

Yorkshire GREEN Project

Environmental Impact Assessment

Preliminary Environmental Information Report
Volume three Appendix 4B Climate Change
Technical Note

October 2021

nationalgrid

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Climate Change Technical Note

1. Climate

1.1 Introduction

1.1.1 The assessment of the effects of the Project in relation to the global climate can be divided into two subsections in line with the Institute of Environmental Management and Assessment (IEMA) guidance¹:

- Greenhouse gas (GHG) emissions – the effects on the climate of the GHG emissions arising from the operation and construction of the Project, including how the Project would affect the ability of the UK Government to meet its carbon reduction targets.
- Vulnerability to climate change – this assessment demonstrates the effects of a changing climate on the Project, including how design will take account of the projected impacts of climate change.

1.1.2 Chapter 17 of the Scoping Report proposed to scope out the assessment of climate change effects from the EIA. In paragraph 3.3.25 of the Scoping Opinion, the Planning Inspectorate stated that “*the Environmental Statement (ES) should include a description and assessment (where relevant) of the likely significant effects the Proposed Development has on climate*” and “*the vulnerability of the project to climate change. Where relevant, the ES should describe and assess the adaptive capacity that has been incorporated into the design of the Proposed Development.*” Paragraph 4.13.1 also stated that the “*ES should provide an assessment of GHG emissions during construction and operation.*”

1.1.3 The vulnerability to climate change assessment is not discussed in this section but is considered as part of the scope of other relevant environmental aspects, namely **Chapter 6: Landscape and Visual Amenity; Chapter 8: Biodiversity; Chapter 9: Hydrology; Chapter 10: Geology and Hydrogeology; Chapter 11: Agriculture and Soils; Chapter 12: Traffic and Transport; and Chapter 13: Air Quality**. Where relevant the Project has been designed so that it is not vulnerable to the effects of Climate Change. Further information on the vulnerability of the Project to climate change will be provided in the ES.

1.1.4 The Project will enable increased electric power flows in Britain to be managed efficiently by improving the ability to transfer clean energy across the country. Although the resultant decreases in GHG emissions cannot be quantified, as they will also be dependent on electricity generation projects being commissioned and operated, it is considered that the project will be beneficial in supporting the UK to decarbonise and meet its UK carbon target, often referred to as ‘net zero’, and will therefore support the ability of the UK Government to meet its carbon budgets. The Climate Change Act 2008² and its 2050 target amendment³ commits the UK to reduce its net GHG emissions by at least 100% below 1990 levels by 2050. The Project will also support the Government’s commitment to quadruple the UK’s offshore wind capacity by 2030.

¹ IEMA (2020). *Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation*. [online] Available at: <https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020> [Accessed 13 August 2021].

² *Climate Change Act 2008* [online]. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents> [Accessed 29 July 2021].

³ *The Climate Change Act 2008 (2050 Target Amendment) Order 2019* [online]. Available at: <https://www.legislation.gov.uk/uksi/2019/1056/contents/made> [Accessed 29 July 2021].

1.2 Relevant legislation and policy

Legislative context

- 1.2.1 Legislation relevant to the assessment of the effects on climate change is provided in **Table 4B.1**.
- 1.2.2 The UK Emission Trading Scheme (ETS) was set up to replace the UK's participation in the EU ETS in January 2021. The UK ETS is a market-based mechanism of emissions trading to control pollution through the provision of economic incentives for reducing the emissions of pollutants.

Table 4B.1 – Legislative context for climate

Policy	Policy context
Climate Change Act 2008 ⁴ (including The Climate Change Act 2008 (2050 Target Amendment) Order 2019 ⁵)	<p>This Act, as amended in 2019, commits the UK to reduce its net GHG emissions by at least 100% below 1990 levels by 2050 (the 'UK carbon target', often referred to as 'net zero') and requires the Government to establish 5-year carbon budgets. The Act also established an independent expert body, the Committee on Climate Change, to advise the Government on the level of those emissions targets and report on progress made to reduce emissions.</p> <p>The Act sets out reporting requirements in the form of Adaptation Reports, a mechanism for gathering and presenting evidence to help understand climate change risks to the UK.</p>
The Carbon Budgets Order 2009 ⁶	<p>This legislation implements the carbon budgets set out in the Climate Change Act 2008⁴. The budgets require the UK to continually reduce emissions in line with the carbon reduction commitments established under that Act.</p> <p>The carbon budgets are:</p> <ul style="list-style-type: none">• first carbon budget, 2009 to 2012, 3,018 mega tonnes carbon dioxide equivalent (MtCO₂e) representing 25% reduction below 1990 levels;• second carbon budget, 2013 to 2017, 2,782 MtCO₂e representing 31% reduction below 1990 levels;• third carbon budget, 2018 to 2022, 2,544 MtCO₂e representing 37% reduction below 1990 levels by 2020;• fourth carbon budget, 2023 to 2027, 1,950 MtCO₂e representing 51%

⁴ *Climate Change Act 2008* [online]. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents> [Accessed 07 June 2021].

⁵ *The Climate Change Act 2008 (2050 Target Amendment) Order 2019* [online]. Available at: <https://www.legislation.gov.uk/uksi/2019/1056/contents/made> [Accessed 07 June 2021].

⁶ *The Carbon Budgets Order 2009* [online]. Available at: <https://www.legislation.gov.uk/uksi/2009/1259/contents/made> [Accessed 07 June 2021].

Policy	Policy context
Energy Act 2016	<p>reduction below 1990 levels by 2025; and</p> <ul style="list-style-type: none"> fifth carbon budget, 2028 to 2032, 1,725 MtCO₂e representing 57% reduction below 1990 levels by 2030. <p>Sixth carbon budget, 2033 to 2037, 965 MtCO₂e representing 78% reduction below 1990 levels by 2035.</p> <p>The Energy Act 2016 is a UK Act of Parliament relating to UK enterprise law and energy in the UK. It covers three main areas, establishes the new Oil and Gas Authority (OGA), sets out the formal powers of the OGA and sets out the closure of Renewables Obligation for onshore wind in England, Wales and Scotland.</p>

1.2.3 All carbon budgets that have been legislated, or are under draft legislation, have been considered in the GHG assessment. The timescale of these budgets covers the construction period and some of the operational period only. The total UK budgets, expressed in the form of million tonnes of carbon dioxide equivalent (million tCO₂e), are detailed in **Table 4B.2**.

Table 4B.2 – UK Carbon budgets

Budget	Carbon budget level (million tCO ₂ e)	Reduction below 1990 levels	Legal status
4 th Carbon Budget (2023 to 2027)	1,950	51% by 2025	Statute
5 th Carbon Budget (2028 to 2032)	1,725	57% by 2030	Statute
6 th Carbon Budget (2033 -2037)	965	78% by 2035	Statute
Net Zero Target	0	100% by 2050	Statute

Climate policy content

1.2.4 There are a number of policies at the international and national level that will be relevant to the Project. The National Policy Statements (NPSs) provide the primary policy basis for the consideration of Nationally Significant Infrastructure Projects (NSIP). The principal policies and their relevance to GHG emissions are listed in **Table 4B.3**.

Table 4B.3 – Climate policy context

Policy	Implications
International Policy	
The United Nations Framework Convention on Climate Change (UNFCCC) Paris Agreement	The UNFCCC is the major international body responsible for managing climate change and carbon emissions. In 2015, it adopted the Paris Agreement, the aims of which are stated as: “This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by: (a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change”. The agreement sets targets for countries’ GHG emissions, but these are not legally binding or enforceable. In December 2020, the UK submitted its first Nationally Determined Contribution (NDC) to the UNFCCC, committing to “at least a 68%” reduction in GHG emissions below 1990 levels (1995 levels for F-gases) by 2030, aligned with the UK’s 2050 net-zero GHG emissions target.
UNFCCC Kyoto Protocol (UNFCCC, 1997)	<p>The Kyoto Protocol was adopted in December 1997 and there are currently 192 Parties to the Kyoto Protocol. It commits industrialised countries and economies to transition to limit and reduce GHG emissions in accordance with agreed individual targets. These have been strengthened in more recent international agreements culminating in the Paris Agreement (UNFCCC, 2015), as described above.</p> <p>The Kyoto Protocol contains a list of seven GHG to be reported, which remains relevant in the Paris Agreement, namely: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF₆), and nitrogen trifluoride (NF₃). In this GHG assessment, these seven GHG are collective considered “GHG emissions” and reported as carbon dioxide equivalent (CO₂e) GHG emissions.</p>
National Policy Statements	
Overarching National Policy Statement (NPS) for Energy (EN-1) ⁷	EN-1 sets out general assessment principles for applications relating to energy infrastructure. This includes that the Secretary of State should take into account the potential benefits of a project including meeting needs for energy infrastructure and job creation and long term or wider benefits.

⁷ Department for Business, Energy and Industrial Strategy (2011). *Overarching National Policy Statement for Energy (EN-1)* [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/47854/1938-overarching-nps-for-energy-en1.pdf [Accessed 13th October 2021].

Policy	Implications
National Policy Statement for Electricity Networks Infrastructure (EN-5) ⁸	<p>The Energy NPS aims to “<i>speed up the transition to a low carbon economy and thus help to realise the UK climate change commitments sooner than continuation under current planning system</i>” [1.7.2]. Note the “<i>current planning system</i>” as described in the Energy NPS has since been updated with more ambitious carbon reduction targets.</p> <p>EN-1 notes that the ES should consider the impacts of climate change when planning the location, design, build and operation of new energy infrastructure.</p> <p>EN-5 is directly relevant to the consideration of the Project as a grid reinforcement project.</p>
National Planning Policy Framework (NPPF) ⁹	<p>The 2021 revision of the NPPF, paragraph 148 states: “<i>The planning system should support the transition to a low carbon future in a changing climate... shape places in ways that contribute to radical reductions in greenhouse gas emissions... and support renewable and low carbon energy and associated infrastructure</i>”.</p> <p>It also requires in paragraph 154 that new development should be planned for in ways that “<i>can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards</i>”.</p> <p>Furthermore, it is stated in paragraph 155, that local planning authorities should expect new development to:</p> <p>a) “<i>comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and</i> <i>take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.</i>”</p>
Clean Growth Strategy (BEIS)	<p>This report, prepared by BEIS, provides the strategy for the UK’s future clean growth to allow carbon budgets to be met and support economic growth. It sets out policies and targets out to 2050 for reducing GHG emissions across a number of</p>

⁸ Department for Business, Energy and Industrial Strategy (2011). *National Policy Statement for Electricity Networks Infrastructure (EN-5)* [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/37050/1942-national-policy-statement-electricity-networks.pdf [Accessed 13th October 2021].

⁹ Ministry of Housing, Communities and Local Government (2021). *National Planning Policy Framework* [online]. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf [Accessed 13th October 2021].

Policy	Implications
The UK's Nationally Determined Contribution under the Paris Agreement ¹⁰	sectors. Whilst not in itself planning policy it is a material consideration. In December 2020, the UK submitted its first NDC under the Paris Agreement to the UNFCCC, committing to “at least a 68%” reduction in economy-wide GHG emissions below 1990 levels (1995 levels for F-gases) by 2030, aligned with the UK’s 2050 net-zero GHG emissions target.

1.3 Assessment methodology

- 1.1.1 At this stage of the Project, it has not been possible to carry out a final life cycle GHG inventory analysis, as detailed specifications of the Project elements, which are currently unavailable, are required to complete such an exercise. Further detail will be presented in the ES once certain aspects of the Project design are refined further. Therefore, an indication of the nature and magnitude of GHG emissions associated with the Project have been estimated in this section using current design knowledge, expert judgement and published literature studies. This follows the methodology reported within the IEMA guidance¹¹.
- 1.1.2 **Table 4B.4** presents the scope of the assessment and assumptions made by outlining the different elements of the Project according to the infrastructure life cycle and modules set out in the PAS 2080: Carbon Management Infrastructure¹². Assumptions made in order to quantify the GHG emissions associated with the different elements of the Project are also reported in **Table 4B.4**. The result of quantifying the GHG emissions associated with the Project is reported below.

¹⁰ Department for Business, Energy & Industrial Strategy (2020). *The UK's Nationally Determined Contribution under the Paris Agreement* [online]. Available at: <https://www.gov.uk/government/publications/the-uks-nationally-determined-contribution-communication-to-the-unfccc> [Accessed 13th October 2021].

¹¹ IEMA (2017). *Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance* [online]. Available at: https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf [Accessed 23 July 2021].

¹² The Green Construction Board, Construction Leadership Council (2016). *PAS 2080:2016 Carbon Management in Infrastructure* [online]. Available at: https://shop.bsigroup.com/ProductDetail?pid=00000000030323493&creative=443668107352&keyword=&matchtype=b&network=g&device=c&gclid=EA1aIQobChMI1pLT1OCG7QIVB813Ch3RrwQUEAAAYAAEqJXGfD_BwE [Accessed 23 July 2021].

Table 4B.4 – Stages of the Project considered as sources of GHG emissions

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
Pre-Construction	A0 – pre-construction	<p>pre- This stage of the Project comprises preliminary studies and works, for example strategy and brief development, design development, survey work to support EIA and engineering design, and cost planning. Most, if not all, of these functions will be largely office-based functions contributions from across the value chain.</p> <p>Construction logistics undertaken by LSTC Group¹³ indicate that for this Project pre-construction works will involve pre-site surveys, ground investigations and construction compounds.</p>	<p>Included - The maximum number of vehicles estimated per day for this stage of the Project is 12¹³. Works would be of a limited duration and would comprise vans or smaller vehicles.</p>	<p>The assessment assumes that Light Duty Vehicles) LDVs will be used in the pre-construction stage.</p>
Construction	A1 – A2 – A3 - Raw materials supply, transport and manufacture	<p>These comprise embodied GHG emissions associated with the raw material assets required to construct the Project.</p>	<p>Included - A bill of materials required to construct the Project has been developed based on the current design and upon liaison with project engineers. Material weights have been estimated based on published literature and used alongside embodied carbon</p>	<p>It has been assumed that all overhead lines are predominantly made up of aluminium and the pylon structures predominantly made up of steel. For the CSECs and the substation compounds, it has been assumed that the predominant raw materials are concrete and steel.</p>

¹³ LSTC Group, 2021. *Yorkshire Green: Indicative Construction Vehicle Movements*. Doc reference: PDD-33754-REP-505-001

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
Construction	A4 – Construction transport	Transport of construction materials resources and equipment from point of purchase to the works site. Commuting of workforce during construction.	Included - Construction traffic modelling (Chapter 12: Traffic and Transport) has provided traffic	<p>Concrete is assumed to take up the floor area for the CSECs (see Chapter 3: Description of the Project), and it is assumed that the steel components make up 10% of this area.</p> <p>It is assumed that only 10% of the area of the substation compounds (see Chapter 3: Description of the Project) would be made up on concrete and that steel structures would make up 10% of the area covered by the concrete.</p> <p>For all steel structures 5% of the total calculated area was considered in the assessment, since there are gaps in the structures.</p> <p>An average one-way distance travelled by construction vehicles was obtained from the DfT dataset on domestic freight transport by commodity and length of haul¹⁵.</p>

¹⁴ Circular Ecology. The Inventory of Carbon and Energy (ICE) database. [Online]. Available from: [Embodied Carbon Footprint Database - Circular Ecology](#)

¹⁵ DfT (2020). TSGB0430 (RFS0105): Goods lifted and moved by commodity and length of haul. <https://www.gov.uk/government/statistical-data-sets/tsgb04-freight> [Accessed 16th September 2021].

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
Construction	A5 - Construction process stage	<p>Emissions associated with construction and installation processes (including fuel and electricity consumption) of the temporary works, ground works, landscaping and permanent works. Emissions associated with site water demand.</p> <p>Waste management activities (transport, processing, final disposal) associated with waste arising from the Project.</p>	<p>movements included in the assessment of construction transport for this GHG assessment. The traffic model indicates peak construction traffic movements from January 2025 – December 2027 during the overall construction programme from 2024 to 2028.</p> <p>Included - Construction compounds would be installed at five locations throughout the Project and comprise of temporary portacabins limiting the amount of land take required. These construction compounds would also provide laydown areas for the storage of the construction plant and materials. The quantification of GHG emissions</p>	<p>At this stage of the Project, it is assumed that there would be no removal of soils from the draft Order Limits and that all such material would be reused on-site, for example for landscape bunding around the substations.</p>

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
			<p>associated with the construction of these compounds is included within the embodied carbon assessment, stage A1 – A2 – A3.</p>	
			<p>National Grid will adopt good construction and management practices to ensure waste is minimised as far as possible and that the storage, transport and eventual disposal of waste would have no significant environmental effects. All operations that result in the production of waste would adopt the waste hierarchy. The impacts from the transportation of wastes (for example removal of dismantled pylons) associated with the Project are</p>	

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
			considered within the transport assessment discussed above for stage A4.	
Construction	A5 - Construction process stage	Emissions associated with land use change.	Scoped out - It is expected that the changes in land use type associated with the Project would be minimal, and so have not been considered as part of the assessment.	
Operation	B1 - Boundary of use stage – installed products and materials	Called 'Use', this represents the carbon emitted directly from the fabric of products and materials once they have been installed as part of infrastructure and it is in normal use.	Scoped out - At this stage of the design it is not anticipated that any of the materials used in the construction of the Project will be capable of emitting carbon directly. This will be reviewed at ES stage, when further design information will become available. In particular, attention will be paid to confirm that no switch gear will be using SF ₆ and therefore have	

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
Operation	B2 – B5 Maintenance, repair, replacement and refurbishment	Represents the works activities and new materials for the maintenance, repair, replacement and refurbishment of the infrastructure during the use stage/operation of infrastructure.	potential for leakage of this GHG.	- Discussion with project engineers concluded that a reasonable assumption regarding vehicle movements associated with these works would equal 25% of the construction vehicle movements.
		This is notionally described as capital carbon. However, depending on organisational interpretation, and the way that such activities are delivered through capital and/or operational expenditure budgets, they might alternatively be described as operational carbon emissions.	Included Maintenance and Project inspection of the required throughout its operational lifetime. The works can be expected to be undertaken in small teams, with a limited number of vehicles and comprise predominantly visual inspections, with the occasional replacement of materials, where required. The quantification of GHG emissions associated with this stage are reported below in the summary section.	
			The GHG emissions associated with the replacement of materials have been included in the embodied carbon	

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
			assessment and therefore the GHG emissions reported for stage A1 – A2 – A3. These are also reported in the summary section below.	
Operation	B6 – energy	Operational Emissions resulting from the energy used by the Project to enable it to deliver its service during operation. For example, the GHG emissions associated with the generation of power.	Scoped out - The nature of the Project is such that it largely transmits rather than uses energy although there would be some minimal uses, for example security lighting at the substations.	
Operation	B7 – Operational water	Emissions resulting from the consumption of water required by the Project to operate and deliver its service.	Scoped out - Consumption of water is not expected during operation of the Project.	
Operation	B8 – Other operational processes	Represents other process GHG emissions arising from the Project to enable it to operate and deliver its service.	Scoped out - Emissions associated with the transport of workforce would be very minimal and associated with occasional	

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
			<p>maintenance works. At this stage of the Project it is assumed that the substations would be unmanned.</p> <p>No other operational processes of the Project have been identified, additional to the transport of workforce associated with the maintenance and repair of materials, considered in stage B2-B5.</p>	
Operation	B9 – User’s utilisation	Represents the activities associated with user’s utilisation of the Project during the use stage. This is defined by the principle of control and influence whereby the GHG emissions are B9 (user’s utilisation) when they arise from an activity that the user has control over.	Scoped out – Activities such as those described for this stage have not been identified for the Project.	
General	D – Benefits and loads beyond the infrastructure life cycle	Includes avoided carbon emissions associated with the Project including potential for re-use, recovery and recycling of materials and/or energy and associated GHG emissions beyond the system boundary. GHG benefits from avoided fossil fuel power generation have been recorded.	Included but not quantified - The Project is needed to improve the transfer of clean energy across the country. Maximising the potential of renewable energy generation to	

Project Phase	Main stage of Project life cycle	Sources of GHG emissions	Assessment	Assumptions
			<p>provide clean energy to homes will help to avoid CO₂ emissions and have a beneficial impact on the Climate.</p>	
			<p>The avoided emissions discussed here cannot be quantified, and therefore will not influence the determination of the significance of effects from GHG emissions associated with the Project.</p>	

1.4 Determination of significance

1.1.3 The magnitude of the Project has been evaluated based on the extent to which the Project materially affects the ability of the UK Government to meet its carbon target and budgets.

1.1.4 Based on the above, the following statements can be made:

- Net increase in GHG emissions associated with the Project represents an adverse effect.
- Net reduction in GHG emissions associated with the Project represents a beneficial effect.
- The significance of the effect is dependent on the extent to which the increase/decrease in GHG emissions materially affects the ability of the UK Government to achieve its UK carbon budgets.

1.1.5 The extent of the effect of the Project is assessed as described in **Table 4B.5**. The following statements can be made based on **Table 4B.5**:

- A major effect where net gain in GHG emissions are calculated to contribute a major amount to the UK Carbon budgets will constitute as high in magnitude.
- A minor effect where net gain in GHG emissions are calculated to contribute only a minor amount to the UK Carbon budgets will constitute as low in magnitude.

Table 4B.5 – Determination of effect matrix

Magnitude	Effect
Negligible	None
Low	Minor
High	Major

1.1.6 The significance of the GHG emissions from the Project has therefore been determined based on **Table 4B.6**. Any impact which is concluded to have either a low or high effect on the Climate will be significant. This methodology outlined to determine significance follows current IEMA¹⁶¹⁷ guidance where it is understood any net GHG emissions (either positive or negative) from a Project might be considered to be significant.

Table 4B.6 – Significance criteria

Magnitude	Effect
High (adverse)	Net increases in GHG emissions associated with the Project are considered to materially

¹⁶ IEMA. (2017). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. [online]. Available at: [EIA Guide GHG Assessment and Significance IEMA 16May17.pdf \(iaia.org\)](#) [Accessed 15 October 2021]

¹⁷ IEMA (2010). Climate Change Mitigation & EIA [online]. Available at: <https://www.iema.net/document-download/33006> [Accessed 15 October 2021]

Magnitude	Effect
	affect the ability of the UK Government to meet its carbon budgets/targets.
Low (adverse)	Net increases in GHG emissions associated with the Project are considered to not materially affect the ability of the UK Government to meet its carbon budgets/targets.
Negligible	Overall, GHG emissions associated with the Project are zero, and thus there is no implication for carbon budgets/targets.
Low (beneficial)	Net decreases in GHG emissions associated with the Project are considered to not materially affect the ability of the UK Government to meet its carbon budgets/targets.
High (beneficial)	Net decreases in GHG emissions associated with the Project are considered to materially affect the ability of the UK Government to meet its carbon budgets/targets.

1.5 Preliminary assessment of GHG emissions

1.1.7 The preliminary GHG assessment is reported below in **Table 4B.7** and concludes 78.79 tCO_{2e} emissions associated with the construction and operation of the Project.

Table 4B.7 – GHG emission estimates during the lifecycle of the Project

Stage of Project	Main stage of Project life cycle	Estimated emissions (tCO _{2e})
Construction	A0 – Pre - construction	0.29
	A1 – A2 – A3 - Raw materials supply, transport and manufacture	58.85
	A5 – Construction process stage	-
	A4 – Construction Transport	15.96
Operation	B2 – B5 – Maintenance, repair, replacement and refurbishment	3,99
	B6 – Operational energy	-
	B7 – Operational water	-

Stage of Project	Main stage of Project life cycle	Estimated emissions (tCO ₂ e)
	B8 – Other operational processes: Landfill	-
Other	B8 – Other operational processes: Operational transport	-
Net change in GHG emissions from the Project		78.79

Contextualisation against UK carbon budgets

- 1.1.8 To determine the significance of the Project's contribution to the UK GHG emissions, the net GHG emissions calculated are contextualised against the carbon budgets set out in **Table 4B.2**.
- 1.1.9 The GHG emissions associated with the Project and reported in **Table 4B.7** can be considered to fall within the following categories: construction traffic, construction embodied carbon, and operational traffic. Construction traffic modelling set out in the traffic assessment (**Chapter 12: Traffic and Transport**) covers the period of peak impacts runs from 2025 – 2027 within the overall construction programme of 2024 to 2028. GHG emissions from peak construction traffic will therefore fall within the fourth carbon budget. GHG emissions from the embodied carbon assessment will also fall within this fourth budget since embodied carbon is associated with construction works. The Project is expected to be operational from 2027 and has an operational lifetime of 80 years. The GHG emissions associated with the operational traffic will therefore fall within all four carbon budgets. As a worse-case scenario, a uniform annual emission has been applied to the total lifetime of the Project and calculated from the total GHG emissions expected from operational traffic.
- 1.1.10 **Table 4B.8** presents the net tCO₂e associated with construction traffic, embodied carbon and operational traffic during each of the legislated carbon budget periods.

Table 4B.8 – Estimates GHG emissions contextualised against the relevant UK carbon budgets

Project phase	Estimated total GHG emissions from the Project (tCO ₂ e)	Net Project GHG emissions per relevant carbon budget and 2050 net zero target (tCO ₂ e)			
		4 th (2023 to 2027)	5 th (2028 to 2032)	6 th (2033 to 2037)	2050 net zero target (2050 only)
Pre-construction	0.29	0.29			
Construction traffic	15,957	15,957			

		Net Project GHG emissions per relevant carbon budget and 2050 net zero target (tCO ₂ e)			
Project phase	Estimated total GHG emissions from the Project (tCO ₂ e)	4 th (2023 to 2027) 1,950,000,000	5 th (2028 to 2032) 1,725,000,000	6 th (2033 to 2037) 965,000,000	2050 net zero target (2050 only)
Embodied carbon	58,845	58,845			
Operational traffic	3,989	49.9	199.5	199.5	49.9
Total	78,791	74,851	199	199	50
% contribution		0.004	0.00001	0.00002	

Conclusion of significance

- 1.1.11 The contributions of GHG emissions from the Project has been established and equates to <0.01% of each of the UK's carbon budgets. In this context the Project will have an adverse impact on the climate but one that will not materially impact on achieving carbon reduction targets as set out by the UK Government. The Project is assessed as having a **low (adverse) effect**. In line with IEMA guidance¹⁶¹⁷, as the Project will increase GHG emissions (albeit to a degree that will not affect the ability to meet UK carbon budgets) this effect is considered to be significant.
- 1.1.12 The benefits of the Project (as discussed in **Table 4B.4** and paragraph 1.1.4) have not been taken into account in assessing the effect of the Project on the Climate since the benefits cannot be quantified. Despite this, it can be recognised that the Project would facilitate the transfer of clean energy across the country and by doing so support decarbonisation and resultant decreases in associated GHG emissions.

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