Environmental Impact Assessment Report (EIAR)

Ballydermot Wind Farm, Co. Offaly & Co. Kildare

Chapter 11 Climate

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GLOSSARY OF TERMS

Term	Definition
Carbon Budget	The total amount of greenhouse gas emissions that may be released during an agreed period. In Ireland, this is measured on an economy-wide basis, excluding aviation and maritime, in mega tonnes of carbon dioxide equivalent over a five-year period. Carbon budgets are used in climate policy and act as a benchmark to help ensure sustained emissions reductions over a period of time.
Climate Change Performance Index	Established in 2005, the Climate Change Performance Index (CCPI) is an independent monitoring tool which tracks individual countries climate protection performance.
Conference of the Parties	Every year since 1995, the Conference of the Parties (COP) has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments, and is the supreme decision-making body of the UNFCCC.
Embodied Carbon	The emissions associated with procuring, mining and harvesting raw materials, the transformation of those materials into construction products, transporting them to site, installation of these materials during a construction phase, and the subsequent replacement, removal, and disposal of these materials upon decommissioning
Emissions Trading System	A market-based policy to reduce greenhouse gas emissions by setting a cap on total emissions which lowers over time. Entities must hold allowances for every ton of Co2 they emit, which they can trade. The system promotes cost-effective emissions reductions, primarily used in sectors like power generation and industry.
The Climate Change Advisory Council	An Independent advisory body providing evidence-based advice and recommendations on policy to support Ireland's just transition to a biodiversity rich, environmentally sustainable, climate neutral and resilient society.

GLOSSARY OF ACRONYMS

Acronym	Definition
AAR	Average Annual Rainfall

AE	Actual Evaporation
AERS	Annual Environment Reports
AMOC	Atlantic Meridional Overturning Circulation
BMP	Biodiversity Management Plan
CAP	Climate Action Plan
CCAC	Climate Change Advisory Council
CCPI	Climate Change Performance Index
CEMPs	Construction and Environmental Management Plans
CFRAM	National Catchment Flood Risk Management
CH4	Methane
CO2	Carbon Dioxide
COP	Conference of the Parties
CSO	Central Statistics Office
DEFRA	Department for Environment, Food and Rural Affairs
DoT	Department of Transport
EEA	European Environment Agency
EIAR	Environmental Impact Assessment Report
EPA	Environmental Protection Agency
ESR	Effort Sharing Regulation
ETS	Emissions Trading System
FRA	Flood Risk Assessment
HGV	Heavy Goods Vehicles
HSE	Health Service Executive
ICCA	Ireland's Climate Change Assessment
IEMA	Institute of Environment Management and Assessment
IPC	Integrated Pollution Control
IPCC	Intergovernmental Panel on Climate Change

ISEP	Institute of Sustainability and Environment Professionals
KDCP	Kildare County Development Plan
ktCO2e	Kilotonnes of Carbon Dioxide Equivalent
kWh	kilowatt hour
LACAP	Local Authority Climate Action Plan
LGV	Light Goods Vehicles
LULUCF	Land Use, Land Use Change, and Forestry
MRF	Materials Recovery Facility
$MtCO_2e$	Million Metric tonnes of Carbon Dioxide Equivalent
NCQG	New Collective Quantified Goal on Climate Finance
NDCs	Nationally Determined Contribution
NECP	National Energy and Climate Plan
NIFM	National Indicative Fluvial Flood Mapping
NIR	National Inventory Report
NPS	National Peatland Strategy
OHL	Overhead Line
PE	Potential Evapotranspiration
RCP	Representative Concentration Pathways
RED	Renewable Energy Directive
rEIAR	Remedial Environmental Impact Assessment Report
rNIS	Remedial Natura Impact Statement
RWMP	Resource Waste Management Plan
SEAI	Sustainable Energy Authority of Ireland
SSFRA	Site-Specific Flood Risk Assessment
tCO_2e	Tonnes of Carbon Dioxide Equivalent
TII	Transport Infrastructure Ireland
UAE	United Arab Emirates

UKCEH	UK Centre for Ecology and Hydrology
UNEP	United Nations Environment Programme
UNFCCC	Nations Framework Convention on Climate Change
WAM	With Additional Measures
WEM	With Existing Measures
WMO	World Meteorological Organisation

11. CLIMATE

11.1 Introduction

This chapter identifies, describes, and assesses the potential direct and indirect effects on climate arising from the construction, operation and decommissioning of the Proposed Project and has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. The full description of the Proposed Project is detailed in Chapter 4: Description of the Proposed Project of this Environmental Impact Assessment Report.

The objective of this assessment is to assess the potential effects that the Proposed Project may have on Climate and sets out proposed mitigation measures to avoid, reduce or offset any potential significant effects that are identified. This EIAR comprehensively assesses the susceptibility of the Proposed Project to climate change across EIAR Chapters 5 through 17, outlining specific measures in each chapter to enhance the Proposed Project's ability to withstand potential impacts that are identified. Chapter 17: Major Accidents and Natural Disasters of this EIAR consolidates the risks and vulnerabilities identified throughout all EIAR chapters to assess the overall risk to the Proposed Project concerning major accidents and natural disasters, including climate change.

The aim of the Proposed Project when in operation is to reduce the requirement for a carbon-intensive, fossil fuel-based energy supply to the national grid and thereby reduce the amount of greenhouse gas emissions being released to the atmosphere. Harnessing more energy from renewable sources will reduce dependency on fossil fuels, resulting in a reduction in harmful emissions that can be damaging to human health and the environment.

As detailed in Section 1.1.1 in Chapter 1 Introduction, for the purposes of this EIAR, the various project components are described and assessed using the following references: 'Proposed Project', 'Proposed Enhancement Areas', 'Proposed Construction Haul Routes', 'Proposed Turbine Delivery Route', 'Project Site', 'Proposed Wind Farm', 'Proposed Turbines', 'Proposed Grid Connection', 'Proposed Onsite Substation' and 'Proposed Offsite Substation'.

11.1.1 Chapter Structure and Climate Study Areas

This chapter of the EIAR aims to provide an assessment of the potential significant direct and indirect effects on climate arising from all phases of the Proposed Project, as well as the vulnerability of the Proposed Project to changes in climate.

The chapter structure is as follows:

- A review of all relevant climate change legislation, policy and guidance applicable to the Proposed Project in international, national, and local contexts (Section 11.2).
- Presentation of the baseline environment (Section 11.3 below), including:
  - A description of the current baseline environment established from desk study, utilising relevant datasets and data provided within other sections of the EIAR (Section 11.3.1 below).
  - A description of the future baseline environment established from desk study, utilising relevant datasets and data provided within other sections of the EIAR (Section 11.3.2 below).
- A detailed carbon assessment, which considers how the Proposed Project will affect Ireland's national greenhouse gas emissions as a result of its construction, operation, and decommissioning phase activities (inclusive of both carbon losses and carbon savings) (Section 11.4 below).

- Presents an assessment of the potential likely significant effects on climate arising from the Proposed Project during the construction phase (Section 11.5.2) operational phase (Section 11.5.3), and decommissioning phase (Section 11.5.4) based on the information gathered and the analysis and assessments undertaken.
    - All required mitigation measures to prevent, minimise, reduce or offset the likely significant environmental effects identified in the construction phase, operational phase, and decommissioning phase is provided in this section.
- An assessment of potential cumulative impacts is provided in Section 11.6 and details any potential cumulative effects on climate between the Proposed Project and other permitted or proposed projects and plans in the area (wind energy or otherwise) for the construction phase (Section 11.6.1), operational phase (Section 11.6.2), and decommissioning phase (Section 11.6.3).

As stated in the Institute of Sustainability and Environment Professionals (ISEP) (formerly the Institute for Environmental Management and Assessment) 2026 supplementary guidance *'greenhouse gas emission impacts and resulting effects are global rather than affecting one localised area*'[1]. By their very nature, the impacts and resulting effects of greenhouse gas emissions are global rather than affecting one localised area. The study area for this chapter is therefore defined thematically rather than spatially and operates across three scales as set out below. Fundamentally a tonne of carbon dioxide equivalent (CO_2e) emitted or avoided as a result of the Proposed Project in Co. Offaly and Co. Kildare contributes equally to atmospheric concentrations and global mean temperature as one emitted or avoided anywhere else on Earth. Effects arising from the potential impacts on climate are therefore considered at a global, national, and regional scale, with data considered at each level where relevant and available.

For the purposes of the EIAR, the study area is defined at global, national and site-specific scales. The climate and the global atmosphere are the receptors for the climate assessment, while the Proposed Project and surrounding environs considered in the site-level carbon assessment. The study areas proposed for this chapter are outlined below, with each study area shown on Figure 11-1 and Figure 11-2.

Global Scale

At the broadest level, the assessment contained in this EIAR chapter considers the global atmospheric context within which the Proposed Project will operate. This encompasses Ireland's contribution to international climate commitments, including those arising from the Paris Agreement and the requirement to limit global average temperature rise to 1.5°C above pre-industrial levels (see Appendix 11-1 for further details on relevant international climate legislation and policy). The displacement of fossil fuel-derived electricity generation by renewable energy — and the consequent reduction in greenhouse gas emissions to the global atmosphere — is assessed at this scale. The **Global Climate Study Area** is not subject to a defined spatial boundary; rather, it reflects the scientific understanding that greenhouse gas concentrations and radiative forcing effects are globally uniform once emissions enter the atmosphere.

The Global Climate Study Area reflecting the global nature of greenhouse gas emissions and climate change effects.

National Scale

At the national scale, the assessment contained in this EIAR chapter considers the Proposed Project's contribution to Ireland's statutory and policy climate targets (see Appendix 11-1 for further details on relevant national climate legislation and policy). These include the legally binding obligations under the

[1] *ISEP (2026). Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online at: https://www.isepglobal.org/media/iimlrmqw/2026-04-comms-policy-ia-ghg-assessment.pdf*

Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a 51% reduction in greenhouse gas emissions by 2030 relative to 2018 levels and to achieving net-zero emissions no later than 2050. The assessment considers the Proposed Project's role in supporting the targets set out in the national Climate Action Plan, including the ambition to deliver 9 GW of onshore wind capacity by 2030. Ireland's national greenhouse gas inventory and sectoral emissions ceilings, as maintained by the Environmental Protection Agency (EPA), provide the reference framework for the **National Climate Study Area**.

Figure 11-2 includes an inset map showing the geographical context of the Proposed Project within the National Climate Study Area. As the National Climate Study Area encompasses the entirety of Ireland and is not associated with a discrete project-specific boundary, an inset map is provided for geographical context and to illustrate the location of the Proposed Project within the national receiving environment.

Proposed Project and Regional Scale

At the most localised level, the **Regional Climate Study Area** comprises the Project Site and the wider receiving environment within Co. Offaly and Co. Kildare. Assessment at this scale addresses direct and indirect greenhouse gas emissions associated with the construction, operation, and decommissioning of the Proposed Project, including those arising from site preparation, peat and soil disturbance, construction material embodied carbon, and vehicle and machinery use.

For the purposes of the EIAR, it has been assessed that the Proposed Turbine Delivery Route will transport turbine components to the Project Site. A swept path analysis has been completed and is provided as Appendix 15-3 to the EIAR. The Proposed Turbine Delivery Route will exit off the motorway within Co. Westmeath (i.e., Junction 5 (Tullamore/Kilbeggan)) and traverse onto the N52, and travelling south towards Tullamore. Additionally, 1 no. quarry and associated ~800m of the Proposed Construction Haul Routes to the Project Site is located in Co. Westmeath. As no works are being proposed within Co. Westmeath for either the Proposed Construction Haul Routes or the Proposed Turbine Delivery Route, Co. Westmeath has been screened out of the Regional Climate Study Area for the purposes of the assessment.

The Central Statistics Office (CSO)[2] identify that the peatland land cover within Co. Offaly and Co. Kildare in 2018 is approximately 33,158 ha and 10,390 ha respectively. The portion of the Project Site located within part of the Allen Bog Group, hereafter the Proposed Wind Farm site, encompasses approximately 12.8% of total peatlands across Co. Offaly and Co. Kildare. The impact of the Proposed Project on carbon sequestration potential is considered within the context of the climate and greenhouse gas emission targets identified for Co. Offaly and Co. Kildare, having regard to land cover type, rehabilitation plans, and emission reduction targets, as well as the existing Integrated Pollution Control (IPC) Licence for the Allen Bog Group (P0503-01), within which part of the Proposed Project is located.

Please see Figure 11-1 for the geographical context of the Proposed Project within the Regional Climate Study Area.

Carbon Assessment

The Regional Climate Study Area is further refined to facilitate the project specific carbon assessment. The carbon assessment encompasses all elements of the Proposed Project, including the Proposed Wind Farm, Proposed Grid Connection, Proposed Enhancement Areas, Proposed Turbine Delivery Route, and Proposed Construction Haul Routes, which are hereafter referred to as the '**Carbon Assessment Study Area**'.

[2] https://data.cso.ie/table/EAP03 *which utilised the 2018 Tailte Éireann 2018 National Land Cover data (https://data.gov.ie/dataset/high-value-dataset-national-land-cover-2018)*

The carbon assessment identifies carbon losses and savings, inclusive of sequestration potential, within the Proposed Wind Farm site, as well as those associated with construction materials and traffic and transport activities. Where the Proposed Project intersects with carbon storing material, including any areas of peat or degraded bog within the Project Site, the potential for soil carbon loss or sequestration is also considered, in accordance with guidance issued by the EPA and with cognisance given to the Draft Rehabilitation Plans for the Project Site. The carbon balance and payback period for the Proposed Project are calculated with reference to site-specific conditions.

Please see Figure 11-2 for further detail on the Carbon Assessment Study Area.

Relationship to Other EIAR Chapters

Certain climate-adjacent topics are addressed in detail elsewhere in this EIAR, including impacts on peatland habitats (Chapter 6), land, soils and geology (Chapter 8), water and hydrological connectivity (Chapter 9), air quality (Chapter 10), traffic and transport (Chapter 15), and major accidents and natural disasters (Chapter 17). This chapter focuses specifically on greenhouse gas accounting and climate policy conformance and should be read in conjunction with the above referenced chapters where relevant interactions are identified.

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750000

700000

N

Co. Westmeath

Co. Meath

Co. Offaly

Co. Kildare

Co. Laois

IRELAND

Mullingar

Tullamore

Portlaoise

Newbridge

Naas

Athy

Carlow

Westmeath

Meath

Offaly

Laois

Kildare

Wicklow

N55 N61 R393 N52 M3 M6 R148 M4 N7 N62 N80 E20 M9 R448 R747 N77 N78 E201 R489 R756 N81 R502

485 m 527 m 480 m 849 m 925 m

0 5 10 20 30 40 Kilometers

Legend

Carbon Assessment Study Area

Regional Climate Study Area

KILDARE

OFFALY

County Boundaries

Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere

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SITE LOCATION - NOT TO SCALE

Drawing Title
Global Climate Study Area, National Climate Study Area, Regional Climate Study Area and Carbon Assessment Study Area

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	11-1	1:600,000
Drawn By	Checked By	Date
LPM	EC	12/10/2026

Email: info@mkoireland.ie/ Website: www.mkoireland.ie

640000 660000 680000

740000

720000

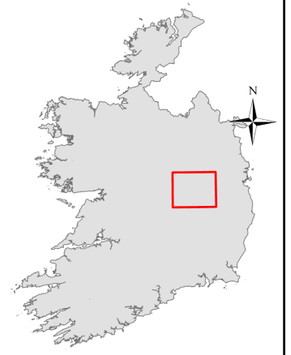
N

Legend

- Project Site
- Carbon Assessment Study Area

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Spatial Reference
Name: WGS 1984 Web Mercator Auxiliary Sphere
Datum: WGS 1984
Projection: Mercator Auxiliary Sphere



SITE LOCATION - NOT TO SCALE

Drawing Title
Carbon Assessment Study Area

Project Title
Ballydermot Wind Farm
Co. Offaly & Co. Kildare

Project No.	Drawing No.	Scale
250708	11-2	1:275,000
Drawn By	Checked By	Date
LPM	EC	12/10/2026

MKO
Email: info@mkoireland.ie/ Website: www.mkoireland.ie

0 4 8 16 24 32 Kilometers

640000 660000 680000

11.1.2 Scoping and Consultation

Section 2.8 of Chapter 2: Background to the Proposed Project describes the scoping and consultation exercise undertaken for the Proposed Project. General scoping was initially conducted in May 2021. Revised general scoping was conducted in December 2025 due to time elapsed from when previous scoping was carried out, updates in local and national policy and legislation, updates in relevant EIAR guidance, changes in the environmental baseline and refinement of the Proposed Project layout and design.

Copies of all scoping responses are included in Appendix 2-1 of this EIAR. The recommendations of the consultees have informed the EIAR preparation process and the contents of this chapter. Table 2-4 in Chapter 2 of this EIAR describes where the comments raised in the scoping responses received have been addressed in this assessment. Table 11-1 provides a list of the responses received during consultation with regard to Climate during the scoping process, with each response detailed below.

Table 11-1 Scoping Responses

Consultee	Date of Response for 2021 scoping	Date of Response for 2025 scoping
Transport Infrastructure Ireland	17th February 2021	6th January 2026
Health Service Executive	22nd March 2021	29th January 2026
Department of Transport	21st April 2021	8th January 2026

Transport Infrastructure Ireland

Scoping responses were received from Transport Infrastructure Ireland (TII) on 17th February 2021 and 6th January 2026. TII stated that, the EIAR preparation should acknowledge official policy concerning access to national roads, outlined in the DoECLG 'Spatial Planning and National Roads Guidelines for Planning Authorities' (2012). TII has provided general recommendations in their response to be considered in the preparation of EIAR.

Impacts on Climate are assessed in Section 11.5. An assessment of effects on climate as a result of impacts to traffic are assessed in Section 11.5.2 and 11.5.3 and in more detail within Chapter 15 Material Assets: Traffic and Transport.

Health Service Executive

Scoping responses were received from National Environmental Health Service Executive (HSE) on 12th February 2021, with further detail being provided on the 22nd March 2021. Following revised scoping in 2025, a response was received on 29th January 2026. In both 2021 and 2026, the HSE stated that the EIAR should examine all likely significant impacts and provide the following information for each:

- Description of the receiving environment;
- The nature and scale of the impact;
- An assessment of the significance of the impact;
- Proposed mitigation measures;
- Residual impacts.

In addition to any likely significant negative effects from the Proposed Project, any positive likely significant impacts should also be assessed.

The HSE recommends that climate is included and assessed in the EIA; impacts from Climate are assessed in Section 11.5.

Department of Transport

Scoping responses were received from Department of Transport (DOT) on 21st April 2021 and 8th January 2026.

The DoT referenced Section 12.4.1.1 'Accelerate Renewable Electricity Generation' of the national Climate Action Plan 2024 (CAP24) which details the objective of reaching 80% of electricity demand from renewable sources by 2030 through a range of measures, including; '*All relevant public bodies will carry out their functions in a manner which supports the achievement of the renewable electricity targets, including, but not limited to, the use of road and rail infrastructure to provide a route for grid infrastructure where this is the optimal solution'*. Having regard to the measures identified in CAP24 and the provision of a Proposed Grid Connection underground electrical cabling route as part of the Proposed Project, the DoT recommends that the Proposed Grid Connection underground electrical cabling route is demonstrated to be the 'optimal solution'.

Impacts from Climate are assessed in Section 11.5. An assessment of effects on Climate as a result of impacts to traffic are assessed in Section 11.5.2 and 11.5.3 and in more detail within Chapter 15 Material Assets: Traffic and Transport. Please see Section 3.2.5.4.1 of Chapter 3 for details on the design evolution of the Proposed Grid Connection.

11.1.3 Statement of Authority

This chapter of the EIAR has been prepared by Catherine Johnson, with input from Lakshmi Priya Mohan, and reviewed by Ellen Costello and Sean Creedon, all of MKO.

Lakshmi is an Environmental Scientist at MKO with over two years of consultancy experience. Lakshmi holds a master's degree in environmental science, a master's degree in Zoology and a bachelor's degree in Zoology. Prior to taking up her position with MKO in March 2026, Lakshmi worked as an Environmental Consultant in DNV, Ireland. Experienced Production of EIARs, Construction and Environmental Management Plans (CEMPs), EIA Screenings, SEA Screening, GIS map outputs across various large infrastructure developments and land infill projects in Ireland.

Catherine is a Project Environmental Scientist at MKO with four years of consultancy experience in climate, renewable energy, and sustainability. Catherine possesses skills in mapping and design, which complement her experience in preparing comprehensive reports for EIAs. Catherine holds a BSc in Earth and Ocean Science and a LLM in Global Environment and Climate Change Law. Catherine has been involved in a myriad of environmental service offerings at MKO including EIA Screenings and Reports, climate and sustainability related work and renewable energy infrastructure projects, including both onshore and offshore wind energy developments.

Ellen Costello is a Senior Environmental Scientist with MKO with over six years' experience in private consultancy. Ellen holds a BSc (Hons) in Earth Science, and a MSc (Hons) in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on renewable energy development in Europe and its implications on environment and society. Ellen's key strengths and expertise are Environmental Protection and Management, Environmental Impact Statements, Project Management, and GIS Mapping and Modelling. Since joining MKO, Ellen has been involved in a range of renewable energy infrastructure projects. In her role as a senior project manager, Ellen works with and co-ordinates large multidisciplinary teams including members from MKO's Environmental, Planning, Ecological and Ornithological departments.

This report has been reviewed by Sean Creedon (B.Sc., M.Sc.). Sean Creedon is an Associate Director in the Environment Team at MKO. Sean has over 23 years' experience in program and project development, holds an MSc from NUI Galway and a Diploma in Project Management from Institute of Project Management Ireland. He leads a team of highly skilled environmental professionals working on EIAR for large-and medium scale Renewable Energy infrastructure. Sean has directed and overseen multiple renewable energy projects across wind, solar, battery and hydrogen as well as a range of

thermal and other energy related developments. He has worked on the planning and environmental impact elements within all stages of wind farm project delivery. Sean's professional experience includes the development and management of a portfolio of wind farm developments to the consenting decision. He is a member of the MKO senior management team.

11.2 Climate Legislation, Policy, and Guidance

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing the world today and is primarily the result of increased levels of greenhouse gases in the atmosphere. Increasing human emissions of carbon dioxide and other greenhouse gases cause a positive radiative imbalance at the top of the atmosphere, meaning energy is being trapped within the climate system. The imbalance results in the accumulation of heat within the Earth's climate system, which is the primary driver of observed global warming.[3,4] Greenhouse gases are emitted from a range of natural and anthropogenic sources, with the combustion of fossil fuels for energy generation and use representing the dominant anthropogenic source.

In March 2024 the European Environment Agency (EEA) published the European Climate Risk Assessment.[5] This assessment states that Europe is the fastest warming continent on the planet and is warming at about twice the global rate. The average global temperature in the 12-month period between February 2023 and January 2024 exceeding pre-industrial levels by 1.5°C. 2023 was the warmest year on record in more than 100,000 years, at 1.48°C above pre-industrial levels, with the world's ocean temperature also reaching new heights.

The Intergovernmental Panel on Climate Change (IPCC), in their AR6 Synthesis Report: Climate Change 2023[6], state that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. This has led to widespread adverse impacts and related losses and damages to people and nature due to the pressures of climate change and the inability to adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

Relevant legislation, policy, and guidance in international (Section 11.2.1), national (Section 11.2.2), and local (Section 11.2.3) contexts are detailed below.

11.2.1 International Greenhouse Gas Emission and Climate Targets

Globally, governance relating to climate change has changed significantly since 1994 when the United Nations Framework Convention on Climate Change (UNFCCC) entered into force. Greenhouse gas emissions have been a primary focus of climate related international agreements for almost two decades.

Table 11-2 below identifies international instruments relating to greenhouse gas emissions and climate change targets. The following table provides an overview of the international agreements that have played key roles in establishing climate governance; please refer to Appendix 11-1 '*Climate Legislation, Policy, and Guidance*' for further detail on each of the below international instruments.

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[3] *Hansen, J.; Sato, M.; Kharecha, P. et al. Earth's Energy Imbalance and Implications. Atmospheric Chemistry and Physics 2011, 11 (24), 13421–13449.* https://doi.org/10.5194/acp-11-13421-2011
[4] *von Schuckmann, K.; Palmer, M. D.; Trenberth, K. E. et al. An Imperative to Monitor Earth's Energy Imbalance. Nature Clim Change 2016, 6 (2), 138–144.* https://doi.org/10.1038/nclimate2876.
[5] *European Environment Agency (2024) European Climate Risk Assessment* <https://www.eea.europa.eu/publications/european-climate-risk-assessment>
[6] *IPCC AR6 Synthesis Report: Climate Change 2023.* https://www.ipcc.ch/report/sixth-assessment-report-cycle/

Table 11-2 International Instruments Relating to Greenhouse Gases and Climate Change Targets

International Instrument	Description
Kyoto Protocol	The Kyoto Protocol was adopted on 11 December 1997; this Protocol operationalised the UNFCCC and was the first international agreement that committed countries to reduce their greenhouse gas emissions. The Kyoto Protocol came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, became binding for the first time.
Doha Amendment to the Kyoto Protocol	In Doha, Qatar, on 8th December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes: › New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from starting in 2013 and lasting until 2020. › A revised list of greenhouse gases to be reported on by Parties in the second commitment period
Conference of the Parties (COP): *Every year since 1995, the Conference of the Parties (COP) has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments, and is the supreme decision-making body of the UNFCCC.*	**COP21 – Paris** (30th November to 12th December 2015) COP21 closed with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The 12-page text, made up of a preamble and 29 articles, provides for a limitation of the temperature rise to below 2°C above pre-industrial levels and even to tend towards 1.5°C.
	COP25 – Madrid (December 2nd to December 13th, 2019) At COP25 the European Union launched its most ambitious plan, 'The European Green Deal' which aims to lower CO_2 emissions to zero by 2050.
	COP28 – Dubai (30th of November 2023 to the 13th of December 2023) COP28 resulted in a landmark deal to 'transition away' from fossil fuels, the United Arab Emirates (UAE) Consensus. The agreement calls for 'transitioning away from fossil fuels in energy systems, in a just, orderly, and equitable manner.' COP28 concluded the first ever Global Stocktake under the Paris Agreement. The Global Stocktake recognises that the world is not on track to meet 1.5°C and will require Parties to align their national targets and measures with the Paris Agreement.
	COP29 – Azerbaijan (11th November 2024 to 22nd November 2024) COP29 focused on accelerating global efforts to address climate change, in particular global efforts related to climate finance. The New Collective Quantified Goal on Climate Finance (NCQG) was agreed in the final days of COP with developed nations agreeing to triples finance to developing countries, with commitments increasing from USD 100 billion annually to USD 300 billion annually by 2035. Significant progress was made in the discussions surrounding carbon markets, with nearly 200 nations agreeing on critical rules under Article 6 of the Paris Agreement. The adoption of these rules is seen as a crucial step towards operationalising a robust and credible carbon market. Despite the advances, concerns were expressed about the potential for weak governance and risks of exploitation in the system; these issues must be addressed to ensure the market's full functionality.

	COP30 – Belém (November 10th 2025 to November 21st 2025) COP30 in Belém, Brazil, focused on enhancing national climate plans known as Nationally Determined Contribution (NDCs) for 2035, aiming to increase adaptation finance and mobilize over a trillion annually for climate action. Key takeaways included a strong focus on the social dimension of climate action. While a formal, binding fossil fuel phase-out roadmap was not finalised, the summit advanced commitments and highlighted growing trade-climate tensions.
United Nations Sustainable Development Goals	On the 14th July 2025, the United Nations published 'The Sustainable Development Goals Report 2025' this report finds that, following an assessment of all 169 targets, for which trend data is available, only 17% of the SDG targets are on track, 18% of SDG targets are showing minimum or moderate progress, 47% having stalled in progress and 18% having regressed from 2024.
Climate Change Performance Index	Established in 2005, the Climate Change Performance Index (CCPI)[7] is an independent monitoring tool which tracks individual countries climate protection performance. Ireland, ranked 29th in 2025, has moved down 4 places to 33rd in 2026 and is now considered a 'medium' performer in international performance. The CCPI states that Ireland's policies are missing a long-term strategy for phasing out fossil fuel infrastructure and shifting investments from natural gas towards an emissions-neutral energy supply.
State of the Global Climate 2025	In March 2026, the World Meteorological Organisation (WMO) published a report entitled the 'State of the Global Climate 2025'[8]. This report provided a summary on the state of the climate indicators with sections on key climate indicators, extreme events and impacts. The key messages in the report include: › 2015–2025 was the warmest 11-year period on record, with 2025 ranked as the 2nd or 3rd hottest year at ~1.43°C above the 1850–1900 average; › The Earth's energy imbalance: the difference between incoming solar energy and outgoing radiation—is now at the highest level ever recorded, confirming rapid, persistent warming; › The ocean has been absorbing about eighteen times the annual human energy use each year for the past two decades;
Renewable Energy Directive	The first Renewable Energy Directive (RED)[9] is legislation that influenced the growth of renewable energy in the EU and Ireland for the decade ending in 2020. From 2021, RED was replaced by the second Renewable Energy Directive (REDII),[10] which continues to promote the growth of renewable energy out to 2030. REDII introduced a binding EU-wide target for overall RES of 32% in 2030 and requires Member States to set their national contributions to the EU-wide target. Per the National Energy and Climate Plan (NECP) 2021-2030, Ireland's overall RES target is 34.1% in 2030.

[7] *Climate Change Performance Index 2024 <https://ccpi.org/>*
[8] *WMO, State of the Global Climate 2025: https://library.wmo.int/records/item/69807-state-of-the-global-climate-2025*
[9] *Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Available from: https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:en:PDF*
[10] *Directive (EU) 2018/2001 on the promotion of the use of energy from renewable resources (recast). Available from: https://eurlex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L2001*

	Given the need to ratchet up the EUs clean energy transition, RED was revised in 2023, and the amending Directive EU/2023/2413 (REDIII)[11] entered into force on 20 November 2023 and was transposed into Irish Law in August 2025. REDIII amended the EU-wide overall 2030 RES target from 32% to at least 42.5% with the aim of 45%.
European Green Deal	The European Green Deal is a comprehensive package of policy initiatives aimed at achieving climate neutrality across the EU by 2050. It features a wide range of actions and targets in different sectors such as energy, transport, industry, environment and agriculture. The goal is to transform the EU into a resource-efficient, competitive, circular economy that is fair and inclusive for every individual and region. In its approach to decarbonisation, the EU has split greenhouse gas emissions into two categories, the Emissions Trading System (ETS) and the non-ETS. Under the EU Green Deal, the targets for the ETS and non-ETS sectors will be revised upwards in order to achieve the commitment, at EU level, to reach an economy-wide 2030 reduction in emissions of at least 55%, compared to 1990 levels.
Council Regulation (EU) 2022/2577 and 2024/223	Council Regulation (EU) 2022/2577 and 2024/223 lay down a framework to accelerate the deployment of renewable energy. Regulation 2022/2577 and 2024/223 recognises the relative importance of renewable energy deployment in the current difficult energy context and provides significant policy and legislative support to enabling renewable energy projects. Further detail is provided in Section 1.1.1.8 of Appendix 11-1 and in Section 2.3.1 in Chapter 2 of this EIAR.
EU Nature Restoration Law	The EU Nature Restoration Law was approved on June 17th, 2024. EU countries are expected to submit National Restoration Plans to the Commission within two years of the Regulation coming into force (by mid-2026), showing how they will deliver on the targets. They will also be required to monitor and report on their progress. The Nature Restoration Law is the first continent-wide, comprehensive law of its kind. It is a key element of the EU Biodiversity Strategy, which sets binding targets to restore degraded ecosystems, in particular those with the most potential to capture and store carbon and to prevent and reduce the impact of natural disasters. The law aims to restore ecosystems, habitats and species across the EU's land and sea areas in order to: › Enable the long-term and sustained recovery of biodiverse and resilient nature; › Contribute to achieving the EU's climate mitigation and climate adaptation objectives; and › Meet international commitments.
EU Effort Sharing Regulation	Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ESR). This established binding annual greenhouse gas emission targets for Member States for the period 2021–2030. Ireland is required to reduce its emissions from these sectors by 30% by 2030, relative to 2005 levels. Please see Section 1.1.1.10 of Appendix 11-1 for further details on the EU ESR.

[11] *Directive (EU) 2023/2413 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources and repealing Council Directive (EU) 2015/652. Available from: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_202302413*

11.2.2 National Greenhouse Gas Emission and Climate Targets

Ireland has reached a crucial point in addressing climate change with the goal to becoming climate neutral by 2050 and to significantly cut greenhouse gases by 2030. National greenhouse gas emission and climate targets are critical for achieving Ireland's climate ambitions.

Table 11-3 below provides an overview of the national legislation and reports relating to greenhouse gases and climate change targets in Ireland; please refer to Appendix 11-1 for further detail on each of the below national legislation measures.

Table 11-3 National Legislation and Reports relating to Greenhouse Gas Emission and Climate Change Targets

National Instrument	Description
Programme for the Government - Securing Ireland's Future	The Programme for Government – Securing Ireland's Future was published in January 2025. The programme notes that the government are committed to reducing greenhouse gas emissions by an average 7% per annum over the next decade in a push to achieve a net zero emissions by the year 2050. The Programme states the Government's ongoing support and commitment to take "*the necessary action to deliver at least 70% renewable electricity by 2030*".
Climate Action and Low Carbon Development Act 2015	The Climate Action and Low Carbon Development Act 2015 established the national framework for the approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy.
Climate Action and Low Carbon Development (Amendment) Act 2021	The Climate Action and Low Carbon (Amendment) Act 2021 amended the Climate Action and Low Carbon Development Act 2015 and is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050. This was passed into law in July 2021. The Programme for Government has committed to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieve net zero emissions by 2050. This Act will manage the implementation of a suite of policies to assist in achieving these annual targets.
Climate Change Advisory Council	The Climate Change Advisory Council (CCAC) was established on 18th January 2016 under the Climate Action and Low Carbon Development Act 2015. The Annual Review 2026: Electricity report has been released by the CCAC and focuses specifically on key findings and recommendations for the Electricity sector. The report highlights that emissions from the electricity sector decreased by approximately 8.9% in 2025 compared to 2024. Ireland achieved a coal-free electricity grid in June 2025, although coal still contributed around 7% of annual emissions while accounting for a small proportion of generation. Despite this progress, renewable energy deployment remains below required levels, with approximately 0.8 GW of new capacity added in 2025, significantly lower than that needed to meet 2030 targets.
Carbon Budgets	The first national carbon budget programme proposed by the CCAC, approved by Government and adopted by both Houses of the Oireachtas in April 2022 comprises three successive 5-year carbon budgets. The total emissions allowed under each budget are shown in Section 1.1.2.5 of Appendix 11-1.
Sectoral Emission Ceilings	The Sectoral Emissions Ceilings were launched in September 2022. The Sectoral Emissions Ceilings alongside the annual published Climate Action Plan provide a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030.

	The Sectoral Emission Ceilings for each 5-year carbon budget period was approved by the government on the 28th of July 2022 and is shown in Section 1.1.2.6 of Appendix 11-1.
Climate Action Plan 2025	The National Climate Action Plan (CAP) 2025 was launched in April 2025. CAP 2025 sets out the roadmap to deliver on Ireland's climate ambition. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 following the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. CAP 2025 highlights the firm commitment that has been made by Ireland in relation to the clean energy transition and provides an outline of precise goals for renewable energy, focusing on solar, onshore wind, and offshore wind.
Ireland's Climate Change Assessment	In 2023 the EPA published Ireland's Climate Change Assessment (ICCA). This assessment provides a comprehensive overview and breakdown of the state of knowledge around key aspects of climate change with a focus on Ireland. The ICCA report is presented in four volumes: › Volume 1: Climate Science – Ireland in a Changing World; › Volume 2: Achieving Climate Neutrality in 2050; › Volume 3: Being Prepared for Ireland's Future; and › Volume 4: Realising the Benefits of Transition and Transformation. Please refer to Section 1.1.2.8 of Appendix 11-1 for further information on the ICCA.
National Peatlands Strategy	The National Peatlands Strategy 2015-2025 (NPS) was published in 2015 and outlines a national strategy for the management of Ireland's peatlands. The NPS sets out principles and actions to be taken to evaluate the potential for restoration and rehabilitation of Ireland's peatlands in conjunction with current and potential future use of the peatlands in line with national climate and biodiversity targets.

Ireland has established national objectives for the rehabilitation and restoration of degraded peatlands through the National Peatlands Strategy[12], CAP 2025[13] and local authority county development plans (detailed in Section 11.2.3 below)[14]. These initiatives promote the large-scale rehabilitation of peatlands to reduce greenhouse gas emissions from degraded peat soils, facilitate the re-establishment of peat-forming habitats and enhance long-term carbon sequestration.

11.2.3 Local Greenhouse Gas Emission and Climate Targets

11.2.3.1 Offaly County Council Local Authority Climate Action Plan 2024-2029

The Offaly County Council Local Authority Climate Action Plan 2024-2029[15] (Offaly LACAP) was adopted in February 2024 and published in April of the same year.

The Offaly LACAP highlights the current state of climate action in Ireland, and how Offaly County Council intends to deliver and enable climate action for a just transition to a low carbon and climate

[12] *National Peatlands Strategy (NPWS, 2015):* National Peatlands Strategy | National Parks & Wildlife Service
[13] *Climate Action Plan, 2025:* Climate_Action_Plan_2025_updated_cover.pdf
[14] *BnM PCAS:* BnM Peatlands Climate Action Scheme
[15] *Offaly County Council Climate Action Plan 2024-2029 (2024). Available at:* <https://www.offaly.ie/app/uploads/Offaly-CoCo-Climate-Action-Phase-Two-English-Digital-.pdf>

resilient future within County Offaly. The Offaly LACAP will help address the mitigation of greenhouse gases, the implementation of climate change adaption measures, and will strengthen the alignment between national climate policy and the delivery of effective local climate action. The overall greenhouse gas emission details for Offaly are detailed in Section 11.3.1.3 below.

Strategic Goal 2 of the Offaly LACAP is to '*achieve [Offaly's] carbon emission and energy efficiency targets for 2030 and 2050*' and Strategic Goal 3 is to '*deliver on climate adaptation and climate resilience*.' These goals are designed to ensure that local authorities adhere to carbon budgets and collaborate as a sector to achieve their 2030 and 2050 targets and adapts their buildings, infrastructure and natural environment to the changing climate to increase the climate resilience of their county. The Offaly LACAP assesses climate risk relevant to Ireland and to County Offaly; the Offaly LACAP, in conjunction with the evidence baseline, inform the climate objectives and actions that will be undertaken by Offaly County Council to assist in the achievement of national and international climate targets.

Once operational, the Proposed Project will assist in reducing greenhouse gas emissions by enabling renewable energy to be fed into the national grid, thereby reducing the overall carbon intensity of Ireland's electricity supply. This will, in turn, support the decarbonisation of other sectors, particularly the main emitting sectors in County Offaly as identified above. Please see Section 11.4.3.2 below for further information on carbon savings associated with the Proposed Project.

The Offaly County Development Plan 2021-2027 (OCDP)[16] sets out the overall strategy for the proper planning and sustainable development of the County over a 6-year period. Key components of the OCDP are the settlement strategy, housing strategy and renewable energy strategy for the county; please refer to Section 2.6.4 of Chapter 2 of this EIAR for more details.

The OCDP recognises the important role of peatlands in climate regulation, biodiversity conservation and carbon storage. The OCDP supports the rehabilitation and restoration of degraded peatlands and seeks to protect peatland resources where appropriate, recognising their function as carbon stores and their contribution to climate change mitigation. The OCDP also supports renewable energy development, including wind energy, where such development is compatible with environmental protections and climate objectives. Accordingly, the rehabilitation of cutaway peatlands under IPC Licence and the generation of renewable energy associated with the Proposed Project are aligned with the broader climate action and sustainable development objectives of the OCDP.

11.2.3.2 Kildare County Council Local Authority Climate Action Plan 2024-2029

The Kildare County Council Local Authority Climate Action Plan 2024–2029[17] (Kildare LACAP) was published in January 2024 and outlines the county's pathway towards a low-carbon, climate-resilient future. The plan sets out the actions to be delivered by Kildare County Council, businesses, communities and citizens in response to climate challenges, consistent with the national climate objective of achieving a climate-neutral economy by 2050.

The Kildare LACAP aims to create a low-carbon and climate-resilient County Kildare by embedding climate action across all council functions and by strengthening the county's capacity to adapt to climate change. The plan emphasises the Council's leadership role in enhancing climate resilience, increasing energy efficiency, and reducing greenhouse gas emissions across its assets, services and infrastructure. The overall greenhouse gas emission details for Kildare are detailed in Section 11.3.1.3 below.

The plan identifies Kildare's responsibility to build climate resilience and reduce vulnerabilities associated with changing climate conditions. Strategic Priority S4 of the Kildare LACAP is to '*Support*

[16] *Offaly County Development Plan 2021-2027 (2021). Available at: <* https://www.offaly.ie/c/county-development-plan/*>*
[17] *Kildare Local Authority Climate Action Plan 2024-2029 (2024). Available at:* https://kildarecoco.ie/AllServices/ClimateAction/KildareCountyCouncilClimateActionPlan2024-2029/LocalAuthorityClimateActionPlan20242029.pdf

ongoing expansion and improvements to the electricity grid infrastructure within the County to support renewable generation and supply, having due regard to environmental sensitivities such as archaeology, European sites, biodiversity and amenity value, water and air quality.' Kildare County Council have partnered with BnM to achieve a number of climate related goals relating to peatland enhancement and the development of a Green Infrastructure Masterplan. These goals are designed to ensure that local authorities adhere to carbon budgets and collaborate as a sector to achieve their 2030 and 2050 targets and adapts their buildings, infrastructure and natural environment to the changing climate to increase the climate resilience of their county.

The Kildare LACAP assesses climate risk relevant to Ireland and to County Kildare; highlighting the need to prepare for and manage climate-related risks such as extreme weather, flooding, heatwaves and drought, and recognising the scale to which these climate related risks already affect the county. The Kildare LACAP prioritises collaboration with local networks and stakeholders to increase adaptive capacity across communities and businesses.

Once operational, the Proposed Project will contribute to the objectives of the Kildare LACAP by enabling additional renewable electricity to be supplied to the national grid, thereby lowering the carbon intensity of Ireland's power generation mix. This supports emissions reductions not only within Kildare's own operational estate but also across broader sectors such as transport, industry and residential energy use. Further detail on the carbon savings associated with the Proposed Project is provided in Section 11.4.3.2 of this EIAR.

The Kildare County Development Plan (KCDP)[18] provides the overarching planning framework for the county, including settlement strategy, housing, and renewable energy policies. The Kildare LACAP aligns closely with this framework by ensuring that climate mitigation and adaptation considerations are integrated into spatial planning, service delivery and long-term infrastructural development, refer to Section 2.13.4 of Chapter 2 for further detail.

The KCDP acknowledges the role of natural capital, green infrastructure and peatland habitats in climate change mitigation and adaptation. The KCDP supports the protection, restoration and enhancement of peatlands, wetlands and other carbon-rich ecosystems, recognising their contribution to carbon sequestration, biodiversity and flood attenuation. The KCDP also supports the transition to a low-carbon economy and facilitates renewable energy infrastructure that contributes to national and regional climate objectives. The rehabilitation of lands within the Project Site under IPC Licence and the generation of renewable electricity by the Proposed Project are therefore consistent with the climate action and environmental objectives of the KCDP.

11.2.4 Relevant Guidance

The climate chapter of this EIAR is carried out in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and has been prepared in accordance with guidance listed in Section 1.7.2 of Chapter 1: Introduction. Due to the nature of the Proposed Project, a wind farm project, the following methodology and guidance was also utilised for the climate section of this EIAR:

- '*Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment'* (European Commission, 2013);
- *Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation*' (Institute of Environment Management and Assessment (IEMA), 2020);
- *'Calculating Carbon Savings from Wind Farms on Scottish Peat Lands*' (University of Aberdeen and the Macauley Institute, 2008);
- '*Wind Farms and Carbon Savings*' (Scottish Natural Heritage, 2003);

[18] *Kildare County Development Plan 2023-2029:* https://kildarecoco.ie/AllServices/Planning/DevelopmentPlans/KildareCountyDevelopmentPlan2023-2029/

- Macauley Institute Carbon Calculator for Wind Farms on Scottish Peatlands (Version 2.15.6) (Macauley Institute, 2023);
- Assessing Greenhouse Gas Emissions and Evaluating their Significance (ISEP, 2026)[19];
- Greenhouse Gas Management Hierarchy (ISEP)[20];
- Transport Infrastructure Ireland (TII) Carbon Assessment Tool (Version 1.0.0) (TII, 2020); and
- TII Climate Assessment of Proposed National Roads – Standard PE-ENV-01105. (December 2022) (TII 2022b)[21].

Consideration has also been given to the 'Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107' (Transport Infrastructure Ireland, December 2022 (2022a)), Climate Assessment of Proposed National Roads – Standard and Overarching Technical Documentation (Transport Infrastructure Ireland, December 2022b/c) and TII Carbon Tool for Road and Light Rail Projects: User Guidance Document, GE-ENV-01106 (TII, 2025).

11.3 Climate and Weather

Climate change projections show that the Earth is getting warmer and extreme weather events are increasing in frequency on an annual basis. The Proposed Project will assist in mitigating these effects through the deployment of clean renewable energy to the national grid and subsequent decarbonisation of energy systems. Climate change is expected to influence future climatic conditions in Ireland, including temperature, precipitation and storm patterns. The baseline and future climate conditions relevant to this assessment are described in detail within the following sections. The vulnerability of the Proposed Project to climate change and climate-related hazards, including extreme weather events and natural disasters, is assessed separately in Chapter 17: Major Accidents and Natural Disasters, which considers the resilience of the Proposed Project to major accidents and natural disasters throughout the construction, operation, and decommissioning phases of the Proposed Project.

11.3.1 Baseline Environment

11.3.1.1 Data Sources

A review of literature and data relating to climate change in Ireland was undertaken and utilised to provide an overview of the current baseline environment within the Global Climate Study Area, National Climate Study Area, and Regional Climate Study Area. The following key data sources were reviewed:

- Met Éireann 30-Year Averages[22];
- Ireland's Climate Averages 1991-2020 Summary Report[23];
- Ireland's National Inventory Report 2025[24];
- Climate Status Report for Ireland 2020[25];

[19] *Assessing Greenhouse Gas Emissions and Evaluating their Significance (ISEP, 2026):* https://www.isepglobal.org/media/iimlrmqw/2026-04-comms-policy-ia-ghg-assessment.pdf
[20] *Greenhouse Gas Management Hierarchy (ISEP):* https://www.isepglobal.org/learn/greenhouse-gas-management-hierarchy/
[21] *TII Climate Assessment of Proposed National Roads – Standard PE-ENV-01105. (December 2022) (TII 2022b)* <https://www.tiipublications.ie/library/PE-ENV-01105-01.pdf>
[22] *Met Éireann 30-Year Averages* < https://www.met.ie/climate/30-year-averages>
[23] *Department of Housing, Local Government and Heritage (2024) Irelands Climate Averages 1991-2020 Summary Report* <https://edepositireland.ie/bitstream/handle/2262/108695/Ireland%27s_climate_averages_1991-2020_rev2.pdf?sequence=1&isAllowed=y>
[24] *EPA (2025) Ireland's National Inventory Report* <https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf>
[25] *EPA (2021) Climate Status Report for Ireland 2020* <https://www.epa.ie/publications/research/climate-change/research-386-the-status-of-irelands-climate-2020.php>

- Annual Review 2025 – Our Changing Climate in 2024[26];
- Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report (AR6)[27]; and
- World Meteorological Organization (WMO) State of the Global Climate 2025[28].

11.3.1.2 Physical Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. Met Éireann provides 30-year weather averages for Ireland at specific weather stations throughout Ireland. The closest weather and climate monitoring station to the Project Site and located within the Regional Climate Study Area is the Edenderry weather station located approximately 7.5km northwest of the Proposed Wind Farm (i.e., T32). The next closest weather and climate monitoring station to the Project Site, that is located within the National Climate Study Area, and that has meteorological data recorded for a 30-year period is Casement, Co. Dublin[29], located approximately 20.8km east to the Project Site at its closest point (i.e., Proposed Offsite Substation). Meteorological data recorded at Casement over the 30-year period from 1991-2020 is shown in Table 11-4 below. On average, the wettest months are October and December, with March and February being the driest. July is the warmest month with an average temperature of 19.8° Celsius.

More recent, monthly meteorological data recorded at Casement, Co. Dublin from January 2023 to January 2026 is available at https://www.met.ie/climate/available-data/monthly-data. July 2023 was the wettest month in this time period, with 124.2mm of rainfall recorded, while July 2026 the driest month with 3.5mm of rainfall. July 2026 was the warmest month in this time period, with a mean monthly temperature of 18° Celsius. January 2025 was the coldest month with a mean monthly temperature of 4.4° Celsius.

Table 11-5 below provides a summary of the current physical baseline environment with reference to relevant chapters within the submitted EIAR where further information is available.

[26] *Climate Change Advisory Council (2025) Annual Review 2025 – Our Changing Climate in 2024* <https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC%20AR25%20Our%20Changing%20Climate-final.pdf>
[27] *IPCC Sixth Assessment report (AR6):* Sixth Assessment Report – IPCC
[28] *State of Global Climate, 2025:* State of the Global Climate 2025
[29] *Casement Weather Station:* https://www.met.ie/cms/assets/uploads/2023/09/www_met_ie_casement_9120.htm

Table 11-4: Data from Met Éireann Weather Station at Casement 1991-2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8	8.5	10.3	12.4	15.4	18	19.8	19.4	17	13.7	10.3	8.3	13.4
Mean daily min	2.4	2.2	3.1	4.5	6.9	9.6	11.6	11.4	9.6	7.2	4.4	2.6	6.3
Mean temperature	5.2	5.3	6.7	8.5	11.2	13.8	15.7	15.4	13.3	10.4	7.4	5.4	9.9
Absolute max.	15	17.2	19.8	22.4	25.7	27.6	30.9	28.9	25.2	20.2	17	14.8	30.9
Absolute min.	-12.4	-8.1	-9	-5.9	-3.6	0.3	4.5	2.2	-0.7	-4.3	-9.1	-15.7	-15.7
Mean num. of days with air frost	6.8	7.1	5	2.9	0.8	0	0	0	0.1	1.1	3.7	7.3	34.8
Mean num. of days with ground frost	13.9	13.6	12.8	10.3	4.6	0.7	0	0	1.1	4.7	8.8	13.8	84.5
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	88.1	88	85.1	80.2	77.4	77.6	80.2	82.6	85.4	87.1	89.4	89	84.2
Mean at 1500UTC	82.8	77.9	71.7	67.9	66.8	67.6	69.3	69.7	71.9	76.6	82.3	84.8	74.1
SUNSHINE (hours)													
Mean daily duration	1.7	2.6	3.4	5.2	6.1	5.6	4.9	5	4.2	3.3	2.2	1.5	3.8
Greatest daily duration	8.1	10	11.5	13.8	15.3	16	15.5	14.4	12.3	10.2	8.8	7.3	16
Mean num. of days with no sun	8.7	5.5	4.4	2.5	1.7	2.2	1.6	1.2	2.3	4.1	6.5	9.1	49.8
RAINFALL (mm)													
Mean monthly total	65	55.2	51.8	55.3	59.1	65.7	59.4	71.2	61.6	81.6	81.9	75.7	783.5
Greatest daily total	30	35.6	34.2	41.5	36	98.5	33.7	36	51.1	86.1	82	46.8	98.5
Mean num. of days with >= 0.2mm	17.6	15.8	15.5	14.8	15.4	14.8	16.3	16.8	14.9	16.7	17.8	17.5	193.9
Mean num. of days with >= 1.0mm	12.3	11.4	10.2	10.9	10.5	10.1	11.9	11.5	10	12	12.4	13.2	136.4
Mean num. of days with >= 5.0mm	4.7	3.4	3.3	3.8	3.6	3.9	3.7	4.5	4.1	4.7	5.1	5.1	49.9
WIND (knots)													
Mean monthly speed	12.4	12	11.1	9.5	9	8.4	8.4	8.7	9	10.1	10.9	11.7	10.1
Max. gust	80	74	71	59	62	55	45	53	59	64	64	82	82
Max. mean 10-minute speed	57	47	47	43	43	41	31	34	41	46	41	54	57
Mean num. of days with gales	3.3	2.4	1	0.6	0.3	0.1	0	0	0.2	0.8	1.2	2.6	12.6
WEATHER (Mean No. of Days With:)													
Snow or sleet	3.2	3.1	2.2	0.7	0.1	0	0	0	0	0	0.6	2	11.9

Snow lying at 0900UTC	1	0.9	0.6	0	0	0	0	0	0	0	0.1	0.7	3.4
Hail	1.1	1.8	2.3	2.7	1.5	0.3	0.2	0	0.1	0.1	0.5	0.7	11.3
Thunder	0.1	0.1	0.2	0.6	0.8	0.9	1.2	1.1	0.4	0.4	0.1	0	6.1
Fog	1.7	1.4	1.8	1.3	1.1	1.1	0.9	1.4	2.6	2.3	1.8	2.2	19.8

Table 11-5 Summary of Current Physical Baseline Environment

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
Air Temperature	Global average temperatures have increased by approximately 1.4°C above pre-industrial levels, with recent years among the warmest on record[30]. Continued warming is projected under all emission scenarios. This assessment is based on the IPCC Sixth Assessment Report, with the ongoing Seventh Assessment Cycle expected to provide updated findings[31]. Climate change is impacting air temperatures in the Northern European region, with a range of observable effects including rising temperature, increased frequency of heatwaves, changes in seasonal temperature patterns and milder winters[32]. Ireland's Climate Averages 1991-2020 Summary Report identifies that the annual mean air temperature for Ireland over the period 1991-2020 is 9.8°C. The annual mean air temperature ranges from approximately 8.5°C - 10.8°C. Comparing the 1991-2020 annual mean air temperature for Ireland with that of the 1961-1990 period, there has been an increase of approximately 0.7°C. The Climate Status Report for Ireland 2020[33] states that air temperatures in Ireland have '*been increasing at an average rate of 0.078°C per decade since 1900 and that the annual average temperature is now approximately 0.9°C higher than it was in the early 1900s'*. Temperatures in Ireland are increasing, with 16 of the top 20 warmest years on record occurring since 1990[34]. On	Chapter 10: Air Quality

[30] https://climate.copernicus.eu/climate-indicators/temperature
[31] https://www.ipcc.ch/report/seventh-assessment-report-syr/
[32] IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>
[33] Government of Ireland (2020) Climate Status Report for Ireland 2020 <https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf>
[34] Irelands Climate Change Assessment (2023) Volume 1 Climate Science – Ireland in a Changing World <https://www.epa.ie/publications/monitoring-assessment/climate-change/irelands-climate-change-assessment-volume-1.php>

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
	10th July 2024 Met Éireann confirmed that 2023 was Ireland's wettest and warmest year on record (with records dating back to 1900).[35] Due to the moderating influence of the North Atlantic, Ireland has, and will continue to, experience much milder air temperatures as compared to mainland Europe and other continental countries[36]. However, this moderating influence could be in jeopardy if the Atlantic Meridional Overturning Circulation (AMOC) continues to weaken[37]. The AMOC is a large system of ocean currents responsible for carrying warm water from the tropics into the North Atlantic and the strength of this current is a function of global mean temperature. The weakening of this current would counterbalance the warming effects of climate change creating instability for local ecosystems, agriculture, and fisheries. The National Climate Study Area experiences a temperate oceanic climate with mild winters and cool summers. Local meteorological data (e.g., Birr, Mullingar) show typical seasonal variation, with July 2023 as the wettest month, March 2025 being the driest month and January 2026 as the coldest as detailed above[38]. The Regional Climate Study Area is located within the Midlands region (EPA Air Quality Zone D), where temperature patterns are broadly consistent with inland Irish conditions, with slightly greater seasonal variation compared to coastal areas.	
Precipitation	Global precipitation patterns are undergoing significant change due to climate warming, with observed increases in the frequency and intensity of heavy rainfall events across many regions[39]. Rising temperatures are intensifying the global hydrological cycle, increasing atmospheric moisture and resulting in heavier precipitation events, while also contributing to longer dry periods in some regions. Recent assessments confirm that extreme rainfall and flooding events are becoming more frequent and severe globally, reflecting increased climate variability[40].	Further detail on rainfall and evaporation data is provided in Section 9.3.2.1 in Chapter 9: Water.

[35] https://www.met.ie/2023-confirmed-as-irelands-wettest-year-on-record
[36] https://www.met.ie/climate/what-we-measure/temperature#:~:text=The%20moderating%20influence%20of%20the,mild%20winters%20and%20cool%20summers.
[37] *IPCC (2019) IPCC Special Report on the Ocean and Cryosphere in a Changing Climate Chapter 6. Extremes, Abrupt Changes, and Managing Risk* <https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/08_SROCC_Ch06_FINAL.pdf>
[38] *Met Éireann:* https://www.met.ie/climate/available-data/monthly-data
[39] https://www.ipcc.ch/report/sixth-assessment-report-cycle/
[40] State of the Global Climate 2025

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
	Climate change is impacting precipitation patterns in the Northern European region, with a range of observable effects including increased precipitation, more extreme precipitation events, seasonal variations and impacts on hydrological regimes[41]. Precipitation has been measured systematically in Ireland since the late 19th century and is a key indicator of changes in the climate; measurements and analysis of rainfall are essential for assessing the effects of climate change on the water cycle, water balance and for flood mitigation. Met Éireann highlights that it is already observing these trends, with the national annual average rainfall over the period 1991-2020 being approximately 1,288mm, which represents an increase of 7% from the previous 30-year monitoring period (1961-1990)[42]. Ireland's Climate Averages 1991-2020 Summary Report obtained averages for the annual, seasonal and monthly number of rain days (number of days with rainfall ≥ 0.2 mm), wet days (number of days with rainfall ≥ 1 mm) and very wet days (number of days with rainfall ≥ 10 mm) within the National Climate Study Area. Over the period 1991-2020, on an annual basis, the average number of rain days ranges from 201 days to 272 days; the average number of wet days ranges from 147 days to 226 days; and the average number of very wet days ranges from 22 days to 68 days. The Regional Climate Study Area is located within the Irish Midlands, where precipitation patterns are characterised by moderate annual rainfall and relatively even distribution throughout the year, consistent with inland Irish conditions. Local long term average annual rainfall (AAR) and evaporation data were sourced from Met Éireann, with the closest synoptic station where the average Potential Evapotranspiration (PE) is recorded being located in Mullingar, approximately 30km northwest of the Proposed Wind Farm. The long-term average PE for this station is 445.8mm/yr. PE. Actual Evaporation (AE) at the within the Regional Climate Study Area can therefore be estimated as 423.5mm/yr (which is 0.95 × PE).	
Flood Risk	No recurring or historic flood incidents are mapped by the OPW within the Proposed Wind Farm. The GSI Winter (2015/2016) Surface Water Flooding map shows historic surface water flooding within the Proposed Wind Farm. These historic flood zones are located in the west of Glashabaun North Bog, in the north/northeast of Codd I Bog, in the	Appendix 9-1: Site-Specific Flood Risk Assessment (SSFRA) for the Proposed

[41] *IPCC (2021) Climate Change 2021: The Physical Science Basis* <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>
[42] Department of Housing, Local Government and Heritage (2024) Irelands Climate Averages 1991-2020 Summary Report <https://edepositireland.ie/handle/2262/108695>

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
	north and east of Ballydermot North Bog and towards the centre of Lodge Bog. These historic flood zones correspond with some of the lower lying peat fields within the Proposed Wind Farm. The GSI Historical Groundwater flood map and the modelled groundwater flood extents map (www.floodinfo.ie) do not show the occurrence of any groundwater flooding within the Project Site. The National Catchment Flood Risk Assessment and Management (CFRAM)[43] Programme has been completed along the Slate River, approximately 1.7km south of the Proposed Wind Farm at its nearest point (T03) and Figile River to the flows from the northeast to west within the Proposed Wind Farm in between Proposed Turbines T28, T45, T42, T41, T21, T22, T25, T26, both rivers showing an extensive floodplain from the mapped river channel. With regards to the Proposed Project infrastructure, low probability fluvial flood zone associated with the 1 in 1,000-year flood event is situated approximately 2.5km from the nearest Proposed Turbine (T19) and relates to the Figile River in the vicinity of Clonbullogue Village. NIFM flood zones are present along the Proposed Grid Connection underground electrical cabling route. Existing watercourse crossings are present at these locations, and it has been determined that the Proposed Grid Connection underground electrical cable route will have no effect on flooding or mapped flood zones. No part of the Proposed Onsite Substation is mapped in any flood zone from the available flood mapping (National Indicative Flood Mapping, CFRAM, GSI Groundwater flood mapping). There are some GSI Groundwater flood mapping within Lodge Bog (Winter 2015/2016 and SAR mapping), but it is not mapped within the footprint of the Proposed Onsite Substation. The Proposed Offsite Substation can be categorised as a "Highly Vulnerable Development"; however, the Proposed Offsite Substation is located outside of areas mapped as fluvial Flood Zones and is therefore appropriate from a flood risk perspective. The Proposed Grid Connection underground electrical cable route is largely located in Flood Zone C. However, some small sections of the route are mapped in fluvial flood zones.	Wind Farm and Proposed Onsite Substation Appendix 9-2: SSFRA for the Proposed Grid Connection and Proposed Offsite Substation

[43] *CFRAM is Catchment Flood Risk Assessment and Management. The national CFRAM programme commenced in Ireland in 2011 and is managed by the OPW. The CFRAM Programme is central to the medium to long-term strategy for the reduction and management of flood risk in Ireland.*

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
Wind and Storms	Climate change is impacting wind patterns in the Northern European region with a range of observable effects including increased wind speeds, changes in wind direction and seasonal variations[44]. Ireland's Climate Averages 1991-2020 Summary Report identifies that the annual mean hourly wind speed ranges from 9 knots at Shannon Airport to 15 knots at Malin Head. Winds are generally strongest in the northwest of the country. The strongest winds are observed during the winter months and range from 10 knots at Shannon Airport to 18 knots at Malin Head. The lightest winds are observed during the summer months and range from 8 knots at Valentia Observatory to 13 knots at Malin Head. In late 2023 and early 2024, Ireland experienced a very active storm season; the county was affected by 13-14 severe storms[45]. In Ireland, the storm naming season begins on 1st September each year and ends on the 31st August the following year. In the 2024/2025 storm season there were 6 no. named storms, with Storm Eowyn, occurring in January 2025, reaching hurricane force winds (maximum wind speed recorded as 184km/h). There were 5 no. named storms in the 2025/2026 storm season and, at the time of writing, there has been 1 no. named storm in the 2026/2027 storm season.[46] The increased frequency and intensity of storm events will lead to associated increases in precipitation (see above). As stated in 'Air Temperature' above, the AMOC has a moderating influence on Europe. However, as identified by the IPCC, the strength of the AMOC is directly correlated to global mean temperature, and as global mean temperature increases, the AMOC will weaken[47]. The weakening of this current would result in increased storm activity in Northern Europe. The Regional Climate Study Area is influenced by prevailing south-westerly winds and experiences seasonal wind variability consistent with inland Ireland. Occasional storm events occur, reflecting national patterns of Atlantic-driven weather systems.	Chapter 17 Major Accidents and Natural Disasters

[44] *IPCC (2021) Climate Change 2021: The Physical Science Basis* <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>
[45] *Met Éireann (2024) Human-caused Climate Change Brings Increased Storm Rainfall* <https://www.met.ie/human-caused-climate-change-brings-increased-storm-rainfall>
[46] https://www.met.ie/climate/storm-centre
[47] *IPCC (2019) IPCC Special Report on the Ocean and Cryosphere in a Changing Climate Chapter 6. Extremes, Abrupt Changes, and Managing Risk* <https://www.ipcc.ch/site/assets/uploads/sites/3/2022/03/08_SROCC_Ch06_FINAL.pdf>

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
	The climate change risk assessments included in the Offaly LACAP[48] and Kildare LACAP[49] identifies windstorms as a key risk to the counties under climate change. Current EPA Research indicates that nationally the overall number of North Atlantic cyclones is projected to decrease by approximately 10%[50].	

[48] *Offaly County Council, 2023. Climate Change Risk Assessment. Available at: https://www.offaly.ie/app/uploads/KPMG_OffalyCoCo_LACAP_Final-Report_20230202-1.pdf*
[49] *https://kildarecoco.ie/AllServices/ClimateAction/KildareCountyCouncilClimateActionPlan2024-2029/LocalAuthorityClimateActionPlan20242029.pdf*
[50] *Kildare Local Authority Climate Action Plan: Kildare Climate Action Office, Local Authority Climate Action Plan 2024 to 2029*

11.3.1.3 Existing Greenhouse Gas Emissions

Greenhouse gas emissions arise from a large majority of anthropogenic activities. According to the latest data, global greenhouse gas emissions in 2024 reached 53.2 Gt CO_{2eq} (without Land Use, Land Use Change and Forestry).[51] The 2024 data experienced an increase of 1.3% or 665 $MtCO_2eq$ compared to the levels in 2023. In the framework of UNFCCC, countries are developing national emissions inventories and propose/implement actions to mitigate greenhouse gas emissions. Fossil CO_2 emissions, which are the main contributors to global greenhouse gas emissions are still increasing at world level despite climate change mitigation agreements. Global fossil CO_2 emissions have increased by nearly 75% since 1990. The increase in CH_4 and N_2O emissions has followed a somewhat slower pace: CH_4 increased by nearly 30% and N_2O by 34.4% between 1990 and 2024, while F-gases have seen a four-fold increase (+310.4%) over the same period.

The main sectoral emissions in Ireland are detailed in Section 1.1.2.6 of Appendix 11-1 Climate Legislation Policy and Guidance. These sectors include:

- Electricity;
- Transport;
- Built Environment;
  - Residential
  - Commercial
- Industry;
- Agriculture;
- Land Use, Land Use Change, and Forestry (LULUCF)[1];
- Other (F-Gases, Waste, Petroleum refining); and
- Unallocated savings.

The most recent inventory report for Ireland, National Inventory Report 2025 (NIR 2025)[52], was published in 2025 and refers to the greenhouse gas inventory timeseries for the years 1990-2023. From 1990-2001, total emissions of greenhouse gases (excluding LULUCF) increased steadily from 55,734.9 $ktCO_2e$ in 1990 to 70,848.8 $ktCO_2e$ in 2001, which is the highest level of greenhouse gas emissions ever reported in Ireland. Emissions then plateaued until 2008 with estimates ranging from 70,149.9 $ktCO_2e$ to 67,927 $ktCO_2e$. There was then a sharp decrease from 67,927 $ktCO_2e$ in 2008 to 57,836.3 $ktCO_2e$ in 2011. The declining trend between 2008 and 2011 is largely attributable to a slowing down of the previously sustained increase in transport emissions, coupled with the 2008 financial crisis. In 2023, total emissions of greenhouse gases including indirect emissions from solvent use (excluding LULUCF) in Ireland were 54,934.4$ktCO_2e$, which is 6.8% lower than emissions in 2022, and the lowest level in the time series.

The Electricity sector accounted for the bulk of the CO_2 emissions in 2023 (57.1%), Agriculture contributed 36.2%, while a further 5.2% emanated from Industrial Processes and Product Use and 1.5% was due to Waste. Emissions of CO_2 accounted for 61.1% of the national total in 2023, with CH_4 and N_2O contributing 28.9% and 8.8%, respectively. The combined emissions of fluorinated gases (HFC, PFC, SF_6 and NF_3) accounted for 1.2% of total emissions in 2023.[53]

Overall, the greenhouse gas emissions generated from County Offaly equated to 1,450,877 tonnes of carbon dioxide equivalent (tCO_2e) in the baseline year of 2018[54]. The top three emitting sectors within

[51] *European Commission (2025) GHG Emissions of all World Countries. Available at: https://edgar.jrc.ec.europa.eu/booklet/GHG_emissions_of_all_world_countries_booklet_2025report.pdf*
[52] *EPA (2024) National inventory Report 2025 <https://www.epa.ie/publications/monitoring--assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf>*
[53] *Ibid.*
[54] *Offaly County Council Climate Action Plan 2024-2029: Offaly-CoCo-Climate-Action-Phase-Two-English-Digital-.pdf*

County Offaly in terms of total greenhouse gas emissions in the baseline year were agriculture, residential and transport producing 47%, 17%, and 17% of total emissions respectively.

Overall, the greenhouse gas emissions generated from County Kildare equated to 1,678,583 tonnes of carbon dioxide equivalent (tCO_2e) in the baseline year of 2018[55]. The top three emitting sectors within County Kildare in terms of total greenhouse gas emissions in the baseline year were transport, residential, and commercial producing 38.2%, 23.3%, and 19.2% of total emissions respectively.

Kildare County Council provided a progress report reflecting the plan implementation period from January 2024 to December 2024[56]. In 2023 total CO_2 emissions was 29.2% below the 2018 baseline. Based on the 2023 Gap to Target, Kildare County Council must save an additional 4,047,359 $kgCO_2$ in the 7 years to reach the 2030 target of 2,712,836 kgCO2. To achieve this target, Total CO_2 emissions must reduce by another 59.9%, from the 2023 levels.

Kildare County Council and Offaly County Council, along with all public sector entities must reduce greenhouse gas emissions by 51% by 2030 as compared to 2018 in line with the National Climate Action Plan 2025 (CAP25) (Section 11.2.2 above).

11.3.2 Future Environment

Ireland is experiencing climate change in line with global trends, with current projections, detailed below, indicating that these effects will intensify in the coming decades. The baseline environment, detailed above, will undergo significant shifts, influencing Ireland's environment, economy, and society. Predicted changes include rising temperatures, altered precipitation patterns, and increased frequency of extreme weather events.

Visible effects of global climate change are evident worldwide, with climate change projections suggesting further, more pronounced impacts in the future. These impacts will have wide-ranging effects on both natural and man-made environments across various sectors and regions, resulting in socio-economic repercussions. Referred to as the 'costs of inaction' these economic impacts of climate change are increasingly influencing policy discussions[57]. It has become clear that even if greenhouse gas emissions were to cease immediately, climate alterations would persist for many decades. Therefore, alongside efforts for mitigation, it is imperative to develop effective adaptation to mitigate damages arising from climate change.

The Regional Climate Study Area (Co. Offaly and Co. Kildare) is located within Ireland's Midlands region and is therefore expected to experience future climate conditions that are broadly consistent with national climate projections. These projections indicate increasing average air temperatures, a reduction in frost days, wetter winters, drier summers, an increase in the frequency and intensity of extreme rainfall events, and a greater likelihood of extreme weather events.

While the overall direction of climate change is expected to be similar across both counties, the nature and severity of potential effects will vary according to local environmental characteristics. Within Co. Offaly, extensive peatland systems, including part of the Allen Bog Group, may be particularly sensitive to changes in temperature, rainfall patterns and hydrological conditions, with implications for carbon storage, carbon sequestration and peatland restoration activities[58]. Within Co. Kildare, the presence of

[55] *Kildare County Council Climate Action Plan 2024-2029: Kildare Climate Action Office, Local Authority Climate Action Plan 2024 to 2029*
[56] *Kildare County Council Implementation Report for Elected Members and Stakeholders 2024 (2024). Available at: https://kildarecoco.ie/AllServices/ClimateAction/KildareCountyCouncilClimateActionPlan2024-2029/KCC%202025%20LA%20CAP%20Progress%20Reporting%20for%20Elected%20Members%20%20Stakeholders%20Final.pdf*
[57] *European Environment Agency (2007) Climate change: the cost of inaction and the cost of adaptation <https://www.eea.europa.eu/publications/technical_report_2007_13/download>*
[58] *Offaly County Council Climate Action Plan 2024- 2-29: Offaly-CoCo-Climate-Action-Phase-Two-English-Digital-.pdf*

major river catchments and associated floodplains may increase the sensitivity of certain areas to projected changes in rainfall intensity and fluvial flood risk[59].

This section provides a description of the future predictions for climate change.

11.3.2.1 Data sources

A review of literature and data relating to climate change in Ireland was undertaken and utilised to provide an overview of the future baseline environment. The following key data sources were reviewed:

- High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach (report No. 339)[60];
- Climate Status Report for Ireland 2020[61]; and
- Climate Ireland[62].

11.3.2.2 Physical environment

This section will describe the future baseline for the Global Climate Study Area, National Climate Study Area and Regional Climate Study Area using a range of climate scenarios consistent with current international modelling frameworks.

Previous climate assessments frequently utilised the Representative Concentration Pathway (RCP) 8.5 scenario to represent a high greenhouse gas emissions pathway. However, recent research underpinning the next generation of climate projections (CMIP7)[63] indicates that such extreme high-emission scenarios are now considered less plausible based on current emissions trends, technological developments and climate policy.

The updated CMIP7 Scenario MIP framework instead adopts a reduced and more policy-relevant range of emissions pathways, representing low, medium and high levels of climate change, with a focus on plausible future trajectories and scenarios where emissions peak and decline during the 21st century.

Accordingly, this assessment adopts a scenario-based approach reflecting a plausible range of future climate outcomes, including:

- A medium emissions scenario, broadly aligned with current emissions trends and policy commitments; and
- A higher-end scenario representing the upper bound of plausible warming, rather than an extreme worst-case pathway.

For consistency with available national and regional datasets (i.e., Met Éireann and EPA projections), the quantitative projections referenced below are derived from previously established high-emissions scenario datasets (i.e., RCP 8.5), which are used here as a proxy for the upper bound of plausible climate change, rather than as a prediction of future emissions pathways. For the purposes of this assessment, and to ensure alignment with national and regional datasets, these projections have been adopted as the basis for the assessment.

RCPs represent climate change scenarios used in modelling the possible future climate evolution, and are based on a wide suite of assumptions, to specify the greenhouse gas concentrations that will result in

[59] *Kildare County Council Climate Action Plan 2024-2029: Kildare Climate Action Office, Local Authority Climate Action Plan 2024 to 2029*
[60] *EPA Research (2020) High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach* <https://www.epa.ie/publications/research/climate-change/Research_Report_339_Part1.pdf>
[61] https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf
[62] https://www.climateireland.ie/
[63] CMIP Rapid Evaluation Framework - Coupled Model Intercomparison Project

defined radiative forcing by 2100. The RCP 8.5 combines assumptions about high population and relatively slow income growth with modest rates of technological change and energy intensity improvements, leading in the long term to high energy demand and greenhouse gas emissions in absence of climate change policies. Compared to the total set of RCPs, RCP 8.5 thus corresponds to the pathway with the highest greenhouse gas emissions[64]. The physical environment of the Global Climate Study Area, National Climate Study Area and Regional Climate Study Area under future climate conditions and vulnerability is discussed under the following headers:

- Air Temperature
- Precipitation and Flood Risk
- Wind and Storms

Air Temperature

Within the Global Climate Study Area, average surface air temperature has already increased by approximately 1.4°C above pre-industrial levels, with further warming projected under all future scenarios[65]. Global temperatures are expected to reach or exceed 1.5°C in the near term, with end-century warming ranging from approximately 1.5°C to over 3°C depending on emissions pathways, reflecting a divergence between low-emission and higher-end plausible scenarios[66].

Annual surface air temperatures within the National Climate Study Area are approximately 1°C higher than they were in the early 1900s (2013–2022 relative to 1903–1912), reflecting the observed global warming trend driven by anthropogenic greenhouse gas emissions[67].

The upward trend in air temperature is projected to continue across all seasons under future climate conditions. Recent advances in climate scenario development (CMIP7) indicate that previously used extreme high-emissions pathways (e.g. RCP 8.5) are now considered less plausible, and future projections are based on a range of more realistic emissions scenarios reflecting low, medium and higher-end warming trajectories[68].

In this context, projections for Ireland indicate that annual air temperatures may increase by over 3°C by the end of the 21st century relative to a 1976–2005 reference period, representing the upper bound of plausible warming derived from earlier high-emissions datasets.

Met Éireann projections under the RCP 8.5 scenario indicate an increase of approximately 1–1.6°C in mean annual temperatures by mid-century within the National Climate Study Area, with the largest increases observed in the east of the country, reflecting inland climatic influences. Temperature extremes are also projected to intensify, with:

- Summer daytime temperatures increasing by 0.7–2.6°C
- Winter night-time temperatures increasing by 1.1–3°C

In addition, the number of frost days (days when minimum temperature is below 0°C) is projected to decrease significantly (by up to ~60% under higher-end warming scenarios), indicating a substantial shift in seasonal temperature patterns.

While Met Éireann projections are presented at a national scale, spatial analysis indicates that the Regional Climate Study Area is expected to experience climate changes consistent with projections for the National Climate Study Area, including slightly higher temperature increases compared to coastal areas and generally lower annual rainfall totals than western regions.

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[65] https://climate.copernicus.eu/climate-indicators/temperature
[66] https://www.ipcc.ch/report/sixth-assessment-report-cycle/
[67] https://www.ipcc.ch/report/sixth-assessment-report-cycle /
[68] https://gmd.copernicus.org/articles/19/2627/2026/

Precipitation and Flood Risk

Within the Global Climate Study Area, climate change is intensifying the hydrological cycle, resulting in increased precipitation variability and more frequent and intense rainfall events. Global average precipitation is projected to increase with warming, with heavy rainfall intensity rising by approximately 7% per degree of temperature increase[69]. While some regions are expected to become wetter, others will experience increased drought conditions, leading to greater seasonal contrasts. These changes are projected to increase flood risk globally, driven by more intense rainfall, increased frequency of extreme events, and rising sea levels.

Climate change is expected to have a significant impact on Ireland's precipitation patterns, i.e., the National Climate Study Area is predicted to experience greater vulnerability to climate change due to increased seasonality in precipitation, with more extreme fluctuations between wet and dry periods. Winter and autumn are anticipated to see increased rainfall, while spring and summer are projected to become drier, leading to more frequent droughts. The EPA's climate projections indicate that very wet days (i.e., days with more than 30mm of rainfall) in Ireland will become more common, increasing by 31% under a high emissions scenario (RCP 8.5).

Due to Ireland's location in the west of Europe, exposure to Atlantic storms is of concern and this is particularly the case in the context of rising sea levels which will enhance the impacts of storm surges.[70]

The Midlands region, inclusive of the Regional Climate Study Area is projected to experience a greater vulnerability to climate change in line with the National Study Area projections detailed above; i.e., increased rainfall variability, with wetter winters, drier summers, and an increase in the frequency and intensity of extreme rainfall events, contributing to elevated localised flood risk. Section 9.3.2 of Chapter 9: Water identifies that the severity of any future climate change will depend on the degree of future warming. Under a 1.5°C warming scenario, where global temperatures increase by 1.5°C above pre-industrial levels, average winter and summer precipitation rates are projected to be between 2.78mm/day and 2.23mm/day respectively in the Regional Climate Study Area. Meanwhile, in a 4°C warming scenario, where global average temperatures increase by 4°C above pre-industrial levels, the average winter and summer precipitation rates in the Regional Climate Study Area are projected to be approximately 3.03mm/day and 2.02mm/day respectively.

Extreme rainfall events, such as those currently expected only once every 50 years, could become twice as frequent by the end of the century. This means more frequent flooding risks, particularly during the winter months[71]. Further information on flood risk is presented in the section below.

Flood Risk

Global sea levels are projected to continue rising throughout the 21st century due to ocean warming (thermal expansion) and the melting of glaciers and ice sheets. By 2100, global mean sea level is projected to increase by approximately 0.28 m to 1.01 m depending on emissions scenarios[72]. This will increase the frequency and severity of coastal flooding and exacerbate storm surge impacts, particularly in regions exposed to Atlantic weather systems.

Chapter 9: Water, and the accompanying Flood Risk Assessment (FRA) (Appendix 9-1 and Appendix 9-2) details the flood risk of the Proposed Project. Based on the information provided in the stated documents, the areas of the Proposed Project at risk of flooding were identified and are detailed in

[69] *ibid*
[70] https://www.epa.ie/our-services/monitoring--assessment/climate-change/climate-ireland/impact-of-climate-change-on-ireland/climate-hazards/coastal-flooding.
[71] *EPA (2005) Climate Change Regional Climate Model Predictions for Ireland* <https://www.epa.ie/publications/research/climate-change/climate-change-regional-climate-model-predictions-for-ireland-.php>
[72] *IPCC (2021):* Chapter 9: Ocean, Cryosphere and Sea Level Change

Section 11.3.1.2 above. The FRA has been undertaken for the Proposed Project, comprising two separate assessments:

- A Site-Specific Flood Risk Assessment (SSFRA) for the Proposed Wind Farm and Proposed Onsite Substation (Appendix 9-1); and
- A SSFRA for the Proposed Grid Connection and Proposed Offsite Substation (Appendix 9-2).

The flood risk assessments completed for the Proposed Project have completed fluvial flood modelling with consideration to future climate scenarios where the potential effects of climate change can increase rainfall.

The CFRAM Programme has modelled flooding associated with potential 2 no. future climate change scenarios. The Mid-Range and High-End Future Scenario flood extents were generated using an increase in rainfall of 20% and 30% respectively. The extent of the CFRAM flood zones increase slightly for each future scenario.

Both modelled flood extents show similar flood zones to the Present Day Scenario discussed in Section 4.3.8 of Appendix 9-1 and Section 4.3.6 in Appendix 9-2. Therefore, flood zones at the Proposed Wind Farm site, along the Proposed Grid Connection underground electrical cable route and at the Proposed Offsite Substation are unlikely to be significantly impacted by future climate change.

The SSFRA concluded that, it may be considered that the Proposed Project can be categorised as "Highly Vulnerable Development". Therefore, a justification test has been completed and concludes that the Proposed Project is designed and laid out in a manner that reduces flood risk, and that there is no significant potential for any increase in flood risk upstream or downstream of the Proposed Project.

Wind and Storms

Future climate and weather predictions indicate a slight reduction in mid-century (2041 – 2060) average wind speeds around the National Climate Study Area (-2.47% for RCP 8.5 high emissions scenario compared to the 1981 – 2000 baseline), with these decreases being more pronounced during the summer months[73]. Predictions also point towards less frequent, but more intense storm activity around the National Climate Study Area. However, there is uncertainty regarding future predictions for storms, and it is expected that the trends observed in the frequency and intensity of storms will continue to be influenced by natural variability. Additionally, future trends and vulnerability are difficult to predict due to a low confidence in attributing historic trends in storms to climate change. However, ongoing changes in the climate may potentially affect storms with cumulative effects on wind.

Projections indicate a decrease in average and extreme wave heights towards the end of the century, but an increase in the frequency and severity of storm surges in coastal regions along the western coast of the National Climate Study Area, particularly in winter months[74]. Storm surge levels over a 20-to-30-year return period are anticipated to increase by up to 9cm by 2100[75].

[74] https://www.epa.ie/publications/research/climate-change/research-339-high-resolution-climate-projections-for-ireland-.php
[75] https://www.climateireland.ie/impact-on-ireland/future-climate-of-ireland/waves-surges/

11.3.2.3 Greenhouse Gas Emissions Projections

The sixteenth edition of the United Nations Environment Programme (UNEP) Emissions Gap Report[76] finds that global warming projections over this century, based on full implementation of Nationally Determined Contributions (NDCs), are now 2.3-2.5°C, while those based on current policies are 2.8°C. Nations remain far from meeting the Paris Agreement goal to limit warming to well-below 2°C, while pursuing efforts to stay below 1.5°C. Reductions to annual emissions of 35% and 55%, compared with 2019 levels, are needed in 2035 to align with the Paris Agreement 2°C and 1.5°C pathways, respectively. Given the size of the cuts needed, the short time available to deliver them and a challenging political climate, a higher exceedance of 1.5°C will happen, very likely within the next decade.[77]

In its approach to decarbonisation, the EU has split greenhouse gas emissions into two categories: Emissions Trading System (ETS) emissions and non-ETS emissions. Emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 43% by 2030, relative to 2005 levels. Within the ETS, participants are required to purchase allowances for every tonne of emissions, with the amount of these allowances declining over time to ensure the required reduction of 43% in greenhouse gas emissions is achieved at EU-level[78].

Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ESR[79]). This regulation established binding annual greenhouse gas emission targets for Member States for the period 2021–2030. Please see Section 11.2.1 above and Section 1.1.1.10 of Appendix 11-1 for further details on the EU ESR.

Considerable progress has been made in the decarbonisation of the Electricity Sector in Ireland, with emissions falling 22% between 2022 and 2023. This reduction in emissions is due to an increase in the share of renewable electricity generation, from 38.6% to 40.7% from 2022 to 2023, with wind energy accounting for 33.7% of electricity supply.[80]

The EPA publish Ireland's greenhouse gas emission projections and at the time of writing, the most recent report, *'Ireland's Greenhouse Gas Emissions Projections 2025-2030'* was published in May 2026[81]. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2030 set under the ESR.

The EPA has produced two scenarios in preparing these greenhouse gas emissions projections: a "With Existing Measures" (WEM) scenario and a "With Additional Measures" (WAM) scenario. These scenarios forecast Ireland's greenhouse gas emissions in different ways. The WEM scenario is a projection of future emissions based on the measures currently implemented and actions committed to by Government. To become part of the WEM scenario a policy or measure must be in place by the end of 2024 and, in parallel, the resources and/or legislation must be in place or committed to by Government Departments or Agencies. The WAM scenario is a projection of future emissions based on implemented measures included in the WEM scenario plus additional planned measures that are under discussion (as per plans, programmes or other policy documents) and have a realistic chance of implementation in the future.

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[76] *UNEP (2025) Emissions Gap Report 2025: Off target - Continued collective inaction puts global temperature goal at risk. Available at: https://wedocs.unep.org/items/9f0bf855-2069-42a6-a856-4b389f740c5c*
[77] *Ibid.*
[78] *Department of the Environment, Climate and Communications (2023) - Climate Action Plan 2024 https://www.gov.ie/en/publication/79659-climate-action-plan-2024/*
[79] *Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (Text with EEA relevance)*
[80] *Department of the Environment, Climate and Communications (2025) - Climate Action Plan 2025*
[81] *EPA (2026) Irelands Greenhouse Gas Emissions Projections (2026) https://www.rte.ie/documents/news/2026/05/epa-report.pdf*

Ireland's 2024 and 2025 Climate Action Plans both discuss unallocated emissions savings of 26 $MtCO_2eq$ over the 2026-2030 period (5.25 $MtCO_2eq$ annually). While CAP 25 set out actions to "*Allocate currently unallocated emissions savings by sector ahead of 2026*", and "*Update sectoral emissions ceilings for the second carbon budget period (2026-2030)",* the outcomes of these actions were not available in time to include in the current projections.

The EPA Emission Projections Update notes the following key trends:

- Ireland is not on track to meet the 51% emissions reduction target by 2030 (as compared to 2018 levels) based on the most up to date data.
  - Full implementation of a wide range of policies and plans across all sectors that deliver carbon savings is required to achieve a projected reduction of 25%.
- Carbon Budget 1 (2021-2025) of 295 $MtCO_2eq$ is projected to be largely met, with the WEM scenario exceeding the budget by 0.4 $MtCO_2eq$, while the WAM scenario projects emission will be 1.8 $MtCO_2eq$ under budget.
  - With carryover from Carbon Budget 1, Carbon Budget 2 (2026-2030) of 200 $MtCO_2eq$ is expected to be exceeded by 53 to 81 $MtCO_2eq$.
- Of the seven sectors with legally binding Sectoral Emission Ceilings (SEC), three are projected to remain below their SEC in Carbon Budget 1 (Electricity, Residential Buildings, 'Other'), and only the 'Other' Sector (Waste, F-gas, Petroleum Refining) will remain below its SEC in Carbon Budget 2.
- Ireland is not projected to meet its EU target under the ESR of a 42% emissions reduction by 2030 (compared to 2005) even with flexibilities applied.
  - This assessment shows that greenhouse gas emissions will be reduced by 13 to 23% by 2030 without the use of flexibilities, and by 17 to 27% with the use of flexibilities.
  - By 2030, annual emissions from the agriculture sector are projected to be between 17.3 $MtCO_2eq$ and 20.5 $MtCO_2eq$, compared with 21.4 $MtCO_2eq$ in 2018. This represents a reduction of 19% under the WAM scenario and 4% under the WEM scenario. Transport emissions are projected to decrease from 12.4 $MtCO_2e$ in 2018 to between 9.0 $MtCO_2e$ and 10.5 $MtCO_2e$ in 2030 (a 28% reduction in WAM and 16% decrease in WEM).
  - Total emissions from the land use, land use change and forestry sector (LULUCF) are projected to increase from 3.0 $MtCO_2eq$ in 2018 to between 3.1 and 5.2 $MtCO_2eq$ (a 4% increase in WAM and 72% increase in WEM).
  - Current and planned measures are unlikely to deliver the necessary emission reductions necessary to meet the target set under the EU LULUCF Regulation.
- From 10.2 MtCO2e in 2018, emissions from the Energy Industries sector are projected to decrease to between 4.0 and 4.7 MtCO2e in 2030 (a 55 to 61% reduction).
  - Projections include greater electricity demand and delays in the delivery of both increased interconnection and offshore wind generation.
- The top five Policies and Measures (WEM and WAM) are estimated to achieve 89 $MtCO_2eq$ greenhouse gas emission reductions from 2025 to 2030, accounting for over 60% of the total potential greenhouse gas emission reductions over these five years.

As outlined in the preceding sections, Ireland is, and will continue to be, affected by climate change in line with global trends. Projections for both the National Climate Study Areas and Regional Climate Study Areas indicate, with high certainty, increases in severe weather events and flood risk, rising air temperatures, and sea level rise in the likely future environment.

11.3.3 Likely Future Receiving Environment

This section identifies the future receiving environment relating to climate likely to exist at the Proposed Wind Farm site at the commencement of the construction phase. In accordance with the approach set out in Section 1.8.4 of Chapter 1, the likely future receiving environment has been established having regard to the existing climate baseline presented in Section 11.3 and uses observed change over the survey period (2020 to 2026) to inform, the likely future receiving environment.

The likely future receiving environment has been established having regard to:

- The existing climate baseline described in Section 11.3.1;
- The relevant findings of Chapter 6 (Biodiversity), Chapter 8 (Land, Soils and Geology), Chapter 9 (Water), Chapter 10 (Air Quality) and Chapter 15 (Other Material Assets – Traffic);
- Observed environmental change during site specific surveys from 2020 to 2026, including natural revegetation;
- Available BnM site records and environmental data, including management and monitoring undertaken under IPC Licence Reg. No. P0503-01 included within the Annual Environment Reports (AERS) for the Allen Bog Group;
- Published evidence concerning greenhouse gas emissions from drained, extracted, cutaway, cutover, rewetted and restored Irish peatlands as detailed in Section 11.2.4 above and including:
    - Derivation of greenhouse gas emission factors for peatlands managed for extraction in the Republic of Ireland and the United Kingdom (Wilson et al, 2015) [82];
- Relevant national climate projections and applicable EIA and greenhouse gas assessment guidance as outlined in Section 11.2 above.

Bogs and peatlands are known to store large amounts of organic carbon due to the waterlogged nature of these habitats, i.e., stored carbon is not broken down and released into the atmosphere. Drainage and peat extraction lower the water table and expose peat to aerobic decomposition, increasing carbon dioxide emissions. Accordingly, degraded and drained peatlands are generally greenhouse gas sources, whereas the direction and magnitude of emissions and removals at any particular location depend on site-specific factors, including water-table position, residual peat properties and depth, vegetation community, temperature and management.

The Project Site is located predominantly on former industrial peat extraction lands within the Allen Bog Group. Industrial peat extraction ceased in June 2020. Since then, environmental conditions across these lands have natural revegetation, alongside ongoing site management, decommissioning works, and environmental monitoring undertaken in accordance with IPC Licence P0503-01. Under the existing baseline, the Proposed Wind Farm site is determined to be a net greenhouse gas source; while industrial peat extraction has ceased, cessation of industrial scale peat extraction and natural revegetation do not, of themselves, demonstrate that drainage-related peat oxidation has ceased or affirm re-establishment of the area to a greenhouse gas emission sink.

At the commencement of the construction phase the likely future receiving environment will reflect the continued establishment of natural revegetation in suitable areas, in combination with the continuation of site management, decommissioning works, and environmental monitoring under IPC Licence P0503-01. The anticipated vegetation communities and their spatial distribution are described in Section 6.3.4 of Chapter 6 Biodiversity and summarised here.

[82] *Derivation of GHG emission factors for peatlands managed for extraction in the ROI and the UK. (2015)* <https://bg.copernicus.org/articles/12/5291/2015/>

Natural succession is expected to be spatially variable and is not assumed to follow a uniform trajectory across the Proposed Wind Farm site. Following the trends observed within the Proposed Wind Farm site following cessation of industrial peat extraction to date, at the commencement of construction it is likely that birch and willow scrub will have begun to develop on areas of dry cutaway, shallow peat, and some areas currently identified as scrub are anticipated to have developed into birch and willow-dominated woodland in this timeframe. Birch-dominated woodlands have already established in many areas of the Proposed Wind Farm site, particularly in Glashabaun North, Glashabaun South, Ballydermot North and Barnaran Bogs. As such the overall cover of scrub and woodland habitats within the Proposed Wind Farm site is anticipated to have increased by the time construction commences.

Pioneer poor fen habitats, most frequently dominated by common cottongrass (*Eriophorum angustifolium*) and soft-rush (*Juncus effusus*), have commonly been observed revegetating on areas of bare peat within the Proposed Wind Farm site. In drier areas, *Calluna*-dominated secondary communities may also revegetate bare peat. Therefore, the extent of these pioneer habitats are anticipated to have increased by the commencement of the construction phase of the Proposed Project. However, as industrial peat extraction has ceased within the Proposed Wind Farm site for over 6 years at the time of writing, and significant areas of the Proposed Wind Farm site remain dominated by bare peat, it has been shown that these habitats are slow to develop in many areas. This natural revegetation, primarily with pioneer fen, scrub and *Calluna*-dominated communities, will reduce the overall extent of exposed bare peat across the Proposed Wind Farm site by the commencement of the construction phase of the Proposed Project.

Chapter 8 Land Soils and Geology notes that enhanced rehabilitation works already completed at Lodge Bog under the PCAS have altered local drainage and surface conditions and have also included some (peat) cell bunding using local peat, they are not anticipated to have materially changed the local peat morphological conditions or the underlying geological environment at Lodge Bog. With Chapter 9 Water identifying that ongoing site management, decommissioning works, and environmental monitoring, along with natural revegetation, may result in localised changes to surface conditions, but these are not anticipated to materially alter the overall hydrological or hydrogeological regime of the Proposed Wind Farm site. Therefore, the likely future receiving environment established in Chapter 8 and Chapter 9 of this EIAR will not materially alter the likely future receiving environment for climate at the commencement of the construction phase.

Natural revegetation may reduce the extent of exposed bare peat and can alter the components of the greenhouse gas balance of the Proposed Wind Farm site. However, vegetation cover is not a proxy for rewetting, with available documentation not supporting a uniform quantified reduction in emissions from vegetation establishment alone. Measurements reported by Wilson et al. (2015), for example, demonstrate that emissions from peatlands managed for extraction are controlled by interacting site variables, i.e., soil temperature, water table position, level of rainfall, moisture content of peat, and vegetation cover.

On this basis, the likely future receiving environment of the Proposed Wind Farm site at the commencement of the construction phase will be a former industrial peat-extraction landscape with a developing but spatially variable cover of naturally revegetation, managed and monitored under IPC Licence Reg. No. P0503-01. From a climate perspective, the Proposed Wind Farm site will remain a net greenhouse gas source and is anticipated to be materially comparable to the existing baseline as established in Section 11.3.1.

The assessment of likely significant effects presented in Section 11.5.2 below has therefore been undertaken against this likely future receiving environment. As the climate conditions predicted at commencement of construction are materially comparable to those described in the existing baseline environment, the information presented in Section 11.3.1 remains representative of the likely future receiving environment for climate against which the Proposed Project is assessed.

11.3.3.1.1 Future Environmental Trends

This section identifies the future environment trends relating to climate likely to exist at the Proposed Wind Farm site following implementation of targeted rehabilitation within the Draft Rehabilitation Plans throughout the operational phase.

Continued natural revegetation, ongoing site management, environmental monitoring, and decommissioning works and implementation of the Draft Rehabilitation Plans are anticipated to facilitate the progressive rehabilitation of peatland across the Proposed Wind Farm site. These activities are anticipated to regenerate the Proposed Wind Farm site as a carbon store and contribute to the reduction of greenhouse gas emissions at the national level through the increased carbon sequestration potential projected for the Proposed Wind Farm site. However, As detailed in Section 6.3.4.1 of Chapter 6, it is not anticipated that the majority of the Proposed Wind Farm site has the potential to develop Active raised bog analogous to the priority EU Habitats Directive Annex I habitat within the foreseeable future (c.50 years), as the majority of peat has been removed and the environmental conditions have been modified. Areas of the Proposed Wind Farm site with deeper residual peat (>2m depth) have the potential to develop embryonic *Sphagnum*-rich peat-forming communities if optimum hydrological conditions can be developed in this timeframe. *Sphagnum* is a key species for restoring naturally functioning raised bog conditions.

Accordingly, notwithstanding the continued natural revegetation, and implementation of the Draft Rehabilitation Plans, the future environmental trends of the receiving environment for climate will remain materially comparable to the baseline conditions described in Section 11.3.1 above and have been brought through the impact assessment contained in Section 11.5.3 below; the future environmental trends of individual environmental factors influencing climate including traffic, water, land soils and geology, and air quality, have been considered through the relevant discipline-specific assessments.

The continuation of the aforementioned activities in the absence of the Proposed Project is considered in the Do-Nothing Scenario in Section 11.5.1 and in the cumulative assessment in Section 11.6.

11.3.3.1.2 Rehabilitation Calculations: Proposed Wind Farm site

The Peatland Code carbon calculator was used to assess the emission reduction potential of the Proposed Wind Farm site under the requirements of the IPC Licence (P0503-01). The carbon sequestration loss potential resulting from the Proposed Project permanent infrastructure footprint, has been determined for both the construction and operational phase of the Proposed Project and is outlined in Section 11.4.3.1.1 below.

The Peatland Code is a voluntary standard owned and operated by the IUCN National Committee UK and is managed on its behalf by an Executive Board. The Executive Board is facilitated by IUCN UK Peatland Programme (IUCN UK PP) staff and supported by a Technical Advisory Board. The Peatland Code was developed by the IUCN UK PP, with a Pilot Peatland Code funded in 2012 by the Department for Environment, Food and Rural Affairs (DEFRA) as one of several Payment for Ecosystem Service Pilots. These pilots informed a DEFRA-funded and commissioned report to develop carbon metrics and financial modelling to enable the quantification and valuation of the carbon impacts of peatland restoration. This work was developed into the Peatland Code 1.0, formally launched at the World Forum for Natural Capital in Edinburgh in 2015.

The Peatland Code Calculator specifies requirements for the validation and verification of a greenhouse gas assertion from voluntary UK-based projects which actively reduce greenhouse gas emissions through peatland restoration. The methodology has been refined and updated on several occasions since: Version 1.2 was launched in April 2022; Version 2.0 was launched in March 2023, which expanded the Peatland Code's scope to include fens, reduced the minimum peat depth for bogs, and updated the emission factors based on a DEFRA-funded research report led by the UK Centre for Ecology & Hydrology (UKCEH), aligning the Peatland Code with the UK Greenhouse Gas Inventory;

and Version 2.1 followed, and was utilised for the below calculation, with the accompanying Guidance Document dated October 2024[83].

Net greenhouse gas emissions reductions are calculated using project-specific Emissions Calculators (separate tools for bogs and fens), which subtract the total carbon cost of restoration from the gross emissions reduction (or apply a 5% carbon cost buffer where this cannot be calculated), apply a further 5% conservative buffer, and adjust for any leakage. The emission factors used within the calculators — covering carbon dioxide, methane, nitrous oxide, dissolved organic carbon and particulate organic carbon, expressed as CO2 equivalent over a 100-year global warming potential — are developed by academics employed by the UK Government and kept in alignment with the UK Greenhouse Gas Inventory as data availability and scientific confidence improve. The IUCN UK Peatland Programme has supplied the Bog Emissions & Carbon Calculator and the Fen Emissions Calculator, which have been used to complete the following carbon assessment.

The Peatland Code carbon assessment has been utilised to determine the emission reductions per year between 5 years and 100 years from the start of IPC required rehabilitation as outlined in the Draft Rehabilitation Plans for the Proposed Wind Farm site.

The Peatland Code defines a pre-restoration and post-restoration baseline with relevant emission factors provided for each category (see Appendix 11-2 for a detailed overview on the list of assumptions for the Peatland Code, i.e., the habitat baselines and associated carbon storage capacity of restored/replanted habitats).

The Draft Rehabilitation Plans are reviewed and updated every two years as per the condition of the licence, with any measures outlined in the plans to be approved in writing by the EPA before their full implementation. Therefore, the Draft Rehabilitation Plans have the flexibility to change, in response to stakeholder consultation and in order to adapt to the evolving conditions and dynamic nature of the site as necessary, ensuring the correct habitat management measures are implemented in the correct place. The Peatland Code carbon assessment was completed in October 2026.

The baselines set for the Proposed Wind Farm site are as follows:

- Pre-Restoration Baseline: Drained and Artificial
- Post-Restoration Baseline: Rewetted Modified Bog

Based on the area of the 14-no. Allen Bog Group bogs which form the Proposed Wind Farm site (i.e., 5,139ha) and the above identified baselines, total emission reductions have been determined to be 2,158,380 tCO2eq over the operational lifetime of the Proposed Wind Farm (i.e., 0-35 years); see detailed presented in Table 11-6 below:

[83] *UICN Peatland Programme (October 2024) Peatland Code Version 2.1* <https://www.iucn-uk-peatlandprogramme.org/sites/default/files/2025-09/Peatland%20Code%20V2.1%20-%20Web%20Final-Sept%202025.pdf>

Table 11-6 Emission Reduction within the Proposed Wind Farm site from the Draft Rehabilitation Plans over the 35 year operational life of the Proposed Wind Farm

Period (Year)	Assessment Unit Cumulative Emission Reduction (tCO2eq/ha) - from lookup tables	Assessment Unit Emission Reduction (tCO2eq) - Cumulative Emission Reduction (tCO2eq/ha) x Area (ha)
0-5	15.00	77,085.00
5-10	30.00	154,170.00
10-15	45.00	231,255.00
15-20	60.00	308,340.00
20-25	75.00	385,425.00
25-30	90.00	462,510.00
30-35	105.00	539,595.00
Total		2,158,380

As outlined in Table 11-6 above, net emission reductions of 2,158,380 tCO2eq have been determined across the 5,139ha of rehabilitated bog over the operational life of the Proposed Wind Farm (i.e., 0-35 years) (modelled from 2033) in the absence of the Proposed Project. On an annual basis, from 2033 to 2068, this equates to 61,668 tCO2eq.

Please see Section 11.4.3.1.1 below for further detail on the carbon sequestration loss potential resulting from the Proposed Project permanent infrastructure footprint on rehabilitation in the part of the Allen Bog Group located within the Project Site as compared to the above identified net emission reductions.

11.3.4 Summary

As outlined in the preceding sections, Ireland is and will continue to experience climate change in line with global trends, with current projections indicating that these effects will intensify in the coming decades. The design of the Proposed Project has considered the potential climate change effects under both the baseline and future environment, and it is considered that the Proposed Project will not be negatively impacted by climate change, nor will it have a negative impact on climate change over its 35-year design horizon.

Further information on the vulnerability of the Proposed Project to major accidents and natural disasters is detailed in Section 17.4 of Chapter 17 Major Accidents and Natural Disasters.

Peatland rehabilitation and renewable energy development has been proven to successfully coexist, as shown by BnM's Cloncreen Wind Farm and other similar sites across Ireland; further details are provided in Section 2.5.4 of Chapter 2. The permanent infrastructure footprint of the Proposed Project is 154 ha, representing 2.9% of the overall Project Site (5,157ha). Out of the 154 ha permanent infrastructure footprint of the Proposed Project, 152 ha is located within the Allen Bog Group. This 152ha footprint represents 2.9% of the Proposed Wind Farm site (5,139 ha). As the overall footprint of the Proposed Project will be less than 3% of the total area of the Project Site, it will not impact or change the overall goals and outcomes of the Draft Rehabilitation Plans under the future trends for the Proposed Wind Farm site as identified in Section 11.3.3.1.1 above.

11.4 Carbon Assessment - Calculating Carbon Losses and Savings from the Proposed Project

11.4.1 Background

In addition to the combustion of fossil fuels, greenhouse gases are also released through natural processes such as the decomposition of organic (i.e., carbon-based) material. Bogs and peatlands are known to store large amounts of organic carbon. Due to the waterlogged nature of these habitats, stored carbon is not broken down and released into the atmosphere. The construction of wind farms on bog and peat habitats may affect the natural hydrological regime, thus exposing and drying out the peat and allowing the decomposition of carbon. It is therefore necessary to demonstrate that any wind farm constructed on such sites saves more carbon than is released. The Proposed Wind Farm comprises natural revegetation of cutaway and degraded bog. The Proposed Wind Farm site has been subject to industrial peat extraction and drainage over several decades and consequently, the peatland habitats and hydrology are highly degraded and modified from their original state. As such, the peatland habitat loss would not be as significant as that of an intact peatland. The Proposed Grid Connection underground electrical cabling is primarily comprised of public road corridor, and the Proposed Offsite Substation is located in agricultural land. For this reason, the carbon balance between the use of renewable energy and the loss of the carbon stored in the peat will be assessed in this section of the EIAR.

CO_2 emissions occur naturally in addition to being released with the burning of fossil fuels. All organic material is composed of carbon, which is released as CO_2 when the material decomposes. Organic material acts as a store of carbon. Peatland habitats have a significant capacity to store organic carbon. The vegetation on a peat bog slowly absorbs CO_2 from the atmosphere when it is alive and converts it to organic carbon. When the vegetation dies, in the acidic waterlogged conditions of bogs and peatlands, the organic material does not decompose fully, and the organic carbon is retained in the ground.

When developments such as wind farms are proposed for peatland areas, there will be direct impacts and loss of peat in the area of the development footprint. There may also be indirect impacts where it is necessary to install drainage in certain areas to facilitate construction, or from the reinstatement of extracted peat. The works can either directly or indirectly allow the peat to dry out, locally, which permits the full decomposition of the stored organic material with the associated release of the stored carbon as CO_2. It is therefore important to demonstrate that a wind farm development in a peatland area offsets more CO_2 through its operational lifetime than is released during construction, operation and decommissioning.

As identified in Section 11.3.2.4 above, the Proposed Wind Farm site is currently managed under IPC Licence P0503-01. BnM have produced Draft Rehabilitation Plans for the bogs contained within the Proposed Wind Farm site and it is the intention of BnM to rehabilitate the bogs in a phased approach under IPC Licence. The Draft Rehabilitation Plans have been designed with consideration of the Proposed Project permanent footprint; The permanent infrastructure footprint of the Proposed Project is 154 ha, representing 2.9% of the overall Project Site (5,157ha). Out of the 154 ha permanent infrastructure footprint of the Proposed Project, 152 ha is located within the Allen Bog Group. This 152ha footprint represents 2.9% of the Proposed Wind Farm site (5,139 ha).

The Draft Rehabilitation Plans further detail the framework and outline of the works that will be undertaken to achieve the aims of successful rehabilitation. These targeted rehabilitation measures are not included as part of this planning application and will be implemented by BnM in agreement with the EPA irrespective of any further development on the Project Site, as per the BnM's IPC Licence Obligations. The Draft Rehabilitation Plans are included as Appendix 2-4 and are described in Section 2.10.2.3 of Chapter 2 of this EIAR. Consideration of the potential carbon sequestration loss of the Allen Bog Group as a result of the Proposed Project is considered in Section 11.4.3.1.1 below.

PCAS is a form of enhanced peatland rehabilitation and been successfully implemented at the operational Cloncreen Wind Farm located to the west of the Project Site. To date, approximately 24,503ha of peatland has been rehabilitated under the PCAS[84]. PCAS has been completed within the Project Site at Lodge Bog, located within Co. Kildare. The completed PCAS activities at Lodge Bog are separate to the proposals of this planning application and will continue to be managed by BnM. The Proposed Project infrastructure footprint does not overlap with the PCAS in Lodge Bog and as such they have not been considered in the carbon assessment contained in Section 11.4.3 below. Please refer to Section 11.6 for a detailed assessment on the interaction between PCAS and the Proposed Project.

As outlined in Section 4.4.1.8 of Chapter 4, as part of the Proposed Project, approximately 60.7ha of forestry will be permanently clear-felled. Note, in line with the Forest Service's published policy[85] on granting felling licences for wind farm developments, areas cleared-felled forestry for access roads, and any other wind farm-related uses will be replaced by replanting at an alternative site or sites. The specific lands on which any such replacement afforestation would occur have not been identified at this stage. On a precautionary basis, the Applicant commits that, where replacement afforestation is required, the replacement afforestation lands will be located at least 10km from the Proposed Wind Farm and will not be located where there is a hydrological pathway through which the afforestation works could give rise to cumulative effects with the Proposed Project. The losses associated with these activities has been determined in the below carbon loss assessment, however, under a precautionary scenario the carbon storage potential of replanted forestry under as required by the Foresty Felling Licence has not been included in the below assessment.

The below assessment includes all projected carbon losses associated with the Proposed Project, including the full lifecycle of turbine infrastructure (manufacture, construction, decommissioning) of the Proposed Project, back-up requirements of the Proposed Turbines, reduced carbon sequestration potential of the Project Site (accounting for the likely future baseline as outlined in Section 11.3.4 above), loss of soil organic matter, tree felling activities, traffic generation emissions, embodied carbon of all construction materials, and those emissions associated with carbon savings from the Proposed Project.

The values discussed in Section 11.4.3.1 are based on the assumption that no habitat enhancement, offset measures or replanting activities will take place as part of the Proposed Project; refer to Appendix 11-2 for the full list of assumptions utilised for the carbon assessment. These measures form part of the Proposed Project however; they are excluded from the calculations for assessment purposes. As detailed in Section 4.4.1.8 of this EIAR, the estimated 60.3 hectares that will be permanently clear-felled for the footprint of the Proposed Project will be replaced or replanted as a condition of any felling licence that will be issued in respect of the Proposed Project. Furthermore, the Proposed Enhancement Areas, consisting of enhancement and offsetting measures for Golden Plover and habitat management for woodland, peatland and marsh fritillary, will be implemented throughout the Proposed Wind Farm. Please see Appendix 6-5 Biodiversity Management Plan (BMP) for further detail. These activities will result in carbon sequestering habitat, however, as outlined in Appendix 11-2, the carbon storage capacity of restored/replanted habitats will vary over time as vegetation matures and land use and the baseline environment change. Therefore, while it can be assumed that the Proposed Enhancement Areas and replanting as required under the Forestry Felling Licence will result in an increased capacity of carbon storage due to the carbon storage potential that exists within these habitats, under a precautionary approach the quantification of these potential carbon savings associated with these measures has not been quantified in this assessment.

[84] https://www.bnmpcas.ie/news-and-updates/
[85] *Department of Agriculture, Food, and the Marine, Tree Felling and Reforestation Policy* <https://www.gov.ie/en/publication/19b8d-tree-felling-licences/>

11.4.2 Methodology for Calculating Losses

The calculation methodology for carbon loss utilises the Macauley Institute Carbon Calculator for Wind Farms on Scottish Peatlands and the Transport Infrastructure Ireland (TII) Carbon Assessment Tool as outlined in Section 11.2.4 above.

Table 11-7 below provides a summary of the methodologies, tools and data sources used to calculate the carbon losses, carbon savings and overall carbon balance associated with the Proposed Project. Further detail on the assessment methodologies are outlined below.

Table 11-7: Summary of Carbon Assessment Methodologies

Assessment Component	What is Being Calculated	Methodology / Tool Used	Output
Turbine lifecycle emissions	Emissions/embodied carbon associated with turbine transport, construction, operation and decommissioning	Macauley Institute Carbon Calculator (Version 2.15.6)	tCO_2eq losses
Peat excavation and peat disturbance	Carbon losses arising from peat removal and disturbance during construction	Macauley Institute Carbon Calculator (Version 2.15.6)	tCO_2eq losses
Carbon fixing potential	Loss of future carbon sequestration potential resulting from the Proposed Project permanent infrastructure footprint	Macauley Institute Carbon Calculator (Version 2.15.6)	tCO_2eq losses
Clear-Felled Forestry	Losses associated with clear-felled forestry	Macauley Institute Carbon Calculator (Version 2.15.6)	tCO_2eq losses
Embodied carbon of construction materials	Carbon associated with production, transport and installation of materials such as concrete, steel, aggregates and cables	TII Carbon Tool (Version 1.0.0)	tCO_2eq losses
Construction traffic emissions	Emissions associated with material haulage, turbine delivery and workforce movements	TII Carbon Tool (Version 1.0.0)	tCO_2eq losses
Renewable energy carbon savings	Carbon emissions displaced through generation of renewable electricity – detailed assessment provided in Section 11.4.3.2	SEAI grid emission factors and wind farm electricity generation calculations	tCO_2eq savings

Macauley Institute Carbon Calculator

A methodology for calculating carbon losses on peatlands was published in June 2008 by scientists at the University of Aberdeen and the Macauley Institute with support from the Rural and Environment

Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. The document, '*Calculating Carbon Savings from Wind Farms on Scottish Peat Lands'*, was developed to calculate the impact of wind farm developments on the soil carbon stocks held in peat. This methodology was refined and updated in 2011 based on feedback from users of the initial methodology and further research in the area. The Macauley Institute has supplied the most up to date version of the calculator (Version 2.15.6) via worksheet to MKO which has been used to complete the following carbon loss assessment. The tool provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands. Previously, guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of more detailed methods.

Further to the methodology supplied by the Macauley Institute, other relevant data sources utilised for the calculation of carbon losses to provide relevant information in an Irish context. These additional information sources are listed below:

- Multiyear greenhouse gas balances at a rewetted temperate peatland (Wilson et al., EPA, 2016a);
- Greenhouse gas Emission Factors. (Wilson et al., 2016b);
- Derivation of GHG emission factors for peatlands managed for extraction in the ROI and the UK. (Wilson et al., EPA, 2015);
- The Effect of Management Strategies on Greenhouse Gas Balances in Industrial Cutaway Peatlands in Ireland (The CARBAL Report) (Wilson, D. and Farrell, E.P., EPA, 2007); and.
- Carbon Emissions and Removals from Irish Peatlands: Present Trends and Future Mitigation Measures, Irish Geography 2013 Vol. 46 Nos. 1-2, 1-23 (Wilson et al., EPA, 2013).
- Peatland Properties Influencing Greenhouse Gas Emissions and Removal (Wilson et al., EPA, 2022)

These data sources were used to assess the effects of the Proposed Project in terms of potential carbon losses taking into account peat removal and reinstatement, drainage, habitat improvement, forestry felling and site restoration.

Although the loss of carbon fixing potential from vegetation on peatland is not substantial, it is nonetheless calculated for areas from which peat is removed and the areas affected by drainage. The development of a wind farm requires the construction of infrastructure, i.e., turbines and associated foundations and hardstands, internal site roads, construction compounds, etc. and, on a site such as the Proposed Project, this requires peat excavation resulting in the loss of the carbon-fixing potential associated with that peat. The determination of the carbon losses associated with the carbon-fixing potential of peat is calculated from the area affected by proposed infrastructure of a wind farm development (both directly by removal of peat and indirectly by drainage, the annual gains due to the carbon fixing potential of the peatland, and the time required for habitat restoration). The amount of carbon lost is estimated by the Macauley Institute carbon tool using default values from the IPCC Revised 1996 Guidelines for National Greenhouse Gas Inventories[86] as well as by more site-specific equations derived from the scientific literature and updated emission factors.[87] Carbon losses associated with the removal of other carbon-fixing vegetation will result in additional carbon losses. These have not been quantified as the lack of consistent national-level field data and methodologies limits the ability to make accurate projections on carbon sequestration potential for other carbon fixing habitat types, i.e., hedgerow, grassland, etc., and therefore carbon loss associated with removal. While it can be assumed that loss of carbon fixing vegetation will occur as part of the Proposed Project due to the removal of these habitat types, the exact carbon loss is not quantifiable. It is also assumed that these

[86] *IPCC (1997) Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*
[87] *Calculating potential carbon losses and savings from wind farms on Scottish peatlands (2018)* <https://www.gov.scot/advice-and-guidance/2018/12/carbon-calculator-technical-guidance/documents/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands>

carbon losses are Not Significant as the vast majority of the Proposed Wind Farm consists of bare peat and therefore vegetation coverage is limited. However, to ensure a robust assessment in Section 11.5 below, these carbon losses have been considered; please see Section 11.5.2 and 11.5.3 below for the detailed impact assessment and Appendix 11-2 for further information on assumptions used in this assessment.

Peatlands are essentially unbalanced systems. When flooded, peat soils emit less carbon dioxide than when drained, but emit more methane in this condition. In waterlogged soils, CO_2 emissions are usually exceeded by plant fixation, so the net exchange of carbon with the atmosphere is negative and soil carbon stocks increase. When soils are aerated, CO_2 emissions usually exceed plant fixation, so the net exchange of carbon with the atmosphere is positive. In order to calculate the CO_2 emissions resulting from the removal or drainage of the peat, the Macauley Institute method accounts for emissions occurring if the peat had been left in-situ and subtracts these from the emissions occurring after removal and drainage.

The Macauley Institute methodology states that the total volume of peat impacted by the construction of a wind farm is strongly correlated to the extent of the peatland affected by drainage at the site.

The drainage of peat soils leads to continual loss of soil carbon until a new steady state is reached, when inputs are approximately equal to losses. For peats, this steady state approximates 0% carbon, so 100% carbon loss from drained peats is assumed if the site is not restored after decommissioning of the wind farm.

The amount of carbon lost is calculated on the basis of the annual emissions of methane and carbon dioxide, the area of drained peat, and the time until the site is restored. In the case of the Proposed Project, the Macauley Carbon Calculator has been run on the assumption that targeted rehabilitation listed in the Draft Rehabilitation Plans and forming part of the Proposed Enhancement Areas will not be implemented. In reality, the Proposed Wind Farm site is subject to the requirements of the IPC Licence, as detailed in Section 11.3.3 above, and will undergo rehabilitation in line with the targeted rehabilitation measures contained in the Draft Rehabilitation Plans (Appendix 2-4). Furthermore, the Proposed Wind Farm site is subject to the enhancement and offsetting measures contained within the Proposed Enhancement Areas.

As outlined in Section 11.4.1 above, the permanent infrastructure footprint of the Proposed Project is 154 ha, representing 2.9% of the overall Project Site (5,157ha). Out of the 154ha permanent infrastructure footprint of the Proposed Project, 152ha is located within the Allen Bog Group. This 152ha footprint represents 2.9% of the Proposed Wind Farm site (5,139 ha).

In addition, as detailed in Section 4.12 of Chapter 4, upon decommissioning, it is proposed that all above ground turbine components will be removed, and hardstands and compounds would remain. The Decommissioning Plan, included as Appendix 4-7, will be updated prior to the end of the operational phase in line with decommissioning methodologies that will exist at the time and will be agreed with the competent authority at that time.

The effects of drainage may also reduce dissolved and particulate organic carbon retention within the peat. Losses of carbon dioxide due to leaching of dissolved and particulate organic carbon are calculated as a proportion of the gaseous losses of carbon from the peat. The Macauley Institute method assumes that published good practice is employed to avoid the risk of peat landslides. This is certainly the case in respect to the Proposed Project, which has been the subject of a peat stability risk assessment, as described in the Peat Stability Assessment Report in Appendix 8-1 of this EIAR.

The outputs of the Macauley Institute carbon calculator are included in Appendix 11-2 of this EIAR, ‘Carbon Calculations’ and summarised in Section 11.4.3.1 below.

Transport Infrastructure Ireland (TII) Carbon Assessment Tool

In addition to the Macauley Institute methodology described above, where possible, CO_2 emissions or losses associated with embodied carbon of materials used in the construction, operational and decommissioning phase of the Proposed Project have been identified using the TII Carbon Assessment Tool. Embodied carbon refers to the emissions associated with procuring, mining and harvesting raw materials, the transformation of those materials into construction products, transporting them a site along dedicated haul routes and installation of these materials during a construction phase, and the subsequent replacement, removal, and disposal of these materials upon decommissioning[88].

The full life cycle and embodied carbon of the Proposed Turbines have been taken account of in the Macauley Institute model. The emissions associated with the embodied carbon, along with the construction phase transport movements, of the remaining features of the Project Site are considered using the TII Carbon Tool (TII, 2025)[89]. The TII Carbon Tool is customised for road and light rail projects in Ireland, using emission factors from recognised sources during the construction, maintenance and operation of TII projects in Ireland. Section 15.1.5 in Chapter 15 of this EIAR outlines traffic generation numbers relative to quantum of materials required for the construction of the Proposed Project, the details of which have been utilised to determine the emissions associated with these activities and are included in Appendix 11-2 and summarised in Section 11.4.3.1 below.

11.4.3 Carbon Losses and Savings Calculations

11.4.3.1 Carbon Losses

The Macauley Institute Carbon Calculator[90] was used to assess the impacts of the Proposed Project in terms of potential carbon losses taking into account peat removal and reinstatement, drainage, habitat improvement, forestry felling and site restoration. The online calculator is pre-loaded with information specific to the CO_2 emissions from the United Kingdom's electricity generation plant, which is used to calculate emissions savings from Proposed Wind Farm projects in the UK. However, due to the availability of Irish-specific carbon intensity emission factors for the Irish electricity generation plant, available from the SEAI website[91], the CO_2 emissions savings from the Proposed Project have been calculated separately from the online carbon calculator as set out in Section 11.4.3.2 below.

In relation to embodied carbon and associated transport movements of all other ancillary elements of the Proposed Project, the TII Carbon Tool has been utilised to assess the impacts of the Proposed Construction Haul Route and Proposed Turbine Delivery Route in terms of potential carbon losses in relation to construction phase transport emissions and embodied carbon.

A copy of the outputs is provided as Appendix 11-2 of this EIAR, *'Carbon Calculations'*. Where available and relevant, site-specific information was inserted into the online carbon calculators. Otherwise, default values were used.

The main CO_2 losses due to the Proposed Project are summarised in Table 11-8.

[88] *Irish green Building Council – What is embodied carbon?* <https://www.igbc.ie/what-is-embodied-carbon/>
[89] *Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document* https://cdn.tii.ie/publications/GE-ENV-01106-03.pdf
[90] *Scottish Government online Carbon Calculator. Available at:* https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/
[91] https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors

Table 11-8 CO_2 Losses from the Proposed Project

Origin of Losses	CO_2 Losses (tonnes CO_2 equivalent)	
	Expected	Maximum
Losses due to turbine life (e.g., manufacture, construction, operation, decommissioning), i.e., Proposed Turbine embodied carbon	279,353	283,651
Losses due to backup during operation	221,144	224,304
Losses from reduced carbon fixing potential	4,304	5,739
Losses from soil organic matter and due to leaching of dissolved and particulate organic carbon (CO_2 loss from removed and drained peat)	69,923	345,814
Losses associated with embodied carbon in construction materials	344,715	344,715
Losses associated with construction phase traffic and transport movements	3,314	3,314
Losses due to clear-felled forestry	26,877	26,877
Total	949,630	1,234,414

The worksheet models and online tools calculate that the Proposed Project will give rise to 949,630 tCO_2eq losses over the construction, operation, and decommissioning phase of the Proposed Project. Of this total figure, the losses due to the life of the Proposed Turbines directly account for 279,353 tCO_2eq, or 29%. Losses due to backup account for 221,144 tCO_2eq, or 23%. Losses from reduced carbon fixing potential accounts for 4,304 tCO_2eq, or 0.5%. Losses from soil organic matter, i.e., CO_2 loss from removed and drained peat, will equate to 69,923 tCO_2eq, or 7%. Losses due to embodied carbon accounts for 344,715 tCO_2eq, or 36% and losses due to construction phase transport emissions accounts for 3,314 tCO_2eq, or 0.3%. Losses due to clear-felled forestry equates to 26,877 tCO_2eq or 2.8%.

The figure of 69,923 tonnes of CO_2 arising from ground activities associated with the Proposed Project is calculated based on the entire Proposed Project infrastructure footprint being "Acid Bog", as this is one of only two choices the model allows (the other being Fen). The Carbon Calculator Technical Guidance document[92] defines 'Acid Bog' as being '*a wetland fed primarily by rainwater and often inhabited by sphagnum moss, thus making it acidic*' and 'Fen' as being '*a type of wetland fed by surface and/or groundwater (McBride et al., 2011)'.* The habitat that will be impacted by the Proposed Project infrastructure footprint, as detailed above in Section 11.3.2.4, comprises predominantly cutover peatland which has been subject to industrial peat extraction and drainage over several decades and agricultural lands. Consequently, the peatland habitats and hydrology are highly degraded and modified from their original state. As outlined in Section 11.4.1 above, the permanent infrastructure footprint of the Proposed Project is 154 ha, representing 2.9% of the overall Project Site (5,157ha). Out of the 154 ha permanent infrastructure footprint of the Proposed Project, 152 ha is located within the Allen Bog Group. This 152ha footprint represents 2.9% of the Proposed Wind Farm site (5,139 ha). Therefore, while the carbon calculations are based on the precautionary assumption that there will be no rehabilitation of the Project Site after the decommissioning of the Proposed Wind Farm, in reality

[92] *Scottish Government (2018) Carbon Calculator: Technical Guidance* <https://www.gov.scot/publications/carbon-calculator-technical-guidance/>

the Proposed Wind Farm site has continued to develop through natural revegetation, alongside ongoing site management, decommissioning works and environmental monitoring undertaken in accordance with IPC Licence P0503-01 (Section 11.3.2.4 above) and will be subject to the targeted rehabilitation measures set out in the Draft Rehabilitation Plans (Appendix 2-4). The Draft Rehabilitation Plans will be implemented following completion of the construction phase, subject to agreement and approval by the EPA. Carbon sequestration loss potential of the rehabilitation requirements under IPC Licence in relation to the Proposed Project permanent infrastructure footprint are detailed in Section 11.4.3.1.1 below.

Therefore, based on the above, it is assumed that the actual carbon losses associated with ground activities will be less than the 83,403 tonnes stated in Table 11-8 above, which was calculated under a theoretical precautionary scenario of "Acid Bog".

As identified in Section 11.3.2.4.1 above, the Proposed Wind Farm site is located on land subject to IPC License. Given the nature of the onsite activities identified, i.e., IPC Licence, the Draft Rehabilitation Plans as described in detail in Chapter 2, and the enhanced rehabilitation under PCAS completed within Lodge Bog, the likely future climate baseline would evolve to facilitate the progressive rehabilitation of peatland across the Proposed Wind Farm site. The impact of the Proposed Project infrastructure on the implementation of the Draft Rehabilitation Plans is further assessed in Section 11.4.3.1.1 below and a cumulative assessment of the interaction is given in Section 11.6 below. All measures associated with Condition 10 of the IPC Licence (i.e., the Draft Rehabilitation Plans) will continue irrespective of the planning permission for the Proposed Project.

Taking into account the progressive rehabilitation of peatland forming part of the Proposed Enhancement Areas that will take place as part of the Proposed Project, the actual CO_2 losses for reduced carbon fixing potential of the peatland on which the Proposed Project is situated is expected to be lower than the values detailed in Table 11-6, over the lifetime of the Proposed Project.

The figure of 344,715 tonnes of CO_2 arising from the embodied carbon of construction materials associated with the Proposed Project is calculated based on the types of materials available in the TII Carbon Tool such as, concrete, steel, cement and granular fill, and assumes that each Heavy Goods Vehicles (HGV) or Light Good Vehicles (LGV) will be carrying material at its full capacity. The figure of 3,314 tonnes of CO_2 arising from traffic and transport movements along the Proposed Construction Haul Route and Proposed Turbine Delivery Route associated with construction activities of the Proposed Project is calculated based on the assumption that material will be imported only along the specified routes. Details on the assumptions made for the modelling of embodied carbon and construction phase transport emissions are included in Appendix 11-2.

The above calculation is based on the assumption that the hydrology of the Proposed Project and habitats within the Project Site are not restored (i.e., implementation of the Draft Rehabilitation Plans and Proposed Enhancement Areas) on decommissioning of the Proposed Wind Farm after its expected 35-year proposed operational life. As detailed in the Decommissioning Plan, Appendix 4-7, it is proposed that the Proposed Turbines will be dismantled and removed offsite. It is not intended to remove the concrete foundations from the ground as it is considered that their removal will be the least preferred option in terms of potential effects on the environment. The Proposed Grid Connection and all the associated transmission infrastructure i.e. underground cables, overhead line cabling, steel masts, etc. will remain in place as it will be under the ownership and control of the ESB Networks and/or EirGrid and will form a permanent part of the national electricity grid. Taking into account the proposals incorporated in the Decommissioning Plan, Appendix 4-7, the actual CO_2 losses are expected to be lower than the values detailed in Table 11-8.

11.4.3.1.1 *Carbon Sequestration Potential*

During the construction and operation phase, the lands beneath the Proposed Project infrastructure footprint will not be available to develop into carbon sequestering habitat. In addition, lands adjacent to the Proposed Project infrastructure footprint may also be indirectly impacted through drainage and

therefore also not reach their carbon sequestration potential. As stated in Section 1.1.2 of Chapter 1 of the EIAR, the permanent infrastructure footprint of the Proposed Project is 154 ha, representing 2.9% of the overall Project Site (5,157ha). Out of the 154 ha permanent infrastructure footprint of the Proposed Project, 152 ha is located within the Allen Bog Group. This 152ha footprint represents 2.9% of the Proposed Wind Farm site (5,139 ha).

The carbon sequestration potential for the Proposed Wind Farm site, as detailed in Section 11.3.2.4.2 above, is considered within the context of Proposed Project infrastructure located within the Proposed Wind Farm site (i.e., the Proposed Wind Farm, Proposed Onsite Substation and 0.5km of Proposed Grid Connection underground electrical cabling route). The Proposed Grid Connection infrastructure not contained within the Allen Bog Group is not included in the below assessment. For clarity, all quantifiable carbon losses associated with the Proposed Project not in peatland are included in the carbon assessment contained in Section 11.4.3.1 above.

In order to assess the potential that the Proposed Project might have on the carbon balance of the Proposed Wind Farm site over the lifetime of the Proposed Project, a number of conservative assumptions are made:

- 100% of the area beneath the Proposed Project infrastructure footprint will actively sequester carbon continuously over the 35-year period and will begin to sequester carbon in 2026.
- The Proposed Project infrastructure footprint is buffered by 5m around the permanent infrastructure to allow for any possible impact on habitat formation in those areas adjacent to the footprint.

The Draft Rehabilitation Plans for the 14 no. bogs forming part of the Allen Bog Group and the Proposed Wind Farm site (Appendix 2-4) recognise that the surface topography within the Allen Bog Group is heterogeneous. Therefore, it is not possible to re-wet all areas within the Allen Bog Group and hence create the optimum conditions for carbon sequestration. In the drier areas, this will result in the formation of dry woodland areas or similar drier habitats. Furthermore, in those areas where the optimum conditions for carbon sequestration will be created by the Draft Rehabilitation Plans it will require time to transition to the desired habitat. This applies to both the areas within and outside the Proposed Project infrastructure footprint. Finally, the application of a 5m buffer around the Proposed Project infrastructure within the Allen Bog Group is a conservative assumption. Research has indicated that the impact of drains on the water table adjacent to the drain may extend only a few metres.[93,94] Habitat regeneration and rehabilitation can be directly applied adjacent to the Proposed Project infrastructure.

The proposals contained within the Draft Rehabilitation Plans have been designed with consideration of the Proposed Project infrastructure footprint. The permanent infrastructure footprint of the Proposed Project represents approximately 2.9% of the Proposed Wind Farm site and therefore does not impact or change the overall goals and outcomes of the proposed rehabilitation plans for the Allen Bog Group. The targeted rehabilitation measures set out in the Draft Rehabilitation Plans will be implemented following completion of the construction phase, subject to agreement and approval by the EPA. The primary objective of the Draft Rehabilitation Plans is environmental stabilisation, with targeted rehabilitation of the cutaway areas occurring both between and surrounding the Proposed Wind Farm infrastructure footprint. This has proven successful during the construction of the Derrinlough, Mountlucas, and Cloncreen Wind Farms, see Plate 11-1 below.

The projected impact under theoretical precautionary conditions is outlined in Table 11-9.

[93] *Stewart and Lance (1991) Effects of Moor-Draining on the Hydrology and Vegetation of Northern Pennine Blanket Bog. Journal of Applied Ecology, Dec. 1991, Vol. 28, No. 3 pp. 1105-1117.* https://www.jstor.org/stable/2404228
[94] *Galvin, L. F 1976 Physical Properties of Irish Peats. Irish Journal of Agricultural Research, Vol. 15, No. 2 (Aug. 1976), pp. 207-221.* http://www.jstor.org/stable/25555820

Table 11-9 Assessment of potential loss of carbon sequestration

Description	Proposed Project Infrastructure within the Allen Bog Group	Project Infrastructure within the Allen Bog Group plus 5m Buffer[1]
Area of the Proposed Wind Farm site (Ha)	5,139	5,139
Annual tCO_2eq emission reductions over 35 years as per Table 11-8 above	61,668	61,668
Total Proposed Project infrastructure footprint (ha)	152	220
Area of the Proposed Wind Farm site assumed to actively sequester carbon[2] (Ha)	4,987	4,919
Annual Peatland Code Calculator Results as per Section 3 in Appendix 11-2 (tCO_2eq)	59,844	59,028
Annual tCO_2eq emission reductions lost per Annum over 35 years	1,824	2,640
% of lost annual tCO_2eq emission reductions	3%	4.3%

Note 1: 5m is considered to be a worst-case buffer.
Note 2: The Total Footprint (ha) has been removed from the values provided

Plate 11-1 Peatland rehabilitation implemented in the form of drain blocking proximal to wind farm infrastructure at Cloncreen Wind Farm (located to the west of the Project Site). Source: BnM.



As outlined in Section 11.3.2.4.2 above, the permanent Proposed Project infrastructure within the part of the Allen Bog Group accounts for 152ha, the total ground disturbance during the construction phase has assumed a 5m buffer on this footprint equates to 220ha. Therefore, the area of the Proposed Wind Farm site assumed to actively sequester bog (based on a conservative assumption outlined above) is reduced by 152ha during the operational phase and 220ha during the construction phase. The calculations provided in Table 11-9 above are completed under theoretical precautionary conditions as the implementation of the Draft Rehabilitation Plans, following agreement with EPA, will occur after the completion of the construction phase of the Proposed Project, i.e., the 220ha construction footprint will not have an impact on the carbon sequestration potential of the part of the Allen Bog Group in which Proposed Project infrastructure is located.

Based on the detail provided in Table 11-9, it is concluded that once the area of the Proposed Project infrastructure footprint is removed from the total potential carbon sequestration area, approximately 97% of the Proposed Wind Farm site remains available for rehabilitation, this area has the potential to result in approximately 59,844tCO_2eq of carbon savings per annum over the 35 year operational life of the Proposed Wind Farm, with the loss of area resulting from the Proposed Project permanent infrastructure footprint (i.e. 3% of the Proposed Wind Farm site) equating to 1,824 tCO2eq emission reductions per annum. Once the area of the Proposed Project infrastructure footprint plus the 5m buffer is removed from the total potential carbon sequestration area, approximately 96% of the Proposed Wind Farm site remains available for rehabilitation, this area has the potential to result in approximately 59,028tCO_2eq of carbon savings per annum over 35 year operational life of the Proposed Wind Farm with the loss of area resulting from the Proposed Project construction footprint (i.e. 4% of the Proposed Wind Farm site) equating to 2,640 tCO2eq emission reductions per annum..

Following the end of the 35-year operational life, the Proposed Wind Farm will be decommissioned. As outlined in Section 11.4.3.1 above and in Appendix 4-, it is not intended to remove the concrete foundations or roads from the Project Site. Under a precautionary scenario it is determined that these areas will remain unavailable for carbon sequestration measures associated with the Draft Rehabilitation Plans. Therefore, it is determined that the Proposed Project infrastructure footprint (152ha) is permanent.

The Proposed Wind Farm will offset the greenhouse gas emissions associated with the entirety of the Proposed Project within its operational life, as outlined in Section 11.4.3.2 below.

11.4.3.2 Carbon Savings

According to the carbon losses as determined from the Macauley Carbon Calculator and TII Carbon Tool as described in Section 11.4.2 and Section 11.4.3.1 above, the Proposed Project will give rise to total losses of 947,363 tonnes of carbon dioxide throughout the construction, operation, and decommissioning phases.

A formula can be used to calculate carbon dioxide emissions reductions resulting from the generation of electricity from wind power rather than from carbon-based fuels such as peat, coal, gas and oil. The formula is:

$$CO_2 \text{ (in tonnes)} = \frac{(A \times B \times C \times D)}{1000}$$

where: A = ... The rated capacity of the wind energy development in MW

B = ... The capacity or load factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc.

C = ... The number of hours in a year

D = ... Carbon load in grams per kWh (kilowatt hour) of electricity generated and distributed via the national grid.

For the purposes of this calculation, the rated capacity of the Proposed Wind Farm is assumed to be 322MW (based on 46 No. 7 MW turbines).

A capacity factor of 29.2% (0.292)[95] is applied here.

The number of hours in a year is 8,760.

A conservative figure for the carbon load of electricity generated by natural gas in Ireland was sourced from Sustainable Energy Authority Ireland's (SEAI) Conversion and Emissions Factors for Publication worksheet.[96] The emission factor for electricity generated in Ireland in 2024 was 178.3gCO_2/kWh.[97] While it is acknowledged that the Irish national grid is progressively decarbonising as a result of increasing renewable energy capacity – and will continue to do so as proposals such as the Proposed Project are progressed – the most recent emission factor published by the SEAI has been applied for the purposes of the carbon saving calculations for the operational phase of the Proposed Project presented below.

The calculation for carbon savings is therefore as follows:

$$CO_2 \text{ (in tonnes)} = \frac{(322 \times 0.292 \times 8{,}760 \times 178.3)}{1000}$$

$$= 146{,}857 \text{ tonnes per annum}$$

[95] *SEAI (2025) Energy In Ireland 2025 (https://www.seai.ie/sites/default/files/publications/Energy-in-Ireland-2025.pdf)*
[96] *Conversion and Emission Factors for Publication (2024) https://www.seai.ie/sites/default/files/data-and-insights/seai-statistics/conversion-factors/SEAI-conversion-and-emission-factors.xlsx*
[97] *SEAI have published the provisional 2023 emission factor for electricity generation in Ireland as 229.9 gCO2/kWh. This is a provisional value that may change.*

Based on this calculation 146,857 tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the Proposed Wind Farm. Over the proposed 35-year lifetime of the development, therefore **5,139,995** tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation.

Based on the Macauley Institute Carbon Calculator and TII Carbon Tool as presented above in Section 11.4.3.1, 949,630 tonnes of CO_2 will be lost to the atmosphere due to changes in the soil and ground conditions and due to the construction and operation of the Proposed Project. This represents **18%** of the total amount of carbon dioxide emissions that will be offset by the Proposed Wind Farm. The 949,630 tonnes of CO_2 that will be lost to the atmosphere due to changes in soil and ground conditions and due to the construction and operation of the Proposed Project will be offset by the Proposed Wind Farm in approximately **77.6** months (6.4 years) of operation.

As detailed in Section 11.4.3.1 above, habitat enhancement will take place as part of the Proposed Project, in addition to the restoration requirements required as part Condition 10 of the relevant IPC licence (Ref. P0503-01) and completed PCAS activities in Lodge Bog. These activities have the potential to give rise to a net emission reduction of 2,158,380tCO_2eq over a 35-year rehabilitation period (see Section 11.3.2.4.2 above) in the absence of the Proposed Project infrastructure. As outlined in Section 11.4.3.1.1 above, the annual tCO_2eq emissions lost as a result of the Proposed Project is approximately 1,824 tCO_2eq under the permanent Proposed Project infrastructure footprint and 2,640 tCO_2eq when considering the 5m construction buffer. It is noted that the 5m construction buffer will only be in place during the construction phase (30 to 36 months) and therefore this land is available for targeted rehabilitation measures set out in the Draft Rehabilitation Plans following completion of the construction phase, subject to agreement and approval by the EPA. Therefore, the percentage loss of carbon sequestration arising from the Proposed Project permanent infrastructure footprint over the 100-year rehabilitation period is determined to be 3%.

The carbon storage capacity of restored habitats will vary over time as vegetation matures land use and the baseline environment change. Therefore, while the targeted rehabilitation measures proposed in the Draft Rehabilitation Plan have been quantified in Section 11.3.2.4.2 above, the carbon storage potential associated with the Proposed Enhancement Areas (including native woodland replanting and peatland restoration) has not been quantified to ensure the assessment below is identified under a theoretical precautionary scenario. The carbon sequestration potential associated with the replanting of native woodland will be able to be determined in the future via the Teagasc Forest Carbon Tool[98]; currently this is not able to be completed due to Teagasc carrying out further analysis and validation on current data and the sequestration potential not being available in the public domain.

As outlined in Section 11.3.3.1.2 and Section 11.4.3.1.1 above, the carbon sequestration potential of the Proposed Wind Farm site has been determined in the likely future receiving environment, with consideration to long-term future trends for the Allen Bog Group, and from the introduction of the Proposed Project infrastructure. When considering the loss of the 152ha arising from the introduction of the Proposed Project permanent infrastructure footprint, and 220ha when implementing the conservative 5m buffer for construction the following calculations quantify the percentage of carbon savings from the operation of the wind farm that would be required to offset this loss:

Permanent Infrastructure Footprint

$$1{,}824 tCO2eq * 35\ years = 63{,}840\ tCO2eq/yr$$

$$\frac{63{,}840\ tCO2eq}{5{,}139{,}995\ tCO2eq}\ x\ 100 = 1.24\%$$

Permanent Infrastructure Footprint plus 5m Buffer

[98] https://interactive.teagasc.ie/Open/ForestryCarbon/ForestryCarbonCalculator

$$2{,}640\ tCO2eq * 35\ years = 92{,}400\ tCO2eq/yr$$

$$\frac{92{,}400\ tCO2eq}{5{,}139{,}995\ tCO2eq}\ x\ 100 = 1.8\%$$

The introduction of the Proposed Project permanent infrastructure footprint (plus 5m buffer) to the rehabilitation areas in the Allen Bog Group equates in a loss of 2,640 tCO_2eq emission reductions per annum, equating to 4.3% of the overall emission reductions per annum in the Allen Bog Group (Table 11-9 above). As is made evident in the theoretical carbon savings scenario detailed above, the loss of carbon sequestration potential arising from the Proposed Project will be offset by **less than 2%** of the carbon savings associated with the Proposed Project's generation of renewable electricity from wind power.

Please refer to Section 11.6 below for further detail on the cumulative assessment between the Proposed Project and the ongoing EPA licenced activities in the Allen Bog Group, and the Draft Rehabilitation Plans in the Allen Bog Group.

11.5 Likely Significant Effects and Associated Mitigation Measures

11.5.1 'Do-Nothing' Scenario

If the Proposed Project were not to proceed, the Proposed Wind Farm site would continue to be managed under the requirements of the IPC licence (P0503-01) and therefore the ongoing decommissioning works, site management and environmental monitoring would continue. The lands required for the Proposed Project not located within lands under IPC License or under PCAS, would continue to function as it does at present, with no changes to the current land-use. Therefore, under a 'Do-Nothing' scenario, the Proposed Wind Farm site would continue to be managed as per the requirements of the IPC licence as detailed in Chapter 4, Section 4.6.7.

In the absence of the Proposed Project, natural revegetation processes would continue across the Project Site. Areas of bare peat would progressively revegetate and transition through successional stages, potentially developing into heath communities, scrub or bog woodland over time, depending on local hydrological conditions. Therefore, the existing baseline of the landscape will transition from a predominantly industrial cutover peatland landscape, with open exposed peat surfaces and drainage features, to a more natural mosaic landscape of cutaway peatland, wetland and regenerating bog habitats, resulting in increased carbon storage capacity within the existing landbank. Prior to the submission of Cutaway Bog Decommissioning and Rehabilitation Plans to the EPA for agreement, baseline ecological surveys will be undertaken to establish the extent of natural revegetation, the potential for targeted revegetation and/or rewetting, and the future targeted rehabilitation measures of the cutaway areas to ensure their long-term stabilisation.

As outlined in Table 11-6 above, net emission reductions of 2,158,380 tCO_2eq have been determined across the 5,139ha of bog undergoing rehabilitation under the requirements of the IPC Licence over the next 35 years (modelled from 2033) in the absence of the Proposed Project. If the Proposed Project were not to proceed, the potential loss of carbon sequestration, i.e., affecting 3 to 4% of the total area available for rehabilitation, would not occur. Retaining this area (i.e., 152ha and 220ha respectively) equates to less than <3% of the Proposed Wind Farm site and is therefore considered as permanent imperceptible positive do-nothing effect and is Not Significant.

If the Proposed Project were not to proceed, the opportunity to displace **5,139,995** tonnes of carbon dioxide from traditional carbon-based electricity generation and capturing a significant part of County Offaly's, County Kildare's and Ireland's valuable renewable energy resources would be lost. This would

reduce the contribution of the Proposed Project towards national and EU renewable energy and climate objectives, as well as the renewable energy, climate action and decarbonisation objectives of the OCDP and the KCDP. Consequently, the associated benefits arising from the displacement of fossil fuel-based electricity generation, including reductions in greenhouse gas emissions and air pollutant emissions, would not be realised. The opportunity to generate local employment and investment and to diversify the local economy would also be lost. Furthermore, as part of this planning application includes a BMP (Appendix 6-5) to be implemented during the development's operation, the opportunity to enhance the Proposed Wind Farm for biodiversity, separate to the requirements of the IPC License, at a local scale, would also be lost. This would be a long-term moderate negative do-nothing effect and is Not Significant.

11.5.2 Construction Phase

11.5.2.1 Greenhouse Gas Emissions

Pre-Mitigation Impact

Proposed Project

As outlined in Section 11.3.3.1.2 above, at the commencement of the construction phase, the likely future receiving environment for the Proposed Wind Farm site relating to climate will remain a net greenhouse gas source and is anticipated to be comparable to the existing baseline as established in Section 11.3.1.

The construction of Proposed Wind Farm infrastructure, including turbines and associated foundations and hard-standing areas, meteorological masts, relay mast, access roads, amenity track, temporary construction compounds, peat and spoil areas, site drainage, vegetation removal and tree felling, and all ancillary works and apparatus will require construction materials (such as cement). Furthermore, the operation of construction vehicles and plant on and off-site and the transport of workers to and from the Proposed Wind Farm to facilitate the construction of the Proposed Project will be required.

The construction of the Proposed Grid Connection, i.e., Proposed Onsite Substation, Proposed Offsite Substation, underground 220kV connection to the Proposed Offsite Substation, and associated overhead line (OHL) connection into the Existing Maynooth-Dunstown 220kV OHL, will require the operation of construction vehicles and plant on and off site, and the transport of workers to and from the Proposed Grid Connection. Greenhouse gas associated with vehicles and plant, such as carbon dioxide (CO_2), carbon monoxide, and nitrogen oxides will arise as a result of Proposed Grid Connection construction activities.

Greenhouse gas emissions, e.g., carbon dioxide (CO_2), carbon monoxide and nitrogen oxides, associated with the production of construction materials, and operation of vehicles and plant will arise as a result of the construction activities for the Proposed Wind Farm and Proposed Grid Connection. As outlined in Table 11-8 above, the Proposed Project will give rise to 949,630 tCO_2eq losses over its 35-year life. Losses from soil organic matter, i.e., CO_2 loss from removed and drained peat, will equate to 69,923 tCO_2eq, or 7%, losses due to embodied carbon of construction materials accounts for 344,715 tCO_2eq, and losses due to clear-felled forestry equates to 26,877 tCO_2eq or 2.8%. therefore, prior to mitigation, the Proposed Project (i.e., the Proposed Wind Farm and Proposed Grid Connection) will have a short-term, negative and moderate impact on climate, which is Not Significant, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. Mitigation measures to reduce this impact are presented below.

The Proposed Enhancement Area includes proposed measures which contains the enhancement for Golden Plover and habitat management for woodland, peatland and marsh fritillary. Some potential short-term slight negative impacts, which are Not Significant, during the implementation of the Proposed Enhancement Areas is the release of carbon dioxide to the atmosphere due to maintenance

and monitoring activities required at establishment of the Proposed Enhancement Areas, and the removal of carbon fixing vegetation and habitat associated with Proposed Enhancement Areas measures.

As identified in Section 11.4.3.1, during the construction phase of the Proposed Project, to assess emission reduction potential of the Allen Bog Group, a 5m buffer has been applied to all Proposed Project infrastructure within the Allen Bog Group, resulting in a total footprint of 220ha. This buffer represents a conservative assumption on the impacts of the Proposed Project construction phase on the landcover within the Allen Bog Group. As outlined in Table 11-8, the Proposed Project construction footprint will result in a emission reduction potential loss of 4% during the construction phase (i.e., based on a 5m construction buffer on the Proposed Project permanent infrastructure footprint). As the construction phase of the Proposed Project will only occur over a 36-month period, the potential impacts are considered to be short-term slight and negative, which is Not Significant.

Transport to and from the Project Site

The transport of turbines and construction materials to the Project Site, which will occur on specified routes only (i.e., Proposed Construction Haul Routes and Proposed Turbine Delivery Route) (see Section 4.5.2 in Chapter 4 of this EIAR), will also give rise to greenhouse gas emissions associated with the transport vehicles and exhaust emissions as outlined in Table 11-8 above, 3,314 tCO_2eq will arise from emissions associated with construction material delivery, representing 0.3% of total carbon losses as outlined in Section 11.4.3.1 above. For transporting construction materials, 9 no. existing, authorised quarries, located within 20km of the Project Site have been selected which will be utilising the Proposed Construction Haul Routes which encompasses National, regional and local roads. Turbine blades and towers being imported indicatively to Galway Port will be delivered to the Project Site utilising the Proposed Turbine Delivery Route which comprises of M6, N52 and other regional roads and then through the entrance of the existing Cloncreen Wind Farm. This impact will be short-term, negative and slight, and is Not Significant, given the quantity of greenhouse gases that will be emitted and will be restricted to the duration of the construction phase. Mitigation measures to reduce this effect are presented below.

Waste Disposal

Construction waste will arise from the Proposed Project, mainly from excavation and unavoidable construction waste including material surpluses, damaged materials and packaging waste. This potential impact will be short-term, negative and moderate only, and is Not Significant, given the quantity of greenhouse gases associated with the generation and management of these waste streams that will be emitted to the atmosphere and will be restricted to the duration of the construction phase, therefore it is Not Significant. Waste management will be carried out in accordance with *Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021) produced by the EPA.

Please refer to Section 4.6.9 of Chapter 4 of this EIAR and Section 3.8 of the Construction and Environmental Management Plan (CEMP) (Appendix 4-4) for detailed processes on waste management during the construction phase of the Proposed Project.

Overall, the Proposed Project will result in a short-term moderate negative effect on climate, which is Not Significant, prior to mitigation being applied.

Mitigation

- Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- When stationary, delivery and on-site vehicles will be required to turn off engines.
- Turbines and construction materials will be transported to the Project Site along the Proposed Construction Haul Routes and Proposed Turbine Delivery Route only unless otherwise agreed with the Planning Authority. Please see Section 15.1.10 of Chapter 15 Material Assets for details.
- Aggregate materials for the construction of the internal access road network and all associated infrastructure will all be locally sourced where possible, which will further reduce potential emissions.
- A CEMP (Appendix 4-4) will be in place throughout the construction phase.
- The CEMP (Appendix 4-4) includes a Resource Waste Management Plant (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material.
    - The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort.
    - Section 4.6.9 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor.
    - The MRF facility will be local to the Project Site to reduce the number of emissions associated with vehicle movements.
        - Edenderry Recycling Centre is the closest waste facility to the Project Site and is approximately 3.5km north of the Proposed Turbine (T32).
        - Drehid Landfill located approximately 6.5km northeast of the Proposed Turbine (T30).
        - Chem Regen located approximately 25.5km southwest of the Proposed Turbine (T14).
        - Cleary Compost & Shredding Ltd. located approximately 24.9km south of the Proposed Turbine (T14).
        - Soltec (Ireland) Ltd, located approximately 31.5km northwest of the Proposed Turbine (T32).
        - Allied Recycling located approximately 9.2 km southeast of the Proposed Offsite Substation.
- Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.

Residual Effects

Following implementation of the mitigation measures above, residual effects of greenhouse gas emissions arising from the construction phase of the Proposed Project will have a short-term, slight, negative effect, which is Not Significant within the Regional Climate Study Area. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent slight negative effect on climate, which is Not Significant, within the National Climate Study Area and Global Climate Study Area.

When considering these greenhouse gas emissions within the context of the national Electricity Sector Emissions Ceilings (i.e., the National Climate Study Area) as detailed in Section 11.2.2 above, Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 M tCO_2eq for large-scale deployment of renewables. The carbon losses associated with the Proposed Project, i.e., 949,630 tCO_2eq, accounts for approximately 4.8% of available budget in the second carbon budgeting period. Carbon Budget 3 will extend from 2025 to 2030, at the time of writing the sectoral emission ceiling for electricity has not been defined within the third carbon budget period and therefore the Proposed Project carbon losses have

been defined within the available budget. While the Proposed Project will account for 4.8% of Carbon Budget 2 and will account for an unknown percentage of the Carbon Budget 3, as detailed in Section 11.4.3.2, the Proposed Project will displace **5,139,995** tonnes of carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. Therefore, while there will be greenhouse gas emissions associated with the construction phase activities of the Proposed Project, this will take place under the Electricity sector emissions ceiling and will be offset by the operation of the Proposed Project within its operational life.

The emission reduction potential of the Proposed Wind Farm site will be reduced by 3% as a result of the Proposed Project permanent infrastructure footprint plus 5m construction buffer. However, as outlined in Section 11.4.3.1.1 above, based on the detail provided in Table 11-9, it is concluded that once the area of the Proposed Project infrastructure footprint is removed from the total potential carbon sequestration area, approximately 96% of the Proposed Wind Farm site remains available for rehabilitation, this area has the potential to result in approximately 59,028 tCO_2eq of emission reductions per annum. The loss of carbon sequestration potential arising from the Proposed Project infrastructure footprint plus 5m construction buffer will be offset by less than 2% of the carbon savings associated with the Proposed Project's generation of renewable electricity from wind power. The 5m construction buffer will only be in place during the construction phase (30 to 36 months) and therefore will not have a residual effect on rehabilitation over the 35-year rehabilitation period.

Please refer to Section 11.6 below for further detail on the cumulative assessment between the Proposed Project and the ongoing EPA licenced activities on Proposed Wind Farm site.

Significance of Effects

Based on the assessment above there will be no significant effects with regard to greenhouse gas emissions arising from the construction phase of the Proposed Project.

11.5.3 Operational Phase

11.5.3.1 Greenhouse Gas Emissions

Pre-Mitigation Impact

Proposed Project

As outlined in Section 11.3.2.4.1 above, the future environmental trends during the operational phase will reflect the regeneration of the Proposed Wind Farm site as a carbon store, with overall carbon sequestration potential improving progressively through the maintenance and monitoring of PCAS in Lodge Bog and the implementation Draft Rehabilitation Plans. As identified in Section 11.4.3.1, the Proposed Project permanent footprint represents 2.9% of the area of the Proposed Wind Farm site and 2.9% of the Project Site. The permanent infrastructure footprint within the Proposed Wind Farm site is assessed in Table 11-9 which identifies that the 152ha footprint will result in an emission reduction potential loss of 2.96% within the Proposed Wind Farm site during the operational phase. As the operational phase of the Proposed Project will occur over a 35-year period, the potential impacts are considered to be long-term imperceptible and negative, which is Not Significant. The requirements of the IPC Licence and completed PCAS do not form part of this planning application and therefore are assessed cumulatively; please see Section 11.6 below for further detail.

During the operational phase, the Proposed Enhancement Areas will be subject to ongoing habitat management, monitoring, and maintenance activities associated with biodiversity enhancement measures., including those for Golden Plover and habitat management for woodland, peatland, and marsh fritillary. These activities will result in the use of plant and machinery which will give rise to greenhouse gas emissions. Therefore, there will be a will have a long-term, imperceptible, negative

impact on climate, which is Not Significant. Once the Proposed Enhancement Areas are fully implemented/replanted areas mature there will be a long-term slight positive effect on climate.

The Proposed Project will generate energy from a renewable source. As detailed in Section 11.4.3.2 above, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. For the purposes of this EIAR, a rated output of 7MW per turbine has been chosen to calculate the anticipated power output of the Proposed Project, which would result in an estimated output of 322MW, displacing approximately, 146,857 tonnes of carbon dioxide per annum from traditional carbon-based electricity generation from the Global Climate Study Area, National Climate Study Area, and Regional Climate Study Area. This will have a long-term significant positive effect on climate, which is Significant.

The operational phase of the Proposed Project will generate additional traffic to the area in the form of LGVs visiting the site 1-2 times per day for inspections but on occasion, daily visits by LGVs and HGVs may be required over short periods during maintenance/component replacement activities. LGVs will also be present on site in the form of public vehicles for the local community to access the amenity tracks. Amenity visitors will arrive to the Proposed Wind Farm and park at identified amenity carparks near proposed amenity site entrances (please see Table 4-7 in Chapter 4 for further detail). The addition of LGV/HGVs on occasion over the 35-year lifetime of the Proposed Project will give rise to a long-term, imperceptible, negative effect on climate which is Not Significant.

The Proposed Onsite Substation and Proposed Offsite Substation will be operated and maintained by ESB/EirGrid. It is anticipated that substation operators will visit the Project Site 1-2 times per day in LGVs, but on occasion, HGVs may be required to visit the site for maintenance/substation component replacement. On occasion, the removal of hydrocarbons (transformer oil) and waste from substation welfare facilities will be removed from the Project Site by a licenced waste disposal company. Traffic movements, and associated emissions, associated with the Proposed Grid Connection underground electrical cable route will be negligible given that no works are proposed along this element of the Proposed Project during the operational phase. This impact will be long-term, negative and slight, which is Not Significant.

The pre-mitigation impact resulting from the Proposed Project is therefore assessed as long-term, negative and slight, which is Not Significant.

Transport to and from the Project Site

In the unlikely event that a turbine blade is damaged and must be replaced during the operational phase, emissions will arise from the transportation of the replacement turbine blade(s) to the Project Site and the impacts described in Section 11.5.2.1 will be the same. This impact will be long-term, negative and imperceptible therefore, it is Not Significant. Emissions resulting from routine maintenance at Proposed Wind Farm are included in the section '*Proposed Project'* above.

Waste Disposal

Waste is not proposed to be generated onsite during the operational phase, any waste that does arise will be minimal and any impact will be short-term, negative and imperceptible, which is Not Significant. Waste management will be carried out in accordance with '*Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects'* (2021) produced by the EPA.

Mitigation

- Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise.

Residual Effect

Following implementation of the mitigation measures above, residual effects of greenhouse gas emissions arising from the operational phase of the Proposed Project will have potential long-term imperceptible negative effect on Climate, which is Not Significant within the Regional Climate Study Area.

As identified above in Section 11.4.3.2, the carbon storage capacity of restored habitats relating to the Proposed Enhancement Areas will vary over time as vegetation matures and, land use and the baseline environment change. Therefore, while it can be assumed that measures outlined in the BMP (Appendix 6-5) will result in an increased capacity of carbon storage due to the carbon storage potential that exists within these habitats, to ensure this assessment is completed under a theoretical precautionary scenario the quantification of these potential carbon savings (via an increase in carbon storage potential) associated with these measures has not been included.

The operation of the Proposed Project will displace **5,139,995** tonnes of carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan due to the provision of clean renewable energy to the national grid. Therefore, while there will be 949,630 tonnes of CO_2 lost to the atmosphere due to the construction and operation of the Proposed Project will be offset by the Proposed Wind Farm in approximately **77** months (6.4 years) of operation.

This will have a long-term significant positive effect on climate as a result of reduced greenhouse gas emissions during the operational phase, which is Significant.

Significance of Effects

Based on the assessment above there will be a significant positive effect with regard to greenhouse gas emissions arising from the operational phase of the Proposed Project.

11.5.4 Decommissioning Phase

The Proposed Turbines are expected to have a lifespan of approximately 35-years. Following the end of their useful life, the equipment may be replaced with a new technology, subject to planning permission being obtained, or the Proposed Project will be decommissioned fully.

Upon decommissioning of the Proposed Wind Farm, the Proposed Turbines would be disassembled. All above-ground turbine and mast components would be separated and removed from the Project Site for recycling. Turbine foundations would remain underground; leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant temporary environmental nuisances such as noise, dust and vibration. Project Site roadways could be in use for purposes other than the operation of the Proposed Project by the time the decommissioning of the Proposed Wind Farm is to be considered, and therefore it may be more appropriate to leave the Project Site roads in situ for future use. It is envisaged that the roads will be widely utilised for amenity purposes by the local community.

Therefore, the site roads will be retained post decommissioning to continue to facilitate amenity use.

As outlined in Section 11.4.3.1 above and in Appendix 4-7, it is not intended to remove the concrete foundations or roads from the Project Site. Under a precautionary scenario it is determined that these areas will remain unavailable for carbon sequestration measures associated with the Draft Rehabilitation Plans.

The Proposed Grid Connection infrastructure, including the Proposed Onsite Substation and Proposed Offsite Substation, will remain in place as it will be part of the National Electricity Grid network under the ownership and control of the ESB Networks and/or EirGrid.

Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts.

A Decommissioning Plan has been prepared and serves as Appendix 4-7 to this EIAR. The Decommissioning Plan will be updated prior to the end of the operational period in line with best-practice decommissioning methodologies that may exist at the time and will agree with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR.

11.6 Cumulative Assessment

Potential cumulative effects on climate between the Proposed Project and other permitted or proposed plans in the area, (wind energy or otherwise), as set out in Section 2.1 in Chapter 2 of this EIAR, were also considered as part of this assessment. The developments considered as part of the cumulative effect assessment are described in Section 2.10.1 of this EIAR and presented in Appendix 2-3; please see Table 2-6 of Chapter 2 for the relevant cumulative assessment boundary justification.

11.6.1 Construction Phase

During the construction phase of the Proposed Project and other permitted or proposed projects and plans in the area as set out in Section 2.10 in Chapter 2 of this EIAR, that are yet to be constructed, there will be greenhouse gas emissions arising from production of construction materials (such as concrete), and the operation of construction vehicles and plant. These will be restricted to the duration of the construction phase, and as such will give rise to emissions over a short-term duration. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent, slight, negative effect on climate, which is Not Significant.

As identified in Section 11.4.3.1.2 the percentage loss of carbon sequestration potential within the Project Site arising from the construction of the Proposed Project is determined to range from 3% - 4%, this will have a long-term, moderate, negative cumulative effect on climate.

Eastern and Midlands Region Water Supply Project

The proposed Uisce Éireann Eastern and Midlands Region Water Supply Project (Case Ref: PA92.323980) includes a proposed water pipeline from a new water treatment plant near Birdhill, Co. Tipperary to a termination point reservoir at Peamount, Co. Dublin, traverses the Project Site in an east-west direction across 5 no. bogs detailed in Section 2.10.2.1 of Chapter 2. The Water Supply Project has been considered in the design of the Proposed Project and is considered in the cumulative impact assessments of this EIAR chapter. Given the nature of the Water Supply Project as linear utility infrastructure, and subject to its own design, consenting, construction management and operational controls, no credible pathway has been identified whereby the Water Supply Project would interact with the Proposed Project to give rise to significant cumulative effects in terms of climate. The greenhouse gas emission for this proposed development is expected to have minor negative, long-term and not significant effect, which cumulatively with the Proposed Project will not give rise to any significant cumulative effect on climate after implementing necessary mitigation measures.

Gas to Bord na Móna, Edenderry

The proposed Edenderry Gas Pipeline project, currently the subject of a planning application by Gas Networks Ireland, is located within the Proposed Wind Farm site where a part of the proposed gas pipeline project crosses the Project Site (nearest Proposed Turbine is T22). This proposed development has been considered as part of the cumulative assessment. The proposed gas pipeline comprises an approximately 23.65 km underground gas pipeline connecting the existing Edenderry Power Station to

the Dublin–Galway high-pressure gas transmission network. The greenhouse gas emission for this proposed development is expected to have direct, long-term, negative and slight effect, which when assessed cumulatively with the Proposed Project, will not give rise to any significant cumulative effect on climate after implementation of mitigation measures.

Cushaling 110kV OHL Upgrades

A planning application (Ref. 2560087) has been submitted for the proposed uprating of the existing 110 kV OHL between the existing Cushaling 110 kV Substation in the townland of Ballykilleen, Co. Offaly, and the existing Portlaoise 110 kV Substation in the townlands of Clonminam and Kylekiproe, Co. Laois. The proposed development has been considered as part of the cumulative assessment for the Proposed Project.

Based on discussions held during the EirGrid scoping meeting on 16th December 2025, there is currently no anticipated overlap between the construction programme of the Proposed Project and that of the proposed OHL uprating project, with the final phase of the EirGrid project currently expected to extend to 2029. Given the nature of the proposed OHL uprating works and the absence of a temporal overlap in construction activities, no significant cumulative effects in relation to climate are anticipated. Should material changes occur to the EirGrid project programme or design during the planning process, EirGrid has indicated that such changes can be communicated to the Applicant and further engagement held as appropriate.

Substitute Consent

As identified in Section 2.10.2.1 in Chapter 2, an application for substitute consent was submitted to An Coimisiún Pleanála (Case Ref: SU09.324604) on 20th August 2026, for peat extraction and ancillary works that have been carried out within the Allen Bog Group. A Remedial Natura Impact Statement (rNIS) and Remedial Environmental Impact Assessment Report (rEIAR) was submitted with this application. Impacts on climate within the substitute consent application during identified activities to be carried out within the Allen Bog Group in the future were determined to be direct, long term, beneficial, which is not significant, due to the provisions outlined in the Draft Rehabilitation Plans.

EPA Licenced Activities

The cumulative assessment has also considered the Draft Rehabilitation Plans for the Proposed Wind Farm site together with the Proposed Project and the other proposed, permitted and operational developments identified in Chapter 2 of this EIAR. The targeted rehabilitation measures identified within the Draft Rehabilitation Plans are not anticipated to be implemented concurrently with the construction phase of the Proposed Project. Currently, the cutaway peatlands are undergoing natural revegetation, and no active rehabilitation works are presently planned within the Project Site. Accordingly, the Draft Rehabilitation Plans have been considered as part of the future baseline and cumulative assessment rather than as activities occurring simultaneously with the construction of the Proposed Project. Overall, no significant negative cumulative effects on climate are predicted in relation to the Draft Rehabilitation Plans and the Proposed Project.

As outlined in Section 11.3.2.4.1 above, net emission reductions of 2,158,380 tCO_2eq have been determined across the 5,139ha of rehabilitated bog over 35-year operational life of the Proposed Wind Farm (modelled from 2033) in the absence of the Proposed Project. Annualised, this equates to 61,668 tCO_2eq. Section 11.4.3.1.1 above outlines the potential carbon sequestration loss of the 5,139ha resulting from the Proposed Project. During the construction phase a 5m buffer was applied to the Proposed Project infrastructure footprint, the identified 220ha footprint will result in a 4% carbon sequestration loss potential to lands available for rehabilitation (i.e. 2,640 tCO2eq emission reductions per annum). Therefore, the Proposed Project construction footprint does not impact or change the overall goals and outcomes of the proposed rehabilitation plans for the Allen Bog Group and there are No Significant cumulative effects.

The Draft Rehabilitation Plan measures for the 14-no. Allen Bog Group bogs will occur after the completion of the Proposed Project construction phase, therefore there will be no significant cumulative effects arising as a result of the construction phase activities and implementation of the required rehabilitation measures.

Peatland Climate Action Scheme

The PCAS works are completed within Lodge Bog. The works included intensive and targeted drain blocking, the creation of berms to control/retain water levels, peat field re-profiling, modifying outfalls and managing overflows, seeding and inoculation of Sphagnum. These works will optimise hydrological conditions and will have benefits for water quality and storage attenuation as well as increased carbon storage and reduced emissions.

When considered cumulatively, the Proposed Wind Farm and the completed PCAS works at Lodge Bog will not give rise to any negative effects on climate. As the PCAS works are already complete, there is no temporal overlap with the construction phase of the Proposed Project, and the PCAS monitoring works completed to date do not overlap with the permanent infrastructure footprint. Therefore, there is no potential for cumulative greenhouse-gas emissions from concurrent construction activities.

There is therefore no potential for significant cumulative effects to occur between the Proposed Project and PCAS during construction phase.

11.6.2 Operational Phase

The nature of the Proposed Project is such that, once operational, it will have a long-term, significant, positive effect on climate. As noted above, the Proposed Project will offset the 949,630 tonnes of CO_2 associated with the construction and operational phase that will be lost to the atmosphere (Section 11.4.3.2) in approximately **77** months of operation.

When considering these greenhouse gas emissions within the context of the national Electricity Sector Emissions Ceilings (i.e., the National Climate Study Area) as detailed in Section 11.2.2 above, Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 $MtCO_2eq$ for large-scale deployment of renewables. The carbon losses associated with the Proposed Project, i.e., 949,630 tCO_2eq, accounts for approximately 4.8% of available budget in the second carbon budgeting period. Carbon Budget 3 will extend from 2025 to 2030, at the time of writing the sectoral emission ceiling for electricity has not been defined within the third carbon budget period and therefore the Proposed Project carbon losses have been defined within the available budget. While the Proposed Project will account for 4.8% of Carbon Budget 2 and will account for an unknown percentage of the Carbon Budget 3, as detailed in Section 11.4.3.2, the Proposed Project will displace **5,139,995** tonnes of carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. Therefore, while there will be greenhouse gas emissions associated with the construction phase activities of the Proposed Project, this will take place under the Electricity sector emissions ceiling and will be offset by the operation of the Proposed Project within its operational life. Thus, there will be no negative cumulative effects arising on climate from the Proposed Project and other permitted or proposed projects and plans in the area as set out in Section 2.10 in Chapter 2 of this EIAR.

The Proposed Project will operate within an established wind energy landscape that includes the existing Cloncreen Wind Farm and existing Cushaling Wind Farm, both of which are currently operational within the Regional Climate Study Area.

The combined operation of these renewable energy developments will result in the generation of electricity from renewable sources, contributing cumulatively to the displacement of greenhouse gas emissions associated with conventional fossil fuel-based generation. This displacement effect represents a significant positive cumulative contribution to climate change mitigation at both regional and national scales.

Substitute Consent

The substitute consent application for peat extraction and ancillary works that have been carried out within the Allen Bog Group identified that activities to be carried out within the Allen Bog Group in the future would result in a long-term, neutral and not significant effect.

EPA Licensed Activities

The Draft Rehabilitation Plans for the Allen Bog Group (Appendix 2-4), prepared in accordance with Condition 10 of IPC Licence Ref. P0503-01, recognises that the surface topography of the Project Site is heterogeneous. As a result, it is not feasible to re-wet all areas to achieve optimum carbon sequestration conditions. In relatively drier areas, rehabilitation is likely to result in the establishment of dry woodland or other dry habitat types. In areas where optimal re-wetting conditions can be achieved, time will be required for ecological transition and habitat maturation before full carbon sequestration functionality is restored.

The carbon storage capacity of restored peatland habitats will vary over time as vegetation establishes, hydrological conditions stabilise, and baseline environmental conditions evolve. As identified in Section 11.4 the Allen Bog Group is subject to rehabilitation measures under Condition 10 of the IPC Licence. These measures will increase the carbon storage potential of the Allen Bog Group relative to its current condition. As outlined in Section 11.3.3.1.2 above, net emission reductions of 2,158,380 tCO_2eq have been determined across the 5,139ha of rehabilitated bog over the 35-year operational life of the Proposed Wind Farm (modelled from 2033) in the absence of the Proposed Project infrastructure. Annualised, this equates to 61,668 tCO_2eq. Section 11.4.3.1.1 above outlines the potential carbon sequestration loss of the 5,139ha resulting from the Proposed Project. During the operational phase, the Proposed Project infrastructure footprint, i.e., 152ha, will result in a 3% carbon sequestration loss potential to lands available for rehabilitation (i.e. 1,824 tCO2eq emission reductions per annum). The proposals contained within the Draft Rehabilitation Plan have been designed with consideration of the Proposed Project infrastructure footprint. The permanent infrastructure footprint of the Proposed Project represents approximately 2.9% of the Proposed Wind Farm site and therefore does not impact or change the overall goals and outcomes of the proposed rehabilitation plans for the Allen Bog Group and there are

If the Draft Rehabilitation Plans measures for the 14-no. Allen Bog Group bogs (i.e., the Proposed Wind Farm site) occur simultaneously with the operational phase of the Proposed Project, carbon losses associated with operational maintenance and monitoring activities and amenity for the Proposed Project and rehabilitation works associated with the measures contained in the Draft Rehabilitation Plans will have an imperceptible negative cumulative effect.

As identified in Section 11.5.3 above, there will be a long-term imperceptible negative impact on carbon sequestration potential within the Allen Bog Group as a result of the Proposed Project permanent infrastructure footprint. However, it can be assumed that the implementation of measures in the Draft Rehabilitation Plans and the operation of the Proposed Project will result in a positive cumulative effect on climate. Furthermore, the Proposed Project and the Draft Rehabilitation Plans will assist in the national goal of achieving a climate neutral Ireland by 2050 as set out in the Climate Action and Low Carbon Development (Amendment) Act 2021.

Peatland Climate Action Scheme

As identified in Section 11.6.1 above, PCAS works is completed within Lodge Bog, which is located within the Project Site where the Proposed Onsite Substation is proposed.

PCAS represents enhanced peatland rehabilitation measures which are designed to stabilise former industrial peat production areas and restore peatland hydrology. Enhanced rehabilitation will facilitate the transition of these bogs from degraded cutover peat toward functioning carbon sinks, thereby reducing ongoing carbon emissions and promoting long-term carbon sequestration.

The cumulative effect of the Proposed Project, the Draft Rehabilitation Plans and the PCAS works within the Proposed Wind Farm site will store more water following rainfall and as a result there will be a reduced risk of fluvial flooding downstream of the Proposed Wind Farm site.

As outlined in Section 11.4.3.2, the Proposed Wind Farm will generate renewable electricity over its 35-year lifespan, displacing carbon dioxide emissions from fossil fuel-based generation. The carbon savings associated with the Proposed Project will therefore have a long-term significant positive effect on climate.

When considered cumulatively, the renewable energy generation from the Proposed Project and the peatland restoration measures under PCAS will result in an overall long term, positive, significant cumulative effect on climate during the operational phase.

11.6.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.12 in Chapter 4: Description of the Proposed Project. Any effects that occurs during the decommissioning phase are expected to be similar to that which occur during the construction phase, albeit of lesser effect. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential cumulative effects.

Peatland rehabilitation measures required under Condition 10 of IPC Licence P0503-01 will continue to be implemented within the Allen Bog Group throughout the operational life of the Proposed Wind Farm, independent of the Proposed Project. Following decommissioning of the Proposed Wind Farm, any remaining rehabilitation, monitoring, maintenance or aftercare measures required under the IPC Licence and agreed with the EPA at that time will continue to be undertaken within the Allen Bog Group, as appropriate. As identified in Section 11.4.3.1 above, the Project Site under IPC License will undergo a percentage loss of carbon sequestration potential due to the construction and operational phase footprint of the Proposed Project. During the decommissioning phase, the permanent footprint of the Project Site will remain largely the same due to the elements of the Proposed Project (i.e., construction compound foundations, roads, amenity track, etc.) that will remain in situ. Therefore, it can be assumed that the immediate footprint of the Proposed Project will not return to full sequestration capabilities, however the carbon sequestration potential of the area surrounding the Proposed Project will improve as a result of Condition 10 of the IPC licence.

The emissions associated with the Decommissioning Phase activities will have a long-term, not significant, neutral cumulative effect on climate.