

Ballyfeeny Green Energy Project



Environmental Impact Assessment Report Volume II

Chapter 9 — Air Quality and Climate

September 2025

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Acronyms

Term	Meaning
EIAR	Environmental Impact Assessment Report
GHG	Greenhouse Gas
GCR	Grid Connection Route
TDR	Turbine Delivery Route
CEMP	Construction Environmental Management Plan
TMP	Traffic Management Plan
DMP	Decommissioning Management Plan
CEnv	Chartered Environmentalist
C.WEM	Chartered Water and Environmental Manager
CAFE	Clean Air for Europe
EU	European Union
EIA	Environmental Impact Assessment
IAQM	Institute of Air Quality Management
EPA	Environmental Protection Agency
DoHPLG	Department of Housing Planning and Local Government
DECLG	Department of Environment, Community and Local Government
EC	European Commission
WEDG 2006	Wind Energy Development Guideline 2006
Draft WEDG 2019	Draft Wind Energy Development Guideline 2019
WHO	World Health Organisation
µg/m³	Micrograms per cubic metre
NO₂	Nitrogen Dioxide
PM	Particulate Matter
PM₁₀	Particulate Matter ≤10 micrometres
PM_{2.5}	Particulate Matter ≤2.5 micrometres
mg/m³	Milligrams per cubic metre
ppm	Parts per million
TII	Transport Infrastructure Ireland
ITM	Irish Transverse Mercator
HGVs	Heavy Goods Vehicles
RLB	Red Line Boundary
NO_x	Nitrogen oxides
NO	Nitric Oxide
NO₂	Nitrogen Dioxide
SO₂	Sulphur Dioxide
CO	Carbon Monoxide
NEC	National Emissions reduction Commitments
CAP25	Climate Action Plan 2025

Term	Meaning
CAP24	Climate Action Plan 2024
NCDs	noncommunicable diseases
SE1	Site Entrance 1
HV	Heavy Vehicle
tCO₂	Tonnes Carbon Dioxide
WTG	Wind Turbine Generators
SAC	Special Area of Conservation
SPA	Special Protection Area
NHA	Natural Heritage Area
pNHA	proposed Natural Heritage Area
SSSI	Site of Specific Scientific Interest
MWh	Megawatts per hour
SE1	Site Entrance 1
kV	kilovolt
AADT	Annual Average Daily Traffic
ECOW	Environmental Clerk of Works
HDV	Heavy Duty Vehicle
HDD	Horizontal Directional Drilling
T01	Turbine 1
T02	Turbine 2
T03	Turbine 3
T04	Turbine 4
T05	Turbine 5
T06	Turbine 6
CEA	Cumulative Effects Assessment
EIS	Environmental Impact Statement
ETS	Emissions Trading System
CAP	Climate Action Plan
GW	Gigawatts
LULUCF	Land Use, Land-Use Change and Forestry
SEPA	Scottish Environment Protection Agency
SNH	Scottish Natural Heritage
MW	Megawatts
SEAI	Sustainable Energy Authority of Ireland
gCO₂/kWh	grams of CO ₂ per kilowatt-hour

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9. Air Quality & Climate Factors

9.1 Part 1 – Air Quality

9.1.1 Introduction

This Chapter assesses the likely significant direct and indirect effects of the proposed Project on air quality and climate during the construction, operational and decommissioning phases. The Chapter is split into 2 sections as follows:

- **Part 1** - Air quality: the air quality environment surrounding the proposed Project is assessed taking account of potential effects such as air pollution (i.e. from vehicles and equipment) and dust deposition; and
- **Part 2** - Climate: greenhouse gas emissions (GHGs) over the lifetime of the proposed Project are quantified to assess the potential effects on climate. The effects of climate change on the proposed Project and the ability of the proposed Project to adapt to possible climate changes over the course of its lifetime is also assessed.

The proposed Project includes six no. turbines and all associated infrastructure including Turbine Foundations, Turbine Hardstands, Site Access Tracks, Wind Farm Internal Cabling, Grid Connection Route (GCR), Relay Tower, Onsite Substation and works required along the public road network for the two Turbine Delivery Route (TDR) options to facilitate the delivery of turbine components. A full description of the proposed Project is provided in **Chapter 2 – Project Description**.

The Applicant is in receipt of a notification of opinion by the Local Authority on design flexibility. The notification is provided in **Appendix 1.5 – DFR-25-1 Notification of Opinion by Local Authority**. This opinion from the Local Authority confirmed that it was *‘appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application’*.

Chapter 1 – Introduction, Section 1.6 Approach to Design Flexibility, outlines with respect to the notification of opinion by the Local Authority, the Applicant in this EIAR, proposes to assess three distinct Technology Options within the range outlined by the Local Authority and in accordance with the design flexibility parameters sought. **Chapter 1 – Introduction Table 1-3**, outlines the options and associated parameters that are used in the EIAR, comprising three potential turbines classified as Technology Option 1, 2 and 3. Further details on the assessment of the Technology

Options is provided in **Section 9.1.4**. A full description of the proposed Project and the three Technology Options is provided in **Chapter 2 – Description of the Proposed Project**.

This chapter is supported by the following appendices:

- **Appendix 1.3 – Scoping Consultation Responses**
- **Appendix 2.1 – Construction Environmental Management Plan (CEMP)**
- **Appendix 2.1.3 – Traffic Management Plan (TMP)**
- **Appendix 2.1.4 – Decommissioning Management Plan (DMP)**
- **Appendix 9.1 – Scottish Government – Carbon Calculation Input and Output**
- **Appendix 9.2 – Construction Dust Assessment Methodology**
- **Appendix 16.1 – Long list of other projects for the cumulative effects assessment**

The assessment should be read in conjunction with:

- **Chapter 5 – Population & Human Health;**
- **Chapter 12 – Traffic and Transport;**
- **Chapter 16 – Cumulative Effects**, which considers other plans and projects that may act cumulatively with the proposed Project; and
- **Chapter 17 – Interrelated Effects**, which address the interactions between effects on different environmental aspects.

Statement of Authority

Part 1 of this Chapter of the EIAR has been written by Jessica Boyd. Jessica is a Senior Environmental Consultant, having joined Rowan Engineering Consultants Ltd., in February 2024 with over 6 years' experience in Environmental Impact Assessment, in relation to Pharmaceutical, Aggregate Industry and Onshore Wind Developments. Additionally, Jessica's experience includes Environment and Planning preparation for Onshore Wind, Solar and Battery Energy Storage Systems across Ireland. Jessica holds a BSc in Environmental Management and MSc in Spatial Planning: Cities, Water & Climate Change.

Denise Meade has reviewed this Chapter. Denise has over 20 years' experience working on both public and private sector developments. Her experience lies in the environmental co-ordination of large infrastructure projects across a range of industries including renewable energy, roads, water and wastewater. She has managed all aspects of planning applications, with a focus on the technical review and delivery of EIARs. She is a Chartered Environmentalist (CEnv) and

Chartered Water and Environmental Manager (C.WEM) and hold an MSc in Applied Environmental Science and AdvDip in Planning & Environmental Law.

9.1.2 Legislation, Guidance and Policy

Legislation

This air quality assessment has been carried out in accordance with the relevant legislation as follows:

- The Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC) as amended by Commission Directive (EU) 2015/1480, as amended (the CAFE Directive);
- Ambient Air Quality Standards Regulations 2022 (as amended);
- EU Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment, as amended by Directive 2014/52/EU, as amended (the EIA Directive);
- The Planning and Development Act 2000 (as amended); and
- The Planning and Development Regulations, 2001 (as amended).

Guidance

This air quality assessment has regard to the relevant guidance as follows:

- Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes, National Roads Authority (now Transport Infrastructure Ireland) (2022);
- Guidance on the assessment of dust from demolition and construction, V2.2 (hereafter referred to as IAQM Guidance) (IAQM, 2024);
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA) Guidelines) (EPA, 2022);
- Draft Revised Wind Energy Development Guidelines (Department of Housing Planning and Local Government (DoHPLG), 2019) (hereafter referred to as Draft WEDG's 2019);
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment (Department of Environment, Community and Local Government (DECLG), August 2018);

- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission (EC), 2017);
- Wind Energy Development Guidelines (Department of the Environment, Heritage and Local Government, 2006) (hereafter referred to as WEDG 2006); and
- WHO global air quality guidelines (2021) Particulate matter (PM_{2.5} and PM₁₀), ozone, nitrogen dioxide, sulphur dioxide and carbon monoxide (the WHO Air Quality Guidelines).

The assessment has been completed in accordance with the WEDG 2006 and having due regard for the Draft WEDG 2019.

Policy

The overarching planning policy relevant to the proposed Project is detailed in **Chapter 4 – Planning and Policy**. A **Planning Statement** has been provided with the planning application.

Geographically, the Site is located within County Roscommon and consequently, the Roscommon County Development Plan (CDP) 2022-2028 has also been consulted as part of the assessment process.

The Roscommon CDP 2022-2028 details a policy to promote Climate Action, Energy and Environment Policy:

- **(CAEE 8.2)** Support the National Climate Change Strategy by actively seeking to implement the policy objectives throughout this Plan which contribute to positive climate actions, including those related to renewable energy, sustainable transport, air quality, flooding and the promotion of urban and rural green initiatives.

The Roscommon CDP 2022-2028 also details a policy to promote and protect Natural Heritage which is as follows:

- **(NH 10.8)** Ensure that no plans, programmes, etc. or projects are permitted that give rise to significant cumulative, direct, indirect or secondary impacts on the integrity of European Sites arising from their size or scale, land take, proximity, resource requirements, emissions (disposal to land, water or air), transportation requirements, duration of construction, operation, decommissioning or from any other effects, (either individually or in combination with other plans, programmes, etc. or projects).

Air Quality Standards

The Ambient Air Quality Standards Regulations 2022 transpose the CAFE Directive. This Directive and the transposing Ambient Air Quality Standards Regulations 2022 set out the main standards for air quality in Ireland. These standards are summarised in **Table 9-1**.

The Ambient Air Quality Recast Directive 2024/2881 entered into force in December 2024. The new Directive must be transposed by member states by December 2026. While the 2022 CAFE Directive currently remains in force, it will be nullified in December 2026. It is therefore necessary to be cognisant of any amendments to the parameter limit values contained within the impending Directive. Any amendments to limit values are noted in bold in **Table 9-1** and these limit values are to be attained by January 2030.

The CAFE Directive also stipulates target values and long-term objectives for ozone. **Table 9-2** stipulates the limit and target values for ozone. The new Directive contains slightly varying target values to those stipulated in the CAFE Directive, noting $120 \mu\text{g}/\text{m}^3$ as the target value not to be exceeded on more than 18 days per calendar year averaged over 3 years. In essence, the number of days where the ozone target value is permitted to be exceeded has reduced to 18 days per calendar year averaged over 3 years in the new Directive from 25 days per calendar year averaged over 3 years in the soon to be CAFE Directive.

In addition to these standards, there are also WHO Air Quality Guidelines relating to air quality. These guidelines were developed by the WHO to provide appropriate air quality targets worldwide, based on the latest health information available. Whilst the WHO Air Quality Guidelines are not mandatory, they represent current informed opinion on the levels to which we should be aspiring in order to minimise the adverse health impacts of air pollution. The WHO Air Quality guidelines referenced are summarised in **Table 9-3**.

Table 9-1: The Ambient Air Quality Standards Regulations 2022 based on the CAFE Directive.

Pollutant	EU Legislation	Limit Type	Margin of Tolerance	Value
Nitrogen dioxide	CAFE Directive	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	None	200 µg/m ³ NO ₂
		Annual limit for protection of human health	None	40 µg/m ³ NO ₂ (20 µg/m ³)
		Annual limit for protection of vegetation	None	30 µg/m ³ NO + NO ₂
Sulphur dioxide	CAFE Directive	Hourly limit for protection of human health - not to be exceeded more than 24 times/year	150 µg/m ³	350 µg/m ³
		Daily limit for protection of human health - not to be exceeded more than 3 times/year	None	125 µg/m ³
		Annual & Winter limit for the protection of human health and ecosystems	None	20 µg/m ³ (20 µg/m ³)
Particulate Matter (as PM ₁₀)	CAFE Directive	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50%	50 µg/m ³
		Annual limit for protection of human health	20%	40 µg/m ³ (20 µg/m ³)

Pollutant	EU Legislation	Limit Type	Margin of Tolerance	Value
Particulate Matter (as PM _{2.5})	CAFE Directive	Annual limit for protection of human health (Stage 1)	20% from June 2008. Decreasing linearly to 0% by 2015	25 µg/m ³ (10 µg/m ³)
		Annual limit for protection of human health (Stage 2)	None To be achieved by 2020	20 µg/m ³
Carbon Monoxide	CAFE Directive	8-hour limit (on a rolling basis) for protection of human health	60%	10 mg/m ³ (8.6 ppm)
Benzene	CAFE Directive	Annual limit for protection of human health	0% by 2010	5 µg/m ³
Lead	CAFE Directive	Annual limit for protection of human health		0.5 µg/m ³

Table 9-2: Target values for Ozone based on the 2022 CAFE Directive.

Objective	Parameter	Target Value for 2010	Long-term Target Value from 2020
Protection of human health	Maximum daily 8-hour mean	120 µg/m ³ not to be exceeded more than 25 days per calendar year averaged over 3 years	120 µg/m ³

Objective	Parameter	Target Value for 2010	Long-term Target Value from 2020
Protection of vegetation	AOT40 calculated from 1-hour values May to July	18,000 $\mu\text{g}/\text{m}^3\cdot\text{h}$ averaged over 5 years	6,000 $\mu\text{g}/\text{m}^3\cdot\text{h}$

Table 9-3: WHO Air Quality Guidelines 2021.

Pollutant	Limit Type	Value
Nitrogen dioxide	Hourly limit for protection of human health	200 $\mu\text{g}/\text{m}^3$ NO ₂
	Annual limit for protection of human health	40 $\mu\text{g}/\text{m}^3$ NO ₂
Sulphur dioxide	Daily limit for protection of human health	20 $\mu\text{g}/\text{m}^3$
	10-minute limit for protection of human health	500 $\mu\text{g}/\text{m}^3$
Particulate Matter (as PM ₁₀)	24-hour limit for protection of human health	45 $\mu\text{g}/\text{m}^3$
	Annual limit for protection of human health	15 $\mu\text{g}/\text{m}^3$
Particulate Matter (as PM _{2.5})	24-hour mean for protection of human health	15 $\mu\text{g}/\text{m}^3$
	Annual mean for protection of human health	5 $\mu\text{g}/\text{m}^3$
Ozone	Peak season* mean for protection of human health	60 $\mu\text{g}/\text{m}^3$
	8-hour limit for protection of human health	100 $\mu\text{g}/\text{m}^3$
Carbon monoxide	24-hour mean for protection of human health	4 mg/m ³
	Hourly mean for protection of human health	35 mg/m ³

Average of daily maximum 8-hour mean O₃ concentration in the six consecutive months with the highest six-month running-average O₃ concentration.

National and European statutory bodies have set limit the limits outlined above as a measure to reduce the risk of health from poor air quality.

Dust Deposition Guidelines

The concern from a health perspective is relative to particles of dust which are less than 10µm in size. There are no statutory guidelines regarding the maximum dust deposition levels that may be generated during the construction and operational phase of a proposed project in Ireland.

With regards to guidelines for dust deposition, the German TA-Luft standard for dust deposition (non-hazardous dust) (German VDI, 2002) applies a maximum emission level for dust deposition of 350 mg/m²/day, averaged over a one month monitoring period at those receptors outside of the site boundary.

Recommendations from the Department of the Environment, Heritage & Local Government (DEHLG, 2004) apply the Bergerhoff limit of 350 mg/m²/day to the boundary of quarries. In the absence of other statutory or specific guidance, this limit value is an accepted standard in Ireland to prevent dust effects from construction phase of the proposed Project

9.1.3 Methodology

Consultation

Scoping and consultation have been carried out in support of the proposed Project and in line with the EIA Directive, together with the EPA Guidelines and with due regard for the *Environmental Impact Assessment of Projects: Guidance on Scoping* (European Commission, 2017).

An EIA Scoping Report was issued to 48 Statutory and non-statutory stakeholders via email in September 2024, of which 10 responded. Consultation also included meetings with key stakeholders. All scoping consultation responses are provided in **Appendix 1.3 – Scoping Consultation Responses**.

Table 9-4 summaries issues raised during the consultation process relevant to Air Quality.

Table 9-4: Consultation responses relative to Air Quality

Stakeholder	Stakeholder Comment	How comment has been addressed in the EIAR
Fáilte Ireland <i>(response to the EIAR Scoping Report consultation)</i>	Tourism impact upon air quality is dependent on the activity proposed and sensitivity of the location. If the tourism project includes a large increase in transportation services, collection of baseline air emission data is advised. Transportation emissions affect not only air quality, but also greenhouse gases. Changing climatic patterns due to climate change should be factored into this analysis.	An assessment is effects on air quality is detailed in Section 9.1.6 Assessment of Effects. The proposed Project would not include a large increase in transportation services. Chapter 12 – Traffic and Transport presents the traffic volumes associated with the construction, operational and decommissioning phases. Section 9.1.6 Assessment of Effects describes the TII screening thresholds which establish if traffic from a development has the potential to impact on air quality. Traffic volumes associated with the proposed Project are below these screening thresholds. Climate and greenhouse gas emissions are assessed in Section 9.2 Part 2 Climate.

Study Area

For the purpose of the assessment, the air quality study area has been based on the potential area of influence from construction and decommissioning activities associated with the proposed Project. During these phases, emissions from construction dust may impact on the surrounding air quality.

A qualitative evaluation was carried out, based on the IAQM Guidance to determine the likely effect of proposed Project's activities that could generate dust. Dust emissions typically arise during construction due to excavation for turbine foundation, additional HGV's movements onsite together with storage of materials onsite.

Dust deposition typically takes place in close proximity to work areas; therefore, the study area has been confined to a 250m radius from any dust generating activities and 250m from site entrances, in line with the IAQM Guidance. The IAQM Guidance also stipulates that sensitive receptors should be considered where located with 250m from proposed turbines and site entrances.

Site Visits

A site visit was conducted of the lands within the planning Redline Boundary (RLB) and the Study Area to support understanding and inform the identification of potential sensitive receptors in relation to air quality. Owing to the non-industrial characteristic of the proposed Project site and rural nature of the surrounding area, air quality sampling was not deemed necessary.

Desk Study

The desk-top study was completed through consulting a number of sources as follows:

- EPA 2021 Air Quality in Ireland Report and Summary Tables 2021;
- EPA 2022 Air Quality in Ireland Report and Summary Tables 2022;
- EPA 2023 Air Quality in Ireland Report and Summary Tables 2023; and
- Met Éireann Website.

The above sources were used to ascertain baseline data for the existing air quality at the proposed Project and its environs. The above sources confirmed that the proposed Project site is located in Air Quality Zone D - Rural Ireland. These sources were also utilised to ascertain if any exceedances in air pollutants were noted within the Study Area.

Approach to Project Design

As set out in **Chapter 1 – Introduction**, under Section 32I of the Planning and Development Act 2000 (as amended), the Applicant is in receipt of an opinion on flexibility, relating to 3 no. options of Turbines. This opinion from the Local Authority confirmed that it was *'appropriate that the*

proposed application be made and decided before the prospective applicant has confirmed certain details of the application’.

The differences in the three Technology Options would not be expected to influence the overall significance of effects with respect to air quality. The Turbine Hardstand areas requirements for the three Technology Options are nearly identical. Therefore, the hardstand design is shown with a single design that is suitable for all three Technology Options. In essence, each Technology Option will not pose variance of effects in terms of air quality.

On this basis, the assessment conclusions (i.e. the significance of effects) for air quality will not differ across the three Technology Options. The assigned significance rating is applicable to each of the Technology Options.

Approach to Impact Assessment

In accordance with the EPA Guidelines, the structure of this air quality assessment is as follows:

- Description of baseline environment;
- Identification and assessment of likely significant direct and indirect effects to air quality associated with the proposed Project, during the construction, operational and decommissioning phase. This assessment also accounts for the Do-Nothing scenario;
- Mitigation measures to avoid or reduce identified likely significant effects;
- Description of the residual effects associated with the proposed Project following the implementation of mitigation measures;
- Assessment of the potential for any unplanned events on the environment, with regard to air quality; and
- Description of any associated cumulative and inter-related effects.

The construction phase dust assessment has been undertaken in accordance with IAQM Guidance, which considers both sensitivity of the receptor and the magnitude of dust emissions from construction phase activities (i.e. demolition, earthworks, general construction and trackout). The resulting level of risk from the proposed Project determines the level of mitigation measures to ensure that any effects are not significant. Professional judgement has been used to determine the significance of the IAQM guided risks in EIA terms in line with the EPA Guidelines.

The significance of effects were determined using the classifications assigned in accordance with the EPA Guidelines. These included **Imperceptible**, **Not Significant**, **Slight**, **Moderate**, **Significant**, **Very Significant** and **Profound**.

For the purposes of this assessment, effects rated as '**Significant**' or above are considered to be significant in EIA terms. Effects identified as '**Moderate**' significance or below are not considered to be significant in EIA terms.

The EPA Guidelines describe various factors involved in the determination of the significance of effects including quality and duration. In considering the effects, these criteria were also considered. These criteria are detailed in Table 3.4 of the EPA Guidelines and are also presented in **Table 1-6 in Chapter 1 – Introduction**. As per the EPA Guidelines, all categories of these terms do not need to be used for every effect.

In order to determine the significance of effect, the EPA Guidelines has provided a matrix which compares the character of the potential effect to the sensitivity of the receiving environment, see **Figure 9-1**.

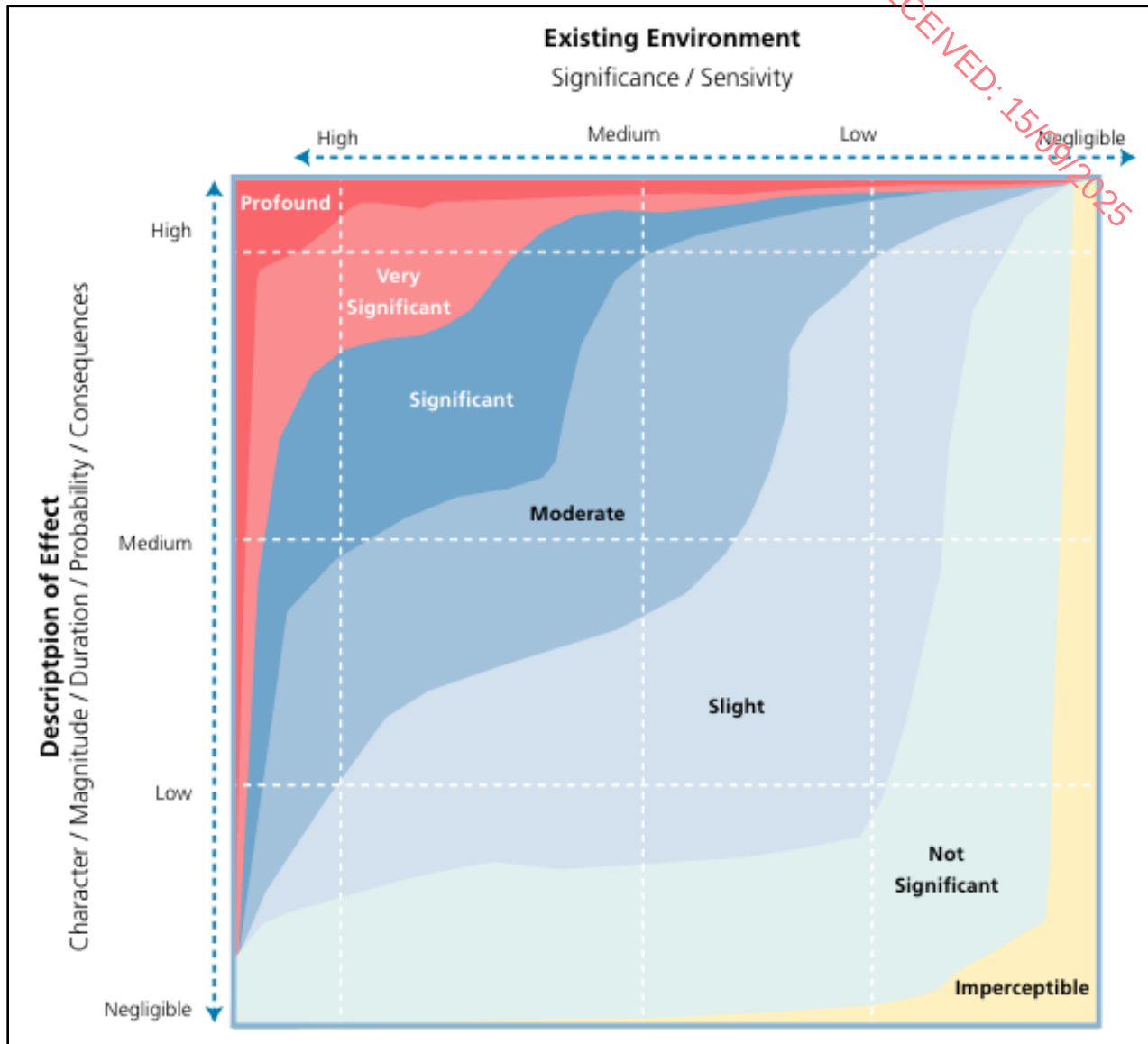


Figure 9-1: Typical Classification of the Significance of Effects (EPA, 2022)

Assumptions and Limitations

No limitations were encountered during the preparation of the air quality section of this Chapter of the EIAR. However, it is noted that new information for national datasets may be published after this EIAR is submitted for planning approval. Regardless, a comprehensive description of the Baseline Environment has been described in this Chapter and the available data was sufficient to inform the assessment of effects.

9.1.4 Baseline Environment

Weather Patterns

Prevailing weather conditions can influence changes in air quality. The nearest representative synoptic weather station gathering detailed weather records is Mount Dillon Observatory, which is situated c. 5km southeast from the proposed wind farm Site. **Table 9-5** presents monthly rainfall data at Mount Dillon Observatory over previous years.

Table 9-5: Monthly rainfall at Mount Dillon Observatory from 2021-2024

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	74.1	112.2	142.1	102.7	106.5	42.8	71.4	120.8	34.9	82.9	87	82.2	1059.6
2023	102.9	21.7	168.8	89.4	48.6	74.9	206	120.7	121.8	115.9	106.1	159.3	1337.1
2022	52.4	140.0	33.5	59.4	76.9	103.7	33.7	66.3	85.9	182.8	122.1	104.6	1061.3
2021	129.0	88.3	102.0	24.2	105.1	25.7	57.8	96.9	78.0	143.0	49.6	116.4	1016.0

Mount Dillon Observatory collects wind speed and wind direction; however, wind direction is not displayed on their website. Wind speed at Mount Dillon from 2022-2024 is displayed in **Table 9-6**.

Figure 9-2 shows the windrose at Claremorris Observatory, which is the station most proximal to the proposed wind farm Site (55km west) recording wind direction. Winds at this Observatory prevail mostly from southerly and westerly directions.

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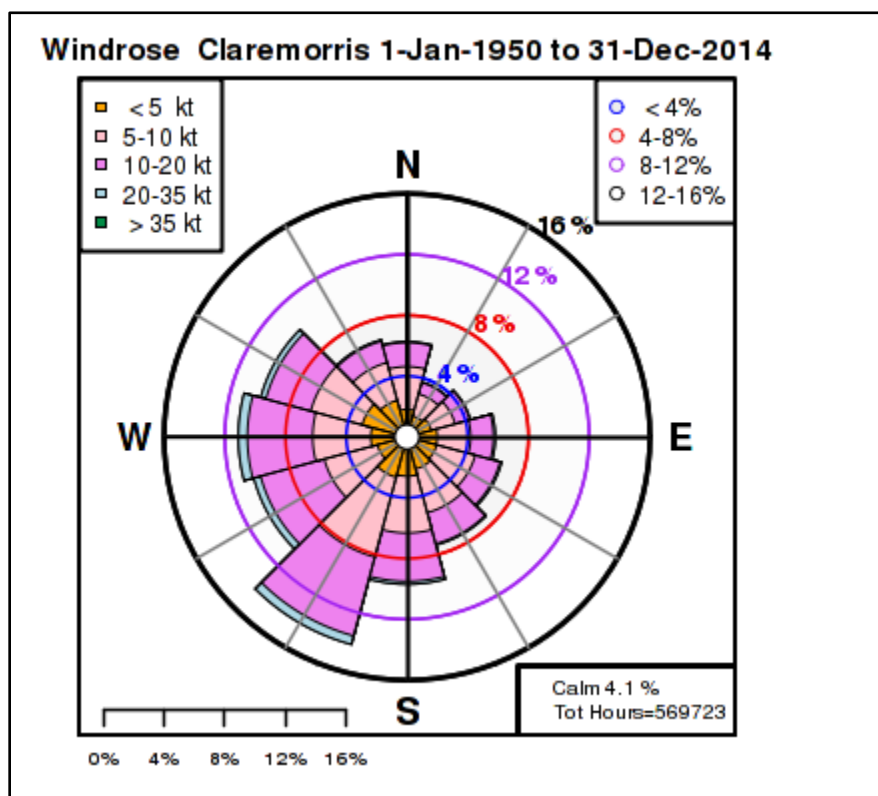


Figure 9-2: Windrose at Claremorris

Table 9-6: Number of days with a maximum 10-min. mean wind speed $\geq 15\text{m/s}$ (Dillon Observatory)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2025	N/A	N/A										
2024	1	0	0	0	0	0	0	0	0	0	0	2
2023	0	0	0	0	0	0	0	0	0	0	1	0
2022	0	0	0	0	0	0	0	0	0	0	0	0

Regarding wind direction in Ireland, wind blows most frequently from south and west for open sites while winds from the northeast or north occur infrequently. In January, the southerly and south-easterly winds are more prominent than in July, which has a high frequency of westerly winds. Easterly winds occur most often between February and May and are commonly accompanied by dry weather.

Air Quality

Under the CAFE Directive, EU member states must designate 'Zones' for the purpose of managing air quality. As a result, four air quality zones have been established for Ireland, as follows:

- **Zone A:** Dublin Conurbation;
- **Zone B:** Cork Conurbation;
- **Zone C:** Other cities and large towns comprising Limerick, Galway, Waterford, Drogheda, Dundalk, Bray, Navan, Ennis, Tralee, Kilkenny, Carlow, Naas, Sligo, Newbridge, Mullingar, Wexford, Letterkenny, Athlone, Celbridge, Clonmel, Balbriggan, Greystones, Leixlip and Portlaoise.; and
- **Zone D:** Rural Ireland, i.e. the remainder of the State excluding Zones A, B and C.

The proposed Project is located within Zone D – Rural Ireland.

The EPA have carried out baseline monitoring of air quality at the four zones, including Zone D. The baseline air quality for Zone D which encompasses the proposed Project, has been summarised for the period of 2021-2023, from a review of Air Quality in Ireland Reports 2021, 2022 and 2023. Details are presented in **Table 9-7**.

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Table 9-7: EPA Baseline Monitoring 2021 – 2023 Annual Mean for Zone D Against Relevant Limit Values

Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
NO ₂	Emo Court	3.6		3.3		2.3		40 µg/m ³ (annual limit for the protection of human health)
	Birr	12.8		12.4		11.3		
	Castlebar	6.3		7.5		6.6		
	Carrick-on-shannon	11.2	7.5	11.5	7.4	10.0	8.1	
	Kilkitt	2.4		2		1.7		
	Edenderry	8.8		7.3		8.6		
	Briarhill	N/A		N/A		16.1		
NO _x	Emo Court	5.2		4.6		4.1		
	Birr	31.5		29.8		26.4		

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Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
	Castlebar	10.9	14.2	11.4	14	9.5	16.3	40 µg/m³ (annual limit for the protection of human health)
	Carrick-on-shannon	21.9		23.7		21.0		
	Kilkitt	3.1		2.6		2.5		
	Edenderry	12.3		11.8		13.5		
	Briarhill	N/A		N/A		36.7		
SO₂	Kilkitt	1.7	4.2	2.1	5	1.6	4.3	20 µg/m³ (annual limit for the protection of human health and ecosystems)
	Leterkenny	10.2		8.3		10.0		
	Cork Harbour	5.5		4.3		3.9		
	Askeaton	1.6		6.3		3.3		
	Edenderry	1.8		4.2		2.7		

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Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
PM₁₀	Tipperary Town	12.7		13.9		10.8		40 µg/m³ (annual limit for the protection of human health)
	Carrick-on-shannon	9.4		9.4		8.4		
	Enniscorthy	13.7		15		8.9		
	Birr	12.2		14.5		13.3		
	Askeaton	8.7		N/A		13.1		
	Macroom	14.6		16.1		11.3		
	Castlebar	9.8		11.2		9.9		
	Cobh Carrignafof	12		13.2		11.8		
	Claremorris	9.5		7.9		8.1		
	Kilkitt	7.8		8.5		7.1		

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Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
	Cavan	10.6	12	11	12.7	10.0	10.9	
	Roscommon Town	10.3		11.2		9.7		
	Edenderry	17.8		17.7		16.3		
	Mallow	14.7		13.5		10.5		
	Longford	13.9		16		13.1		
	Cobh Cork Harbour	13.4		14.4		11.4		
	Killarney	N/A		9.1		8.9		
	Malin Head	N/A		N/A		12.8		
PM_{2.5}	Tipperary Town	8.6		9.1		6.7		
	Carrick-on-shannon	5.9		6.3		5.4		

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Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
	Mallow	7.9	8.7	7.5	8.4	6.1	7.1	40 µg/m³ (annual limit for the protection of human health)
	Cork Glanmire Rd	N/A		N/A		7.6		
	Enniscorthy	9.8		10.2		9.0		
	Birr	7.9		9.5		8.3		
	Askeaton	5.7		5.5		4.8		
	Macroom	10.1		11		7.3		
	Longford	9.4		10.9		9.2		
	Cobh Carrignafof	7.4		7.6		6.8		
	Claremorris	8.2		6.1		5.2		
	Cavan	7.4		7.3		6.4		

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Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
	Roscommon	7.1		7.6		6.4		
	Edenderry	17.8		13.4		12.4		
	Killarney	N/A		5.6		5.4		
	Malin Head	N/A		N/A		6.8		
CO	Birr	0.3	0.3	0.8	0.8	0.6	0.6	8-hour limit (on a rolling basis) for protection of human health = 10 mg/m ³
O3	Emo Court	53.3		53.7		52.4		
	Kilkitt	56.9		59.4		54.4		
	Carnsore Point	57.7		61.9		64.2		

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Pollutant	Zone D Monitoring Stations	EPA Baseline Monitoring Data Annual Mean 2021	2021 Average	EPA Baseline Monitoring Data Annual Mean 2022	2022 Average	EPA Baseline Monitoring Data Annual Mean 2023	2023 Average	Relevant Limit Value
	Mace Head	72.4	60.2	73.2	61.7	73.3	61.5	120 µg/m³ (annual limit for the protection of human health)
	Castlebar	54.5		54.7		53.5		
	Valentia	65.7		63.9		68.3		
	Malin Head	61.1		65		64.2		

Summary of EPA Air Monitoring Results from 2021-2023 -Zone D

Oxides of Nitrogen

Nitrogen oxides (NO_x) refers to nitric oxide (NO) and nitrogen dioxide (NO₂), are primarily formed during the combustion of fossil fuels. The main portion of these gases is nitric oxide (NO). NO reacts with other gases in the atmosphere to form Nitrogen dioxide (NO₂) which is harmful to health. NO_x can pose environmental effects, from deposition of nitrogen to the environment both directly as a gas (dry deposition) and in precipitation (wet deposition) can change soil chemistry and affect biodiversity in sensitive habitats. With regards to the proposed Project, the primary source from the development will be from construction traffic and machinery.

As outlined in **Table 9-7**, the EPA have carried out continuous monitoring across Zone D sites for the 2021 - 2023 period. An observation of the data for NO₂ over this period confirms the average annual mean concentrations ranging from 7.5 to 8.1 µg/m³ from 2021 and 2023. Based on these results, a conservative estimate of the annual average NO₂ concentration for the proposed Project and its environs is 8.1 µg/m³, thus not exceeding the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

With regards to NO_x, an observation of the data provided from the EPA over 2021 to 2023 confirms an average annual mean concentration of 14.2 µg/m³ to 16.3 µg/m³, respectively (see **Table 9-7**). Based on these results, a conservative estimate of the background annual average NO_x concentration for the proposed Project and its environs is 16.3 µg/m³, which does not exceed the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

Sulphur Dioxide

Emissions of sulphur dioxide (SO₂) are generated from combustion activities.

Ireland's national emission reduction commitment for SO₂ under the National Emissions reduction Commitments (NEC) Directive (2016/2284/EU) includes an 85% reduction on 2005 levels to be achieved by 2030. Ireland is on track to meet this goal, as SO₂ emissions in Ireland have reduced substantially from 1990 to 2021, with most recent estimates indicating a reduction of 93.6% from 183.8 kt in 1990 to 11.8kt in 2021. (EPA 2021)

Continuous monitoring carried out at Zone D sites confirms an average annual mean concentration ranging from 4.2 µg/m³ in 2021 to 5 µg/m³ in 2023. Based on these results, a conservative estimate of the background annual average concentration of SO₂ for the

proposed Project and its environs is $5 \mu\text{g}/\text{m}^3$, which does not exceed the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

PM₁₀ & PM_{2.5}

There are countless sources of particulate matter (dust) including vehicle exhaust emission, soils and road surfaces, together with construction works. Particulate matter can be formed from various reactions between a number of pollutant gases, and includes particles in the air, including dust, dirt, soot, smoke and liquid droplets. PM₁₀ has a diameter less than $10\mu\text{m}$ and PM_{2.5} has a diameter less than $2.5\mu\text{m}$.

PM₁₀ monitoring carried out across Zone D sites confirm annual average mean concentrations ranging from 10.9 to $12.7 \mu\text{g}/\text{m}^3$ from 2021-2023. As a result, a conservative estimate of the background annual average PM₁₀ concentrations for the proposed Project and its environs is $12.7 \mu\text{g}/\text{m}^3$, which does not exceed the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

PM_{2.5} monitoring conducted throughout Zone D sites indicate an average annual mean concentration ranging from 7.1 to $8.7 \mu\text{g}/\text{m}^3$ from 2021 to 2023. Based on these results, a conservative estimate of the background annual average PM_{2.5} concentration for the proposed Project and its environs is $8.7 \mu\text{g}/\text{m}^3$ which does not exceed the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

Carbon Monoxide

Carbon monoxide monitoring conducted across Zone D sites confirmed an average annual mean concentration ranging from 0.3 and $0.8 \text{ mg}/\text{m}^3$ from 2021 to 2023. On this basis, a conservative estimate of the background annual average carbon monoxide concentration for the proposed Project and its environs area is $0.8 \text{ mg}/\text{m}^3$ which does not exceed the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

Ozone

Ozone monitoring conducted across Zone D sites confirmed an average annual mean concentration ranging from 60.2 – $61.7 \mu\text{g}/\text{m}^3$ from 2021 to 2023. On this basis, a conservative estimate of the background annual average carbon monoxide concentration for the proposed Project and its environs area is $61.7 \mu\text{g}/\text{m}^3$, which does not exceed the relevant limit value stipulated in the WHO Guidelines, CAFE 2022 Directive or the upcoming amended Directive.

Overall Summary

Owing to the fact that the air pollutants monitored by the EPA over the 2021 to 2023 period are well below relevant limit values, it can be concluded that air quality within this Zone D area does not pose issues or cause for concern for human health. The annual mean concentrations for each pollutant (**Table 9-7**) are well below the associated limit values applied for the protection of human health.

The averages outlined for each pollutant can be considered representative of background air quality for proposed Project area and its environs.

Air Quality and Health

The Climate Action Plan 2024 (CAP24) and Climate Action Plan 2025 (CAP25) were enforced in May 2024 and May 2025 in Ireland, respectively. CAP24 and CAP25 have deployed a roadmap of actions which will support Ireland in meeting national climate objectives of pursuing and achieving, by no later than the end of year 2050. CAP25 aligns with the legally binding carbon budgets and sectoral emissions ceilings and will enable Ireland to make progress towards 2030 and 2050 decarbonisation objectives.

Additionally, CAP25 supports ambitions of Ireland's Clean Air Strategy, which aims to promote government policy required to reduce air pollution and promote cleaner ambient air. Ireland's Clean Air Strategy also aims to promote and increase awareness of the importance of clean air, together with the links between cleaner air and better health.

The WHO noted that an estimated 6.7 million deaths were caused by worldwide air pollution in 2019, of which approximately 85% were attributable to noncommunicable diseases (NCDs), (WHO 2024).

The European Environment Agency noted that despite ongoing overall improvements in air quality, levels of air pollutants above EU standards are noted across European and air pollution remains a significant health concern for Europeans (European Environment Agency, 2023).

Under the Europeans Green Deals's Zero Pollution Action Plan, the EC set the 2030 goal of reducing the number of premature deaths resultant from fine particulate matter (PM_{2.5}, a key air pollutant), by at 55% compared with 2005 levels (European Environment Agency, 2023).

Dust Deposition

Monitoring of dust levels is not undertaken by the EPA in the vicinity of the proposed Project. However, given the rural environment, levels for dust deposition would generally be low.

There is an operating quarry, known as Ballyfeeny Rock Quarry, located on the western boundary of the proposed wind farm Site. At certain times, the dust levels may be slightly higher than the average for the wider area, due to the proximity of the quarry activities.

Sensitivity of the Receiving Environment/Receptors

Sensitive receptors relevant to the proposed Project have been accounted for throughout this Chapter. As per the IAQM guidance, sensitive receptors include locations where people spend time and where property may be affected by dust, for example, residential housing, hospitals, schools, heritage buildings, special habitats and amenity areas. Ecological receptors are habitats that might be sensitive to air quality pollutants, including dust.

Receptors proximal to the wind farm Site have been identified through ArcGIS. There are five receptors recorded within 250m of the wind farm Site, of which four include residential receptors within 250m from Site Entrance 1 (SE1) and commercial receptor (Ballyfeeny Rock Quarry) within 250m of T04.

As per the IAQM Guidance, the sensitivity of the wind farm Site environs should firstly be assessed in order to assess the effects of dust. The assessment of air quality effects takes into account receptor sensitivity and their proximity to the proposed construction area. **Table 9-8** outlines the sensitivity criteria adapted from the IAQM Guidance, which has been implemented in this assessment.

Table 9-8: IAQM Guidance Receptor Sensitivity Criteria

Sensitivity of Area	Dust Soiling Human Receptors Ecological Receptors
High	<u>In regard to sensitivities of people to dust soiling effects, high sensitivity receptors include the following:</u> • users can reasonably expect enjoyment of a high level of amenity; or • the appearance, aesthetics or value of their property would be diminished by soiling; and • the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. • indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms <u>In terms of human receptors, locations would include:</u>

Sensitivity of Area	Dust Soiling Human Receptors Ecological Receptors
	• locations where members of the public are exposed over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day) • indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment. <u>In terms of ecological receptors, locations would include:</u> • locations with an international or national designation and the designated features may be affected by dust soiling; or • locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain • indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings
Medium	<u>In regard to sensitivities of people to dust soiling effects, medium sensitivity receptors include the following:</u> • users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or • the appearance, aesthetics or value of their property could be diminished by soiling; or • the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. • indicative examples include parks and places of work. <u>In terms of human receptors, locations would include:</u> • locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM10 (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). • indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM10, as protection is covered by Health and Safety at Work legislation <u>In terms of ecological receptors, locations would include:</u> • locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or • locations with a national designation where the features may be affected by dust deposition. • indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features
Low	<u>In regard to sensitivities of people to dust soiling effects, low sensitivity receptors include the following:</u>

Sensitivity of Area	Dust Soiling Human Receptors Ecological Receptors
	- the enjoyment of amenity would not reasonably be expected; or - property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or - there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. - indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short term car parks and roads. <u>In terms of human receptors, locations would include:</u> - locations where human exposure is transient - indicative examples include public footpaths, playing fields, parks and shopping streets <u>In terms of ecological receptors, locations would include:</u> - locations with a local designation where the features may be affected by dust deposition. - indicative example is a local Nature Reserve with dust sensitive features

With regard to receptor sensitivity to dust soiling, there are no residential receptors within 250m of the turbines. However, Ballyfeeny Rock Quarry is situated less than 150m from T04, and is classified as 'Low' sensitivity based on the IAQM Criteria stipulated in **Table 9-8**. Ballyfeeny Rock Quarry is considered as a commercial receptor.

As per the IAQM Guidance, the number of receptors existing within 250m from the site entrances has also been assessed in terms of dust soiling. There are four residential receptors within 250m of Site Entrance 1 (SE1), including receptor 26, receptor 27, receptor 28, and receptor 29, located 88.2m, 139.9m, 216.1m and 246.1m from SE1, respectively. Receptors in proximity to the turbines and Site Entrances are displayed separately on **Figure 9-3** and **Figure 9-4**.

While there are 4 residential receptors within 250m of SE1, due to the low number of receptors together with the distance being greater than 88.2m from SE1, the sensitivity of the area to dust soiling during the construction phase is deemed to be **Low**, as per the IAQM Guidance, stipulated in **Table 9-9**. Additionally, Ballyfeeny Rock Quarry is located less than 150m from T04. The sensitivity of Ballyfeeny Rock Quarry to dust soiling during the construction phase is deemed to be **Low**, as per the IAQM Guidance, stipulated in **Table 9-9**. This is due to the fact that the quarry is located at a distance greater than 100m from the source of construction, i.e. T04.

Table 9-9: Sensitivity of the Area to dust soiling effects on people and property

Receptor Sensitivity	Number of Receptors	Distance from the source (m)			
		<20	<50	<100	<250
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

Figure 9-3 shows the receptors within 250m of the turbines. The overlap of Ballyfeeny Rock Quarry with T04 is also noted.



Figure 9-3: Receptors within 250m of the turbines (Ref: EIAR Figure 9-3 (Volume 4))

Figure 9-4 shows the receptors in proximity to SE1.

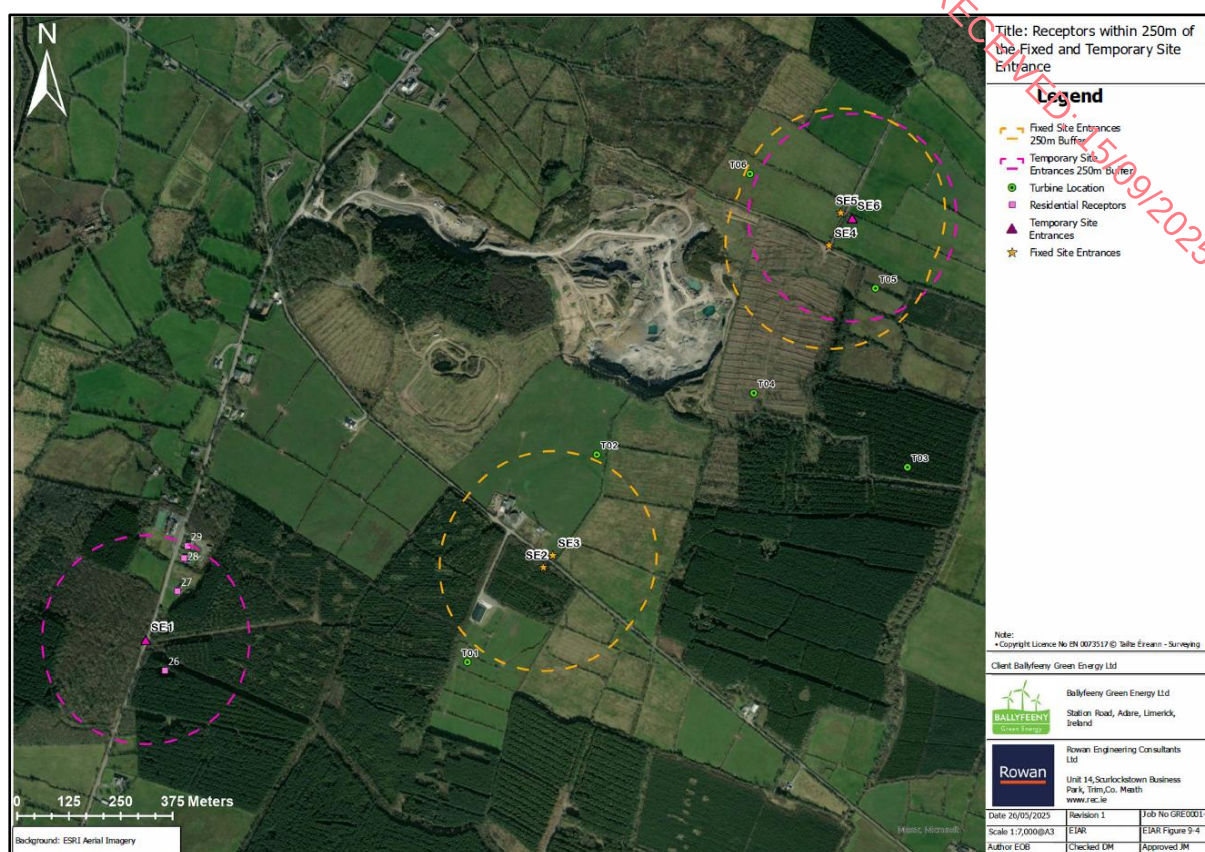


Figure 9-4: Sensitive receptors proximal to Site Entrances (Ref: EIAR Figure 9-4 (Volume 4))

Additionally, the IAQM Guidelines place importance in determining the sensitivity of the area to human health effects, accounting for the current annual mean PM_{10} concentration, receptor sensitivity together with the number of receptors affected within a number of distances from the construction areas.

As previously outlined in this Chapter, PM_{10} monitoring carried out across Zone D sites confirm annual average mean concentrations ranging from 10.9 to 12.7 $\mu g/m^3$ from 2021-2023. As a result, a conservative estimate of the background annual average PM_{10} concentrations for the proposed Project and its environs is 12.7 $\mu g/m^3$.

As previously outlined, there are five receptors recorded within 250m of the wind farm Site, of which four include residential receptors within 250m from Site Entrance 1 (SE1) and commercial receptor (Ballyfeeney Rock Quarry) within 250m of T04. Sensitive Receptor 26 is most proximal to the wind farm Site (located 88.2m from SE1).

Consequently, the worst -case sensitivity of the area to human health effects is deemed to be **Low**, as per **Table 9-10**. Additionally, the sensitivity of the area to human health effects

associated with the proposed Project is deemed as **Low** due to the low number of receptors proximal in conjunction with low background concentrations of PM₁₀.

Table 9-10: Sensitivity to the Area to Human Health Effects

Receptor Sensitivity	Annual Mean PM ₁₀ concentration	Number of receptors	Distance form Source			
			<20	<50	<100	<250
High	>32 µg/m ³	>100	High	High	High	Medium
		10-100	High	High	Medium	Low
		1-10	High	Medium	Low	Low
	28-32 µg/m ³	>100	High	High	Medium	Low
		10-100	High	Medium	Low	Low
		1-10	High	Medium	Low	Low
	24-28 µg/m ³	>100	High	Medium	Low	Low
		10-100	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
	24 µg/m ³	>100	Medium	Low	Low	Low
		10-100	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	>32 µg/m ³	>10	High	Medium	Low	Low
		1-10	Medium	Low	Low	Low
		>10	Medium	Low	Low	Low
Medium	28-32 µg/m ³	>10	Medium	Low	Low	Low
		1-10	Low	Low	Low	Low
	24-28 µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	24 µg/m ³	>10	Low	Low	Low	Low
		1-10	Low	Low	Low	Low
	-	>1	Low	Low	Low	Low
		>1	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low

Assessment criteria is also outlined within the IAQM Guidance for determining the sensitivity of the area to ecological effects from dust. The criteria considers whether the receiving environment is designated as a Special Area of Conservation (SAC), Special Protection Area (SPA), Natural Heritage Area (NHA), or proposed Natural Heritage Area (pNHA) under the EU Habitats Directive, or if the site serves as a local nature reserve or habitat for sensitive plant or animal species.

According to IAQM Guidance, dust related ecological effects can occur up to 50m from construction works and site entrances. **Chapter 6 – Biodiversity** of this EIAR outlines the designated sites proximal to the wind farm Site and confirms that there are no European designated sites (SACs or SPAs) located within 50 m of the Site.

Therefore, as per the IAQM Guidance stipulated in **Table 9-11**, the sensitivity to ecological dust effects from the wind farm Site is considered to be **Low**.

Table 9-11: Sensitivity of the Area to Ecological Effects

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

9.1.5 Embedded Mitigation

Through the development of the proposed Project, measures have been adopted as part of the evolution of the design to avoid or reduce adverse effects on the environment. These measures are referred to as ‘embedded mitigation’ and are effectively built into the effects assessment. Embedded mitigation relevant to Air Quality is set out below. Where additional mitigation measures are proposed, these are detailed after the assessment of effects (**Section 9.1.8**).

The process of site selection and the consideration of alternatives (**Chapter 3 – Consideration of Reasonable Alternatives**) has considered alternative locations, designs and processes for the proposed Project.

The process included a multi staged assessment which was guided by the 'Methodology for Local Authority Renewable Energy Strategies' Report from the SEAI (SEAI, 2013) and which included the consideration of environmental effects.

The main reasons for the selection of the proposed wind farm Site included that there were no mapped EPA watercourses present within the site, no mapped archaeological constraints within the site, no immediate connectivity to European and nationally designated sites, good access from the surrounding road network and the ability to satisfy setback distances for residential receptors.

Overall, the site selection process for the wind farm Site was therefore considered a key driver for mitigation by avoidance.

9.1.6 Assessment of effects

'Do Nothing' Scenario

The desktop study undertaken as part of this assessment indicates that air quality in the region of the proposed Project is generally good, with all air quality standards compliant with Irish and European limits. In the event that the proposed Project does not proceed, it is likely that air quality will remain in line with existing trends, with improvements in technology and national government commitments to meet the requirements of the CAFE Directive. This would be subject to local influences such as other new developments in the surrounding area and any changes in local road traffic.

If the proposed Project did not proceed, reliance on electricity generated from coal and oil would continue and an opportunity to reduce air pollutants through the development of renewable energy sources in the area would be lost. The proposed Project provides a renewable alternative energy generation, benefitting both the area and nationally. If the Project did not proceed, the equivalent energy (~2,288,350 MWh expected over the lifetime of the Project) would continue to be generated to be generated by a mix of sources including fossil fuels. The combustion on these fossil fuels for both heating and electrical generation causes the release of not only CO₂ but also other air quality pollutants, most notably NO_x, SO_x and particulate matter.

If the proposed Project were not to proceed, the opportunity to capture part of Roscommon's valuable 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 RCDP 2022-2028 supports the concept of generating renewable energy at 'local' level and the significant

contribution that wind energy can make as a clean sustainable solution to energy requirements.

Construction Phase

The potential effects to air quality during the construction phase of the proposed Project are as follows:

- Construction dust emissions; and
- Exhaust emissions from construction traffic and plant/equipment.

Construction Dust Emissions

The main dust generating activities during the construction phase include:

- Clearance, levelling and excavation of the site;
- Movement and stockpiling of soils;
- The installation of Site Access Tracks, Turbine Foundations, Onsite Substation, Relay Tower and Turbine Hardstand areas;
- Trenching for installation of the GCR and the Wind Farm Internal Cabling;
- Movements of construction vehicles on and off site; and
- Temporary accommodating works along the Turbine Delivery Route (TDR).

The extent of dust generation will be dependent on a number of factors including the nature of the dust, the nature of the construction activity being undertaken and the weather factors including rainfall, wind speed and wind direction etc. The IAQM Guidance indicates that construction dust emissions can be deposited as far as 250m from a construction site, however, most of the deposition takes place within the first 50m.

All groundworks (i.e. Site Entrances, Access Tracks, cable trenching, Turbine Hardstands and Foundations) are expected to take approx. 6 months to complete and will be completed in no greater than 12 months total duration.

Construction Dust Assessment

As per the IAQM Guidance potential effects in relation to construction dust are categorised as follows:

- Demolition;
- Earthworks;
- Construction; and

- Trackout.

Demolition

There will be no demolition works within the proposed wind farm Site.

Trackout

In terms of trackout, dust emissions can be distinguished from small, medium to large based on IAQM Guidance definitions stipulated as follows:

- **Large:** >50 Heavy Duty Vehicle (HDV) (>3.5t) outward movements in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length >100m;
- **Medium:** 20-50 HDV (>3.5t) outward movements in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50m – 100m; and
- **Small:** <20 HDV (>3.5t) outward movements in any one day, surface material with low potential for dust release, unpaved road length <50m.

In accordance with IAQM Guidance, the proposed earthworks can be classified as Large due to the number of outward movements per day (with the most intensive period of traffic resulting in >100 HV's movements daily). As previously outlined, there are four residential receptors within 250m of SE1, located off the R371. As these receptors are residential properties, they are classified as High Sensitivity as per the IAQM Guidance (refer to **Table 9-8**). Additionally, Ballyfeeny Rock Quarry is located less than 150m from T04 and is classified as a commercial receptor.

The sensitivity to the area to dust soiling is deemed as **Low** as per **Table 9-9**, due to the all five receptors being located over 50m from the sources of the works (i.e., SE1 and T04). Dust soiling may occur in and around SE1 during the transport of material to the site through the Site Entrance. Sensitivity to dust soiling in terms of human health and ecological receptors was also deemed as **Low** (**Table 9-10** and **9-11**).

Table 9-12 displays the criteria for rating of dust effects for trackout, as per the IAQM guidance. **Table 9-13** displays the risk of dust effects because of trackout activities on the various receptors prior to mitigation, which is deemed to be **Low**.

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Table 9-12: Criteria for rating risk of Dust Effects - Trackout

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 9-13: Risk of Dust Effects - Trackout

Receptor	Receptor Sensitivity	Dust Emissions Magnitude - Trackout	Risk of Dust Effects
Dust Soiling	Low Risk	Large	Low Risk
Human Health	Low Risk		Low Risk
Ecological	Low Risk		Low Risk

Earthworks and construction activities taking place within the proposed wind farm Site will result in some dust emissions, however, this will occur at the actual works area, which is a adequate distance from the single residential receptors. Receptor 35 comprises a residential dwelling which is the most proximal the development, located a considerable distance of 599m from T02.

Earthworks

Earthworks predominantly comprise excavations together with stockpiling of materials. In accordance with the IAQM Guidance, earthworks can be categorised as small, medium or large, and are stipulated as follows:

- **Large** Total site area > 110,000 m², potentially dusty soil type (e.g., clay which will be prone to suspension when dry due to small particle size), > 10 heavy earth moving vehicles active at any one time, formation of bunds >6 m in height;
- **Medium** Total site area 18,000 m² – 110,000 m², moderately dusty soil type (e.g., silt), dd nearest 5 - 10 heavy earth moving vehicles active at any one time, formation of bunds 3 – 6 m in height;and
- **Small** Total site area < 18,000 m², soil type with large grain size (e.g., sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 3 m in height.

In line with IAQM Guidance the potential of effects as a result of earthworks is Large, due to the size of the site area (49.774 Hectares which equates to 497,740m²).

Table 9-14 displays the criteria for rating risk of dust effects for earthworks are per the IAQM guidance. In terms of dust soiling, human health and ecological effects, the sensitivity of the area has been deemed as **Low** as per the IAQM Guidance. **Table 9-15** displays the risk of dust effects as a result of earthwork activities on the various receptors prior to mitigation, which is deemed to be **Low**.

Table 9-14: Criteria for rating risk of Dust Effects - Earthworks

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 9-15: Risk of Dust Effects - Earthworks

Receptor	Receptor Sensitivity	Dust Emissions Magnitude - Earthworks	Risk of Dust Related Impacts
Dust Soiling	Low Risk	Large	Low Risk
Human Health	Low Risk		Low Risk
Ecological	Low Risk		Low Risk

Construction

As per the IAQM Guidance, dust emissions magnitude from construction can be classified as small, medium or large, and are stipulated within the guidance as follows:

- **Large:** Total building volume > 750,000 m³, on-site concrete batching, sandblasting;
- **Medium:** Total building volume 12,000 m³ – 75,000 m³, potentially dusty construction material (e.g., concrete), on-site concrete batching; and
- **Small:** Total building volume < 12,000 m³, construction material with low potential for dust release (e.g., metal cladding or timber).

In accordance with the IAQM guidance, the potential magnitude of impact according to IAQM guidance is Small based on the estimated volume of concrete per turbine as 6,215 m³ for the six Turbines, Onsite Substation and Relay Tower.

As per the IAQM Guidance, **Table 9-16** displays the criteria for classifying dust effects for construction. As previously outlined, the sensitivity of the area in terms of potential effects to dust soiling, human health and ecology is deemed as **Low**, and potential risks are derived on this basis, as stipulated in **Table 9-17**.

Table 9-16: Criteria for rating risk for Dust Effects - Construction

Sensitivity of Area	Dust Emissions Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table 9-17: Risk of Dust Effects - Construction

Receptor	Receptor Sensitivity	Dust Emissions Magnitude - Earthworks	Risk of Dust Related Impacts
Dust Soiling	Low Risk	Large	Negligible
Human Health	Low Risk		Negligible
Ecological	Low Risk		Negligible

In terms of the GCR and works on the TDR, these will be restricted to limited activities and will be brief-temporary in duration. The GCR installation is anticipated at a rate of approximately 100m per day and the HDD crossing of the N5 is approximately 50m in length and will take approximately 1.5 weeks to complete.

The overall significance of effect of dust emissions during the construction phase will be **Short-term, Adverse** and **Slight**. In EIA terms, the effect is **Not Significant**.

Construction Traffic and Equipment Emissions

Exhaust emissions from construction traffic and equipment have the potential to effect air quality.

For construction traffic emissions, **Chapter 12 – Traffic and Transport**, outlines that the peak HV traffic movements during the construction phase will take place during the concrete pour for the turbine foundations (9 HV's per hour over a 12-hour period). For the installation of the Site Access Tracks and Turbine Hardstands, up to 50 HV's would be required per day, for up to 2 weeks. A detailed breakdown of deliveries for construction is outlined in **Chapter 12 – Traffic and Transport, Tables 12-5 – 12-9**.

TII published Screening thresholds in 2022 which stipulate specific criteria to establish if traffic changes are envisaged due to a proposed scheme and if the changes may impact air quality. Where HV flows change by 200 Annual Average Daily Traffic (AADT) or more, dispersion modelling is required. The AADT threshold is not triggered, as there is 108 HV's planned daily during peak periods (the concrete pours for the turbine foundations) and as a result, dispersion modelling is not necessary.

Whilst construction phase traffic and equipment will generate exhaust emissions, any emissions associated with the proposed Project would result in a small and localised increase in overall, over the course of the 18-month construction period.

The effect of exhaust emissions during the construction phase will be **Short-term, Adverse and Imperceptible**. In EIA terms, this is considered **Not Significant**.

Operational Phase

Once the proposed Project is operational, it will make a significant contribution to renewable sustainable energy generation, which will allow a reduction in the potential CO₂ and other emissions that would have occurred if the power had been generated from traditional carbon-based resources. Over the lifespan of the wind farm Site, it is anticipated to generate in the region of 2578385 MWh of electricity with an annual saving of up to 16870 tCO₂ per year. This reduction will result in an improvement in air quality both nationally and locally. This effect during the operational phase will be **Long-term, Positive and Significant**. In EIA terms, this is **Significant**.

Operational Phase Traffic Emissions

During the operational phase, the wind farm Site will be generally unmanned and will be monitored remotely at an offsite control centre, 24 hours per day. Site visits during this phase will occur biannually and for turbine maintenance.

Typically, traffic accessing the Site during the operational phase will involve occasional vehicle access to the wind farm Site will be required by van or small truck for the purposes of routine maintenance and monitoring by operatives and technician

Whilst operational phase traffic will generate exhaust emissions, any traffic associated with the proposed Project will be in low numbers. Operational traffic will access the Site through the permanent site entrances and access tracks. The effect of exhaust emissions during the operational phase will be **Long-term, Adverse** and **Imperceptible**. In EIA terms, this is considered **Not Significant**.

Decommissioning Phase

The Applicant is seeking consent for a period of 35 years for the operation of the proposed Project from the date of commissioning. Following the end of the operational phase the Applicant may wish to replace the turbines with a new set of turbines, subject to fulfilling the planning requirements at the time or the proposed Project may be decommissioned fully. The Onsite Substation and grid connection will remain in place as it will be in the ownership of ESB Networks and will form part of the National Grid. The Relay Tower will remain in place as it will form part of the telecommunication network in the area.

A description of the decommissioning is as follows:

- Removal of the turbines including the blades, hub, nacelle and wind turbine towers;
- Removal of the above ground section of the Turbine Foundation called the 'plinth';
- Removal of all Wind Farm Internal Cabling. The cable ducting will remain in-situ to minimise the associated ground disturbance; and
- Reinstatement of the Turbine Hardstands and Turbine Foundations, by covering with earth and reseeded/replanted as appropriate.

The Turbine Foundations will remain in place underground except for the foundation plinth that will be removed below ground level. The Site Access Tracks and associated drainage will serve the ongoing forestry and farming practices in the area. All other hard surfaced areas such as the Turbine Hardstands will be covered by earth and reseeded/replanted as agreed at the time with the landowners and the Local Authority.

A **DMP** has been prepared as part of this EIAR (**Appendix 2.1.4**). This Plan and all final requirements for the infrastructure will be updated and finalised with the Local Authority in advance of decommissioning activities commencing. Decommissioning will be undertaken in

accordance with best practice and legislation in place at the time of decommissioning. Further details on the decommissioning phase are provided in **Chapter 2 – Project Description**.

It is predicted that the effects will be similar to those identified for the construction phase. Furthermore the effects in terms of air quality will be of a shorter duration and scale during the decommissioning phase. The effects are considered to be **Short-term, Adverse** and **Imperceptible**. In EIA terms, the effect is considered **Not Significant**.

Summary

The effects identified for the construction; operational and decommissioning phases are all predicted to be **Not Significant** in EIA terms. The final selection of Technology Option 1,2 or 3 would not introduce any new receptor pathways that have not already been considered in this assessment and would not result in any changes to the significance of effects, which have been determined for the construction, operational and decommissioning phases.

9.1.7 Mitigation Measures

Construction Phase Mitigation

The pre mitigation assessment concludes that no likely significant effects will arise in respect of air quality as a result of the proposed Project. Nonetheless, the following management and control measures, derived from the IAQM Guidance and in line with best practice, will be implemented:

- The Site Access Tracks and public roads in the vicinity will be regularly cleaned to remove mud and aggregate materials from their surface;
- The Site Access Tracks will be well maintained;
- Dampening of the Site Access Tracks using water bowsters during prolonged dry periods if necessary;
- Construction vehicles delivering or collecting material with potential for dust emissions shall be enclosed, covered or wetted at all times to restrict the escape of dust;
- Construction vehicles delivering or collecting material with potential for dust emissions shall be checked before accessing the public road network, to confirm there is no potential for dust emissions;
- Public roads directly outside the construction site shall be regularly inspected for cleanliness, as a minimum on a daily basis, and cleaned as necessary;
- Transport of materials to and from the construction site will take place in normal working hours and along routes agreed with Roscommon County Council;

- Vehicle speeds will be restricted on the internal Site Access tracks;
- Dusty materials such as excavated materials will be stored and handled appropriately (e.g. covering where necessary and minimising the drop heights of materials);
- Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods;
- Suitable hoardings will be erected at construction site to prevent wind blow of materials;
- Ensuring timely completion of all construction works;
- Construction vehicles will be routinely maintained to minimise vehicular emissions;
- Vehicles will be switched off when not in use;
- Vehicles will not be left running unnecessarily and low emission fuels will be used where possible;
- The appointed Contractor shall monitor performance and undertake regular site inspections, to ensure that the mitigation measures are implemented; and
- A complaints register will be kept on site detailing all telephone calls and letters of complaint received in connection with dust nuisance or air quality concerns, together with details of any remedial actions carried out.

These measures are also captured in **Appendix 2.1 – CEMP**. The dust management measures within **Appendix 2.1 – CEMP**, will be reviewed by the appointed Contractor and the Environmental Clerk of Works (ECoW) and Applicant at regular intervals during the construction phase to confirm the effectiveness of the measures in place.

The appointed Contractor will brief construction site personnel on dust management measures during Toolbox Talks and Site Meetings. Geotechnical Investigations have confirmed that the Site is not suitable for borrow pits. However, the Project has identified a number of local aggregate and concrete suppliers in the immediate area, which will be utilised for the Project. Use of local suppliers reduces the need for extended transport and therefore reduces potential effects on air quality. The Site has been determined as suitable for reuse of soils and subsoils within the Site boundary, thus preventing the requirement for significant transportation and risk of dust nuisance.

Operational Phase Mitigation

Due to the very low volumes of traffic generated during the operational phase, no mitigation measures are proposed.

Decommissioning Phase Mitigation

While no likely significant effects have been identified in respect of air quality from the proposed Project during the decommissioning phase, the mitigation measures described for the construction phase above will also be implemented for the decommissioning phase as part of **Appendix 2.1.4 – DMP** to avoid and/or minimise any potential effects in accordance with best practice.

9.1.8 Residual Effects

Construction Phase

As no likely significant effects on air quality were identified for the construction phase in the pre-mitigation assessment, no likely significant residual effects arise for the construction phase. With the implementation of the mitigation measures outlined in **Section 9.6** and **Appendix 2.1 – CEMP**, the residual effects during the construction phase are assessed as **Short-term, Adverse** and **Imperceptible**. In EIA terms, this is considered **Not Significant**.

Operational Phase

The residual effects associated with traffic emissions during the operational phase are assessed as **Long-term, Adverse** and **Imperceptible**. In EIA terms, this is **Not Significant**.

Additionally, once the proposed Project is operational, it will support a reduced reliance on electricity generated from coal and oil, which is assessed as **Long-term, Positive** and **Slight**. In EIA terms, this is considered as **Not Significant**.

Decommissioning Phase

With the implementation of the mitigation measures outlined in **Section 9.6** as part of the future **DMP (Appendix 2.1.4)**, the residual effects during the decommissioning phase are assessed as **Short-term, Adverse** and **Imperceptible**. In EIA terms, this is **Not Significant**.

Summary

The residual effects identified for the construction; operational and decommissioning phases are all predicted to be **Not Significant** in EIA terms. The final selection of Technology Option 1, 2 or 3 would not result in any changes to the significance of the residual effects, which have been determined for the construction, operational and decommissioning phases.

9.1.9 Risk of Major Accidents and/or Disasters

This section considers the vulnerability of the proposed Project to major accidents and/or disasters, the risk of those major accidents and/or disasters occurring and the potential for any significant adverse effects on air quality.

According to EPA Guidelines, these unplanned events can include 'spill from traffic accidents, floods or landslides affecting the site, fire, collapse or equipment failure on site'. Additionally, the EIA Directive requires "major accidents, and/or natural disasters (such as flooding, sea level rise or earthquakes)" be addressed.

The *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017) requires the consideration of major hazards in the context of the SEVESO III Directive. It is noted that the proposed Project will not come under the Control of Major Accident Hazards (COMAH) Regulations. Additionally, the wind farm Site and GCR are not located in proximity to a COMAH establishment with the closest establishment located c. 37km west. Works for the TDR will be localised and temporary in nature and no interactions with COMAH sites are anticipated

An example of a major accident or disaster which could pose an effect to air quality includes an incident, arising from fuel spillages, equipment failure and/or electrical problems.

As outlined in **Appendix 2.1 – CEMP**, have been prepared for the proposed Project and will be implemented by the appointed Contractor for the construction phase. This document set out a framework to ensure that appropriate controls will be implemented on site, including the implementation of an Emergency Response Plan. With this mitigation in place, it is considered that the risk associated with a spillage or equipment failure incident is low and there are no associated significant adverse effects on air quality. This is considered **Not Significant** in EIA terms.

Furthermore, the Site has carefully been selected to ensure there are no gas pipelines within the footprint. During the operational phase, the Site will be monitored remotely at an offsite control centre, 24 hours per day. It is considered that the risk of any incidents are low with no associated significant adverse effects on air quality. This is considered **Not Significant** in EIA terms.

9.1.10 Cumulative Effects

This section presents the findings for the cumulative effects assessment (CEA) and considers the residual effects for air quality presented in **Section 9.1.9** against the potential effects of other relevant projects during the construction, operational and decommissioning phases.

Full details on the approach to the assessment of cumulative effects are provided in **Chapter 16 – Cumulative Effects**. A list of other projects relative to the proposed Project was compiled by the project team and is provided in **Appendix 16.1 – Long list of other projects for the cumulative effects assessment**.

In summary, the CEA has been approached in a staged process. The stages included the following:

- Stage 1: Establishing the list of other projects;
- Stage 2: Applying topic specific criteria to the list of other projects, to confirm a short list for each topic chapter;
- Stage 3: Collating information on each of the other projects to inform the CEAs; and
- Stage 4: Undertaking the assessment to an appropriate level of detail. This is based on the information available on each of the other projects.

The initial list of other projects for the proposed Project (Stage 1) was produced based on a 20km radius from the outermost turbines. The 20km radius aligned with the study area (the zone of theoretical visibility) applied in **Chapter 11 – Landscape and Visual** and which is defined in the Draft WEDG 2019. In confirming the topic specific screening range for air quality (Stage 2), it was determined that the area of 250m would be employed for dust emissions, as this allowed the assessment to account for potential indirect cumulative effects from dust on receptors. In relation to traffic and equipment emissions, the project list from within the 20km radius was considered.

In terms of the TDR, a 50m buffer was applied to collate a list of other projects. This distance reflects the temporary and localised nature of the works at these locations on the public road network. This 50m list was considered to appropriate to account for potential cumulative effects on air quality receptors.

Ballyfeeny Rock Quarry

The Ballyfeeny Rock Quarry is situated less than 150m from T04 at its nearest point. An Environmental Impact Statement (EIS) was produced with the planning application for the Quarry, in 2010. No significant adverse residual effects were reported in the EIS. The Quarry site is subject to planning conditions for aspects including environmental management noise, blasting and dust management and monitoring.

During the construction and decommissioning phases of the proposed Project, the dust management mitigation measures in **Section 9.1.8** will be implemented.

Given that mitigation measures are being implemented by both developments, it is considered that the effects from dust emissions will continue to be **Short-term, Adverse** and **Imperceptible**. In EIA terms, this is **Not Significant**. There are no dust emissions associated with the proposed Project during the operational phase. There are no other projects on the list in **Appendix 16.1 – Long list of other projects for the cumulative effects assessment**

within the 250m dust screening range for the proposed wind farm Site and GCR.

In relation to traffic and equipment emissions to air, there will be no spatial overlaps with the other projects included in **Appendix 16.1 – Long list of other projects for the cumulative effects assessment**. Should there be an overlap in the construction/decommissioning phases, any effects would be temporary in nature. Additionally, it is considered that any permitted projects would be controlled by mitigation measures in their planning applications and by any conditions imposed in a grant of planning. This would include Traffic Management Plans that will control emissions from traffic and equipment. During the operational phase, any emissions would be minimal from the proposed Project. There would be no significant cumulative effects with the proposed Project. This is considered **Not Significant** in EIA terms.

Other projects outlined in **Appendix 16.1 – Long list of other projects for the cumulative effects assessment** for the TDR were not expected to have a significant cumulative effect with the proposed Project. This is due to their small size and the absence of complex likely air quality effects. The works for the TDR are also localised, minor and temporary in nature.

The final selection of Technology Option 1,2 or 3 would not introduce any new receptor pathways that have not already been considered in the CEA and would not result in any changes to the significance of effects, which have been determined.

9.1.11 Inter-Related Effects

The topics addressed in this EIAR do not exist separately from one another, and therefore, any effect on a specific element of the environment has the potential to impact another. The

interactions between effects on various factors throughout the EIAR, are described, in **Chapter 17 – Interrelated Effects**.

9.1.12 Summary of Effects

The significance of effects of the construction, operational, and decommissioning phases of the proposed Project has been assessed individually and cumulatively. **Table 9-18** overleaf displays the Summary of Effects for all phases of the proposed Project.

The assessment has identified that there will be **No Significant** effects on Air Quality as a result of the proposed Project.

Table 9-18: Summary of Effects

Receptor	Potential Effect	Significance of effect (pre mitigation)	Mitigation Measures	Residual significance of effect
Construction Phase				
Dust soiling, Human health, ecological receptors	Construction dust emissions	The overall significance of effect will be Short-term, Adverse and Slight . In EIA terms, the effect is Not Significant .	Dust mitigation measures detailed in Section 9.1.8	With the implementation of the mitigation measures outlined in Section 9.1.6 and Appendix 2.1- CEMP , the significance of the residual effects will be Short-term, Adverse and Imperceptible . In EIA terms, this is Not Significant
Human health, ecological receptors	Construction traffic and equipment emissions	The impact of exhaust emissions will be Short-term, Adverse and Imperceptible . In EIA terms, this is Not Significant .	Vehicle and equipment emission mitigation measures detailed in Section 9.1.8	With the implementation of the mitigation measures outlined in Section 9.1.6 and Appendix 2.1- CEMP , the significance of the residual effects will be Short-term, Adverse and Imperceptible . In EIA terms, this is Not Significant
Operational Phase				

Receptor	Potential Effect	Significance of effect (pre mitigation)	Mitigation Measures	Residual significance of effect
Human health, ecological receptors	Operational phase traffic emissions	The significance of effect will be Long-term, Adverse and Imperceptible . In EIA terms, this is Not Significant .	No requirement for mitigation measures.	The significance of the residual effects will be Long-term, Adverse and Imperceptible . In EIA terms, this is Not Significant
Human health, ecological receptors	Operation of the Ballyfeeny Green Energy Project	The significance of effect will be Long-term, Positive and Slight . In EIA terms, this is Not Significant .	No requirement for mitigation measures.	The significance of the residual effects will be Long-term, Positive and Slight . In EIA terms, this is considered as Not Significant
Decommissioning Phase				
Dust soiling, Human health, ecological receptors	Dust emissions	The overall significance of effect will be Short-term, Adverse and Imperceptible . In EIA terms, the effect is Not Significant	Dust mitigation measures detailed in Section 9.1.8	With the implementation of the mitigation measures outlined in Section 9.1.6 , the significance of the residual effects will be Short-term, Adverse and Imperceptible . In EIA terms, this is Not Significant

Receptor	Potential Effect	Significance of effect (pre mitigation)	Mitigation Measures	Residual significance of effect
Human health, ecological receptors	Traffic and equipment emissions	The impact of exhaust emissions will be Short-term, Adverse and Slight . In EIA terms, this is Not Significant .	Vehicle and equipment emission mitigation measures detailed in Section 9.1.8	With the implementation of the mitigation measures outlined in Section 9.1.6 , the significance of the residual effects will be Short-term, Adverse and Imperceptible . In EIA terms, this is Not Significant

9.2 Part 2 – Climate

9.2.1 Introduction

Climate Change and Greenhouse Gases

GHGs are gases in the earth's atmosphere that trap heat, contributing to the greenhouse effect. This effect warms the earth's surface and helps regulate temperatures, making life on earth possible. However, an excess of GHGs can lead to global warming and climate change

Climate change naturally fluctuates over long period of time, however since the late 19th century climate pattern has seen rapid changes, which is largely driven by human activity. The primary drivers of recent climate change include:

1. GHG Emissions – The burning of fossil fuels;
2. Deforestation – Cutting down trees realises stored carbon into the atmosphere; and
3. Industrialization and Urbanization – The major growth of cities and industrial processes.

Statement of Authority

Part 2 of this Chapter of the EIAR has been written by Dr James Massey – James is a Senior environmental consultant and ecologist with over 25 years' experience, specifically on environmental assessment of renewable projects, onshore and offshore in Ireland and worldwide. James is a Fellow of the Institute of Environmental Sciences and a member of several professional organisations. James is a Chartered Environmentalist and Chartered Scientist and holds a PhD, DSc, BSc in Applied Marine Biology and a number of professional and industry qualifications.

Denise Meade has reviewed this Chapter. Denise has over 20 years' experience working on both public and private sector developments. Her experience lies in the environmental co-ordination of large infrastructure projects across a range of industries including renewable energy, roads, water and wastewater. She has managed all aspects of planning applications, with a focus on the technical review and delivery of EIARs. She is a Chartered Environmentalist (CEnv) and Chartered Water and Environmental Manager (C.WEM) and hold an MSc in Applied Environmental Science and AdvDip in Planning & Environmental Law.

9.2.2 Legislation, Guidance and Policy

Legislation

This assessment has been prepared in accordance with the legislation and treaties listed below, having regard to the guidance which follows:

- United Nations Climate Change - The Paris Agreement 2015;
- United Nations Climate Change – Glasgow Climate Pact;
- Kyoto Protocol to the United Nations Framework Convention on Climate Change;
- Climate Action Low Carbon Development 2015 as amended by the Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the Climate Act);
- The EIA Directive;
- The Planning and Development Act 2000 (as amended); and
- The Planning and Development Regulations, 2001 (as amended).

Guidance

The principal guidance and data sources used to inform the assessment are as follows:

- European Union (2014) - The 2030 Climate & Energy Framework;
- Department of Climate, Energy and the Environment (2023) Climate Action Plan 2023;
- Department of Climate, Energy and the Environment (2024) Climate Action Plan 2024;
- Department of Climate, Energy and the Environment (2025) Climate Action Plan 2025;
- Department of Climate, Energy and the Environment - National Adaptation Framework (2024);
- Scottish Government (2019) Calculating carbon savings from Wind Farms on Scottish peatlands. Scottish Government;
- Guidelines on the information to be contained in Environmental Impact Assessment Reports (hereafter referred to as the Environmental Protection Agency (EPA Guidelines) (EPA, 2022);
- Draft Revised Wind Energy Development Guidelines (Department of Housing Planning and Local Government (DoHPLG), 2019) (hereafter referred to as Draft WEDG's 2019);
- Guidelines for Planning Authorities and An Bord Pleanála on Carrying Out Environmental Impact Assessment (Department of Environment, Community and Local Government (DECLG), August 2018);
- Environmental Impact Assessment of Projects – Guidance on the Preparation of the Environmental Impact Assessment Report (European Commission (EC), 2017); and
- Wind Energy Development Guidelines (Department of the Environment, Heritage and Local Government, 2006); (hereafter referred to as WEDG 2006).

Policy

Climate Change and Wind Development Agreements

Wind farm developments and their associated merits are supported by global, national and local policy. There are a myriad of historic policies and strategy documents supporting the current framework in which the proposed Project should be regarded. Additional policies and Agreements pertinent to climate change and the abatement of air pollution include the following:

Doha Amendment to Kyoto Protocol

Ireland ratified the Kyoto Protocol in 1997, which is an international agreement that sets limits and reduction targets for GHGs for member states. Upon the protocol coming into effect and ratification from Ireland, emission reduction targets agreed from Ireland are legally binding. The amendment to the Kyoto Protocol was adopted in Doha, Quata, December 2012. Amendments to the protocol include the following:

- New commitment for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- A revised list of GHG to be reported on by parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

The first commitment period saw 37 industrialised countries and the European Community pledge to reduce GHG emissions to an average of 5% against the 1990 levels. From 2013 to 2020, during the second commitment period, parties committed to further reduce GHG emissions by at least 18% below the 1990 levels. However, it must be noted that the composition of the Parties in the second period is different from the first.

The Kyoto Protocol has been implemented to facilitate countries in adapting to the detrimental impacts of climate change, while promoting the innovation and deployment of various technologies that can help increase resilience to the impacts of climate change.

Paris Agreement

The Paris Agreement is a legally binding international treaty on climate change that was adopted on December 12, 2015, during the 21st Conference of the Parties (COP21). The

agreement entered into force on November 4, 2016. The primary aim of the Paris Agreement is to limit global temperature rise this century to well below 2°C above pre-industrial levels, with an aspiration to limit the increase to 1.5°C. This target is seen as crucial to preventing the most catastrophic impacts of climate change, such as extreme weather events, sea-level rise, and biodiversity loss.

The 2030 Climate & Energy Framework

In October 2014, the European Council agreed on the 2030 climate and energy framework for the EU, while setting out imperative targets, as follows:

- A binding EU target of at least 40% less greenhouse gas emissions by 2030, compared to 1990;
- A target, binding at EU level, of at least 27% renewable energy consumption in 2030; and
- An indicative target of at least 27% improvement in energy efficiency in 2030.

The European Council will continue to provide strategic guidance to the framework, specifically in relation to the emissions trading system (ETS), interconnections and energy efficiency. Furthermore, this will enable member states in progressing towards a climate-neutral economy and enforce commitments under the Paris Agreement.

Ireland's Climate Action Plans

The initial Climate Action Plan (CAP) was launched by the Irish Government in June 2019, setting out an ambitious course of action over the coming years to address diverse and wide-ranging impacts on Ireland's environment, society, economic and natural resources. The 2019 CAP also detailed the required governance arrangements for enforcement, including the carbon proofing of government policy, carbon budgets together with a Climate Change Advisory Council.

The Irish government published a second CAP in 2021, known as CAP21, which assumed full implementation on the 2019 Plan, though with additional measures. CAP21 provided an in-depth plan for taking decisive action to achieve a 51% reduction in overall in overall greenhouse gases by 2023 to meet net-zero emissions by 2050. A series of National Long Term Climate Action Strategies is also included within the CAP21.

The CAP21 paved the way for CAP23, CAP24 and CAP25, published in December 2022, May 2024 and May 2025 respectively. CAP23 was the second annual update to Ireland's Climate Action Plan 2019; implementing carbon budgets together with sectoral emissions ceilings

while setting out roadmaps for taking decisive action to halve Irelands emissions by 2030 and reach net zero no later than 2050. CAP23 outlines crucial high impact sectors where the largest savings can be made, including the following:

- Renewable Energy;
- Energy Efficiency of Buildings;
- Transport;
- Sustainable Farming;
- Sustainable Business; and
- Change of Land-use.

CAP23 comments on the imperativeness of decarbonisation of Irelands manufacturing industry being key to Irelands economy.

Moreover, CAP23 has aimed to deliver 9GW of onshore wind, 8 GW of solar, at least 7GW of offshore wind and 2 GW green hydrogen to be incorporated into Irish energy production no later than 2030. This will reduce emissions in Ireland while enabling the nation to electrify other sectors including transport and heat and reduce emissions in these sectors also. CAP23 continues ambition to increase renewable electricity generation to 80% by 2030.

Additionally, phasing out and ceasing the use of coal and peat in electricity generation by 2030 is a predominant aim within CAP23.

As set out in CAP23, a long-term electricity system development strategy to achieve the 2050 objective could require the following potential policies and opportunities:

- A policy to require future dispatchable generation to be zero carbon gas ready;
- The continued delivery of required levels of variable renewable electricity generation and supporting infrastructure as we electrify buildings, industry and transport;
- Zero carbon demand growth supported by an industrial spatial strategy to locate new industrial development with renewable generation opportunities;
- The continued delivery of demand flexibility, to incentivise demand when low carbon variable renewable electricity is available;
- Further policies to incentivise the construction of short and long duration storage to provide for smoothing of electricity supply and demand between times of high variable renewable production and low variable renewable production;
- Policies to ensure that zero carbon gases, like hydrogen, are utilised in the electricity sector to provide zero carbon dispatchable electricity at sufficient scale;
- Policies to support the development of inter seasonal storage of hydrogen;

- Development of further interconnectors with other European markets; and
- Industrial spatial strategy to locate new industrial development with renewable generation opportunities.

The streamlining of licensing, permitting and planning for infrastructure and providing clarity in relation to timing will expedite the transition required by all sectors.

In April 2023, the Irish Government published a Long-term Strategy on Greenhouse Gas Emission Reductions, towards achieving carbon neutrality for Ireland by 2050.

The Long-term strategy covers with a perspective of at least 30 years:

- Total greenhouse gas emission reductions and enhancements of removals by sinks;
- Emission reductions and enhancements of removals in individual sectors, including electricity, industry, transport, the heating and cooling and buildings sector (residential and tertiary), agriculture, waste and land use, land-use change and forestry (LULUCF);
- Expected progress on transition to a low greenhouse gas emission economy, including greenhouse gas intensity, CO₂ intensity of gross domestic product, related estimates of long-term investment, and strategies for related research, development and innovation;
- The expected socio-economic effect of the decarbonisation measures, including aspects related to macro-economic and social development, health risks and benefits and environmental protection; and
- Links to other national long-term objectives, planning and other policies and measures, and investment.

Climate Action Plan 2024

The CAP24 outlines concerns that, in absence of acceleration, Ireland risks missing specific 2030 production targets. Stronger policy support and incentives are needed to increase renewable energy project deployment rates if renewable energy targets are to be achieved. Policy must be elevated with emphasis on energy efficiency. If no action is taken, there is potential for over 20% of renewable generation to be curtailed by 2030.

Climate Action Plan 2025

The CAP25 is Ireland's third statutory annual update to its national climate strategy, as mandated by the Climate Action and Low Carbon Development (Amendment) Act 2021. The Climate Action Plan CAP 2025 sets out a plan designed to deliver a 51% national reduction in GHG emissions by 2030, aiming to halve emissions and reach net zero no later than 2050. It

is important to note that CAP 2025 should be read in conjunction with the CAP 2024, as both plans collectively guide Ireland's climate objectives.

The proposed Project accords with the provision of both CAP 2024 and CAP 2025. It represents a shift away from more traditional carbon sources and will contribute to increasing the level of renewable electricity generated in Ireland, particularly at the local community level.

Once operational, the Project will supply renewable electricity directly to the national grid. In doing so, the Project supports and aligns with Ireland's national objectives to reduce GHG emissions and to diversify the energy mix through a greater reliance on renewable sources, thereby helping to power local communities across the country in a more sustainable manner.

Climate Action Low Carbon Development (Amendment) Act 2021

The Climate Act commits Ireland to a climate-resilient, climate-neutral economy by 2050. It aims for a 7% average yearly reduction in greenhouse gas emissions over the next decade and net-zero emissions by 2050.

Key points include:

- A legally binding national climate objective to achieve a climate-neutral economy by 2050;
- Carbon budgeting: The government must adopt five-year carbon budgets with sector-specific targets, starting in 2021;
- Annual updates to the Climate Action Plan detailing sectoral actions;
- A National Long-Term Climate Action Strategy every five year;
- Ministers will be accountable for sectoral targets, reporting to an Oireachtas Committee annually; and
- The Climate Change Advisory Council will propose carbon budgets, with a target of reducing emissions by 51% by 2030.

National Adaptation Framework 2024

The chief influence on Ireland's climate is the Atlantic Ocean (i.e. the gulf stream) and consequently, Ireland does not suffer from the extremes of temperatures experienced by other countries at a similar latitude. The climate of Ireland is changeable due to various atmospheric systems and surrounding oceanic conditions.

Climate change and an increase in GHGs is expected to change Ireland's climate in the coming decades, including rising temperatures, altered precipitation patterns, sea level rise and increased storm intensity.

The National Adaptation Framework 2024 have provided a summary of observed and projected climate change impacts for Ireland, and these are described in the **Table 9-17**.

Table 9-19: Irelands future Climate projections (Extracted from DECC, 2024, National Adaptation Framework 2024 (Appendix 4))

Parameter	Observed	Projected	Example of Biophysical Impacts
Temperature	Annual average surface air temperature has increased 0.9°C over the last 120 years and 0.7°C when comparing the period 1991-2020 to 1961-1990. The frequency of warm years has increased– with fifteen of the top 20 warmest years on record occurring since 1990.	Projected that mean annual temperatures will increase by mid-century between 1–1.6°C (under different scenarios). Projected that heatwave events will increase by the middle of the century with increases in heatwave events ranging from 1-15 (under different scenarios).	Temperature increases may increase growing rates for forestry and extend the growing season for agriculture. There is a risk that increased temperatures may also introduce new pests or diseases. Higher temperatures and moisture deficits may increase the risk of drought and wildfires as well as pressure on water supplies.
Precipitation	Annual precipitation has increased by 6% between 1989– 2018 compared to 1961-1990. Evidence suggests that there is a trend towards increased winter rainfall and decreased summer rainfall.	Projected that there will be substantial decreases in precipitation for the summer months, with reductions ranging from 0% - 17% under different scenarios. Projected that the mid-century precipitation climate will become more variable with substantial increases in the frequency and intensity of dry periods and heavy precipitation events.	Decreased summer precipitation and increased drought frequency could result in water stress for livestock and soils. More extreme precipitation events may lead to more frequent and intensive pluvial and fluvial flooding.
Wind Speed and Storms	No long-term trend in wind speed can be determined with confidence based on the limited analysis carried out to date. Increasing wave heights have been observed over the last 70 years in the North Atlantic with winter season trends of increases up to 20 cm per	Projected that mean 10-m wind speeds will decrease for all seasons by mid-century – with decreases largest for summer months (up to 5.4% for the RCP8.5 scenario).	Changes to storm activity will impact built, archaeological, transport, communication and energy infrastructure – causing structural damage and landscape alterations.

Parameter	Observed	Projected	Example of Biophysical Impacts
	decade, along with a northward displacement of storm tracks.		
Sea Level and Sea Surface Temperature	Sea level around the coast of Ireland has increased by 2-3mm per year since the 1990's. Average sea temperature has risen by 0.47°C over the last 10 years compared to 1981- 2010.	Projected sea level rise for Ireland shows that areas of the extreme southwest are likely to experience largest increases in sea level Projected increase in sea temperature. Projected changes for the Irish Sea indicate a warming for all seasons with the highest warming in Autumn and the lowest in Spring	Rising sea levels will adversely impact coastal areas and may damage embankments in estuarine areas impacting drainage schemes. Changes in sea surface temperature may impact fish stocks and introduce nonnative species.

Roscommon County Development Plan 2022-2028

Aims, policies and objectives relevant to climate in the Roscommon CDP 2022-2028 include:

- **(Strategic Aim 1):** Achieve a transition to a competitive, greener, low carbon, climate resilient and environmentally sustainable county, facilitated through reducing the need to travel, by integrating land use and sustainable modes of transport, by reducing the use of non- renewable resources and by promoting and facilitating renewal energy initiatives on a domestic and commercial scale.
 - **(CAEE 8.1)** Support European and national objectives for climate action, adaptation and mitigation which address land use planning, energy, sustainable mobility, flood risk management and drainage as detailed in the Climate Action Plan (2019), the National Climate Change Adaptation Framework (2018) and The Planning System and Flood Risk Management Guidelines (2009) and any subsequent versions of any of the aforementioned.
 - **(CAEE 8.2)** Support the National Climate Change Strategy by actively seeking to implement the policy objectives throughout this Plan which contribute to positive climate actions, including those related to renewable energy, sustainable transport, air quality, flooding and the promotion of urban and rural green initiatives.
- (CAEE 8.3):** Support developments and actions that assist in achieving the national targets for energy from renewable energy, from renewable resources and reducing greenhouse gas emissions associated with energy production

9.2.3 Methodology

Consultation

Scoping and consultation have been carried out in support of the proposed Project and in line with the EIA Directive, together with the EPA Guidelines and with due regard for the *Environmental Impact Assessment of Projects: Guidance on Scoping* (European Commission, 2017).

An EIA Scoping Report was issued to 48 Statutory and non-statutory stakeholders via email in September 2024, of which 10 responded. Consultation also included meetings with key stakeholders. All scoping consultation responses are provided in **Appendix 1-3 – Scoping Consultation Responses**.

Table 9-3 within **Part 1 – Air Quality** summaries issues raised during the consultation process relevant to Air Quality and Climate.

Desk Study

The desk-top study was completed through consulting a number of sources as follows:

- Sustainable Energy Authority of Ireland (SEAI 2024);
- Scottish Government (2019) – *Calculating carbon savings from wind farms on Scottish peatlands; and*
- Met Éireann – Weather data from Mount Dillon station;
- Irelands GHG Emissions; and
- Climate Change projections for Ireland – (Nolan, P, 2018).

Approach to Project Design

As set out in **Chapter 1 – Introduction**, under Section 32I of the Planning and Development Act 2000 (as amended), the Applicant is in receipt of an opinion on flexibility, relating to 3 no. options of Turbines. This opinion from the Local Authority confirmed that it was *‘appropriate that the proposed application be made and decided before the prospective applicant has confirmed certain details of the application’*.

In the case of the potential climate effects and benefits a worst-case scenario for construction assuming the maximum effect (Technology Option 1) (**Table 9-20**) has been evaluated.

However, for the carbon assessment of effects, the model considered power output as the key differentiator to assess a minimum, maximum and expected assessment value. In this case the minimum is based on a 25MW output and the maximum a 29MW output, with the expected representing the median. The potential output is based on the currently available Technology Options, however these are continuously evolving, and there is a chance that the same Technology Options may have increased output in future when procurement takes place. For the purpose of the EIAR, the currently available models have been used to assess the minimum, maximum and median output values for the carbon calculator tool.

Table 9-20: Technology Options and associated Parameters to be assessed

Turbine Parameter	Technology Option 1	Technology Option 2	Technology Option 3
Number of WTGs	6	6	6
Tip Height (m)	160	156	159
Rotor Diameter (m)	136	133	138
Hub Height (m)	92	90	90

Turbine Parameter	Technology Option 1	Technology Option 2	Technology Option 3
Megawatt (MW) Rating	4.5	4.8	4.26

**Modern wind turbines currently have a typical generating capacity in the 4 to 7 MW range, with the generating capacity continuing to evolve upwards as technology improvements are achieved by the turbine manufacturers. The exact power rating of the installed turbine will be designed to match the wind regime on the proposed Project and will be determined by the chosen manufacturer. For the purposes of this EIAR, the MW rated output for each Technology Option are shown in this table.*

Approach to Impact Assessment

A climate assessment has been prepared through desktop assessment, examining the climate effects of the project at a local level as well as on a national scale (Baseline description);

The climate effects of the proposed Project have been evaluated using two approaches, the ISO 14064-1:2018 Guidelines carbon return equation used to provide a high level assessment of the carbon payback of the project. This is the international accepted method and is the formula provided by DECC. The project has also conducted a more detailed assessment based on the newest version of the Carbon Calculator Tool (version 1.8.1, released on 11 Dec 2023) (hereafter referred to as the Carbon Calculator). Specifically designed for assessing the climate effects of wind farms, this tool was developed with input from the Scottish Government, Scottish Environment Protection Agency (SEPA), Scottish Natural Heritage (SNH), and Forestry Research (impact assessment). This model is specifically developed to assess the full project lifespan of the wind farm for forestry, peat and wetland sites. An Irish equivalent is not currently available, this model has been used in many similar wind farm applications in Ireland and is considered to align with industry best practice.

Calculating Carbon Losses and Savings

Carbon Calculator

To evaluate the potential effects of the proposed Project on the climate, the carbon emissions or savings associated with it were calculated using a Carbon Calculator.

The Carbon Calculator is designed to evaluate, in a thorough and consistent manner, the carbon effect of wind farm projects. It compares the carbon costs associated with the development of the wind farm to the carbon savings generated by the farm. The calculation considers the carbon emissions from various sources throughout the construction, operational, and decommissioning phases. This includes embodied carbon emissions

associated with the manufacture, transport, and installation of turbines, which are incorporated within the Scottish Government's Carbon Calculator to ensure a comprehensive lifecycle assessment in line with IEMA Guidelines.

For wind farm developments, the Carbon Calculator serves several key purposes:

1. **Carbon Payback:** The tool helps determine how long it will take for the wind farm to offset the carbon emissions that were produced during its construction through the renewable energy it generates. The concept is that a wind farm produces "clean" energy, which displaces fossil fuel-generated electricity, thus reducing carbon emissions over time.
2. **Lifecycle Emissions:** The Carbon Calculator accounts for CO₂ emissions from all stages of the wind farm's lifecycle:
 - **Construction:** Includes emissions from building the wind turbines, roads, and infrastructure;
 - **Operation:** Accounts for emissions from the day-to-day functioning of the wind farm (though these are typically low compared to fossil fuel energy production); and
 - **Decommissioning:** Emissions from dismantling the wind farm at the end of its operational life.
3. **Carbon Savings:** By comparing the carbon emissions of the wind farm to the emissions from traditional fossil fuel energy sources, the calculator estimates the total **carbon savings** over the lifetime of the wind farm.

The completed worksheet, which includes the assumptions used in the model, is provided in **Appendix 9.1 – Scottish Government – Carbon Calculation Input and Output**. The model calculates the total carbon emissions associated with the proposed Project, including the manufacturing of turbine technology, transport, construction, and tree felling. It is assessed for both the lower range (25 MW) and the higher range (29 MW).

Assumptions and Limitations

No assumptions of limitations have been identified for the climate assessment. Calculations and assessment have been based on the three Technology Options as defined in **Chapter 2 – Project Description** operating for a lifespan of 35 years.

9.2.4 Baseline Environment

Existing Environment Climate and Weather

Air temperatures in Ireland are notably mild, becoming slightly warmer in summer months. Met Éireann weather station at Mount Dillion Is the closest weather and climate monitoring station c. 8.5km from the proposed Project. **Table 9-21** displays mean temperatures in degrees Celsius for Mount Dillon Observatory from 2021-2024.

Table 9-21: Mean temperatures for Mount Dillon

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	4.3	7.3	7.2	8.9	13.1	12.9	12.9	14.3	12.2	10.3	7.7	6.8	10.0
2023	5.4	7.2	7.0	9.0	12.5	15.7	14.8	15.6	14.2	10.6	6.8	6.7	10.5
2022	5.4	6.6	6.4	8.2	12.2	13.4	16.3	15.2	12.6	11.2	8.2	2.8	9.9
2021	3.4	5.9	7.6	7.1	9.5	13.6	17.3	15.1	14.6	11.3	8.0	6.5	

Average potential evapotranspiration data from Mount Dillon Observatory is displayed in the **Table 9-22** from 2021-2024. Based on the average potential evapotranspiration (507.6 mm) from 2021–2024, actual evapotranspiration is estimated at 95% of the potential evapotranspiration, resulting in an average of 418 mm for 2023.

Table 9-22: Potential Evapotranspiration (mm) Mount Dillon Observatory 2021-2024

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	9.2	5.9	32.1	53.3	73.3	81.6	75.2	61.8	44.5	24.2	10.6	10.9	492.5
2023	8.4	17.9	30.9	53.2	85.2	96.2	71.4	67.1	44.0	21.9	11.0	n/a	507.2
2022	9.4	17.5	40.3	54.1	76.5	73.6	82.7	79.4	43.1	22.9	10.3	4.7	514.5
2021	5.8	19.2	29.9	58.7	74.5	83.0	93.2	64.4	41.3	24.5	11.7	10.0	516.2

Ireland's GHG Emissions

According to the EPA Ireland's GHG emissions have dropped by 1.2% since 1990. In 2023, emissions (excluding land use changes and forestry) were estimated at 55 million tonnes of CO₂ equivalent, which is:

- 6.8% lower than in 2022; and
- 7.9% lower than in 2019 (before COVID-19).

Figure 9-5 shows how emissions have risen and fallen each year since 1990. The biggest drops happened after the 2008 financial crisis and recession. While 2023 saw the largest drop in emissions outside of a recession, Ireland still isn't cutting emissions fast or consistently enough to meet its climate targets.

Ireland remains one of the highest per-person emitters of GHGs in the EU. Emissions per person fell from 11.4 tonnes in 2022 to 10.4 tonnes in 2023. With the population expected to grow to 5.2–5.6 million by 2031, per person emissions will need to drop significantly to stay within Ireland's climate goals.

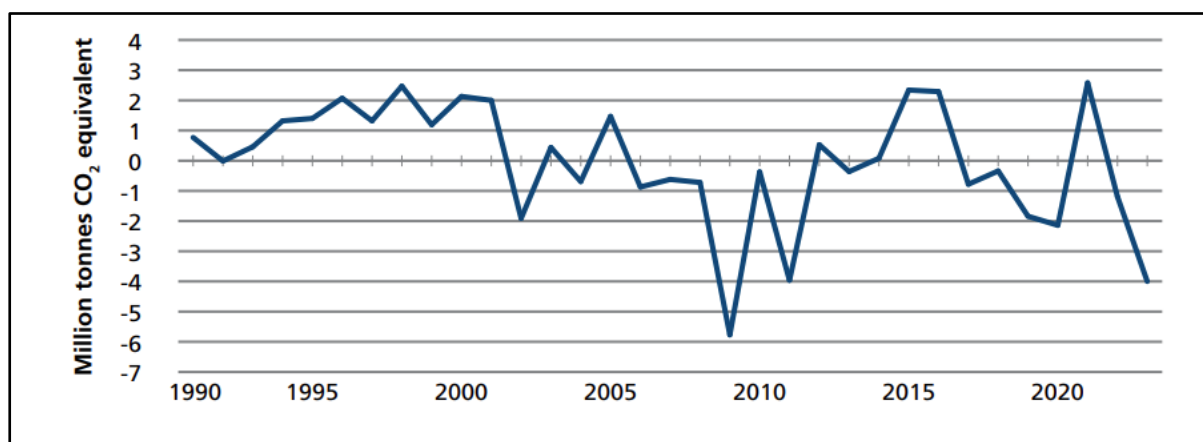


Figure 9-5: Interannual Changes in National Greenhouse Gas Emissions between 1990-2023 (EPA,2024)

Climate Change effects in Ireland

As shown in **Table 9-4** above Ireland has seen a 0.9°C increase in average temperature over the last 120 years, with a projected rise of 1–1.6°C by mid-century. These temperature changes could affect agriculture and forestry by lengthening the growing season but also increase the risk of drought, wildfires, and the spread of pests and diseases.

Precipitation patterns are changing, with more rainfall in winter and less in summer. Projections suggest less summer rainfall (up to 17%) and more extreme rainfall events, which could lead to water shortages and flooding.

Sea levels have risen by 2–3 mm/year since the 1990s, and further increases are expected, especially in the southwest, which could affect coastal areas. Warmer sea temperatures may also impact marine life and fish stocks.

9.2.5 Embedded Mitigation

Through the development of the proposed Project, measures have been adopted as part of the evolution of the design to avoid or reduce adverse effects on the environment. These measures are referred to as 'embedded mitigation' and are effectively built into the effects assessment. Embedded mitigation relevant to climate is set out below. Where additional mitigation measures are proposed, these are detailed after the after the assessment of effects (**Section 9.2.7**).

The process of site selection and the consideration of alternatives **Chapter 3 – Consideration of Reasonable Alternatives** has considered alternative locations, designs and processes for the proposed Project.

The process included a multi staged assessment which was guided by the 'Methodology for Local Authority Renewable Energy Strategies' Report from the SEAI (SEAI, 2013) and which included the consideration of environmental effects.

The primary reasons for the selection of the proposed wind farm Site was due to the absence of mapped EPA watercourses, the lack of identified mapped archaeological constraints within the site, no direct connectivity to European and nationally designated sites, good accessibility from the surrounding road network and the ability to satisfy setback distances for residential receptors.

9.2.6 Assessment of Effects

Do nothing Scenario

If the proposed Project did not advance, then the GHG emissions associated with construction and decommissioning phases would not occur. The opportunity to generate renewable electricity would be lost. The electricity may then be generated from alternative fossil fuel sources within the current Irish grid generation mix and the GHG savings that would arise from the operation of the proposed Project would be lost, leading to a **Long Term, Adverse and Significant** effect. In EIA terms, the effect is considered as **Significant**.

The potential for Ireland to reach its renewable energy targets set out in the National Climate Action Plan 2023 and to contribute to climate change mitigation would be reduced. Emissions of CO₂, NO_x and SO₂ from other fossil fuel sources that would otherwise have been displaced will continue to adversely contribute to climate change. This approach gives a clearer view of the consequences of not moving forward with the proposed Project, especially in the context of its positive environmental potential.

Carbon Losses

The potential carbon losses for the proposed Project were evaluated. The primary CO₂ losses associated with the project are outlined in **Table 9-23**. A full copy of the carbon calculation is provided in **Appendix 9.1 – Scottish Government Carbon Calculation Input and Output**.

To evaluate the proposed Project, all three Technology Options were used for the modelling assessment. Additionally, although some sections of the forestry at the Ballyfeeny site are scheduled for felling in 2025 and 2026 according to the Coillte felling registry and following storm damage from recent storms, a worst-case scenario was considered for the model. This scenario assumes that the proposed Project areas of forestry must be felled by the Project, resulting in the equivalent carbon footprint being lost, in order to represent the worst-case scenario for project carbon payback.

For the purposes of the model, the maximum area of forestry requiring felling based on the evaluation of current forestry and assuming trees at reasonable maturity has been used for the carbon loss assessment. The area of forestry is not dependent on the Technology Option. This represents a worst-case scenario and does not account for Coillte proposed felling and forestry thinning schedule for 2025 and 2026. Refer to **Chapter 6 – Biodiversity** for further details on habitat loss.

Table 9-23: CO₂ Equivalent emissions from the proposed Project in tonnes.

Items	<i>Expected (tCO₂)</i>	<i>Minimum (tCO₂)</i>	<i>Maximum (tCO₂)</i>
Turbine life	104,652	95,196	139,758
Backup	26,573	2,953	2,953
Bog plants	121	69	46
Soil organic carbon	0	318	301
Dissolved Organic Carbon (DOC) & Particulate Organic Carbon (POC)	31	22	20
Management of forestry	3,373	139	2,117
Total tCO₂	134,750	98,697	145,195

The worksheet model calculates that the proposed Project is expected to result in 98,697 tonnes of CO₂ equivalent losses at the lower range (25MW) and 145,195 tonnes of CO₂ equivalent emission at the higher range (29MW) equivalent losses over its 35-year lifespan.

The overview of these losses are as follows:

- Wind turbines accounts for 104,652 tonnes (78%) of the total CO₂ equivalent emissions with a lower range of 95,196 tonnes and a higher range of 139,758 tonnes;
- Backup emissions (wind accounts for 26,573 tonnes (20%);
- Soil organic matter, reduced carbon fixation potential, and forestry felling accounts for the remaining 3,572 tonnes (2% of the total) with forestry having the largest contribution of 3,373 tonnes CO₂; and
- The preliminary ground investigations completed as part of **Chapter 7 – Soils and Geology** identified there is no peat deposition onsite so there was no significant loss of soil carbon or restoration of bog included in the calculations.

The model was also used to calculate CO₂ losses assuming that hydrology and habitats will not be restored upon decommissioning. Backup emission and forestry felling account primarily for accessing track to the site and a worst-case forestry has been presumed to be removed.

However, if, at the end of the 35-year lifespan, the turbines are replaced with newer models, the carbon losses from not restoring the site's habitats or hydrology could be offset by the carbon-neutral energy generated by the new turbines. This would further reduce the overall carbon effect of the proposed Project, and a repowering project would be subject to further planning and assessment.

The assessments have been conducted based on a 35-year operational phase lifespan of the proposed Project and then the decommissioning of the Project in line with the **DMP – Appendix 2.1.4**. Climate impact and payback have been calculated based on this lifespan for the purposes of the EIAR.

Carbon Return Equation

An industry standard recognised formula is used to calculate CO₂ emissions reductions resulting from the generation of electricity from wind power rather than from carbon-based fuels such as peat, coal, gas and oil. (DECC website and ISO 14064-1:2018 Guidelines)

The formula is as follows: CO₂ (in tonnes) = $\frac{A \times B \times C \times D}{1000}$

1000

Where:

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

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

C = The number of hours in a year.

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

For the purposes of this calculation, the maximum rated capacity of the proposed Project is assumed to be approximately 29MW. The minimum rated capacity of the proposed Project is assumed to be approximately 25MW.

A capacity factor of 0.35 (or 35%) has been used for the proposed Project. (DECC website based on EirGrid 2024 and SEAI 2024).

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

In 2024, the emission factor for electricity generated from natural gas in Ireland is estimated to be approximately 229.9 grams of CO₂ per kilowatt-hour (gCO₂/kWh) (SEAI,2024)

The calculation for carbon savings at the lower and higher ranger is therefore as follows:

- CO₂ (in tonnes) = (25 x 0.35 x 8,760 x 229.9) 1000 = 17,621.835 tonnes per annum (Lower Range)
- CO₂ (in tonnes) = (29 x 0.35 x 8,760 x 229.9) 1000 = 20,441.3286 tonnes per annum (Higher Range)

Based on the calculation, it is estimated that approximately 17,621.84 tonnes (lower range) or 20,441.33 tonnes (higher range) of CO₂ will be displaced annually from the current Irish based grid energy mix which includes carbon based generation.

Over the proposed 35-year lifetime of the wind farm, the total estimated displacement of carbon dioxide is 617,763.73 tonnes (lower range) or 716,445.50 tonnes (higher range).

This provides the displacement of CO₂ based on the requirements of DECC and the ISO standard, however, this Chapter has conducted a more detailed assessment using the Carbon Calculator Tool which includes calculations of the impact of forestry and excavation as well as lifecycle assessment.

CO₂ Emissions Savings Comparison Carbon Calculator Tool (SEPA, 2024)

In order to provide a detailed assessment of the carbon savings of the proposed Project, in addition to the DECC calculations, the SEPA, 2024 Wind farm Carbon Calculator Tool was used to assess the Project.

Originally published in 2008 with research report, calculating carbon savings from wind farms on Scottish peat lands: a new approach (Nayak et al, 2008), the calculator has been refined on the basis of feedback and further research (Nayak et al., 2010 and Smith et al., 2011). The calculator was subsequently revised to include multiple regions for forestry and construction and updated to the most recent IPCC and production statistics as well as Smith et al 2014 to include hard stand, vegetative loss and forestry restoration.

The Carbon Calculator (**Appendix 9.1**) utilises assessment the total savings of carbon emissions from a wind farm are estimated with respect to emissions from different sources of power generation. Losses of carbon are accounted for due to production, transportation, erection, operation and dismantling of the wind farm, backup power generation, loss of carbon-fixing potential of peatland and wetland, loss of carbon stored in peatland, carbon saving due to improvement of habitat and loss of carbon-fixing potential as a result of forestry clearance

As shown above, estimates that the construction and operation of the proposed Project will result in 17,621.84 tonnes (lower range) or 20,441.33 tonnes (higher range) of CO₂ emissions (higher range) being released into the atmosphere.

The detailed assessment of the Carbon Calculator Tool includes the loss of forestry and changes in land use for hardstands etc as well as a more conservative estimation of windspeed ratios and conversion factors.

Based on the projected carbon savings over the 35-year lifespan of the wind farm, the carbon emissions from the construction and operation of the proposed Project will be offset in approximately 24 months of operation at the lower range and 34 months at the higher range.

Table 9-24 shows the amount of CO₂ emissions (in tonnes per year) that would be saved by using the wind farm instead of these traditional sources. It is expected the wind farm would save an expected 41,974 tonnes of CO₂ per year compared to using fossil fuels mix for energy generation. The table provides a range of CO₂ savings, showing the minimum and maximum amounts depending on the type of energy generation mix used (e.g., coal or grid electricity) and the current energy mix in Ireland.

Table 9-24: CO₂ emissions saving comparison to tradition energy generation

Windfarm CO ₂ emission saving per annum	Expected	Minimum	Maximum
Coal-fired electricity generation (tCO ₂ yr ⁻¹)	6,080	6,423	6,851
Grid-mix of electricity generation (tCO ₂ yr ⁻¹)	14,972	15,816	16,870
Fossil fuel - mix of electricity generation (tCO ₂ yr ⁻¹)	41,974	44,339	47,295
Energy output from windfarm over lifetime (MWh)	2,288,315	2,417,234	2,578,383

Table 9-25: CO₂ payback times in comparison to tradition energy generation.

Windfarm CO ₂ emission results	Expected	Minimum	Maximum
Net emissions of carbon dioxide (t CO ₂ eq.)	124,802	37,210	266,065
Carbon Payback Time	28 Months	24 Months	34 Months
Coal-fired electricity generation (years)	20.5	5.4	41.4
Grid-mix of electricity generation (years)	8.3	2.2	16.8
Fossil fuel - mix of electricity generation (years)	3.0	0.8	6.0
Ratio of CO ₂ eq. emissions to power generation (g / kWh) (TARGET ratio by 2030 (electricity generation) < 50 g /kWh)	55	14	110

Note: Items in red exceed the 2030 Targets

Construction Phase

The construction of the proposed Project and all associated infrastructure will require the use of construction vehicles and machinery on-site. This will lead to the generation of GHG emissions, such as CO₂, CO, and (NO), as a result of the fuel consumption by the vehicles and plant machinery during construction activities. The model has used a worst-case scenario for the forestry felled onsite of 10.12ha to include bat buffers and other clearance. The lost forestry accounts for an expected loss of 3,373 t CO₂ eq during the operations phase.

However, a section of the forest is planned to undergo felling and thinning activities in 2025, and thus prior to the commencement of the Project. This planned tree felling is a standard part of commercial forestry. The assessment has calculated the potential effects without this thinning activity (as a worst-case scenario), as it was not undertaken at the time of the baseline assessments. If it occurs as planned, it will be completed prior to the Project commencement so there is no cumulative interaction with Coilltes planned activities. It should be noted that as a result of storm Eoghan (January 2025) it is possible that Coillte may undertake additional felling and clearance operations as a result of storm damage, these works are planned in 2025 and may result in areas of forestry that the project has anticipate felling in association with construction being already cleared before the project starts.

The potential effect from construction and felling activities will be minimal, considering the relatively small amount of GHG emitted, and will be confined to the construction phase. Therefore, this effect is **Short-term, Adverse and Slight**. In EIA terms, the effect is considered as **Not Significant**.

Operational Phase

The operational phase of the proposed Project will not produce any GHG emissions. Over the 35-year lifespan of the Project, it will help offset CO₂ emissions by replacing fossil fuel-based electricity generation. The proposed Project is expected to reduce carbon dioxide emissions of the current Irish grid generation mix by 14,972 tonnes annually at the lower expected capacity, or 16,870 tonnes annually at the higher expected capacity.

The proposed Project is aligned with current energy and climate policy, aims and objectives, which primarily seek to increase the production of electricity from renewable sources. This reduction represents a **Long-Term, Positive and Significant** benefit to climate. In EIA terms, the effect is considered as **Significant**.

Decommissioning Phase

The Applicant is seeking consent for a period of 35 years for the operation of the proposed Project from the date of commissioning. Following the end of the operational phase the applicant may wish to repower the wind farm to extend the life of production, subject to fulfilling the planning requirements at the time. Repowering and decommissioning alternatives are described in **Chapter 3 – Consideration of Reasonable Alternatives**. For the consideration of effects the full decommissioning of the site has been considered. The Onsite Substation and GCR will remain in place as it will be under ESB Networks ownership and will form part

of the National Grid. The Relay Tower will remain in place as it will form part of the telecommunication network in the area.

A description of the decommissioning is as follows:

- Removal of the turbines including the blades, hub, nacelle and wind turbine towers;
- Removal of the above ground section of the Turbine Foundation called the 'plinth';
- Removal of all Wind Farm Internal Cabling. The cable ducting will remain in-situ to minimise the associated ground disturbance; and
- Reinstatement of the Turbine Hardstands and Turbine Foundations, by covering with earth and reseeded/replanted as appropriate.

The Turbine Foundations will remain in place underground except for the foundation plinth that will be removed below ground level. The Site Access Tracks and associated drainage will serve the ongoing forestry and farming practices in the area. All other hard surfaced areas such as the Turbine Hardstands will be covered by earth and reseeded/replanted as agreed at the time with the landowners and the Local Authority.

Appendix 2.1.4 – DMP has been prepared as part of this EIAR. This Plan and all final requirements for the infrastructure will be updated and finalised with the Local Authority in advance of decommissioning activities commencing. Further details on the decommissioning phase are provided in **Chapter 2 – Project Description**.

It is anticipated that for the purposes of the assessment, that the effects will be no greater than those identified for the construction phase. The decommissioning will return the site to a state where the predevelopment activities (agriculture and forestry) can be resumed by the landowner, if they so wish. For the purposes of the Climate assessment, it is assumed that the land will return to predevelopment use by the respective landowners after decommissioning. In the case of forestry, it is assumed a 10-year growth cycle to return to maturity after decommissioning.

Furthermore, in most cases the effects in terms of Climate will be of a shorter duration and scale during the decommissioning phase. The likely significant effects are considered to be **Short-term, Adverse** and **Slight**. In EIA terms, the effect is considered as **Not Significant**.

9.2.7 Mitigation Measures

Construction Phase Mitigation

The following climate mitigation measures will be implemented during the construction phase of the project, with the aim of reducing greenhouse gas emissions and supporting sustainable practices:

- Management of vehicles including emissions and fuel usage;
- In the event of a vehicle requiring repairs, maintenance will be promptly carried out, thereby minimising emissions arising from inefficient operation;
- When onsite vehicles are stationary, they will be required to turn off their engines to reduce unnecessary idling emissions; Users of the site must ensure that all plant and vehicles are properly maintained to minimise emissions of engine-generated pollutants;
- The majority of aggregate materials and concrete for the construction of the proposed Project will be obtained from local quarries, thereby reducing the emissions associated with vehicle movements;
- Use of local quarries, materials suppliers and waste facilities will be used; and
- Groundworks and excavation are minimised to required development areas. Soils and subsoils to be reused onsite to reduce transport requirements.

These measures are also captured in **Appendix 2.1 – CEMP**.

The appointed Contractor will brief construction site personnel on emission management measures during Toolbox Talks and Site Meetings.

Operational Phase Mitigation

The operational phase of the proposed Project will have a favourable effect on the climate due to the removal use of fossil fuels, meaning no additional mitigation is required for this phase.

In cases where turbine components are to be replaced, the same mitigation measures as those applied during the construction phase will be implemented.

Decommissioning Phase Mitigation

During the decommissioning phase, it is expected that the mitigation measures described for the construction phase will be implemented as part of **Appendix 2.1.4 – DMP** to avoid and/or minimise any potential effects.

9.2.8 Residual Effect

Construction Phase

As no likely significant effects on Climate were identified for the construction phase in the pre-mitigation assessment, no likely significant residual effects arise for the construction phase.

With the implementation of the mitigation measures outlined in **Section 9.2.7** and **Appendix 2.1 – CEMP**, the residual effects during the construction phase are assessed as **Short-term, Adverse** and **Not Significant**. In EIA terms, the effect is considered as **Not Significant**.

Operational Phase

Once the proposed Project is operational, it will be contributing to the reduction of greenhouse gas emissions, which is assessed as **Long-Term, Positive** and **Significant** benefit to the climate. In EIA terms, the effect is considered as **Significant**.

Decommissioning Phase

With the implementation of mitigation measure outlined above, the residual effects during the decommissioning phase are assessed as **Short-term, Adverse** and **Temporary**. In EIA terms, the effect is considered as **Not Significant**.

9.2.9 Risk of Major Accidents and/or Disaster

This section considers the vulnerability of the proposed Project to major accidents and/or disasters, the risk of those major accidents and/or disasters occurring and the potential for any significant adverse effects on climate.

According to EPA Guidelines, these unplanned events can include ‘spill from traffic accidents, floods or landslides affecting the site, fire, collapse or equipment failure on site’. Additionally, the EIA Directive requires “major accidents, and/or natural disasters (such as flooding, sea level rise or earthquakes)” be addressed.

The *Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report* (European Commission, 2017) requires the consideration of major hazards in the context of the SEVESO III Directive. It is noted that the proposed Project will not come under the Control of Major Accident Hazards (COMAH) Regulations. Additionally, the wind farm Site and GCR are not located in proximity to a COMAH establishment with the closest establishment located c. 37km west. Works for the

TDR will be localised and temporary in nature and no interactions with COMAH sites are anticipated

Climate relevant aspects are as follows:

- **Extreme Weather** - Wind farms are designed to withstand specific wind conditions, however severe weather events such as strong storms, heavy rainfall, or snowfall can lead to temporary shutdowns, component stress, or access issues. Although hurricanes are unlikely in Ireland, increasing storm intensity due to climate change could pose operational challenges.
- **Flooding** - Increased rainfall and surface water runoff may result in localised flooding of access roads, hardstands, or substations. While the project design will include standard drainage measures, ongoing climate trends may lead to more frequent or intense rainfall events.
- **Temperature Extremes** - Both high and low temperatures can affect turbine performance and component durability. Heatwaves may put pressure on electrical systems, while cold weather, although becoming less frequent, can still cause icing or mechanical strain. Snowfall is projected to decrease by around 31% but isolated snow or ice events remain possible (Nolan, 2025). These can affect blade performance and may require temporary shutdowns or mitigation measures.
- **Seismic Activity** - Although Ireland is considered a low-risk region for seismic events, this is still recognised in national guidance. All three Technology Options consider resistance to small scale seismic events within their design.

Potential unplanned events have been considered. Given the predicted lifespan of 35 years anticipated changed in climate even on the more extreme climate models and scenarios are relatively minor. Through the application of best practice in site selection, engineering design, and mitigation planning, the vulnerability of the proposed Project to unplanned events or natural disasters is considered to be low.

9.2.10 Cumulative Effects

Once operational, the proposed Project will not produce any direct CO₂ or other GHG emissions. The only emissions associated with the operational phase will arise from occasional maintenance and service vehicles. These emissions will be **Long-term, Adverse** and **Imperceptible** in the context of the project's overall operation. In EIA terms, the effect is considered as **Not Significant**.

As such, the proposed Project will not contribute any measurable or significant adverse cumulative effects on climate when considered alongside other developments in the area. The Volume of vehicles is so low that, even when combined with traffic from other nearby or future projects, it would not lead to any noticeable or meaningful impact on greenhouse gas emissions or the climate.

On the contrary, should this proposed Project and other renewable energy projects become operational, the combined **Long Term, Positive** and **Significant** will be substantial climate through the avoidance of CO₂ emissions. In EIA terms, the effect is considered as **Significant**.

9.2.11 Inter- Related Effects

The topics addressed in this EIAR do not exist separately from one another, and therefore, any effect on a specific element of the environment has the potential to impact another. The interactions between effects on various factors throughout the EIAR, are described, in **Chapter 17 – Interrelated Effects**.

9.2.12 Summary of Effects

The significance of effects of all aspects of the construction, operation, and decommissioning of the proposed Project on the receiving environment in regard to Climate. **Table 9-26** displays the Summary of Effects for all phases of the Project.

The assessment has identified that there will be **Significant** positive effects on Climate as a result of the proposed Project.

Table 9-26: Summary of Effects

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
Construction Phase				
Climate	Construction vehicles and machinery onsite will lead to the generation of greenhouse gas emissions, such as carbon dioxide (CO ₂), carbon monoxide (CO), and nitrogen oxides (NO _x), as a result of the fuel consumption by the vehicles and plant machinery during construction activities. To facilitate construction, small areas of tree felling, totalling approximately 10.12 hectares.	Therefore, this effect is Short-term, Adverse and Slight . In EIA terms, the effect is considered as Not Significant .	Construction phase mitigation measures are outlined in Section 9.2.8. No further mitigation measures are required in addition to those outlined in the Chapters of this EIAR.	Taking mitigation measure into account, the residual effects during the construction phase are assessed as Short-term, Adverse and Not Significant . In EIA terms, the effect is considered as Not Significant .

Receptor	Potential Effect	Significance of effect	Additional Mitigation	Residual significance of effect
Operational Phase				
Climate	The operational phase of the proposed Project will not produce any greenhouse gas emissions or odorous pollutants. Over the 35-year lifespan of the Project, it will help offset carbon dioxide emissions by replacing fossil fuel-based electricity generation	This reduction represents a Long-Term, Positive and Significant benefit to the climate. In EIA terms, the effect is considered as Significant .		Once the proposed Project is operational, it will be contributing to the reduction of greenhouse gas emissions, which is assessed as Long-Term, Positive and Significant benefit to the climate. In EIA terms, the effect is considered as Significant .
Decommissioning Phase				
Climate	It is anticipated that the effects will be no greater than those identified for the construction phase.	The likely significant effects are considered to be Short-term, Adverse and Slight . In EIA terms, the effect is considered as Not Significant .		With the implementation of mitigation measure the residual effects during the decommissioning phase are assessed as Short-term, Adverse and Temporary . In EIA terms, the effect is considered as Not Significant .

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