The Great Grid Upgrade

Sea Link

Sea Link

Volume 7: Other Documents

Document 7.5.13 Greenhouse Gas Reduction Strategy

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Ex1.1.1 This Greenhouse Gas (GHG) Reduction Strategy has been developed for the Proposed Project to meet the Overarching National Policy Statement for Energy (NPS-EN1) requirement for a GHG reduction strategy to accompany Development Consent Order (DCO) submission application.

Ex1.1.2 This document sets out how the GHG emissions associated with the Proposed Project should be managed and reduced, in accordance with NPS-EN1 requirements.

Ex1.1.3 This document should be read in conjunction with the Environmental Statement (ES) climate change chapter, namely **Application Document 6.2.5.1 Part 5 Combined Chapter 1 Climate Change**. The GHG calculations presented in this GHG Reduction Strategy are also presented in the ES climate change chapter. Refer to the ES climate change chapter for more detail on the calculation methodology and assessment of GHG impacts.

Ex1.1.4 The GHG management process described in this document is structured in accordance with Publicly Available Specification (PAS) 2080:2023 Carbon Management in Buildings and Infrastructure, which represents best practice for carbon management in the built environment. The GHG management process includes the following key steps:

- identifying governance, roles and responsibilities in terms of GHG management;
- developing a GHG baseline and identifying GHG hotspots;
- identifying and prioritising GHG reduction opportunities, with the aid of a Decarbonisation Tracker; and
- reviewing GHG reduction alignment with relevant GHG reduction targets.

Ex1.1.5 The total baseline lifecycle GHG emissions of the Proposed Project are 292,432 tCO_2e. Of this, 62% is attributable to embodied GHG emissions in raw materials, and 12% is attributable to transmission losses across the high voltage direct current (HVDC) cable. Note that the term ‘GHG baseline’ in this document is from PAS 2080 best practice and refers to a basis against which GHG reductions can be assessed and may diverge from the terminology used in the Environmental Statement. The GHG baseline is based on current design at outline design stage. This GHG Reduction Strategy sets out how GHG emissions should be managed as the project progresses to detailed design and construction.

Ex1.1.6 Embodied carbon in raw materials is a key GHG hotspot for the Proposed Project. Of the embodied carbon in raw materials, 50% can be attributed to converter stations. Understanding GHG hotspots can inform carbon reduction opportunities.

Ex1.1.7 The GHG baseline is summarised graphically in Plate Ex 1.1, broken down per PAS 2080 lifecycle module. More detail on what is included under each lifecycle module is provided in Section 5 of this document.

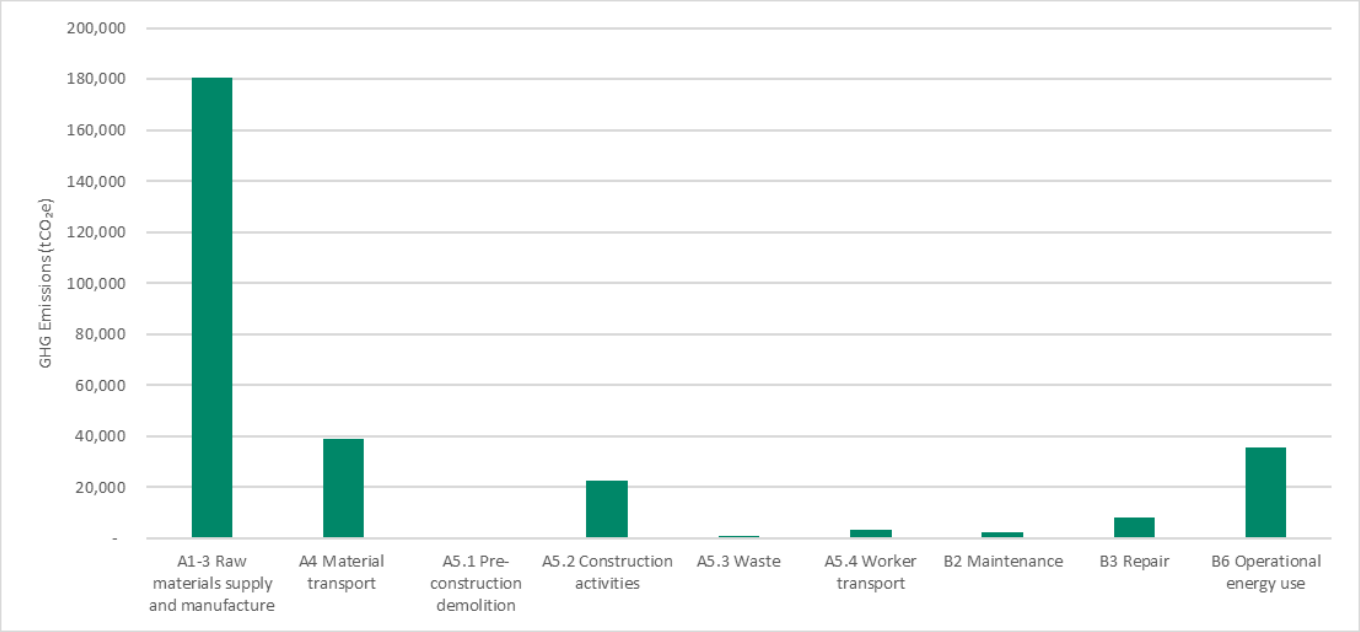

Plate Ex 1.1 Lifecycle GHG emissions

Potential carbon reduction opportunities have been grouped into the following categories:

- Strategy and Governance.
- Innovative Design.
- Lower Carbon Products.
- Lean Construction Techniques.

Ex1.1.8 Potential carbon reduction opportunities identified during a collaborative workshop with National Grid and the design teams are listed in the Decarbonisation Tracker in **Appendix B.** This includes consideration of nature-based solutions where applicable, as per NPS EN-1 requirements. These are only potential GHG reduction opportunities identified and are not committed to through the DCO.

Ex1.1.9 Although construction and maintenance of the Proposed Project will result in GHG emissions, when considered in the context of the wider grid, the Proposed Project will play a key role in decarbonising the electricity grid. Over its lifetime the Proposed 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 Proposed Project will facilitate the connection of new renewable and low carbon energy generation and interconnectors.

Ex1.1.10 This GHG Reduction Strategy is structured as follows, in line with PAS 2080 best practice for carbon management:

- **Section 1**: Introduction to the Proposed Project and purpose of this GHG Reduction Strategy.
- **Section 2**: Explanation of benefits of this GHG Reduction Strategy in terms of NPS EN-1 requirements and wider decarbonisation commitments.

- **Section 3**: Sets out the GHG management approach for the Proposed Project, including objectives, coverage and GHG management process.
- **Section 4**: Highlights key roles and responsibilities for GHG management, referring to the Construction Environmental Management Plans(s) (CEMP(s)).
- **Section 5**: Presents the GHG baseline and GHG hotspots to inform key aspects for GHG reduction.
- **Section 6**: Sets out the process to identify and prioritise decarbonisation opportunities, referring to the identified opportunities for the Proposed Project listed in the Decarbonisation Tracker in **Appendix B**.
- **Section 7**: Describes the UK and National Grid decarbonisation targets which are applicable to the GHG reduction of the Proposed Project.
- **Section 8**: Describes how GHG management should be implemented.
- **Section 9**: Describes how GHG management activities should be reviewed to facilitate their successful implementation.
- **Section 10**: Describes how communication and training within the project team should facilitate successful implementation of GHG reduction activities.

1. Introduction

1.1 The Proposed Project

1.1.1 The Sea Link Project (hereafter referred to as the 'Proposed Project') is a proposal by National Grid Electricity Transmission plc (hereafter referred to as National Grid) to reinforce the transmission network in the South East and East Anglia. The Proposed Project is required to accommodate additional power flows generated from renewable and low carbon generation, as well as accommodating additional new interconnection with mainland Europe.

1.1.2 National Grid owns, builds and maintains the electricity transmission network in England and Wales. Under the Electricity Act 1989, National Grid holds a transmission license under which it is required to develop and maintain an efficient, coordinated, and economic electricity transmission system.

1.1.3 This would be achieved by reinforcing the network with a High Voltage Direct Current (HVDC) Link between the proposed Friston substation in the Sizewell area of Suffolk and the existing Richborough to Canterbury 400kV overhead line close to Richborough in Kent.

1.1.4 National Grid is also required, under Section 38 of the Electricity Act 1989, to comply with the provisions of Schedule 9 of the Act. Schedule 9 requires license holders, in the formulation of proposals to transmit electricity, to:

- Schedule 9(1)(a) *'…have regard to the desirability of preserving natural beauty, of conserving flora, fauna and geological or physiographical features of special interest and of protecting sites, buildings and objects of architectural, historic or archaeological interest;*' and
- Schedule 9(1)(b) *'…do what [it] reasonably can to mitigate any effect which the proposals would have on the natural beauty of the countryside or on any such flora, fauna, features, sites, buildings or objects*'.

1.1.5 The Proposed Project would comprise the following elements:

The Suffolk Onshore Scheme

- A connection from the existing transmission network via Friston Substation, including the substation itself. Friston Substation already has development consent as part of other third-party projects. If Friston Substation has already been constructed under another consent, only a connection into the substation would be constructed as part of the Proposed Project.
- A high voltage alternating current (HVAC) underground cable of approximately 1.9 km in length between the proposed Friston Substation and a proposed converter station (below).
- A 2 GW high voltage direct current (HVDC) converter station (including permanent access from the B1121 and a new bridge over the River Fromus) up to 26 m high plus external equipment (such as lightning protection, safety rails for maintenance

works, ventilation equipment, aerials, similar small scale operational plant, or other roof treatment) near Saxmundham.

- A HVDC underground cable connection of approximately 10 km in length between the proposed converter station near Saxmundham, and a Transition Joint Bay (TJB) approximately 900 m inshore from a landfall point (below) where the cable transitions from onshore to offshore technology.
- A landfall on the Suffolk coast (between Aldeburgh and Thorpeness).

The Offshore Scheme

- Approximately 122 km of subsea HVDC cable, running between the Suffolk landfall location (between Aldeburgh and Thorpeness), and the Kent landfall location at Pegwell Bay.

The Kent Onshore Scheme

- A landfall point on the Kent coast at Pegwell Bay.
- A TJB approximately 800 m inshore to transition from offshore HVDC cable to onshore HVDC cable, before continuing underground for approximately 1.7 km to a new converter station (below).
- A 2 GW HVDC converter station (including a new permanent access off the A256), up to 28 m high plus external equipment such as lightning protection, safety rails for maintenance works, ventilation equipment, aerials, and similar small scale operational plant near Minster. A new substation would be located immediately adjacent.
- Removal of approximately 2.2 km of existing HVAC overhead line, and installation of two sections of new HVAC overhead line, together totalling approximately 3.5 km, each connecting from the substation near Minster and the existing Richborough to Canterbury overhead line.

1.1.6 The Proposed Project also includes modifications to sections of existing overhead lines in Suffolk (only if Friston Substation is not built pursuant to another consent) and Kent, diversions of third-party assets, and land drainage from the construction and operational footprint. It also includes opportunities for environmental mitigation and compensation. The construction phase will involve various temporary construction activities including overhead line diversions, use of temporary towers or masts, working areas for construction equipment and machinery, site offices, parking spaces, storage, accesses, bellmouths, and haul roads, as well as watercourse crossings and the diversion of Public Rights of Way (PROWs) and other ancillary operations.

1.2 Background

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

1.2.2 This GHG Reduction Strategy covers the Proposed Project as described in **Application Document 6.2.1.4 Part 1 Introduction Chapter 4 Description of the Proposed Project**.

1.2.3 This GHG Reduction Strategy should be read in conjunction with the Environmental Statement (ES) climate change chapter, namely **Application Document 6.2.5.1 Part 5 Combined Chapter 1 Climate Change**. The GHG calculations presented in this GHG Reduction Strategy are also presented in the ES climate change chapter. Refer to the ES climate change chapter for more detail on the calculation methodology and assessment of GHG impacts.

1.2.4 This GHG Reduction Strategy has been prepared following Publicly Available Specification (PAS) 2080:2023 – Carbon Management in Buildings and Infrastructure (Department for Energy Security and Net Zero (DESNZ), 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.

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

1.2.6 This GHG Reduction Strategy provides National Grid with a routemap, setting out how the GHG emissions associated with the Proposed Project should be managed and reduced. Key national and local legislation, policies and commitments requiring GHG emission reductions over the lifetime of the Proposed Project have informed the development of this GHG Reduction Strategy (see **Appendix A**).

1.2.7 Throughout this GHG Reduction Strategy, the term ‘GHG’ includes the seven Kyoto Protocol GHGs (WRI & WBCSD, 2015). Emissions of GHGs are expressed in tonnes of carbon dioxide equivalent (tCO_2e), i.e. mass of CO_2 resulting in equivalent global warming potential.

1.2.8 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 Proposed Project lifecycle. This GHG Reduction Strategy helps inform actions that should be undertaken at each relevant work stage.

1.2.9 This GHG Reduction Strategy should be used in conjunction with the Decarbonisation Tracker in **Appendix B**, which contains a log of key carbon reduction opportunities identified for the Proposed Project. These are potential GHG reduction opportunities identified only and are not committed to through the DCO. This includes consideration of nature-based solutions where applicable, as per NPS EN-1 requirements.

2. Benefits of this GHG Reduction Strategy

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

2.1.2 This GHG Reduction Strategy presents how National Grid should effectively manage GHG emissions throughout the Proposed 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 project early in the design process is critical to minimising associated GHG emissions and realising the greatest benefits.

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

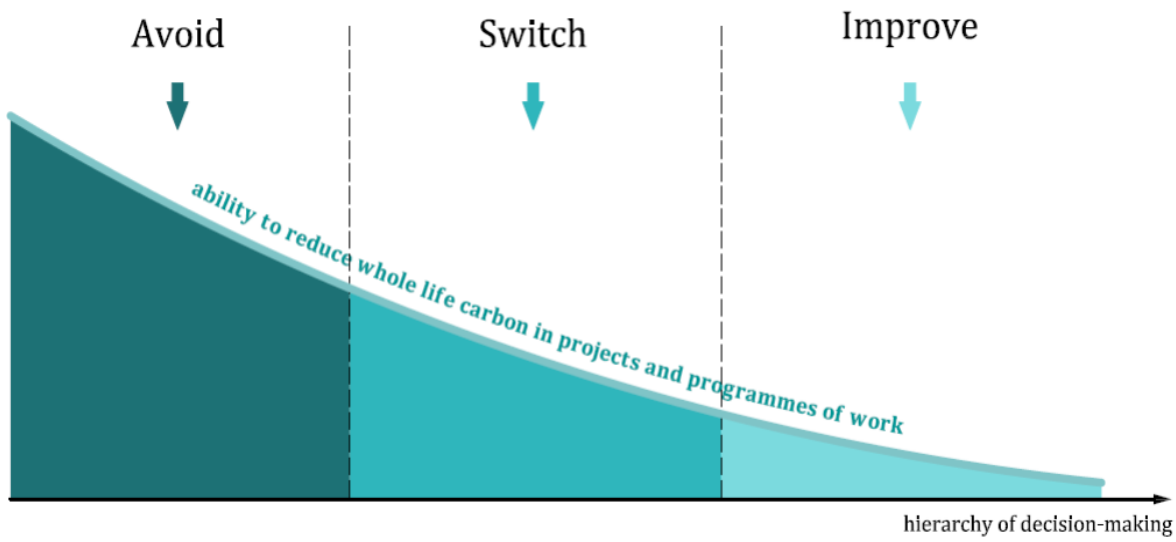

Plate 2.1 PAS 2080:2023 Carbon Reduction Hierarchy

2.1.4 Plate 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 Proposed 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; and
- 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 a proactive systems thinking and whole-life approach early on, National Grid can integrate GHG management throughout the Proposed 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 Proposed Project should be managed, in accordance with NPS EN-1 2023 (Department for Energy Security and Net Zero (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 Proposed Project;
- facilitate early identification of potential GHG reduction opportunities;
- describe the Proposed Project in the context of National Grid's GHG reduction target; and
- 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 Insitution of Chartered Surveyors (RICS), 2023) and PAS 2080:2023 Carbon Management in Buildings and Infrastructure guidelines (British Standards Institute (BSI), 2023). These principles can be applied across all sectors.

3.2.2 The RICS Whole Life Carbon Assessment (Royal Insitution of Chartered Surveyors (RICS), 2023) guidelines stipulate that as a minimum, whole life carbon assessments should account for all components relating to the Proposed 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 Plate 3.1:

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

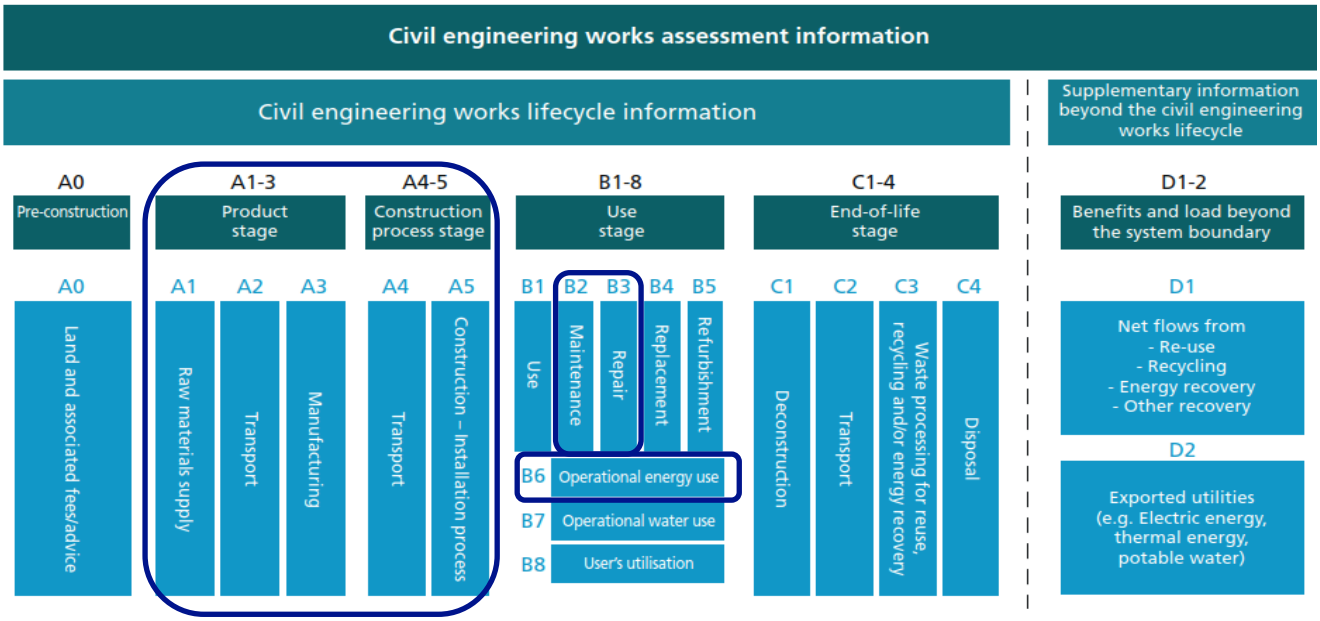

Plate 3.1 PAS 2080:2023 lifecycle stages

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 Proposed 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 the ES climate change chapter, namely **Application Document 6.2.5.1 Part 5 Combined Chapter 1 Climate Change**. Refer to the ES climate change chapter 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.

PAS 2080 lifecycle stage		Emission source(s)	In scope of GHG Reduction Strategy?
	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 Proposed Project.	In scope
	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 Proposed Project.
	Maintenance, repair, replacement, refurbishment (B2 – B5)	Emissions associated with repair and replacement of assets during the Proposed Project lifetime (including embodied Carbon in materials, energy required for	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

PAS 2080 lifecycle stage		Emission source(s)	In scope of GHG Reduction Strategy?
		operation of machinery, and transport).	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 Proposed 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 Proposed Project context.
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 tCO_2e) already accounts for the GHG reduction measures presented at the Proposed Project concept phase.

- Holding a GHG Workshop – 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 Proposed 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 Proposed Project lifecycle.
- Developing a GHG Reduction Strategy – this document, developed to support the delivery of GHG reduction opportunities across the Proposed Project lifecycle.

4. Governance, Roles and Responsibilities

4.1.1 The CEMP(s) should support the implementation of the measures presented in this GHG Reduction Strategy.

4.1.2 As part of the monitoring process, the Engineering, Procurement and Construction Contractor(s) should allocate a designated Environmental Site Officer(s) (ESO(s)) who should be present on-site throughout the construction process and at the commencement of new construction activities. The ESO(s) should observe activities within the Proposed Project site and report any deviations from the CEMP in a logbook, along with the action taken and general conditions at the time. The Applicant should be informed of such deviations as soon as possible following identification.

4.1.3 During construction, the ESO(s) should conduct daily walkover surveys to ensure all requirements of the CEMP are being met. Action from these surveys should be documented on an Environmental Action Schedule, discussed with the Site Foreman for programming requirements and issued weekly for actioning.

4.1.4 The ESO should arrange regular formal inspections to ensure the requirements of the CEMP are being met. After completion of construction activities, the ESO(s) should conduct a final review.

4.1.5 The ESO should retain records of environmental monitoring and implementation of the CEMP. This should allow provision of evidence that the CEMP is being implemented effectively.

5. GHG Baseline

5.1 Approach

5.1.1 The GHG calculation presented in this GHG Reduction Strategy corresponds with the GHG calculation presented in the ES climate change chapter, namely **Application Document 6.2.5.1 Part 5 Combined Chapter 1 Climate Change**. For the purposes of the GHG Reduction Strategy, the term 'GHG baseline' is based on PAS 2080 aligned terminology and refers to a basis against which GHG reduction measures and future GHG quantifications can be compared. This may diverge from the definition of the term 'baseline' in the Environmental Statement.

5.1.2 PAS 2080 notes that depending on the lifecycle stage at which quantification is made, either part or all the quantification may be based on predictive data (i.e., something forecasted or planned to occur) rather than actual activity data (e.g., recorded consumption amounts).

5.1.3 The GHG baseline for this GHG Reduction Strategy provides expected project lifecycle emissions in tonnes of carbon dioxide equivalent (tCO_2e). This baseline has been developed based on predictive data and estimates.

5.1.4 The GHG baseline is presented to assist National Grid in understanding which stages or activities associated with the Proposed Project are key sources of GHG emissions and to provide a basis against which GHG reduction measures and future GHG quantifications can be compared.

5.1.5 GHG emissions across the various lifecycle stages were calculated following the GHG Protocol's method, represented in the following equation:

Activity Data x GHG Emissions Factor = GHG emissions value

5.1.6 Activity data refers to data collected which represents activities which result in GHG emissions, for example, litres of diesel consumed, kWh of electricity consumed etc. Activity data was requested from the Proposed Project team in a Request for Information (RFI) and follow up discussions. Where the activity data is unavailable, proxy data from similar projects and fundamental assumptions were used.

5.1.7 Emission factors refer to factors which convert activity data into corresponding GHG emissions. The activity data obtained, and emission factors used are detailed in Table 5.1.

5.2 GHG calculation method and assumptions

5.2.1 Project data and information, industry benchmarks and proxies, and professional judgement have been used to estimate the Proposed Project's capital and operational GHG baseline. Calculations were undertaken using a bespoke GHG accounting tool developed by AECOM. Table 5.1 indicates how forecast GHG emissions have been determined per PAS 2080 lifecycle stage.

5.2.2 In accordance with the climate change chapter of the Environmental Statement (**Application Document 6.2.5.1 Part 5 Combined Chapter 1 Climate Change**) and asset lifespans, a reference operational period of 40 years is assumed.

Table 5.1 GHG calculation methods and assumptions

PAS 2080 lifecycle stage		GHG calculation method and assumptions
Before Use Stage	Preconstruction stage (A0)	Represents the preliminary studies and works such as strategy and brief development, design efforts, Environmental Impact Assessment, and cost planning. It has been assumed to be minimal and therefore not a material contributor to the overall footprint.
	Product Stage (A1-3)	Estimated material quantities for cables, electrical equipment, steel, concrete, etc were obtained from an RFI and follow up discussions with the design team. Emission factors were obtained from the Bath University Inventory of Carbon and Energy (ICE) (Bath University Inventory of Carbon and Energy, 2019). Where appropriate ICE factors were not available, for example for converter station and substation equipment, conversion factors from National Grid's internal carbon database were used. Material quantities were uplifted by respective wastage rates for each material type, based on wastage rate assumptions from the Royal Institution of Chartered Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment, 2nd edition guidelines (Royal Insitution of Chartered Surveyors (RICS), 2023).
	Material Transport (A4)	Distances of material transport to the construction site from the point of production, and mode of transport, have been assumed based on the RICS guidance. Emission factors from the Department for Energy Security and Net Zero (DESNZ) (DESNZ, 2023) have been used (Rigid HGV, Average Laden and Cargo Ship, Average Size). All cables and electrical equipment are assumed to be transported from Europe.
	Construction Installation process (A5)	*Waste* Material wastage rates and end-of-life scenarios were assumed based on RICS guidance. *Construction Activities* Terrestrial plant fuel use was estimated based on the average litres of diesel consumed per hour for each plant type, which was applied to the anticipated construction hours. The DESNZ (DESNZ, 2023) emissions factor for 'gas oil' was then applied. Construction activities relating to excavation and filling activities have been calculated from volumes of excavated and filled and materials provided in the RFI from the design team, using factors from the Civil Engineering Standard Method of Measurement (CESMM4) (CESMM4, 2013). Assumptions for marine plant fuel consumption and number of marine plant were provided by the design team. Estimated fuel consumptions (tonnes of fuel day) for each vessel type were provided. Where ranges where provided, the average value was used. This fuel was multiplied by the number of each vessel type and the

PAS 2080 lifecycle stage		GHG calculation method and assumptions
		number days of respective marine works as per the Proposed Project programme, to estimate the total fuel consumption from marine plant. The emission factor for marine gas oil was applied. *Worker transport* Emissions from transportation of workers to the work site (i.e., commuting) was calculated based on an estimate commute distance of 30km. Unless otherwise indicated, it was assumed workers commute via car with an occupancy rate of 1 per vehicle. The number of construction workers was obtained from the Proposed Project schedule. *Land use* GHG emissions associated with land use were estimated based on hectares of habitat type lost and gained due to the development. Land use emission factors were obtained from the EU Commission guidelines for the calculation of land carbon stocks (EU Commission, 2010).
Use Stage	Maintenance, repair, replacement, refurbishment (B2-B5)	Emissions from maintenance and repair activities have been assumed in line the RICS guidance. Based on asset lifetimes, no replacement is anticipated to occur before 40 years, and therefore no replacement emissions have been calculated for the 40-year reference period.
	Operational energy use (B6)	Emissions from lighting at converter stations and substations have been estimated by applying BEIS grid emission factors to the number and wattage of lights across the 40-year reference period. Transmission losses across the HVDC cable were estimated using a factor of 3% losses per 1,000 km (Gordonnat, 2020). It is assumed that the cable is designed for 100% load factor (i.e. the cable is sized appropriately for the anticipated load). BEIS emission factors are used which account for anticipated grid decarbonisation over the 40-year reference period. GHG emissions from refrigerant leakage have not been accounted for due to a lack of available data at this stage in the design. However, it is assumed that no SF_6 equipment will be used in the Proposed Project, in accordance with National Grid policy. SF_6 alternatives such as C4 or G^3 have a >99% lower global warming potential (GWP) than SF_6. Having applied this reduced GWP to SF_6 leakage emissions calculated for similar transmission projects, it is considered that any refrigerant leakage emissions associated with the Proposed Project will not be material in the context of the overall footprint, and as such will not affect the outcome of this assessment.
	Users' utilisation (B8)	Scoped out as not relevant for this Proposed Project context.

PAS 2080 lifecycle stage		GHG calculation method and assumptions
End of Life Stage	Deconstruction, transport, waste processing for recovery and disposal (C1-4)	End of life stage (PAS 2080 stages C1 to C4) has been excluded from the GHG calculations and quantified assessment as the decommissioning environment and associated practices of the future may vary considerably to those observed currently (e.g., waste management processes, fuel types used etc.) and therefore reasonable assumptions for quantifying associated GHG emissions cannot be determined. However, considering end-of-life phase in early design, such as reusability of materials, remains a consideration for design and mitigation.

5.3 Baseline Results

5.3.1 Table 5.2 provides the GHG baseline of the Proposed Project. A series of measures to mitigate the GHG emissions from the Proposed Project have been identified. These mitigation measures have been included within the Decarbonisation Tracker (see **Appendix B**).

Table 5.2 GHG baseline results

Lifecycle Module		Emission Source	GHG Emissions (tCO_2e) Suffolk	Kent	Offshore	TOTAL	Percentage of lifecycle emissions (%)
A: Before Use Stage	A1-3 Product Stage	A1-3 Raw materials supply and manufacture	80,975	71,453	27,935	**180,363**	61.7%
	A4-5 Construction Process Stage	A4 Material transport	6,932	15,786	16,178	**38,897**	13.3%
		A5.1 Pre-construction demolition	0.03	0.31	0	**0.35**	<0.1%
		A5.2 Construction activities	4,883	3,018	14,730	**22,631**	7.7%
		A5.3 Waste	511	116	124	**750**	0.3%
		A5.4 Worker transport	1,759	1,450	-	**3,209**	1.1%
		Total tCO_2e over Construction period	**95,061**	**91,823**	**58,966**	**245,850**	
B: Use Stage		B2 Maintenance	951	918	590	**2,458**	0.8%
		B3 Repair	3,251	2,959	2,084	**8,291**	2.8%
		B6 Operational energy use	5	5	35,821	**35,830**	12.3%
		Total tCO_2e over Operational period	**4,206**	**3,882**	**38,494**	**46,582**	

Total tCO_2e over Construction + Operational period	**292,432**

5.4 GHG baseline and hotspots

5.4.1 The GHG baseline is summarised graphically in Plate 5.1. The main GHG hotspot is embodied GHG emissions in raw materials which account for 62% of the Proposed Project lifecycle emissions. Module B6 (operational energy use) emissions account for 12% of the Proposed Project lifecycle emissions and refer to emissions associated with transmission losses across the HVDC cable.

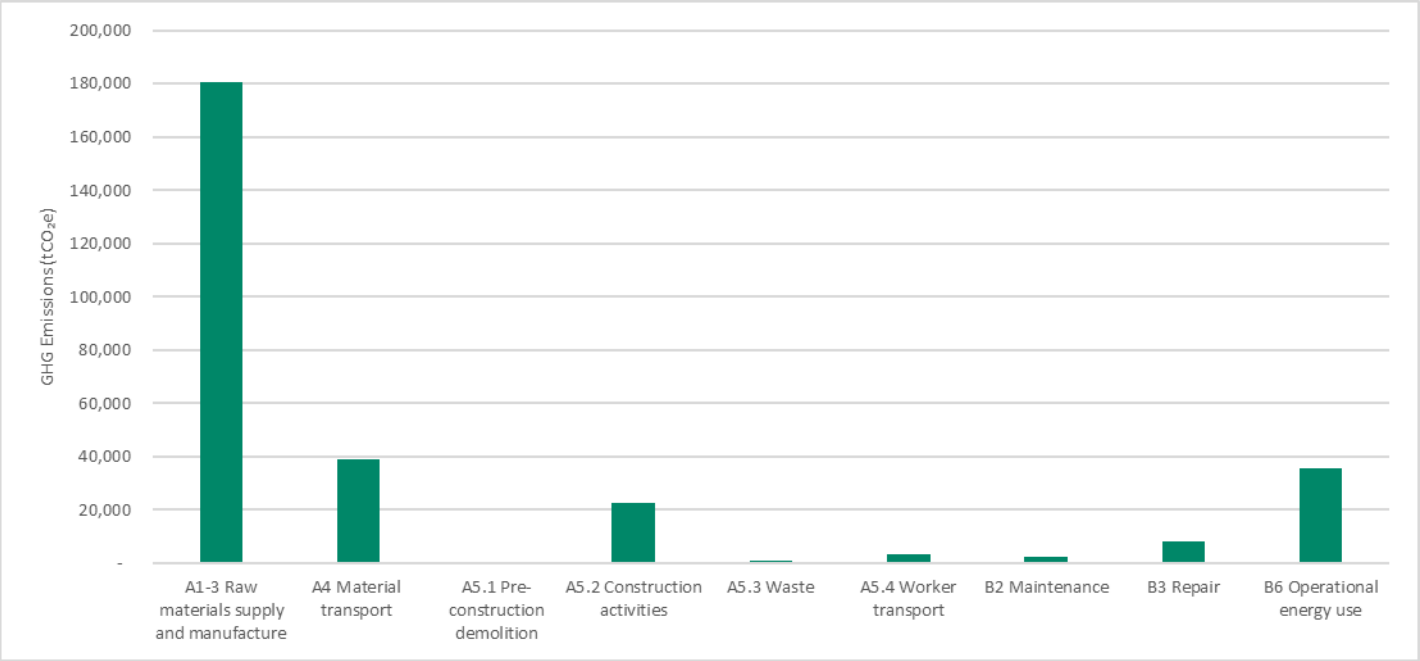

Plate 5.1 Lifecycle GHG emissions

5.4.2 A breakdown of emissions per area is presented in Plate 5.2. The emissions from the offshore components are predominantly from transmission losses across the cable as well as embodied GHG emissions in materials, whereas for the onshore components the emissions are predominantly from embodied GHG emission in materials. All transmission losses across the 40-year operational life are attributed to the offshore components.

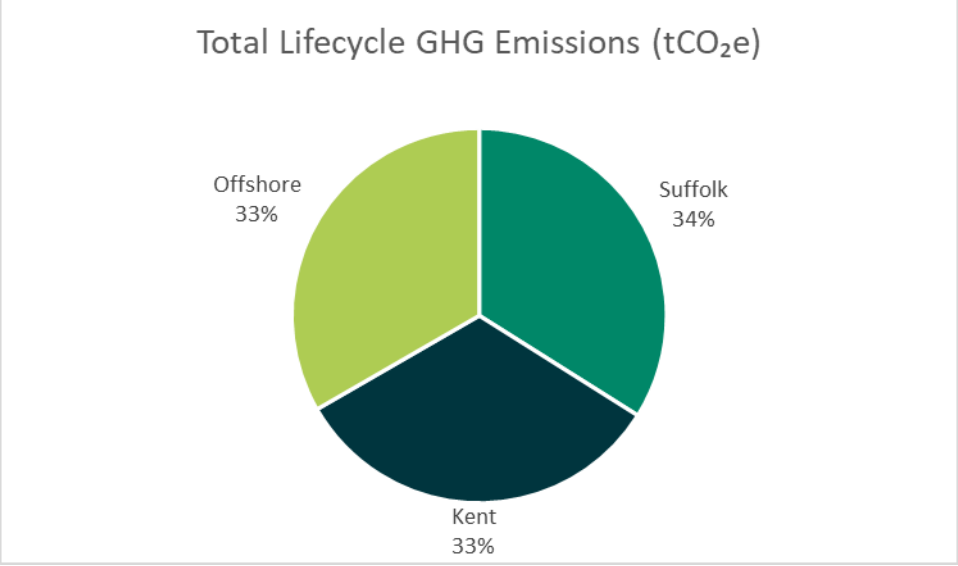

Plate 5.2 Breakdown of lifecycle GHG emissions by scheme area

5.4.3 Since embodied (A1-A3) emissions in materials are a key GHG hotspot, this is broken down into more detail in Plate 5.3 and Plate 5.4 below. Plate 5.3 displays A1-A3 emissions per element of works, whilst Plate 5.4 displays A1-A3 emissions per material type.

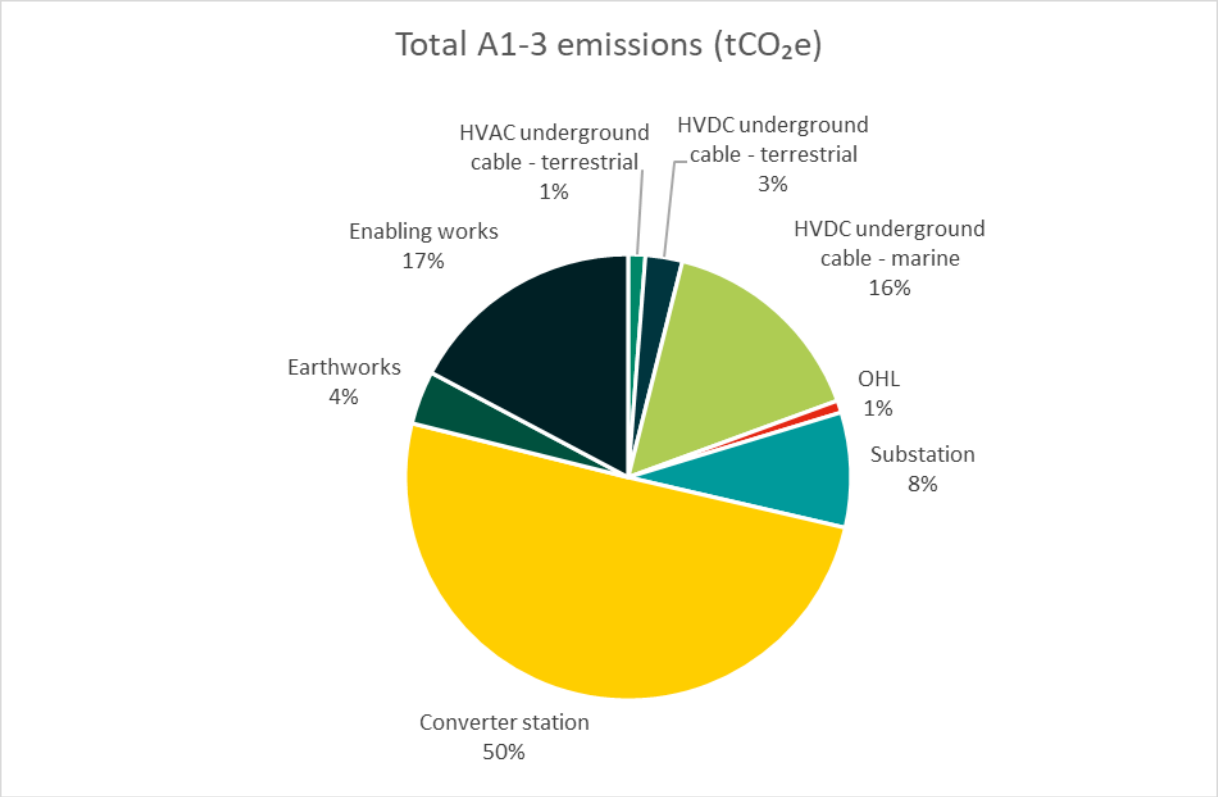

Plate 5.3 Embodied GHG emissions per element of works

5.4.4 It is evident from Plate 5.3 that the converter stations contribute the most (50%) to embodied emissions. This can be attributed to the size of these converter stations, as well as the buildings and electrical equipment at these stations which are relatively emission intensive in terms of embodied carbon. Enabling works accounts for 17% of A1-A3 emissions, which can be attributed to the bridges and haul roads constructed as part of enabling works. The marine HVDC cable contributes 16% to A1-A3 emissions.

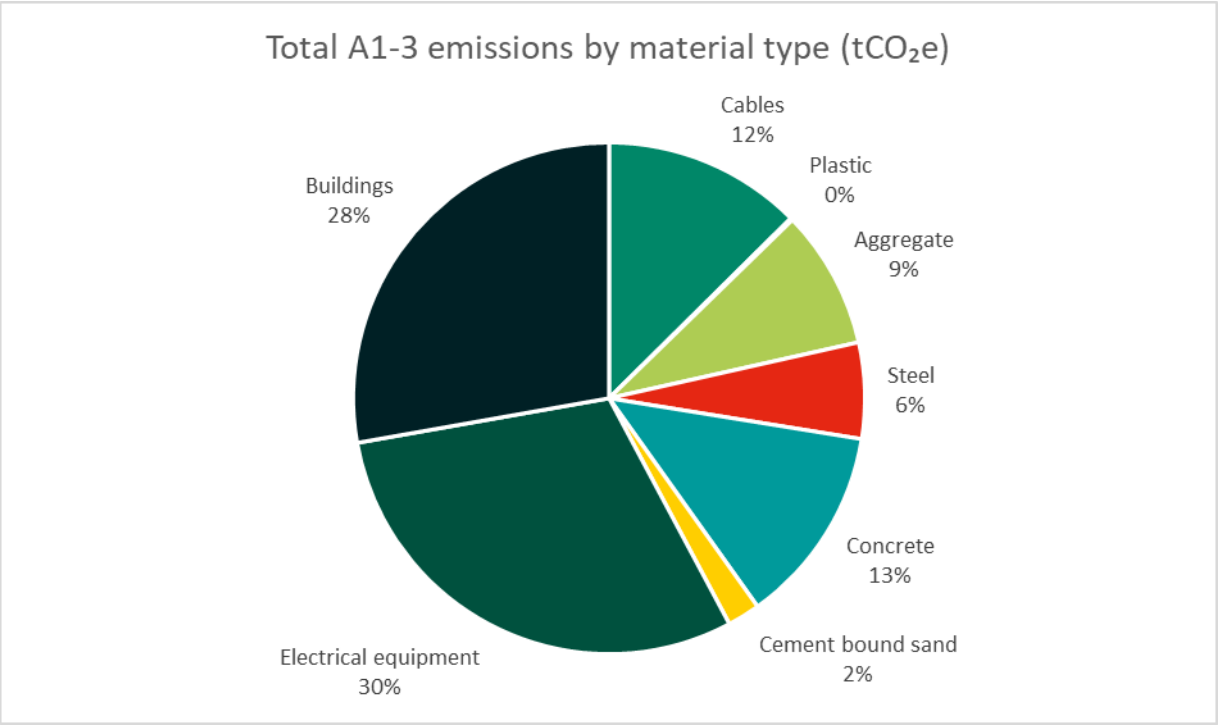

Plate 5.4 Embodied GHG emissions per material type

5.4.5 Plate 5.4 shows that electrical equipment in the converter stations and substations is the material category which contributes the most (30%) to A1-A3 emissions. This is followed by buildings at the converter stations and substations (28%). Concrete (used in enabling works and across various other elements) accounts for 13% of A1-A3 emissions and cables (including the marine HVDC cable) account for 12%.

5.4.6 Although the Proposed Project will result in GHG emissions, the Proposed Project will play a key role in decarbonising the electricity grid. Over its lifetime the Proposed 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 Proposed Project will facilitate the connection of new renewable and low carbon energy generation and interconnectors.

5.5 GHG Accounting Process

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

5.5.2 A suitably qualified carbon practitioner should undertake calculations at each stage and should align with GHG Protocol and PAS 2080:2023 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 the Decarbonisation Tracker in **Appendix B** and focus on reducing GHG emissions from key emissions sources. These are only potential GHG reduction opportunities identified and 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 provides a framework for how opportunities can be identified and prioritised. These identified GHG reduction opportunities include consideration of nature-based solutions where applicable, as per NPS EN-1 requirements.

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

- Strategy and Governance;
- Innovative Design;
- Lower Carbon Products; and
- Lean Construction Techniques.

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

6.1.4 The initial list of GHG reduction opportunities was developed during a GHG-focused workshop with representatives from National Grid and the design team.

6.1.5 The Decarbonisation Tracker is a live document, which should be continually updated throughout the Proposed 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 Plate 6.1.

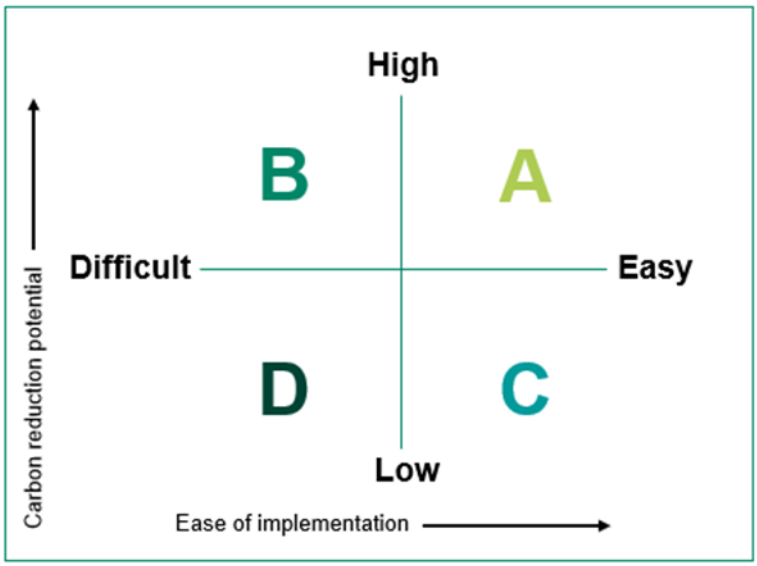

Plate 6.1 GHG reduction opportunity prioritisation matrix

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

- additionality to business-as-usual (decarbonisation policy and market drivers);
- minimising negative GHG impacts;
- maximising GHG benefits; and
- 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; and
- 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 should be reviewed periodically following further discussions and feasibility analysis as the Proposed Project progresses. Prioritisation ratings should also be assigned to any further measures identified and recorded within the Decarbonisation Tracker. This should 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 should be identified for each opportunity throughout the Proposed Project lifecycle. This enables specific responsibilities to be assigned within the Proposed 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 should 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 decarbonization commitment is to achieve net zero GHG emissions by 2050. This net zero target covers Scope 1, 2 and 3 emissions (see glossary of terms in **Appendix C**). 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 2030/31 (from a 2018/19 baseline).
- Reduce absolute Scope 3 GHG emissions (excluding sold electricity) by 37.5% by 2033/34 (from a 2018/19 baseline).
- Move to a 100% electric fleet by 2030 for their light-duty vehicles and pursue the replacement of our medium- and heavy-duty vehicles with zero carbon alternatives.
- Reduce absolute SF_6 emissions from their operations by 50% by 2030/31 (from a 2018/19 baseline).
- Reduce absolute energy consumption in their flagship offices by 20% by 2030/31 (from a 2020/21 baseline).
- Reduce our absolute annual air travel emissions by at least 50% by 2025/26 (from a 2019/20 baseline) and offset any remaining emissions responsibly.
- Engage with the top 50% of their US suppliers by emissions to establish a decarbonisation roadmap/action plan towards a Science Based Target by 2025/26.
- The top 80% of their UK suppliers by emissions will have formally committed to set a Science Based Target by 2025/26.

7.1.2 Over its lifetime, the Proposed 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 Proposed Project will facilitate the connection of new renewable and low carbon energy generation and interconnectors. The proposed Project is therefore a key part of UK policy to decarbonise the electricity grid and transition to net zero by 2050.

7.1.3 While the Proposed 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 Proposed Project where possible. These GHG reductions can be driven by implementation of this GHG Reduction Strategy, in particular implementation of the Decarbonisation Tracker which assigns tasks and responsibilities to relevant parties.

8. Implementation

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

8.1.2 Reporting progress against the agreed GHG targets should 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 should be necessary 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 Proposed Project e.g., policy changes.

8.1.4 Key contractual clauses relevant to the above should be documented within the specification and contract documents issued to the contractor at the tender stage.

9. Review

9.1.1 National Grid should be supported through the design and planning stage by the Proposed Project's design consultant, and during the construction stage by the principal contractor. With specific regard to GHG emissions, review activities to facilitate the successful implementation of the GHG Reduction Strategy should 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; and
  - 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 Proposed 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 includes 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 should be shared and communicated with key stakeholders (including National Grid, the design consultant and the principal contractor) throughout the delivery of the Proposed Project.

10.1.3 The Proposed Project team should undertake the necessary training to enable them to manage GHG emissions across the Proposed Project. National initiatives such as the Carbon Literacy Project or equivalent provide existing GHG training courses.

10.1.4 The design consultant should undertake necessary training to ensure that all designers on the Proposed Project are sufficiently cognisant of their role in designing out GHG emissions on the Proposed 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.

10.1.5 Toolbox Talks could 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 should be identified through the building of the Proposed Project team following training needs analysis and implemented as appropriate.

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Appendix A Legislation, Policy and Commitments

A.1.1 Key legislation, policies and commitments concerning achieving carbon emission reductions over the lifetime of the scheme are outlined below.

Appendix Table A.1 Legislation, Policy and Commitments

International

The Paris agreement (UNFCCC, 2015)

Published by the United Nations Framework Convention on Climate Change (UNFCCC), the Paris Agreement is a framework for facilitating a global response to the threat of climate change and keeping global temperature rise this century well below 2ºC above pre-industrial levels. A more ambitious aim within the Paris Agreement is limiting the temperature increase to 1.5ºC.

National

The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (HM Government, 2019)

In June 2019, the UK Government adopted the Climate Change Act 2008 (2050 Target Amendment) Order 2019. This amended the Climate Change Act 2008 which set the target for the UK to achieve an 80% reduction of GHG emissions by 2050 (compared to 1990 levels). It also, more ambitiously, revised the target intending to achieve a reduction of 100% (net zero carbon) target by 2050.

Achieving the revised net zero carbon target will require future GHG emissions to fall within the sixth carbon budget ceiling established by Government (i.e., either avoided or offset). The Sixth Carbon Budget, required under the Climate Change Act, will advise Ministers on the volume of GHGs the UK can emit during 2033-2037. The sixth budget is imposed by The Carbon Budget Order 2021 setting the budget for the same budgetary period at 965 million tonnes of carbon dioxide equivalent ($MtCO_2e$).

These carbon budgets set a cap on the maximum level of net carbon produced by the UK for a five-year budgetary period. This will set the path to the UK's net zero emissions target in 2050, as the first carbon budget to be set into law following that commitment.

The Committee on Climate Change (CCC) recently stated that, "[It]… will revise its assessment of the appropriate path for emissions over the period to 2050 as part of its advice next year on the sixth carbon budget." Whilst some tightening of the current carbon budgets is likely to occur when they are reviewed and revised later this year, to reflect the recent commitment to a net zero carbon economy by 2050, the CCC has indicated that the trajectory will be steeper over time; therefore, it is the later carbon budgets rather than near term ones which will see more stringent reductions.

The Carbon Budget Order 2021 (HM Government, 2021)

The Carbon Budget Order imposes the sixth carbon budget, 2021setting the budget for the same budgetary period (2033-2037) at 965 million tonnes of carbon dioxide equivalent ($MtCO_2e$).

The table below illustrates the emission limits for the 4th, 5th and 6th carbon budget periods set by the Climate Change Act to date. The emissions limits provided for the 7th, 8th, and 9th budget periods indicate what is likely based on data published by the CCC and have not been passed into law.

Budget period	Dates	Emissions limit (Mt CO_2e)
4th	2023-27	1,950
5th	2028-32	1,725
6th	2033-37	965
7th	*2038-42*	*526*
8th	*2043-47*	*195*
9th	*2048-50 (only three yrs instead of 5)*	*17*

National Policy Statement for Energy (EN-1) 2023 (Department for Energy Security and Net Zero (DESNZ), 2023) **and National Policy Statement for Electricity Networks Infrastructure** (Department for Energy and Climate Change, 2011)

National Policy Statements (NPSs) set out the primary policy tests against which the application for a Development Consent Order (DCO) for the Proposed Project would be considered. NPS EN-1 sets out the requirement for a GHG Reduction Strategy to be developed as part of DCO application.

NPS EN-1 notes the need to decarbonise the UK electricity grid in order to reduce emissions in line with UK carbon budgets to reach the 2050 net zero target. In particular, NPS EN-1 states the need to establish new electricity network infrastructure to meet UK energy objectives and reduce the need for fossil fuels.

National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, 2024)

The NPPF, published in March 2012 and revised in December 2024, sets out the Government's planning policies for England and how these are expected to be applied. The NPPF states that planning systems should support the transition to a low carbon future, taking full account of flood risk and coastal change, by:

- Contributing to the reduction in GHG emissions;
- Minimising vulnerability and improving resilience;
- Encouraging the reuse of existing resources; and
- Supporting renewable and low carbon energy and Infrastructure.

National Planning Practice Guidance (PPG) on Climate Change (Department for Levelling up, Housing and Communities and the Ministry of Housing, Communities and Local Government, 2021)

This PPG for Climate Change advises identifying and implementing suitable mitigation and adaptation measures in the planning process.

Local

Suffolk County Council's Energy and Climate Adaptive Infrastructure Policy (Suffolk County Council, 2023)

This policy outlines how the Council will engage and influence other parties to make sure adverse impacts to communities are understood by future infrastructure decisions. With regards to GHG emissions, the policy states: ""*The Council wishes to ensure that Suffolk can fulfil this role, both to support the national and local response to climate change, and to maximise opportunities for new and existing businesses and technologies in Suffolk.*

Whilst recognising the importance of projects to deliver Net Zero and adapt to the changing climate, the Council considers it is essential that projects do not lead to avoidable, unmitigated, or uncompensated detriment to the communities and environment of Suffolk, and its existing businesses"

East Suffolk Council – Suffolk Coastal Local Plan (East Suffolk Council, 2020)
This plan sets out the Council's policies on "*low-carbon and renewable energy*", as well as "*sustainable construction*".

Kent and Medway Energy and Low Emissions Strategy: Implementation Plan 2020-2023 (Kent County Council, 2016)

The Kent and Medway Energy and Low Emissions Strategy sets out how the Council will respond to the UK climate emergency and promote clean and resilient economic recovery that eliminates poor air quality, reduces fuel poverty, and promotes the development of an affordable, clean and secure energy supply across Kent and Medway. The implementation plan commits the Council to net zero GHG emissions by 2050, targeting "significant reduction" by 2030.

Thanet District Council Local Plan (Thanet District Council, 2020)

The Thanet District Council Local Plan sets out the Council's policies and proposals that will be used to guide decisions on investment on development and regeneration over the period to 2031. The plan sets out that new development must mitigate against climate change by reducing emissions and energy demands through the use of up to date technologies.

Appendix B Tracker

Decarbonisation

Ref.	Opportunity	Description	Impact potential: - Low - High	Ease of implementation: - Difficult - Easy	Rating (impact vs implementation)	Delivery timeframe (short, medium or long term)
O-1	Project fuel hierarchy	Project fuel hierarchy to drive supply chain to lower carbon fuels	High	Easy	A	Medium term (during construction)
O-2	Carbon targets and performance tracking	Strong carbon targets and tracking of performance/data	High	Easy	A	Medium term (during construction)
O-3	Local supply chain	Local supply chain wherever possible	High	Easy	A	Medium term (during construction)
O-4	Incentivise carbon performance	Incentivisation of carbon performance, similar to that delivered on LPT2	High	Difficult	B	Short term (during design)
O-5	Collaborate with organisations to improve decarbonisation	Work with reputable organisations to help improve decarbonisation, e.g. Centre for Alternative Technology	High	Difficult	B	Short term (during design)
O-6	Reusable concrete modules	Use concrete modules that could be reused even after plant is decommissioned, giving it 'second life'	Low	Easy	C	Short term (during design)
O-7	Second-hand furniture for substations	Buy second hand furniture for substation/converter station fitout from local sources	Low	Easy	C	Medium term (during construction)
O-8	Zero waste to landfill	Implement rigid waste management criteria, aiming for zero waste to landfill	Low	Easy	C	Medium term (during construction)
O-9	Faster building and commissioning	Build and commission project faster - therefore realise green benefits of the project on green energy availability sooner	Low	Difficult	D	Short term (during design)
O-10	Learn from other projects	Use lessons learnt from existing projects elsewhere in Europe and beyond	Low	Easy	C	Medium term (during construction)
O-11	Off-the-shelf designs	Use 'off-the-shelf' designs for cable and converter stations to build quicker and realise HVDC benefits sooner	High	Difficult	B	Short term (during design)
O-12	Sustainable innovations fund	Sustainable innovations fund to allow future innovation to be funded, aligned to EGL1/2 approach	High	Difficult	B	Short term (during design)
O-13	Bidders share carbon management approach	Require bidders to share their approach to carbon management and opportunities during the tender process	High	Easy	A	Medium term (during construction)
O-14	Community carbon compensation	Supporting community carbon compensation for offsetting some of the project emissions locally	Low	Difficult	D	Medium term (during construction)
O-15	3D printed concrete foundations	3D printed concrete foundations	Low	Difficult	D	Short term (during design)
O-16	Screw pile foundations	Screw pile foundations	Low	Difficult	D	Short term (during design)
O-17	Modular / offsite build	Modular / offsite build for civil assets	High	Difficult	B	Short term (during design)
O-18	Valve hall heat recovery	Heat recovery scheme from valve hall (community benefit)	High	Difficult	B	Long term (during operation)
O-19	Cross-laminated timber	Greater use of cross-laminated timbers instead of steel	High	Easy	A	Short term (during design)
O-20	Works phasing	Phasing of the works to install permanent assets early, e.g. access roads and converter fencing (condensing the programme for less time on site etc)	High	Difficult	B	Medium term (during construction)
O-21	Blue marine initiatives	Blue marine initiatives like native oysters to increase biodiversity and soak up carbon	Low	Difficult	D	Short term (during design)
O-22	Natural light	Greater use of natural light to avoid the need for industrial lighting	Low	Difficult	D	Long term (during operation)
O-23	Solar PV	Solar PV for converter stations and EV fleet	Low	Easy	C	Long term (during operation)
O-24	Sustainable drainage systems (SuDS)	Sustainable drainage systems (SuDS), e.g. French drains, reed beds, rain gardens	Low	Easy	C	Long term (during operation)

O-25	Alternative cable surround	Look at alternative cable surround to cement blended sand (CBS), design for higher thermal resistivity (TR) surround	High	Difficult	B	Short term (during design)
O-26	Co-location with neighbouring NGV projects	Converter site Master Plan - reduce number of buildings as may be able to share facilities with neighbouring NGV projects, i.e. meeting space, workshops, kitchens, storage, fire fighting measures	High	Difficult	B	Short term (during design)
O-27	Rain and grey water harvesting	Rain and grey water harvesting, e.g. for flushing toilets and feeding green roofs	Low	Easy	C	Long term (during operation)
O-28	Use existing buildings	Explore existing buildings and consider buying those that can meet needs locally rather than building new, e.g. storage building at Manston airport	High	Difficult	B	Short term (during design)
O-29	Reed beds for waste management	Use of reed beds for managing waste	Low	Easy	C	Long term (during operation)
O-30	Reduce structural demand	Adopt best practice in structural arrangements to reduce structural demand, resulting in lower material use	High	Easy	A	Short term (during design)
O-31	Maximise carbon sequestration of landscaping	Plant trees with greatest possible carbon sequestration abilities as part of landscaping and BNG	Low	Easy	C	Medium term (during construction)
O-32	House equipment outdoors	Explore what can be housed outdoors to avoid need for new buildings, e.g. DC hall equipment	High	Difficult	B	Short term (during design)
O-33	Recycled / low carbon concrete	Concrete using recycled concrete or low carbon alternative	High	Difficult	B	Short term (during design)
O-34	Low carbon copper	Low carbon copper in cables	High	Difficult	B	Short term (during design)
O-35	Recycled / low carbon aggregate (converter - haul roads)	Recycled and/or local aggregate supply for haul roads	High	Difficult	B	Medium term (during construction)
O-36	Recycled / low carbon aggregate (cable - haul roads)	Recycled and/or local aggregate supply for cable protection	High	Difficult	B	Medium term (during construction)
O-37	Recycled / low carbon steel	Steel using recycled content or low carbon alternative	High	Difficult	B	Medium term (during construction)
O-38	Soil stabilisation or trackway	Soil stabilisation or trackway instead of stone haul roads	High	Difficult	B	Short term (during design)
O-39	SF6-free assets	SF6-free assets (e.g. using G3)	High	Easy	A	Long term (during operation)
O-40	Reusable alternatives to wooden shuttering	Reusable products as alternative to wooden shuttering	Low	Easy	C	Medium term (during construction)
O-41	On-site concrete batching	Concrete batching on site to reduce vehicle movements	Low	Difficult	D	Medium term (during construction)
O-42	Lower quality interior finishings	Lower quality finish inside the buildings, e.g. avoid plasterboard for minimalist approach	Low	Difficult	D	Short term (during design)
O-43	Low concrete roadways	Low concrete roadways, e.g. grasscrete	Low	Difficult	D	Short term (during design)
O-44	Earth Friendly Concrete	Earth Friendly Concrete use in applications requiring lower class concrete	High	Difficult	B	Medium term (during construction)
O-45	Mass-timber walls	Mass-timber walls as alternative to metal cladding	High	Difficult	B	Short term (during design)
O-46	Warm mix asphalts	Warm mix asphalts (WMAs) to be used on permanent roads and temporary bellmouths to reduce production carbon	Low	Difficult	D	Medium term (during construction)
O-47	Reduce packaging	Challenge supplier regarding amount of packaging that is used without risking damage to assets	Low	Difficult	D	Medium term (during construction)
O-48	Reuse waste packaging	Local use for waste packaging, e.g. wood packing to build bird hides	Low	Easy	C	Medium term (during construction)

O-49	Nature-friendly concrete for marine environment	Use of nature-friendly concrete mattresses in the marine environment	Low	Difficult	D	Short term (during design)
O-50	Distribution Network Operator (DNO)	Implement DNO supplies on day 1	Low	Easy	C	Medium term (during construction)
O-51	EV plant	Require use of EV plant	High	Difficult	B	Medium term (during construction)
O-52	Bio-diesel vessels	Bio-diesel powered vessels	High	Difficult	B	Medium term (during construction)
O-53	Electric vehicles	Electric vehicles	Low	Easy	C	Medium term (during construction)
O-54	Onshore power supplies for vessels	Onshore power supplies for vessels moored up or waiting on weather	High	Easy	A	Medium term (during construction)
O-55	Modern haul road techniques	Modern haul road techniques such as products by soil science	High	Difficult	B	Medium term (during construction)
O-56	Limit guard vessels	Phasing of marine work to limit use of guard vessels	Low	Difficult	D	Medium term (during construction)
O-57	Use software for more efficient energy savings programmes	Using BIM / AI software to build up more efficient programmes to realise energy savings	High	Easy	A	Medium term (during construction)
O-58	Pre-cast concrete	Using pre-cast concrete and minimising waste concrete related to concrete overestimates	High	Difficult	B	Medium term (during construction)
O-59	Water conservation	Preserve and protect water	Low	Difficult	D	Medium term (during construction)
O-60	Sustainable lodging	Sustainable lodging / accommodation for construction workers	Low	Difficult	D	Medium term (during construction)
O-61	Reuse temporary works structures	Reuse of temporary works structures	High	Easy	A	Medium term (during construction)
O-62	Sale of construction materials to other projects	Planning for sale or donation of construction materials to future projects	Low	Difficult	D	Medium term (during construction)
O-63	Promote active travel for workers	Secure bike storage to promote active travel	Low	Easy	C	Medium term (during construction)
O-64	EV shuttle service for workers	EV shuttle service to promote public transport	Low	Easy	C	Medium term (during construction)
O-65	Wind-powered-vessels	Use of wind-powered vessels for long distance transport	Low	Difficult	D	Medium term (during construction)
O-66	Minimising rock required for marine protection	Efficiencies in the design to minimise material quantities.	High	Difficult	B	Medium term (during construction)

Appendix C Glossary of terms

Appendix Table C.1 Glossary of Terms

Term	Description
Hotspot	Key emission sources which result in a relatively large proportion of emissions.
Carbon Team	Team of suitably qualified carbon practitioners responsible for technical GHG work, e.g. conducting GHG calculations.
Designer	Team responsible for the design of the Proposed Project.
Contractor	Team responsible for the construction of the Proposed Project.
Client	The party who the Proposed Project is being constructed for, i.e. National Grid.
Scope 1 emissions	Direct emissions from the reporting entity's direct activities (e.g. fuel consumption on site).
Scope 2 emissions	Indirect emissions from energy purchased by the reporting entity (e.g. purchased electricity).
Scope 3 emissions	Indirect emissions from activities upstream and downstream in the reporting entity's value chain (e.g. emissions associated with purchased goods).

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7.5.13 Greenhouse Gas Reduction Strategy

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