



Morven Hawthorn Pit Grid Connection Project

Preliminary Environmental Information Report

Volume 4, Chapter 4: Climate Change

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Table of contents

4	Climate Change.....	1
4.1	Introduction.....	1
4.2	Legislative and policy context	2
4.3	Consultation and engagement	10
4.4	Baseline Characterisation.....	13
4.5	Impact assessment methodology	18
4.6	Key parameters for assessment	23
4.7	Commitments adopted as part of the MHPGC Project	37
4.8	Assessment of impacts	42
4.9	Cumulative effects	50
4.10	Transboundary effects.....	53
4.11	Summary.....	53
4.12	References	57

List of tables

Table 4.1: Summary of UK carbon budgets	2
Table 4.2: Summary of the NPS provisions relevant to Climate Change	4
Table 4.3: Summary of NPPF requirements relevant to Climate Change	6
Table 4.4: Marine planning policy relevant to Climate Change	8
Table 4.5: Local policy relevant to Climate Change	10
Table 4.6: Summary of scoping responses relevant to Climate Change	10
Table 4.7: Onshore Climate Change Projections under RCP8.5	17
Table 4.8: GHG emissions scale of adverse effect criteria.....	19
Table 4.9: Receptor susceptibility criteria	20
Table 4.10: Receptor vulnerability criteria.....	21
Table 4.11: Receptor sensitivity criteria	21
Table 4.12: CCR and adaptation likelihood of impact criteria	21
Table 4.13: CCR and adaptation consequence of impact criteria	22
Table 4.14: Assessment matrix for CCR impacts	22
Table 4.15: CCR and adaptation significance criteria	22
Table 4.16: Impacts scoped into the assessment (GHG emissions)	23
Table 4.17: Impacts scoped out of the assessment (GHG Emissions)	24
Table 4.18: Impacts scoped into the assessment (Climate resilience)	25
Table 4.19: Impacts scoped out of the assessment (Climate resilience)	25
Table 4.20: MDS relevant for the assessment of potential impacts on Climate Change	27
Table 4.21: Embedded commitments relevant to GHG implemented as part of the MHPGC Project	38

Table 4.22: Embedded commitments relevant to climate change risk implemented as part of the MHPGC Project	41
Table 4.23: Estimated construction phase Onshore and Offshore GHG emissions	42
Table 4.24: Contextualisation of Estimated Construction phase Onshore and Offshore GHG emissions against UK, Local Recommended and UK Sector Carbon Budgets.....	43
Table 4.25: Estimated O&M phase Onshore and Offshore GHG emissions	44
Table 4.26: Contextualisation of Estimated O&M phase Onshore and Offshore GHG emissions against UK, Local Recommended and UK Sector Carbon Budgets.....	44
Table 4.27: Summary O&M Climate Change Risk Assessment.....	45
Table 4.28: Estimated decommissioning phase Onshore and Offshore GHG emissions	47
Table 4.29: Summary Decommissioning Climate Change Risk Assessment	47
Table 4.30: Estimated net whole life Onshore and Offshore GHG emissions	49
Table 4.31: Contextualisation of Estimated net whole life Onshore and Offshore GHG emissions against UK Carbon Budgets	49
Table 4.32: Scenarios to be considered in the MHPGC Project whole project Assessment for GHG	51
Table 4.33: Whole Project Assessment and Morven Programme Assessment summary	51
Table 4.34: Whole Project and Programme Significance Assessment Summary	52
Table 4.35: Summary of potential impacts and residual effects	55

Annexes

Annex number	Annex title
Volume 4, Annex 4.1	GHG Assessment
Volume 4, Annex 4.2	Climate Change Risk Assessment

Glossary

Term	Meaning
Commitments	Measures (embedded mitigation & secondary) to be adopted during the construction, operation and maintenance, and decommissioning phases of the MHPGC Project.
Cumulative effect	The combined effect of the MHPGC Project with the effects from other proposed developments, on the same receptor or resource.
Cumulative effects assessment	Assessment of potential significant effects resulting from the MHPGC cumulatively with other plans, projects or reasonably foreseeable activities.
Embedded mitigation	Measures included as part of the project design. Includes both primary and tertiary mitigation.
Environmental Assessment (EIA) Impact	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Inter-related effects	Effects that may arise from the interactions between different EIA topic effects considered within the project-alone assessment, potentially leading to more significant effects than if they were to be considered in isolation
Landfall	The area in which the offshore export cables make landfall (come onshore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area between the trenchless technique exit pits and the transition joint bay inclusive of all construction works.
Magnitude	A combination of the spatial extent, duration, frequency and reversibility of an impact.
Marine Directorate Licensing Operations Team (MD-LOT)	The part of the Scottish Government's Marine Directorate responsible for assessing and administering applications for marine licences and Section 36 consent (offshore) in Scotland.
Marine Management Organisation (MMO)	The MMO, as a UK government body, is responsible for licensing, regulating and overseeing activities in the marine environment for English waters. For a DCO and deemed marine licence, the MMO acts as a statutory consultee, advising on marine planning, environmental impacts, habitats and compliance with marine licensing regulations.
Maximum design scenario (MDS)	The realistic, worst-case scenario, selected on a topic-specific and impact specific basis, from a range of potential parameters for the MHPGC Project.
Mean High Water Springs (MHWS)	The most inshore level location reached by the sea at high tide during mean high water spring tide. This is defined as the average throughout the year, of two successive high waters, during a 24-hour period in each month when the range of the tide is at its greatest.
Mean Low Water Springs (MLWS)	The average height of the low water levels of each pair of successive low waters during the periods of about 24 hours when the tidal range is at its greatest.
MHPGC Project Scoping Opinions	Separate scoping opinions received from Planning Inspectorate (PINS) (on behalf of the Secretary of State (SoS)) and Marine Directorate – Licensing Operations Team (MD-LOT) (on behalf of the Scottish

Term	Meaning
	Ministers) in response to the MHPGC Project Scoping Report. The MHPGC Project Scoping Opinions contain the range of issues that PINS, and MD-LOT in consultation with statutory stakeholders, have identified should be considered within the EIA process.
MHPGC Project Scoping Report	A Scoping Report for the MHPGC Project, scoping the likely significant effects of the project on the environment, was submitted and accepted by PINS and submitted to the Scottish Ministers, via MD-LOT in February 2025.
Morven Hawthorn Pit Grid Connection Project	The MHPGC Project is comprised of the offshore export cables in Scottish and English waters from the Morven North or the Morven South offshore substation platform(s) (OSP), landfall, onshore export cables, the onshore land substation (LSS) and AC connection cables. Also referred to in this report as the MHPGC Project, for ease of reading.
Morven North Offshore Wind Array Project (hereafter 'Morven North')	The Morven North Offshore Wind Array Project which includes the wind turbines and foundations, OSPs and foundations, inter-array and interconnector cables and associated infrastructure located within the Morven North Boundary.
Morven South Offshore Wind Array Project (hereafter 'Morven South')	The Morven South Offshore Wind Array Project, which includes the wind turbines and foundations, Offshore Substation Platforms and foundations, inter-array and interconnector cables and associated infrastructure located within the Morven South Boundary.
The Morven Option Lease Agreement Site (hereafter 'Morven Site')	The 859km ² area awarded to the Applicant, identified as a result of the ScotWind leasing round and located in Plan Option (PO) area E1 in Scottish waters. Morven North and Morven South are two distinct projects, located within the Morven Option Lease Agreement Site.
National Grid Hawthorn Pit Substation	The National Grid substation at Hawthorn Pit, County Durham, which the AC connection cables will connect into from the Onshore Land Substation.
Net zero	Net zero refers to total greenhouse gas emissions generated equal to or less than emissions removed from the environment. This can be achieved through emission reduction and emission removal.
Offshore substation platforms (OSPs)	OSPs comprise the support structure, topside and electrical components used for collecting the electricity generated by the wind turbine generators in Scottish waters, for the passage or transmission to landfall. These OSP(s) can be divided into two types: • High Voltage Alternating Current (HVAC) collector substations; • High Voltage Direct Current (HVDC) converter substations.
Operations and maintenance phase (O&M)	The operational and maintenance phase of the MHPGC Project.
Planning Inspectorate (PINS)	The PINS is an executive agency of the UK Government responsible for administering and examining DCO applications for NSIPs in England. PINS manages the application process, oversees consultation and examination, and makes a recommendation to the relevant Secretary of State on whether consent should be granted.
MHPGC Project Preliminary Environmental Information Report (PEIR)	A report that provides preliminary environmental information in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. This is information that enables

Term	Meaning
	consultees to understand the likely significant environmental effects of a project and which helps to inform consultation responses.
Primary mitigation	Measures included as part of the location or design of the MHPGC Project made during the pre-application phase that are an inherent part of the MHPGC Project and do not require additional action to be taken. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the MHPGC Project, the parameters and associated commitments secured by the DCO and marine licence, or both.
Representative Concentration Pathways	A term used to describe scenarios for climate modelling that project future greenhouse gas concentrations based on different assumptions about economic growth, energy use, and land use. There are four pathways that have been adopted by the Intergovernmental Panel on Climate Change, with varying degrees of greenhouse gas concentrations assumed. RCP 8.5 represents emissions continuing to rise throughout the 21st century and is generally taken as the basis for a worst-case climate change scenario.
Residual effects	Effects that continue to exist after mitigation has been applied.
Secondary mitigation	Actions that will require further activity to achieve the anticipated outcome and may be imposed as part of the planning consent, or through inclusion in the ES. These include measures required to reduce the significance of environmental effects and may be secured through an environmental management plan. For secondary mitigation measures, both pre-mitigation and residual effects are presented.
Significance	Effect factor that is determined by the magnitude of impact along with the sensitivity of the receptor.
Tertiary mitigation	Actions that would occur with or without input from the EIA process feeding into the design. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects.
The Study Area	For each environmental topic, the baseline environment will be characterised, and the potential environmental impacts will be described within a topic-specific Study Area. Specific Study Areas are defined for each topic and are based on the maximum spatial extent across which potential impacts of MHPGC Project may be experienced by the relevant receptors (i.e. Zone of Influence).
Transboundary effects	Assessment of likely significant effects resulting from MHPGC Project on the interests of another European Economic Area (EEA) state(s).
Transboundary impact	Potential impacts resulting from MHPGC Project and affecting another EEA state.

Acronyms

Unit	Meaning
BEIS	Department for Business, Energy & Industrial Strategy
CBRA	Cable Burial Risk Assessment

Unit	Meaning
CCC	Climate Change Committee
CCR	Climate Change Resilience
CCRA	Climate Change Risk Assessment
CEA	Cumulative Effects Assessment
CERP	Climate Emergency Response Plan
CLV	Cable Lay Vessel
CMS	Construction Method Statement
CoCP	Code of Construction Practice
COLREG	International Regulations for Preventing Collisions at Sea
COP21	United Nations Climate Change Conference held in 2015
CO ₂ / CO ₂ e	Carbon dioxide / Carbon dioxide equivalent
CSIP	Cable Specification and Installation Plan
CTV	Crew Transport Vessel
DCO	Development Consent Order
Defra	Department for Environment, Food and Rural Affairs
DESNZ	Department for Energy Security and Net Zero
DP	Direct Pipe
DSV	Dive Support Vessel
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
ES	Environmental Statement
GHG	Greenhouse Gas
GV	Guard Vessel
HDD	Horizontal Directional Drilling
HVAC	High Voltage Alternating Current
HVDC	High Voltage Direct Current
ICCI	In-Combination Climate Impacts
IEMA	Institute of Environmental Management and Assessment
IMO	International Maritime Organization
ISEP	Institute of Sustainability and Environmental Professionals
ISV	Installation Support Vessel
LAT	Lowest Astronomical Tide
LSE	Likely Significant Effects
MBAGC	Morven Branxton Area Grid Connection
MD-LOT	Marine Directorate Licensing Operations Team
MDS	Maximum Design Scenario

Unit	Meaning
MFE	Mass Flow Excavator
MHPGC	Morven Hawthorn Pit Grid Connection
MHWS	Mean High Water Springs
MLWS	Mean Low Water Springs
MMO	Marine Management Organisation
MOHC	Met Office Hadley Centre
MPS	Marine Policy Statement
NDC	Nationally Determined Contribution
NPPF	National Planning Policy Framework
NPS	National Policy Statements
O&M	Operations and Maintenance
OD	Outer Diameter
ODMP	Operational Drainage Management Plan
OEMP	Offshore Environmental Management Plan
OSP	Offshore Substation Platform
PDE	Project Design Envelope
PEIR	Preliminary Environmental Information Report
PINS	Planning Inspectorate
PLGR	Pre-Lay Grapnel Run
RCP	Representative Concentration Pathways
SAC	Special Area of Conservation
SMP	Soil Management Plan
SOLAS	International Convention for the Safety of Life at Sea
SoS	Secretary of State
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Strategy
TSV	Trenching Support Vessel
UK	United Kingdom of Great Britain and Northern Ireland
UKCP18	UK Climate Projections
VTMP	Vessel Traffic Management Plan

Units

Unit	Meaning
°C	Degrees Celsius
GW	Gigawatt
ha	Hectare

Unit	Meaning
kg/s	Kilograms per second
km	Kilometre
km ²	Square kilometres
ktCO ₂ e	Kilotonnes of carbon dioxide equivalent
m/hr	Metres per hour
m/s	Metres per second
m	Metre
m bgl	Metres below ground level
m ²	Square metres
m ³	Cubic metres
mm	Millimetres
MtCO ₂ e	Million tonnes of carbon dioxide equivalent
MW	Megawatt
tCO ₂ e	Tonnes of carbon dioxide equivalent
%	Percentage

4 Climate Change

4.1 Introduction

- 4.1.1.1 This chapter of the Preliminary Environmental Information Report (PEIR) presents the preliminary findings of the Environmental Impact Assessment (EIA) work undertaken to date for the Morven Hawthorn Pit Grid Connection Project (hereafter 'MHPGC Project'), as described in **Volume 1, Chapter 2: Project Description, of the PEIR**.
- 4.1.1.2 The assessment considers the following factors:
- Effects of the MHPGC Project on the climate through resulting greenhouse gas (GHG) emissions; and
 - The vulnerability and resilience of the MHPGC Project to medium and long-term changes to the climate.
- 4.1.1.3 The assessment is informed by the following chapters:
- **Volume 1, Chapter 2: Project Description, of the PEIR;**
 - **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR;**
 - **Volume 1, Chapter 5: Policy and Legislation, of the PEIR.**
- 4.1.1.4 The chapter also draws on information contained within the following annexes:
- **Volume 1, Annex 4.1: Draft Commitments Register, of the PEIR;**
 - **Volume 1, Annex 4.2: Transboundary Screening Annex, of the PEIR;**
 - **Volume 1, Annex 4.3: Cumulative Screening and Location Plan, of the PEIR.**
- 4.1.1.5 The chapter is supported by two accompanying annexes:
- **Volume 4, Annex 4.1: Greenhouse Gas Assessment, of the PEIR;**
 - **Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.**

4.1.2 Effects on the Climate

- 4.1.2.1 The chapter considers the potential impacts and effects on Climate Change that could result from the construction, operation and maintenance (O&M) and decommissioning phases of the MHPGC Project. Specifically, it relates to the offshore elements of the MHPGC Project from the offshore substation platform(s) (OSPs) within Morven North Offshore Wind Array Project or Morven South Offshore Wind Array Project (hereafter 'Morven North and Morven South') located within Scottish offshore waters, transiting through English offshore and inshore waters, to Mean High Water Springs (MHWS) at landfall and the onshore elements of the MHPGC Project landward of Mean High Water Springs (MHWS) at landfall to the National Grid Hawthorn Pit Substation in England.
- 4.1.2.2 This chapter describes the methodology and datasets that have informed the preliminary assessment, the baseline conditions (including the future baseline), mitigation measures and the preliminary residual significant effects on Climate Change that could result from the MHPGC Project.

4.1.3 Effects of Climate Change

- 4.1.3.1 The chapter provides a climate change risk assessment that evaluates how forecast changes in climate behaviour may impact on the construction, operation and decommissioning of the MHPGC Project. It therefore assesses the extent of climate related risks to the resilience of the MHPGC Project and how these can be mitigated in design and operation.
- 4.1.3.2 An In-Combination Climate Impact (ICCI) assessment considers where projected changes in climate may exacerbate existing risks identified within other environmental topic areas. An ICCI will be undertaken for the MHPGC Project at ES stage and rather than present the findings of the ICCI in this Chapter, details will be presented in the relevant topic Chapters.

4.1.3.3 This PEIR provides an overview of the MHPGC Project's potential environmental impacts and mitigation measures, presenting essential data to stakeholders for review and feedback. The PEIR will also be informed by the ongoing pre-application consultation process.

4.1.3.4 Following consultation, comments will be reviewed and considered, where appropriate, in preparation of the Environmental Statement (ES) that will accompany the application to the Planning Inspectorate (PINS) for development consent and a marine licence application to Marine Directorate Licensing Operations Team (MD-LOT).

4.2 Legislative and policy context

4.2.1 Overview

4.2.1.1 The full relevant legislation and policy context for the MHPGC Project has been detailed in **Volume 1, Chapter 5: Policy and Legislation, of the PEIR**. This section sets out the legislation and planning policy that is relevant to this chapter.

4.2.2 Legislation

Paris Agreement (2015)

4.2.2.1 The Paris Agreement (United Nations, 2015) is an internationally binding treaty on climate change, adopted by 195 Parties, including the United Kingdom of Great Britain and Northern Ireland (UK), during the United Nations Climate Change Conference (COP21) in Paris on 12 December 2015. The aim of the treaty is to limit the increase in global average temperature to well below 2°C above pre-industrial levels, with an ambition to limit the increase to 1.5°C to prevent dangerous climate change. Achieving the 1.5°C target requires global GHG emissions to be reduced to net zero during the latter half of this century. The Climate Change Committee (CCC) has advised that achieving net zero earlier than 2050 would strengthen the UK's contribution to this goal.

4.2.2.2 As part of each party's commitment there is a requirement to develop a Nationally Determined Contribution (NDC) climate action plan. These NDCs are reviewed every five years. The UK's latest 2035 NDC target is to reduce UK GHG emissions by at least 81% (relative to 1990).

Climate Change Act 2008

4.2.2.3 The Climate Change Act 2008 (HM Government, 2008) committed the UK to its first statutory carbon reduction target to reduce carbon emissions by at least 80% from 1990 levels by 2050. The Climate Change Act 2008 (2050 Target Amendment) Order 2019 (HM Government, 2019b) amended the Act by introducing a target for a 100% reduction in UK GHG emissions relative to 1990 levels (net zero) by 2050, following advice from the CCC. The 100% reduction is often referred to as 'net zero' GHG emissions.

4.2.2.4 The Act mandates that five-yearly carbon budgets are set and not exceeded to ensure that regular progress is made towards the target. Seven Carbon Budgets have been set in law to date (HM Government, 2026), as summarised in **Table 4.1**.

Table 4.1: Summary of UK carbon budgets

Carbon budget	Fourth: 2023-2027 (MtCO ₂ e)	Fifth: 2028-2032 (MtCO ₂ e)	Sixth: 2033-2037 (MtCO ₂ e)	Seventh: 2038-2042 (MtCO ₂ e)
UK	1,950	1,725	965	535

4.2.2.5 The Climate Change Act 2008 also established a requirement for the UK Government to undertake a climate change risk assessment (CCRA) for every five-year period and develop a programme for adaptation action in response to the risks identified. The UK Government's second CCRA was published in 2017 (Department for Environment, Food and Rural Affairs (Defra), 2017), and the third CCRA (CCRA3) published in 2022 (Defra, 2022), was informed by the Independent Assessment of UK Climate Change Risk published by the CCC in June 2021 (CCC, 2021).

4.2.2.6 It establishes eight priority risk areas for action:

- increased flooding and drought;
- emissions from natural carbon stores;
- failure of the power system;
- risks to supply chains;
- health and well-being from high temperatures;
- natural capital;
- food production and trade; and
- climate change impacts overseas that affect the UK.

4.2.2.7 The CCRA3 identifies risks to offshore infrastructure from storms and high waves and risks to infrastructure services from coastal flooding and erosion. It highlights the need for infrastructure to be located, planned, designed and maintained to be resilient to climate change, including severe weather events. It also recognises that more action is needed to encourage information sharing between infrastructure operators to improve overall risk management.

The Climate Change (Scotland) Act 2009

4.2.2.8 The Climate Change (Scotland) Act 2009 (HM Government, 2009a) established Scotland's first climate change framework, initially setting legally binding targets to cut GHG emissions by at least 80% by 2050, with an interim 42% reduction by 2020. It introduced annual targets, mandatory reporting to Parliament, adaptation programmes, and duties for public bodies to act on climate change. The Act was amended by the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 (HM Government, 2019a), increasing the ambition of Scotland's emissions reduction targets to net zero by 2045.

Scotland's Carbon Budgets (2025)

4.2.2.9 Scotland's Carbon Budgets (CCC, 2025a), set out the CCC's 2025 advice under the Climate Change (Scotland) Act (HM Government, 2009a), recommending four five-yearly carbon budgets for 2026 to 2045. The advice sets out ambitious targets for reducing emissions across key sectors, including a focus on decarbonising energy and electricity generation, particularly through the expansion of offshore and onshore wind. This includes ambitions, at the time of writing, to increase renewable capacity, with reference to wider Scottish Government ambitions to develop up to 30GW of offshore wind capacity in Scotland over the next 10 to 15 years. This target has been superseded by the 40GW target set by the Scottish Government in the Offshore Wind Policy Statement Update (2026), which increases Scotland's targets to up to 40 GW of new offshore wind by 2035–2040 (see **paragraph 4.2.3.6** below).

Infrastructure Planning (EIA) Regulations 2017

4.2.2.10 The Infrastructure Planning (EIA) Regulations 2017 (HM Government, 2017b) apply to projects requiring development consent under the Planning Act 2008 (HM Government, 2008). These Regulations require that an EIA is undertaken to identify, describe and assess the likely significant environmental effects of a proposed development. This includes consideration of climate factors, such as the impact of the development on climate (including the nature and magnitude of greenhouse gas emissions) and the vulnerability of the development to climate change.

Marine Works (EIA) Regulations 2007

4.2.2.11 The Marine Works (EIA) Regulations 2007 (HM Government, 2007) apply to projects requiring a marine licence under the Marine and Coastal Access Act 2009 (HM Government, 2009c). These Regulations require an Environmental Impact Assessment to identify, describe and assess the likely significant environmental effects of marine works. This includes the assessment of climate-related effects, such as greenhouse gas emissions associated with construction and operation, and consideration of the resilience of the proposed development to the potential impacts of climate change.

4.2.3 National policy context

National Policy Statements

4.2.3.1 National Policy Statements (NPS) set out the primary policy framework for a Development Consent Order (DCO) under which the MHPGC Project will be considered. This framework includes guidelines, requirements and criteria that the MHPGC Project must meet to obtain consent and proceed with development. **Table 4.2** provides details of the NPS relevant to Climate Change and how and where they are covered in the PEIR:

- Overarching NPS for energy (NPS EN-1) (Department for Energy Security and Net Zero (DESNZ), 2025);
- NPS for renewable energy infrastructure (NPS EN-3) (DESNZ, 2025); and
- NPS for electricity networks infrastructure (NPS EN-5) (DESNZ, 2025).

Table 4.2: Summary of the NPS provisions relevant to Climate Change

Summary of relevant NPS provisions	How and where considered in the PEIR
NPS EN-1	
<i>The Overarching National Policy Statement for Energy (NPS EN-1) sets out the UK Government's policy for the delivery of major energy infrastructure required to support the transition to net zero and ensure a secure, reliable and affordable energy system.</i> <i>This includes a significant investment in new energy infrastructure, both large nationally significant developments and smaller-scale developments determined at a local level (Section 2.3, Paragraph 2.3.4). This will be driven through rapid deployment of low carbon generation, flexibility infrastructure, and electricity transmission infrastructure (Section 2.3, Paragraph 2.3.5). Securing affordable, homegrown and abundant renewable resources will enable the UK's power system to be run for increasing periods on clean, low carbon generation, with renewables providing the vast majority of generation (Section 2.3, Paragraph 2.3.6).</i>	Volume 1, Chapter 1: Introduction of the PEIR, and Section 4.2 of this chapter set out the need for the MHPGC Project to provide a low carbon energy supply. Section 4.8 describes the contribution of the Project to reduce greenhouse gas emissions and supporting the UK's transition to net zero.
<i>New energy infrastructure will typically need to remain operational over many decades, in the face of a changing climate. Consequently, applicants must consider both the impact of the Proposed Development on climate and the vulnerability of the Proposed Development to climate change, including direct and indirect effects, when planning the location, design, build, operation and, where appropriate, decommissioning of new energy infrastructure (Paragraph 4.10.8).</i>	This chapter assesses the impact of the MHPGC Project on climate and the risk and adaptation associated with climate for the relevant elements in Section 4.8 of this chapter for the construction, operation and maintenance, and decommissioning phases of the MHPGC Project. Further details are provided within Volume 4, Volume 4, Annex 4.1: GHG Assessment, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.
<i>An ES should set out how the proposal will take account of the projected impacts of climate change, using government guidance and industry standard benchmarks such as the Climate Change Allowances for Flood Risk Assessment, Climate Impacts Tool, and British Standards for climate change adaptation, in accordance with the EIA Regulations (Paragraph 4.10.9).</i> <i>Applicants should assess the impacts on and from their proposed energy project across a range of climate change scenarios, in line with appropriate expert advice and guidance available at the time. (Paragraph 4.10.10).</i>	Response of the Project to the projected climate change impact are outlined in Sections 4.7 and 4.11.2, with projections arrived using relevant government guidance and industry standard benchmarks in Section 4.4.3 of this chapter. Further detail on the assessments is presented in Volume 4, Annex 4.1: GHG Assessment, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.

Summary of relevant NPS provisions	How and where considered in the PEIR
<i>Applicants should demonstrate that proposals have a high level of climate resilience built-in from the outset and should also demonstrate how proposals can be adapted over their predicted lifetimes to remain resilient to a credible maximum climate change scenario (Paragraph 4.10.11).</i>	The climate change risk assessment (CCRA) uses a worst-case scenario Representative Concentration Pathways (RCP) 8.5 (high emissions scenario), and the 35-year anticipated operational lifetime of the MHPGC Project is considered, as part of the CCRA as outlined in Section 4.4 of this chapter. The CCRA also considers the Maximum Design Scenario as outlined in Section 4.6.2 of this chapter demonstrating a high level of climate resilience and adaptation.
<i>Where energy infrastructure has safety critical elements, the applicant should apply a credible maximum climate change scenario. A risk-averse approach should be applied to elements of infrastructure which are critical to the safe operation of the Proposed Development (Paragraph 4.10.12).</i>	The CCRA considers the Maximum Design Scenario as outlined in Section 4.6.2 of this chapter, following a risk-averse approach with the maximum climate change scenario.
<i>All proposals for energy infrastructure projects should include a GHG assessment as part of their ES. This should include: a whole life GHG assessment; explanation of steps to drive down climate change impacts; measurement of embodied GHG impact from the construction stage; how reduction in energy demand and consumption during operation has been prioritised; how operation emissions have been reduced; calculation of operational energy consumption and associated GHG emissions; whether and how residual GHG emissions will be offset or removed; and the impact of residual emissions on national and international efforts to limit climate change (Paragraph 5.3.4).</i>	This chapter provides an assessment of the construction, operation and maintenance, and decommissioning GHG emissions associated with the Project, at Sections 4.8.1, 4.8.2, and 4.8.3 , as well as the overall net whole life emissions Section 4.8.4 . The sections also contextualise the emissions associated with the MHPGC Project within the UK carbon budgets. Section 4.9 details the cumulative impact of the MHPGC Project on climate change, in combination with the Generation Assets. The assessment is supported by Volume 4, Annex 4.1: GHG Assessment, of the PEIR .
<i>A GHG assessment should be used to drive down GHG emissions at every stage of the proposed development and ensure that emissions are minimised as far as possible for the type of technology, taking into account the overall objectives of ensuring our supply of energy remains secure, reliable and affordable as we transition to net zero (Section 5.3, Paragraphs 5.3.5 to 5.3.6). Applicants should look for opportunities within the proposed development to embed nature-based or technological solutions to mitigate or offset the emissions of construction and decommissioning.</i>	Based on the GHG assessment undertaken, emissions will be minimised through a variety of measures as outlined in Sections 4.7 and 4.11.2 of this chapter, supporting the transition to net zero.
<i>Steps taken to minimise and offset emissions should be set out in a GHG Reduction Strategy, secured under the Development Consent Order. The GHG Reduction Strategy should consider the creation and preservation of carbon stores and sinks including through woodland creation, hedgerow creation and restoration, peatland restoration and other natural habitats (Paragraph 5.3.7). These requirements also align with the wider provisions of NPS EN-1 relating to the assessment and reduction of greenhouse gas emissions (Paragraphs 5.3.8 to 5.3.12).</i>	A GHG Reduction Strategy will be developed (and submitted as part of the DCO application) and adopted in line with the NPS EN-1 requirements, as outlined in Section 4.11.2 of this chapter.
NPS EN-3	
<i>NPS EN-3 provides the primary policy for decisions by the Secretary of State on applications they receive for nationally significant renewable energy infrastructure (Section 1.6).</i>	This is considered in Volume 1, Chapter 5: Policy and Legislation, of the PEIR and Section 4.2 of this chapter.

Summary of relevant NPS provisions	How and where considered in the PEIR
<i>While offshore wind farms and offshore transmission infrastructure may not be affected by flooding, applicants should demonstrate that any necessary land-side infrastructure (such as cabling and onshore substations) will be appropriately resilient to climate-change induced weather phenomena, and how the proposal would be resilient to storms (Paragraph 2.4.8).</i>	This is considered in the Climate Change Risk Assessment in Section 4.8 of this chapter with further details provided within Volume 4 Annex 4.2: Climate Change Risk Assessment, of the PEIR . Consideration of onshore flood risk has been addressed within Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions and Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR .
NPS EN-5	
<i>Applicants should assess the exposure and sensitivity of infrastructure to physical climate impacts, including flooding, storms and high winds, increased temperatures, ground conditions such as subsidence, and coastal processes including erosion and demonstrate how resilience has been incorporated into the design (Paragraph 2.3.2).</i>	This is considered in the Climate Change Adaptation and Resilience assessment outlined in Section 4.8 of this chapter. Further details are provided within Volume 4 Annex 4.2: Climate Change Risk Assessment, of the PEIR .

National Planning Policy Framework

- 4.2.3.2 The National Planning Policy Framework (NPPF) is relevant to the consideration of the MHPGC Project by the Secretary of State (SoS) (Department for Levelling Up, Housing and Communities, 2025). **Table 4.3** provides details of the elements of the NPPF that are relevant to Climate Change and how and where they are covered in the PEIR or will be covered within the ES.
- 4.2.3.3 The NPPF was updated in August 2026 and will be fully considered in the MHPGC Environmental Statement.

Table 4.3: Summary of NPPF requirements relevant to Climate Change

NPPF section	How and where this is considered in the PEIR
Policy 2: Achieving sustainable development – this policy sets out environmental objectives around using natural resources prudently, mitigating and adapting to climate change and moving to a low carbon economy (Paragraph 8).	Mitigation and adaptation to climate change, which includes measures related to resource use and low carbon alternatives, is considered in the GHG and CCRA Assessments, outlined in Sections 4.7 and 4.11.2 of this chapter, and in Volume 4, Annex 4.1: GHG Assessment, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR .
Policy 14: Meeting the challenge of climate change, flooding and coastal change sets out that the planning system should support the transition to net zero by 2050 and take full account of all climate impacts including overheating, water scarcity, storm and flood risks and coastal change (Paragraph 161).	The CCRA assesses all climate impacts, as outlined in Section 4.8 of this chapter and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR .
Plans should take a proactive approach to mitigating and adapting to climate change, considering the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating and drought from rising temperatures (Paragraph 162).	Mitigation and adaptation to climate change, which includes measures related to resource use and low carbon alternatives, is considered in the GHG and CCRA Assessments outlined in Sections 4.7 and 4.11.2 of this chapter, and in Volume 4, Annex 4.1: GHG Assessment, of the PEIR , and Volume 4, Annex 4.2: Climate Change Resilience and Adaptation Assessment, of the PEIR . The CCRA assesses all climate impacts, as outlined in Section 4.8 of this chapter and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR .

Planning Practice Guidance

- 4.2.3.4 The NPPF is supported by National Planning Practice Guidance, which includes the Climate Change Planning Practice Guidance (Ministry of Housing, Communities & Local Government, 2019) that

advises how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change. This guidance has been followed and informs the approach of the assessments presented in this chapter.

Scottish Offshore Wind Policy Statement (2020)

- 4.2.3.5 Scotland's Offshore Wind Policy Statement set out the Scottish Government's ambitions for the future of offshore wind in Scotland in the context of its statutory target to achieve net zero greenhouse gas emissions by 2045. The policy emphasises the need to decarbonise energy use and meet growing demand for clean electricity and outlines an ambition to deliver 8-11 GW of offshore wind capacity by 2030. The policy also recognises the requirement for substantial supporting transmission infrastructure to enable the delivery of offshore wind generation and the integration of renewable electricity into the wider energy system.
- 4.2.3.6 In January 2026 the Scottish Government updated this ambition to up to 40 GW of new offshore wind capacity by 2040, in addition to capacity already operational or consented as of August 2025 (Scottish Government, 2026).

Carbon Budget and Growth Delivery Plan (2025)

- 4.2.3.7 The Carbon Budget Delivery Plan (DESNZ, 2023) was established by the UK Government in 2023 to meet its statutory carbon budgets under the Climate Change Act 2008. It has since been updated in 2025 to the Carbon Budget and Growth Delivery Plan (DESNZ, 2025), which outlines a revised package of proposals and policies, along with associated timescales and delivery risks, for decarbonising all sectors of the economy, including power, transport, heat, and buildings. Its purpose is to ensure the UK meets its Carbon Budgets 4 to 6 and international climate commitments.
- 4.2.3.8 The plan aims to support power decarbonisation by 2035 and contribute to the UK's overall goal of achieving net-zero emissions by 2050. The document sets out a number of key policies, including powering the UK entirely with clean electricity by 2035, delivering 40GW of offshore wind by 2030, including floating offshore wind farms.

UK's 2035 Nationally Determined Contribution emissions reduction target under the Paris Agreement (2025)

- 4.2.3.9 On 30 January 2025, the UK communicated its updated Nationally Determined Contribution (NDC) under the Paris Agreement to the United Nations Framework Convention on Climate Change (DESNZ, 2025e). The NDC commits the UK to reducing economy-wide GHG emissions by at least 81% by 2035 compared to 1990 levels. It also sets out the information underpinning this target, including assumptions and methodologies, referred to under the Paris Agreement as 'information to facilitate clarity, transparency and understanding'.

UK's Clean Power 2030 Action Plan (2024)

- 4.2.3.10 In December 2024, the UK Government published the Clean Power 2030 Action Plan (DESNZ, 2024). The Plan sets out pathways for infrastructure deployment and generation capacity to ensure that clean sources produce at least 95% of Great Britain's electricity generation by 2030. This supports delivery of the sixth Carbon Budget and contributes to the UK's longer-term objective of achieving net zero greenhouse gas emissions by 2050.

Good Practice During Wind Farm Construction (2024)

- 4.2.3.11 Scotland's Good Practice During Wind Farm Construction (2024) provides guidance on minimising carbon emissions during the construction of wind energy infrastructure. Key considerations related to offshore transmission assets, i.e. cable installation, are included. While onshore transmission assets are not explicitly mentioned, good practice measures are set out for carbon savings and development on peat, which are of relevance for such assets.

The Third National Adaptation Programme and the Fourth Strategy for Climate Adaptation Reporting (2023)

- 4.2.3.12 The Climate Change: Third National Adaptation Programme (2023-2028) was produced by Defra and published in 2023. The programme sets out the UK government's response to the third CCRA. It

forms part of the five-yearly cycle of requirements established under the Climate Change Act 2008, with the aim of driving a dynamic and adaptive approach to building the nation's resilience to climate change.

UK Government British Energy Security Strategy (2022)

- 4.2.3.13 The UK Government's British Energy Security Strategy (BEIS, 2022a) sets out a framework to strengthen the UK's energy independence while accelerating the transition to low-carbon energy. The strategy emphasises the rapid expansion of domestic energy supply, including a significant increase in offshore wind capacity, alongside investment in supporting infrastructure. It highlights the critical role of electricity networks and transmission infrastructure in enabling the integration of renewable energy into the national system. As such, the strategy supports the need for projects such as the Proposed Development, which facilitate the connection of offshore renewable generation to the onshore grid and contribute to achieving the UK's net zero targets.

4.2.4 Marine planning policy context

- 4.2.4.1 The following marine plans are relevant to Climate Change and have informed the assessment of preliminary effects in this chapter, their relevance to the MHPGC Project is outlined in **Table 4.4**:

- The UK Marine Policy Statement (MPS) (Defra, 2011), supported by the Guidance to the UK Marine Policy Statement (2020);
- Scotland's National Marine Plan (Marine Scotland, 2015);
- Scotland's National Marine Plan 2 (Scottish Government, 2023) (proposed, emerging policy);
- Northeast Inshore and Northeast Offshore Marine Plan (MMO, 2024).

Table 4.4: Marine planning policy relevant to Climate Change

Marine plan description	How and where considered in the PEIR
UK Marine Policy Statement	
<i>In marine planning and decision-making consideration will need to be given to how the marine environment can adapt to the impacts of climate change (Section 2.6.7.7).</i>	Resilience and adaptation of the marine environment are considered in the CCRA outlined in Section 4.8 and Section 4.11.2 of this chapter and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR .
<i>Marine plan authorities should take account of the latest UK Climate Change Risk Assessment, national adaptation programmes and UK Climate Projections, as well as other relevant research. They should consider the impacts of climate change over the lifetime of developments and encourage proposals to incorporate flexibility, resilience and adaptation measures. Consideration should also be given to opportunities associated with climate change and to synergies with climate change mitigation activities, including offshore renewable energy (Section 2.6.7.8).</i>	This is considered in the CCRA as outlined in Section 4.5 of this chapter, and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR , and informs the assessment.
Scottish National Marine Plan	
<i>Marine planners and decision makers must act in the way best calculated to mitigate and adapt to climate change (GEN Policy 5).</i> <i>Developers and users of the marine environment should seek to address climate change through:</i> <i>Mitigation: Marine planners and decision makers should seek to facilitate a transition to a low carbon economy. They should consider ways to reduce emissions of carbon and other greenhouse gasses. This will be of particular relevance in cases of large-scale development and infrastructure projects.</i>	Mitigation and adaptation to climate change, which includes measures related to resource use and low carbon alternatives, is considered in the GHG and CCRA Assessments, outlined in Sections 4.7 and 4.11.2 of this chapter, and in Volume 4, Annex 4.1: GHG Assessment, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR . Resilience and adaptation of the marine environment are considered in the CCRA outlined in Section 4.8 and Section 4.11.2 of this chapter and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR .

Marine plan description	How and where considered in the PEIR
<i>Adaptation: Marine planners and decision makers should be satisfied that developers and users have sufficient regard to the impacts of a changing climate and, where appropriate, provide effective adaptation to its predicted effects. Offshore and coastal developments should be appropriately sited and designed, and use technologies and equipment appropriate for local conditions, now and in the future, giving particular consideration to vulnerability, scale and longevity of operation. The Scottish Climate Change Adaption Programme should be complied with. Where appropriate, marine planning authorities should be satisfied that adequate risk management and contingency plans are in place, particularly in relation to potential changes in sea temperatures, sea level rise, storminess and extreme water levels, using the best scientific evidence available at the time. (Paragraph 4.18).</i>	
Northeast Inshore and Northeast Offshore Marine Plan	
<i>With regard to climate change, proposals that conserve, restore or enhance habitats that provide flood defence or carbon sequestration will be supported (Policy NE-CC-1).</i>	Considered in Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR, Volume 4 Chapter 4: Climate Change, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.
<i>With regards to climate change, proposals in the northeast marine plan areas should demonstrate for the lifetime of the project that they are resilient to the impacts of climate change and coastal change (Policy NE-CC-2).</i>	Considered in the CCRA outlined in Section 4.4 and 4.8 of this chapter, and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.
<i>Proposals in the northeast marine plan areas, and adjacent marine plan areas, that are likely to have significant adverse impacts on climate change adaptation measures inside and outside of the proposed project areas, should only be supported if they can demonstrate that they will, in order of preference:</i> • avoid; • minimise; • mitigate adverse impacts so they are no longer significant (Policy NE-CC-3).	Mitigation measures considered for the Sections 4.8 and 4.11.2 of this chapter, and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.
<i>Proposals must assess their direct and indirect impacts upon local air quality and emissions of GHGs. Proposals that are likely to result in increased air pollution or increased emissions of GHGs must demonstrate that they will, in order of preference:</i> • avoid; • minimise; • mitigate air pollution or GHG emissions or both, in line with current national and local air quality objectives and legal requirements (Policy NE-AIR-1).	GHG emissions and mitigations are assessed in Sections 4.8 and 4.11.2 of this chapter, and Volume 4, Annex 4.1: GHG Assessment, of the PEIR, and air pollution is assessed in Volume 3, Chapter 7: Onshore Air Quality, of the PEIR.

4.2.5 Local policy context

4.2.5.1 The MHPGC Project lies within the jurisdiction of Durham County Council. The following local policies are relevant to Climate Change and have informed the assessment of preliminary effects in this chapter. Their relevance to the MHPGC Project is outlined in **Table 4.5**.

- Durham Local Plan (Durham County Council, 2020).

Table 4.5: Local policy relevant to Climate Change

Policy description	How and where considered in the PEIR
Durham Local Plan	
<i>Policy 33 Renewable and Low Carbon Energy states that the council will support renewable and low carbon energy development in appropriate locations. In determining planning applications for such projects significant weight will be given to the achievement of wider social, environmental and economic benefits.</i>	The MHPGC Project supports these objectives by facilitating renewable and low carbon energy generation. This been considered as part of the GHG assessment in Section 4.8 of this chapter, and Volume 4, Annex 4.1: GHG Assessment, of the PEIR. The socio - economic benefits of the Project are assessed in Volume 4, Chapter 2: Socio- Economics, of the PEIR.
<i>Policy 35 Water Management states that all development proposals will be required to consider the effect of the proposed development on flood risk, both onsite and offsite, commensurate with the scale and impact of the development and taking into account the predicted impacts of climate change for the lifetime of the proposal.</i>	Any likely significant effects in regard to flooding, as identified in Volume 3, Annex 2.2: Flood Risk Assessment, of the PEIR have been reported in Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR. Predicted impacts of climate change are considered in assessments outlined in Section 4.8 of this chapter and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR.
<i>Policy 37 (Durham Heritage Coast and Wider Coastal Zone) seeks to protect and enhance the coastal environment. Development proposals should ensure that they do not exacerbate risks associated with climate change, including flooding, coastal erosion and land instability.</i>	Relevant risks have been considered as part of the CCRA in this chapter and in Volume 3, Chapter 1: Geology, Hydrogeology and Ground Conditions, of the PEIR, Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR .

4.3 Consultation and engagement

4.3.1 Scoping

- 4.3.1.1 A Scoping Report for the MHPGC Project was issued to the PINS and MD-LOT in February 2025 (RPS, 2025). Following consultation with the appropriate statutory bodies, PINS (on behalf of the SoS) and MD-LOT both provided Scoping Opinions in March 2025 (PINS, 2025; MD-LOT, 2025, respectively).
- 4.3.1.2 **Table 4.6** sets out the key comments raised during the scoping process specific to Climate Change, with details of how these comments have been addressed within the PEIR.

Table 4.6: Summary of scoping responses relevant to Climate Change

Comment	How and where considered in the PEIR
MD-LOT	
<i>The Scottish Ministers are broadly content with the Applicant's approach in assessing climate change and Greenhouse Gases ("GHG") in Section 9.5 of the Scoping Report and note that the Institute of Sustainability and Environmental Professionals (ISEP), formerly Institute of Environmental Management and Assessment (IEMA)). Environmental Impact Assessment Guide "Assessing Greenhouse Gas Emissions and Evaluating Their Significance" referenced by the Applicant provides further insight on this matter. The Scottish Ministers have considered this together with the Climate Change (Emissions Reduction Targets) (Scotland) Act 2019 and the requirement of the EIA Regulations to assess significant effects from the Proposed Works on climate. The Scottish Ministers therefore advise that the GHG Assessment should include the pre-construction, construction, operation and decommissioning phases, including the consideration of</i>	All suggested elements have been considered within this chapter of the PEIR, as described in Volume 4, Annex 4.1: GHG Assessment, of the PEIR , with the exception of 'the consideration of the supply chain as well as benefits beyond the life cycle of the Proposed Works'. In line with ISEP (formerly IEMA) guidance (ISEP, 2026), this element is not considered within scope, and it is not usual best practice. The emissions associated with the extraction and processing of raw materials, transporting of raw materials and product manufacturing have been included in the assessment.

Comment	How and where considered in the PEIR
the supply chain as well as benefits beyond the life cycle of the Proposed Works.	
The Scottish Ministers direct the Applicant further to the NatureScot representation regarding climate change and blue carbon which must be fully addressed by the Applicant in the EIA Report.	The GHG assessment presented in Section 4.8 of this chapter of the PEIR and Volume 4, Annex 4.1: GHG Assessment, of the PEIR estimates emissions from each phase (construction, O&M, decommissioning) of the MHPGC Project. The draft methodology for estimating emissions from blue carbon has been set out in Volume 4, Annex 4.1: GHG Assessment, of the PEIR .
Natural England	
Section 9: The England Biodiversity Strategy published by Defra establishes principles for the consideration of biodiversity and the effects of climate change. The ES/Application should reflect these principles and identify how the development's effects on the natural environment will be influenced by climate change, and how ecological networks will be maintained. The NPPF requires that the planning system should contribute to the enhancement of the natural environment 'by establishing coherent ecological networks that are more resilient to current and future pressures' (NPPF Para 174), which should be demonstrated through the ES/Application. Further information is available from the CCC Independent Assessment of UK Climate Risk, the National Adaptation Programme (NAP), [1] Report: Trends Report 2020: Trends in critical load and critical level exceedances in the UK - Defra, UK the Climate Change Impacts Report Cards (biodiversity, infrastructure, water etc.) and the UKCP18 climate projections.	An ICCI assessment will be undertaken at ES stage as per the scope and approach set out in the MHPGC Project Scoping Report. It will consider how climate change may influence or exacerbate the effects on the natural environment identified in other technical chapters of the ES. The assessment will also consider the influence of climate change on ecological networks and where necessary will identify measures to mitigate any significant impacts.
PINS	
ID5.5.1: The vulnerability of the proposed development to climate change (construction). The Scoping Report states that the construction phase (approximately 4 years) would not be lengthy enough for significant climate change risks to occur compared to the present-day baseline. The applicant states that they would employ good health and safety practices with respect to risks such as heatstroke or storm events offshore. The Inspectorate considers that there is potential for climate change impacts to have likely significant effects on the construction phase, for example in respect of increased flood risk that may require mitigation in the planning of construction compounds and temporary drainage strategies. The Inspectorate notes (table 8.23) that the vulnerability of the proposed development to flooding during construction will be assessed within a standalone Flood Risk Assessment. The Inspectorate is content with this approach, provided any likely significant effects are reported within the ES. The applicant should ensure that the most recent climate change allowances are taken into account in the applicant's assessment.	Any likely significant effects regarding flooding, as identified in Volume 3, Annex 2.2: Flood Risk Assessment, of the PEIR have been reported in Volume 3, Chapter 2: Water Resources and Flood Risk, of the PEIR . The most recent climate change allowances have been taken into account within Volume 3, Annex 2.2: Flood Risk Assessment, of the PEIR . Furthermore, any likely significant effects regarding the vulnerability of the MHPGC Project to climate change have been outlined in Section 4.8 of this chapter of the PEIR.

Comment	How and where considered in the PEIR
<i>ID5.5.2: The in-combination climate impacts of the proposed development (construction and decommissioning) The Scoping Report explains that in combination climate impacts will be assessed within each relevant topic chapter, assessing how climate change may affect the future baseline scenario. The Inspectorate is content with this approach. The climate change ES chapter should cross-reference other relevant chapters where this is assessed in for clarity.</i>	An ICCI assessment will be carried out at ES stage in line with the scope and approach set out in the MHPGC Project Scoping Report. As set out in Table 9.33 of the MHPGC Project Scoping Report, ICCI during the construction and decommissioning phases has been scoped out.
<i>ID5.5.3: Assessment methodology. The Inspectorate notes the references in the Scoping Report (paragraph 9.5.8.1) to professional guidance (i.e. 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (ISEP, 2022)) and ISEP's 'Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation' (ISEP, 2020).</i> <i>The ES should set out the methodologies used to explain any departure from the proposed approach where professional judgement is applied. Outputs from other assessments should be clearly explained where these have been applied. Where significance criteria are not explicitly defined within the guidance, the ES should clearly set out where deviation from guidance has occurred, and professional judgement has been applied.</i>	The GHG and CCRA in Section 4.8 of this chapter of the PEIR, Volume 4, Annex 4.1: GHG Assessment, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR, have aligned with ISEP guidance (ISEP, 2020, 2026). However, professional judgement has been applied in instances where there is a lack of guidance for a particular matter. The methodologies used, including any departures from the proposed approach, the assumptions made, and outputs used from other assessments, have been set out in Section 4.5 of this chapter of the PEIR, Volume 4, Annex 4.1: GHG Assessment, of the PEIR and Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR. Where professional judgement has been applied, this has been stated.
Environment Agency	
<i>E5 – Operation and maintenance phase activities: Confirmation of anticipated operation and maintenance activities for the onshore portion of the Project is required.</i>	Details of activities included are provided in Section 4.8.2 and in Volume 4, Annex 4.1: GHG Assessment, of the PEIR
<i>E6 - Retention of buried infrastructure during decommissioning. The risks posed by the retention of below ground infrastructure following decommissioning needs to be considered and assessed.</i>	An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable. [CoT17]
<i>E18 – Impacts proposed to be scoped out: Impacts from the substation construction and associated earthworks should be Scoped In during the decommissioning phase until it can be demonstrated that this aspect of the Project would not cause impact.</i>	Details of activities included are provided in Section 4.8.3 and in Volume 4, Annex 4.1: GHG Assessment, of the PEIR
<i>F2 – Consumptive uses of water: We recommend that the Applicant produces a basic water supply strategy to identify all consumptive uses of water, indicative volumes required and an options appraisal of sources of supply intended to be used to meet demands. This will help to identify and problem solve any potential restrictions or obstacles early in the process and may expedite the permitting process later.</i>	No groundwater abstractions are proposed as part of the MHPGC Project. Water will either be extracted from the mains supply, or transported to the construction area via tanker. The total volume of water required is not known at this stage.

4.3.2 Further consultation and engagement

- 4.3.2.1 There has been no additional consultation beyond the Scoping Opinion relating to the Climate Change chapter.

4.4 Baseline Characterisation

4.4.1 Overview

4.4.1.1 **Volume 1, Chapter 2: Project Description**, of the PEIR sets out the description of the MHPGC Project and **Volume 1, Chapter 4: Approach to Environmental Impact Assessment**, of the PEIR sets out the overarching approach that has been used in developing the preliminary environmental information.

4.4.1.2 This section describes the methods and data sources used to characterise the baseline for Climate Change within the study area and describes the existing baseline characteristics.

4.4.2 Climate Change Study Area

GHG emissions

4.4.2.1 The GHG emissions arising from the construction, O&M, and decommissioning of the MHPGC Project are assessed on the global atmospheric concentrations of GHGs, expressed as carbon dioxide equivalents (CO₂e).

4.4.2.2 These GHG emissions may occur both on-site and off-site across national and international locations associated with the lifecycle of the MHPGC Project, rather than directly affecting specific local receptors. Hence the spatial study area is at a global scale.

4.4.2.3 The temporal study area of the assessment includes emissions associated with all phases of the Project. This includes GHG emissions arising from:

- Construction activities, the manufacture and transport of materials, on-site construction processes, and the movement of personnel and equipment;
- Operation and maintenance activities, including energy consumption, material use, and associated vessel or transport activities;
- Decommissioning activities, including dismantling, removal, transport, and the processing or disposal of materials at the end of the MHPGC Project's operational life.

Climate change resilience and adaptation

4.4.2.4 The assessment focuses on risks to the MHPGC Project arising from climate change over its operational lifetime.

4.4.2.5 The spatial study area comprises of the MHPGC Project PEIR Red Line Boundary with the onshore study area defined by the MHPGC Project PEIR Red Line Boundary: Onshore and the offshore study area defined by area seaward of MHWS within the MHPGC Project PEIR Red Line Boundary.

4.4.2.6 The onshore study area is informed by two 25km grid cells derived from the UK Climate Projections 2018 (UKCP18) probabilistic projections (Met Office Hadley Centre (MOHC), 2021).

4.4.2.7 The temporal scope of the CCRA considers climate change impacts during the construction, O&M, and decommissioning phases of the MHPGC Project. The operation and maintenance phase is assumed to commence in 2038 and run for 35 years. This represents the primary period over which long-term climate risks may occur.

4.4.3 Relevant guidance

4.4.3.1 The preliminary assessment has been carried out in accordance with the following guidance documents:

- Assessing Greenhouse Gas Emissions and Evaluating their Significance (ISEP, 2026);
- Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation (ISEP, 2026);
- Greenhouse Gas Protocol: Corporate Accounting and Reporting Standard (GHG Protocol, 2015);
- UK Government Greenhouse Gas Conversion Factors for Company Reporting (DESNZ, 2026);
- PAS 2080: Carbon Management in Buildings and Infrastructure (BSI, 2023).

4.4.4 Baseline Data Sources

Desk study

GHG emissions

4.4.4.1 In order to establish the existing and future GHG emissions baseline conditions, relevant data were reviewed and assessed. Data were obtained from the following sources:

- Local Planning Authority (Durham County Council) and national regional GHG (CO₂e) emissions statistics (UK Government, 2025);
- UK Carbon Budgets (HM Government, 2009, 2011, 2016, 2021; Climate Change Committee (CCC), 2025b).

Climate change resilience and adaptation

Onshore

4.4.4.2 Data on the climate baseline and future projections are based on freely available information from third parties, including the historical meteorological variables recorded by the Meteorological Office and the UKCP18 developed by the Met Office (Met Office, 2018). This assessment has been informed by a range of existing climate change research and literature available at the time of writing (further details provided in **Volume 4, Annex 4.1: Greenhouse Gas Assessment, of the PEIR**).

4.4.4.3 Onshore baseline climate trends have been determined from Met Office Historic Climate Data (Met Office, 2020) which presents a set of 30-year averages, covering the period 1991 to 2020 for a range of parameters and locations. The closest onshore meteorological Met Office data station to the MHPGC Project PEIR Red Line Boundary: Onshore is in Tynemouth (around 15 miles away); associated observational data has been used to inform the onshore baseline environment.

4.4.4.4 Met Office UKCP18 probabilistic climate change projections published at 25km grid cell scale are used to assess the future climate change trends for the onshore O&M and decommissioning phases of the development (Met Office, 2018). The projections are based on Representative Concentration Pathway (RCP) 8.5 (which is a high emissions scenario), providing a conservative worst-case scenario for the purpose of the CCRA.

Offshore

4.4.4.5 Offshore baseline climate trends have been determined from the UK Offshore Energy Strategic Environmental Assessment 4: Appendix 1F: Climate & Meteorology (Department for Business, Energy & Industrial Strategy (BEIS, 2022b). Consideration of future offshore climate trends has been based on the Met Office Hadley Centre UKCP18 marine report (Palmer *et al.*, 2018), which is subsequently reviewed within the CCRA3, Chapter 4: Infrastructure (Jaroszweski *et al.*, 2021). The mentioned resources have been utilised to analyse future trends for wind speed, wave height and sea level change.

Data limitations and assumptions

Greenhouse gas emissions

4.4.4.6 The baseline (without development) has been defined to include all relevant emission sources within the MHPGC Project PEIR Red Line Boundary to the extent possible, including stationary fuel use, minor operational activities, and energy consumption. Therefore, a conservative worst-case scenario assuming no operational energy within the MHPGC Project PEIR Red Line Boundary has been used for the baseline (without development) to ensure that potential GHG impacts have been adequately considered in the assessment.

4.4.4.7 Land-use change related emissions are not quantified at this stage. Current land use habitat classification does not identify any areas of peatland or peaty soils within the onshore study area defined by the MHPGC Project PEIR Red Line Boundary: Onshore. It is not anticipated, therefore, that installation of the LSS and cables will directly affect any significant carbon stores and therefore the change in carbon storage value of the land would be minimal. This is considered to be the case for both temporary land use change, where the habitat is anticipated to be returned to its pre-

development state after decommissioning, and permanent land use change where the habitat may not be restored.

4.4.4.8 In respect of construction, land use changes are anticipated to be temporary with subsequent restoration following completion of works, assuming:

- Once the onshore export cables and AC connection cables installation work is completed the ground will be reinstated using stored subsoil and topsoil, the land will be restored to its original condition.
- Hedgerows will be replanted using locally sourced native species, where practicable.
- Joint bays will be completely buried, with the land above reinstated.

Climate change resilience and adaptation

4.4.4.9 Data on the climate baseline and future projections have been derived from freely available third-party sources, including historical meteorological variables recorded by the Met Office and the UKCP18 probabilistic climate projections developed by the Met Office (Met Office, 2020, 2018). The assessment has been informed by a range of existing climate change research and literature available at the time of writing. Where site-specific data have not been available, regional and national datasets have been applied as proxies.

4.4.4.10 The CCRA has been undertaken using UKCP18, the latest set of probabilistic climate projections for the UK (Met Office, 2018). The UKCP18 projections are based on a range of GHG emissions scenarios, which are subject to a degree of uncertainty. The climate system's response to different levels of emissions is acknowledged as uncertain.

4.4.4.11 There are three key sources of uncertainty within these climate projections:

- natural climate variability: changes resulting from natural external influences on climate (e.g., change in atmospheric particulates due to volcanic activity) or changes in solar radiation or other naturally occurring atmospheric process;
- incomplete understanding of earth system processes and their imperfect representation in climate models (modelling uncertainty);
- uncertainty in future man-made emissions (of GHGs and other pollutants).

4.4.4.12 The CCRA has been conducted qualitatively. Specifically, assessments of drainage infrastructure and flood risk have been informed by Environment Agency Flood Risk Assessments, including climate change allowances for increases in peak river flows and rainfall intensity.

4.4.4.13 The assessment of climate risks has been recognised to carry a high degree of uncertainty due to variability in modelling outputs and the potential magnitude of future changes across different spatial scales and temporal horizons. To provide a precautionary, conservative approach, the worst-case RCP8.5 scenario has been applied. Where multiple climate hazards could interact, potential compounding effects have been considered qualitatively, although detailed quantification has not been undertaken at the PEIR stage.

4.4.4.14 In the significance assessment, a precautionary approach has been adopted to evaluate the likelihood and consequence of climate hazards on each receptor. Through this approach, limitations and uncertainties have been minimised where possible to provide a robust CCR and adaptation assessment.

4.4.5 Overview of baseline environment

GHG emissions

4.4.5.1 The current baseline (without development) for onshore land use is based on information outlined in **Volume 3, Chapter 3: Terrestrial Ecology and Terrestrial and Intertidal Ornithology, of the PEIR** which sets out the key habitat types within the UKHab Survey Area, which is defined as the MHPGC Project PEIR Red Line Boundary: Onshore with an additional 30m buffer. The current baseline for the onshore elements primarily comprises agricultural land, with cropland being the most common habitat recorded. Small patches of broadleaved woodland and scrub make up the western area of the UKHab Survey Area, while the eastern area comprises more grassland habitats around the coastal cliffs and shingle beach at the coast.

- 4.4.5.2 The current baseline (without development) for the offshore elements consists of various subtidal habitats of mixed sediments comprising sand, coarse sediments, mud and rock. These habitats support diverse benthic sediment-based communities. Such environments are detailed within **Volume 2, Chapter 3: Benthic Subtidal and Intertidal Ecology, of the PEIR.**
- 4.4.5.3 National GHG emissions statistics are published by the UK Government and contain historical emissions data covering 2005 to 2024 for all Local Authorities and Councils (UK Government, 2026). These records indicate that Durham County Council emitted 2,514ktCO₂e in 2024. This figure can be broken into the following sectors:
- 844.7ktCO₂e from transport;
 - 681.0ktCO₂e from domestic sources;
 - 80.4ktCO₂e from the public sector;
 - 151.2ktCO₂e from commercial;
 - 370.7ktCO₂e from agriculture;
 - 244.9ktCO₂e from industry;
 - 187.1ktCO₂e from waste sector.
- 4.4.5.4 Between 2005 and 2024, emissions fell by 28% in Northern Ireland, 42% in Scotland, 46% in Wales, and 46% in England. The North-East of England was the region with the largest proportional fall in emissions over this period, at 67%, in part due to industrial closures.
- 4.4.5.5 There are no existing buildings within the MHPGC Project PEIR Red Line Boundary that are anticipated to be demolished as part of the MHPGC Project. As a reasonable worst-case scenario, it has been assumed that, in its current use, there are no operational energy or transport GHG emissions arising within the MHPGC Project PEIR Red Line Boundary (e.g. from energy consumption to power existing buildings).

Climate change resilience and adaptation

Onshore

- 4.4.5.6 For the onshore baseline, climate data available for Tynemouth (Tynemouth Location-specific long-term averages, Met Office, 2020) shows annual maximum and minimum temperatures being lower than and higher than, respectively, the UK average (average annual maximum temperature of 12.4°C, compared to a UK average of 12.8°C and average minimum temperature of 6.9 °C, compared to a UK average of 5.5°C) and fewer days of air frost experienced annually (an average of 17.9 annual air frost days in comparison to the England annual average of 53.4 days). The average annual rainfall for Tynemouth is 608.3mm, compared to an average for England of 1162.7mm.

Offshore

- 4.4.5.7 For the offshore baseline, the UK Offshore Energy Strategic Environmental Assessment 4: Appendix 1F: Climate & Meteorology (BEIS, 2022b) provides a summary of offshore climate conditions for the North Sea. The mean air temperature over the sea is between 4 and 6°C in January and in July, temperatures are approximately 16°C. Annual rainfall varies between 340 and 500mm, averaging 425mm. The percentage chance of rainfall in July is 13% and in January it is 20%. The drier months are April to June, and the wetter months are October to January. The prevailing winds are from the southwest and north-northeast. Wind strengths in the winter are typically 6m/s to 11m/s. Wind strengths greater than 8m/s are recorded 60-65% of the time in winter and 22% to 27% of the time in summer.

4.4.6 Future baseline conditions

- 4.4.6.1 During the 35-year operational lifetime of the MHPGC Project, the onshore noise and vibration baseline would be expected to evolve both on a natural basis and in response to other anthropogenic activities. The Infrastructure Planning (EIA) Regulations 2017 require that "an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge" is included. Therefore, an assessment of future baseline conditions, in the absence of the MHPGC Project, has been undertaken and is described within this section.

- 4.4.6.2 In developing the future baseline (without Development) an operational lifetime of 35-years is assumed.

GHG emissions

- 4.4.6.3 In terms of the future baseline (without Development) scenario where the MHPGC Project is not developed, the future baseline will be determined by the current GHG emissions. Since there is no physical development or activity within the Project Site in this scenario, GHG emissions are treated as zero.

Climate change resilience and adaptation

- 4.4.6.4 The future projected climate conditions and extreme weather events for the onshore elements of the MHPGC Project for the 2030 to 2059 and 2060 to 2089 time horizons are outlined in **Table 4.7** (Met Office, 2018). These time periods cover the assumed operational life (2038 to 2073) and decommissioning life (2060 – 2089) of the MHPGC Project. The construction phase is scoped out for the onshore and offshore infrastructure (total expected duration of approximately 4.5 years), as it will not be long enough for significant climate change risks to the MHPGC Project to occur compared to the present-day baseline. Industry standard health and safety practices with respect to risks such as heatstroke or storm events will be employed.
- 4.4.6.5 The key parameters of precipitation and temperature are included in the onshore assessment. The UKCP18 projection values presented in **Table 4.7** are expressed relative to the current baseline (the historical time horizon 1981 to 2010 (Met Office, 2018)).
- 4.4.6.6 In summary, the data within **Table 4.7** shows that at 50th percentile (the median value), the intensity of seasonal precipitation trends increases: precipitation is projected to increase during winter and decrease during summer. Temperatures are projected to increase across the year, both during the winter and summer seasons. These trends of milder, wetter winters and hotter, drier summers are projected to continue and amplify towards the latter half of the century.

Table 4.7: Onshore Climate Change Projections under RCP8.5

Parameter	Units	10 th percentile	50 th percentile	90 th percentile
Time Horizon 2030-2059				
Precipitation – annual average	%	-4.26	0.77	6.18
Precipitation – average summer	%	-16.73	-3.66	9.58
Precipitation – average winter	%	-2.61	7.98	20.37
Temperature – annual average	°C	0.56	1.25	1.99
Temperature – average summer	°C	0.55	1.51	2.50
Temperature – average winter	°C	0.2	1.10	2.08
Temperature – maximum summer	°C	0.36	1.55	2.75
Temperature – minimum winter	°C	0.15	1.20	2.35
Time Horizon 2060-2089				
Precipitation – annual average	%	-7.21	-0.18	7.29
Precipitation – average summer	%	-38.98	-20.6	-2.15
Precipitation – average winter	%	-3.94	14.28	36.66
Temperature – annual average	°C	1.40	2.66	4.00
Temperature – average summer	°C	1.50	3.39	5.35
Temperature – average winter	°C	0.68	2.24	3.88
Temperature – maximum summer	°C	1.36	3.67	5.99

Parameter	Units	10 th percentile	50 th percentile	90 th percentile
Temperature – minimum winter	°C	0.61	2.43	4.46

- 4.4.6.7 Probabilistic climate projections, as used to assess the onshore climate trends, are not available for the offshore climate trends. Therefore, consideration of offshore climate is based on the Met Office Hadley Centre UKCP18 marine report (Palmer *et al.*, 2018) and the UK CCRA3 Technical Report (Jaroszweski *et al.*, 2021). This provides projections for wave height, wind speed and sea levels and indicative future trends. It is noted, however, that there is significant uncertainty in the models and so these projections should be treated with low confidence. The data is based on the RCP8.5 scenario until the year 2100.
- 4.4.6.8 It is anticipated that global mean sea level rise by 2100 will be between 0.56m to 1.12m (compared to a 1981 to 2000 baseline) (Palmer *et al.*, 2018). In the UK, the mean sea level is projected to rise approximately 1m; however, this change is regionally variable (Palmer *et al.*, 2018). Sea level rise in the northern parts of the UK is expected to be lower than in southern parts of the UK. The mean significant wave height is projected to decrease around the UK, with an estimated decrease in the North Sea of approximately 0.1m (Jaroszweski *et al.*, 2021). The mean maximum significant wave height is projected to decrease by 0.5m in the southern and central part of the North Sea (Jaroszweski *et al.*, 2021). Changes in the mean wind speeds by the end of the 21st century are spatially variable throughout the UK (Palmer *et al.*, 2018). The mean wind speed in the north of the UK is anticipated to slightly increase, with the changes in the mean maximum wind speed ranging from +/- 1.5m/s throughout the UK (Palmer *et al.*, 2018).

4.5 Impact assessment methodology

4.5.1 Overview

- 4.5.1.1 **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR** sets out the overarching approach that has been used in developing the preliminary environmental information. This section describes the technical methods used to determine the sensitivity of the receptors and magnitude of effects and sets out the significance criteria that have been used for the preliminary climate change assessment.
- 4.5.1.2 The Climate Change assessment considers both offshore and onshore elements of the MHPGC Project. The approach recognises that different regulatory frameworks, baseline environments and assessment methodologies may apply to each area. Accordingly, where relevant, the assessment distinguishes between offshore (marine) and onshore (terrestrial) receptors and impact pathways. For example, receptors located within Scottish and English waters are assessed in accordance with the respective legislative and policy requirements of each jurisdiction, while maintaining consistency in the overarching approach to evaluating sensitivity, magnitude and significance.

4.5.2 Effects on the Climate

GHG Emissions Methodology

- 4.5.2.1 In line with ISEP (formerly IEMA) guidance (ISEP, 2026), the assessment considers the contribution of the MHPGC Project to climate change through GHG emissions. GHG emissions are assessed across the full project lifecycle, including construction, O&M, and decommissioning phases.
- For construction, this includes emissions associated with material use, plant and vehicle use, construction equipment uses and material transport;
 - Operational emissions are considered during O&M, including the consumption of materials and energy for maintenance and associated vessel activity;
 - Decommissioning emissions are evaluated for plant, vessel use, and the recovery, recycling, or disposal of infrastructure and materials.

Receptor sensitivity - Greenhouse gas emissions

- 4.5.2.2 GHG emissions have a global impact rather than directly affecting any specific local receptor to which a level of sensitivity can be assigned. The global atmospheric mass of the relevant GHGs and consequent warming potential, expressed in CO₂e, has therefore been treated as a single receptor of high sensitivity (given the importance of the global climate as a receptor), as defined within ISEP guidance (ISEP, 2026).

Magnitude of impact - Greenhouse gas emissions

- 4.5.2.3 In line with ISEP Guidance on assessing GHG emissions (ISEP, 2026), it should be noted that the crux of significance for the GHG assessment is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050.
- 4.5.2.4 Contextualisation of the carbon footprint of a project determines whether or not it supports or undermines the trajectory towards net zero. Therefore, the GHG emissions associated with the MHPGC Project have been compared to the UK national, local, and sector-specific carbon budgets.

Carbon Budgets

- 4.5.2.5 As the construction of the MHPGC Project is anticipated to begin in 2033 and be complete by 2037, the GHG emissions arising from construction phase of the MHPGC Project have been compared with the UK national sixth (2033 to 2037) carbon budget (HM Government, 2021).
- 4.5.2.6 The O&M phase of the MHPGC Project has been compared with the seventh carbon budget (2038 to 2042) (CCC, 2025b). This is the furthest future period within which such comparison can be made, since no carbon budgets have been set beyond 2042 at the point of assessment. The O&M phase of the MHPGC Project will not be compared beyond the seventh carbon budget as projections are highly uncertain and fall outside the scope of current policy frameworks. The project's GHG emissions are estimated using current carbon emission factors, which reflect present-day energy and material intensities. Extending these assumptions beyond 2042 would not provide a realistic or meaningful comparison, as future emission factors are expected to decline substantially due to ongoing decarbonisation.

Significance of effect - Greenhouse gas emissions

- 4.5.2.7 With regards to assigning significance, ISEP (formerly IEMA) Guidance provides five distinct levels of significance, which are not solely based on whether a project emits GHG emissions alone, but how the project makes a relative contribution towards achieving a science-based 1.5°C aligned transition towards net zero. The levels of significance that will be used for the GHG assessment, as defined in the ISEP (formerly IEMA) Guidance are outlined in **Table 4.8**.
- 4.5.2.8 Major or Moderate Adverse effects and Beneficial effects will be considered Significant; Minor Adverse and Negligible effects will be considered as Not Significant.

Table 4.8: GHG emissions scale of adverse effect criteria

Significance classification	Definition
Major Adverse (Significant)	The MHPGC Project's GHG emissions impacts are not mitigated or are only compliant with minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.
Moderate Adverse (Significant)	The MHPGC Project's GHG emissions impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.

Significance classification	Definition
Minor Adverse (Not Significant)	The MHPGC Project's GHG emissions impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
Negligible (Not Significant)	The MHPGC Project's GHG emissions impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Beneficial (Significant)	The MHPGC Project's net GHG emissions impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without project baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact.

4.5.3 Effects of Climate Change

Climate Resilience Methodology

- 4.5.3.1 The assessment of CCR and adaptation focuses on the vulnerability of MHPGC Project assets and receptors to projected future climate conditions. The O&M and decommissioning phases are particularly considered because these periods expose infrastructure to long-term climate effects, including increases in wind speed, storm intensity, wave height, and sea-level rise. The methodology ensures that resilience measures are incorporated into detailed design to address potential climate-related vulnerabilities.

Receptor sensitivity - Climate change resilience and adaptation

- 4.5.3.2 To determine sensitivity of the receptor, the vulnerability of the receptor to climate change and its ability to recover and adapt (susceptibility) are considered. Professional judgement has been used to identify the sensitivity of the key receptors based on **Table 4.9**, **Table 4.10**, and **Table 4.12**.
- 4.5.3.3 In line with ISEP guidance on CCR and adaptation (ISEP, 2020), the sensitivity of receptors to potential climate change impacts should be considered. In determining the sensitivity of receptors in relation to potential climate change effects, the following factors must be considered:
- Susceptibility of the receptor (e.g. Ability to be affected by a change);
 - Vulnerability of the receptor (e.g. Potential exposure to a change)
- 4.5.3.4 The susceptibility of receptors has been classified as low, medium or high, in accordance with the criteria set out in **Table 4.9**.

Table 4.9: Receptor susceptibility criteria

Likelihood	Description
Low	Receptor has the ability to withstand/be minimally affected by the projected changes to the existing/prevaling climatic factors (e.g. retain much of its original function and form).
Medium	Receptor has some limited ability to withstand/not be altered by the projected changes to the existing/prevaling climatic conditions (e.g. retain elements of its original function and form).
High	Receptor has no ability to withstand/not be substantially altered by the projected changes to the existing/prevaling climatic factors (e.g. lose much of its original function and form).

- 4.5.3.5 The vulnerability of the receptor has been classified as low, medium or high, in accordance with the criteria set out in **Table 4.10**.

Table 4.10: Receptor vulnerability criteria

Likelihood	Description
Low	Climatic factors have little influence on the receptors.
Medium	Receptor is dependent on some climatic factors but able to tolerate a range of conditions (e.g. a species which has a wide geographic range across the entire UK).
High	Receptor is directly dependent on existing/prevaling climatic factors and reliant on these specific existing climate conditions continuing in future (e.g. river flows and groundwater level) or only able to tolerate a very limited variation in climate conditions.

- 4.5.3.6 The overall sensitivity of the receptor is determined as the product of the susceptibility and vulnerability as summarised in **Table 4.11**.

- 4.5.3.7 The sensitivity of receptors has been classified as low, medium or high, in accordance with the criteria set out in

Table 4.11: Receptor sensitivity criteria

Susceptibility	Vulnerability		
	Low	Medium	High
Low	Low	Low	Low
Medium	Low	Medium	High
High	Low	High	High

Magnitude of impact - Climate change resilience

- 4.5.3.8 The magnitude of impact has been assessed using professional judgement as a combination of both the probability (likelihood) of the impact and the impact consequence.
- 4.5.3.9 In line with ISEP (formerly IEMA) Guidance on CCR and adaptation (ISEP, 2020), the probability of the impact refers to the likelihood of a climate impact occurring and having an impact on the MHPGC Project, over its lifespan. This includes consideration of existing and embedded mitigation measures within the design of the MHPGC Project. The probability of the impact has been classified as likely, possible and unlikely in accordance with the criteria presented in **Table 4.12**.

Table 4.12: CCR and adaptation likelihood of impact criteria

Likelihood	Description
Unlikely	The climate impact is not anticipated to occur during the lifetime of the MHPGC Project (35 years).
Possible (as likely as not)	The climate impact may occur a limited number of times during the lifetime of the MHPGC Project (35 years).
Likely	The climate impact may occur multiple times during the lifetime of the MHPGC Project (35 years).

- 4.5.3.10 In line with ISEP (formerly IEMA) guidance on CCR and adaptation (ISEP, 2020), consequence takes into account the geographical extent of the effect, or the number of receptors affected (e.g. scale), the complexity of the effect, degree of harm to those affected and the duration, frequency, and reversibility of effect. The consequence of the impact has been classified as Very High, High, Medium, Low and Negligible in accordance with criteria set out in **Table 4.13**.

Table 4.13: CCR and adaptation consequence of impact criteria

Consequence	Description
Very High	Permanent damage to structures/assets; complete loss of operation/service; complete renewal of infrastructure; exceptional environmental damage; multiple fatalities; and/or extreme financial impact.
High	Extensive damage to structures/assets; partial loss of operation/service over a broad area or critical function; partial renewal of infrastructure; large adverse effect on the environment, requiring remediation; one fatality; and/or major financial impact.
Medium	Some infrastructure damage and partial loss of service over localised area; minor infrastructure renewal; adverse impact on the environment; long-term injury; and/or moderate financial impact.
Low	Localised infrastructure disruption and minor loss of service; no permanent damage, minor restoration work required; slight adverse environmental effects; short-term injury; and/or small financial losses.
Negligible	No damage to infrastructure; no impacts on the environment; near miss; no adverse financial impact.

4.5.3.11 CCR and adaptation impacts have been assessed on the basis of the likelihood of impact and consequence as presented in **Table 4.14**.

Table 4.14: Assessment matrix for CCR impacts

Consequence	Likelihood of impact		
	Unlikely	Possible	Likely
Very high	Medium	High	High
High	Medium	High	High
Medium	Low	Medium	High
Low	Low	Low	Medium
Negligible	Low	Low	Medium

Significance of effect - Climate change resilience

4.5.3.12 As stated within ISEP (formerly IEMA) Guidance on CCR and adaptation (ISEP, 2020), there is no legislative definition of 'significance'. The significance of a reported effect has therefore been determined using professional judgement on the basis of the sensitivity of receptors against the impact magnitude criteria using the matrix presented in **Table 4.15**. If receptors are considered to be of high sensitivity, impacts that are of medium or high magnitude have been considered 'significant' in EIA terms. Additional mitigation has been identified for those climate resilience effects considered significant.

Table 4.15: CCR and adaptation significance criteria

Magnitude of impact	Sensitivity of receptors		
	Low	Medium	High
Low	Not Significant	Not Significant	Not Significant
Medium	Not Significant	Not Significant	Significant
High	Not Significant	Significant	Significant

4.5.4 Assumptions and limitations of the assessment

Greenhouse gas emissions

- 4.5.4.1 In the absence of detailed design information related to the assets, materials, and construction, operation, maintenance and decommissioning methods, the GHG emissions assessment has been undertaken using industry standards, benchmarks, estimations and professional judgement. The limitations and assumptions related to the GHG assessment have been detailed in **Volume 4, Annex 4.1: GHG Assessment, of the PEIR**. This includes the draft methodology, assumptions and limitations for land use changes emissions, which will be estimated for the ES.

4.6 Key parameters for assessment

4.6.1 Scope of the assessment

- 4.6.1.1 The approach to assessment was presented in the MHPGC Project Scoping Report and has been refined in consultation with relevant statutory and non-statutory consultees as detailed in **Section 4.3** and through the MHPGC Project Scoping Opinions received from the PINS and MD-LOT.

GHG Emissions

- 4.6.1.2 **Table 4.16** summarises the impacts considered as part of the assessment, while a summary of the effects scoped out of the assessment is presented in **Table 4.17**.

Table 4.16: Impacts scoped into the assessment (GHG emissions)

Impact	Potential effects scoped into the assessment
Construction phase	
Product stage: manufacture and transport of raw materials (A1 to A3)	Raw materials required for the MHPGC Project would result in embodied emissions that have the potential to be large.
Transport of materials to Site (A4)	Construction Phase emissions from fuel/energy consumption due to delivery of material to site have the potential to be large.
Plant and equipment use during Construction Phase (A5)	Emissions from the plant, construction vessels and equipment used during construction of the Proposed Development have the potential to be large.
Transport of waste (A5)	Emissions from fuel/energy consumption due to the transport of waste materials have the potential to be large.
Land Use Change (A5)	Land-use change related emissions are not quantified at this stage. Current land use habitat classification does not identify any areas of peatland or peaty soils within the onshore study area defined by the MHPGC Project PEIR Red Line Boundary: Onshore. It is not anticipated, therefore, that installation of the LSS and cables will directly affect any significant carbon stores and therefore the change in carbon storage value of the land would be minimal. This is considered to be the case for both temporary land use change, where the habitat is anticipated to be returned to its pre-development state after decommissioning, and permanent land use change where the habitat may not be restored.
O&M phase	
Maintenance, repair, replacement and refurbishment (B2 to B5)	Over the assumed 35-year lifespan of the MHPGC Project, replacement and refurbishment of building fabric would release a potentially significant magnitude of emissions.
Decommissioning phase	

Impact	Potential effects scoped into the assessment
End-of-life/decommissioning (C1 to C4)	GHG emissions arising from decommissioning works (e.g. plant, fuel and vessel use) and the recovery (or disposal) of materials would contribute to the lifecycle total and net GHG balance of the MHPGC Project. Options for either recycling the transmission infrastructure or repowering the generation and transmission elements of the MHPGC Project will be assessed at end of life.

Table 4.17: Impacts scoped out of the assessment (GHG Emissions)

Impact	Justification for scoping out of the assessment
Construction phase	
Disposal of waste (A5)	Emissions from the disposal of waste materials is not expected to be large as it will predominantly comprise inert waste.
O&M phase	
Operational energy use (B6)	The MHPGC Project would not give rise to potentially significant operational energy demand.
Operational water use (B7)	The MHPGC Project would not give rise to potentially significant operational water demand.
Decommissioning phase	
N/A	N/A

Climate Resilience

- 4.6.1.3 Climate change risks that are not considered likely to result in moderate/major significant effects compared to the present-day baseline have been scoped out of the assessment, and these impacts will not be considered further. **Table 4.16** summarises the impacts considered as part of the assessment, while a summary of the effects scoped out of the assessment is presented in **Table 4.19**.
- 4.6.1.4 The potential offshore impacts from the MHPGC Project have been considered collectively for both English and Scottish waters, as these will not change between these areas given the commonality of the works proposed (offshore cabling).

Table 4.18: Impacts scoped into the assessment (Climate resilience)

Impact	Potential effects scoped into the assessment
O&M phase	
The vulnerability of the MHPGC Project to climate change during O&M phase.	Effect of projected future climate change on the operation and suitability of the assets. This includes impacts on human receptors.
The ICCI of the MHPGC Project.	Exacerbated effects of projected future climate change on the potential impacts on a receptor from the MHPGC Project identified in other environmental topic chapters.
Decommissioning phase	
The vulnerability of the MHPGC Project to climate change during decommissioning phase.	Effect of projected future climate change on the operation and suitability of the assets. This includes impacts on human receptors.

Table 4.19: Impacts scoped out of the assessment (Climate resilience)

Impact	Justification for scoping out of the assessment
Construction phase	
The vulnerability of the MHPGC Project to climate change during construction phase.	The construction phase for the onshore and offshore infrastructure (total expected duration of up to 4 years) is not considered long enough for significant climate change risks to occur relative to the present-day baseline. Definitive trends in changing climate risk indicators can only be modelled over periods of decades. Seasonal weather patterns within a period of a few years provides insufficient data to model long term climate trends.
The ICCI of the MHPGC Project during construction phase	The construction phase for the onshore and offshore infrastructure (total expected duration of up to 4 years) is not considered long enough for significant ICCIs to occur.
O&M phase	
N/A	N/A
Decommissioning phase	
The impact of GHG emissions arising from land use and seabed change during decommissioning phase.	During the O&M phase no additional carbon release is anticipated as a result of decommissioning. This approach ensures that terrestrial and marine carbon is accounted for across the project lifecycle without double-counting emissions that have already occurred.
The vulnerability of the onshore and offshore infrastructure of the MHPGC Project to climate change during decommissioning phase.	The decommissioning phase of the MHPGC Project will occur at the end of its operational life. The purpose of decommissioning will be to recommission and remove (where appropriate) the Project's onshore and offshore infrastructure therefore is not considered necessary to consider impacts on the assets that are being decommissioned.
The ICCI of the MHPGC Project during decommissioning phase.	It is considered unlikely that the decommissioning phase would be long enough to result in significant ICCIs, beyond those considered for the operation and maintenance phase assessment.

4.6.2 Maximum design scenario

- 4.6.2.1 The approach to assessment was presented in the MHPGC Project Scoping Report and has been refined in consultation with relevant statutory and non-statutory consultees as detailed in **Section 4.3** and through the MHPGC Project Scoping Opinions received from the PINS, MD-LOT and the MMO.
- 4.6.2.2 Effects that are not considered likely to be of moderate/major significance have been scoped out of the assessment and these impacts will not be considered further. **Table 4.16** and **Table 4.18** summarise the impacts considered as part of the assessment, while a summary of the effects scoped out of the assessment is presented in **Table 4.17** and **Table 4.19**

Table 4.20: MDS relevant for the assessment of potential impacts on Climate Change

Impact	Maximum Design Scenario	Explanation
Construction		
Offshore		
Offshore installation works that result in embodied GHG emissions associated with materials used	The cable length measurements are for the distance between the Morven North or Morven South OSP and trenchless drill exit pit unless otherwise stated. For clarity one trench length is as follows: - OSP to exit pit - 324.67km; - OSP to MHWS – 326.00km; - Scottish waters (OSP – Scottish-English offshore waters boundary) – 98.00km; - English waters (English offshore waters boundary – exit pit) – 226.67km; - English waters (English offshore waters boundary – MHWS) – 228.00km. Sandwave clearance - Sandwave clearance activities undertaken using Mass Flow Excavator (MFE) over an approximate four month duration; - Sediment disturbance rate is 1000kg/s; - Surface width of up to 28m per trench and base width of up to 20m per trench. Per trench = 1,484,000m² - Scottish waters: 31km length × 28m width = 868,000m²; - English waters: 22km length × 28m width = 616,000m²; Total (up to two trenches) = 2,968,000 m² - Scottish waters: 1,736,000m²; - English waters: 1,232,000m²; Cable installation (trenching): - Installation via trenching of up to 324.67km of cable, with a trench width of up to 2.1m and a depth of up to 3m; - Trenching rate is 400m/hr; <u>Per trench = 2,045,421m³</u> - Scottish waters: 98km length × 2.1m width × 3m depth = 617,400m³;	Details provide maximum number of components or largest scale of asset at upper bound of design envelope.

Impact	Maximum Design Scenario	Explanation
	- English waters: 226.67km length × 2.1m width × 3m depth = 1,428,021m³. <u>Total (up to two trenches) = 4,090,842m³</u> - Scottish waters: 1,234,800m³; - English waters: 2,856,042m³. Boulder clearance: <u>Per trench = 1,380,000m²</u> - Scottish waters: 31km length × 20m width = 620,000m²; - English waters: 38km length × 20m width = 760,000m²; <u>Total (up to two trenches) = 2,760,000 m²</u> - Scottish waters: 1,240,000m²; - English waters: 1,520,000m². Pre-Lay Grapnel Run (PLGR): <u>Per trench = 3,246,700m²</u> - Scottish waters: 98km length × 10m width = 980,000m²; - English waters: 226.67km length × 10m width = 2,266,700m². <u>Total (up to two trenches) = 6,493,400m²</u> - Scottish waters: 1,960,000m²; - English waters: 4,533,400m². Cable protection (English and Scottish waters): - Offshore export cable: up to 8.3% (equivalent to 27km) of the total route length within Scottish and English waters may require external protection using rock installation. Rock installation may be up to 14m wide and 2m high and side slope of 1:3. <u>Area per trench = 378,980m²</u> <u>Total area (up to two trenches) = 757,960m²</u> <u>Volume per trench = 433,120m³</u> <u>Total volume (up to two trenches) = 866,240m³</u> - Export cable crossing: Up to 16 crossings using either rock installation or concrete mattresses within Scottish and English waters. Each crossing will be up to 200m (length) × 18m (wide) × 2m (height). <u>Per crossing = 3,600m²</u> <u>Total (up to 34 crossings) = 122,400m²</u>	

Impact	Maximum Design Scenario	Explanation
Offshore installation works that result in GHG emissions as a result of construction activities	Construction duration: up to 4 years. Offshore vessel activity: - There will be up to 550 return trips by installation vessels (including Cable Lay Vessels (CLV), trenching support vessels (TSV), installation support vessel (ISV), guard vessels (GV), survey vessels, PLGR vessel, out of service cable removal vessel, boulder clearance vessel, dredging vessel, crew transport vessel (CTV), rock dumping vessel, construction support vessel, tug/anchor handler and cable barge); - A maximum of 33 vessels may be operational at any one time during the construction phase. Landfall vessel activity: - There will be up to 250 return trips by installation and support vessels (including CLV, ISV, GV, dredging vessels, tug/anchor handlers, cable barge, CTV and dive support vessels (DSV)); - A maximum of 14 vessels may be operational at any one time during the construction phase.	Details provide maximum number of components or largest scale of asset at upper bound of design envelope.
Landfall works that result in embodied GHG emissions associated with materials used	Trenchless techniques (landfall) (English waters): - Up to four boreholes. Trenchless installation via Horizontal Directional Drilling (HDD), (conduit diameter of 1.6m, conduit length of 2,000m). Drilling fluid discharge up to 180m³ each and up to 1,083m³ total. Trenchless drill punchout will be up to approximately 1690m offshore of MHWS in water depths up to 20m LAT; - Up to four exit pits (140m long × 50m wide × 5m deep). Area up to 7,000m² each; 28,000m² total. Volume up to 18,667m³ each; 74,668m³ total; - Up to two floatation pits (240m long × 55m wide × 5m deep). Area up to 13,200m² each; 26,400m² total. Volume up to 39,167m³ each; 78,334 m³ total. Vessel seabed interactions (English waters): - Up to 127,456m² anchor seabed disturbance per vessel movement × 40 full anchor spread movements = 5,098,240m². - Up to six jack-up events (2m diameter spud legs × 4), 3.14m² per events, total disturbance = 18.85m². Landfall (trenchless drill) - Landfall trenchless drill installation method: HDD or Direct Pipe; - Maximum burial depth of trenchless drill (per bore): 80m bgl;	Details provide maximum number of components or largest scale of asset at upper bound of design envelope.

Impact	Maximum Design Scenario	Explanation
	- Maximum trenchless drill length: 2km; - Duration of trenchless drilling activity: 300 days; - Construction period for Landfall: 3.5 years. Landfall Infrastructure onshore (landward of MHWS) - Maximum width of trenchless drill area, west of Durham Coast Line: 400m; - Corridor length: 800m; - Number of trenchless drill entry points: 4 bores; - Material quantities associated with excavation: 130,000m³. Transition Joint Bays - Number of TJBs: 2; - Location of TJBs: Within 150m of landfall trenchless drill entry point; - Working Area for TJB (construction): 750m². - Depth of TJB: 2.5m. Infrastructure Intertidal (MLWS - MHWS) Trenchless drill length intertidal = 60 m	
Landfall works result in GHG emissions as a result of construction activities	Landfall Duration of construction and compound operation = 3.5 years Duration of trenchless drilling activity: 300 days Number of main compounds = 1 [48,000m ²]; Number of secondary compounds = 1 [900m ²] Maximum of 2 access tracks (width = 10m) Working hours = 07:00 - 19:00 Mon - Fri and 07:00 - 13:00 on Sat; no activity on Sundays or Bank Holidays, excluding trenchless techniques, which will require 24-hour working. Material arising from excavation activities = 130,000m ³ [Assume topsoil and subsoil from site-strip and excavations will be reused on site during backfilling or for reinstatement. Assume bore arisings from HDD/Direct Pipe (DP) will be removed from site] Movements and workforce <i>Landfall</i>	Details provide maximum number of components or largest scale of asset at upper bound of design envelope.

Impact	Maximum Design Scenario	Explanation
	Abnormal loads: HGV low loader with extendable trailer (70t maximum load) - movement order required. 6 AILs; Maximum 20 HGV movements per day; 240 vehicle movements per day. Up to 48 employees working at site per day. Landfall (Trenchless Drill/Pull-in Operations) Single or multiple cable lay vessels/barges - typically Length = 100 -180m; beam = 20 - 40m Max vessels on site at any one time = 14 [2 x CLV; 2 x ISV; 2 x GV; 1 x dredging vessel.; 4 x Tug Anchor Handler; 1 x Cable Barge; 1 x CTV; 1 x DSV] Number of vessels and number of return trips across construction period = CLV: 2x20 = 40; ISV: 2x20 = 40; GV: 2x20 = 40; Dredging: 1x30 = 30; Tug/Anchor: 4x15 = 60; Barge: 1x10 = 10; CTV = 1x20=20; DSV = 1x10=10. Total: 250 Jack up operations and spud leg dimensions: Single smaller type jack-up potentially required for supporting construction at the trenchless drill exit pit locations. Qty: 1; Barge dimensions typically in the range of 30m x 15m to 60m x 30m. Corresponding leg diameters used below. Qty: 1; Tugs to support barge movements. Qty: 4; Construction Support vessel for use of exit pit construction: Qty: 1; Supply Vessels: Qty 1; Dive Support Vessel for use at bellmouth construction: Qty 1. 2.0m Spud Leg Dia; 4 x Spud Legs = 3.14m² seabed interaction per location. 6.28m² seabed interaction for 2no. Exit pits; 18.85m² seabed interaction for 6no. Exit pits Installation Vessels and Support Vessel Anchoring = Anchored cable lay barge holding position with 7no. anchor spread during pull-in operations. Maximum anchor corridor 1000m. 40 potential full anchor spread movements across 20km trench of nearshore lay. Total anchor corridor area: 20km²; Total potential seabed disturbance: 5,098,230m² Landfall construction: Anchored cable Lay barge holding position with 7no. Anchor spread during pull in operations; Maximum anchor corridor 1000m. 4 potential full anchor spread movements across 2km trench of nearshore lay. Total anchor corridor area: 2km²; Total potential seabed disturbance: 509,824m².	
Onshore		
Onshore works that result in embodied GHG emissions associated with materials used	Onshore Export Cable (High Voltage Direct Current (HVDC)) – Blue Land Substation (LSS) 1 circuit (2 conductors + 2 fibre optic) = 4 cables in total. Total length of cable route = 4.83km.	Blue LSS provides the maximum number of components or largest scale of asset at upper bound of design envelope.

Impact	Maximum Design Scenario	Explanation
	HVDC cable diameter = 155mm; fibre optic cable outer diameter (OD) = 40mm. Maximum of 2 trenches - 6.85m cable corridor width (per trench); 14m width for full cable corridor Trench width at base = 4m; width at top = 6.85m; depth = 1.8m with depth of stabilised backfill = 1m. Number of cable route joint bays = 12; volume of material excavated per joint bay = 700m³; 8,400m³ for all joint bays Volume of material excavated per monitoring box: 18m³ Volume of material excavated (for monitoring boxes): 216m³ Construction land take per monitoring box: 64m² Construction land take for all monitoring boxes: 768m² AC Connection Cable (High Voltage Alternating Current (HVAC)) Total of 24 export cables (4 circuits = 12 power cores + 4 earth continuity conductors + 8 fibre optic/control allowance HVAC cable diameter = 150mm; fibre optic cable OD = 40mm Length of cable route = 4,260m; 4 cable trenches - trench width at base = 2.8m; at top = 4.8m; trench depth = 1.8m; depth of stabilised backfill = 1m Number of cable route joint bays = 32; volume of material excavated per JB = 2,264m³ (total volume = <u>18,112m³</u>) Construction land take for joint bay (surface area): 1,472m² (<u>total = 11,776m²</u>) Volume of material excavated per link box: 12.5m³ Construction land take for link box: 100m² (total = 3200m²) Volume of material excavated (link boxes): 400m³ Infrastructure Number of haul roads = 1; road width = 8m; depth = 0.5m. Construction involves: 400mm topsoil strip; placement of geogrids and 500mm of stone along haul road. Additional engineering/intervention in some sections of the haul road to mitigate impacts on buried utilities or prevent excessive settlement (due to geohazards or compressible materials). Assume areas of hardstanding which will be created at joint bays for drum delivery and winch pads included. Number of main compounds: 2 Main compound dimensions: 7ha Number of secondary construction compounds: 6	

Impact	Maximum Design Scenario	Explanation
	Dimensions per secondary construction compound: 10,000m² Total area of secondary construction compounds: 6ha Trenchless Drill Crossings Major Crossings understood to be: - A, B and Classified unnumbered roads (known as C roads) (including the A19 and B1432); - Hesledon Moor East SSSI. Trenchless drill methodology: HDD, micro-tunnelling (auger bore or direct pipe) Number of trenchless drill compounds: 6 (3 entry and 3 exit trenchless drill compounds) Dimensions of trenchless drill compounds: 6,000m² Total trenchless drill compound area: 36,000m² Trenchless depth (excluding landfall): 30m LSS Construction Description of foundations: raft or pile caps (suspended structure) or piled foundations and suspended structures Volume of excavation for foundations: 20,000m³ Cut and fill balance: 50,000m³ Material types and quantities associated to excavation: 14,000m³ topsoil, 65,000m³ other materials Estimated waste quantities: 50,000m³ Electrical Components Earth switches = 96; lightning arrestors or surge arrestors = 30; Voltage transformers = 30; current transformers = 30; circuit breakers = 30; electrical isolators = 159; busbars = 54; power transformer = 7; static VAR compensator = 12; harmonic filter bank = 12; shunt reactor = 12; terminal towers/line-cable interface mast = 12	
Onshore works that result in GHG emissions associated with construction activities	Movements and workforce <i>Onshore Export Cable</i> Abnormal loads (Number): 450	Details provide maximum number of components or largest scale of asset at upper bound of design envelope.

Impact	Maximum Design Scenario	Explanation
	Abnormal loads (Type): Cable drums on tractor trailers - low loaded lorry's may be suitable for transport also. Total daily construction traffic movements (HGV): 83 Total daily construction traffic movements (Vehicles): 90 Number of employees working on site: 120 LSS Abnormal loads (Number): 18 Abnormal loads (Type): Cable drums on tractor trailers - low loaded lorry's may be suitable for transport also. Total daily construction traffic movements (HGV): 100 Total daily construction traffic movements (Vehicles): 300 Number of employees working on site: 250 to 350	
Operation and Maintenance		
O& M activities resulting in GHG emissions from surveys or inspections	Seaward of MLWS O&M: Operational lifespan of 35 years. Vessel presence: Routine inspection (no remediation/repair) constitutes survey activity (survey vessel) up to 2 surveys per year per trench; duration 2 weeks per survey; 3 return trips per survey; 2 vessel max at 1 time per survey. Per year for 2 trenches: • Surveys – 4 • Return trip – $4 \times 3 = 12$ • Total vessels at time – 2 Routine inspection (no remediation/repair) constitutes survey activity (USV) up to 2 surveys per year per trench; duration 6 weeks per survey; 110 return trips (up to 4 USV + 1 guard vessel with port call every 4 days) (55 per survey = 110); up to 4 USV + 1 guard vessel = 5 max at 1 time per survey. Per year for 2 trenches: • Surveys – 4 • Return trips – $4 \times 55 = 220$ • Total vessels at time – 5 • Remediation (up to 13.056km per year per trench, in different locations along route) Vessels on site for REMEDIATION activities, for up to two trenches:	Details provide maximum number of components or largest scale of asset at upper bound of design envelope.

Impact	Maximum Design Scenario	Explanation
	•Up to four operation and maintenance vessels on site at any one time, comprising a combination of construction support vessel (CSV) and/or Service Operation Vessels (SOV) and/or guard vessel and/or rock dump vessels and/or CTVs/workboats. Vessel movements (remediation), for up to two trenches: •Up to 62 operation and maintenance vessel movements (return trips) each year, consisting of CSV or SOV and/or guard vessel and/or rock dump vessels and/or CTVs/workboats. •Repair (41 lifetime repairs, for up to two trenches) Vessels on site for REPAIR activities, for up to two trenches: •Up to four operation and maintenance vessels on site at any one time, comprising a combination of CLV and/or barge and/or Barge Handlers/Tugs and/or Jack-Up and/or CSV and/or CTV and/or Rockdump. Vessel movements (repair), for up to two trenches: •Up to 245 operation and maintenance vessel movements (return trips) over the operational lifetime (35 yrs) consisting of CLV and/or barge and/or Jack-Up and/or Barge Handlers/Tugs and/or CSV and/or CTV and/or Rockdump. Landward of MLWS Landfall Typical duration of operation: 35 years Operational land take for TJB (surface area): 25m² Total area of TJB: 150m² Activities anticipated during operation and maintenance: quarterly Onshore Export Cable Typical duration of operation: 35 years AC Cable Corridor – Blue LSS Length of cable route: 4.26km Width of cable corridor (permanent): 25m HVAC Onshore cable area (permanent): 106,500m² HVAC Operational land take per access cover: 25m² (total = 200m²) Onshore Export Cable Corridor – Blue LSS Length of cable route: 4.83km Width of cable corridor (permanent): 8.65m	

Impact	Maximum Design Scenario	Explanation
	HVDC Onshore cable area (permanent): 41,780m ² HVDC Operational land take per access cover: 6.25m ² (total = 75m ²) Activities anticipated during operation and maintenance: quarterly LSS Typical duration of operation: 35 years Area of permanent footprint: 6.5ha Impermeable permanent area: 3.5ha Sustainable Drainage Strategy (SuDS) area: 2,300m ² SuDS volume: 3,500m ³ Number of permanent accesses: 2 Permanent access width: 15m Permanent access points: 2 Activities anticipated during operation: Monthly day visit inspections; Quarterly detailed inspections/ non-intrusive work; Annual turnaround/shutdown.	
Decommissioning		
<i>Landfall and Export Cables</i>		
All onshore cables will remain in situ whilst offshore cables and cable protection will be fully removed. The process is anticipated to be the reverse of the construction process, with similar parameters to the equivalent construction phase impact.		
LSS		
Deconstruction in the inverted sequence of installation, after the LSS has been decommissioned. All equipment and materials including foundations will be demolished and disposed of, in accordance with the latest relevant guidance. The site will be reinstated.		

4.7 Commitments adopted as part of the MHPGC Project

- 4.7.1.1 As set out in **Volume 1, Chapter 4: Approach to Environmental Impact Assessment** and **Volume 1, Annex 4.1: Draft Commitments Register**, several measures have been adopted as part of the MHPGC Project to reduce the potential for impacts on Climate Change.
- 4.7.1.2 Embedded mitigation includes the following measures as identified in the Institute of Environmental Management and Assessment (IEMA) Guide to Shaping Quality Development (IEMA, 2015):
- Primary mitigation - measures included as part of the project design. IEMA describes these as “modifications to the location or design of the development made during the pre-application phase that are an inherent part of the project and do not require additional action to be taken”. This includes modifications arising through the iterative design process. These measures will be secured through the consent itself through the description of the project and the parameters secured in the DCO and marine licence, or both.
 - Tertiary mitigation - IEMA describes these as “actions that would occur with or without input from the EIA feeding into the design process. These include actions that will be undertaken to meet other existing legislative requirements, or actions that are considered to be standard practices used to manage commonly occurring environmental effects”.
- 4.7.1.3 Embedded mitigation measures that will form part of the final design (and are established legislative requirements/good practice, or both) have been taken into account as part of the initial assessment presented in **Section 4.8** (i.e., the initial determination of impact magnitude and significance of effects assumes implementation of these measures). This ensures that the measures that the Applicant is committed to are considered in the assessment of effects.
- 4.7.1.4 Where an assessment identifies likely significant adverse effects, secondary mitigation measures may be applied. These are measures that could further prevent, reduce and, where possible, offset these effects. They are defined by IEMA as “actions that will require further activity to achieve the anticipated outcome” and may be imposed as part of the planning consent, or through inclusion in the ES. These include measures required to reduce the significance of environmental effects and may be secured through an environmental management plan. For secondary mitigation measures both pre-mitigation and residual effects are presented.
- 4.7.1.5 The measures relevant to Climate Change are outlined in **Table 4.21** and **Table 4.22**. As there is a secured commitment to implementing these measures, they are considered inherently part of the design of the MHPGC Project and have therefore been considered in the assessment presented in **Section 4.8**.

Table 4.21: Embedded commitments relevant to GHG implemented as part of the MHPGC Project

Commitment number	Measure adopted	How the measure will be secured
CoT01	An Outline Code of Construction Practice (CoCP) will be prepared and submitted as part of the application for development consent. A Detailed CoCP will be developed in accordance with the Outline CoCP. The Outline CoCP will include that farm access routes between fields within a farm holding will be maintained (where reasonably practicable), or alternative routes agreed with the land holder to enable the continued operation of agricultural land holdings during the construction phase, where this may be possible.	Will be secured via DCO Schedule &/or Requirement
CoT06	An Outline Offshore Environmental Management Plan (OEMP) will be prepared and submitted with the application for development consent. A Detailed OEMP will be developed in accordance with the Outline OEMP. The Outline OEMP will include: • An Outline Marine Biosecurity Plan; • An Outline Marine Pollution Contingency Plan; • An Outline Marine Mammal Mitigation Protocol; • An Outline Vessel Traffic Management Plan; • An Outline Navigational Safety Plan; • A chemical risk assessment that includes information such as how chemicals will be used, stored, and transported, in line with recognised best-practice guidance; • A dropped-object protocol will be established to cover the reporting and recovery of any items lost overboard that could endanger other sea users; • A Marine Emergency Action Card outlining the steps to be followed in the case of a marine emergency; • Provisions for the handling and disposal of waste.	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)
CoT07	An Outline Offshore Operations and Maintenance Plan will be prepared and submitted as part of the application for development consent. A Detailed Offshore Operations and Maintenance Plan will be produced prior to entering the operation and maintenance phase.	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)
CoT08	An Outline Offshore Cable Specification and Installation Plan (CSIP) will be prepared and submitted with the application for development consent. It will include cable burial	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)

Commitment number	Measure adopted	How the measure will be secured
	to be the preferred option for cable protection, where practicable. A Detailed CSIP will be developed prior to construction in accordance with the Outline CSIP. The Outline CSIP will include (but is not limited to): • A Cable Burial Risk Assessment (CBRA), which will define burial depths and safeguards, based on seabed conditions and external aggression and climate change hazards, to keep the offshore export cables protected and compliant through all project phases while upholding navigational and environmental safety; • The implementation, management and monitoring of cable protection.	
CoT13	The Project Description (Volume 1, Chapter 3: Project Description, of the PEIR) sets out that the installation of the offshore export cables under Durham Coast Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) will be undertaken by trenchless technologies. The exit pits associated with the trenchless technologies installation will be at least 100m seaward of the eastern boundary of the Durham Coast SSSI and SAC.	Will be secured via DCO Schedule &/or Requirement
CoT14	An Offshore Construction Method Statement (CMS) will be produced and implemented prior to construction.	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)
CoT15	A GHG Reduction Strategy will be produced, setting out steps taken to minimise and offset emissions, as required under NPS EN-1 (paragraph 5.3.7). As per NPS EN-1, this will outline ways in which GHG emissions will be reduced through the project lifecycle.	n/a
CoT18	An Outline CoCP will be prepared and submitted with the application for development consent. A Detailed CoCP will be developed in accordance with the Outline CoCP. The Outline CoCP will include (but is not limited to) measures to maintain and address: • flood protection and control measures; • water environment and drainage; • noise and vibration management measures; • air quality and dust management; • pollution prevention and management; • geology and ground conditions; • soil and materials management; • land use, tourism and recreational assets;	Will be secured via DCO Schedule &/or Requirement

Commitment number	Measure adopted	How the measure will be secured
	waste management.	
CoT30	An Outline Vessel Traffic Management Plan (VTMP) will form part of the Outline OEMP, which will be prepared and submitted with the application for development consent. A Detailed VTMP will be developed pre-construction in line with the Outline VTMP, and in accordance with the relevant legislation, guidance and industry best practice. The Detailed VTMP will: - detail vessel routing to and from construction areas and ports to avoid areas of high risk, including liaison with the Port of Seaham and the Port of Sunderland; - include vessel standards and a code of conduct for vessel operators in compliance with international marine regulations as adopted by the Flag State, including the International Regulations for Preventing Collisions at Sea (COLREGs) (International Maritime Organization (IMO), 1972/77) and the International Convention for the Safety of Life at Sea (SOLAS) (IMO, 1974); - detail measures to reduce disturbance to marine mammal receptors from transiting vessels, such as slow transit through the MHPGC Project and other measures as detailed in the Outline Marine Mammal Mitigation Protocol; - detail measures to reduce disturbance to red throated diver from transiting vessels, such as slow transit through the MHPGC Project and other measures as detailed in the Red Throated Diver Protocol; - liaison with the Port of Seaham and the Port of Sunderland.	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)
CoT44	An Offshore Decommissioning Programme will be developed prior to decommissioning and will be adhered to. It will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable.	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)

Table 4.22: Embedded commitments relevant to climate change risk implemented as part of the MHPGC Project

Commitment number	Measure adopted	How the measure will be secured
CoT08	An Outline Offshore CSIP will be prepared and submitted with the application for development consent. It will include cable burial to be the preferred option for cable protection, where practicable. A Detailed CSIP will be developed prior to construction in accordance with the Outline CSIP. The Outline CSIP will include (but is not limited to): • A CBRA which will define burial depths and safeguards, based on seabed conditions and external aggression and climate change hazards, to keep the offshore export cables protected and compliant through all project phases while upholding navigational and environmental safety; • The implementation, management and monitoring of cable protection.	Will be secured via dML condition and/or condition of Scottish Marine Licence(s)
CoT16	An Onshore Decommissioning Plan will be developed prior to decommissioning. It will include provisions for the removal of all onshore above ground infrastructure and the decommissioning of below ground infrastructure (if and where relevant and practicable), and details relevant to flood risk, pollution prevention, protection of soils and avoidance of ground disturbance. The Onshore Decommissioning Plan will be in line with the latest relevant legislation and available guidance at the time of production, as far as reasonably practicable.	Will be secured via DCO Schedule &/or Requirement
CoT22	An Outline Operational Drainage Management Plan (ODMP) for the onshore land substation will be prepared and submitted with the application for development consent. The Outline ODMP will detail measures to ensure that existing land drainage is reinstated and/or maintained, including limiting discharge rates and attenuate flows to maintain greenfield runoff rates at the onshore substation. A Detailed ODMP will be developed in accordance with the Outline ODMP and in line with the latest relevant drainage guidance notes in consultation with the Environment Agency and the Lead Local Flood Authority.	Will be secured via DCO Schedule &/or Requirement

4.8 Assessment of impacts

4.8.1 Construction phase

GHG emissions

- 4.8.1.1 The assessment of effects for GHG emissions follows the impact assessment methodology set out in **Section 4.5** and **Volume 4, Annex 4.1: GHG Assessment, of the PEIR**.
- 4.8.1.2 The construction phase GHG emissions assessment considers activities including raw material production/manufacturing, trench excavation, cable laying, vessel movement related to construction activities, construction of buildings and roads, fuel for construction plant and transport of materials to site.

Total construction phase GHG emissions

Table 4.23: Estimated construction phase Onshore and Offshore GHG emissions

LCA Stage	Onshore Estimated Emissions (tCO ₂ e)	Offshore Estimated Emissions (tCO ₂ e)	Total Onshore and Offshore Estimated Emissions (tCO ₂ e)	% of total estimated emissions
Product stage including raw material supply transport and manufacture [A1-A3] ¹	52,719	163,176	215,895	65%
Transport of materials to/from works site [A4]	1,788	5,798	7,586	2%
Construction/installation processes [A5]	9,202	99,233	108,436	33%
Total	63,709	268,207	331,917	100%

Receptor sensitivity

- 4.8.1.3 The assessment considers a single receptor, the global atmosphere, which is assigned a **high** sensitivity in accordance with ISEP (formerly IEMA) guidance (ISEP, 2026).

Magnitude of impact

- 4.8.1.4 The magnitude of GHG emissions during the construction phase is estimated to be **331,917 tCO₂e**.

Significance of effect

- 4.8.1.5 This assessment relates to the MHPGC Project only, given that the generation assets (Morven North and Morven South) are consented separately. Given that the individual projects will not operate in isolation, a whole project assessment is included in **Section 4.9**.
- 4.8.1.6 The construction of the MHPGC Project is anticipated to begin in 2033 and be complete by 2037. The GHG emissions arising from the construction phase of the MHPGC Project have therefore been compared with the UK Sixth Carbon Budget (2033 to 2037), as well as against the recommended

¹ While there is embodied carbon associated with the rock to be used as offshore cable protection, the carbon is naturally occurring rather than generated through the processing of raw materials. Placement of cable protection is therefore considered to displace existing embodied carbon rather than create additional emissions through material processing. On this basis, no additional embodied carbon emissions have been attributed to rock to be used for cable protection within the assessment.

local carbon budget for County Durham and the electricity supply sector projected budget, as set out in **Table 4.24**.

Table 4.24: Contextualisation of Estimated Construction phase Onshore and Offshore GHG emissions against UK, Local Recommended and UK Sector Carbon Budgets

Carbon Budget Type	6 th Carbon Budget Period (2033-2037)
Estimated net construction emissions (tCO ₂ e)	331,917
UK Carbon Budget (tCO ₂ e)	965,000,000
Contribution (%)	0.03%
Electricity Supply Sector Projected Budget (tCO ₂ e)	29,172,598
Contribution (%)	1.14%

4.8.1.7 The MHPGC Project is a transmission system infrastructure project that provides the means of transporting renewable energy generation to the National Grid. It is therefore a critical aspect of ongoing power sector decarbonisation efforts and, by extension, UK decarbonisation efforts. Without it, the carbon benefits associated with either of the generator projects at Morven North and Morven South cannot be realised.

4.8.1.8 The calculated construction phase emissions and embedded design measures are fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type.

4.8.1.9 The overall assessment of significance for the construction phase is therefore assessed as **Moderate Adverse (Significant)**.

Additional mitigation and residual effect

4.8.1.10 A moderate adverse effect is predicted for GHG emissions produces as a result of construction activity associated with the MHPGC Project. This is significant in EIA terms. In order to mitigate this effect, the Applicant is committed to exploring options to reduce construction-related emissions. A Greenhouse Gas (GHG) Reduction Strategy will be prepared and submitted with the application for development consent (CoT15).

4.8.1.11 With the implementation of this commitment to look at opportunities to reduce construction-related emissions, the impact magnitude is predicted to reduce and the residual effect is likely to be minor adverse, which is not significant in EIA terms.

4.8.2 O&M phase

GHG emissions

4.8.2.1 The assessment of effects for GHG emissions follows the impact assessment methodology set out in Section 4.5. **Volume 4, Annex 4.1: GHG Assessment, of the PEIR** provides the calculation methodology for the emission sources.

4.8.2.2 The O&M phase GHG emissions assessment considers activities pertaining to maintenance and repair of the assets, including asset replacement, asset repair, and fuel for O&M vehicles.

Total O&M phase GHG emissions

Table 4.25: Estimated O&M phase Onshore and Offshore GHG emissions

LCA Stage	Onshore Estimated Emissions (tCO ₂ e)	Offshore Estimated Emissions (tCO ₂ e)	Total Onshore and Offshore Estimated Emissions (tCO ₂ e)	% of total estimated emissions
Maintenance [B2] – includes vessel movement related emissions for offshore	527	187,694	188,221	80%
Repair [B3]	132	35,466	35,597	15%
Replacement [B4]	11,762	N/A	11,762	5%
Total	12,715	225,073	237,788	100%

Receptor sensitivity

- 4.8.2.3 The assessment considers a single receptor, the global atmosphere, which is assigned a **high** sensitivity in accordance with ISEP (formerly IEMA) guidance (ISEP, 2026).

Magnitude of impact

- 4.8.2.4 The magnitude of GHG emissions during the O&M phase is estimated to be **237,788 tCO₂e**.

Significance of effect

- 4.8.2.5 The estimated operational life of the MHPGC Project is 35 years (2038-2073). The O&M phase of the MHPGC Project has been compared with the seventh UK carbon budget (2038 to 2042). The estimated emissions shown in **Table 4.26** only cover the years 2038-2042 instead of showing the full O&M phase estimated emissions to align with the seventh UK carbon budget. For the purposes of contextualisation, the operational carbon emissions are assumed to be equally split across the 35 years of the O&M phase. Contextualisation has not been extended beyond the seventh carbon budget, as projections are highly uncertain and fall outside the scope of current policy frameworks. Furthermore, the MHPGC Project's GHG emissions have been estimated using carbon emission factors applicable at the time of assessment, which reflect energy and material intensities representative of conditions at the time of assessment. However, GHG emission factors are expected to decline substantially over this period (HM Treasury, 2023) due to ongoing grid and supply chain decarbonisation; applying current emission factors beyond 2042 would not provide a realistic or meaningful comparison. **Table 4.26** presents the contextualisation of the estimated O&M Onshore and Offshore GHG emissions against UK, local and UK sector carbon budgets.

Table 4.26: Contextualisation of Estimated O&M phase Onshore and Offshore GHG emissions against UK, Local Recommended and UK Sector Carbon Budgets

Carbon Budget Type	7 th Carbon Budget Period (2038-2042)
Estimated net O&M emissions (tCO ₂ e)	33,883 (over 5 year period)
UK Carbon Budget (tCO ₂ e)	535,000,000
Contribution (%)	0.01%
Electricity Supply Sector Projected Budget (tCO ₂ e)	21,889,970
Contribution (%)	0.15%

- 4.8.2.6 Given the nature of the MHPGC Project as electricity transmission infrastructure, direct O&M GHG emissions are limited to periodic maintenance, repair, and replacement activities rather than continuous operational fuel or energy consumption. The existing design and embedded mitigation

measures are considered to meet the applicable existing and emerging policy requirements and follows good practice design standards.

- 4.8.2.7 The overall assessment of significance for the O&M phase is considered to be **Moderate Adverse (Significant)**.

Additional mitigation and residual effect

- 4.8.2.8 A moderate adverse effect is predicted for GHG emissions produced as a result of operation and maintenance activities associated with the MHPGC Project. This is significant in EIA terms. In order to mitigate this effect, the Applicant is committed to exploring options to reduce construction-related emissions. A Greenhouse Gas (GHG) Reduction Strategy will be prepared and submitted with the application for development consent (CoT15).
- 4.8.2.9 With the implementation of these commitments to look at opportunities to reduce operation and maintenance-related emissions, the impact magnitude is predicted to reduce and the residual effect is likely to be minor adverse, which is not significant in EIA terms.

Climate change resilience and adaptation

- 4.8.2.10 The detailed assessment of climate change risks on operation and maintenance is set out in **Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR** and are summarised in this section. The assessment has been carried out in accordance with the assessment criteria laid out in **Section 4.5** of this PEIR chapter. A summary is provided at **Table 4.27**.

Table 4.27: Summary O&M Climate Change Risk Assessment

Receptor	Impact	Sensitivity	Magnitude	Significance
Onshore Infrastructure	Extreme rainfall events could result in damage to the land substation (LSS) and associated equipment leading to operational interruptions. Wetting and drying cycles can accelerate degradation of assets.	Medium	Low	Not Significant
	Increased coastal and fluvial flooding could damage onshore infrastructure through inundation and scour. Any buried infrastructure near watercourses could also be vulnerable to this.	Medium	Low	Not Significant
	Increased frequency and severity of extreme heat events (i.e. heat waves) could result in overheating of mechanical and electrical equipment within the LSS.	Medium	Low	Not Significant
	Drier summers could cause drier soils and soil instability, while wetter winters could also cause this through heave leading to upward movement of the ground when soil expands with moisture. Cycling between extreme temperatures can cause shrinkage and expansion of structures could lead to cracking of concrete structures. These factors could lead to the instability of onshore structures such as the LSS and joint bays.	Medium	Low	Not Significant
	Storm events and extreme wind forces could cause damage to the MHPGC Project. This damage could include structural damage to the LSS and associated equipment leading to operational interruptions.	Medium	Low	Not Significant
	Sea level rise could lead to greater occurrences of coastal flooding with potential damage to structures, electrical equipment, causing interference with operations.	Medium	Low	Not Significant

Receptor	Impact	Sensitivity	Magnitude	Significance
Human Welfare (Maintenance Personnel)	Intense rainfall events could affect the ability of onshore maintenance personnel to undertake certain maintenance operations which may cause operational issues. The welfare of maintenance personnel could be affected.	Medium	Medium	Not Significant
	Heatwaves and higher temperatures could impact the welfare of maintenance personnel, for example, heat stress and unsafe working conditions.	Medium	Medium	Not Significant
	Windstorms or wind gusts could impact on the safety and activities of maintenance site personnel.	Medium	Medium	Not Significant
	Intense rainfall events could disrupt offshore maintenance activities and lead to operational issues. The welfare of maintenance personnel could be affected.	Medium	Medium	Not Significant
	Heatwaves and higher temperatures could impact the welfare of offshore maintenance personnel, for example, heat stress and unsafe working conditions.	Medium	Medium	Not Significant
Offshore Infrastructure	Overheating may inhibit the functioning of export cables.	Medium	Low	Not Significant
	Increased temperatures and ocean acidification could accelerate the deterioration of structures below sea-level, such as export cables and cable protection.	Medium	Low	Not Significant
	Damage to cabling as a consequence of scour from sediment transfer.	Medium	Low	Not Significant

Summary

- 4.8.2.11 **Table 4.27** shows the sensitivity of each receptor to be **Medium** based on their vulnerability and susceptibility to climate change. Further information on sensitivity can be found in **Volume 4, Annex 4.2: Climate Change Assessment, of the PEIR**.
- 4.8.2.12 The main impacts are related to changes in rainfall patterns, increased frequency of extreme events (flooding and storms), increased risk of heatwaves and windstorms leading to damage to assets, failure in equipment and risks to maintenance personnel. The magnitude of impacts assessed has taken into consideration the consequence of the impact and the likelihood of the impact occurring. Based on this it is considered that the overall range of magnitude of impacts, during the O&M phase is **Low to Medium**.
- 4.8.2.13 Overall, it is considered that the receptor sensitivity is **Medium** and the magnitude is **Low to Medium**. Therefore, the effect of climate change on the onshore assets, during the O&M phase, are considered to be **Not Significant**.

4.8.3 Decommissioning phase

GHG emissions

- 4.8.3.1 The assessment of effects for GHG emissions follows the impact assessment methodology set out in **Section 4.5** and **Volume 4, Annex 4.1: GHG Assessment**, of the PEIR provides the calculation methodology for the emission sources.
- 4.8.3.2 The decommissioning phase GHG emissions assessment considers activities including decommissioning of the assets, disposal of materials and energy consumption for

decommissioning plant. For the purposes of this assessment, it has been assumed that decommissioning will commence in 2073.

Total decommissioning phase GHG emissions

Table 4.28: Estimated decommissioning phase Onshore and Offshore GHG emissions

LCA Stage	Onshore Estimated Emissions (tCO ₂ e)	Offshore Estimated Emissions (tCO ₂ e)	Total Onshore and Offshore Estimated Emissions (tCO ₂ e)	% of total estimated emissions
Deconstruction [C1]	2,301	25,983	28,284	94.8%
Transport [C2]	612	N/A	612	1.9%
Recycling [C3]	892	N/A	892	2.9%
Disposal [C4]	43	N/A	43	0.4%
Total	3,848	25,983	29,831	100%

Receptor sensitivity

- 4.8.3.3 The assessment considers a single receptor, the global atmosphere, which is assigned a **high** sensitivity in accordance with ISEP (formerly IEMA) guidance (ISEP, 2026).

Magnitude of impact

- 4.8.3.4 The magnitude of GHG emissions during the decommissioning phase is estimated to be **29,831 tCO₂e**.

Significance of effect

- 4.8.3.5 For the purposes of this assessment, it is assumed that decommissioning will commence in year 2073. This is two decades after 2050 and all UK Government targets to achieve net zero. On that basis the quantified emissions presented here can be considered to be conservative and a worst case scenario, given the extent of further decarbonisation sought via national policy efforts before 2073.
- 4.8.3.6 On this basis, the impacts associated with the decommissioning phase are considered to be **Minor Adverse (Not Significant)**.

Climate change resilience and adaptation

- 4.8.3.7 The detailed assessment of climate change risks on decommissioning is set out in **Volume 4, Annex 4.2: Climate Change Risk Assessment, of the PEIR** and are summarised in this section. The assessment has been carried out in accordance with the assessment criteria laid out in **Section 4.5** of this PEIR chapter. A summary is provided at **Table 4.29**.

Table 4.29: Summary Decommissioning Climate Change Risk Assessment

Receptor	Impact	Sensitivity	Magnitude	Significance
Onshore Infrastructure	N/A			
Human Welfare (Maintenance Personnel)	Intense rainfall events could affect the ability of onshore decommissioning personnel to undertake dismantling and lead to risk of injury.	Medium	Low	Not Significant

Receptor	Impact	Sensitivity	Magnitude	Significance
	Heatwaves and higher temperatures could impact the welfare of onshore decommissioning personnel, for example, heat stress and unsafe working conditions.	Medium	Low	Not Significant
	Windstorms or wind gusts could impact on the safety and activities of onshore decommissioning personnel.	Medium	Low	Not Significant
	Heatwaves and higher temperatures could impact the welfare of offshore decommissioning personnel, for example, heat stress and unsafe working conditions.	Medium	Medium	Not Significant
	Windstorms or wind gusts could impact on the safety and activities of offshore decommissioning personnel.	Medium	Low	Not Significant
	Increased wave heights leading to unsafe conditions on vessels and flooding of decommissioning platforms could pose a risk to offshore personnel dismantling the infrastructure.	Medium	Low	Not Significant
Offshore Infrastructure	N/A			

Summary

4.8.3.8 The relevant receptors for decommissioning are human health.

4.8.3.9 **Table 4.29** shows the sensitivity of each receptor to be **Medium** based on their vulnerability and susceptibility to climate change.

4.8.3.10 The main impacts are related to changes in rainfall patterns, increased frequency of extreme events (flooding and storms), increased risk of heatwaves and windstorms leading to H&S risks to decommissioning personnel. The magnitude of impacts assessed has taken into consideration the consequence of the impact and the likelihood of the impact occurring. Based on this it is considered that the overall range of magnitude of impacts, during the decommissioning phase is **Low to Medium**.

4.8.3.11 Overall, it is considered that the receptor sensitivity is **Medium** and the magnitude is **Low to Medium**. Therefore, the effect of climate change on human welfare, during the decommissioning phase, is considered to be **Not Significant**.

4.8.3.12 No additional mitigation is required and the existing design and commitments adopted as part of the design are considered appropriate to account for climate change resilience.

Additional mitigation and residual effect

4.8.3.13 Additional mitigation is not required. The existing commitments CoT16 and CoT44 will ensure that both an Onshore Decommissioning Plan and an Offshore Decommissioning Plan will be developed prior to decommissioning.

4.8.4 Whole life GHG Assessment

GHG emissions

4.8.4.1 The whole life cycle GHG emissions arising during the construction, operation and maintenance and decommissioning of the MHPGC Project are presented in **Table 4.30**.

Table 4.30: Estimated net whole life Onshore and Offshore GHG emissions

LCA Stage	Onshore Estimated Emissions (tCO ₂ e)	Offshore Estimated Emissions (tCO ₂ e)	Total Onshore and Offshore Estimated Emissions (tCO ₂ e)
Construction: A1-A5	63,706	268,207	331,916
Operation and Maintenance: B1-B4	12,421	223,160	237,788
Decommissioning: C1-C4	3,848	25,983	29,831
Total	79,978	517,350	599,535

4.8.4.2 As decommissioning of the MHPGC Project is anticipated to commence in 2073, the decommissioning phase falls beyond the 7th Carbon Budget Period (2038-2042) and therefore cannot be contextualised against an established carbon budget allocation. Therefore contextualisation is presented for the construction phase (2033-2037) and the O&M phase (2038-2042) only, as set out in **Table 4.31**.

Table 4.31: Contextualisation of Estimated net whole life Onshore and Offshore GHG emissions against UK Carbon Budgets

Carbon Budget Type	6 th Carbon Budget Period (2033-2037)	7 th Carbon Budget Period (2038-2042)
Estimated net emissions (tCO ₂ e)	331,297	33,654
UK Carbon Budget (tCO ₂ e)	965,000,000	535,000,000
Contribution (%)	0.03%	0.01%
Energy Supply Sector Projected Budget (tCO ₂ e)	29,172,598	21,889,970
Contribution (%)	1.14%	0.15%

4.8.4.3 Considering the whole life GHG emissions of the MHPGC Project, the overall whole life effect is considered to be **Minor Adverse (Not Significant)**. This conclusion reflects the inherently low operational emissions profile of electricity transmission infrastructure, the time-limited nature of construction and decommissioning activities, and the partial mitigation achieved through good practice design and embedded mitigation measures across all phases.

4.8.4.4 The MHPGC Project transmission assets are consistent with the principles set out in NPS EN-1 in supporting the delivery of new renewable and low carbon energy infrastructure. The transmission assets are a necessary component of the UK's energy transition, enabling the connection of renewable generation capacity to the national grid and facilitating the expansion of low carbon electricity supply. In this context, the whole life GHG emissions associated with the transmission assets must be understood alongside the broader decarbonisation benefit enabled by the Project, namely the displacement of higher-carbon generation sources through the delivery of renewable electricity at scale.

4.9 Cumulative effects

4.9.1 Cumulative effects assessment

- 4.9.1.1 The global atmosphere is the receptor for the GHG assessment. Emissions of GHGs to the atmosphere have the potential to contribute to climate change, and therefore the effects are global and cumulative in nature. This is considered in defining the receptor (i.e. the global atmosphere) as high sensitivity.
- 4.9.1.2 The ISEP (formerly IEMA) guidance (ISEP, 2026) states that effects of GHG emissions from specific cumulative projects should not be individually assessed, as there is no basis for selecting which projects to assess cumulatively over any other. The GHG assessment is therefore considered to be inherently cumulative, and no additional consideration of cumulative effects is required.
- 4.9.1.3 However, the MHPGC Project is one distinct project within the Morven Programme, which also includes:
- Morven North – offshore renewable generation project;
 - Morven South – offshore renewable generation project;
 - Morven Branxton Area Grid Connection (MBAGC) – grid connection project.
- 4.9.1.4 There is an inherent requirement for the MHPGC Project to enable transport of power generated from the assets within the Morven North or Morven South projects. Conversely, the benefit of the generation from Morven North or Morven South cannot be realised without the existence of the MHPGC and MBAGC Projects.
- 4.9.1.5 The net impact of the four projects within the overall Morven Programme is of interest in terms of the overall impact arising from the individual projects.
- 4.9.1.6 This whole project assessment is summarised in the following sections.

4.9.2 Whole Project Assessment and Cumulative Effects Assessment methodology

Methodology

- 4.9.2.1 The Morven Programme comprises four distinct projects: Morven North, Morven South, MHPGC Project, and MBAGC Project.
- 4.9.2.2 The following assessment scenarios have been considered to identify the Likely Significant Effects (LSE) of the MHPGC Project in combination with other projects on the same receptor (the global atmosphere), as follows (and summarised in **Table 4.32**):
- Whole project assessment: to identify the potential impacts associated with MHPGC Project together with Morven North and Morven South in turn, (Scenario 1: Morven North and Scenario 2: Morven South), each of which would comprise a “Whole Project”;
 - Morven Programme assessment: to identify potential impacts associated with all four components of the Morven Programme (Scenario 3);
 - Cumulative Effects Assessment (CEA): to identify the potential impacts associated with MHPGC Project together with relevant projects, plans and activities, including other components of the Morven Programme, using a tiered approach (Scenario 4).
- 4.9.2.3 The whole project assessment is undertaken in accordance with the methodology described in **Volume 1, Chapter 4: Approach to Environmental Impact Assessment, of the PEIR**.

Table 4.32: Scenarios to be considered in the MHPGC Project whole project Assessment for GHG

Whole project assessment		Morven Programme assessment	CEA
Scenario 1	Scenario 2	Scenario 3	Scenario 4
MHPGC Project and Morven North	MHPGC Project and Morven South	MHPGC Project, Morven North, Morven South and MBAGC Project	MHPGC Project, Tier 1 (including Morven North and Morven South), Tier 2 and Tier 3 (including MBAGC Project) projects and plans screened in

4.9.2.4 For the purposes of this GHG assessment, Scenarios 1, 2, and 3 have been taken forward for assessment. Scenario 4 is not relevant to the current assessment since no additional projects or plans are screened in (as noted in paragraph 4.9.1.2).

Maximum Design Scenario

4.9.2.5 The maximum design scenario applied for the whole project and Morven Programme assessments uses details published in the Morven North and Morven South environmental impact assessment reports (Morven Offshore Wind Limited, 2026). Given a similar reporting approach to the current assessment, these are consistent with assessment of the most significant potential impact from each project.

Assessment Summary

4.9.2.6 The potential GHG impacts identified are summarised in **Table 4.33**.

Table 4.33: Whole Project Assessment and Morven Programme Assessment summary

Whole project assessment			Morven Programme assessment
Phase	Scenario 1	Scenario 2	Scenario 3
	MHPGC Project and Morven North	MHPGC Project and Morven South	MHPGC Project, Morven North, Morven South and MBAGC Project
Construction	MHPGC Project – 331,917 tCO ₂ e Morven North – 3,542,526 tCO ₂ e	MHPGC Project – 331,917 tCO ₂ e Morven South – 3,469,383 tCO ₂ e	MHPGC Project – 331,917 tCO ₂ e Morven North – 3,542,526 tCO ₂ e Morven South – 3,469,383 tCO ₂ e MBAGC Project – 301,277 tCO ₂ e
<i>Sub-Totals</i>	3,874,443 tCO ₂ e	3,801,300 tCO ₂ e	7,645,103 tCO ₂ e
O&M	MHPGC Project – 237,788 tCO ₂ e Morven North – 1,095,685 tCO ₂ e	MHPGC Project – 237,788 tCO ₂ e Morven South – 1,144,816 tCO ₂ e	MHPGC Project – 237,788 tCO ₂ e Morven North – 1,095,685 tCO ₂ e Morven South – 1,144,816 tCO ₂ e MBAGC Project – 33,055 tCO ₂ e
Avoided Emissions – Lower Bound*	Morven North – -382,069 tCO ₂ e	Morven South – -382,069 tCO ₂ e	Morven North – -382,069 tCO ₂ e Morven South – -382,069 tCO ₂ e
Avoided Emissions – Upper Bound*	Morven North – -61,531,177 tCO ₂ e	Morven South – -61,531,177 tCO ₂ e	Morven North – -61,531,177 tCO ₂ e Morven South – -61,531,177 tCO ₂ e

Whole project assessment			Morven Programme assessment
Phase	Scenario 1	Scenario 2	Scenario 3
Sub-Totals (Lower Bound)	1,715,542 tCO ₂ e	1,764,673 tCO ₂ e	3,480,215 tCO ₂ e
Sub-Totals (Upper Bound)	-59,498,358 tCO ₂ e	-59,449,227 tCO ₂ e	-120,346,277 tCO ₂ e
Decommissioning	MHPGC Project – 29,831 tCO ₂ e Morven North – 255,377 tCO ₂ e	MHPGC Project – 29,831 tCO ₂ e Morven South – 280,695 tCO ₂ e	MHPGC Project – 29,831 tCO ₂ e Morven North – 255,377 tCO ₂ e Morven South – 280,695 tCO ₂ e MBAGC Project – 24,102 tCO ₂ e
Sub-Totals	285,208 tCO ₂ e	310,526 tCO ₂ e	565,903 tCO ₂ e
Whole Life – Lower Bound	5,875,193 tCO ₂ e	5,876,499 tCO ₂ e	11,751,692 tCO ₂ e
Whole Life – Upper Bound	-56,038,053 tCO ₂ e	-56,036,747 tCO ₂ e	-112,074,800 tCO ₂ e

- Avoided Emissions Lower Bound calculated using DESNZ long run electricity grid marginal intensity figures (incorporating all generation sources including renewable sources). This results in lower avoided emissions since it is assuming displacement of other renewable generation sources within the generation mix. The Avoided Emissions Upper Bound is calculated using the DESNZ 'non-renewable fuels' carbon intensity. This therefore assumes that the generation sources will displace only non-renewable generation. The avoided emissions in this case are much larger.

4.9.2.7 A summary of the overall assessment findings in terms of significance is summarised in **Table 4.34**.

Table 4.34: Whole Project and Programme Significance Assessment Summary

	Scenario 1: MHPGC Project and Morven North	Scenario 2: MHPGC Project and Morven South	Scenario 3: MHPGC Project, Morven North, Morven South and MBAGC Project
Construction phase			
Magnitude of impact	There is potential for further GHG emissions arising from seabed disturbance during construction, including cable scour protection installation. There is also potential for emissions arising from manufacturing and installation activities associated with Morven Programme, including the construction and installation of wind turbines, arrays and connection points, and vessel and transport movements throughout the construction phase. Onshore activities associated with construction of the MBAGC substation would also contribute to further GH emissions.		
Sensitivity of receptor	High		
Significance of effect	The overall assessment of significance is Moderate Adverse (Significant)		
Further mitigation and residual significance	Morven North CoT42: A Greenhouse Gas (GHG) Reduction Strategy has been prepared and submitted with the application for development consent. The GHG Reduction Strategy outlines options to reduce construction-related emissions. Morven South MM-47 notes: The Applicant is committed to reducing construction related emissions through the provision of a GHG Reduction Strategy (aligned with PAS 2080: Carbon Management in Infrastructure) detailing the processes and measures to be implemented to manage carbon throughout the construction phase. MHPGC Project CoT15 states: A Greenhouse Gas (GHG) Reduction Strategy will be produced, setting out steps taken to minimise and offset emissions, as required		

	Scenario 1: MHPGC Project and Morven North	Scenario 2: MHPGC Project and Morven South	Scenario 3: MHPGC Project, Morven North, Morven South and MBAGC Project
	<i>under NPS EN-1 (paragraph 5.3.7). As per NPS EN-1, this will outline ways in which GHG emissions will be reduced through the MHPGC Project lifecycle.</i> <i>These measures are predicted to reduce the residual significance to Minor Adverse (Not Significant).</i>		
Operations and maintenance phase			
Magnitude of impact	There is potential for further GHG emissions arising from the consumption of materials and energy in repair and maintenance activities, replacement materials and vessel movements. The generation from the Morven North and Morven South projects provides the ability to displace more carbon intensive generating assets contributing to wider decarbonisation of the national grid and achievement of net zero targets.		
Sensitivity of receptor	High		
Significance of effect	The overall assessment of significance is Beneficial (Significant) .		
Further mitigation and residual significance	No mitigation measures are considered necessary because the likely effect in the absence of further mitigation (beyond the designed in measures outlined in Section 4.7), is assessed as beneficial .		
Decommissioning phase			
Magnitude of impact	There is potential for further GHG emissions arising from decommissioning works, including plant, fuel and vessel use, removal of infrastructure, associated transport movements, and the recovery or disposal of materials.		
Sensitivity of receptor	High		
Significance of effect	The overall assessment of significance is Minor Adverse (Not Significant)		
Further mitigation and residual significance	No mitigation measures are considered necessary because the likely effect in the absence of further mitigation (beyond the existing commitments outlined in Section 4.7), is not significant in EIA terms.		

4.9.2.8 The Morven Programme fully aligns with the decarbonisation pathway for the UK national grid and provides a meaningful contribution to the phase out of more carbon intensive forms of power generation.

4.10 Transboundary effects

The atmospheric concentration of GHGs and resulting effect on climate change is affected by all sources and sinks globally, anthropogenic and otherwise. As GHG emission impacts and resulting effects are global rather than affecting one localised area, no transboundary effects are identified.

4.11 Summary

4.11.1 Summary of effects

4.11.1.1 This chapter has assessed the construction, O&M and decommissioning phases of the MHPGC Project. The assessment has considered both the onshore and offshore transmission assets.

4.11.1.2 For the assessment of GHG emissions associated with the offshore assets, English and Scottish waters have not been presented separately, as it is not possible to disaggregate emissions by jurisdiction and the overall impacts are not influenced by whether emissions occur within English or Scottish waters.

4.11.1.3 The climate change resilience assessment presents the impacts for the onshore and offshore assets.

4.11.1.4 A summary of assessment of the MHPGC Project is provided here:

- Construction phase: The assessment of effects are Moderate Adverse (Significant) in design with embedded mitigation. The application of additional secondary measures reduces the effect to **Minor Adverse (Not Significant)**. Given the timescales for construction no climate change resilience assessment is applicable;
- O&M phase: The assessment of effects are Moderate Adverse (Significant) in design with embedded mitigation. The application of additional secondary measures reduces the effect to **Minor Adverse (Not Significant)**. The overall impacts of climate change risk are assessed as **Minor Adverse (Not Significant)**;
- Decommissioning Phase: The assessment of effects are assessed as **Minor Adverse (Not Significant)**. The overall impacts of climate change risk are assessed as **Minor Adverse (Not Significant)**.

4.11.1.5 The whole life assessment of the MHPGC Project assesses the impact as Minor Adverse (Not Significant) in terms of both GHG emissions and assessment of climate resilience.

4.11.2 Summary of secondary mitigation and monitoring

4.11.2.1 Secondary mitigation is proposed in relation to GHG emissions during the construction and operation and maintenance phases.

- A Greenhouse Gas (GHG) Reduction Strategy will be produced, setting out steps taken to minimise and offset emissions, as required under NPS EN-1 (paragraph 5.3.7). As per NPS EN-1, this will outline ways in which GHG emissions will be reduced through the MHPGC Project lifecycle. [CoT15]

4.11.2.2 **Table 4.35** presents a summary of the secondary mitigation and monitoring proposed.

Table 4.35: Summary of potential impacts and residual effects

Impact	Sensitivity of receptor	Magnitude of impact	Significance of impact	Secondary mitigation and monitoring	Residual effect
Construction phase					
The impact of GHG emissions arising from the manufacturing and installation of the MHPGC Project, including vessel and vehicle movements.	High	277,803 tCO ₂ e	Significant	A Greenhouse Gas (GHG) Reduction Strategy will be produced, setting out steps taken to minimise and offset emissions, as required under NPS EN-1 (paragraph 5.3.7). As per NPS EN-1, this will outline ways in which GHG emissions will be reduced through the MHPGC Project lifecycle	Not significant
O&M phase					
The impact of GHG emissions arising from the consumption of materials and activities required to facilitate the O&M phase.	High	237,788 tCO ₂ e	Significant	A Greenhouse Gas (GHG) Reduction Strategy will be produced, setting out steps taken to minimise and offset emissions, as required under NPS EN-1 (paragraph 5.3.7). As per NPS EN-1, this will outline ways in which GHG emissions will be reduced through the MHPGC Project lifecycle [CoT15]	Not significant

Impact	Sensitivity of receptor	Magnitude of impact	Significance of impact	Secondary mitigation and monitoring	Residual effect
The vulnerability of the MHPGC Project (onshore) to climate change during O&M phase.	Medium	Low-Medium	Not significant	None	Not significant
The vulnerability of the MHPGC Project (offshore) to climate change during O&M phase.	Medium	Low	Not significant	None	Not significant
Decommissioning phase					
The impact of GHG emissions arising from decommissioning works (e.g. plant, fuel and vessel use) and the recovery (or disposal) of materials.	High	29,831 tCO ₂ e	Not significant	None	Not significant
The vulnerability of the MHPGC Project (onshore) to climate change during decommissioning phase.	High	Low	Not significant	None	Not significant
The vulnerability of the MHPGC Project (offshore) to climate change during decommissioning phase.	High	Low	Not significant	None	Not significant

4.12 References

- BEIS. (2022a). British Energy Security Strategy. Available at: <https://www.gov.uk/government/publications/british-energy-security-strategy/> (Accessed: July 2026).
- BEIS. (2022b) UK Offshore Energy Strategic Environmental Assessment 4 (OESEA4). Available at: <https://www.gov.uk/government/consultations/uk-offshore-energy-strategic-environmental-assessment-4-oesea4/> (Accessed: July 2026).
- CCC. (2020). The Sixth Carbon Budget. Available at: <https://www.theccc.org.uk/publication/sixth-carbon-budget/> (Accessed: July 2026).
- CCC. (2021). Independent Assessment of UK Climate Risk: Advice to Government for the UK's Third Climate Change Risk Assessment. Available at: <https://www.theccc.org.uk/publication/independent-assessment-of-uk-climate-risk/> (Accessed: July 2026).
- CCC. (2025a). Scotland's Carbon Budgets. Available at: <https://www.theccc.org.uk/publication/scotlands-carbon-budgets/> (Accessed: July 2026).
- CCC. (2025b). The Seventh Carbon Budget. Available at: <https://www.theccc.org.uk/publication/the-seventh-carbon-budget/> (Accessed: July 2026).
- CCC. (2025c). Supplementary Analysis of the Seventh Carbon Budget. Available at: <https://www.theccc.org.uk/publication/supplementary-analysis-of-the-seventh-carbon-budget/> (Accessed: July 2026).
- DEFRA. (2017). Second UK Climate Change Risk Assessment 2017 (CCRA2). Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2017/> (Accessed: July 2026).
- DEFRA. (2020a). UK Marine Policy Statement. Available at: <https://www.gov.uk/government/publications/uk-marine-policy-statement/> (Accessed: July 2026).
- DEFRA. (2020b). Guidance to the UK Marine Policy Statement from 1 January 2021. Available at: <https://www.gov.uk/government/publications/uk-marine-policy-statement/guidance-to-the-uk-marine-policy-statement-from-1-january-2021/> (Accessed: July 2026).
- DEFRA. (2022). Third UK Climate Change Risk Assessment 2022 (CCRA3). Available at: <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2022/> (Accessed: July 2026).
- DEFRA. (2023). Third National Adaptation Programme (NAP3) and the Fourth Strategy for Climate Adaptation Reporting. Available at: <https://www.gov.uk/government/publications/third-national-adaptation-programme-nap3/> (Accessed: July 2026).
- Department for Levelling Up, Housing and Communities. (2016). Planning Practice Guidance. Available at: <https://www.gov.uk/government/collections/planning-practice-guidance/> (Accessed: July 2026).
- Department for Levelling Up, Housing and Communities. (2025). National Planning Policy Framework (NPPF). Available at: <https://www.gov.uk/government/publications/national-planning-policy-framework-2/> (Accessed: July 2026).

- DESNZ. (2023). Carbon Budget Delivery Plan. Available at: <https://www.gov.uk/government/publications/carbon-budget-delivery-plan/carbon-budget-delivery-plan/> (Accessed: July 2026).
- DESNZ. (2024). Clean Power 2030 Action Plan: A New Era of Clean Electricity. Available at: <https://www.gov.uk/government/publications/clean-power-2030-action-plan/> (Accessed: July 2026).
- DESNZ. (2025a). Carbon Budget and Growth Delivery Plan. Available at: <https://www.gov.uk/government/publications/carbon-budget-and-growth-delivery-plan/> (Accessed: July 2026).
- DESNZ. (2025b). Overarching National Policy Statement for Energy (NPS EN-1). Available at: <https://www.gov.uk/government/publications/overarching-national-policy-statement-for-energy-en-1/> (Accessed: July 2026).
- DESNZ. (2025c). National Policy Statement for Electricity Networks Infrastructure (NPS EN-5). Available at: <https://www.gov.uk/government/publications/national-policy-statement-for-electricity-networks-infrastructure-en-5/> (Accessed: July 2026).
- DESNZ. (2025d). National Policy Statement for Renewable Energy Infrastructure (NPS EN-3). Available at: <https://www.gov.uk/government/publications/national-policy-statement-for-renewable-energy-infrastructure-en-3/> (Accessed: July 2026).
- DESNZ. (2025e). UK's 2035 NDC Emissions Reduction Target under the Paris Agreement. Available at: <https://www.gov.uk/government/publications/uks-2035-nationally-determined-contribution-ndc-emissions-reduction-target-under-the-paris-agreement/> (Accessed: July 2026).
- Durham County Council. (2020). County Durham Plan. Available at: <https://www.durham.gov.uk/media/34069/County-Durham-Plan-adopted-2020-/pdf/CountyDurhamPlanAdopted2020vDec2020.pdf/> (Accessed: July 2026).
- Durham County Council. (2024). Climate Emergency Response Plan (CERP3). Available at: <https://www.durham.gov.uk/media/45491/Climate-Emergency-Response-Plan-CERP-2024-27/pdf/ClimateEmergencyResponsePlan2024to2027.pdf/> (Accessed: July 2026).
- EU. (2011). Directive 2011/92/EU of the European Parliament and of the Council. Available at: <https://eur-lex.europa.eu/eli/dir/2011/92/oj/eng/> (Accessed: July 2026).
- GHG Protocol. (2015). GHG Protocol Corporate Accounting and Reporting Standard. Available at: <https://ghgprotocol.org/corporate-standard/> (Accessed: July 2026).
- HM Government. (1989). Electricity Act 1989. Available at: <https://www.legislation.gov.uk/ukpga/1989/29/contents/> (Accessed: July 2026).
- HM Government. (2007). The Marine Works (Environmental Impact Assessment) Regulations 2007. Available at: <https://www.legislation.gov.uk/uksi/2007/1518/contents/made/> (Accessed: July 2026).
- HM Government. (2008). Climate Change Act 2008. Available at: <https://www.legislation.gov.uk/ukpga/2008/27/contents/> (Accessed: July 2026).
- HM Government. (2009). The Carbon Budgets Order 2009. Available at: <https://www.legislation.gov.uk/uksi/2009/1259/contents/made/> (Accessed: July 2026).

- HM Government. (2011). The Carbon Budgets Order 2011. Available at: <https://www.legislation.gov.uk/uksi/2011/1603/made/> (Accessed: July 2026).
- HM Government. (2016). The Carbon Budgets Order 2016. Available at: <https://www.legislation.gov.uk/uksi/2016/785/contents/made/> (Accessed: July 2026).
- HM Government. (2017a). Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/> (Accessed: July 2026).
- HM Government. (2017b). The Marine Works (Environmental Impact Assessment) (Scotland) Regulations 2017. Available at: <https://www.legislation.gov.uk/ssi/2017/115/contents/> (Accessed: July 2026).
- HM Government. (2019). The Climate Change Act 2008 (2050 Target Amendment) Order 2019. Available at: <https://www.legislation.gov.uk/uksi/2019/1056/contents/made/> (Accessed: July 2026).
- HM Government. (2021). The Carbon Budgets Order 2021. Available at: <https://www.legislation.gov.uk/uksi/2021/750/made/> (Accessed: July 2026).
- HM Government. (2026). The Carbon Budget Order 2026. Available at: <https://www.legislation.gov.uk/uksi/2026/695/contents/made> (Accessed July 2026).
- HM Treasury. (2023). Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal, Table 1: Electricity emissions factors to 2100, kgCO₂e/kWh. Available at: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal> (Accessed: July 2026)
- IPCC. (2018). Global Warming of 1.5°C. Available at: <https://www.ipcc.ch/sr15/> (Accessed: July 2026).
- ISEP. (2015). EIA Guide to: Delivering Quality Development. Available at: <https://www.isepglobal.org/webinars/eia-shaping-and-delivering-quality-development/> (Accessed: July 2026).
- ISEP. (2020). EIA Guide to: Climate Change Resilience and Adaptation. Available at: <https://www.isepglobal.org/media/mabhqino/iema-eia-climate-change-resilience-june-2020.pdf> (Accessed: July 2026).
- ISEP. (2026). Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available at: <https://www.isepglobal.org/media/iimlrmqw/2026-04-comms-policy-ia-ghg-assessment.pdf> (Accessed: July 2026).
- Jaroszweski, D., Wood, R. and Chapman, L. (2021). Infrastructure. In: The Third UK Climate Change Risk Assessment Technical Report. Available at: <https://www.ukclimaterisk.org/publications/technical-report-ccra3-ia/chapter-4/> (Accessed: July 2026).
- Marine Directorate. (2015). Scotland's National Marine Plan. Available at: <https://www.gov.scot/publications/scotlands-national-marine-plan/> (Accessed: July 2026).
- Marine Directorate. (2025). National Marine Plan 2 – Planning Position Statement Consultation. Available at: <https://www.gov.scot/publications/national-marine-plan-2-planning-position-statement-consultation-analysis-report/> (Accessed: July 2026).

Marine Directorate – Licensing Operations Team. (2025). Scoping Opinion - Morven Offshore Wind Farm, Hawthorn Pit Grid Connection. Available at: [morven_offshore_wind_farm_-_scop-0058_-_hawthorn_pit_grid_connection_-_scoping_opinion.pdf](https://www.marine.gov.scot/sites/default/files/morven_offshore_wind_farm_-_scop-0058_-_hawthorn_pit_grid_connection_-_scoping_opinion.pdf) (Accessed: July 2026).

Met Office. (2018). UKCP18 Data. Available at: <https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/> (Accessed: July 2026).

Met Office. (2020). Location-Specific Long-Term Averages – Tynemouth Observatory. Available at: <https://www.metoffice.gov.uk/research/climate/maps-and-data/location-specific-long-term-averages/gcybzz9xh/> (Accessed: July 2026).

Ministry of Housing, Communities & Local Government. (2019). Planning Practice Guidance: Climate Change. Available at: <https://www.gov.uk/guidance/climate-change> (Accessed July 2026)

MMO. (2021). North East Inshore and North East Offshore Marine Plan. Available at: <https://www.gov.uk/government/publications/the-north-east-marine-plans-documents/> (Accessed: July 2026).

MMO. (2025). Scoping Request under the Infrastructure Planning (EIA) Regulations 2017 for the Proposed Morven Offshore Windfarm Transmission Assets Project by Morven Offshore Wind Limited. MMO Reference: DCO/2025/00005.

Morven Offshore Wind Limited (2026). Morven South Offshore Wind Array Project, Environmental Impact Assessment Report, Volume 3, Annex 18.2: Climate Change Shared Greenhouse Gases Technical Report. Available at: https://marine.gov.scot/sites/default/files/annex_18.2_-_climate_change_shared_greenhouse_gases_technical_report_0.pdf (Accessed August 2026)

NatureScot. (2024). Good Practice During Wind Farm Construction. Available at: <https://www.nature.scot/doc/good-practice-during-wind-farm-construction/> (Accessed: July 2026).

Palmer, M. et al. (2018). UKCP18 Marine Report. Available at: <https://www.metoffice.gov.uk/pub/data/weather/uk/ukcp18/science-reports/UKCP18-Marine-report.pdf> (Accessed: July 2026).

PAS. (2023). PAS 2080:2023 Carbon Management in Buildings and Infrastructure. Available at: <https://www.bsigroup.com/en-GB/insights-and-media/insights/brochures/carbon-management-in-buildings-and-infrastructure/> (Accessed: July 2026).

PINS. (2025). Scoping Opinion: Proposed Morven Hawthorn Pit Grid Connection Project - EN0210005. Available at: <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0210005-000005-Scoping%20Opinion%20-%20Morven%20Hawthorn%20Pit%20Grid%20Connection%20Project.pdf> (Accessed: July 2026).

RPS. (2025). Morven Hawthorn Pit Grid Connection Project EIA Scoping Report. Available at: <https://nsip-documents.planninginspectorate.gov.uk/published-documents/EN0210005-000004-Morven%20Hawthorn%20Pit%20Grid%20Connection%20Project%20Scoping%20Report.pdf> (Accessed: July 2026).

Scottish Government. (2009). Climate Change (Scotland) Act 2009. Available at: <https://www.legislation.gov.uk/asp/2009/12/contents/> (Accessed: July 2026).

Scottish Government. (2019). Climate Change (Emissions Reduction Targets) (Scotland) Act 2019. Available at: <https://www.legislation.gov.uk/asp/2019/15/contents/> (Accessed: July 2026).

Scottish Government. (2020). Scottish Offshore Wind Policy Statement. Available at: <https://www.gov.scot/publications/offshore-wind-policy-statement/> (Accessed: July 2026).

Scottish Government (2026). Offshore wind policy statement 2020 update: Scotland's Offshore Wind Ambition. Available at: [Offshore wind policy statement 2020 update: Scotland's Offshore Wind Ambition - gov.scot](https://www.gov.scot/publications/offshore-wind-policy-statement-2020-update/) (Accessed: July 2026).

UK Government. (2025). UK Local Authority and Regional Greenhouse Gas Emissions National Statistics: 2005–2023. Available at: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-greenhouse-gas-emissions-statistics-2005-to-2023/> (Accessed: July 2026).

UK Government. (2025). Greenhouse Gas Reporting: Conversion Factors 2025. Available at: <https://www.gov.uk/government/collections/government-conversion-factors-for-company-reporting/> (Accessed: July 2026).

United Nations. (2015). Paris Agreement. Available at: https://unfccc.int/sites/default/files/paris_agreement.pdf (Accessed: July 2026).