Proposed Ballynalacken Windfarm Project

Environmental Impact Assessment Report

Chapter 12: Climate

Topic Chapter Authors:

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Glossary of Terms

Term	Definition
Ballynalacken Windfarm Project	Ballynalacken Windfarm including 12 No. turbines, turbine foundations and hardstanding areas, Windfarm Site Roads, Internal Windfarm Cabling, Windfarm Control Building, Site Entrances, ancillary works at and for the windfarm, along with the Internal Cable Link, Tinnalintan Substation and ancillary works, and Ballynalacken Grid Connection and grid connection works to the Eirgrid Ballyragget Substation. The Project also involves works and activities along the turbine component haul route remote from the site, including the construction of a temporary Blade Transfer Area at HR8.
CO_2e	This is defined as the 'carbon dioxide equivalent'. It is a term for describing different greenhouse gases in a common unit. For any quantity and type of greenhouse gas, CO_2e signifies the amount of CO_2 which would have the equivalent global warming impact.
Embodied emissions	These are defined as the energy consumed by all of the processes associated with the production of a development, from the mining and processing of natural resources to manufacturing, transport and product delivery.
Mt	Megatonne. 1 Mt = 1 Million Tonnes

List of Abbreviations

Abbreviation	Full Term
CAP	Climate Action Policy
CO_2e / CO_2eq	Carbon Dioxide equivalent
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
GHG	Greenhouse Gas
LULUCF	Land Use, Land Use Change and Forestry
$MtCO_2e$	Million tonnes of Carbon Dioxide equivalent
MW	Megawatt
RE-E	Renewable Energy - Electricity

CHAPTER 12 CLIMATE

EIAR 12.1 INTRODUCTION

EIAR 12.1.1 The Authors of this Chapter (Competent Experts)

The Climate chapter was prepared by Ciara Nolan, MSc in Applied Environmental Science and BSc (Hons) in Energy Systems Engineering, of AWN Consulting, a multidisciplinary environmental consultancy. Ciara is a Member of the Institute of Air Quality Management (MIAQM) and Institute of Environmental Sciences (MIEnvSc). She has over 8 years of experience in undertaking air quality and climate assessments. She has prepared air quality and climate impact assessments as part of EIARs for numerous developments including residential, industrial, commercial, pharmaceutical, windfarm and data centres.

EIAR 12.1.2 Overview of Climate in the Local Environment

Climate is defined as the average weather over a period of time. Climate change is a significant change in this average weather. Climate change is a natural phenomenon but in more recent years has accelerated as a result of human activities through the release of greenhouse gases (GHGs). These GHGs are altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This is causing an increase in the atmosphere's heat trapping abilities, resulting in increased average global temperatures (global warming) over the past number of years. The release of carbon dioxide as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'.

The scientific community and governments across the world are in agreement - the climate is changing, and a stronger link between the planet's warming and its changing weather patterns is evident. Though it can be hard to pinpoint whether climate change intensified a particular weather event, the trajectory is clear — climate change is already affecting the entire world, with extreme weather conditions such as drought, heat waves, heavy rain, floods and landslides becoming more frequent, including in Europe. Other consequences of the rapidly changing climate include rising sea levels, ocean acidification and loss of biodiversity. Ireland has directly experienced the extreme weather events of flooding, drought and extreme snow fall. The shift in climate is bringing profound shifts of desertification, rising sea levels, displaced population, profound challenges to the natural world and economic and social disruption. We are close to a tipping point where these impacts will sharply worsen. Decarbonisation is now a must if the world is to contain the damage and build resilience in the face of such a profound challenge.

In 2022 the UN describes climate change as "the defining issue of our time and we are at a defining moment. From shifting weather patterns that threaten food production, to rising sea levels that increase the risk of catastrophic flooding, the impacts of climate change are global in scope and unprecedented in scale".

Climate Action: Addressing climate change requires two types of responses: mitigation and adaptation. Climate mitigation is about reducing emissions of greenhouse gases to limit the amount of warming that happens over the coming decades. Reducing the dependence on fossil fuels in all aspects of our lives[1] is a key

[1] EPA (2019) Research Report *Irish Climate Futures: Data for Decision-making*

factor in climate mitigation. Climate change adaptation is how we can adapt our current and future projects to the impacts of climate change by building in increased resilience to various climate related hazards.

Climate action, and in particular the cutting of greenhouse gas emissions, is a key element of the European Green Deal.

As part of Ireland's mitigation response, ambitious national renewable energy generated electricity (RE-E) targets have been set in the White Paper **Ireland's Transition to a Low Carbon Energy Future 2015 – 2030.** This set out a vision for transforming Ireland's fossil fuel-based energy sector into a clean, low carbon system by 2050.

Ireland's Climate Action and Low Carbon Development (Amendment) Act 2021, (the 2021 Climate Act), was signed into law in 2021. The purpose of the 2021 Climate Act is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*".

The Climate Action Plan 2024 (CAP24) is the third annual update to Ireland's Climate Action Plan and the second to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021 and following the introduction of the 2022 Sectoral Emission Ceilings and economy wide carbon budgets. According to the Gov.ie website the Climate Action Plan 2024 builds upon CAP 2023 by refining and updating the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings. The Plan provides a roadmap for taking decisive action to halve Ireland's emissions by 2030 and reach net zero by no later than 2050, as committed to in the Climate Action and Low Carbon Development (Amendment) Act 2021. In order to meet these emission targets, Ireland needs to reduce its use of fossil fuels considerably.

EIAR 12.1.3 Sources of Information

Consultation and desktop studies were carried out in order to gather information on the baseline environment.

Table 12-1: Sources of Baseline Information for Climate

Type	Source
Consultation	During pre-application consultations with An Bord Pleanála, the Inspector stated that a carbon calculation should be included as part of the climate chapter of the EIAR. See Chapter 3: Consultation
Desktop	• Transport Infrastructure Ireland (2022) GE-ENV-01106: Carbon Tool for Road and Light Rail Projects: User Guidance Document • Environmental Protection Agency (2024) Ireland's Greenhouse Gas Emissions 1990-2023 • Environmental Protection Agency Greenhouse Gas Emissions and Projections Online. Available: https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/ [accessed 07 May 2024] • Climate Change Advisory Council Carbon Budget Technical Report October 2021 • Environmental Protection Agency (2021) Ireland's Greenhouse Gas Emissions Projections 2020-2040 **Review of the other EIA Report Chapters as follows:** • Chapter 5: Description of the Development
Fieldwork	• No fieldwork was required.

EIAR 12.1.4 Legislation & Regulations

The following legislation and regulations and policy are relevant to Climate and have been adhered to in this EIA Report:

- EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources
- Effort Sharing Regulation (EU 2018/842)
- Climate Action Plan 2024 (CAP24) (Government of Ireland, December 2023)
- European Commission (2013) Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment
- Government of Ireland White Paper 'Ireland's Transition to a Low Carbon Energy Future 2015-2030'
- Climate Action and Low Carbon Development (Amendment) Act 2021 (Government of Ireland, 2021)
- Carbon Budgets (Department of the Taoiseach, 2022) available: https://www.gov.ie/en/publication/9af1b-carbon-budgets/

EIAR 12.1.5 Guidance Documents

The recommendations in the guidelines listed below, have been considered during the preparation of this chapter:

- Transport Infrastructure Ireland (2022) PE-ENV-01104: Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document
- Institute of Environmental Management & Assessment (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance
- Environmental Protection Agency (2022a) Guidelines on the Information to be Contained in Environmental Impact Assessment Reports.

EIAR 12.1.6 Methodology Used

The evaluation for Climate in Section EIAR 12.3 has been carried out in accordance with the Transport Infrastructure Ireland (TII) guidance document *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document*, and the TII Carbon Tool. This methodology has been used to determine the importance and sensitivity of receptors, and the magnitude and significance of potential impacts. The methodology can be found in full in Appendix 12.1: Methodology for the evaluation of Climate.

EIAR 12.2 CLIMATE PART 1: SCOPING FOR SENSITIVE ASPECTS OF CLIMATE

The assessment of significant effects (or impacts) is an essential concept of the EIA Directive, and the primary objective of this EIA Report is to identify and evaluate the significant effects of the Project. Scoping has been carried out in accordance with the *Guidance on Scoping* (EC 2017) in order to focus the consideration of the impacts the Ballynalacken Windfarm Project may have on the environment to those which are significant or important enough to merit assessment, review and decision-making.

Scoping for the Environmental Topic – Climate has been carried out by the chapter authors, throughout the preparation of this Chapter, and includes scoping for the sensitive aspects of Climate (this Section EIAR 12.2), and later in this Chapter - scoping of impacts associated with the Project (see Section EIAR 12.3).

EIAR 12.2.1 Introduction to Scoping for Sensitive Aspects of Climate (Receptors)

The purpose of the scoping exercise, which comprises this Section EIAR 12.2, is to identify the relevant Sensitive Aspects (receptors) of Climate. In order to identify the relevant Sensitive Aspects, the scoping exercise applies a Conceptual Site Model approach and covers the following matters:

1. An examination is carried out, in Section EIAR 12.2.2, of the potential Sources of Impacts resulting from the Project and the Pathways for Impacts which link the sources of impacts to the Receptors (Sensitive Aspects) of the impacts;

2. The Zone of Influence of the Project, within which the impacts of the Project could occur, is set out, with justification for same. The Zone of Influence is also called the 'Study Area' herein. The zones of influence are set out in Section EIAR 12.2.3 for the various Sensitive Aspects which occur in the environment.

3. A scoping examination of Sensitive Aspects which occur within the Study Area(s) is carried out in Section EIAR 12.2.4. The scoping examination results in a Sensitive Aspect being either scoped-in for detailed evaluation in **Part 2: Sensitive Aspect Evaluation Section (i.e. Section EIAR 12.3)** of this chapter or scoped-out from further consideration, the rationale for scoping-out is provided in Section EIAR 12.2.4.

EIAR 12.2.2 Identification of the Sources, Pathways and Receptors of Impacts

The evaluations within the EIAR utilize Conceptual Site Model methods to identify potential impact sources and pathways between the Project and receptors (Sensitive Aspects) of the environment.

EIAR 12.2.2.1 Identification of Impact Sources

The 'source' is an origin of an impact and is associated with the Project. In order to identify the potential 'sources' of impact, the characteristics of the Ballynalacken Windfarm Project, i.e. the size and design, works, activities, use of materials and natural resources, and the emissions and wastes, associated with the construction, operation and decommissioning of the Project, as described in Chapter 5 of this EIA Report, have been examined, and it is considered that the following Project characteristics have potential to act as a 'source' of impact to the sensitive aspects of Climate:

Construction Stage Sources of Impact

- Excavation and relocation of soils and rock
- Importation of construction materials
- Use of machinery and vehicles run on hydrocarbons
- Movement of traffic during material deliveries
- Forestry felling
- Embodied carbon in construction materials

Operational Stage Sources of Impact

- Operating turbines

Decommissioning Stage Sources of Impact

- Movement of soils
- Use of machinery and vehicles run on hydrocarbons
- Wind turbine end of life treatment

EIAR 12.2.2.2 Identification of Impact Pathways

The 'pathway' is the means by which an impact can reach and affect a receptor. The characteristics of the baseline environment have been examined and it is considered that the following pathways could form a link between the Project (sources of impact) and the Sensitive Aspects (receptors):

- Air
- National and European Climate Action Targets

EIAR 12.2.2.3 Identification of Receptors

Any receptor in the environment which could be affected by a development is referred to as a 'Sensitive Aspect' in this EIA Report. The following Sensitive Aspects are relevant to the receiving environment and are subject to scoping in Section EIAR 12.2.3:

- Climate Change (Greenhouse Gas Emissions)
- Climate Change Risk (Vulnerability of the Project to Climate Change)

The Zone of Influence in relation to these Sensitive Aspects is examined in Section EIAR 12.2.3 below, with a scoping exercise for each of the Sensitive Aspects presented in Section EIAR 12.2.4.

EIAR 12.2.3 Scoping of the Study Areas (Zone of Influence of the Project)

The scoping and evaluation focuses on the area or zone of influence within which the impacts of the Project could occur. This area/zone is referred to as the Study Area. The Study Areas for the Sensitive Aspects of the Climate environment are set out in the table below.

Table 12-2: Study Area of the Project in relation to sensitive aspects of the Climate environment

Sensitive Aspect	Ballynalacken Windfarm Project Zone of Influence/Study Area	Justification
Climate Change (Greenhouse Gas Emissions)	Irish State	While climate change is global, the study area for this report relates to the Irish State, and Ireland's commitments and targets under various EU Climate Agreements and other international agreements.
Climate Change Risk (Vulnerability of the Project to Climate Change)	Examined in Chapter 5: Description of the Development; Section EIAR 5.11.2 Vulnerability to Natural Disasters Study area the Windfarm Site	The Study Area for vulnerability to climate change risks, does not need to extend beyond the site boundary because it is assessed in Chapter 5 that the Project is **Extremely Unlikely** to be affected by extreme weather events, including extreme winds, temperatures and rainfall events increasing the risk of flooding and landslide.

EIAR 12.2.4 Scoping of Sensitive Aspects

Any receptor in the environment which could be affected by a development is a Sensitive Aspect. The various sensitive aspects of the Climate environment are scoped in the table below for potential to be affected by the Ballynalacken Windfarm Project. The scoping examination results in a Sensitive Aspect being either scoped-in for detailed evaluation in **Part 2: Sensitive Aspect Evaluation Section (i.e. Section EIAR 12.3)** of this chapter or scoped-out from further consideration

a) Where it is considered that a Sensitive Aspect is likely, or has potential, to be significantly affected by the Project, that Sensitive Aspect has been scoped in for detailed evaluation in Part 2 (Section EIAR 12.3).

b) Where it is considered that there is no potential for a Sensitive Aspect to be affected, or where the likely/potential impacts to that Sensitive Aspect will be Neutral (i.e. No impact/imperceptible impact) then that Sensitive Aspect has been scoped out from further consideration, and the rationale for scoping-out is provided in the table.

c) An exception is made for Sensitive Aspects which are not likely to be significantly affected but may be of particular or local concern and merit a detailed examination, these Sensitive Aspects are also scoped in for detailed evaluation in Part 2 (Section EIAR 12.3).

Table 12-3: Scoping of Sensitive Aspects

Sensitive Aspect	**Is there a Pathway between the Project and the Sensitive Aspect?**	**Likely (or have potential) to be Significant?**	**Scope In/ Out**	**Scoping Result & Rationale *(scoped out only)***
Climate Change	Yes	Yes	Scope In	See Section EIAR 12.3.1 Part 2 Evaluation
Climate Change Risk	Yes	No	Scope Out	Scoped Out: The vulnerability / risk of the Project to Climate Change is considered in Chapter 5: Description of the Development (see Section EIAR 5.11: Vulnerability to Major Accidents, Natural Disasters and Climate Change) The risks posed by climate change are also taken into account in the Environmental Factor topic chapters Land, Soil, Water, Air Quality, Biodiversity, Landscape, Cultural Heritage, Material Assets, Population & Human Health *(Evolution of the Baseline sections)*

EIAR 12.3 CLIMATE PART 2: EVALUATION SECTION

This Evaluation Section examines the scoped-in Sensitive Aspects in greater detail, and comprises a baseline description and impact evaluation for each of the Sensitive Aspects, presented in the following order:

Section EIAR 12.3.1: Climate Change

EIAR 12.3.1 SENSITIVE ASPECT: CLIMATE CHANGE

This detailed evaluation section for Climate Change is presented as follows:

- Section EIAR 12.3.1.1 - description of the baseline environment of Climate Change;
- Section EIAR 12.3.1.2 - evaluation of the impacts of Ballynalacken Windfarm Project on Climate Change; and
- Section EIAR 12.3.1.3 – evaluation of cumulative impacts.

EIAR 12.3.1.1 Baseline Environment – Climate Change

The context, characteristics, importance and sensitivity of *Climate Change* are described in the subsections below. The trends and likely evolution (i.e. Do-Nothing scenario) for this Sensitive aspect are also considered.

EIAR 12.3.1.1.1 Climate Change

The world's climate is changing rapidly with temperatures increasing faster in the last 50 years, than in any other 50-year period in the last 2000 years. Human influence has warmed the atmosphere, ocean and land, leading to widespread and rapid change, including changes to our weather system.

EIAR 12.3.1.1.2 The Status of Ireland's Climate 2020 (EPA)

According to The Status of Ireland's Climate 2020 (EPA)[2] in Ireland:

- **Greenhouse Gas emissions have continued to rise** - Atmospheric concentrations of carbon dioxide, methane and nitrous oxide are the highest observed since measurements began. Background carbon dioxide (CO_2) concentrations reached 414 ppm in 2020 - which is approximately a 50% increase compared to pre-industrial levels. Methane (CH_4) concentrations are at 1940 ppb - which is approximately a 170% increase compared to pre-industrial levels. Nitrous oxide (N_2O) concentrations are now above 330 ppb - which is approximately a 20% increase compared to pre-industrial levels.
- **Annual average amounts of precipitation are increasing** - Annual precipitation was 6% higher in the period 1989 to 2018, compared to the 30-year period 1961 to 1990. The decade 2006 to 2015 was the wettest on record.
- **Aerosols** - Atmospheric levels of sulfur over the 35-year period 1980 - 2015, as measured at Valentia Observatory, Co. Kerry show an approximately 80% reduction, highlighting the success of regulation and technological advances.
- **Annual average air temperature is rising** - The annual average surface air temperature in Ireland has increased by approximately 0.9°C over the last 120 years, with a rise in temperatures being observed in all seasons. Fifteen of the top 20 warmest years on record have occurred since 1990. The length of warm spells has increased slightly over the last 60 years.

[2] https://www.epa.ie/publications/research/climate-change/research-386-the-status-of-irelands-climate-2020.php

- **Sea levels continues to rise** - Satellite observations indicate that the sea level around Ireland has risen by approximately 2-3mm/year since the early 1990s. Analysis of sea level data from Dublin Bay suggests a rise of approximately 1.7mm/year since 1938 which is consistent with global average rates.
- **The ocean is becoming more acidic** - Measurements in the surface waters to the west of Ireland between 1991 and 2013 indicate an increase in ocean acidity which threatens calcifying species such as corals, shellfish and crustaceans.
- **The ocean is getting warmer** - the average sea surface temperature at Malin Head over the 10 years between 2009 and 2018 was 0.47°C above the 1981-2010 mean.
- **River flows** - There is an increase in flows across most of the country. However, there is evidence in recent years of an increase in potential drought conditions, especially in the east.
- **Land Cover** - Land cover observations since 1990 show increases in the area covered by both artificial surfaces and forests and a decrease in wetland areas which include peatlands.
- **Vegetation Fires**- Between 4,000 and 6,000ha are burned annually, with most fires occurring between March and June each year. Upland heaths and blanket bogs have the strongest association with fires.
- **Above Ground Biomass** - The total volume of trees and hence carbon sequestered in forest increased by 38% between 2006 and 2017.

EIAR 12.3.1.1.3 Irelands Greenhouse Gas Emissions 1990-2023

The below data summarises the current baseline environment in relation to GHG emissions based on the most recent EPA data published on the EPA website[3]. This report provides data on Ireland's greenhouse gas emissions in 2023 and trends in emissions from 1990 up to 2023. These figures are based on the SEAI's energy balance provided in June 2024.

The EU's Effort Sharing Regulation (EU 2018/842) sets 2030 targets for emissions outside of the Emissions Trading Scheme (known as ESR emissions) and annual binding national limits for the period 2021-2030. Ireland's original target was to reduce ESR emissions by 30% by 2030 compared with 2005 levels, with a number of flexibilities available to assist in achieving this. The ESR was amended in April 2023 and Ireland must now limit its greenhouse gas emissions by at least 42% by 2030. The ESR provides two flexibilities i) use of ETS allowances and ii) credit from action undertaken in the land use, land use change and forestry (LULUCF).

Data published in July 2024 (EPA, 2024) predicts that Ireland exceeded (without the use of flexibilities) its 2023 annual limit set under EU's Effort Sharing Regulation (EU 2018/842) by 2.27 $MtCO_2e$. However, the 2023 emissions were the first time that Irelands emission were below (-1.2%) 1990 levels. ETS (Emissions Trading Scheme) emissions decreased (-17.0%) and ESR (Effort Sharing Regulation) emissions decreased (-3.4%). Ireland's target is an emission reduction of 626 kt of CO_2e by 2030 on an average baseline of 2016 to 2018. The EPA estimate that 2023 total national GHG emissions, excluding LULUCF, have decreased by 6.8% on 2022 levels to 55.01 Mt CO_2e, with a 2.2 Mt CO_2e (-21.6%) reduction in electricity industries alone. This was driven by a 40.7% share of energy from renewables in 2023 and by increasing our imported electricity. The sectoral breakdown of 2023 GHG emissions is shown in Table 12-4. The sector with the highest emissions in 2023 was agriculture at 37.6% of the total, followed by transport at 21.4%. For 2023 total national emissions (including LULUCF) were 60.62 $MtCO_2e$ as shown in Table 12-4 (EPA, 2024).

[3] EPA (2024) https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/ [Accessed 13/05/2024]

The provisional 2023 figures indicate that Ireland has used 63.9% of the 295 Mt CO_2e Carbon Budget for the five-year period 2021-2025.

The Electricity sector emitted approximately 7.56 $MtCO_2e$ in 2023 which is 12.5% of the total 2023 national emissions. The Electricity sector has used 68% of the 2021 – 2025 carbon emissions budget over the 2021 to 2023 period. As a result, annual emissions reductions of 10.3% are now required in 2024 and 2025 to stay within budget according to the EPA report (EPA, 2024).

Table 12-4: Total National GHG Emissions in 2022

Sector	**2023 GHG Emissions (Mt CO_2e)** [Note 1]	**% of Total 2023 GHG Emissions**
Electricity	7.56	12.5%
Transport	11.79	19.5%
Buildings (Residential)	5.35	8.8%
Buildings (Commercial and Public)	1.41	2.3%
Industry	6.29	10.4%
Agriculture	20.78	34.3%
Other [Note 2]	1.83	3.0%
LULUCF	5.61	9.3%
National total excluding LULUFC	**55.01**	**90.7%**
National total including LULUFC	**60.62**	**100.0%**

Note 1: Reproduced from Latest emissions data on the EPA website (EPA 2024)

Note 2: Other includes Petroleum refining, F-Gases and Waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).

EIAR 12.3.1.1.4 Existing Sources of Impacts to Climate

According to the United Nations, ‘’*Climate change is a real and undeniable threat to our entire civilization. The effects are already visible and will be catastrophic unless we act now*’’[4].

EIAR 12.3.1.1.5 Importance of Climate Change & Sensitivity to Change

Importance: As per EU Directive 2014/52/EU “*Climate change will continue to cause damage to the environment and compromise economic development. In this regard, it is appropriate to assess the impact of projects on climate (for example greenhouse gas emissions) and their vulnerability to climate change*”. This is referenced within the EPA document ‘Guidelines on the information to be contained in Environmental Impact Assessment Reports’ (2022) and climate is one of the environmental factors that must be considered as part of an EIAR.

[4] https://www.globalgoals.org/goals/13-climate-action/

Sensitivity to Change: The sensitivity of the environmental factor Climate can be determined by reference to the criteria of Institute of Environmental Management & Assessment in their guidance document 'Assessing Greenhouse Gas Emissions and Evaluating their Significance' (IEMA, 2022). In relation to GHG emissions these are assessed against compliance with national and sectoral targets and ceilings. Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. These declarations, in conjunction with Ireland's current failure to meet its EU binding targets under Regulation 2018/842 results in any changes in GHG emissions either beneficially or adversely being of more significance than previously viewed prior to these declarations. Climate, as the receptor, therefore, has a **high sensitivity**, given the severe consequences of global climate change and the cumulative contributions of all GHG emission sources. This is in line with the approach within the IEMA guidance (IEMA, 2022).

EIAR 12.3.1.1.6 Evolution of the Baseline Environment (the 'Do-Nothing' scenario)

Trends in Key Indicators over time: The receiving environment is the likely state of the baseline environment at the time of construction/operation/decommissioning as relevant, i.e. current baseline environment + likely evolution thereof.

Under the Ireland's Climate Action Plan 2023, the Government is targeting 80% renewable energy generation in Ireland by 2030. The target is for 9000 MW to be generated by onshore wind, a doubling of existing capacity. The trend in Ireland in this decade is to continue to develop the on-shore wind industry.

Under the Do Nothing Scenario no construction works will take place and the site will remain as it currently is. If the Ballynalacken Windfarm Project does not proceed, the renewable generation from the Ballynalacken wind turbines will not be transported to the National Grid and the subsequent benefits of GHG offsets will not occur. The baseline environment will only change in line with the trends of CO_2eq emissions identified in the above sections, increasingly outstripping the successes achieved to date in increasing the amount of RE-E on the grid system.

EIAR 12.3.1.1.6.1 Climate Action and Low Carbon Development (Amendment) Act 2021

Ireland's Climate Action and Low Carbon Development (Amendment) Act 2021, (the 2021 Climate Act), was signed into law in 2021. The purpose of the 2021 Climate Act is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act also provides for a 51% reduction in greenhouse gases by 2030 compared to 2018 levels, and puts in place a rigorous governance structure, including a system of carbon budgeting, sectoral emissions ceilings, a national adaptation framework, sectoral adaptation plans and annually updated Climate Action Plans, to ensure that Ireland achieves its national, EU and international climate commitments in the near and long-term. The 2021 Climate Act defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period*".

In relation to carbon budgets, the 2021 Climate Act states '*A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')*'. The carbon budget is to be produced for 3 sequential budget periods. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and

different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published in July 2022.

EIAR 12.3.1.1.6.2	Carbon Budget for 2021-2025

Ireland's first carbon budget programme has been approved by the Government and adopted by both Houses of the Oireachtas. A carbon budget represents the total amount of emissions, measured in tonnes of CO_2 equivalent (CO_2e), that may be emitted by a country or a region during a specific time period. The carbon budget programme, comprising three 5-year budgets (2021-2025; 2026-2030; and 2031-2035), came into effect on 6 April 2022. Carbon budgets for each period are proposed by Ireland's Climate Change Advisory Council. The sectorial emission ceilings for 2030 were published in July 2022. Electricity has a 75% reduction requirement and a 2030 emission ceiling of 3 $MtCO_2e$[5](million tonnes of Carbon Dioxide equivalent).

EIAR 12.3.1.1.6.3	Climate Action Plan 2024

The Climate Action Plan 2024 (CAP24)[6] is the third annual update to Ireland's Climate Action Plan 2019 and the second to be prepared under the Climate Action and Low Carbon Development (Amendment) Act 2021 and following the introduction of the 2022 Sectoral Emission Ceilings and economy wide carbon budgets. CAP24 is structured to identify key measures in each sector of the economy. It aligns with the legally binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 and reiterates Ireland's international commitments to achieving international goals.

In CAP24, targets are given for 2025 and 2030, as well as 2031-2035. Achieving these goals will require no less than a national transformation in how we work, travel, heat our homes, source our energy and use our land. To achieve the targets set out in CAP24, considerable investment is needed to reach emission reduction goals – the National Development Plan sets out a public investment total of €165 billion over the period 2021 to 2030. The actions to deliver on the CAP24 ambition will be supported by a robust governance structure that now includes Ireland's first carbon budget programme and Sectoral Emissions Ceilings.

The CAP24 action plan highlights six vital high-impact sectors, each with an associated emissions reduction target to assist Ireland in achieving its 2030 and 2050 climate goals. The seven sectors comprise Electricity; Industry; Built Environment; Transport; Agriculture; Landuse and the Marine Environment. In relation to renewable electricity (RE-E), **CAP24 lays out a plan to increase the proportion of RE-E to up to 80% by 2030 with targets of 9GW from onshore wind**, 8GW from solar and at least 5GW of offshore energy by 2030.

According to CAP24, "At a time when the energy system is under severe pressure to ensure security of supply, amid projections of rapid electricity demand growth over the coming decade, the electricity sector has been set one of the smallest carbon budget allocations and the steepest trajectory (-75%) across all sectors. The scale of the challenge to meet the sectoral emissions ceiling is immense and requires policies to be moved from an 'end of decade' target trajectory towards a 'remaining carbon budget' target. Ireland is at the forefront of global efforts to harness the enormous potential of renewable energy. The IPCC in their most recent assessment report has singled out wind and solar power as, by far, being the most cost-effective technologies to keep the planet on track to staying within 1.5 degrees temperature increase. A renewables led system is the core of Ireland's plan to radically reduce emissions in the electricity sector and protect our energy security through the use of indigenous energy as enshrined in the Government's recently launched Energy Security Package"

[5] Mt CO_{2eq} denotes million tonnes carbon dioxide equivalent.
[6] https://www.gov.ie/en/publication/79659-climate-action-plan-2024/

In 2022, onshore wind energy provided almost 40% %) of the country's electricity requirement through over 4500MW of installed RE-E capacity. Clearly reaching 9000MW of onshore capacity will be a challenge but will result in considerable benefits.

As recently as 6th September 2022, Marie Donnelly - Chair of the Climate Change Advisory Council, called for an increase in on-shore windfarms as soon as possible as part of the national effort to combat the high energy prices and security of supply issues that the European region faces due to the Russian invasion of Ukraine and the consequent effects on the flow of gas from Russia.

EIAR 12.3.1.2 Impact Evaluation – Climate Change

This Section comprises an evaluation of the likely significant impacts of the proposed Ballynalacken Windfarm Project on the receiving environment. Moderate, Slight, Imperceptible and Neutral Impacts are also taken into consideration.

The impacts are presented/evaluated as follows:

a) Significant Impacts which are likely or have potential to occur, are subject to detailed evaluation;

b) Moderate or Slight Impacts, which are likely or have potential to occur, are subject to detailed evaluation;

c) Non-significant impacts of local concern or considered important enough to merit detailed evaluation;

d) Neutral or Imperceptible Impacts are scoped out from detailed evaluation, and a short evaluation is provided in the table below. Unlikely Impacts are also scoped out.

Table 12-5: Impacts to Climate Change

Likely/Potential Impact	**Evaluation**	
Significant Impacts which are likely or have potential to occur – see detailed evaluation		
Operation Phase: Climate Action through Renewable Energy – Electricity (RE-E) production (POSITIVE)		*Section EIAR 12.3.1.2.1*
Non-significant impacts considered important enough (or of local concern) – see detailed evaluation		
Construction Phase: Greenhouse Gas Emissions due to construction materials, works and activities and due to manufacture of turbine components		*Section EIAR 12.3.1.2.2*
Neutral or Imperceptible Impacts, or where no impact is likely to occur – evaluation below		
Construction Phase: Loss of CO_2 uptake capacity due to removal of forestry at the windfarm site	Neutral Impact: The felling of forestry at the windfarm site to accommodate the construction of the turbines and to implement bat mitigation measures will be offset by the afforestation of an equal area of land within the State.	
Operation & Decommissioning Phases: Greenhouse Gas Emissions due to operational or decommissioning works and use of machinery/vehicles	Neutral Impact: There will be very low levels of GHG emissions during the Operation Phase due to the extremely low use of machinery/vehicles on site, limited to maintenance works and infrequent large component replacements. GHG emissions during the Decommissioning Phase will also be very low due to the low numbers of plant and machinery on site during decommissioning, the short duration of works (approx. 4 months) and low emissions from soils (in berms/storage) being moved within the site.	

EIAR 12.3.1.2.1 Increase in Renewable Energy – Electricity (RE-E) production

Sensitive Aspect:	Climate Change
Importance:	**High** (as per Section EIAR 12.3.1.1)
Impact Source(s)	Operating turbines
Impact Pathway(s)	National and European Policy
Project Stage	Operation Phase

Overview of Impact (general):

Renewable electricity (RE-E) production.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

The Ballynalacken Windfarm Project will provide 140 GWh of renewable energy (RE-E) per annum. Over the lifetime of the development (35 years), it is anticipated that the production of renewable electricity will result in total GHG emissions savings of 35,700 tonnes of CO_2e each year based on the energy intensity of the Irish electricity generation mix of 255g CO_2/kWh (Source: EPA, 2024) and once initial emissions from the construction of the development are taken into account.

The annualised GHG saving equates to 0.06% of Ireland's total 2023 GHG emissions of 60.62 $MtCO_2e$ or 1.2% of the 2030 Electricity sector carbon budget of 3 $MtCO_2e$.

Institute of Environmental Management & Assessment significance (IEMA, 2022) states that where the fundamental reason for a proposed project is to combat climate change (e.g. a wind farm) and this beneficial effect drives the project need, then it is likely to be significant. Considering the significance criteria set out in PE-ENV-01104 (TII, 2022) and Table 1 of Appendix 12.1, the impact of GHG emissions from the proposed project align with Ireland's GHG trajectory to net zero by 2050 as per TII Guidance (TII, 2022), this is therefore considered a significant, positive, long-term impact to climate. This project will assist in the CAP24 goal of producing up to 80% renewables for the grid.

Impact Magnitude	Long-term, beneficial	**Impact Significance: *(pre-mitigation)***	**Significant, beneficial**
Mitigation and Monitoring Measures: None required – Positive Effect			
Residual Impact Significance *(post-mitigation)*:			**Long-term, positive, significant**

EIAR 12.3.1.2.2 Greenhouse Gas Emissions

Sensitive Aspect:	Climate Change
Importance:	**High** (as per Section EIAR 12.3.1.1)
Impact Source(s)	Construction materials; excavations; land use change; transportation of materials; production of the turbine components
Impact Pathway(s)	National and European Policy
Project Stage	Construction

Overview of Impact (general):

Increase in GHG emissions due to embodied emissions from construction materials, construction activities and emissions from site vehicles and machinery.

Examination of the Impact of the Proposed Ballynalacken Windfarm Project:

The Ballynalacken Windfarm Project will result in total GHG emissions of 4,566 tonnes CO_2e during the construction phase. This is a result of land-clearance (including forestry felling) and site preparation works at the Windfarm, Tinnalintan Substation, Met Mast and Haul Route Works, the construction activities (i.e. vehicle and machinery emissions), embodied carbon in the non-turbine construction materials (e.g. concrete for turbine foundations), transport of materials to site, construction worker travel to site and construction wastes. There will be a saving in carbon emissions of 1,584 tonnes CO_2e as a result of landscaping and forestry replanting works which has been accounted for in the total figure specified. Replanting will provide a carbon sink which will absorb CO_2 from the atmosphere. The total 4,566 tonnes CO_2e for the project equates to 0.15% of Ireland's 2030 Electricity sector carbon budget.

There will also be GHG emissions from the manufacture of the turbines themselves. However, any GHG emissions produced during the construction phase will be offset during the operational phase as a result of generating renewable electricity. A lifecycle assessment undertaken by Vestas Wind Systems A/S, a major supplier of wind turbines, was reviewed in order to determine the potential GHG emissions and the potential payback period from the production of renewable electricity per year and has an estimated lifespan of 35 years. According to Vestas in the 2023 Sustainability Report, the V117 4.2MW turbine will cause the emission of c.300 tonnes of CO_2 per MW over the full life cycle (inc. raw materials, component production, servicing and maintenance during the lifetime). This is a total of c.15,120 tonnes of CO_2 for all 12 turbines (50.4MW). The turbines will be energy neutral within 4 to 8 months, with an energy return of 30 to 50 times, and a recycling rate of 84-87%[7].

Therefore, construction phase GHG emissions will have a short-term, negative, imperceptible and non-significant impact on climate which will be offset once the project is operational.

Impact Magnitude	Short-term, minor	**Impact Significance:** ***(pre-mitigation)***	**Imperceptible, non-significant**

Mitigation and Monitoring Measures: Even though Significant impacts are not predicted; the following mitigation and monitoring measures will be implemented as best practice environmental management.

Mitigation by Design	The development has proposed the following carbon reduction measures during the construction: • A minimum land-take approach and returning 11.6ha of land to agricultural use once the development is constructed. • While there are thin peaty mineral topsoils at the windfarm site, the location of the turbines and site roads has avoided locations/areas of deep peat;

[7] https://www.vestas.com/en/energy-solutions/onshore-wind-turbines/4-mw-platform

	• Use of borrow pits on-site to reduce transportation emissions from importing aggregates. • Any excavated material which is unsuitable as construction material (i.e. suitable rock) or backfill material will be used to backfill and reinstate borrow pits, with any extra material permanently placed in the designated overburden storage area at T7. Therefore reducing waste materials and transportation emissions associated with removal of waste material from the site.
MM05	During windfarm construction works, excavations will be backfilled as soon as is possible
MM07	All storage berms will be graded and sealed following emplacement. Topsoil and subsoil will be stockpiled separately. The upper vegetative layer (where still present) of excavated soil will be stored with the vegetation part of the sod facing the right way up to encourage growth of plants and vegetation at the surface of the stored spoil within the storage areas. Re-seeding will also be carried out in these areas. Measures such as interceptor ditches around the bases of these areas, sediment traps, covering of berms will also be incorporated to prevent runoff of suspended solids, dust and soil erosion.
SM24	All plant and machinery which will be used during construction will be fit for purpose and in good working order prior to mobilisation to works areas
MM51	Plant and machinery will not be permitted to idle. Machinery used intermittently will be shut down or throttled back to a minimum when not in use, and if any plant/machine is required to operate before 07:00hrs or after 19:00hrs, then it will be surrounded by an acoustic enclosure or portable screen. The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produces by on-site operations. All vehicles and plant will be fitted with effective exhaust silencers. Noise dampeners will be fitted where required.

Effectiveness of Mitigation and Monitoring Measures:

The design of the project has avoided greenhouse gas emissions through the consideration of alternative locations for the wind turbines to avoid areas of deep peat, and through the use of on-site borrow pits rather than importing quarry stone to the construction site and the reuse of excavation materials for backfilling and landscaping works, both of which reduces the carbon emissions associated with the construction phase due to the avoidance of transportation traffic related emissions. The prompt backfilling of excavations and revegetation of these areas along with the vegetation of the overburden storage berms will help offset the emissions of carbon from the excavated soils through the storage of carbon in the soil as a result of the new vegetative layer. The control of plant and machinery will reduce and minimise the carbon emissions from these vehicles. The residual impact will be short-term, negative, imperceptible and Not Significant.

Residual Impact Significance *(post-mitigation)*:	**Not Significant**

EIAR 12.3.1.3 Cumulative Impact on Climate Change with Other Projects & Activities

The 2022 IEMA guidance states that "When considering the cumulative assessment, all global cumulative GHG sources are relevant to the effect on climate change. As a result, the effects of GHG emissions from specific cumulative projects should not be individually assessed. This is due to the fact that there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other".

EIAR 12.3.2 Statement on Certainty and Sufficiency of Information Provided

A clear documentary trail is provided throughout this chapter to the competency of data and methods used and the rationale for selection of same. The information used to compile this chapter is collated from site-specific investigations, data and documents generated by public bodies and statutory agencies. The online baseline data was verified in the field.

Data on Ireland's GHG emissions from 1990 to 2023 has been reviewed in order to identify trends in the baseline environment. The EPA has published provisional estimated data for Ireland's GHG emissions up to 2023, and it is considered that this data is sufficient to evaluate the effects of the Project on Climate.

In respect of Climate, no material limitations or difficulties were encountered during the course of the studies carried out to inform the assessment of impacts of the Ballynalacken Windfarm Project on Climate.

EIAR 12.4 Summary Conclusion

CLIMATE CHANGE: The Climate chapter examines the effects of the Ballynalacken Windfarm development on Climate as a result of the release of greenhouse gases (GHGs) and the production of renewable electricity. GHGs are altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. The release of GHGs as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'. Ireland is committed to UN and European climate agreements and Ireland's 2021 Climate Act provides for a 51% reduction in GHGs by 2030 compared to 2018 levels. The Electricity sector has a 2030 emission ceiling of 3 million tonnes CO_2e which is a 75% reduction compared to 2018 levels. The Climate Action Plan 2024 (CAP24) has set targets to increase the proportion of renewable electricity on the system up to 80% by 2030 with targets of 9GW from onshore wind, which is a doubling of the existing installed capacity.

In relation to the topic **Climate**, this chapter evaluated the impacts to climate as a result of the construction and operational phases. During the construction phase there will be emissions of GHGs from the embodied carbon in construction materials, land-clearance activities (including forestry felling), construction activities and vehicle and machinery emissions. These GHG emissions will have an initial negative impact on climate. However, any GHG emissions during the construction stage will be offset as a result of the production of renewable electricity once the windfarm is operational. Therefore, the initial construction stage GHG emissions are not considered significant. Additionally, any loss of carbon sink potential of the land due to forestry felling will be offset through the replanting of an equivalent area of forestry. The Institute of Environmental Management & Assessment and TII guidance state that climate impact significance should be assessed for the project as a whole and not for the individual phases.

Once the windfarm is operational the production of 140 GWh of renewable electricity will offset the production of an equivalent amount of electricity from conventional fossil fuel electricity generation. This will result in GHG emission savings over the lifetime of the development resulting in a long-term, significant and positive impact to climate. The proposed development aligns with Ireland's net-zero trajectory by 2050 and the CAP24 renewable electricity targets.

Overall, it is evaluated that the impact on the Environmental Factor, Climate, will be long term, likely positive and significant.

EIAR 12.5 Reference List for Climate

Climate Action and Low Carbon Development Act 2015, S.I. No. 46 of 2015, Government of Ireland.

Climate Action and Low Carbon Development (Amendment) Act 2021, S.I. No. 32 of 2021, Government of Ireland.

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Transport Infrastructure Ireland (2022b) *GE-ENV-01106: TII Carbon Assessment Tool for Road and Light Rail Projects and User Guidance Document*.

The Global Goals (n.d.) 13 Climate Action, available: https://www.globalgoals.org/goals/13-climate-action/.

Vestas Wind Systems A/S (2023) *Sustainability Report 2023*

EIAR 12.6 List of Appendices for Climate

APPENDICES (overleaf)

Appendix 12.1	Methodology for the evaluation of Climate

Appendix 12.1: Methodology for the evaluation of Climate

Appendix to Chapter 12: Climate

Appendix 12.1: Methodology for the evaluation of Climate

A12.1 Methodology Applied

The Climate impact assessment is based on the methodology set out within the Transport Infrastructure Ireland (TII) guidance document entitled *PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document* (TII, 2022a). This is the first published national guidance document in relation to climate assessments. While the methodology set out within this document is specific to TII infrastructure projects the assessment approach can be applied to any development that may impact climate.

The TII climate assessment is divided into two distinct sections – a greenhouse gas assessment (GHGA) and a climate change risk assessment (CCRA).

- Greenhouse Gas Emissions Assessment (GHGA) – Quantifies the GHG emissions from a project over its lifetime. The assessment compares these emissions to relevant carbon budgets, targets and policy to contextualise magnitude.
- Climate Change Risk Assessment (CCRA) – Identifies the impact of a changing climate on a project and receiving environment. The assessment considers a projects vulnerability to climate change and identifies adaptation measures to increase project resilience.

This environmental topic chapter examines the impact of the Ballynalacken Windfarm Project on the factor Climate, using the Greenhouse Gas Emissions Assessment.

The Climate Change Risk Assessment is included in Chapter 5: Description of the Development, Section EIAR 5.11 Vulnerability to Major Accidents, Natural Disasters and Climate Change

A12.1.1 Methodology for Greenhouse Gas Emissions Assessment (GHGA)

The Transport Infrastructure Ireland (TII) guidance document entitled PE-ENV-01104 Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document (TII 2022a) outlines a recommended approach for determining the significance of both the construction and operational phases of a development. The approach is based on comparing the 'Do Something' scenario and the net project GHG emissions (i.e. Do Something – Do Minimum) to the relevant carbon budgets (Department of the Taoiseach 2022).

With the publication of the Climate Action Act in 2021, sectoral carbon budgets have been published, and these sectoral budgets are compared with the Net CO_2 project GHG emissions from the proposed development. The Electricity sector emitted approximately 10.5 $MtCO_2eq$ (million tonnes of Carbon Dioxide equivalent) in 2018 and has a ceiling of 3 $MtCO_2eq$ in 2030 which is a 75% reduction over this period.

Construction Phase GHG

The impact of the construction phase of the proposed development on climate has been estimated using the Transport Infrastructure Ireland (TII) Carbon Tool (2022b). This tool is specifically designed to account for the embodied emissions associated with TII road and infrastructure developments in Ireland but can be used for other project types. The assessment commences with the high-level design, through the pre-construction (site clearance) stage, followed by the assessment of the embodied carbon associated with all materials used in the construction of the development, the emissions during the construction phase and additionally emissions related to waste generated during the construction phase. The carbon calculations also account for any land-use changes due to site clearance works or replanting works. This includes the loss of the carbon sink potential of the land as a result of any required forestry felling. Additionally, the replanting of any forestry is also accounted for and the potential return of the carbon sink.

The TII Carbon Tool (TII, 2022b) uses emission factors from recognised sources including the Civil Engineering Standard Method of Measurement (CESSM) Carbon and Price Book database (CESSM, 2013). The carbon emissions are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction phase. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

Information on the material quantities, site activities, land clearance, and construction traffic were input into the carbon tool by the project team. This information was used to determine an estimate of the GHG emissions associated with the development during the construction phase. Detailed information regarding all of the proposed construction materials was not available at the time of this assessment and will be specified at the detailed design stage. Best estimates have been used in this assessment to provide an estimate of the GHGs associated with construction materials.

Operational Phase GHGA

During the operational phase there will be no likely significant negative GHG emissions from the operation of the wind turbines or grid connection.

The savings in CO_2 emissions arising from the production of electricity using renewable sources were compared against CO_2 emissions from electricity production using non-renewable sources. The calculations were carried out using SEAI published emission rates from non-renewable energy sources (SEAI, 2023). This total CO_2 saving annually and over the lifespan of the project relative to CO_2 emissions from power generation was determined.

A12.1.2 Methodology for determining the significance of impacts

The significance of GHG effects set out in PE-ENV-01104 (TII, 2022a) is based on the Institute of Environmental Management & Assessment guidance (IEMA, 2022) which sets out the following principles for significance:

- When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible;

Transport Infrastructure Ireland (TII 2022a) states that professional judgement must be taken into account when contextualising and assessing the significance of a project's GHG impact. In line with IEMA Guidance (IEMA, 2022), TII state that the crux of assessing significance is "*not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*". A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant. Only projects that actively reverse (rather than only reduce) the risk of severe climate change can be judged as having a beneficial effect. Where the fundamental reason for a proposed project is to combat climate change (e.g. a wind farm or carbon capture and storage project) and this beneficial effect drives the project need, then it is likely to be significant.

Significance is determined using the criteria outlined in Table 1 below (derived from Table 6.7 of PE-ENV-01104 (TII 2022a)) along with consideration of the following two factors:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

Table 1: Greenhouse Gas Assessment Significance Criteria

Effects	Significance level	Description
Significant adverse	Major adverse	• The project's GHG impacts are not mitigated. • The project has not complied with do-minimum standards set through regulation, nor provided reductions required by local or national policies; • No meaningful absolute contribution to Ireland's trajectory towards net zero.
	Moderate adverse	• The project's GHG impacts are partially mitigated. • The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.
Not significant	Minor adverse	• The project's GHG impacts are mitigated through 'good practice' measures. • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	• The project's GHG impacts are mitigated beyond design standards. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration. • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.