potential Operational Emissions ($MtCO_2e$)	Percentage Contribution of Potential Construction Emission to the UK Carbon Budget (%)
Eighth (2043–2047)	10	0.00842	0.0842
Ninth (2048–2050)	3	0.00505	0.1683

Overall GHG impact and significance

18.8.15 The overall significance of GHG emissions in terms of their impact on the climate is summarised below. This takes into account emissions in the context of the UK carbon budgets and national policy.

18.8.16 As identified earlier in this assessment, the overall estimated GHG emissions of the Project contribute to less than 0.01% of each respective UK carbon budget across construction and operational phases, and less than 0.2% of each respective UK sector-specific UK carbon budget.

18.8.17 Although the construction and operation of the Project will directly result in increased GHG emissions, to provide context, consideration also needs to be given to its role in wider UK policy to decarbonise the electricity grid, namely National Policy Statements EN-1 and EN-5 described in **Appendix 2B National and Regional Policy**). Over its lifetime, the Project will provide a key contribution to the UK, fulfilling its net zero policy and transition away from fossil fuels. By reinforcing the electricity transmission network, the Project will facilitate the connection of new renewable and low-carbon energy generation and transmission. Without projects such as this that facilitate the connection and transmission of low-carbon energy generation projects to the network, GHG intensity will not decrease as projected, thereby adversely affecting the UK's ability to meet its carbon reduction targets.

18.8.18 This statement is consistent with the position taken in paragraph 150 of the Supreme Court Judgment for R (on the application of Finch on behalf of the Weald Action Group) (Appellant) v Surrey County Council and others (Respondents) (Ref 18.11).

18.8.19 In this there is a need for the relevant planning authority to consider the beneficial indirect effects of a project on the climate, as well as adverse effects, as a material planning consideration: '*Just as beneficial indirect effects of a project on climate - for example, the "green" energy that would be generated by a project to develop a wind farm or solar farm - are clearly a relevant matter for the planning authority to consider, so corresponding adverse effects are also a material planning consideration*' (paragraph 150 of the Judgment, Ref 18.11).

18.8.20 It has been estimated that the largest portion of emissions are associated with the construction phase of the Project. However, it is anticipated that the potential benefits of improving efficiency and enabling greater renewable energy connections from the Project will far outweigh the associated emissions.

18.8.21 In accordance with the ISEP guidance (see Section 18.5), the effect of GHG emissions associated with the Project is deemed to be minor adverse and therefore **not significant**, because the Project's GHG impacts would be fully consistent with applicable existing policy requirements and good practice design standards for projects of this type. A project with 'not significant' effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero. The Project will

support the ambitions for UK policy to decarbonise the electricity grid and transition to net zero by 2050.

18.8.22 The GHG emissions throughout the lifetime of the Project reflect how the increased capacity to be provided by the Project, can provide greater opportunities for future renewable energy connections by way of increasing the capacity of the NETS. In turn this indicates the potential for the Project to support the transition to, and longer-term maintenance of, a low carbon economy.

18.8.23 The GHG calculations presented in this DES are based on standard templates for typical project types and are therefore only a high-level estimate subject to uncertainty. Although the GHG numbers are subject to change when a refined GHG calculation is conducted during the ES assessment, the conclusion of significance is not likely to change since the Project still enables decarbonisation of the UK's national electricity transmission grid.

18.8.24 **Table 18.9** summarises the preliminary assessment of increased GHG emissions.

Table 18.9 Preliminary summary of increased GHG emissions

Receptor(s)	Key Design, Standard and Additional Mitigation	Impact	Magnitude of Change (tCO_2e)	Sensitivity/Value	Likely Significance of Effect
Global climate	Several current and proposed mitigation measures are set out in Section 18.7 of this report regarding reducing construction and operational emissions.	Initial increase of GHG emissions due to construction and operation. However, over its lifetime, the Project is key in enabling the UK to fulfil its net zero policy and move away from fossil fuels.	131,178	The sensitivity of the receptor (global climate) to increases in GHG emissions is always defined as high, as any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future five-year carbon budgets.	In accordance with the ISEP guidance (Ref 18.7) the effect is deemed to be minor adverse and therefore **not significant**, because the Project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero. The Project is part of UK policy to decarbonise the electricity grid and transition to net zero by 2050.

Alternative scenarios

18.8.25 As described in Section 4.4 of **Chapter 4 Description of the Project**, there are elements of the Project which have not been fixed at this stage. Therefore, flexibility needs to be considered in this DES. Two alternative scenarios are outlined in **Table 4.3** of **Chapter 4 Description of the Project** and are assessed in **Table 18.10**.

18.8.26 This assessment considers each scenario, together with the assumptions and mitigation measures described in this chapter. It provides a qualitative appraisal of the potential changes to the preliminary conclusions reported in this section, should these scenarios occur.

18.8.27 **Table 18.10** presents the conclusions of this appraisal, supported by appropriate qualitative justification, to ensure that any potentially significant effects are identified in this DES. If these alternative scenarios remain under consideration in the application for development consent, they will be appropriately assessed in the ES.

Table 18.10 Preliminary assessment of alternative scenarios

Scenario	Potential Change in Impacts	Potential Change in Effects
1. No or reduced haul roads	The haul roads currently considered as part of the Project were proposed along the length of the overhead line and are likely to result in embodied emissions. Therefore, the avoidance of this asset in any capacity also avoids embodied GHG emissions. However, this alternative scenario could change the flow of construction vehicles, forcing them to travel longer distances or idle for longer when using local road networks, even if some existing agricultural vehicles are used as replacement. This could lead to a potential increase in emissions associated with transport of materials and personnel to site due to increased fuel consumption.	For the DES stage, limited detailed design information is available for asset quantities and materials, so a high-level assessment has been undertaken based on emissions associated with typical projects using templates developed by National Grid within the Moata carbon tool. From this, it can be estimated that embodied carbon emissions associated with temporary roads make up approximately 1% of total construction emissions. There is limited data available to indicate the extent of the impact of longer routes to set down points for materials and staff. This scenario may result in a potential increase in vehicular emissions across the construction phase. However, these changes are not expected to materially affect the magnitude of GHG emissions calculated. This is due to the low proportion of emissions anticipated for construction activities within the estimated Project lifecycle emissions and the implementation of standard mitigation measures, such as those listed in **Appendix 4A Draft Outline Code of Construction Practice**. Therefore, this scenario is not anticipated to result in new or different significant effects if it were included as part of the Project.

Scenario	Potential Change in Impacts	Potential Change in Effects
2. Off-site construction compound near Melton Mowbray	A centralised off-site compound rather than scattered on-site ones is likely to reduce emissions associated with waste, and has higher potential to be connected to a mains electricity source for plant use compared to generators or other fuels to be delivered to on-site compounds. It would potentially lead to the reduction in volume of welfare provision, further reducing embodied carbon associated with the transport of such units to site. However, the centralised location may create additional construction traffic which would increase emissions associated with transport.	For the DES stage, data used for the high-level assessment is not granular enough to allow plant fuel use and transport distances to be identified individually. In addition, welfare units have not been included within the assessment at this stage. Whilst there may be increased transport emissions associated with on-site staff movement, these are likely to also result in reductions of waste and other transport emissions. The overall positive or negative impact on carbon emissions cannot be quantified at this stage; however, given the relatively low proportion of construction activities within the overall Project lifecycle, and the implementation of standard mitigation measures, such as those listed in **Appendix 4A Draft Outline Code of Construction Practice**, this scenario is not anticipated to result in a change in the effect conclusion in this assessment if it were included as part of the Project.

18.9 Monitoring

18.9.1 No significant adverse effects have been identified in the lifecycle GHG impact assessment.

18.9.2 Carbon emissions will be monitored during construction by the contractors.

18.10 Further Assessment

18.10.1 When more detailed information is available following further design development, a full GHG assessment adhering to PAS 2080 will be conducted and evaluated for significance against the carbon budgets.

18.10.2 The ES will provide final details of design, standard and additional mitigation measures which will be informed by the findings of the DES and feedback from Stage 2 Consultation.

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