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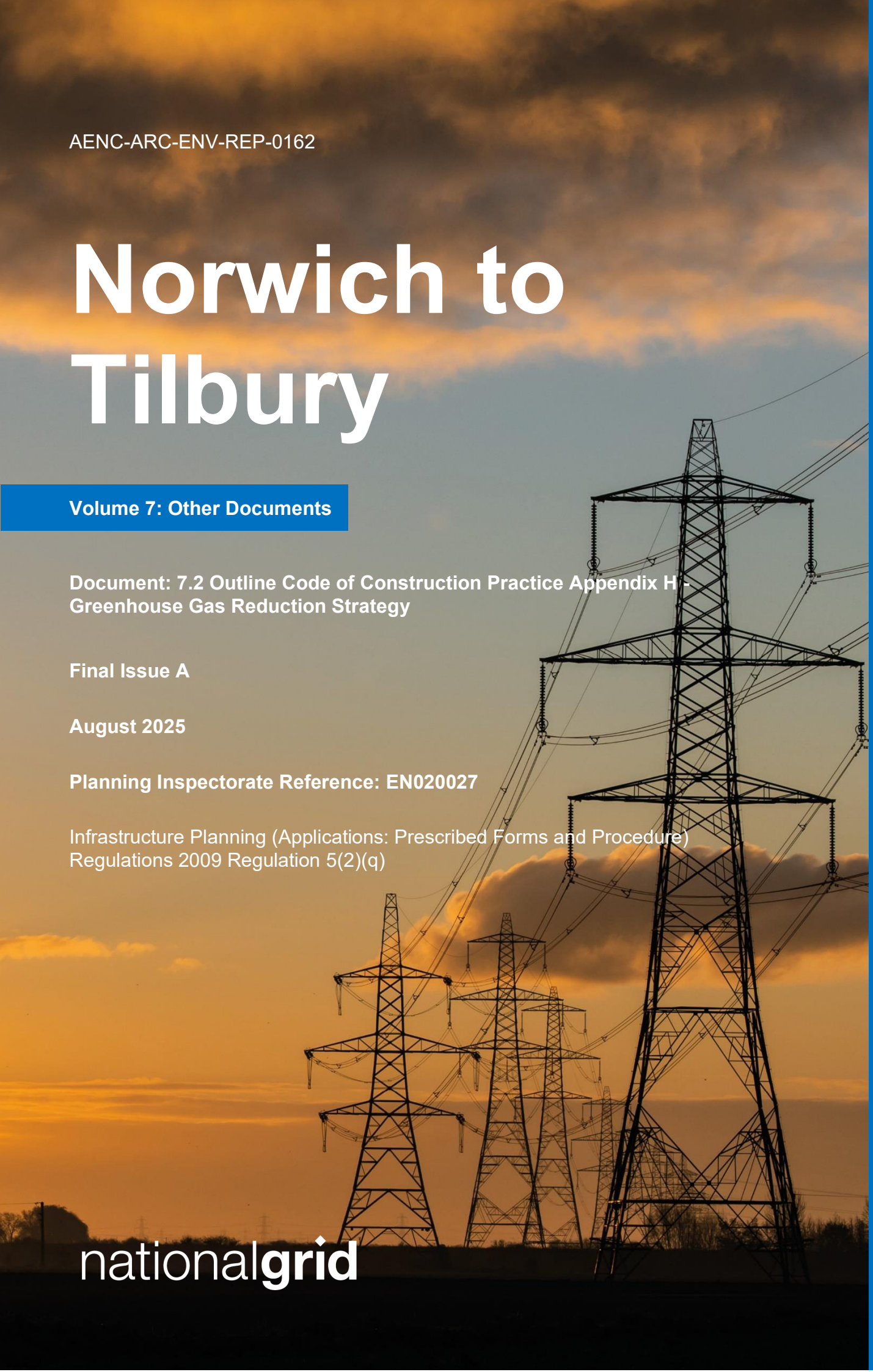

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Contents

1. Introduction

1.1 Background

1.1.1 This Greenhouse Gas (GHG) Reduction Strategy has been developed for Norwich to Tilbury (the Project) in accordance with the Overarching National Policy Statement for Energy (EN-1) (NPS EN-1) (Department for Energy Security and Net Zero (DESNZ), 2023) as part of the submission of the Development Consent Order (DCO) application.

1.1.2 This GHG Reduction Strategy covers the Project as described in ES Chapter 4: Project Description (document reference 6.4).

1.1.3 This GHG Reduction Strategy should be read in conjunction with the Appendix 4.1: Greenhouse Gas Appendix (document reference 6.4.A1). The construction and operational GHG emissions presented in this GHG Reduction Strategy are as presented in the Greenhouse Gas Appendix.

1.1.4 This GHG Reduction Strategy has been prepared following PAS 2080:2023 – Carbon Management in Buildings and Infrastructure (British Standards Institution, 2023) the foremost industry-wide standard for carbon management. PAS 2080 represents best practice for carbon management in the built environment and has informed the structure of this GHG Reduction Strategy. The carbon management principles of PAS 2080 are broadly applicable to all infrastructure types.

1.1.5 Given the national commitment to Net Zero GHG emissions by 2050, GHGs associated with infrastructure projects have become a vital topic for consideration and management throughout project optioneering, design and delivery stages.

1.1.6 This GHG Reduction Strategy provides National Grid with a routemap, setting out how the GHG emissions associated with the Project would be managed and reduced.

1.1.7 Throughout this GHG Reduction Strategy, the term ‘GHG’ includes the seven Kyoto Protocol GHGs (WRI & WBCSD, 2015). Emissions of these seven GHGs are expressed in tonnes of carbon dioxide equivalent (tCO_2e), i.e. mass of CO2 resulting in equivalent global warming potential.

1.1.8 This GHG Reduction Strategy presents the overarching GHG management principles and foundational GHG management requirements to reduce and manage GHG emissions related to the Project. This process helps maintain consistency, clarity, and collaboration, as well as a clear audit trail of applying best practices across the Project lifecycle. This GHG Reduction Strategy helps inform actions that would be undertaken at each relevant work stage.

1.1.9 A decarbonisation tracker would be developed as part of the GHG Reduction Strategy, which would contain a log of key carbon reduction opportunities identified for the Project.

1.1.10 This GHG Reduction Strategy currently sits an appendix to the Outline Code of Construction Practice (CoCP) (document reference 7.2) and would sit as an appendix to the final CoCP, however, no further information is required to be added to this document through the discharge of requirements process.

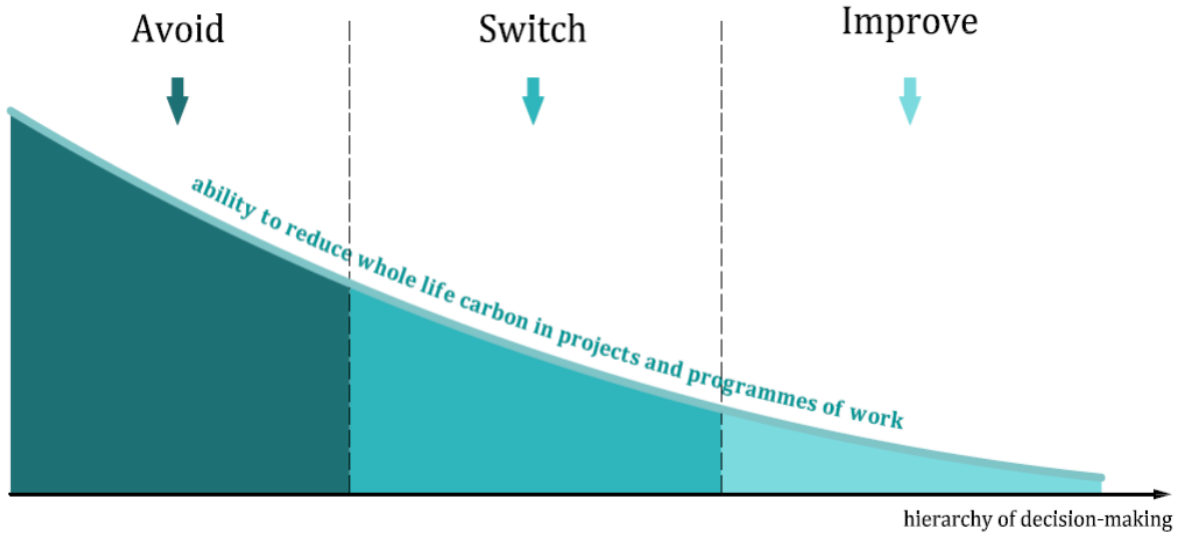
2. Benefits of this GHG Reduction Strategy

2.1.1 This GHG Reduction Strategy has been produced to meet the NPS EN-1 (DESNZ, 2023) requirement for a GHG reduction strategy to accompany the DCO application submission for the Project.

2.1.2 This GHG Reduction Strategy presents how National Grid would effectively manage GHG emissions throughout the Project lifecycle in line with National Grid's net zero goals. This strategy encourages early consideration of GHG emissions and creation of appropriate governance structures and processes. Considering the GHG impacts associated with the Project early in the design process is critical to minimising associated GHG emissions and realising the greatest benefits.

2.1.3 Image 2.1 from PAS 2080 (British Standards Institution (BSI), 2023), demonstrates how there is a decrease in GHG reduction potential over a project's lifecycle.

Image 2.1 PAS 2080:2023 Carbon reduction hierarchy



2.1.4 Image 2.1 demonstrates that the most significant GHG savings are achievable during the early stages of a project, as it is possible to implement more fundamental and transformative measures. For example, some cases include avoiding the project or project components altogether, and switching mode, method or material.

2.1.5 As a project moves beyond the design stage to the delivery and operation phases, reducing GHG emissions is possible by making processes more efficient. However, while there is less scope for high-impact reduction measures at the later stages, it is still important to consider reduction measures across all lifecycle stages. In addition to mitigating climate change, effective GHG management can also provide the following benefits:

- Increasing client, designer and contractor collaboration
- Unlocking innovation and driving better solutions

- Assisting commercial goals through cost savings, realised by increased efficiency, design and procurement choices
- Meeting stakeholder and consumer aspirations through more ambitious climate and sustainability action
- Supporting wider sustainability goals, e.g., resource efficiency and waste reduction, biodiversity protection and training opportunities for staff.

2.1.6 Consistency and continuity across the project lifecycle are crucial for effective GHG management in any project. By implementing proactive systems thinking and a whole-life approach early on, National Grid can integrate GHG management throughout the Project, resulting in more efficient GHG mitigation and improved sustainability outcomes in line with National Grid's net zero goals.

3. GHG Management Approach

3.1 GHG Reduction Strategy Objectives

3.1.1 This document describes how GHG emissions associated with the Project would be managed, in accordance with NPS EN-1 (DESNZ 2023) and the National Grid commitment towards net zero by 2050. The strategy describes GHG reduction opportunities to be considered during infrastructure delivery. The objectives of this GHG Reduction Strategy are to:

- Describe indicative governance, roles and responsibilities associated with GHG management
- Provide, as far as practicable, a baseline assessment of the GHG impact of the Project
- Facilitate early identification of potential GHG reduction opportunities
- Describe the Project in the context of National Grid's GHG reduction target
- Describe the indicative process for ongoing GHG management, monitoring, reporting and review.

3.2 GHG Reduction Strategy Coverage

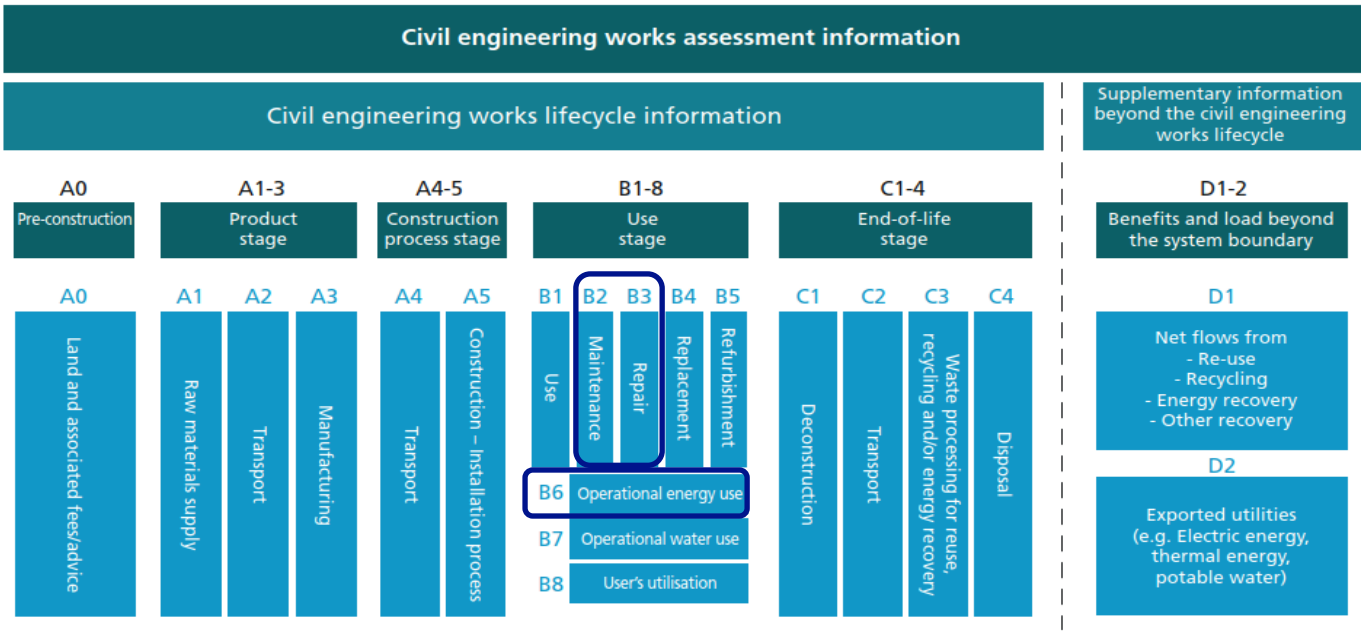
3.2.1 The scope and boundary of this GHG Reduction Strategy has been defined in line with best practice principles set out in the RICS Whole Life Carbon Assessment guidelines (Royal Institution of Chartered Surveyors (RICS), 2023) and PAS 2080:2023 Carbon Management in Buildings and Infrastructure guidelines (British Standards Institution (BSI), 2023). These principles can be applied across all sectors.

3.2.2 The RICS guidelines (RICS 2023) stipulate that as a minimum, whole life carbon assessments should account for all components relating to the Project during all life stages. As such, the PAS 2080 lifecycle modules included in this GHG Reduction Strategy have been selected based on relevance and materiality as informed by industry best practice and constraints in the practical availability of data.

3.2.3 The timescale and boundary of the GHG Reduction Strategy includes the GHG-emitting activities associated with the following PAS 2080 lifecycle modules, as illustrated in Image 3.1:

- Product Stage (A1-3)
- Transport (A4)
- Construction – Installation Process (A5)
- Maintenance and Repair (B2-3)
- Operational Energy Use (B6).

Image 3.1 PAS 2080:2023 lifecycle stages (BSI, 2023)



3.2.4 Due to the unpredictability of the decommissioning lifecycle stage, the 'End-of-life' lifecycle stage has been scoped out of this GHG Reduction Strategy, reflecting that the decommissioning environment and associated practices of the future may vary considerably to those observed currently. However, it is recognised that GHG reduction opportunities adopted during the design stage may reduce emissions associated with the decommissioning stage (e.g., reusability or recyclability of materials).

3.2.5 Sources of GHG emissions associated with the whole lifecycle of the Project are listed in Table 3.1. The GHG emissions calculations focus on quantifiable key emissions sources ('hotspots'). The availability of accurate activity data determines quantifiable emissions.

3.2.6 The GHG emissions within the scope of the GHG Reduction Strategy correspond with the GHG emissions assessed in Appendix 4.1: Greenhouse Gas Appendix (document reference 6.4.A1). Refer to the appendix for more detail on the GHG assessment methodology and assessment of GHG impacts.

Table 3.1 GHG emission sources considered within the scope of the GHG Reduction Strategy

PAS 2080 Lifecycle Stage		Emission Source(s)	In Scope of GHG Reduction Strategy?
Before Use Stage	Preconstruction Stage (A0)	Energy use and transportation demands from office-based tasks.	Scoped out as insufficient data to quantify and likely to be immaterial.
	Product Stage: Raw materials supply, transport and manufacture (A1 – A3)	Fuel consumption and energy use during extraction, transportation and manufacturing of materials to be used in the Project.	In scope

PAS 2080 Lifecycle Stage		Emission Source(s)	In Scope of GHG Reduction Strategy?
	Construction Process stage: Transport to works site; construction process (A4 – A5)	Land Clearance: Loss of biological capacity to absorb and process carbon stock loss. Fuel consumption used to transport plant and machinery to site. Fuel consumption used in transporting construction staff to site. Energy (electricity, fuel, etc.) consumption of plant, machinery, vehicles and generators etc., on site. Energy consumption required for transport and disposal of waste (including construction material waste and spoil).	In scope
Use Stage	Use (B1)	Emissions emitted directly from the use of installed products and materials.	Scoped out as no material emissions are expected from direct use (e.g. refrigerant leakage) in the context of the Project.
	Maintenance, repair, replacement, refurbishment (B2 – B5)	Emissions associated with repair and replacement of assets during the Project lifetime (including embodied carbon in materials, energy required for operation of machinery, and transport).	Maintenance and repair (B2-B3) are in scope. Replacement and refurbishment (B4-5) are scoped out as the reference operational period considered for this GHG Reduction Strategy is 40 years, in accordance with asset lifespans. No replacement is anticipated to occur before 40 years.
	Operational energy use (B6)	Emissions associated with operation of infrastructure associated with the Project, such as lighting. Emissions associated with transmission losses.	In scope.
	Users' utilisation of Infrastructure (B8)	N/A	Scoped out as not applicable to the Project context.

PAS 2080 Lifecycle Stage		Emission Source(s)	In Scope of GHG Reduction Strategy?
End of Life Stage	Deconstruction, transport, waste processing for recovery and disposal (C1 – 4)	Emissions associated with materials removal and disposal.	Scoped out due to unpredictability of the decommissioning stage at this point in time.
Benefits and load beyond system boundary	Net flows from disposal methods used, and exported utilities (D1 – 2)	Emissions associated with carbon flows beyond Project boundary.	Scoped out as insufficient information to quantify at this point in time.

3.3 GHG Management Process

3.3.1 This section describes the key elements of the GHG Reduction Strategy, which provide a framework for effectively integrating Project-specific GHG reduction priorities across the Project lifecycle.

3.3.2 The key elements of the GHG management process include:

- Developing a GHG Baseline – based on preliminary design information available at time of GHG Reduction Strategy preparation, this provides expected whole-life GHG emissions. For the purposes of this GHG Reduction Strategy, the baseline (in tCO2e) already accounts for the GHG reduction measures presented at the Project concept phase
- Holding a GHG Workshop – to be held in collaboration with National Grid, the design team, and buildability advisors to identify, review, assess and prioritise GHG reduction opportunities
- Producing a Decarbonisation Tracker – developed to record GHG reduction opportunities identified during discussions with the Project team, and to support implementation of the GHG reduction targets by assigning responsibility. This is inclusive of a framework mechanism that can be used to track progress throughout the Project lifecycle
- Developing a GHG Reduction Strategy – this document, developed to support the delivery of GHG reduction opportunities across the Project lifecycle.

4. Governance, Roles and Responsibilities

4.1.1 The CoCP (document reference 7.2) will support the implementation of the measures presented in this GHG Reduction Strategy.

4.1.2 As part of the monitoring process, the Main Construction Contractor(s) would allocate a designated Environmental Manager the responsibility of implementing the requirements of the Greenhouse Gas Reduction Strategy. This would include the development of the Decarbonisation Tracker as discussed in Section 6, to ensure that regular reviews are undertaken of the identified measures to reduce greenhouse gas emissions and the allocated owners are undertaking the necessary actions.

5. GHG Baseline

5.1.1 The approach taken to calculate the GHG emissions is presented in ES Appendix 4.1: Greenhouse Gas Assessment (document reference 6.4.A1). Emissions were calculated for both construction and operation phases.

5.1.2 The main GHG emissions are as a result of the construction phase which accounts for 89% of the Project lifecycle emissions. Operational emissions account for 10% of the Project lifecycle emissions and refer to emissions associated with transmission losses across the high voltage alternating current cable. The remaining emissions are as a result of non- Sulphur Hexafluoride (SF_6) loss through leakage.

5.1.3 Although the Project will result in GHG emissions, the Project will play a key role in decarbonising the electricity grid. Over its lifetime the Project will be a key scheme for the UK to fulfil 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 interconnectors.

5.1.4 GHG calculations would be quantified at the end of each stage of infrastructure delivery (i.e., design stage, construction stage), to monitor emissions and reductions achieved.

5.1.5 A suitably qualified carbon practitioner would undertake calculations at each stage and will align with GHG Protocol and PAS 2080:2023 (BSI, 2023) GHG quantification requirements.

6. GHG Reduction Opportunities

6.1 Identification of GHG Reduction Opportunities

6.1.1 Opportunities for the reduction of GHG emissions are identified in a Decarbonisation Tracker (which would be developed by the Main Works Contractor(s) and National Grid) and focus on reducing GHG emissions from key emissions sources. It would identify potential GHG reduction opportunities that are not committed to through the DCO. Identification of GHG reduction opportunities is a key part of the GHG management process and the Decarbonisation Tracker would provide a framework for how opportunities can be identified and prioritised.

6.1.2 Opportunities are identified in terms of the following four categories:

- Strategy and governance
- Innovative design
- Lower carbon products
- Lean construction techniques.

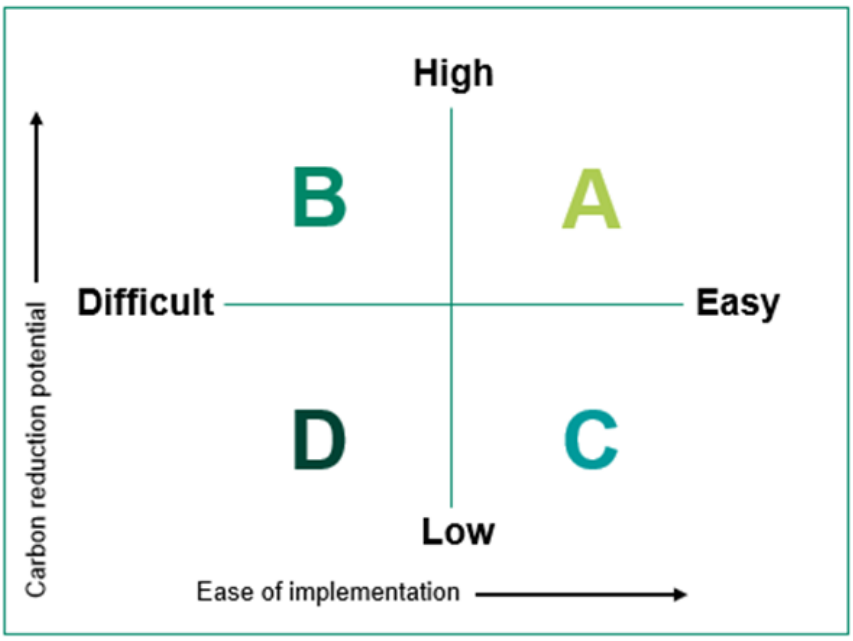
6.1.3 These categories extend across the Project lifecycle, from planning through design to delivery. By identifying and developing GHG reduction opportunities within these categories, all aspects of the Project would be considered, including management processes, procurement and company culture, and technical solutions.

6.1.4 The Decarbonisation Tracker would be a live document which would be continually updated throughout the Project lifecycle as further opportunities and actions are identified, as decisions are made concerning their feasibility, and as such opportunities are implemented.

6.2 Prioritisation of Opportunities

6.2.1 To understand the potential value of GHG reduction opportunities identified, each opportunity has been assigned a prioritisation rating based on a combination of its GHG reduction effectiveness and ease of implementation, using the matrix shown in Image 6.1.

Image 6.1 GHG reduction opportunity prioritisation matrix



6.2.2 The 'carbon reduction potential' aspect of the matrix is determined by considering the following:

- Additionality to business-as-usual (decarbonisation policy and market drivers)
- Minimising negative GHG impacts
- Maximising GHG benefits
- Level of confidence in the effect.

6.2.3 The 'ease of implementation' aspect of the matrix is determined by considering the following:

- Cost implications – positive or negative
- Resource capacity and capability
- Technological impacts – enablers or constraints
- Legislation – drivers or restrictions
- Time limitations
- Whether the opportunity fits with existing priorities and commitments
- Wider sustainability impacts – as enablers or constraints.

6.2.4 The ratings assigned to each opportunity should be seen only as an initial screening and would be reviewed periodically following further discussions and feasibility analysis as the Project progresses. Prioritisation ratings would also be assigned to any further measures identified and recorded within the Decarbonisation Tracker. This would be the responsibility of the National Grid project management team, unless delegated to the suitably qualified carbon practitioner or the owner assigned to each opportunity as appropriate.

6.2.5 Within the Decarbonisation Tracker, owners and key actions would be identified for each opportunity throughout the Project lifecycle. This enables specific responsibilities to be assigned within the Project's organisational structure.

The actions listed, and any further feasibility analysis, are the responsibility of the owner assigned to each opportunity. Any opportunities without an assigned owner would rest with the National Grid project management team until an owner is identified.

6.2.6 The progress of each opportunity is reflected by the assigned status, which identifies the opportunities that have been implemented, those under consideration, those requiring further exploration, and those not being taken forward.

7. Targets

7.1.1 National Grid's overarching decarbonisation commitment is to achieve net zero GHG emissions by 2050. This net zero target covers Scope 1 (direct emissions, e.g. fuel consumption on site), Scope 2 (indirect emissions, e.g. purchased electricity) and Scope 3 (indirect emissions from upstream and downstream, e.g. emissions associated with purchased goods). National Grid's net zero target is underpinned by the following commitments (National Grid, 2024):

- Reduce absolute Scope 1 and 2 GHG emissions 60% by 2030/2031 (from a 2018/2019 baseline)
- Reduce absolute Scope 3 GHG emissions (excluding sold electricity) by 37.5% by 2033/2034 (from a 2018/2019 baseline)
- Move to a 100% electric fleet by 2030 for light-duty vehicles and pursue the replacement of medium- and heavy-duty vehicles with zero carbon alternatives
- Reduce absolute SF6 emissions from their operations by 50% by 2030/31 (from a 2018/2019 baseline)
- Reduce absolute energy consumption in National Grid's flagship offices by 20% by 2030/2031 (from a 2020/2021 baseline)
- Reduce National Grid's absolute annual air travel emissions by at least 50% by 2025/2026 (from a 2019/2020 baseline) and offset any remaining emissions responsibly
- Engage with the top 50% of National Grid's US suppliers by emissions to establish a decarbonisation roadmap/action plan towards a science based target by 2025/2026
- The top 80% of National Grid's UK suppliers by emissions will have formally committed to set a science based target by 2025/2026.

7.1.2 While the Project has a key role to play in helping the UK's electricity grid to decarbonise, it is still important to reduce GHG emissions associated with the Project where practicable. These GHG reductions can be driven by implementation of this GHG Reduction Strategy, in particular, implementation of a Decarbonisation Tracker which would assigns tasks and responsibilities to relevant parties.

8. Implementation

8.1.1 Requirements and responsibilities necessary for implementing the GHG Reduction Strategy would be written into contractual agreements, including suppliers and service providers.

8.1.2 Reporting progress against the agreed GHG targets would be written into the contract of those responsible for delivery.

8.1.3 Where performance against a particular target is challenging, a collaborative approach between all involved in target delivery would be used to identify additional/ alternative actions to meet the target and/or identify a more appropriate target to reflect factors outside of the control of the Project, e.g., policy changes.

8.1.4 Key contractual clauses relevant to the above would be documented within the specification and contract documents issued to the Main Works Contractor(s) at an early stage.

9. Review

9.1.1 National Grid would be supported through the construction stage by the Main Works Contractor(s). With specific regard to GHG emissions, review of activities to facilitate the successful implementation of the GHG Reduction Strategy would include:

- Review and update of the Decarbonisation Tracker (at periodic intervals):
  - Review progress of GHG reduction opportunities implementation
  - Identify new GHG reduction opportunities
  - Assess feasibility of GHG reduction opportunities
  - Incorporate feasible GHG reduction opportunities into design and construction plans and procurement.
- Quantification of GHG emissions (at the end of each lifecycle stage or more frequently as appropriate):
  - Update GHG emissions calculations associated with the Project, to reflect changes related to more accurate activity data and implementation of GHG reduction opportunities.

10. Communication and Training

10.1.1 To support this GHG Reduction Strategy, the Decarbonisation Tracker would include dashboards for communication and progress reporting. This can be used to track performance throughout design, construction and operation, and support evidencing of progress towards fulfilling the GHG reduction targets.

10.1.2 The GHG Reduction Strategy would be shared and communicated with key stakeholders (including National Grid, and the Main Works Contractor(s)) throughout the delivery of the Project.

10.1.3 The Project team will undertake the necessary training to enable them to manage GHG emissions across the Project. National initiatives such as the Carbon Literacy Project (the Carbon Literacy Trust, 2025) or equivalent provide existing GHG training courses.

10.1.4 The design consultant will undertake necessary training to ensure that all designers on the Project are sufficiently cognisant of their role in designing out GHG emissions on the Project. This can be achieved through relevant in-house training or through external projects provided through professional bodies such as the Institution of Civil Engineers and Supply Chain Sustainability School.

10.1.5 Toolbox Talks will be provided to all operatives on site to assist with the identification and implementation of specific task-related GHG reduction opportunities during construction delivery.

10.1.6 Training needs would be identified through the building of the Project team following training needs analysis, and implemented as appropriate.

Abbreviations

Abbreviation	Full Reference
CO_2	Carbon Dioxide
CH_4	Methane
CSE	Cable Sealing End
GHG	Greenhouse Gases
kV	Kilovolt
Mt	Million Tonnes
N_2O	Nitrogen Oxide
SF6	Sulphur hexafluoride

Glossary

Term	Description
Cable Sealing End compound	Electrical infrastructure used as the transition point between overhead lines and underground cables. A compound on the ground acts as the principal transition point.
Development Consent Order	A statutory instrument which grants consents and other rights to build a Nationally Significant Infrastructure Project, as defined by the Planning Act 2008.
Environmental Impact Assessment (EIA)	An assessment of the likely effects of a development project on the environment, which is reported in an Environmental Statement that is publicised and consulted on and taken into account in the decision on whether a project should proceed.
Environmental Statement	The main output from the EIA process, an ES is the report required to accompany an application for development consent (under the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017) to inform public and stakeholder consultation and the decision on whether a project should be allowed to proceed. The EIA Regulations set out specific requirements for the contents of an ES for Nationally Significant Infrastructure Projects.
Greenhouse Gases	Greenhouse gases refer to a number of chemicals in the Earth's atmosphere such as carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O).
Overhead Line	Conductor (wire) carrying electric current, strung from pylon to pylon.
Substation	Substations are used to control the flow of power through the electricity system. They are also used to change (or transform) the voltage from a higher to lower voltage to allow it to be transmitted to local homes and businesses.
Underground cable	An insulated conductor carrying electric current designed for underground installation. Underground cables link together two Cable Sealing End compounds.

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