

11. CLIMATE

11.1 Introduction

This chapter identifies, describes, and assesses the potential significant direct and indirect effects on climate arising from the Existing Development and has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. The full description of the Existing Development is detailed in Chapter 4 of this rEIAR.

The objective of this assessment is to assess the effects that the Existing Development has had, and is having, on Climate and details the mitigation measures that have been implemented to avoid, reduce or offset any potential significant effects that are identified. The aim of the Meenbog Wind Farm (Subject Development), which will be facilitated by the Existing Development, when in operation, is to reduce the input of carbon intensive energy into the national grid and reduce the amount of greenhouse gas emissions being released to the atmosphere that are associated with electricity generation. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby 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 of this rEIAR, the various development components are described and assessed using the following references: 'Subject Development', 'Existing Development', 'Prospective Development', 'Permitted Development', 'Site', 'Wind Farm Site', 'Grid Connection Site', 'BMEP Site', 'Grid Connection', 'November 2020 Peat Slide', '2017 EIAR' and 'proposed turbines' or 'proposed turbine locations'. A detailed description of the Subject Development is provided in Chapter 4 of this rEIAR.

This chapter is supported by Appendix 11-1 Climate Legislation, Policy, and Guidance and Appendix 11-2 Carbon Calculations.

11.1.1 Background

The Wind Farm Site is located within a rural, agricultural setting in County Donegal approximately 8 km southwest of the twin towns of Ballybofey and Stranorlar and approximately 12 km northeast of Donegal Town at its nearest point. The Grid Connection Site extends southwest from the Wind Farm Site for approximately 6 km along the N15 National Road towards Donegal Town before exiting the N15 to the southeast and following Local Roads, adjacent agricultural land and private access track to the Clogher 110kV substation.

Current landcover/landuse on the Wind Farm Site is comprised of the partially constructed wind farm, associated infrastructure, areas of commercial forestry and blanket bog. The surrounding landcover/landuse predominantly comprises peat bogs, commercial forestry, peatland and agricultural grassland used for rough grazing. There is limited residential use along local roads.

Current landcover/landuse along the Grid Connection comprises of public road corridor and private track. landcover/landuse on the wider landscape comprises a mix of forestry, pastoral agriculture, peatlands, low-density residential, and small-scale commercial properties.

11.1.2 Statement of Authority

This section of the rEIAR has been produced by Thomas Blackwell and Catherine Johnson and reviewed by Sean Creedon of MKO.

Thomas Blackwell is a Senior Environmental Consultant in McCarthy Keville O'Sullivan (MKO). Thomas has over 20 years of progressive experience in environmental consulting. Thomas' professional

experience includes managing Environmental Impact Assessment Reports, environmental permitting, environmental due diligence and compliance, and general environmental assessment on behalf of clients in the renewable energy, mining, solid waste management, residential and commercial development, and public sectors. Thomas' multi-sector experience working on projects in multiple jurisdictions has allowed him to develop a wealth of knowledge and understanding of the challenges involved in guiding complex project through the regulatory and planning process. Thomas also has experience in habitat restoration design and implementation for impact mitigation and offsetting. Thomas holds a Bachelor of Arts Degree in Natural Science from Trinity College Dublin, and a Master of Science Degree in Environmental Resource Management from University College Dublin and is a Professional Wetland Scientist.

Catherine Johnson is a Climate Practitioner and Environmental Scientist with MKO with over 3 years of private consultancy experience and expertise in climate and sustainability matters. Catherine has expertise in greenhouse gas assessments, international climate law and policy, earth science, and sustainability/ESG processes. Catherine possesses skills in mapping and design, which complement her experience in preparing comprehensive EIAR chapters with a particular focus on climate change. Catherine holds a BSc in Earth and Ocean Science and a LLM in Global Environment and Climate Change Law. Prior to joining MKO in 2022, Catherine worked as an Environmental Social Governance (ESG) analyst for Acasta in Edinburgh. Catherine has expertise regarding international climate law and policy, earth processes, ocean science, and sustainability/ESG. 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.

Sean Creedon is an Associate Director in the Environment Team at MKO. 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, biogas 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. Sean has over 24 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.

11.1.3 Chapter Structure and Climate Study Areas

This chapter of the rEIAR provides an assessment of the direct and indirect effects on climate arising from all phases of the Existing Development.

The chapter structure is as follows:

- A review of all relevant climate change legislation policy and guidance applicable to the Existing Development in an international, national, and local context (Section 11.2.;
- Presentation of the baseline environment (Section 11.3 below), including:
 - A description of the baseline environment at the inception of the Existing Development (2018) established from desk study, utilising relevant datasets and data provided within other sections of the rEIAR (Section 11.3.1 below);
- A detailed carbon assessment, which considers how the Existing Development has affected and will affect the greenhouse gas emissions associated with Ireland as a result of activities associated with the construction of the Existing Development (inclusive of both carbon losses and carbon savings) (Section 11.4 below);
- An assessment of the effects on climate arising from the Existing Development during the construction phase (Section 11.5) based on the information gathered and the analysis and assessments undertaken;

- All required mitigation measures implemented which would have prevented, minimised, reduced or offset any environmental effects identified in the construction phase;
- An assessment of the cumulative effects is provided in Section 11.6 and details any cumulative effects on climate between the Existing Development, the Prospective Development, and other permitted or proposed projects and plans in the area, (wind energy or otherwise).
- Presents an assessment of the potential likely significant in-cumulation effects on climate arising from the both the Existing Development and the Prospective Development (the Subject Development) 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 Subject Development and other permitted or proposed projects and plans in the area, (wind energy or otherwise) for the construction phase (Section 11.8.1)
- An assessment of potential transboundary impacts of the Subject Development is provided in Section 11.9 and details any potential transboundary effects on climate due to the Subject Development.

By their very nature, the impacts and resulting effects of greenhouse gas emissions are global rather than affecting one localised area. For the purposes of this rEIAR, the overall Climate Study Area for the Existing Development is defined as the national environment (Ireland), where the receptor is the climate and the global atmosphere. As stated in the IEMA 2022 guidance *'greenhouse gas emission impacts and resulting effects are global rather than affecting one localised area'*¹. Therefore, effects arising from the impacts on climate are considered to impact on a national level. National, regional and local data has been considered where relevant and available. The study areas considered across the different assessments provided within this report are detailed below.

Baseline Environment

- Current Baseline
 - Current Baseline Study Area: the Wind Farm Site and Grid Connection Site boundary, as defined in Section 1.1.1 of Chapter 1 of this rEIAR. Information taken from relevant rEIAR Chapters for inclusion in the current baseline assessment is within the discipline's specific assessment boundary.

Carbon Assessment

- Carbon Assessment Study Area: defined as the Wind Farm Site and Grid Connection Site, as defined in Section 1.1.1 of Chapter 1 of this rEIAR.

11.1.4 Scoping and Consultation

Health Service Executive

A scoping response was received from the Health Service Executive (HSE) on the 3rd October 2025, and a follow up response was received on the 10th of April 2026, following the follow up in March Scoping. The HSE noted that the assessment should include the impact construction work may have on the future stability of ground conditions, taking into consideration extreme weather events, site

¹ IEMA (2022). *Assessing Greenhouse Gas Emissions and Evaluating their Significant*, 2nd Edition. Available online at: <https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions>

drainage, and the potential for soil erosion. The HSE stated that a Construction Environmental Management Plan (CEMP) should be included which details dust control and mitigation measures. The HSE recommends a peat stability monitoring programme as set out in the Scottish Government's '*Peat Landslide Hazard and Risk Assessments: Best Practice Guide for Proposed Electricity Developments 2017*'.

Appendix 8-1 of the EIAR contains a Peat Stability Assessment of the Prospective Development, with further detail on the impact of the construction of the Prospective Development on the future stability of the Site. Appendix 4-3 CEMP of the EIAR, contains details on the dust control and other mitigation measures which will be in use during the construction of the Prospective Development.

Department of Climate, Energy and the Environment

A scoping request was issued to the Department of Climate, Energy and the Environment in September 2025 and a follow up in March 2026. No response has been received to date.

Environmental Protection Agency

A scoping request was issued to the Environmental Protection Agency (EPA) in September 2025 and a follow up in March 2026. No response has been received to date.

Sustainable Energy Authority Ireland

A scoping request was issued to Sustainable Energy Authority Ireland (SEAI) in September 2025 and a follow up in March 2026. SEAI responded stating that they are not Statutory Consultees for Onshore Wind projects and as such have no input into Onshore Wind Planning Applications.

11.1.5 Limitations and Difficulties Encountered

This rEIAR has been carried out based on the availability of the information relating to the construction of the Existing Development. No limitations were encountered during the preparation of this assessment that would materially affect the conclusions of this report.

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 leads to an accumulation of energy in the Earth system in the form of heat that is driving global warming.^{2,3} Greenhouse gases come primarily from the combustion of fossil fuels in energy use.

In March 2024 the European Environment Agency (EEA) published the European Climate Risk Assessment.⁴ 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

² 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>

³ 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>.

⁴ European Environment Agency (2024) *European Climate Risk Assessment* <<https://www.eea.europa.eu/publications/european-climate-risk-assessment>>

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 2023⁵, 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 an international (Section 11.2.1), national (Section 11.2.2), and local (Section 11.2.3) context 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 11-1 below identifies international instruments relating to greenhouse gases 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.

Table 11-1 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; and
Conference of the Parties (COP): <i>Every year since 1995, the Conference of the Parties (COP) has</i>	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 twelve-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.

⁵ IPCC AR6 Synthesis Report: Climate Change 2023. <https://www.ipcc.ch/report/sixth-assessment-report-cycle/>

International Instrument	Description
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.	COP25 – Madrid (December 2 nd to December 13 th , 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 (30 th of November 2023 to the 13 th 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 (11 th November 2024 to 22 nd 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 (10 th November 2025 to 21 st November 2025) The 30th UN Climate Change Conference in Belém, Brazil concluded with a mix of political progress and unresolved tensions. Parties adopted the “Belém Political Package,” reinforcing the Paris Agreement’s goals and calling for tripling adaptation finance by 2035 to help vulnerable countries cope with climate impacts, alongside a set of 59 voluntary indicators to track adaptation progress. New mechanisms were launched to bridge the gap between pledges and implementation, including the Global Implementation Accelerator and the Belém Mission to 1.5°C, reflecting a growing focus on turning plans into action. A just transition mechanism and a Gender Action Plan were agreed to support equitable transitions that protect workers, Indigenous groups, and marginalized communities. Progress was also made on nature protection, with initiatives like the Tropical Forests Forever Facility to finance tropical forest conservation. However, negotiators failed to include a formal roadmap for phasing out fossil fuels or a zero-deforestation commitment in the core COP text, highlighting persistent geopolitical divides and the challenge of securing broad consensus. Despite these outcomes, leaders emphasised the urgency of deep emissions cuts and stronger climate finance to stay aligned with the 1.5°C target.
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.

International Instrument	Description
Climate Change Performance Index	Established in 2005, the Climate Change Performance Index (CCPI)⁶ is an independent monitoring tool which tracks individual countries climate protection performance. Ireland, ranked 43rd in 2024, has risen 14 places to 29th for 2025, 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 2024	In March 2025, the World Meteorological Organisation (WMO) published a report entitled the 'State of the Global Climate 2024'. This report provided a summary on the state of the climate indicators in 2023 with sections on key climate indicators, extreme events and impacts. The key messages in the report include: ➤ Greenhouse gases reached record observed levels in 2023. Real time data indicate that they continued to rise in 2024. ➤ The annually averaged global mean near-surface temperature in 2024 was 1.55 °C ± 0.13 °C above the 1850–1900 average used to represent pre-industrial conditions.
Renewable Energy Directive	The first Renewable Energy Directive (RED)⁷ 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),⁸ 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. As per the National Energy and Climate Plan (NECP) 2021-2030, Ireland's overall RES target is 34.1% in 2030. Given the need to ratchet up the EU's clean energy transition, RED was revised in 2023, and the amending Directive EU/2023/2413 (REDIII)⁹ 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

⁶ Climate Change Performance Index 2024 <<https://ccpi.org>>

⁷ 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>

⁸ Directive (EU) 2018/2001 on the promotion of the use of energy from renewable resources (recast). Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L2001>

⁹ 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

International Instrument	Description
	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.
EU Nature Restoration Law	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 ➤ Meet international commitments 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.
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

11.2.2 National Greenhouse Gas Emission and Climate Targets

Ireland has reached a crucial point in addressing climate change with a 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 11-2 below provides an overview of 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 11-2 National Legislation and Reports relating to Greenhouse Gases 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 2024	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 2024: Electricity report has been released by the CCAC and focuses specifically on key findings and recommendations for the Electricity sector. In 2023, emissions from the sector reduced by approximately 21% from 2022 to the lowest level since records began in 1990. This was driven by a considerable decline in the use of coal for electricity generation, coupled with a notable rise in imported electricity.
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 1.1.2.6 of Appendix 11-1 Climate Legislation and Policy.
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 in MtCO₂eq for each 5-year carbon budget period was approved by the government on the 28th of July 2022 The Electricity sector in Carbon Budget I for the period 2021 – 2025 has a budget of 40 MtCO₂eq for the 5 years. Carbon Budget 2 for the period 2026 – 2030 has a budget of 20 MtCO₂eq for the 5 years. In December 2024, the CCAC have provided provisional carbon budgets out to 2040 with CB3 2031-2035 and CB4 2036-2040 being 160 MtCO₂eq and 120 MtCO₂eq, respectively. These have not been formally adopted as of yet but do signify an increasingly constrained national carbon budget over time to reach 2050 goals. Refer to Section 1.1.2.6 of Appendix 11-1 Climate Legislation and Policy for further details.
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 ➤ Volume 4: Realising the Benefits of Transition and Transformation Please refer to Section 1.1.2.8 of Appendix 11-1 Climate Legislation and Policy for further information on the ICCA.

11.2.3 Local Greenhouse Gas Emission and Climate Targets

11.2.3.1 Donegal Local Authority Climate Action Plan 2024-2029

The Donegal County Council Local Authority Climate Action Plan 2024-2029 (Donegal LACAP)¹⁰ was adopted on 21st February 2024 alongside its publication on Donegal County Council's website that same month.

The Donegal LACAP highlights the current state of climate action in Ireland, and how Donegal County Council will take climate action by improving energy efficiency reducing greenhouse gas emissions and embedding climate resilience across its own assets and service.

The Donegal LACAP provides a mechanism for bringing together both adaptation and mitigation actions to help drive positive climate action and outcomes across the local authority and its administrative area. The framework of climate actions set within the plan, configures the arrangement of climate actions within a defined structure that ensures alignment between on the ground actions and the high-level vision that the Donegal LACAP aspires to deliver. The Donegal 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.

Overall, the greenhouse gas emissions generated from County Donegal equated to 1,970 ktCO₂-eq in the baseline year, 2019. The top four emitting sectors within County Donegal in terms of total greenhouse gas emissions in the baseline year were Agriculture, Residential, Transport and Land Use, Land Change and Forestry (LULUCF) producing 39%, 21%, 15% and 13% respectively of total emissions in County Donegal. Donegal County Council, along with all public sector entities must reduce greenhouse gas emissions by 51% by 2030 as compared to 2019 in line with the National Climate Action Plan 2025 (Section 11.4.2 above).

The Donegal LACAP assesses climate risk relevant to Ireland and to County Donegal, this, plus the evidence baseline, inform the climate objectives and actions that will be undertaken by Donegal County Council to assist in the achievement of national and international climate targets.

Once operational, the Subject Development, which will be facilitated by the Existing Development, will assist in reducing emission by facilitating the generation of renewable energy to be fed into the grid and

¹⁰ Donegal County Council (2024). Donegal County Council Local Authority Climate Action Plan 2024-2029. Available at: <https://www.donegalcoco.ie/media/s2cpk5v5/climate-action-plan-english-web-version-v2-1.pdf>

the subsequent decarbonisation of other sectors, in particular the main emitting sectors in County Donegal as identified above.

11.2.3.2 Donegal County Development Plan 2024-2030

The Donegal County Development Plan 2024-2030¹¹ (DCDP) sets out the overall strategy for the proper planning and sustainable development of the County over a 6-year period. The DCDP includes numerous actions and objectives on sustainability and climate for County Donegal to achieve over the 6-year period.

A key objective identified in the DCDP relating to wind energy is as follows:

- **E-O-2^{CC}**: To secure the maximum potential from the wind energy resources of the County commensurate with the receiving environment and local developments patterns consistent with the proper planning and sustainable development, thereby contributing to the national drive towards ensuring the security of energy supply.

Further detail on local policy relating to wind energy in Co. Donegal can be found in Section 2.6.4 of Chapter 2 of this rEIAR.

11.2.4 Relevant Guidance

This chapter of the rEIAR has been prepared in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and in accordance with EPA 2022 EIA guidance listed in Section 1.7.2 of Chapter 1 Introduction.

Due to the nature of the Existing Development, the following methodology and guidance was utilised for the climate assessment of this rEIAR:

- 'Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment' (2013) European Commission
- '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); and
- 'Wind Farms and Carbon Savings' (Scottish Natural Heritage, 2003).
- Macauley Institute Carbon Calculator for Wind Farms on Scottish Peatlands (Version 2.14.0) (2023)
- Transport Infrastructure Ireland (TII), Carbon Assessment Tool for Road, Greenway and Light Rail Projects (GE-ENV-01106), latest version (2025 edition), accessed via TII Web Application Portal.
- 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
- Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document, GE-ENV-01106 (TII 2022d).

11.3 Climate and Weather

¹¹ Donegal County Council (2024). Donegal County Development Plan 2024-2030. Available at: https://www.donegalcocodocs.ie/docs/CountyDonegalDevelopmentPlan2024-2030_041125.pdf

The following section provides a description of the baseline climactic conditions in Ireland at the time of the construction of the Existing Development.

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. The following key data sources were reviewed:

- > Met Éireann 30-Year Averages¹²
- > Irelands Climate Averages 1991-2020 Summary Report¹³
- > Ireland's National Inventory Submissions 2026¹⁴
- > Climate Status Report for Ireland 2020¹⁵
- > Annual Review 2026 – Our Changing Climate in 2025¹⁶

11.3.1.2 Physical Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Malin Head, which is located approximately 78km to the north of the Wind Farm Site, is the nearest weather and climate monitoring station that has meteorological data recorded for the 30-year period from 1991-2020. Meteorological data recorded at the Malin Head weather station over the 30-year period from 1991-2020 is shown in Table 11-3 below. The wettest months are November and December, with April and May being the driest. August is the warmest month with an average temperature of 17.1° Celsius. Recent monthly meteorological data recorded at Finner Camp, Bundoran, located approximately 33km southwest of the Gird Connection Site, from January 2022 to December 2025 is available at: <https://www.met.ie/climate/available-data/monthly-data>. February 2022 was the wettest month in this time period, with 180.2mm of rainfall recorded, while September 2024 was the driest month with 44.2mm of rainfall. June 2023 was the warmest month in this time period, with a mean monthly temperature of 16.8° Celsius. December 2022 was the coldest month in this time period, with a mean monthly temperature of 4.4° Celsius.

¹² <https://www.met.ie/climate/30-year-averages>

¹³ Department of Housing, Local Government and Heritage (2024) Irelands Climate Averages 1991-2020 Summary Report <https://depositireland.ie/bitstream/handle/2262/108695/Ireland%27s_climate_averages_1991-2020_rev2.pdf?sequence=1&isAllowed=y>

¹⁴ EPA (2026) Ireland's National Inventory Submissions <https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland-NID-2026.pdf>

¹⁵ 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>>

¹⁶ Climate Change Advisory Council (2026) Annual Review 2026 – Our Changing Climate in 2025 <<https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC-AR2026-2-our-changing-climate-final.pdf>>

Table 11-3 Data from Met Éireann Weather Station at Malin Head 1991-2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8.2	8.4	9.4	11.1	13.3	15.3	17	17.1	15.8	13.1	10.5	8.8	12.3
Mean daily min	3.7	3.7	4.6	6	8	10.4	12.1	12.4	11.1	8.8	6.2	4.3	7.6
Mean temperature	6	6	7	8.6	10.7	12.8	14.5	14.8	13.4	11	8.4	6.6	10
Absolute max.	14.5	14.6	19.9	21.4	25.1	25.2	25.9	25.9	23.4	20.4	17.4	16	25.9
Absolute Min.	-3.9	-3.6	-2.7	-1.5	0.7	2.7	7.1	6.9	3.6	0.4	-1.2	-5.2	-5.2
Mean No. of Days with Air Frost	2	1.7	1.1	0.2	0	0	0	0	0	0	0.3	1.7	7
Mean No. of Days with Ground Frost	6.9	5.8	5.4	2.5	0.6	0.1	0	0	0	0.4	2.3	5.1	29
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	83.4	82.8	81.5	79.1	79.3	81.6	83.2	83	82.5	82.6	83	82.8	82.1
Mean at 1500UTC	80.7	77.7	76.1	74.7	75.5	78.6	79.9	79	77.5	77.4	79.9	81	78.2
SUNSHINE (Hours)													
Mean daily duration	1.3	2.4	3.4	5.3	6.5	5.5	4.7	4.7	3.8	2.6	1.6	1.1	3.6
Greatest daily duration	7.6	9.1	11.6	14.2	16	16.8	16.4	14.6	12.2	10.4	8	6.7	16.8
Mean no. of days with no sun	9.9	5	4.9	2.9	2.3	2	2	3	3.1	5.6	8	10.4	59.1
RAINFALL (mm)													
Mean monthly total	118.9	95.2	80.7	63.4	65	73.8	86	97.8	94.8	110.3	121.6	130.5	1138.1
Greatest daily total	28.4	34.3	31.4	26.3	35	42.2	27.7	73	34.9	38.7	39.4	66	73
Mean num. of days with $\geq 0.2\text{mm}$	23.2	20.1	20.9	17.2	17.4	17.7	20.1	20.8	19.9	21.5	23.7	23	245.5
Mean num. of days with $\geq 1.0\text{mm}$	18.8	15.8	15.2	12.6	12.2	12.4	15.7	15.7	14.9	17.5	19.8	19.5	190.1
Mean num. of days with $\geq 5.0\text{mm}$	9.1	7.2	5.9	4.3	4.2	5.2	6	6.6	6.9	7.5	9	9.2	81.1
WIND (knots)													
Mean monthly speed	9.4	9.2	8.5	7.5	6.9	6.4	6.1	6.5	7.3	8.3	8.8	9	7.8
Max. gust	91	80	73	71	73	62	57	58	71	78	92	96	96
Max. mean 10-minute speed	68	56	52	52	55	47	42	43	49	56	61	67	68
Mean num. of days with gales	10.5	8.7	7.4	3.4	1.8	0.8	0.6	0.7	2.3	5.1	7.2	8.6	57.2

The 30-year Annual Average Rainfall (AAR) and evaporation data for the period 1981-2010¹⁷ was recorded at Ballybofey (Lough Mourne), which is located ~2km northwest of the Wind Farm Site. This data is presented in Table 11-4. The long-term AAR at Ballybofey (Lough Mourne) is 1,931mm/year. However, this rainfall data is likely to underestimate the actual AAR at the Wind Farm Site due to elevation differences. Ballybofey (Lough Mourne) rainfall station stands at an elevation of 101mOD whilst the topography at the Wind Farm Site ranges up to 327mOD.

Met Éireann also provide a grid of AAR for the entire country for the period of 1991 to 2020. Based on this more site-specific modelled rainfall values, the AAR at the Wind Farm Site ranges from 2,004 to 2,185mm/year. The conservative value of 2,185mm/year is taken as the AAR for the Wind Farm Site. This is considered to be the most accurate estimate of AAR from the available desk study sources.

Table 11-4 Average long-term Rainfall Data (mm)

Station		X-Coord		Y-Coord		Ht (MAOD)		Opened		Closed		
Lough Mourne		110700		23500		101		1963		N/A		
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
214	152	170	113	101	107	122	154	162	211	204	221	1,931
Wind Farm Site (X-Cord: 205000 Y-Cord:387000)												
Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Total
237	199	177	128	126	127	152	165	169	213	235	257	2,185

In addition, HES installed a rain gauge at the Wind Farm Site on 24th November 2020 following the peat slide. The daily rainfall volumes from 24th November 2020 to 17th December 2025 have subsequently been recorded and the data is presented in **Figure 11-1** below. The greatest daily rainfall was recorded on 20th February 2022 with 75.6mm of rainfall. During the monitoring period the month with the greatest rainfall was February 2022 with a total volume of 399mm of precipitation recorded at the Wind Farm Site.

Note that the rain gauge was not recording correctly between the 22nd February and 24th April 2024. Following routine maintenance, the rain gauge resumed operation and continued recording the daily rainfall totals for the Wind Farm Site.

¹⁷ Ballybofey (Lough Mourne) Long term Annual Average Rainfall (AAR) and evaporation data 1981-2010. Source: Met Éireann (www.met.ie)

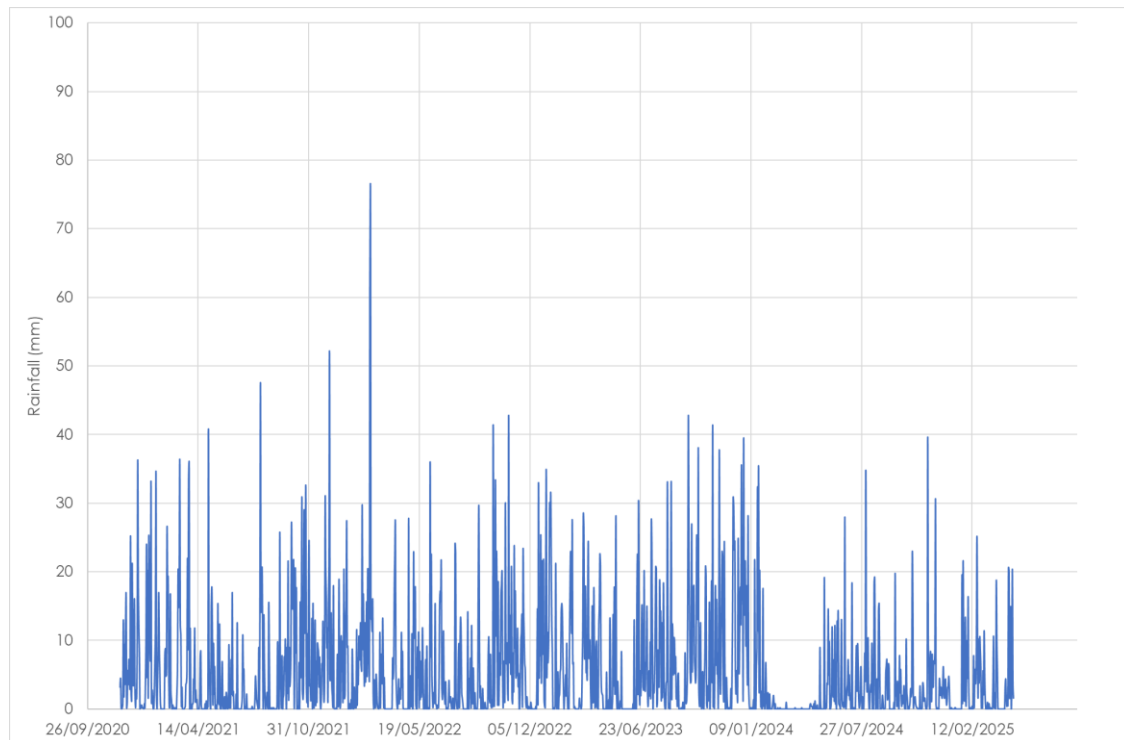


Figure 11-1: Daily Rainfall Data at Site (Dec 2020 – April 2025)

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

Table 11-5 Summary of Current Physical Baseline Environment

Climate variable	Summary of current baseline environment	Relevant rEIAR chapter (if applicable)
Air Temperature	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 winters¹⁸. 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 to 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 2020¹⁹ 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 sixteen of the top 20 warmest years on record occurring since 1990²⁰. On 10th July 2024 Met Éireann confirmed that 2023 was Ireland's wettest and warmest year on record (records going back to 1900).²¹ 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.²² However, this moderating influence could be in jeopardy if the Atlantic Meridional Overturning Circulation (AMOC) continues to weaken²³. 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.	Chapter 10 Air Quality

¹⁸ IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>

¹⁹ Government of Ireland (2020) Climate Status Report for Ireland 2020 <https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf>

²⁰ Ireland's 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>>

²¹ <https://www.met.ie/2023-confirmed-as-irelands-wettest-year-on-record>

²² <https://www.met.ie/climate/what-we-measure/temperature>, <https://www.met.ie/climate/what-we-measure/temperature#:~:text=The%20moderating%20influence%20of%20the,mild%20winters%20and%20cool%20summers>

²³ 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 rEIAR chapter (if applicable)
Precipitation	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 regimes²⁴. 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)²⁵. 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). 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.	Further detail on rainfall and evaporation data is provided in Section 9.3.2 in Chapter 9 Water.
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 variations²⁶. 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 2019 there were 7 no. named storms and 9 in 2020, with Storm Francis bring extreme rainfall in August of 2020 and Storm Aiden bringing 'Storm Force' winds (98km/h) and heavy rainfall on Oct 31st, 2020, with a status orange warning for Donegal at the time. In late 2023 and early 2024, Ireland experienced a very active storm season; the county was affected by 13-14 severe storms²⁷. In 2025 there were 5 no. named storms, with Storm Eowyn, occurring in January 2025, reaching 'Hurricane Force' winds (maximum wind speed recorded	N/A

²⁴ IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>

²⁵ Department of Housing, Local Government and Heritage (2024) Ireland's Climate Averages 1991-2020 Summary Report <<https://edepositireland.ie/handle/2262/108695>>

²⁶ IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>

²⁷ Met Éireann (2024) Human-caused Climate Change Brings Increased Storm Rainfall <<https://www.met.ie/human-caused-climate-change-brings-increased-storm-rainfall>>

Climate variable	Summary of current baseline environment	Relevant rEIAR chapter (if applicable)
	as 142km/h).²⁸ At the time of writing, there was 1 no. named storm in Ireland, Storm Chandra which occurred in January 2026, categorised as a 'Violent Storm' with a wind speed of 104km/h. 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 weaken²⁹. The weakening of this current would result in increased storm activity in Northern Europe.	

²⁸ Met Éireann Storm Centre <https://www.met.ie/climate/storm-centre>

²⁹ 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>

11.3.1.3 Existing Greenhouse Gas Emissions

Greenhouse gas emissions arise from a large majority of anthropogenic activities. The main sectors which release 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)
- > Unallocated savings

The most recent inventory report for Ireland, National Inventory Report 2025 (NIR 2025)³⁰, 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 55,231.5 ktCO₂e in 1990 to 71,476.9 ktCO₂e in 2001, which is the highest level of greenhouse gas emissions ever reported in Ireland. Emissions then plateaued until 2008 with estimates ranging from 69,032.5 ktCO₂e to 71,213.8 ktCO₂e. There was then a sharp decrease from 69,032.5 ktCO₂e in 2008 to 58,582.4 ktCO₂e in 2011. In 2023, total emissions of greenhouse gases including indirect emissions from solvent use (excluding LULUCF) in Ireland were 54,934.4 ktCO₂e, which is 1.4% lower than emissions in 1990. Emissions in 2023 at 54,934.4 ktCO₂e are 6.8% lower than 2022, and the lowest level in the time series.

The Electricity sector accounted for the bulk of the CO₂ 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 CO₂ accounted for 61.1% of the national total in 2023, with CH₄ and N₂O contributing 28.9% and 8.8%, respectively. The combined emissions of fluorinated gases (HFC, PFC, SF₆ and NF₃) accounted for 1.2% of total emissions in 2023³¹.

11.4 Calculating Carbon Losses from the Existing Development

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 material (which is composed of carbon). Bogs and peatlands are known to store large amounts of 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 Existing Development was constructed on areas of former commercial forestry (felling under licence was undertaken to accommodate the construction works and footprint) and blanket bog. The surrounding land-use predominantly comprises peat bogs, commercial forestry and other seminatural

³⁰ EPA (2024) National inventory Report 2025 <<https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland's-NIR-2025.pdf>>

³¹ Ibid.

areas with limited residential use along local roads. For this reason, the carbon balance between the use of renewable energy and the loss of carbon stored in the peat will be assessed in this section of the rEiAR. Note, in line with the Department of Agriculture, Food, and the Marine, Forest Service's published policy³² on granting felling licences for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the footprint of the infrastructure developments. A total of 73.3ha of forestry was felled to accommodate the Existing Development; the approximate total amount of forestry felled as part of the Existing Development (73.3ha) has been accounted for and was replanted outside at an alternative site outside of the county and hydrological catchment. Replanting of the 73.3ha has not been included due to the fact that the carbon storage capacity of restored habitats will vary over time as vegetation matures and land use and the baseline environment change. Therefore, while it can be assumed that replanting of the 73.6ha of coniferous forestry will result in an increased capacity of carbon storage due to the carbon storage potential that exists within this habitat, 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 replanting has not been included.

CO₂ 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 CO₂ 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 CO₂ 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.

The carbon balance of wind farm developments in peatland habitats has attracted significant attention in recent years. 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 CO₂.

The below assessment includes all carbon losses associated with the Existing Development, including carbon lost from construction related activities, tree felling, traffic, and embodied carbon of all construction materials. Please note, as a conservative measure, all peat that was displaced during the November 2020 peat slide (i.e., 86,240m³) is considered lost for the purposes of this carbon calculation.

11.4.2 Methodology for Calculating Losses

A methodology was published in June 2008 by scientists at the University of Aberdeen and the Macaulay 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 web-based version of the carbon calculator, which supersedes the excel based versions of the tool, was released in 2016. Please note, the web-based version of the carbon calculator is currently not available, the Macaulay Institute has supplied a worksheet of the calculator (Version 2.15.0) 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.

³² Department of Agriculture, Food and the Marine (2020). Forest Service <<https://www.gov.ie/en/department-of-agriculture-food-and-the-marine/publications/tree-felling-licences/>>

Previously guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of any 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., 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., 2015); and
- The Effect of Management Strategies on Greenhouse Gas Balances in Industrial Cutaway Peatlands in Ireland (The CARBAL Report) (Wilson, D. and Farrell, E.P., 2007); and
- Wilson et al (2013) 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., 2013).

These data sources were used to assess the effects of the Existing Development in terms of potential carbon losses.

Although the loss of carbon fixing potential from plants on peat land is not substantial, it is nonetheless calculated for areas from which peat is extracted 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. This requires peat excavation resulting in the loss of the carbon-fixing potential associated with peat. The determination of the carbon losses associated with the carbon-fixing potential of peat is calculated from the area affected by proposed infrastructure (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 Inventories³³, as well as by more site-specific equations derived from the scientific literature and updated emission factors.³⁴ Carbon losses associated with the removal of other carbon-fixing vegetation (not including tree felling) 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 that the loss of carbon fixing vegetation has occurred as part of the Existing Development due to the removal of these habitat types, the exact carbon loss is not quantifiable. However, to ensure a robust assessment in Section 11.4.3 these carbon losses have been considered; please see Section 11.4.3 below for the detailed impact assessment and Appendix 11-2 Carbon Calculations of this rEIAR for further information on assumptions used in this assessment.

Peatlands are essentially unbalanced systems. When flooded, peat soils emit less carbon dioxide but more methane than when drained. In waterlogged soils, carbon dioxide 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, carbon emissions usually exceed plant fixation, so the net exchange of carbon with the atmosphere is positive. In order to calculate the carbon 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.

³³ IPCC (1997) Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories

³⁴ Calculating potential carbon losses and savings from wind farms on Scottish peatlands (2018) <
<https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2018/12/carbon-calculator-technical-guidance/documents/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands-technical-guidance/calculating-potential-carbon-losses-and-savings-from-wind-farms-on-scottish-peatlands-technical-guidance.pdf>

The Macauley Institute methodology states that the total volume of peat impacted by the construction of the wind farm is strongly correlated to the extent of the peatland affected by drainage at the Wind Farm 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 Wind Farm 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 Wind Farm Site is restored. The below assessment is an assessment of the Existing Development (i.e., all works carried out to date for the Meenbog Wind Farm) and therefore the model has been prepared on the basis that restoration has not occurred, nor will it, for this element of the Subject Development.

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 in relation to avoiding the risk of peat landslides. As detailed in Section 8.3.8 in Chapter 8 of this rEIAR: Land Soils and Geology, the Existing Development has been the subject of a peat stability risk assessment; further details are contained within Appendix 8-4 of this rEIAR.

Tree felling was required within and around the Existing Development infrastructure footprint to allow for the construction of the turbine foundations, access roads, underground cabling, and the other ancillary infrastructure. In some instances, forestry was felled earlier than originally planned, so limiting the nature and longevity of the resulting timber produced. If a forestry plantation was due to be felled with no plan to replant, the effect of the land use change is not attributable to the wind farm development and is omitted from the calculation. If, however, the forestry is felled for the development, as is the case for the Existing Development, the effects are judged to be attributable to the wind farm development. Carbon losses as a result of felling are calculated from the area to be felled, the average carbon sequestered annually, and the lifetime of the wind farm. Alterations in soil carbon levels following felling are calculated using the equations for drainage and site restoration already described.

The outputs of the Macauley Institute web-based carbon calculator are included in Appendix 11-2 of this rEIAR, '*Carbon Calculations*'.

In addition to the Macauley Institute methodology described above, where possible, carbon emissions or losses associated with embodied carbon of materials used in the construction of the Existing Development have been identified. Embodied carbon refers to the emissions associated with procuring, mining, and harvesting raw materials, the transformation of those materials into construction products, transporting them to the Wind Farm Site, and installation of these materials during a construction phase.³⁵

The emissions associated with the embodied carbon, along with the pre-construction activities, construction excavation activities, and construction phase transport movements of the Existing Development are considered using the Transport Infrastructure Ireland (TII) Carbon Tool (TII 2022)³⁶. 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 15.2 in Chapter 15 of this rEIAR outlines traffic generation numbers relative to quantum of materials required for the construction of the Existing Development, the details of which have been utilised to determine the emissions associated with these activities and are included in Appendix 11-2 '*Carbon Calculations*'.

³⁵ Irish green Building Council – What is embodied carbon? <<https://www.igbc.ie/what-is-embodied-carbon/>>

³⁶ Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document <https://www.tiipublications.ie/library/GE-ENV-01106-01.pdf>

11.4.3 Carbon Loss Calculations

11.4.3.1 Carbon Losses – Existing Development

The Scottish Government online carbon calculator was used to assess the impacts of the Existing Development in terms of potential carbon losses taking into account forestry felling, excavation of peat, and proposed roads. In relation to the assessment of embodied carbon of construction material, and carbon losses associated with pre-construction activities, construction excavation activities, and transport movements of all other ancillary elements of the Existing Development, the TII Carbon Tool has been utilised. A copy of the outputs is provided as Appendix 11-2 of this rEIAR. Where available and relevant, site-specific information was inserted into the online carbon calculators. Otherwise, default values were used. The main CO₂ losses due to the Existing Development are summarised in Table 11-6.

Table 11-6 CO₂ Losses from the Existing Development

Origin of Losses	CO ₂ Losses (tonnes CO ₂ equivalent)	
	Expected	Maximum
Losses due to reduced carbon fixing potential	1,339	1,793
Losses from soil organic matter	109,630	348,442
Losses associated with embodied carbon in construction materials	18,883	18,883
Losses associated with traffic and transport movements	138	138
Losses associated with pre-construction activities	111	111
Losses associated with construction activities	9,662	9,662
Total	139,763	379,029

The worksheet models and online tools calculate that the Existing Development gave rise to an expected 139,763 tonnes of CO₂ equivalent losses. This is the expected and most realistic value based on the site conditions, Existing Development footprint and materials and spoil volumes generated for the Existing Development. Of this total figure, losses from reduced carbon fixing potential accounts for 1% or 1,339 tonnes. Losses from soil organic matter, i.e., CO₂ loss from disturbed soil and subsoils, will equate to 109,630 tonnes, or 78.4%. Losses due to embodied carbon accounts for 18,883 tonnes or 13.5%. Losses due to construction phase transport emissions accounts for 0.1% or 138 tonnes. Losses associated with pre-construction activities accounts for 111 tonnes or 0.1%. Losses associated with construction activities accounts for 9,662 tonnes or 6.9%.

The figure of 109,630 tonnes of CO₂ arising from disturbed soil and subsoils (i.e., peat) is calculated from a conservative estimate of 86,240m³ of peat being displaced as part of the November 2020 Peat Slide and the total volume of excavated peat (450,900 m³) as set out in the Retrospective Peat and Spoil Management Plan (Appendix 4-8 to the rEIAR). An associated area of 309,474 m² of disturbed peatland was used in the calculations. These values have been manually input into the Macauley Tool to ensure the alignment of the final carbon loss outputs with the values quantified within Appendix 6-2.

The Macauley Carbon Calculator model assumes that the footprint of the Existing Development is located within “Acid Bog”, as this is one of only two choices the model allows (the other being Fen).

The habitat that has been impacted by the Existing Development footprint comprises a mix of peatland, coniferous forestry and pastoral agriculture land, rather than acid bog, as assumed by the model, therefore the actual CO₂ losses are expected to be lower than those presented in Table 11-6 above.

The figure of 18,883 tonnes of CO₂ arising from the embodied carbon of construction materials associated with the Existing Development is calculated based the types of materials available in the TII Carbon tool such as, concrete, steel, cement and granular fill, and assumes that each HGV or LGV will be carrying material at its full capacity. The figure of 138 tonnes of CO₂ arising from transport movements associated with construction activities of the Existing Development is calculated based on the assumption that material was imported locally or from a port/city location where applicable. Details on the assumptions made for the modelling of embodied carbon and construction phase transport emissions are included in Appendix 11-2.

The figure of 111 tonnes of CO₂ associated with pre-construction activities is based on the 73.6ha of tree felling that was removed as part of the Existing Development, and the area of peat lost to the November 2020 Peat Slide and general excavation activities within peatland undertaken throughout the Existing Development. As outlined in Section 11.4.1 above, replanting of the 73.3ha has not been included due to fact that the carbon storage capacity of restored habitats will vary over time as vegetation matures and land use and the baseline environment change. 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 replanting has not been included

The figure of 9,662 tonnes of CO₂ arising from construction activities is associated with the volume of material won from the footprint of the Existing Development and utilised within the Wind Farm Site. As identified in Section 4.4.1.3 of Chapter 4 of the rEIAR, approximately 507,808.35m³ of rock has been won on site for use with approximately 496,614.65m³ of rock having been utilised to date as part of the Existing Development. The use of the 496,614.65m³ of rock has therefore been utilised to inform Table 11-6 above.

11.5 Assessment of Significant Effects and Mitigation Measures

11.5.1 'Do-Nothing' Scenario

The 'Do Nothing' Scenario is an alternative scenario to retaining and regularising the Existing Development. In this scenario, should the Existing Development not secure substitute consent it will remain in-situ as an unauthorised and partially completed wind farm, which is, in effect, the "do nothing" option insofar as it represents the current situation as of the date of the application for Substitute Consent. The Do-Nothing Scenario represents a continuation of the existing baseline and does not give rise to any additional GHG emissions or climate impacts relative to the current baseline condition.

11.5.2 Construction of the Existing Development

11.5.2.1 Greenhouse Gas Emissions

Pre-Mitigation impact

Construction of Existing Development Infrastructure

The construction of access roads, turbine foundations, hardstand areas, substation, peat storage cells and borrow pits, berms and stilling ponds and other wind farm infrastructure required the removal of

peat habitat, tree felling, use of construction materials, and the operation of vehicles and plant at the Site. GHG emissions, e.g., carbon dioxide (CO₂), carbon monoxide and nitrogen oxides, associated with tree felling, land disruption, and the operation of vehicles and plant arose as a result of the Existing Development construction activities. This effect is considered to have been negative, slight and permanent considering that once emissions are released to the atmosphere, this impact is not reversible. Mitigation measures to reduce this effect are presented below.

The construction of access roads, turbine foundations, hardstand areas, substation, grid connection, peat storage cells and borrow pits, berms and stilling ponds and other wind farm infrastructure required construction materials (such as cement), and the operation of construction vehicles and plant on and off-site, and the transport of workers to and from the Wind Farm Site. GHG emissions, e.g., carbon dioxide (CO₂), carbon monoxide and nitrogen oxides, associated with the production of construction materials, and operation of vehicles and plant arose as a result of the Existing Development construction activities. This effect is considered to have been negative, slight and permanent considering that once emissions are released to the atmosphere, this impact is not reversible. Mitigation measures to reduce this effect are presented below.

The removal of carbon fixing vegetation and habitat was required to accommodate the footprint of the Existing Development, however, that was avoided where possible by the design and layout of the Existing Development. This effect is considered to have been negative, slight and permanent.

November 2020 Peat Slide

The November 2020 Peat Slide that occurred on the Site during the construction of the Existing Development resulted in the displacement of 86,240m³ of peat at the Site. GHG emissions, e.g., carbon dioxide (CO₂), carbon monoxide and nitrogen oxides, is associated with this event, through the release of CO₂ into the atmosphere from the peat slide and through vehicular and plant emissions which were used to undertake remediation measures e.g. construction of containment walls (refer to section 4.4.3 of Chapter 4 Description for details). This effect is considered to have been negative, slight and permanent considering that once emissions are released to the atmosphere, this impact is not reversible. Mitigation measures to reduce this effect are presented below.

Transport to Site

The transport of staff, equipment, and construction materials to the Wind Farm Site, also gave rise to GHG emissions associated with the transport vehicles and exhaust emissions. This effect is considered to have been negative, slight and permanent considering that once emissions are released to the atmosphere, this impact is not reversible. Mitigation measures to reduce this effect are presented below.

Waste Disposal

The Existing Development gave rise to waste, mainly from excavation and unavoidable construction waste including material surpluses, damaged materials, construction worker welfare facilities, and packaging waste. Waste management was 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. The release of GHG emissions associated with the generation and management of these waste streams is considered to have been negative, slight and permanent considering that once emissions are released to the atmosphere, this impact is not reversible.

Please refer to Section 4.7.6 of Chapter 4 of this ELAR and Section 3.11 of the 2019 Construction and Environmental Management Plan (Appendix 4-4) for detailed processes on waste management during the construction phase of the Existing Development.

Mitigation

- Construction staff were 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 produced and followed a site inspection and machinery checklist which was followed and updated as/when required.
- All construction vehicles and plant were maintained in good operational order while onsite, thereby minimising any emissions that arose.
- When stationary, delivery and on-site vehicles were required to turn off engines.
- the 2019 CEMP (Appendix 4-4) was in place throughout the construction phase.
- The 2019 CEMP included a Waste Management Plan (WMP) which outlined the best practice procedures that will occur during the construction phase relating to waste material.
- The majority of aggregate materials for the construction of the Existing Development were obtained from the onsite borrow pits (with some material being imported from local licenced quarries as needed). This significantly reduced the number of delivery vehicles accessing the Site, thereby reducing the amount of emissions associated with vehicle movements.

Residual Effects

The release of GHG emissions into the atmosphere from the short-term construction phase of the Existing Development had a negative effect on national climate change and global GHG concentrations and continues to do so, as once released, these emissions remain in the atmosphere. When considering these greenhouse gas emissions emitted during the construction of the Existing Development (139,763 tonnes) within the context of the Electricity Sector Emissions Ceilings (Table 11-2 above), Carbon Budget 1 (2021-2025), the most relevant for the Existing Development construction phase, has a carbon budget of 40 MtCO₂eq over the 5-year period. The emissions associated with the Existing Development are slight. Therefore, it is considered that due the nature, scale of the activities and with the implementation of the mitigation measures listed above, the residual effect of this contribution to national climate change and global GHG concentrations is considered to be permanent, negative and slight.

Significance of Effects

Taking the above into consideration, the effects on national climate change and global GHG concentrations from the to the construction of the Existing Development is Not Significant.

11.6

Cumulative Effects - Existing Development

This section presents an assessment of the cumulative effects associated with the construction of the Existing Development and other developments, existing and/or proposed at the time of construction, on national climate change and global greenhouse gas emissions. As stated in section 11.3 above and section 2.9.2 of Chapter 2, which details the Cumulative Impact Assessment Methodology for the rEIAR, the Climate assessment is considered on a national basis and not confined to a specific study area and emissions are considered against global GHG concentrations.

During the short-term construction phase of the Existing Development in cumulation with other permitted or proposed projects and/or plans across the State at the time, GHG emissions would have been released into the atmosphere, having a negative effect on climate change and global GHG concentrations arising from production of construction materials (such as cement), and the operation of construction vehicles and plant. Once emitted to the atmosphere, these greenhouse gas emissions had

an Imperceptible Negative effect on Climate and GHG concentrations. This effect is Permanent and irreversible. Considering these emissions within the context of the national Carbon Budget and relevant sectoral emissions ceiling, the residual effect of the Existing Development in cumulation with other existing or proposed projects and/or plans at the time, is considered to be Permanent, Negative, Imperceptible and Not Significant.

11.7 In-Cumulation Effects

This section considers the in-cumulation impact of the combination of the Existing Development and Prospective Development (the Subject Development).

11.7.1 Carbon Losses and Savings Calculations – Subject Development

11.7.1.1 Carbon Losses – Subject Development

The main CO₂ losses due to the Subject Development are summarised in Table 11-7.

Table 11-7 CO₂ Losses from the Subject Development

Origin of Losses	CO ₂ Losses (tonnes CO ₂ equivalent)	
	Expected	Maximum
Losses due to reduced carbon fixing potential	1,778	3,586
Losses from soil organic matter	131,629	696,884
Losses associated with embodied carbon in construction materials	21,048	95,212
Losses associated with traffic and transport movements	260	260
Losses associated with pre-construction activities	273	273
Losses associated with construction activities	9,734	9,734
Losses due to turbine life (e.g., manufacture, construction, decommissioning)	76,329	76,329
Losses due to backup	43,641	43,641
Total	284,692	925,919

The worksheet models and online tools calculate that the Subject Development will give rise to 284,692 tonnes of CO₂ equivalent losses over its 25-year life. Of this total figure, the proposed turbines directly account for 76,329 tonnes, or 26.8%. Losses due to backup account for 43,641 tonnes, or 15.3%. Losses from reduced carbon fixing potential accounts for 0.6% or 1,778 tonnes. Losses from soil organic matter, i.e., CO₂ loss from disturbed soil and subsoils, will equate to 131,629 tonnes, or 46.2%. Losses due to pre construction activities account for 273 tonnes or 0.1%, while losses due to construction activities account for 9,734 tonnes or 3.4%. Losses due to embodied carbon accounts for 21,048 tonnes or 7.4% and losses due to construction phase transport emissions accounts for 0.1% or 260 tonnes.

The figure of 131,629 tonnes of CO₂ arising from disturbed soil and subsoils (i.e., peat) and ground activities associated with the Subject Development is calculated from the estimate of peat being displaced as part of the November 2020 Peat Slide, the total volume of excavated peat from the Existing Development as detailed in Section 11.4.3 above and volume of peat being disturbed as part of the Prospective Development as detailed in Section 11.4.3 of Chapter 11 of the EIAR. These values have been manually input into the Macauley Tool to ensure the alignment of the final carbon loss outputs with the values quantified within Appendix 4-8 rPSMP of this rEIAR and Appendix 4-2 PSMP of the EIAR.

This total area is calculated based on the entire Subject Development footprint being in “Acid Bog”, as this is one of only two choices the model allows (the other being Fen). The habitat that has and will be impacted by the Subject Development footprint comprises a mix of peatland and coniferous forestry rather than acid bog, as assumed by the model. The value of 1,778 tonnes of CO₂ arising from ground activities in ‘Acid Bog’ is under a precautionary scenario, and therefore the actual CO₂ losses are expected to be lower than this value.

The figure of 21,048 tonnes of CO₂ arising from the embodied carbon of construction materials associated with the Subject Development 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 HGV or LGV will be carrying material at its full capacity. The figure of 260 tonnes of CO₂ arising from transport movements associated with construction activities of the Subject Development is calculated based on the assumption that material will be imported locally or from a port/city location where applicable. Details on the assumptions made for the modelling of embodied carbon and construction phase transport emissions are included in Appendix 11-2 of the EIAR and Appendix 11-2 of this rEIAR.

The figure of 273 tonnes of CO₂ associated with pre-construction activities is based on the 73.6ha of tree felling that was removed as part of the Existing Development and the 121.5ha of tree felling proposed as part of the Prospective Development, As outlined in Section 11.4.1 above and Section 11.4.1 of the EIAR, replanting has not been included due to fact that the carbon storage capacity of restored habitats will vary over time as vegetation matures and land use and the baseline environment change. 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 replanting has not been included.

The figure of 9,734 tonnes of CO₂ arising from construction activities is associated with the volume of material won from the footprint of the Existing Development and material proposed to be won from the Prospective Development and utilised within the Wind Farm Site. As identified in section 4.4.1.4.4 of Chapter 4 of this EIAR and Section 4.4.1.3 of Chapter 4 of the rEIAR, approximately 70,000m³ of rock is proposed to be won on the Wind Farm Site for use and approximately and approximately 507,808.35m³ of rock has been won on site for use. The use of the 577,808.35m³ of rock has therefore been utilised to inform Table 11-7 above.

The values discussed above are based on the assumption that the hydrology of the Subject Development and habitats within the Wind Farm Site are not restored on decommissioning of the Meenbog Wind Farm after its expected 25-year proposed operational life. As detailed in the Decommissioning Plan, Appendix 4-6 of the EIAR, the wind turbines and met mast will be dismantled and removed offsite. It is not intended to remove the concrete foundations from the ground as it is considered that its removal will be the least preferred options in terms of having potential effects on the environment. The associated foundations that protrude above ground level will be covered over with soil - reinforced concrete foundations remaining in-situ. The underground electrical cabling connecting the turbines to the on-site substation will be removed from the cable ducts. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance. The cable materials will be transferred to a suitable recycling or recovery facility. Taking into account the proposals incorporated in the Decommissioning Plan, the actual CO₂ losses are expected to be lower than the values detailed in Table 11-7.

11.7.1.2 Carbon Savings – Subject Development

According to the model described above, the Subject Development will give rise to total losses of 284,692 tonnes of carbon dioxide. As detailed in Section 11.4.3.2 of the EIAR, **53,097** tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the Subject Development. Over the proposed 25-year lifetime of the development, therefore **1,327,425** tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation.

The approximately 284,692 tonnes of CO₂ will be lost to the atmosphere due to changes in the soil and ground conditions and due to the construction and operation of the Subject Development represents **21%** of the total amount of carbon dioxide emissions that will be offset by the Subject Development. The 284,692 tonnes of CO₂ that will be lost to the atmosphere due to changes in soil and ground conditions and due to the construction and operation of the Subject Development will be offset by the Subject Development in approximately **64** months (5.4 years) of operation.

As detailed in Section 11.4.3.1 of the EIAR, habitat enhancement and afforestation activities will take place as part of the Subject Development. Details on replanting can be found in Section 4.4.1.9 of the EIAR. Appendix 6-4 of the EIAR, a BMEP for the Prospective Development has identified enhancement activities which includes forestry felling of approximately 108 ha and the enhancement of approximately 6.2 ha of peatland habitat. These activities, over the lifetime of the Subject Development have the potential to give rise to carbon savings; please note, this potential has not been quantified but is considered in Section 11.5.3 below. The carbon storage capacity of restored habitats will vary over time as vegetation matures and land use and the baseline environment change. Therefore, while it can be assumed that the on the Site will result in an increased capacity of carbon storage due to the carbon storage potential that exists within these habitats³⁷, to ensure the assessment below is identified 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 in the below assessment outside of an assumed offset potential.

The effects on Climate from both the Prospective Development and Existing Development are considered to be Not Significant.

Given the reduction in greenhouse gas emissions that will result from the Prospective Development, there will be no significant in-cumulation effects on climate resulting from the Prospective Development in-combination with the Existing Development. The potential for In-Cumulation effects from the Subject Development is therefore Not Significant.

11.8 Cumulative Effects - Subject Development

The potential for impact between the Subject Development (Prospective Development and Existing Development combined), and other relevant developments has been carried out with the purpose of identifying what influence the Subject Development will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the Site, such as other wind energy developments, extractive industries, battery energy storage systems, forestry etc. Please see Section 2.10 of Chapter 2 of this rEIAR and the EIAR for the cumulative assessment methodology used.

During the construction phase of the Subject Development and the construction of other permitted or proposed projects and plans in the area (please see Section 2.10 in Chapter 2 and Appendix 2-1 of this rEIAR and the EIAR), there will be emissions from construction plant and machinery associated with the construction activities. However, once the mitigation proposals, as outlined in the above assessment

³⁷ <https://teagasc.ie/news-events/daily/carbon-stocks-and-sequestration-in-hedgerows/>

are implemented during the construction phase of the Subject Development, there will be no cumulative negative effect on Climate.

Exhaust emissions during the operational phase of the Subject Development will be minimal, relating to the use of maintenance vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on Climate.

The nature of the Subject Development is such that, once operational, it will have a long-term, moderate, positive impact on the climate. When considered cumulatively with other renewable energy projects, this will have a long-term, significant, positive impact on Climate. There will be no measurable negative cumulative effect with other developments on Climate.

11.8.1 Construction Phase

During the construction phase of the Subject Development and other permitted or proposed projects and plans in the area as set out in Section 2.10 in Chapter 2 of this rEIAR and the EIAR, that are yet to be constructed, there will be greenhouse gas emissions arising from production of construction materials (such as cement), 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 emission 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 imperceptible negative effect on Climate, which is Not Significant.

11.8.2 Operational Phase

The nature of the Subject Development is such that, once operational, it will have a long-term, moderate, positive impact on Climate, which is Not Significant. However, as noted above, the Prospective Development will offset the **284,692** tonnes of CO₂ associated with the construction and operational phase that will be lost to the atmosphere (Section 11.7.1.1) in approximately **64** months of operation.

When considering these greenhouse gas emissions within the context of the Electricity Sector Emissions Ceilings detailed in Section 11.2.2, Carbon Budget 1 (2021-2025) has an Electricity Sector budget of 40 MtCO₂eq. and Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 MtCO₂eq for large-scale deployment of renewables. As detailed in Section 11.4.3.2, the Meenbog Wind Farm will displace carbon dioxide from fossil fuel-based electricity generation, over its proposed 25-year lifespan. Therefore, while there will be greenhouse gas emissions associated with the construction of the Subject Development, this will take place under the Electricity sector emissions ceiling and will be offset by the operation of the Meenbog Wind Farm within its operational life. Thus, there will be no negative cumulative effects arising on climate from the Subject Development and other permitted or proposed projects in the area as set out in Section 2.10 in Chapter 2 of this rEIAR and the EIAR. When the Subject Development is considered cumulatively with other renewable energy projects, this will have a long-term, significant, positive impact on Climate.

11.8.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.11 in Chapter 4: Description of the Prospective Development and detailed in Appendix 4-6 Decommissioning Plan of this EIAR. Any cumulative impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Subject Development will be implemented during the decommissioning phase thereby minimising any potential cumulative effects.

11.9 Transboundary Effects

As stated in Section 11.1.2 above, the impacts and resulting effects of greenhouse gas emissions are global rather than affecting one localised area. The Climate Study Area for the Subject Development is defined as the national environment (Ireland), where the receptor is the climate and the global atmosphere. Taking this into account, any GHG emissions associated with the Subject Development, has by default, a transboundary effect and these effects are not measurable or perceptible between Ireland and Northern Ireland. However, as assessed above, there are no significant effects on climate change and greenhouse gas concentrations either alone, in cumulation or cumulatively with the Subject Development or other proposed, consented plans or projects, given the scale and nature of the emissions, the offsetting effect of the operational phase and the sectoral emissions ceiling under which the Subject Development will be constructed and operational.

As stated in the IEMA 2022 guidance *'greenhouse gas emission impacts and resulting effects are global rather than affecting one localised area'*³⁸. Therefore, the potential for Transboundary effects arising from the potential impacts on climate are considered within the Climate Study Area. There is no potential for significant Transboundary Effects from the Subject Development.

³⁸ IEMA (2022). *Assessing Greenhouse Gas Emissions and Evaluating their Significant*, 2nd Edition. Available online at: <https://www.iema.net/resources/blog/2022/02/28/launch-of-the-updated-eia-guidance-on-assessing-ghg-emissions>