

Environmental Impact Assessment Report (EIAR)

Slievegrine Renewable
Energy Development, Co.
Waterford

Chapter 11: Climate



11.

CLIMATE

11.1

Introduction

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

The objective of this assessment is to assess the potential effects that the Proposed Project may have on Climate and sets out proposed mitigation measures to avoid, reduce or offset any potential significant effects that are identified. The susceptibility of the Proposed Project to climate change is assessed across the entire EIAR, with specific measures outlined in each relevant chapter to enhance the Proposed Project's ability to withstand potential impacts that are identified. Chapter 16 *'Major Accidents & Natural Disasters'* of this EIAR consolidates the risks and vulnerabilities identified throughout all EIAR chapters to assess the overall risk to the Proposed Project concerning major accidents and natural disasters, including climate change. The purpose of this EIAR chapter is to identify and assess the likely significant effects of the Proposed Project on climate throughout its construction, operation and decommissioning phases, establishing the current and future climate baseline.

The aim of the Proposed Project, when in operation is to reduce the requirement for carbon-intensive, fossil fuel-based energy supply to the national grid and thereby reduce the amount of greenhouse gas emissions being released to the atmosphere. Harnessing more energy 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.

In the interest of brevity, the references used throughout this chapter are detailed in Section 1.1.2 of Chapter 1: *'Introduction to the Proposed Project'*.

11.1.1

Background

The Site is located within a rural setting in the south of county Waterford, approximately 5km southwest of Dungarvan. The village of Clashmore is located approximately 3.1km south of the Site. The Site location context is shown in Figure 1-1 of Chapter 1: *'Introduction to the Proposed Project'*.

The Proposed Grid Connection includes a Proposed 110kV Underground Cabling Route from the Proposed 110kV Substation, in the townland of Clashbrack, Co. Waterford, to the Proposed 220kV Loop-in Substation in the townland of Ballycullane, Co. Waterford. The Proposed 110kV Underground Cabling Route measures approximately 9km in length and is located primarily within the curtilage of the public road corridor with two sections (approximately 315m and 800m) being located within private lands.

The Site measures approximately 1,450 hectares and comprises a mix of agri-pastoral land and commercial forestry. The N25 national primary road runs in a north to south direction to the east of the Site, passing within 200m of the Site at its closest extent. The L-2024 local road traverses the northern section of the Proposed Wind Farm in an east- west direction, with the L-6085 local road bisecting the eastern portion of the Site. The L-2023 also bisects the central section of the Site. The Proposed Wind Farm site is also served by a number of existing agricultural roads and tracks. Existing site access is via forestry and agricultural entrances off the L-2023 and L-2024 local roads, as well as the L-6084 local road to the south of the Site and the L-6082 to the west of the Site. The Grid Reference co-ordinates for the approximate centre of the Proposed Wind Farm are X 619562, Y 587416 (ITM).

Current land-use on the Proposed Wind Farm site is predominantly comprised of a mix of commercial forestry and pastoral agriculture. Current land-use at the Proposed Grid Connection site comprises of public road corridor and private land principally used by agriculture. The surrounding land use is predominantly pastoral agriculture, commercial forestry and low-density residential use along local and regional roads.

11.1.2 Chapter Structure and Climate Study Areas

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

The chapter structure is as follows:

- A review of all relevant climate change legislation policy and guidance applicable to the Proposed Project in international, national, and local contexts (Section 11.2).
- Presentation of the baseline environment (Section 11.3 below), including:
 - A description of the current baseline environment established from desk study, utilising relevant datasets and data provided within other sections of the EIAR (Section 11.3.1 below).
 - A description of the future baseline environment established from desk study, utilising relevant datasets and data provided within other sections of the EIAR (Section 11.3.2 below).
- A detailed carbon assessment, which considers how the Proposed Project will affect Ireland's national greenhouse gas emissions as a result of its construction, operation, and decommissioning phase activities (inclusive of both carbon losses and carbon savings) (Section 11.4 below).
- Presents an assessment of the potential likely significant effects on climate arising from the Proposed Project during the construction phase (Section 11.5.2) operational phase (Section 11.5.3), and decommissioning phase (Section 11.5.4).
 - 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 the aforementioned sections of this chapter.
- An assessment of potential cumulative impacts is provided in Section 11.6 and details any potential cumulative effects on climate between the Proposed Project and other permitted or proposed projects and plans in the area (wind energy or otherwise) for the construction phase (Section 11.6.1), operational phase (Section 11.6.2), and decommissioning phase (Section 11.6.3).

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 EIAR, the overall Climate Study Area for the Proposed Project 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 potential 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.

¹ ISEP (2026). *Assessing Greenhouse Gas Emissions and Evaluating their Significant*, Edition 2.1 Available online at: [Defining significance in a net zero era: The next step for Greenhouse Gas Emissions Assessment in Environmental Impact Assessment](#)

Baseline Environment

- Current Baseline
 - Current Baseline Study Area: defined as the Site, defined in Section 1.1.1 of Chapter 1: *‘Introduction to the Proposed Project’* of this EIAR. Relevant information taken from EIAR Chapters for inclusion in the current baseline assessment is within the relevant discipline’s specific assessment boundary, as identified in each cited EIAR Chapter.
- Future Baseline
 - Future Baseline Study Area: defined as the Site, defined in Section 1.1.2 of Chapter 1 of this EIAR. Relevant information taken from relevant EIAR Chapters for inclusion in the future baseline assessment is within the relevant discipline’s specific assessment boundary, as identified in each cited EIAR Chapter.

Carbon Assessment

- Carbon Assessment Study Area: defined as the Site, as defined in Section 1.1.2 of Chapter 1 of this EIAR.

11.1.3 Statement of Authority

This section of the EIAR has been prepared by Eoin McCarthy, with support from Michéal Cahill and Catherine Johnson, all of MKO.

Eoin McCarthy holds a BSc. (Env.) in Environmental Science and is a Project Director with over 15 years’ experience in the consultancy sector. Eoin has completed and reviewed numerous Climate chapters of EIARs for wind farm developments.

Michéal Cahill is an Environmental Scientist with MKO with over 2 years’ experience in environmental consultancy. Michéal holds a first-class honours degree as a Bachelor of Environmental Science at University of Galway and was awarded the Professor Emer Colleran Medal for his academic achievements. Michéal has previous experience in the preparation and review of Environmental Impact Assessment Reports for both offshore and onshore wind farm projects, as well as aiding in the research and design phase of a proposed pumped hydroelectric storage plant. As an environmental scientist within MKO’s environmental renewables team, Michéal has been involved in the preparation and revision of Climate chapters and associated calculations, as well as a variety of other chapters and reports for a range of energy infrastructure projects.

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

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 the twice the global rate. The average global temperature in the 12-month period between February 2023 and January 2024 exceeding pre-industrial levels by 1.5°C. 2023 was the warmest year on record in more than 100,000 years, at 1.48°C above pre-industrial levels, with the world's ocean temperature also reaching new heights.

The Intergovernmental Panel on Climate Change (IPCC), in their AR6 Synthesis Report: Climate Change 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.

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

11.2.1 International Greenhouse Gas Emission and Climate Targets

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

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

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:

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 Climate 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>>

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

	> New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from starting in 2013 and lasting until 2020. > A revised list of greenhouse gases to be reported on by Parties in the second commitment period
Conference of the Parties (COP):	COP30 – Belém (November 10th 2025 to November 21st 2025) COP30 in Belém, Brazil, focused on enhancing national climate plans known as Nationally Determined Contribution (NDCs) for 2035, aiming to increase adaptation finance and mobilize over a trillion annually for climate action. Key takeaways included a strong focus on the social dimension of climate action. While a formal, binding fossil fuel phase-out roadmap was not finalised, the summit promoted voluntary commitments, and highlighted growing trade-climate tensions.⁶
<i>Every year since 1995, the Conference of the Parties (COP) has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments, and is the supreme decision-making body of the UNFCCC.</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 12-page text, made up of a preamble and 29 articles, provides for a limitation of the temperature rise to below 2°C above pre-industrial levels and even to tend towards 1.5°C.
	COP25 – Madrid (December 2nd to December 13th, 2019) At COP25 the European Union launched its most ambitious plan, ‘The European Green Deal’ which aims to lower CO₂ emissions to zero by 2050.
	COP28 – Dubai (30th of November 2023 to the 13th of December 2023) COP28 resulted in a landmark deal to ‘transition away’ from fossil fuels, the United Arab Emirates (UAE) Consensus. The agreement calls for ‘transitioning away from fossil fuels in energy systems, in a just, orderly, and equitable manner.’ COP28 concluded the first ever Global Stocktake under the Paris Agreement. The Global Stocktake recognises that the world is not on track to meet 1.5°C and will require Parties to align their national targets and measures with the Paris Agreement.
	COP29 – Azerbaijan (11th November 2024 to 22nd November 2024) COP29 focused on accelerating global efforts to address climate change, in particular global efforts related to climate finance. The New Collective Quantified Goal on Climate Finance (NCQG) was agreed in the final days of COP with developed nations agreeing to triple 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.

⁶ https://climate.ec.europa.eu/news-other-reads/news/what-did-cop30-achieve-2025-12-01_en

United Nations Sustainable Development Goals	On the 14th July 2025, the United Nations published ‘The Sustainable Development Goals Report 2025’ this report finds that, following an assessment of all 169 targets, for which trend data is available, only 17% of the SDG targets are on track, 18% of SDG targets are showing minimum or moderate progress, 47% having stalled in progress and 18% having regressed from 2024.
Climate Change Performance Index	Established in 2005, the Climate Change Performance Index (CCPI)⁷ is an independent monitoring tool which tracks individual countries climate protection performance. Ireland, ranked 29th in 2025, has fallen 4 places to 33rd in 2026, and remains a ‘medium’ performer in international performance. The CCPI states that Ireland’s policies are missing a long-term strategy for phasing out fossil fuel infrastructure and shifting investments from natural gas towards an emissions-neutral energy supply.
State of the Global Climate 2025	In March 2026, the World Meteorological Organisation (WMO) published a report entitled the ‘State of the Global Climate 2025⁸’. This report provided a summary on the state of the climate indicators in 2025 with sections on key climate indicators, extreme events and impacts. The key messages in the report include: ➤ Greenhouse gases reached record observed levels in 2025. Real-time data indicate that the level of greenhouse gases continued to rise in 2026. ➤ The annually averaged global mean near-surface temperature in 2025 was 1.43 °C ± 0.13 °C above the 1850–1900 average used to represent pre-industrial conditions.
Renewable Energy Directive	The first Renewable Energy Directive (RED)⁹ is legislation that influenced the growth of renewable energy in the EU and Ireland for the decade ending in 2020. From 2021, RED was replaced by the second Renewable Energy Directive (REDII),¹⁰ which continues to promote the growth of renewable energy out to 2030. REDII introduced a binding EU-wide target for overall RES of 32% in 2030 and requires Member States to set their national contributions to the EU-wide target. Per the National Energy and Climate Plan (NECP) 2021-2030, Ireland’s overall RES target is 34.1% in 2030. 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)¹¹ entered into force on 20 November 2023 and was transposed into Irish Law in August 2025. REDIII amended the EU-wide overall 2030 RES target from 32% to at least 42.5% with the aim of 45%.
European Green Deal	The European Green Deal is a comprehensive package of policy initiatives aimed at achieving climate neutrality across the EU by 2050. It features a wide range of actions and targets in different sectors such as energy, transport, industry, environment and agriculture. The goal is to transform the EU into a resource-efficient, competitive, circular economy that is fair and inclusive for every individual and region.

⁷ Climate Change Performance Index 2026 <<https://ccpi.org/>>

⁸ (WMO 2026) State of Global Climate 2025 https://weatherandclimate.org/en/wp-content/uploads/WMO-1391-2025_en.pdf

⁹ Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Available from: <https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:0062:en:PDF>

¹⁰ Directive (EU) 2018/2001 on the promotion of the use of energy from renewable resources (recast). Available from: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32018L2001>

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

	In its approach to decarbonisation, the EU has split greenhouse gas emissions into two categories, the Emissions Trading System (ETS) and the non-ETS. Under the EU Green Deal, the targets for the ETS and non-ETS sectors will be revised upwards in order to achieve the commitment, at EU level, to reach an economy-wide 2030 reduction in emissions of at least 55%, compared to 1990 levels.
Council Regulation (EU) 2022/2577 and 2024/223	Council Regulation (EU) 2022/2577 and 2024/223 lay down a framework to accelerate the deployment of renewable energy. Regulation 2022/2577 and 2024/223 recognises the relative importance of renewable energy deployment in the current difficult energy context and provides significant policy and legislative support to enabling renewable energy projects. Further detail is provided in Section 1.1.1.8 of Appendix 11-1 and in Section 2.3.1 in Chapter 2; <i>'Background to the Proposed Project'</i> .
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; and ➤ 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 42% 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 the national legislation and reports relating to greenhouse gases and climate change targets in Ireland; please refer to Appendix 11-1 for further detail on each of the below national legislation measures.

Table 11-2 National Legislation and Reports relating to Greenhouse Gas Emission and Climate Change Targets

National Instrument	Description
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Programme for the Government - Securing Irelands Future	The Programme for Government – Securing Irelands 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 “ <i>the necessary action to deliver at least 70% renewable electricity by 2030</i> ”.
Climate Action and Low Carbon Development Act 2015	The Climate Action and Low Carbon Development Act 2015 established the national framework for the approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy.
Climate Action and Low Carbon Development (Amendment) Act 2021	The Climate Action and Low Carbon (Amendment) Act 2021 amended the Climate Action and Low Carbon Development Act 2015 and is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050. This was passed into law in July 2021. The Programme for Government has committed to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieve net zero emissions by 2050. This Act will manage the implementation of a suite of policies to assist in achieving these annual targets.
Climate Change Advisory Council	The Climate Change Advisory Council (CCAC) was established on 18th January 2016 under the Climate Action and Low Carbon Development Act 2015. The Annual Review 2025: Electricity report has been released by the CCAC and focuses specifically on key findings and recommendations for the Electricity sector. In 2024, emissions from the sector reduced by approximately 7.3% from 2023. Ireland’s carbon intensity of electricity generation is higher than the EU average due to continued reliance on coal and oil, which are estimated to have contributed 13.4% and 3.1% of total electricity emissions for 2024, while accounting for only 3.2% and 0.7% of indigenous generation, respectively.
Carbon Budgets	The first national carbon budget programme proposed by the CCAC, approved by Government and adopted by both Houses of the Oireachtas in April 2022 comprises three successive 5-year carbon budgets. The total emissions allowed under each budget are shown in Section 1.1.2.5 of Appendix 11-1.
Sectoral Emission Ceilings	The Sectoral Emissions Ceilings were launched in September 2022. The Sectoral Emissions Ceilings alongside the annual published Climate Action Plan provide a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030. The Sectoral Emission Ceilings for each 5-year carbon budget period was approved by the government on the 28th of July 2022 and is shown in Section 1.1.2.6 of Appendix 11-1.
Climate Action Plan 2025	The National Climate Action Plan (CAP) 2025 was launched in April 2025. CAP 2025 sets out the roadmap to deliver on Ireland’s climate ambition. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 following the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. It should be noted that Ireland has now entered the second Carbon Budget period (2026-2030), which requires the implementation of high-impact measures across all sectors if we are to meet the national objective of climate neutrality by 2050. 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.

National Adaptation Framework (2024)	Ireland's National Adaptation Framework (NAF) 2024 is the State's overarching strategy for reducing vulnerability to the unavoidable effects of climate change and building a climate-resilient society, economy and environment, published in June 2024 and superseding the first iteration of the NAF published in 2018. The NAF outlines a whole of government and society approach to climate adaptation in Ireland. Some key elements of the NAF are as follows: ➤ Local authorities must implement adaptation through their statutory Local Authority Climate Action Plans; ➤ Government departments must prepare Sectoral Adaptation Plans covering areas including biodiversity, agriculture, forestry, seafood, transport, energy, communications, flood-risk management, water services, heritage, health and tourism; ➤ Actions should have measurable objectives, appropriate indicators and monitoring arrangements. The NAF, Sectoral Adaptation Plans and local plans operate on an iterative cycle and must generally be reviewed or renewed at least every five years; ➤ The framework established the importance of a National Climate Change Risk Assessments as the common evidence base for prioritising adaptation. This was subsequently published by the EPA in 2025 and is discussed below. The NAF highlights Irelands strategic approach to reducing climate vulnerability and coordinates adaptation and resilience across sectors vulnerable to climate change, local authorities and government departments, ensuring all policies and plans incorporate potential climate risks and vulnerabilities.
National Climate Change Risk Assessment	In June 2025, the Environmental Protection Agency (EPA) published the 'National Climate Change Risk Assessment (NCCRA)', which provides a comprehensive national overview of the potential risks and opportunities posed by climate change in Ireland. The NCCRA adopts a systematic semi-quantitative risk assessment approach delivered through 3 stages: Stage 1: Identifies 115 keys risks for Ireland across nine systems. Stage 2: Classifies 43 risks as significant in terms of impact at a national level. Designates 9 risks as priority risks. Stage 3: A further 4 of these risks classified as requiring "urgent action" within the next five years to offset substantial impacts in the short term and potentially critical impact in the long term. The NCCRA acknowledges that transitioning renewable energy sources canr educe greenhouse gas emissions whilst enhancing the resilience of the power grid to extreme weather events, however acknowledged that trade-offs will be required to enable this transition.
Irelands Climate Change Assessment	In 2023, the EPA published Ireland's Climate Change Assessment (ICCA). This assessment provides a comprehensive overview and breakdown of the state of knowledge around key aspects of climate change with a focus on Ireland. The ICCA report is presented in four volumes: ➤ Volume 1: Climate Science – Ireland in a Changing World; ➤ Volume 2: Achieving Climate Neutrality in 2050; ➤ Volume 3: Being Prepared for Ireland's Future; and ➤ Volume 4: Realising the Benefits of Transition and Transformation. Please refer to Section 1.1.2.8 of Appendix 11-1 for further information on the ICCA.

11.2.3 Local Greenhouse Gas Emission and Climate Targets

11.2.3.1 Waterford City & County Council Local Authority Climate Action Plan 2024-2029

The Waterford City and County Council Climate Action Plan 2024-2029¹² (Waterford CAP) was adopted in February 2024 and published in March of the same year.

The Waterford CAP highlights the current state of climate change and action in Ireland, and how Waterford City and County Council intends to deliver and enable climate action for a just transition to a low carbon and climate resilient future within County Waterford. The Waterford CAP 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 Waterford equated to 1,995,000 tonnes of carbon dioxide equivalent (tCO₂e) in the baseline year of 2018. The top three emitting sectors within County Waterford in terms of total greenhouse gas emissions in the baseline year were agriculture, manufacturing, and transport producing 39.3%, 23.9% and 14.1% of total emissions respectively. Waterford City and County Council, along with all public sector entities must reduce greenhouse gas emissions by 51% by 2030 as compared to 2018 in line with the National Climate Action Plan 2025 (CAP25) (Section 11.2.2 above).

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

The Waterford City and County Development Plan 2022-2028¹³ (WCCDP) sets out the overall strategy for the proper planning and sustainable development of the County over a 6-year period. The WCCDP includes numerous actions and objectives on sustainability and climate for Waterford to achieve over the 6-year period. The WCCDP further includes a Renewable Energy Strategy¹⁴ for the County as Appendix 7 of Volume 3.

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

11.2.4 Relevant Guidance

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

¹² Waterford City and County Council Climate Action Plan 2024-2029 (2024). Available at: < [Our Climate Action Plan – Waterford City & County Council](#) >

¹³ Waterford City and County Council (2023) Waterford City and County Development Plan 2022-2028 Available at: <<https://waterfordcouncil.ie/documents/development-plan-2022-2028/>>

- ‘Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment’¹⁵ (European Commission, 2013);
- *Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation* (Institute of Environment Management and Assessment (IEMA), 2020);
- ‘Calculating Carbon Savings from Wind Farms on Scottish Peat Lands’ (University of Aberdeen and the Macauley Institute, 2008);
- ‘Wind Farms and Carbon Savings’ (Scottish Natural Heritage, 2003);
- Macauley Institute Carbon Calculator for Wind Farms on Scottish Peatlands (Version 2.15.0) (Macauley Institute, 2023); and
- Transport Infrastructure Ireland (TII) Carbon Assessment Tool (Version 1.0.0) (TII, 2020).

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

11.3

Climate and Weather

Climate change projections show that the Earth is getting warmer and extreme weather events are increasing in frequency on an annual basis. The Proposed Project will assist in mitigating these effects through the deployment of clean renewable energy to the national grid and subsequent decarbonisation of energy systems. Changes to climate and weather in Ireland will occur as a result of climate change, for further details on the risks associated with the Proposed Project please refer to Chapter 16; ‘Major Accidents and Natural Disasters’.

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 Averages¹⁶;
- Ireland's Climate Averages 1991-2020 Summary Report¹⁷;
- Ireland's National Inventory Report 2025¹⁸;
- Climate Status Report for Ireland 2020¹⁹; and
- Annual Review 2025 – Our Changing Climate in 2024²⁰.

¹⁵ European Commission (2013). *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment*. Available at: <https://www.enviroportal.sk/dokumenty/integrating-climate-changeand-biodiversity-environmental-assessment.pdf>

¹⁶ <https://www.met.ie/climate/30-year-averages>

¹⁷ Department of Housing, Local Government and Heritage (2024) *Ireland's Climate Averages 1991-2020 Summary Report* <[https://edepositireland.ie/bitstream/handle/2262/108695/Ireland%27s climate averages 1991-2020_rev2.pdf?sequence=1&isAllowed=y](https://edepositireland.ie/bitstream/handle/2262/108695/Ireland%27s%20climate%20averages%201991-2020_rev2.pdf?sequence=1&isAllowed=y)>

¹⁸ EPA (2025) *Ireland's National Inventory Report* <<https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland's-NID-2025.pdf>>

¹⁹ 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>>

²⁰ Climate Change Advisory Council (2025) *Annual Review 2025 – Our Changing Climate in 2024* <<https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC%20AR25%20Our%20Changing%20Climate-final.pdf>>

11.3.1.2 Physical Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The dominant influence on Ireland's climate is the Atlantic Ocean. As a consequence, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitude. The hills and mountains, many of which are near the coasts, provide shelter from strong winds and from the direct oceanic influence.

Met Éireann provides 30-year weather averages for Ireland at specific weather stations throughout Ireland. The closest weather and climate monitoring station to the Current Baseline Study Area that has meteorological data recorded for a 30-year period is Cork Airport which is located southwest of the Site and approx. 53km from the nearest permanent built infrastructure of the Proposed Project (Turbine 22). Meteorological data recorded at Cork Airport over the 30-year period from 1991-2020 is shown in Table 11-3 below. The wettest months are January and December, and May and June are usually the driest. July is the warmest month with a mean daily temperature of 15.2° Celsius.

Table 11-4 below provides a summary of the current physical baseline environment with reference to relevant chapters within the submitted EIAR where further information is available.

Table 11-3 Data from Met Éireann Weather Station at Cork Airport 1991-2020

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
mean daily max	8.2	8.5	9.8	12	14.6	17	18.6	18.4	16.5	13.3	10.3	8.7	13
mean daily min	3.2	3.2	3.9	5.3	7.6	10.1	11.7	11.6	10.2	8	5.3	3.8	7
mean temperature	5.7	5.8	6.8	8.6	11.1	13.6	15.2	15	13.4	10.6	7.8	6.2	10
absolute max.	16.1	14.5	18.8	21.1	23.6	27.2	26.7	27.8	24.5	21.1	15.9	13.9	27.8
min. maximum	-0.3	-1.9	-1.3	4.1	8.5	10.5	12.6	13.8	10.2	6	0.6	-3.1	-3.1
max. minimum	10.5	10.6	10.8	11.3	14.4	16.6	17.5	18	17	15.5	13	11.5	18
absolute min.	-5.6	-4.7	-7	-2.4	0.1	4.1	6.2	5.4	3	-1	-3.3	-7.2	-7.2
mean num. of days with air frost	3.8	3.5	2.3	0.9	0	0	0	0	0	0.2	1	2.8	14.5
mean num. of days with ground frost	12.7	11.8	10.7	6.8	2.4	0.2	0	0.1	0.5	2.4	6.8	11.2	65.6
mean 5cm soil	4.5	4.5	5.9	8.9	12.5	15.6	16.7	15.9	13.4	9.9	6.7	5.2	10
mean 10cm soil	4.9	4.9	5.9	8.2	11.5	14.4	15.7	15.2	13.1	10	7.2	5.6	9.7
mean 20cm soil	5.7	5.7	6.6	8.7	11.5	14.3	15.7	15.5	13.9	11.1	8.3	6.5	10.3
RELATIVE HUMIDITY (%)													
mean at 0900UTC	91.1	90.5	88.3	83.3	81.3	80.9	83.5	86.1	89.1	90.7	91.4	91.3	87.3
mean at 1500UTC	84.4	79.9	75.8	72.3	71.7	71.5	73.7	73.6	76.3	80.4	83.9	86.5	77.5
SUNSHINE (hours)													
mean daily duration	2	2.6	3.6	5.4	6.2	6.1	5.3	5.1	4.3	3.2	2.5	1.8	4
greatest daily duration	8.5	10	11.5	13.8	15.5	16	15.3	14.4	12.1	10.3	8.8	7.6	16
mean num. of days with no sun	9.8	6.7	5.7	3.1	2.4	2.3	2.2	2.4	3.4	6.5	7.8	11.4	63.7
RAINFALL (mm)													
mean monthly total	131.3	97.2	91.5	86.5	80.8	83.3	87.2	94.6	92	131.2	127	136.6	1239
greatest daily total	39.3	39.0	55.2	37.7	34.9	51.3	73.2	59.0	58.9	52.1	47.9	61.4	73.2
mean num. of days with $\geq 0.2\text{mm}$	21.3	18.4	18.3	16.8	15.9	14.6	16.9	16.9	17	19.9	20.8	21.4	218.2
mean num. of days with $\geq 1.0\text{mm}$	16.7	13.7	13.4	12.3	12	10.1	11.9	12.2	11.9	15.1	15.6	16.8	161.7
mean num. of days with $\geq 5.0\text{mm}$	9.1	6.8	5.7	5.8	5.3	5.6	5.7	5.5	5.8	7.8	7.9	8.7	79.7
WIND (knots)													
mean monthly speed	10.9	11	10.5	9.8	9.4	8.9	8.5	8.5	8.8	9.7	10.2	10.8	9.8
max. gust	71	70	65	63	53	49	47	58	51	74	66	80	80
max. mean 10-minute speed	44	50	42	41	34	33	29	45	35	47	46	56	56
mean num. of days with gales	1.3	0.8	0.6	0.3	0	0	0	0.1	0.1	0.4	0.6	1	5.1
WEATHER (mean no. of days with..)													

snow or sleet	2.6	2.5	1.7	0.4	0	0	0	0	0	0	0.3	1.9	9.5
snow lying at 0900UTC	0.3	0.4	0.5	0.1	0	0	0	0	0	0	0	0.4	1.8
hail	1	1.1	1.2	1.5	0.5	0.2	0.1	0	0.1	0.3	0.1	0.4	6.5
thunder	0.3	0.1	0	0.1	0.6	0.4	0.6	0.4	0	0.4	0.1	0.1	3.2
fog	8.6	7.2	8.5	7.8	8	7.3	8.5	9.2	8.3	8.5	7.5	8.5	97.8

Table 11-4 Summary of Current Physical Baseline Environment

Climate variable	Summary of current baseline environment	Relevant EIAR 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 winters²¹. Ireland's Climate Averages 1991-2020 Summary Report identifies that the annual mean air temperature for Ireland over the period 1991-2020 is 9.8°C. The annual mean air temperature ranges from approximately 8.5°C - 10.8°C. Comparing the 1991-2020 annual mean air temperature for Ireland with that of the 1961-1990 period, there has been an increase of approximately 0.7°C. The Climate Status Report for Ireland 2020²² states that air temperatures in Ireland have '<i>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</i>'. Temperatures in Ireland are increasing, with 16 of the top 20 warmest years on record occurring since 1990.²³ On 10th July 2024 Met Éireann confirmed that 2023 was Ireland's wettest and warmest year on record (with records dating back to 1900).²⁴	Chapter 10: 'Air Quality'

²¹ IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>

²² Government of Ireland (2020) Climate Status Report for Ireland 2020 <https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf>

²³ Irelands Climate Change Assessment (2023) Volume 1 Climate Science – Ireland in a Changing World <<https://www.epa.ie/publications/monitoring-assessment/climate-change/irelands-climate-change-assessment-volume-1.php>>

²⁴ <https://www.met.ie/2023-confirmed-as-irelands-wettest-year-on-record>

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
	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.²⁵ However, this moderating influence could be in jeopardy if the Atlantic Meridional Overturning Circulation (AMOC) continues to weaken.²⁶ 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.	
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 regimes.²⁷ 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).²⁸ 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 9.3.8 in Chapter 9: <i>'Hydrology and Hydrogeology'</i>.

²⁵ <https://www.met.ie/climate/what-we-measure/temperature#:~:text=The%20moderating%20influence%20of%20the,mild%20winters%20and%20cool%20summers.>

²⁶ 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_SRCCC_Ch06_FINAL.pdf>

²⁷ IPCC (2021) Climate Change 2021: The Physical Science Basis <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>

²⁸ Department of Housing, Local Government and Heritage (2024) Irelands Climate Averages 1991-2020 Summary Report <<https://edepositireland.ie/handle/2262/108695>>

Climate variable	Summary of current baseline environment	Relevant EIAR chapter (if applicable)
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 variations²⁹. Ireland's Climate Averages 1991-2020 Summary Report identifies that the annual mean hourly wind speed ranges from 9 knots at Shannon Airport to 15 knots at Malin Head. Winds are generally strongest in the northwest of the country. The strongest winds are observed during the winter months and range from 10 knots at Shannon Airport to 18 knots at Malin Head. The lightest winds are observed during the summer months and range from 8 knots at Valentia Observatory to 13 knots at Malin Head. In late 2023 and early 2024, Ireland experienced a very active storm season; the county was affected by 13-14 severe storms³⁰. In Ireland, the storm naming season begins on 1st September each year and ends on the 31st August the following year. In the 2024/2025 storm season there were 6 no. named storms, with Storm Eowyn, occurring in January 2025, reaching hurricane force winds (maximum wind speed recorded as 184km/h).³¹ At the time of writing there have been two named storms in the 2025/2026 storm seasons, Storm Amy in October 2025 and Storm Chandra in January 2026³². 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 weaken³³. The weakening of this current would result in increased storm activity in Northern Europe.	N/A

²⁹ IPCC (2021) *Climate Change 2021: The Physical Science Basis* <https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_FullReport.pdf>

³⁰ Met Éireann (2024) *Human-caused Climate Change Brings Increased Storm Rainfall* <<https://www.met.ie/human-caused-climate-change-brings-increased-storm-rainfall>>

³¹ Met Éireann Storm Centre <<https://www.met.ie/climate/storm-centre>>

³² <https://met.ie/>

³³ 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_SRCCC_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); and
- Unallocated savings.

The most recent inventory report for Ireland, National Inventory Report 2025 (NIR 2025)³⁴, was published in 2025 and refers to the greenhouse gas inventory timeseries for the years 1990-2023. From 1990-2001, total emissions of greenhouse gases (excluding LULUCF) increased steadily from 55,734.9 ktCO_{2e} in 1990 to 70,848.8 ktCO_{2e} in 2001, which is the highest level of greenhouse gas emissions ever reported in Ireland. Emissions then plateaued until 2008 with estimates ranging from 70,149.9 ktCO_{2e} to 67,927 ktCO_{2e}. There was then a sharp decrease from 67,927 ktCO_{2e} in 2008 to 57,836.3 ktCO_{2e} in 2011. The declining trend between 2008 and 2011 is largely attributable to a slowing down of the previously sustained increase in transport emissions, coupled with the 2008 financial crisis. In 2023, total emissions of greenhouse gases including indirect emissions from solvent use (excluding LULUCF) in Ireland were 54,934.4ktCO_{2e}, which is 6.8% lower than emissions in 2022, and the lowest level in the time series.

The Energy Sector accounted for the bulk of the total greenhouse gas 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 2023.³⁵

11.3.2 Future Environment

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

Visible changes in global climate are evident worldwide, with climate change projections suggesting further, more pronounced impacts in the future. These impacts will have wide-ranging effects on both natural and man-made environments across various sectors and regions, resulting in socio-economic repercussions. Referred to as the 'costs of inaction,' these economic impacts of climate change are increasingly influencing policy discussions³⁶. It has become clear that even if greenhouse gas emissions

³⁴ EPA (2025) National inventory Report 2025 <<https://www.epa.ie/publications/monitoring-assessment/climate-change/air-emissions/Ireland's-NIR-2025.pdf>>

³⁵ Ibid.

³⁶ European Environment Agency (2007) Climate change: the cost of inaction and the cost of adaptation <https://www.eea.europa.eu/publications/technical_report_2007_13/download>

were to cease immediately, climate alterations would persist for many decades. Therefore, alongside efforts for mitigation, it is imperative to develop effective adaptation to mitigate damages or seize opportunities arising from climate change.

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

11.3.2.1 Data sources

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

- High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach (report No. 339)³⁷;
- Climate Status Report for Ireland 2020³⁸; and
- Climate Ireland³⁹.

11.3.2.2 Physical environment

This section describes the future baseline physical environment of the Site under the Representative Concentration Pathways (RCP) 8.5 high emission scenario. RCPs are climate change scenarios used to model potential future climate conditions and are based on a wide range of assumptions regarding greenhouse gas concentrations and associated radiative forcing expected by 2100. The RCP 8.5 combines assumptions about high population and relatively slow income growth with modest rates of technological change and energy efficiency improvements, leading in the long term to high energy demand and greenhouse gas emissions in absence of climate change policies. Compared to the total set of RCPs, RCP 8.5 thus corresponds to the pathway associated with the highest greenhouse gas emissions and radiative forcing by the end of the century⁴⁰. The physical environment of the Site under the RCP 8.5 scenario is discussed under the following headers:

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

Air Temperature

Annual surface air temperatures in Ireland are now approximately 1°C higher than they were in the early 1900s (2013 - 2022 period relative to 1903 - 1912).⁴¹ The upward trend in air temperatures is predicted to continue for all seasons; annual air temperatures may increase by over 3°C by the end of the 21st century relative to a 1976 to 2005 reference period under an RCP 8.5 high emission scenario.⁴²

Met Éireann projections indicate an increase of 1–1.6°C in mean annual temperatures in Ireland, with the largest increases seen in the east of the country.⁴³ Warming is enhanced for the extremes (i.e., hot or cold days), with highest daytime temperatures projected to rise by 0.7–2.6°C in summer and lowest night-time temperatures to rise by 1.1–3°C in winter. Averaged over the whole country, the number of

³⁷ EPA Research (2020) *High-resolution Climate Projections for Ireland – A Multimodel Ensemble Approach*
<https://www.epa.ie/publications/research/climate-change/Research_Report_339_Part1.pdf>

³⁸ https://www.epa.ie/publications/research/climate-change/Research_Report_386.pdf

³⁹ <https://www.climateireland.ie/>

⁴⁰ *Climate Change (2011) A scenario of comparatively high greenhouse gas emissions*
<<https://link.springer.com/article/10.1007/s10584-011-0149-y>>

⁴¹ <https://www.epa.ie/publications/monitoring-assessment/climate-change/irelands-climate-change-assessment-volume-1.php>

⁴² *Ireland's Climate Change Assessment (2023) Volume 1 Climate Science – Ireland in a Changing World*

⁴³ <https://www.met.ie/climate/climate-change>

frost days (days when the minimum temperature is less than 0°C) is projected to decrease by 62% for the RCP 8.5 high emissions scenario^{44,45}.

Precipitation and Flood Risk

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

Due to Ireland's location in the west of Europe, exposure to Atlantic storms is of concern and this is particularly the case in the context of rising sea levels which will enhance the impacts of storm surges.⁴⁶

Extreme rainfall events, such as those currently expected only once every 50 years, could become twice as frequent by the end of the century. This means more frequent flooding risks, particularly during the winter months⁴⁷. Further information on flood risk is presented in the section below.

Flood Risk

Chapter 9: '*Hydrology and Hydrogeology*', and the accompanying Flood Risk Assessment (FRA) (Appendix 9-5) detail the flood risk of the Site. Based on the information provided in the stated documents, the areas of the Site at risk of flooding were identified.

No recurring or historic flood incidents are recorded within the Site. The closest OPW mapped past flood event (Flood ID 4507) is located 1.3km southeast of turbine 17 on the Licky River. This flood event occurred on the 24th of August 1986.

The National Catchment Flood Risk Management (CFRAM)⁴⁸ Programme has not been completed for the area of the Site as the catchments are too small.

With regards to fluvial flood zones, for the present-day scenario, no medium (1 in 100) and low probability (1 in 1,000) fluvial flood zones have been mapped to encroach upon the Site. The Site is mapped entirely within Fluvial Flood Zone C (low risk).

The GSI Historical Groundwater flood map and the modelled groundwater flood extents map (www.floodinfo.ie) do not show the occurrence of any groundwater flooding within the Site.

The FRA concludes that the Proposed Project is appropriate from an overall flood risk perspective, as well as being consistent with the Waterford City and County Development Plan 2022-2028.

Robust drainage measures form part of the Proposed Project, including swales, silt traps, check dams, settlement ponds and buffered outfalls. Please refer to Section 4.6 of Chapter 4 and Section 9.4 of Chapter 9 of the EIAR for further details, as well as Appendix 4-2 and Appendix 4-4.

⁴⁴ Nolan, P. 2015. EPA Report: Ensemble of Regional Climate Model Projections for Ireland. EPA climate change research report no. 159. EPA: Wexford.

⁴⁵ O'Sullivan, J., Sweeney, C., Nolan, P. and Gleeson, E., 2015. A high-resolution, multi-model analysis of Irish temperatures for the mid-21st century. *International Journal of Climatology*. doi: 10.1002/joc.4419.

⁴⁶ <https://www.epa.ie/our-services/monitoring-assessment/climate-change/climate-ireland/impact-of-climate-change-on-ireland/climate-hazards/coastal-flooding>.

⁴⁷ EPA (2005) Climate Change Regional Climate Model Predictions for Ireland <<https://www.epa.ie/publications/research/climate-change/climate-change-regional-climate-model-predictions-for-ireland.php>>

Wind and Storms

Future climate and weather predictions indicate a slight reduction in mid-century (2041 – 2060) average wind speeds around Ireland (-2.47% for RCP 8.5 high emissions scenario compared to the 1981 – 2000 baseline), with these decreases being more pronounced during the summer months.⁴⁹ Predictions also point towards less frequent, but more intense storm activity around Ireland.

However, there is uncertainty with regard to future predictions for storms, and it is expected that the trends observed in the frequency and intensity of storms will continue to be influenced by natural variability. Additionally, future trends are difficult to predict due to a low confidence in attributing historic trends in storms to climate change. However, ongoing changes in the climate may potentially affect storms with cumulative effects on wind.

Projections indicate a decrease in average and extreme wave heights towards the end of the century, but an increase in the frequency and severity of storm surges in coastal regions of western Ireland, particularly in winter months.⁵⁰ Storm surge levels over a 20-to-30-year return period are anticipated to increase by up to 9cm by 2100.⁵¹

11.3.2.3 Greenhouse Gas Emissions Projections

The sixteenth edition of the United Nations Environment Programme (UNEP) Emissions Gap Report⁵² finds that global warming projections over this century, based on full implementation of Nationally Determined Contributions (NDCs), are now 2.3-2.5°C, while those based on current policies are 2.8°C. Nations remain far from meeting the Paris Agreement goal to limit warming to well-below 2°C, while pursuing efforts to stay below 1.5°C. Reductions to annual emissions of 35% and 55%, compared with 2019 levels, are needed in 2035 to align with the Paris Agreement 2°C and 1.5°C pathways, respectively. Given the size of the cuts needed, the short time available to deliver them and a challenging political climate, a higher exceedance of 1.5°C will happen, very likely within the next decade.⁵³

In its approach to decarbonisation, the EU has split greenhouse gas emissions into two categories: Emissions Trading System (ETS) emissions and non-ETS emissions. Emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 43% by 2030, relative to 2005 levels. Within the ETS, participants are required to purchase allowances for every tonne of emissions, with the amount of these allowances declining over time to ensure the required reduction of 43% in greenhouse gas emissions is achieved at EU-level.⁵⁴

Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ESR⁵⁵). This regulation established binding annual greenhouse gas emission targets for Member States for the period 2021–2030. Please see Section 11.2.1 above and Section 1.1.1.10 of Appendix 11-1 for further details on the EU ESR.

Considerable progress has been made in the decarbonisation of the Electricity Sector, with emissions falling 22% between 2022 and 2023. This reduction in emissions is due to an increase in the share of

⁴⁹ <https://www.climateireland.ie/impact-on-ireland/future-climate-of-ireland/wind-speed/>

⁵⁰ <https://www.epa.ie/publications/research/climate-change/research-339-high-resolution-climate-projections-for-ireland.php>

⁵¹ <https://www.climateireland.ie/impact-on-ireland/future-climate-of-ireland/waves-surges/>

⁵² UNEP (2025) Emissions Gap Report 2025: Off target - Continued collective inaction puts global temperature goal at risk.

Available at: <https://wedocs.unep.org/items/9f0bf855-2069-42a6-a856-4b389f740c5c>

⁵³ Ibid.

⁵⁴ Department of the Environment, Climate and Communications (2023) - Climate Action Plan 2024

<https://www.gov.ie/en/publication/79659-climate-action-plan-2024/>

⁵⁵ Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (Text with EEA relevance)

renewable electricity generation, from 38.6% to 40.7% from 2022 to 2023, with wind energy accounting for 33.7% of electricity supply.⁵⁶

The EPA publish Ireland's greenhouse gas emission projections and at the time of writing, the most recent report, *'Ireland's Greenhouse Gas Emissions Projections 2025-2030'* was published in May 2026⁵⁷. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2030 set under the ESR.

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

Ireland's 2024 and 2025 Climate Action Plans both discuss unallocated emissions savings of 26 MtCO₂eq over the 2026-2030 period (5.25 MtCO₂eq annually). While CAP 25 set out actions to "Allocate currently unallocated emissions savings by sector ahead of 2026", and "Update sectoral emissions ceilings for the second carbon budget period (2026-2030)", the outcomes of these actions were not available in time to include in the current projections.

The EPA Emission Projections Update notes the following key trends:

- Ireland is not on track to meet the 51% emissions reduction target by 2030 (as compared to 2018 levels) based on the most up to date data.
 - Full implementation of a wide range of policies and plans across all sectors that deliver carbon savings is required to achieve a projected reduction of 25%.
- Carbon Budget 1 (2021-2025) of 295 MtCO₂eq is projected to be largely met, with the WEM scenario exceeding the budget by 0.4 MtCO₂eq, while the WAM scenario projects emission will be 1.8 MtCO₂eq under budget.
 - With carryover from Carbon Budget 1, Carbon Budget 2 (2026-2030) of 200 MtCO₂eq is expected to be exceeded by 53 to 81 MtCO₂eq.
- Of the seven sectors with legally binding Sectoral Emission Ceilings (SEC), three are projected to remain below their SEC in Carbon Budget 1 (Electricity, Residential Buildings, 'Other'), and only the 'Other' Sector (Waste, F-gas, Petroleum Refining) will remain below its SEC in Carbon Budget 2.
- Ireland is not projected to meet its EU target under the ESR of a 42% emissions reduction by 2030 (compared to 2005) even with flexibilities applied.
 - This assessment shows that greenhouse gas emissions will be reduced by 13 to 23% by 2030 without the use of flexibilities, and by 17 to 27% with the use of flexibilities.
 - By 2030, annual emissions from the agriculture sector are projected to be between 17.3 MtCO₂eq and 20.5 MtCO₂eq, compared with 21.4 MtCO₂eq in 2018. This represents a reduction of 19% under the WAM scenario and 4% under the WEM scenario. Transport emissions are projected to decrease from 12.4 MtCO₂e in 2018 to between 9.0 MtCO₂e and 10.5 MtCO₂e in 2030 (a 28% reduction in WAM and 16% decrease in WEM).

⁵⁶ Department of the Environment, Climate and Communications (2025) - Climate Action Plan 2025

⁵⁷ EPA (2026) Irelands Greenhouse Gas Emissions Projections (2026) <https://www.rte.ie/documents/news/2026/05/epa-report.pdf>

- Total emissions from the land use, land use change and forestry sector (LULUCF) are projected to increase from 3.0 MtCO₂eq in 2018 to between 3.1 and 5.2 MtCO₂eq (a 4% increase in WAM and 72% increase in WEM).
- Current and planned measures are unlikely to deliver the necessary emission reductions necessary to meet the target set under the EU LULUCF Regulation.
- From 10.2 MtCO₂e in 2018, emissions from the Energy Industries sector are projected to decrease to between 4.0 and 4.7 MtCO₂e in 2030 (a 55 to 61% reduction).
 - Projections include greater electricity demand and delays in the delivery of both increased interconnection and offshore wind generation.
- The top five Policies and Measures (WEM and WAM) are estimated to achieve 89 MtCO₂eq greenhouse gas emission reductions from 2025 to 2030, accounting for over 60% of the total potential greenhouse gas emission reductions over these five years.

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

11.3.3 Summary

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

Further information on the vulnerability of the Proposed Project to major accidents and natural disasters is detailed in Chapter 16 *‘Major Accidents and Natural Disasters’*.

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

11.4.1 Background

In addition to the combustion of fossil fuels, greenhouse gases are also released through natural processes such as the decomposition of organic (i.e., carbon-based) material. Bogs and peatlands are known to store large amounts of organic carbon. Due to the waterlogged nature of these habitats, stored carbon is not broken down and released into the atmosphere. The construction of wind farms on bog and peat habitats may affect the natural hydrological regime, thus exposing and drying out the peat and allowing the decomposition of carbon. It is therefore necessary to demonstrate that any wind farm constructed on such sites saves more carbon than is released. In the case of the Proposed Project, no peatland habitat is recorded within the Site, which is located in an upland setting comprising predominantly of commercial forestry, agricultural land and low-density residential properties.

As detailed in Section 8.3.2 of Chapter 8 of this EIAR *‘Land, Soils & Geology’*, the Proposed Wind Farm site is largely mapped to be underlain by poorly drained mineral soils (AminPD), derived from mainly non-calcareous parent materials. There is little peat mapped at or occurring locally in the vicinity of the Proposed Wind Farm site. For this reason, the carbon balance between the use of a renewable energy and the loss of carbon stored in the peat is not assessed in this section of the EIAR.

The below assessment includes all projected carbon losses associated with turbine infrastructure lifecycle (manufacture, construction, decommissioning) of the Proposed Wind Farm, back up of

Proposed Turbines during low wind periods, reduced carbon fixing potential of the Site, tree felling activities, traffic generation, embodied carbon of all construction materials, and those emissions associated with carbon savings from the Proposed Project.

11.4.2 Methodology for Calculating Losses

A methodology for calculating carbon losses was published in June 2008 by scientists at the University of Aberdeen and the Macauley Institute with support from the Rural and Environment Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. The document, '*Calculating Carbon Savings from Wind Farms on Scottish Peat Lands*', was developed to calculate the impact of wind farm developments on the soil carbon stocks held in peat. This methodology was refined and updated in 2011 based on feedback from users of the initial methodology and further research in the area. The web-based version of the carbon calculator, which supersedes the Excel-based versions of the tool, was released in 2016. Please note that the web-based version of the carbon calculator is currently not available. The Macauley 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. Previously, guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of more detailed methods.

Given the absence of peat, the Proposed Project will not give rise to any impact on peat habitat. The Macauley Institute methodology states that the total volume of peat impacted by the construction of a wind farm is strongly correlated to the extent of the peatland affected by drainage at a site. Therefore, in calculating the carbon loss/saving of the Proposed Project, all potential carbon losses associated with constructing a wind farm on peatland environments were discounted. The carbon losses as a result of the manufacture, transportation and erection of the Proposed Turbines were included in the calculation.

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

In addition to the Macauley Institute methodology described above, where possible, CO₂ emissions or losses associated with embodied carbon of materials used in the construction, operational and decommissioning phase of the Proposed Project 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 site, installation of these materials during a construction phase, and the subsequent replacement, removal, and disposal of these materials upon decommissioning.⁵⁸

The full life cycle and embodied carbon of the Proposed Turbines have been taken account of in the Macauley Institute model. The emissions associated with the embodied carbon, along with the construction phase transport movements of the ancillary infrastructure and materials required for the construction of the Proposed Project are considered using the TII Carbon Tool (TII, 2022).⁵⁹ The TII Carbon Tool is customised for road and light rail projects in Ireland, using emission factors from recognised sources during the construction, maintenance and operation of TII projects in Ireland.

Section 15.1 in Chapter 15: '*Material Assets*' of this EIAR outlines traffic generation numbers relative to quantum of materials required for the construction of the Proposed Project, the details of which have been utilised to determine the emissions associated with these activities and are included in Appendix 11-2.

⁵⁸ Irish green Building Council – What is embodied carbon? <<https://www.igbc.ie/what-is-embodied-carbon/>>

⁵⁹ 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 Losses and Savings Calculations

11.4.3.1 Carbon Losses

The Scottish Government online carbon calculator⁶⁰ was used to assess the impacts of the Proposed Project in terms of potential carbon losses taking into account peat removal and reinstatement, drainage, habitat improvement, forestry felling and site restoration. The online calculator is pre-loaded with information specific to the CO₂ emissions from the United Kingdom's electricity generation plant, which is used to calculate emissions savings from proposed wind farm projects in the UK. However, due to the availability of Irish-specific carbon intensity emission factors for the Irish electricity generation plant, available from the SEAI website⁶¹, the CO₂ emissions savings from the Proposed Project have been calculated separately from the online carbon calculator as set out in Section 11.4.3.2 below.

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

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

The main CO₂ losses due to the Proposed Project are summarised in Table 11-5.

Table 11-5 CO₂ Losses from the Proposed Project

Origin of Losses	CO ₂ Losses (tonnes CO ₂ equivalent)	
	Expected	Maximum
Losses due to the Proposed Turbines life (e.g., manufacture, construction, decommissioning)	124,634	143,975
Losses due to backup	99,515	113,731
Losses from reduced carbon fixing potential	3,204	4,272
Losses associated to forestry felling (of permanent built infrastructure)	31,117	31,561
Losses associated with embodied carbon in construction materials	38,272	38,272
Losses associated with traffic and transport movements	280	280
Total	297,023	332,092

The worksheet models and online tools calculate that the Proposed Project will give rise to 297,023 tonnes of CO₂ equivalent losses over its 35-year life. Of this total figure, the Proposed Turbines directly account for 124,634 tonnes, or 42% of all carbon losses. Losses due to backup of the Proposed Turbine

⁶⁰ Scottish Government online Carbon Calculator. Available at: <https://www.gov.scot/publications/carbon-calculator-for-wind-farms-on-scottish-peatlands-factsheet/>

⁶¹ <https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors>

(i.e. when a wind farm is generating below capacity and requires an equivalent backup quantity of power from the grid) account for 95,515 tonnes, or 33.5%. Losses from reduced carbon fixing potential accounts for 3,204 tonnes, or 1.1%. CO₂ loss associated to forestry felling of the built infrastructure accounts for 31,117 tonnes or 10.5%. Losses due to embodied carbon in construction materials accounts for 38,272 tonnes, or 12.9% and losses due to construction phase transport emissions accounts for 280 tonnes, or 0.1%.

It should be noted that losses from soil organic matter, i.e., CO₂ loss from removed and drained peat, have not been included as no peat was encountered within the Site and the carbon calculator cannot compute losses from soil matter where peat is not present. The habitat that will be impacted by the development footprint comprises a mix of coniferous forestry, wet grassland and pastoral agriculture land which cannot be calculated using the carbon tool. The value of losses from soil organic matter as displayed in Appendix 11-2 from ground activities in 'Acid Bog', was therefore removed as it is not representative of the proposed works in reality.

The values discussed above are based on the assumption that no habitat enhancement activities will take place as part of the Proposed Project. As detailed in Section 4.3.3.1 of this EIAR, approx. 69.27ha of coniferous forestry will be permanently felled for the built infrastructure footprint of the Proposed Project which will be replaced or replanted on a hectare for hectare basis, and a further 3.6ha of native woodland will be planted for the benefit of biodiversity as well as 5.5km of hedgerow habitat, and is discussed further in the Biodiversity Management and Enhancement Plan (BMEP) (see Appendix 6-4 of the EIAR), which will be subject to the condition of any felling licence that will be issued in respect of the Proposed Project. It should also be noted that whilst forestry will be felled to facilitate the Proposed Wind Farm, this forestry is destined to be felled as a crop plant regardless. Taking into account the additional habitat enhancement that will take place for the Proposed Project outlined in the BMEP, as well as the actual CO₂ losses for reduced carbon fixing potential when considering the Site is not located on 'Acid Bog' (which is assumed by the climate tool), a habitat type which features a species composition more adapted to sequestration of carbon. As such the carbon losses are expected to be lower than the values detailed in Table 11-5, over the lifetime of the Proposed Project.

The figure of 38,272 tonnes of CO₂ arising from the embodied carbon of construction materials associated with the Proposed Project 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 Heavy Goods Vehicles (HGV) or Large Good Vehicles (LGV) will be carrying material at its full capacity. The figure of 280 tonnes of CO₂ arising from transport movements associated with construction activities of the Proposed Project 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.

The above calculation is based on the assumption that the hydrology of the Proposed Project and habitats within the Site are not restored on decommissioning of the Proposed Project after its expected 35-year proposed operational life. As detailed in the Decommissioning Plan, Appendix 4-6, it is proposed that the Proposed Turbines will be dismantled and removed offsite. It is not intended to remove the concrete foundations from the ground as it is considered that their removal will be the least preferred option in terms of potential effects on the environment. The associated foundations will be covered with soil material. Soil will be spread and graded over the foundation using a tracked excavator and revegetation enhanced by spreading of an appropriate seed mix to assist in revegetation and accelerate the resumption of the natural drainage management that will have existed prior to any construction. The underground electrical cabling connecting the Proposed Turbines to the Proposed 110kV 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 11-5.

11.4.3.2 Carbon Savings

According to the model described above, the Proposed Project will give rise to total losses of 297,023 tonnes of carbon dioxide.

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

$$\text{CO}_2 \text{ (in tonnes)} = \frac{(A \times B \times C \times D)}{1000}$$

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

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

C = ... The number of hours in a year: 8,760 hours

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

For the purposes of this calculation, the rated capacity of the Proposed Project is assumed to be 145.2MW (based on 17 No. 6 MW turbines and 6 no. 7.2MW turbines).

A load factor of 0.35 (or 35%) has been used for the Proposed Project.⁶²

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

A conservative figure for the carbon load of electricity generated by natural gas in Ireland was sourced from Sustainable Energy Authority Ireland's (SEAI) Conversion and Emissions Factors for Publication worksheet.⁶³ The emission factor for electricity generated in Ireland in 2025 was 178.3gCO₂/kWh.⁶⁴

The calculation for carbon savings is therefore as follows:

$$\begin{aligned} \text{CO}_2 \text{ (in tonnes)} &= \frac{(145.2 \times 0.35 \times 8,760 \times 178.3)}{1000} \\ &= 79,376 \text{ tonnes per annum} \end{aligned}$$

Based on this calculation, **79,376** tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the Proposed Project. Over the proposed 35-year lifetime of the development, therefore **2,778,160** tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation.

Based on the Scottish Government carbon calculator as presented above in Section 11.4.3.1 297,023 tonnes of CO₂ will be lost to the atmosphere due to changes in the ground conditions and due to the construction and operation of the Proposed Project. This represents **11%** of the total amount of carbon

⁶² Enduring Connection Policy 2.3 Solar and Wind Constraints Report: Assumptions and Methodology Available at: <https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Assumptions-and-Methodology-v1.1.pdf> The Proposed Project is located within the J wind region for Ireland with an associated capacity factor of 35%.

⁶³ Conversion and Emission Factors for Publication (2024) <https://www.seai.ie/sites/default/files/data-and-insights/seai-statistics/conversion-factors/SEAI-conversion-and-emission-factors.xlsx>

⁶⁴ SEAI have published the provisional 2025 emission factor for electricity generation in Ireland as 178.3 gCO₂/kWh. Please note that this is a provisional value that may change.

dioxide emissions that will be offset by the Proposed Project. The 297,023 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 Proposed Project will be offset in approximately **44.9** months of operation.

As detailed in Section 4.3.3.1 of this EIAR, the identified 69.27ha of forestry that will be permanently felled for the permanent built infrastructure footprint will be replaced or replanted on a hectare for hectare basis. The carbon storage capacity of replanted habitats will vary over time as vegetation matures and land use and the baseline environment change. Therefore, while it can be assumed that coniferous forestry replanting outside of the Site as per the Forestry License requirements and enhancement measures on the Site will result in an increased capacity of carbon storage due to the carbon storage potential that exists within these habitats, 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.

11.5 Likely Significant Effects and Associated Mitigation Measures

11.5.1 'Do-Nothing' Scenario

If the Proposed Project were not to proceed, the Site will continue to function as it does at present, with no changes to the current land-use.

If the Proposed Project were not to proceed, the opportunity to capture the available renewable energy resource would be lost, as would the opportunity to contribute to meeting Government and EU targets for the production and consumption of electricity from renewable resources and the reduction of greenhouse gas emissions. The opportunity to generate local employment, local authority development contributions, rates and investment in the local area would be lost. Furthermore, the opportunity to implement the measures outlined in the Biodiversity Management and Enhancement Plan (BMEP) as outlined in Appendix 6-4 would also be lost.

11.5.2 Construction Phase

11.5.2.1 Greenhouse Gas Emissions

Pre-Mitigation Impact

Construction of the Proposed Project

The construction of Proposed Project, including the Proposed Turbines, associated foundations and hard-standing areas, meteorological mast and telecommunications relay mast (inclusive of foundations and hardstands), access roads, construction compounds, borrow pits, site drainage, substations, security compounds, underground electrical cabling and all ancillary works and apparatus will require 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 Site. Greenhouse gas emissions, e.g., carbon dioxide (CO₂), carbon monoxide and nitrogen oxides, associated with the production of construction materials, and operation of vehicles and plant will arise as a result of the construction activities. This effect will be Short-term, Slight, Direct and Negative only. The effect is therefore not significant, given the quantity of greenhouse gases that will be emitted to the atmosphere and will be restricted to the duration of the construction phase. Mitigation measures to reduce this impact are presented below.

Some potential Long-term, Slight, Direct, Negative effects will occur due to the removal of carbon fixing vegetation and habitat, however, that has been avoided where possible by the design and layout of the Proposed Wind Farm, which has upgraded existing roads within the Site where possible to gain

access to the Proposed Turbine and minimise the construction of additional roads. This effect is not significant.

Transport of Construction Materials to the Site

The transport of the Proposed Turbines and construction materials to the Site, which will occur on specified routes only (see Section 4.7 in Chapter 4 of this EIAR), will also give rise to greenhouse gas emissions associated with the transport vehicles and exhaust emissions. This impact will be Short-term, Slight, Direct and Negative, and is not significant, given the quantity of greenhouse gases that will be emitted and will be restricted to the duration of the construction phase, therefore it is not significant. Mitigation measures to reduce this effect are presented below.

Waste Disposal

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

Please refer to Section 4.7.2 of Chapter 4: *Description of the Proposed Project* of this EIAR and Section 3.8 of the Construction and Environmental Management Plan (CEMP) for detailed processes on waste management during the construction phase of the Proposed Project.

Mitigation

- Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- When stationary, delivery and on-site vehicles will be required to turn off engines.
- Turbines and construction materials will be transported to the Site on specified routes only unless otherwise agreed with the Planning Authority. Please see Chapter 15 Material Assets for details.
- It is intended to obtain the majority of materials for the construction of the Proposed Project from the proposed onsite borrow pits, with some material being imported from local licenced quarries as needed. This will significantly reduce the number of delivery vehicles accessing the Site, thereby reducing the emissions associated with vehicle movements.
- A CEMP (Appendix 4-3) will be in place throughout the construction phase.
- The CEMP (Appendix 4-3) includes a Resource Waste Management Plan (RWMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material.
 - The RWMP outlines the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of construction of the Proposed Project. Disposal of waste will be seen as a last resort.
 - Section 4.4.6 of Chapter 4 for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor.

- The MRF facility will be local to the Proposed Project to reduce the amount of emissions associated with vehicle movements.
- Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.

Residual Effects

Following implementation of the mitigation measures above, residual effects of greenhouse gas emissions arising from the construction phase of the Proposed Project will have a Short-term, Imperceptible, Direct, Negative effect, which is not significant. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a Permanent, Imperceptible, Direct, Negative effect on climate.

When considering these greenhouse gas emissions within the context of the national Electricity Sectoral Emissions Ceilings detailed in Section 11.2.2, Carbon Budget 1 (2021-2025) has an Electricity Sector budget of 40 MtCO₂e and Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 MtCO₂e for large-scale deployment of renewables. As detailed in Section 11.4.3.2, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. Therefore, while there will be greenhouse gas emissions associated with the construction of the Proposed Project, this will take place under the Electricity sector emissions ceiling and will be offset by the operation of the Proposed Project within its operational life.

Significance of Effects

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

11.5.3 Operational Phase

11.5.3.1 Greenhouse Gas Emissions

Pre-Mitigation Impact

Operation and Monitoring of the Proposed Project

The Proposed Project will generate energy from a renewable source. As detailed in Section 11.4.3.2 above, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project, displacing approximately, **79,376** tonnes of carbon dioxide per annum from traditional carbon-based electricity generation (see Section 11.4.3.2 above). This will have a Long-term, Significant, Indirect, Positive impact on climate.

Some potential Long-term, Not Significant, Direct, Negative impacts that may occur during the operational phase of the Proposed Project are the release of carbon dioxide to the atmosphere due to maintenance and monitoring activities. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from maintenance and monitoring activities will have a Permanent, Imperceptible, Direct, Negative effect on climate.

Transport to the Site due to Monitoring and Maintenance

With respect to transport volumes, there will only be an average of approximately 1 to 2 trips made to the Site by car or light goods vehicle per day.

In the unlikely event that a turbine blade is damaged and must be replaced during the operational phase, the impacts described in Section 11.5.2.1 will be the same. As outlined above, once emitted to

the atmosphere, the greenhouse gas emissions that will arise from maintenance activities will have a Permanent, Imperceptible, Direct, Negative effect on climate.

Waste Disposal

Large volumes of waste is not proposed to be generated onsite during the operational phase, any waste that does arise will be minimal and any impact on climate will be Temporary, Imperceptible, Direct and Negative which is not a significant impact. Again, once emitted to the atmosphere, the greenhouse gas emissions that will arise from waste disposal activities will have a Permanent, Imperceptible, Direct, Negative effect on climate.

Mitigation

- Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise.
- Waste management will be carried out in accordance with '*Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects*' (2021) produced by the EPA.

Residual Effect

Following implementation of the mitigation measures above, residual effects of greenhouse gas emissions arising from the operational phase of the Proposed Project will have Long-term, Significant Positive, Indirect, effects on Climate, which is Significant.

The operational of the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan due to the provision of clean renewable energy to the national grid. Therefore, while there will be greenhouse gas emissions associated with the operation of the Proposed Project, this will be offset by the operation of the Proposed Project within the 35-year operational life.

Long-term Significant Positive Indirect effects on Climate as a result of reduced greenhouse gas emissions are predicted.

Significance of Effects

Based on the assessment above there will be Significant effects with regard to greenhouse gas emissions arising from the operational phase of the Proposed Project.

11.5.4 Decommissioning Phase

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

Upon decommissioning of the Proposed Wind Farm, the Proposed Turbines, meteorological mast and telecommunications relay mast would be disassembled, and the original links would be restored to their original orientation, unless otherwise agreed with ESB. All above-ground turbine and mast components would be separated and removed from the Site for recycling. Turbine and mast foundations would remain underground and would be covered with soil and allowed to revegetate. Leaving the foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in potentially significant temporary environmental nuisances such as noise, dust and vibration. Site roadways will be used during the operational phase by

farm and forestry machinery and therefore will be retained post decommissioning to continue to facilitate these activities.

The 33kV underground electrical cabling connecting the Proposed Turbines to the Proposed 110kV Substation will be removed from the cable ducts. The cabling will be pulled from the cable ducts using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at the original cable jointing pits which will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. 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.

The Proposed 220kV Loop-in Substation and the Proposed 110kV Substation will remain in place as it will be part of the National Electricity Grid network under the ownership and control of ESB and EirGrid.

Any impact and consequential effect that occurs during the decommissioning phase will be greatly reduced from the predicted impacts of the Construction Phase works on climate. This is primarily due to the lack of excavation works required for the decommissioning of the Proposed Project infrastructure, as it is proposed that all hardstanding areas and foundations be left in-situ and left to revegetate upon decommissioning. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential impacts on climate.

A Decommissioning Plan has been prepared (Appendix 4-6). The Decommissioning Plan will be updated prior to the end of the operational period in line with best-practice decommissioning methodologies that may exist at the time and will agree with the competent authority at that time. The potential for effects during the decommissioning phase of the Proposed Project has been fully assessed in the EIAR.

11.6

Cumulative Assessment

The potential for impact between the Proposed Project, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Project will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans within 25km of the Site, such as other wind energy developments, extractive industries, battery energy storage systems, forestry etc. Please see Section 2.9 of Chapter 2 for the cumulative assessment methodology used.

During the construction phase of the Proposed Project and the construction of other permitted or proposed projects and plans in the area (please see Section 2.9 in Chapter 2 and Appendix 2-3 of this 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 are implemented during the construction phase of the Proposed Project, there will be no significant cumulative negative effect on climate.

Exhaust emissions during the operational phase of the Proposed Project 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 Proposed Project is such that, once operational, it will have a Long-term, Significant, Positive, Indirect impact on the climate. There will be no measurable negative cumulative effect with other developments on climate.

11.6.1 Construction Phase

During the construction phase of the Proposed Project and other permitted or proposed projects and plans in the area as set out in Section 2.9 in Chapter 2 of this EIAR, that are yet to be constructed, there will be greenhouse gas emissions arising from production of construction materials (such as 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, Direct effect on Climate, which is not significant.

11.6.2 Operational Phase

The nature of the Proposed Project is such that, once operational, it will have a Long-term, Significant, Positive, Indirect impact on climate. However, as noted above, the Proposed Project will emit approximately **297,023** tonnes of CO₂ associated with the construction and operational phase to the atmosphere (Section 11.4.3.2), which will be offset in approximately **44.9** months of operation.

When considering these greenhouse gas emissions within the context of the Electricity Sectoral Emissions Ceilings detailed in Section 11.2.2, Carbon Budget 1 (2021-2025) has an Electricity Sector budget of 40 MtCO₂e and Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 MtCO₂e for large-scale deployment of renewables. As detailed in Section 11.4.3.2, the Proposed Project will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Project. Therefore, while there will be greenhouse gas emissions associated with the construction of the Proposed Project, this will take place under the Electricity sectoral emissions ceiling and will be offset by the operation of the Proposed Project within its operational life. Thus, there will be no cumulative effects arising on climate from the Proposed Project and other permitted or proposed projects and plans in the area as set out in Section 2.9 in Chapter 2 of this EIAR.

11.6.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.11 in Chapter 4: *'Description of the Proposed Project'*. Any cumulative impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, albeit of lesser impact. The mitigation measures prescribed for the construction phase of the Proposed Project will be implemented during the decommissioning phase thereby minimising any potential cumulative effects.

EIA Classification Summary

Please see the below table for a summary of all identified impacts for the Proposed Project relating to Climate.

Table 11-6: Impact Assessment Classification Summary

Topic	Pre-Mitigation Effect	Mitigation Section Reference	Residual Effect	Significance
Construction Phase				
Greenhouse Gas Emissions	Short-Term, Slight, Negative	Section 11.5.2	Short-Term, Imperceptible, Negative	Not Significant
Operational Phase				
Greenhouse Gas Emissions	Long-Term, Imperceptible, Negative	Section 11.5.3	Long-Term, Significant, Positive	Significant
Decommissioning Phase				
Greenhouse Gas Emissions	The potential impacts associated with decommissioning of the Proposed Project will be similar to those associated with construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works in comparison to construction phase works.	Section 11.5.2	Short-Term, Imperceptible, Negative	Not Significant