CONTENTS

TABLES

Acronyms and Abbreviations

AADT	Annual Average Daily Traffic
AAMP	Air Quality Monitoring Programme
AFOLU	Agriculture, Forestry and Other Land Use
CCAC	Climate Change Advisory Council
CEMP	Construction Environmental Management Plan
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CTMP	Construction Traffic Management Plan
DECC	Department of the Environment, Climate and Communications
GCR	Grid Connection Route
GHG	Greenhouse Gas
Grid Connection Route (GCR)	Refers to the proposed Grid Connection Route as defined in Chapter 1 of this EIAR.
HDV	Heavy Duty Vehicles
IEMA	Institute of Environmental Management and Assessment
kWh	Kilowatt Hour
LDV	Light Duty Vehicles
Main Wind Farm Development Site	The site where the Proposed Development is located. As defined in Chapter 1 of this EIAR.
N_2O	Nitrous Oxide
NHA	National Heritage Site
NO_2	Nitrogen dioxide
NOx	Oxides of Nitrogen
PM_{10}	Particulate matter with diameter of less than 10µm
$PM_{2.5}$	Particulate matter with diameter of less than 2.5µm
Proposed Project	Refers to the Proposed Development including the GCR.
RCP	Representative Concentration Pathways
RICS	Royal Institution of Chartered Surveyors
SAC	Special Area of Conservation
SEAI	Sustainable Energy Authority of Ireland
SPA	Special Protection Area
Turbine Delivery Route (TDR)	Refers to the proposed turbine delivery route as defined in Chapter 1 of this EIAR.
WHO	World Health Organisation
WLCA	Whole Life Cycle Assessment

8.0 AIR QUALITY AND CLIMATE

INTRODUCTION

8.1 This chapter identifies, describes, and assesses the potential significant direct, indirect, and cumulative effects on air quality and the impacts on climate from the Proposed Project during construction, operation and decommissioning phases. The Proposed Project as assessed in this EIAR comprises the Proposed Development together with the GCR as described in **Chapter 2** of this EIAR. The GCR will not form part of the planning application but is assessed in this EIAR.

Overview of the Local Environment

8.2 The Main Wind Farm Development Site is situated within a coastal region of County Mayo and occupies a relatively condensed area of around 3km in a northeast to southwest orientation, encompassing 2 cluster areas. The Main Wind Farm Development Site boundary is also in proximity to several smaller settlements within a 5km radius, the village of Gweesalia located approximately 0.5km away and Bangor Eris located approximately 8km away (see **Chapter 2**, **Figure 2-1** - Site Location Map). The wider area is illustrated in **Figure 2-2** - Site Context Map. Geographically, the Main Wind Farm Development Site lies north of the intersection of roads L1205 and L1206. The L1206 borders the southern edge of the Main Wind Farm Development Site, while the L1205 runs westward and leads to the R313, located approximately 4km north of the Main Wind Farm Development Site. The R313 provides connections to more extensive road networks, as indicated below.

8.3 The Main Wind Farm Development Site is traversed by a local road (L5252) branching from the L1206 (see **Chapter 2**, **Figure 2-2).** This road runs longitudinally through the Main Wind Farm Development Site, spanning from northwest to southeast, connecting the L1205 and L1206.

8.4 The Main Wind Farm Development Site predominately consists of cutover lowland blanket bog. Small areas of scrub and wet grassland are also present. Habitat within the immediate vicinity of the Main Wind Farm Development Site comprises conifer plantation and peatland. The Main Wind Farm Development Site is located on low-lying terrain, ranging from 3 m AOD at the southern end to 33 m AOD at the northeastern portion.

8.5 There are 109 residential properties located within 1km of the Main Wind Farm Development Site (the main wind farm area). There are 282 residential properties within 500m of the Grid Connection Route (GCR). The nearest residential property is located approximately 740m from the nearest wind turbine (T10).

Limitations / Difficulties Encountered

8.6 This assessment is compiled based on published regional and local data and on guidance documents. No difficulties were encountered in compiling the required information.

8.7 It was necessary to make several assumptions when carrying out the GHG assessment, although assumptions made sought to reflect a realistic worst-case scenario. These have been defined in the chapter below.

Consultations / Consultees

8.8 Scoping consultation was carried out in April 2024, and no specific consultation responses were received with regard to climate change and air quality.

AIR QUALITY

Statement of Authority

8.9 The air quality impact assessment presented in this chapter was prepared by SLR Consulting Ireland. The consultants who undertook and reviewed the assessment were:

8.10 Rachel McHale BSc. (Hons) Geography MIAQM, MIES, has over 19 years of professional experience as an air quality consultant, specialising in mineral and energy developments. Rachel has worked a wide variety of high-profile mineral and renewable energy schemes both nationally and internationally. In her career, Rachel was a member of the IAQM working group and contributed to the publication of the IAQM Guidance on the Assessment of Mineral Dust Impacts for Planning.

9.1 Ryan Guppy (Senior Consultant – Air Quality), BSc. (Hons) Geography, MIAQM, MIES and has 5 years of professional experience as an air quality consultant, undertaking a wide range of assessment methodologies including those relevant to the minerals dust sector (i.e. Dust Impact Assessment / Dust Monitoring Schemes and Dust Management Plans) for planning and permitting.

9.2 The climate assessment presented in this chapter was prepared by SLR Consulting Ireland. The consultants who undertook and reviewed the study were:

8.11 Luke Moseley MSc, BSc, is a Managing Consultant in SLR's Carbon & Energy Management team within the ESG Strategic Advisory technical discipline. Luke has six years of professional experience delivering and managing Scope 1, 2, and 3 greenhouse gas (GHG) emissions and energy calculations, including the development of GHG inventories across a diverse range of projects and clients. He has contributed to climate chapters for multiple renewable energy projects and supported clients in developing decarbonisation strategies and net zero pathways.

8.12 This chapter has been supported and reviewed by Nicola Herschell MSc, MIEMA, CEnv. Nicola is a Technical Director in SLR's Carbon & Energy Management team within the ESG Strategic Advisory technical discipline. Nicola has over 14 years professional experience, with 8 years in her current role at SLR, where she manages a team of consultants. Nicola has worked with a wide variety of large, high profile, multi-site organisations to help manage their reporting requirements and to ensure both Group and site-level compliance with the full suite of carbon and energy legislation, with particular specialism in the EU/UK Emissions Trading Scheme, GHG permitting, Climate Change Agreements, Climate disclosures, Streamlined Energy & Carbon Reporting, and the GHG Protocol.

Regulations

8.13 To protect our health, vegetation and ecosystems, EU Directives have set out air quality standards for Ireland and the other member states for a wide variety of pollutants. These Directives include how we should monitor, assess, and manage ambient air quality. The European Commission set down the principles to this approach in 1996 with its Air Quality Framework Directive (96/62/EC). Four "daughter" directives lay down limits for specific pollutants:

- 1st Daughter Directive (99/30/EC): Sulphur dioxide, nitrogen dioxide and oxides of nitrogen, particulate matter, and lead;
- 2nd Daughter Directive (2000/69/EC): Carbon monoxide and benzene;
- 3rd Daughter Directive (2002/69/EC): Ozone; and

- 4th Daughter Directive (2004/107/EC): Polyaromatic hydrocarbons, arsenic, nickel, cadmium, and mercury in ambient air.

8.14 The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was published in May 2008. It replaced the Framework Directive and the first, second and third Daughter Directives.

8.15 In 2015, the Commission adopted Directive (EU) 2015/1480, which amended several technical annexes of both the CAFE Directive (2008/50/EC) and Directive 2004/107/EC. This amendment updated and harmonised the reference measurement methods, data quality objectives, and siting criteria for air quality monitoring, ensuring consistency and comparability of data across all EU Member States.

8.16 The limit and target values for both Directives are outlined below.

8.17 The CAFE Directive (as amended) is transposed into Irish legislation by the Ambient Air Quality Standards Regulations (AAQSR) 2022. It replaces the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011), the Ozone in Ambient Air Regulations 2004 (S.I. No. 53 of 2004) and the Environmental Protection Agency Act, 1992 (Ambient Air Quality Assessment and Management) Regulations, 1999 (S.I. No. 33 of 1999).

8.18 The fourth Daughter Directive was transposed into Irish legislation by the Arsenic, Cadmium, Mercury, Nickel, and Polycyclic Aromatic Hydrocarbons in Ambient Air Regulations 2009 (S.I. No. 58 of 2009).

8.19 Directive (EU) 2015/1480 is reflected in Ireland through updates to monitoring and reporting practices undertaken by the EPA, in line with the amended technical requirements of the CAFE framework.

8.20 **Table 8.1** details the limit values for pollutants relevant to this assessment as per the CAFE Directive and associated amendments.

Table 8.1 Relevant Air Quality Limit Values: Protection of Human Health

Pollutant	Limit / Target Value		
	Averaging Period	Value	Source
Nitrogen dioxide (NO_2)	Hourly limit for protection of human health - not to be exceeded more than 18 times/year	200	AAQSR
	Annual limit for protection of human health	40	AAQSR
Oxides of Nitrogen (NOx)	Annual limit for protection of vegetation	30	AAQSR
Particulate matter with aerodynamic diameter of less than 10 µm (PM_{10})	24-hour limit for protection of human health - not to be exceeded more than 35 times/year	50	AAQSR
	Annual limit for protection of human health	40	AAQSR
Particulate matter with aerodynamic diameter of less than 10 µm ($PM_{2.5}$)	Annual target value for the protection of human health	25	AAQSR

Specific Guidance Relating to Air Quality / Nuisance

8.21 When the rate of accumulation of the coarser fraction of dust (referred to as deposited dust) is sufficiently rapid to cause fouling or discolouration, then it is generally considered to

introduce a nuisance. The point at which an individual perceives dust deposition as a nuisance and causes a complaint is highly subjective.

8.22 A range of monitoring techniques exist for dust deposition rates (i.e., Bergerhoff and Frisbee gauges). There is currently no Irish, European Union (EU) or World Health Organisation (WHO) statutory standards or limits appropriate for the assessment of deposited dust and its propensity to generate annoyance.

8.23 Industry standard criteria levels for the gravimetric assessment of dust deposition in Ireland recommend the use of the Bergerhoff method for measuring dust deposition, the TA Luft dust deposition limit value of 350 mg/m^2/day (total dust deposition averaged over a 30-day period), measured at development site boundaries.

Assessment Methodology

8.24 The assessment approach has been informed by both national and local planning policy and guidance and established best practice and experience. The methodology used is presented in the sub-sections below.

Assessment Guidance

8.25 The air quality assessment has been carried out with reference to the principles contained within the following guidance documents:

- Air Quality Assessment of Proposed National Roads – Standard (Transport Infrastructure Ireland TII Publication PE-ENV-01107, 2025);
- Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Environmental Assessment Techniques (UK Highway Agency, 2019):
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (Transport Infrastructure Ireland, 2009);
- Guidance on the Assessment of Dust from Demolition and Construction (Institute of Air Quality Management (IAQM, 2024); and
- Guidance on Land-use Planning and Development Control: Planning for Air Quality (IAQM, 2017).

Baseline Air Quality

8.26 There are four zones, based on population density and location type, which help in assessing compliance with air quality limit values, these are as follows:

- Zone A: Dublin city and its suburbs – high population density urban areas;
- Zone B: Other cities and large towns – moderate population density urban areas;
- Zone C: Smaller towns and urban centres – low population density urban areas; and
- Zone D: Rural areas – predominantly countryside, low population density, away from urban centres.

8.27 The Main Wind Farm Development Site is located within air quality Zone D (Rural Ireland), therefore, baseline air quality has been determined from the data available from the EPA monitoring Zone D network to determine compliance with relevant ambient air legislation.

Assessment of Traffic Emissions

8.28 Atmospheric emissions related to site proposals are primarily associated with the exhaust emissions from heavy duty vehicles (HDVs also termed heavy goods vehicles HGVs). A prediction of the local impact of traffic-derived emissions has been carried out as per the following subsections.

Screening Impacts for the Affected Road Network

8.29 The assessment of air quality effects in relation to traffic generated during the construction and operational phase of the Proposed Project has been screened in accordance with Transport Infrastructure Ireland (TII) guidance and the DMRB guidance to identify whether further assessment is required.

8.30 The following traffic screening criteria used to determine whether the air quality impacts of a project can be scoped out or require a detailed assessment is based on the changes between the do something traffic (with the project) compared to the do minimum traffic (without the project) in the opening year.

8.31 Relevant screening applicable to the affected local road network is:

- Annual average daily traffic (AADT) flows will change by 1,000 or more; or
- Heavy duty vehicle (HDV) flows will change by 200 AADT or more; or
- a change in speed band; or
- a change in carriageway alignment by ≥ 5 m.

8.32 If the traffic is not found to exceed any of the screening criteria presented, then effects are considered to be not significant and can be screened out of further consideration.

8.33 If the screening criteria is exceeded, human and ecological receptors within 200 m of affected roads will be assessed, where necessary. If an ecological and/ or human receptor is located >200 m from an affected road link, further consideration is not required.

8.34 The 200 m distance screening threshold is supported in various guidance documents including the TII guidance and is therefore considered appropriate.

Assessment of Dust Emissions

8.35 The potential for dust emissions from the Proposed Project is addressed qualitatively in accordance with the Air Quality Assessment of Proposed National Roads (2022a); referred to hereafter as the TII Guidelines). The 2022 iteration of this guidance supersedes the 2011 Transport Infrastructure Ireland 'Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes', or TII Air Quality Guidelines (TII 2011).

8.36 Section 3.8.4 of the TII Guidelines recommends the use *"The latest version of the IAQM guidance".* As such, v2.2 (published January 2024) of the IAQM Construction Dust Assessment Guidance (the 'IAQM Dust Guidance') has been used to inform the assessment.

8.37 The assessment of dust generated by construction activities on nearby sensitive human and ecological receptors has been undertaken in accordance with the IAQM construction guidance (IAQM, 2024).

8.38 The likely impact magnitude of unmitigated dust emissions associated with demolition, earthworks, construction, and trackout is used in conjunction with the receptor sensitivity to determine the risk of impact for each activity. These sensitivities are:

- Annoyance due to dust soiling;

- The risk of health effects due to an increase in exposure to PM_{10}, and
- Harm to ecological receptors.

8.39 The risk of impact is then used to determine proportionate mitigation requirements in line with the IAQM guidance (IAQM, 2024), which form embedded mitigation for the Proposed Project. The likelihood for a significant effect to arise is considered with this embedded mitigation in place.

Design Parameters Assessment Methodology

8.40 Air quality and climate resilience have been assessed for the turbine dimensions listed in **Table 1-1** of **Chapter 1** of this EIAR. The difference between the design parameters of the three turbine types is considered to be minimal in terms of air quality and climate resilience. The carbon calculations for the Proposed Project are based on the three candidate turbine models which have been assessed against their impact on the national carbon budgets.

Existing Baseline Environment

8.41 A desk study has been carried out to examine all relevant information relating to air quality conditions around the Main Wind Farm Development Site. The EPA website was examined to note information on baseline air monitoring data around the Main Wind Farm Development Site. The EPA co-ordinates and manages a nationwide network of over 110 monitoring stations which measures the levels of air pollutants and delivers this information to the public as part of the National Ambient Air Quality Monitoring Programme (AAMP), which involved a greatly expanded national monitoring network providing enhanced real-time information to the public, as well as an increased local authority capacity to conduct indicative air monitoring. The results of the monitoring are compared to limit values set out in EU and national legislation on ambient air quality.

8.42 The Main Wind Farm Development Site, the GCR and the run-off areas along the TDR fall into Air Quality Zone D, categorised as rural Ireland by the EPA.

Future Baseline Environment

8.43 Baseline air quality conditions are expected to change over time between the existing situation and the operational phase of the Proposed Project. In line with national and EU trends, overall air quality is anticipated to improve in the medium to long term.

8.44 Improvements are expected to arise primarily from continued fleet renewal, increased uptake of electric and low-emission vehicles, and progressively tighter vehicle emission standards. These trends are supported by national and local policies aimed at improving air quality and reducing emissions from transport and other key sources.

8.45 At a national level, Ireland remains subject to EU air quality legislation, with ongoing obligations to meet ambient air quality limit values and targets. Where exceedances are identified, local authorities are required to implement appropriate measures to address them through transport management, land-use planning and other interventions.

8.46 As a result of these factors, background pollutant concentrations are generally expected to decline over time, particularly for nitrogen dioxide (NO_2) associated with road traffic emissions. This assumption is consistent with national monitoring trends and EPA reporting.

8.47 The future baseline considered for the Proposed Project therefore reflects anticipated improvements in background air quality, alongside the influence of other committed developments and plans in the surrounding area. This approach ensures that the

assessment is cumulative in nature and representative of reasonably foreseeable future conditions.

Local Air Quality Monitoring

8.48 The closest national air quality monitoring location to the Main Wind Farm Development Site in a similar Zone D area is located in Castlebar c. 50 km south-east of the Main Wind Farm Development Site. This site monitors levels of PM_{10} and NO_2.

8.49 The closest national air quality monitoring locations in a similar Zone D area that monitors for $PM_{2.5}$ is Claremorris c. 73km south south-east.

8.50 Recent annual mean concentrations monitored at Castlebar and Claremorris (published on the EPA website) are presented in **Table 8.2** and **Table 8.3** below.

Table 8.2 Particulate Matter (PM_{10} & $PM_{2.5}$) Data at Castlebar & Claremorris

Year	PM_{10} (Castlebar)		$PM_{2.5}$ (Claremorris)
	Annual Mean (µg/m^3)	No. Days >50 µg/m^3	Annual Mean µg/m^3
2023	9.9	0	5.2
2022	11.2	0	6.1
2021	9.8	0	8.2

Table 8.3 Nitrogen Dioxide (NO_2) Data at Castlebar

Year	Annual Mean (µg/m^3)	Hourly Maximum (µg/m^3)
2023	6.6	65.9
2022	7.5	85.4
2021	6.3	73.3

8.51 The tables above indicate that NO_2, PM_{10} and $PM_{2.5}$ concentrations monitored are all below the annual mean limit values and there are no exceedances of the 1-hour or 24-hour NO_2 and PM_{10} limit values, respectively. For rural areas, such as those surrounding the Main Wind Farm Development Site, it is anticipated that background concentrations will be no greater than the measured data presented.

Local Mapped Background Concentrations

8.52 EPA regional-to-local (street) scale air pollutant concentration modelling for Ireland has been undertaken for 2018 and 2019. These models have been subsequently updated and now provide daily forecast, hourly updated and annual high-resolution maps for air quality in Ireland. Datasets from the latest EPA report[1] (2024) have been sourced and presented in **Table 8.4**.

Table 8.4 EPA Background Modelled Data (2023)

Pollutant	Mapped Background Concentration (µg/m^3)
NO_2	<5

[1] Environmental Protection Agency (2024) Air Quality in Ireland Report 2023

Pollutant	Mapped Background Concentration (µg/m^3)
PM_{10}	<7
$PM_{2.5}$	5-6

Sensitive Receptors

Ecological Receptors

8.53 Mapping data published by the National Parks and Wildlife Service (NPWS) and the Air Pollution information System (APIS) has been utilised to identify designated ecological sites and protected habitats within the Main Wind Farm Development Site locale and the Over-run Areas along the TDR.

8.54 The Main Wind Farm Development Site is not subject to any statutory or non-statutory nature conservation designations. However, there are relevant ecological receptors located within relevant distances of the Main Wind Farm Development Site, the GCR and the Over-run Areas along the TDR. These are discussed in turn below.

Main Wind Farm Development Site

8.55 The Main Wind Farm Development Site is located in close proximity to several designated ecological sites. The Mullet / Blacksod Bay Complex SAC, the Blacksod Bay / Broad Haven SPA and Ramsar Site lie less than 100m to the west of the site boundary at its southern extent; however, all proposed turbine locations and associated earthworks are situated at distances greater than 500 m from these European designations. Tristia Bog NHA is located adjacent to the northeastern boundary of the Main Wind Farm Development Site, while the Tullaghan Bay and Bog NHA, which also forms part of the Blacksod Bay / Broad Haven SPA, is located approximately 650m to the southeast.

Grid Connection Route

8.56 As the GCR extends eastwards away from the Main Wind Farm Development Site, it passes in relevant distance of several European and nationally designated sites. These include the Owenduff / Nephin Complex SAC and SPA, the Carrowmore Lake Complex SAC, and the Bellacorick Bog Complex SAC. In addition, the Tullaghan Bay and Bog NHA is located adjacent to the GCR approximately 1 km east of the Main Wind Farm Development Site, while the Owenduff / Nephin Complex, Carrowmore Lake Complex and Bellacorick Bog Complex proposed NHAs occur along the route as it continues eastwards.

Over-run Areas along the Turbine Delivery Route

8.57 The Over-run Areas associated with the TDR closely follow and interact with the GCR. As such, the nearest European and national ecological designations relevant to these areas are the same as those identified for the GCR.

Human Receptors

8.58 Sensitive locations are those where people may be exposed to emissions to air from the Proposed Project. Receptors have been identified within a 1 km distance of the proposed turbine locations and any associated earthworks on site, as illustrated in **Figure 4-3** of **Chapter 4** of this EIAR.

8.59 There are no human receptors within 500m of the proposed turbines or any associated earthworks on Main Wind Farm Development Site. There are a total of 280 residences within 500m of the GCR.

Assessment of Potential Impacts – Construction

8.60 This section presents the assessment of impacts arising from the construction phase of the Proposed Project.

8.61 The assessment of construction dust has utilised the methodology prescribed the IAQM Construction Dust Guidance (2024).

8.62 Where figures relating to area or volume, approximate number of construction vehicles or distances to receptors are given, these relate to thresholds as defined in the IAQM guidance (IAQM, 2024) to guide the assessor to define the dust emissions magnitude and sensitivity of the area.

8.63 It is acknowledged that the Proposed Project is split into segments, inclusive of the Main Wind Farm Development Site, the TDR (and associated Over-run Areas) and the GCR. These areas will contain potential dust emitting activities. Given that the exact locations and timing of construction activities are not known and will be subject to construction phase finalisation, impacts have been assessed collectively, rather than in these discrete segments. This aggregated approach assumes simultaneous construction activities across the segments and presents a worst-case precautionary assessment.

8.64 The GCR will exit the Main Wind Farm Development Site and travel along the central spine road east towards the L1206. It will then follow the L1206 in a generally northern direction to join the R213 at Banor Erris before following the R213 to the national route N59. From here it will follow the N59 to the Bellacorick Substation. It should be noted the GCR is considered a rolling construction site, i.e. a small construction zone that progresses along the route. Given the changing sensitivities, the GCR has been considered within the assessment based upon its most sensitive surroundings.

8.65 Furthermore, it should also be noted that TDR in its entirety has not been assessed as this is largely on pre-existing, hard paved road. Therefore, any potential dust impacts are considered to be negligible. Instead, three key Over-run Areas are considered.

Assessment Screening

8.66 There are both human and ecological receptors within the relevant screening distances. Therefore, an assessment of construction dust on both human and ecological receptors has been undertaken.

Potential Dust Emission Magnitude

8.67 Demolition: No demolition activities are proposed on the Main Wind Farm Development Site, TDR and GCR. As such, impacts associated with demolition activities have therefore not been considered further and are screened out.

8.68 Earthworks: resulting from the excavation, handling, haulage and storage of soils, upgrading 1.95km of the existing agricultural tracks on site and construction of approximately 6.8km of new site access tracks. Therefore, the dust emission magnitude for earthworks is considered to be ‘large’.

8.69 Construction: construction of the substation, BESS and 13 No. turbine hard standing areas and associated turbine foundations, with associated material (and aggregate) excavation & storage. Therefore, the dust emission magnitude for earthworks is considered to be ‘medium’.

8.70 Trackout: On-site haulage by heavy vehicles on unpaved / compacted aggregate surfaces. Off-site haulage resulting in potential trackout of materials onto the public road network. Given the size of the Main Wind Farm Development Site, TDR and GCR, the number of

outward HDV movements in any worst-case day will be greater than 100. Therefore, the dust emission magnitude for trackout is considered to be 'large'.

8.71 Dust emissions from the construction activities at the Main Wind Farm Development Site are likely to be variable and will depend on the type and extent of activity, material moisture content, road surface conditions and weather conditions.

8.72 The determined dust emission magnitude for each activity is summarised in **Table 8.5.**

Table 8.5 Dust Emission Magnitude Summary

Source	Dust Emission Magnitude	Comments
Demolition	N/A	N/A
Earthworks (soil stripping, construction of internal access tracks, landscaping, onsite movements)	Large	Large site area. Potentially >10 heavy earth moving vehicles active at any one time. Formation of bunds
Construction (construction / installation of turbines, construction of substation and BESS, onsite movements)	Medium	Materials of moderate to high potential for dust release Storage and use of construction aggregate materials
Trackout	Large	>100 HDV outward movements in any one day. Surface material potential for being moderately dusty.

Sensitivity of the Area

Dust Soiling Impacts

8.73 It is estimated there are 10-100 existing residential properties (high sensitivity receptors) within 20m of the Main Wind Farm Development Site, TDR and GCR. Further to this, there are predicted to be 10-100 high sensitivity receptors located within 20m of road links up to 250m of the proposed construction access points (commensurate of a large site). The sensitivity of the area with respect to dust soiling impacts on people and property is considered to be high in relation to earthworks, construction, and medium in relation to trackout.

Human Health Impacts

8.74 As presented in **Table 8.4**, The regional-to-local modelling has been utilised to characterise the PM_{10} background concentrations.

8.75 The maximum 2023 modelled background PM_{10} concentration for the Main Wind Farm Development Site, TDR and GCR is estimated to be <7µg/m³ and therefore falls into the <24µg/m^3 class.

8.76 The number of high sensitivity receptors within 20m of the Main Wind Farm Development Site, TDR and GCR, and within 20m of potential trackout routes has been utilised to determine the sensitivity of the area with respect to human health impacts. With use of the IAQM assessment matrices, this is classified as low in relation to earthworks, construction, and trackout.

Ecological Impacts

8.77 In accordance with the IAQM guidance, the sensitivity of the surrounding area has been determined based upon the importance of the designation (European or National) and the

distance from Main Wind Farm Development Site, TDR and GCR for each activity (earthworks, construction, and trackout).

8.78 There are several designated ecological sites within 20m of Main Wind Farm Development Site, TDR and GCR. These include:

- Tristia Bog NHA;
- Tullaghan Bay And Bog NHA; and
- Carrowmore Lake Complex SAC / pNHA.

8.79 In line with the IAQM guidance (IAQM, 2024), the Tristina Bog NHA and the Tullaghan Bay and Bog NHA are considered to be a 'medium sensitive' receptor. The Carrowmore Lake Complex SAC / pNHA is considered to be a 'high sensitive' receptor.

8.80 In line with the IAQM assessment matrices, the sensitivity of the area within 20m of the Main Wind Farm Development Site, TDR and GCR to impacts from earthworks and construction, is considered to be high.

8.81 From review of the identified trackout routes, there are only NHAs present within 20m or 50m. Given this and with use of the IAQM assessment matrices, the sensitivity of the study area with respect to ecological impacts from trackout is low.

8.82 A summary of the sensitivity of the surrounding area is presented in **Table 8.6.**

Table 8.6 Sensitivity of the Area

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	High	High	Medium
Human Health	Low	Low	Low
Ecological	High	High	Low

Risk of Impacts

8.83 The outcome of the assessment of the potential magnitude of dust emissions, and the sensitivity of the area are combined in **Table 8.7** below to determine the risk of impact. The defined level of risk has been used to inform the selection of appropriate mitigation, which constitutes embedded mitigation for the Main Wind Farm Development Site, TDR and GCR.

8.84 The IAQM construction dust assessment methodology does not include the consideration of embedded mitigation measures when determining the potential risk of dust impacts, rather is used to define this mitigation.

Table 8.7 Summary of Dust Risk Table (Without Mitigation)

Potential Impact	Dust Impact Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High Risk	Medium Risk	Medium Risk
Human health	Low Risk	Low Risk	Low Risk
Ecological	High Risk	Medium Risk	Low Risk

8.85 Following the construction dust assessment, the risk of impacts from potential worst-case Considered Area (in the absence of mitigation) are summarised as follows:

- High risk in relation to dust soiling impacts on people and property;

- Low risk in relation to human health impacts; and
- High risk in relation to ecological impacts.

8.86 Potential dust effects during the construction phase are considered to be temporary and short-term and may only arise at particular times (i.e., certain activities and/or meteorological conditions).

8.87 Nonetheless, commensurate with the above designation of dust risk and maximum high risk determined, a series of mitigation measures are identified by IAQM guidance (IAQM, 2024) which shall be incorporated into the Construction Environmental Management Plan (CEMP) as recommended in **Paragraph 9.78**. This ensures that any potential impacts arising from the Main Wind Farm Development Site, TDR and GCR are minimised and, where possible, completely removed.

8.88 As such, in accordance with the IAQM construction guidance, residual effects are concluded to be negligible and '**not significant'** in terms of the EIA Regulations.

Traffic Emissions

8.89 As detailed in **Chapter 14 (Traffic and Transport)**, construction traffic will comprise both conventional HGVs delivering materials as well as Abnormal Indivisible Loads (AILs) for transporting the larger turbine components (along the TDR). All construction traffic will originate from the N59, travelling along the L1206 before branching off to the L5252 road which runs through the Main Wind Farm Development Site.

8.90 The construction period for the Proposed Project (inclusive of the cable route and substation) will have a duration of approximately 24 months. The trip generation of combined HGVs and AILs as Annual Average daily Traffic (AADT) 2-way movements during each year of the construction period is detailed below. The calculations are for all construction vehicles, including those associated with the cable route and substation.

Table 8.8: Road Traffic Screening Assessment

Link No.	Location	Construction Traffic Two-Way Traffic		
		Total	HDV	HDV %
Year 1				
1	N59 approximately 1.6km from its junction with the R313 in the eastbound direction.	183	166	91%
2	L1206 approximately 1.2km southwest of Mount Jubilee and 900 south of Tristia.	262	237	91%
3	L5252 approximately 2.4km southeast of Muingmore and north of L1206.	262	237	91%
Year 2				
1	N59 approximately 1.6km from its junction with the R313 in the eastbound direction.	66	40	60%
2	L1206 approximately 1.2km southwest of Mount Jubilee and 900 south of Tristia.	95	57	60%
3	L5252 approximately 2.4km southeast of Muingmore and north of L1206.	95	57	60%

Average Over Construction Period				
1	N59 approximately 1.6km from its junction with the R313 in the eastbound direction.	125	96	77%
2	L1206 approximately 1.2km southwest of Mount Jubilee and 900 south of Tristia.	178	137	77%
3	L5252 approximately 2.4km southeast of Muingmore and north of L1206.	178	137	77%

8.91 The average AADT and HDV AADT traffic flows across the 24-month construction period fall below the TII guidance screening criteria for further assessment. Whilst the criteria are marginally exceeded in Year 1 predictions, Year 2 falls significantly below the relevant criteria.

8.92 The TII guidance, further assessment of the construction phase traffic emissions which is '*proportionate to the nature and scale of the project'* to be undertaken. The IAQM / EPIC guidance also states that: *"exceeding a screening criterion […] does not automatically lead to the requirement for a Detailed Assessment. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence*."

8.93 As a proportionate assessment, the following evidence demonstrates that despite HDV movements marginally exceeding the AADT screening threshold, air quality effects are considered likely to be **'not significant'** in terms of the EIA Regulations:

- The construction phase is temporary (i.e. of short duration) and not anticipated to cause a persistent deterioration in air quality;
- There are no areas of poor air quality in the study area. Furthermore, baseline annual mean NOx, NO_2, PM_{10} and $PM_{2.5}$ concentrations in rural Zone D areas similar to that of the Main Wind Farm Development Site are 'well below' the limit values and are expected to further improve by the time construction begins; and
- The traffic generation data includes all construction-related traffic, including that of the cable route installation despite note being included as part of this planning application. This element of the Proposed Project will be applied for under a separate planning application but has been assessed under the EIA as a precautionary approach.

8.94 Road traffic impacts associated with the Proposed Project on air quality are therefore considered to result in a **'not significant'** effect in terms of the EIA Regulations upon both human and ecological receptors.

8.95 Plant and machinery such as generators, excavators etc. will be required at various stages of the construction works. These will be relatively small units which will be operated on an intermittent basis. Although there will be an emission from these units, given their scale and the length of operation time, the impacts of emissions from these units will be imperceptible.

Grid Connection Route

Traffic Emissions

8.96 Construction vehicles and plant emissions have the potential to increase concentrations of compounds such as NO2 and PM in the receiving environment. However, as this is a "rolling" construction site, meaning that these works will not be concentrated in any one area of the route, these effects are short term, temporary and slight.

8.97 Plant and machinery such as generators, excavators etc. will be required at various stages of the construction works. These will be relatively small units which will be operated on an intermittent basis. Although there will be an emission from these units, given their scale and the length of operational time, the impacts of emissions from these units will be imperceptible.

8.98 The GCR traffic generation has been factored into the into the assessment of the Proposed Project. The overall impacts in relation to road traffic is therefore considered to be '**not significant'** in terms of the EIA regulations.

Potential Impacts - Operational

Wind Farm and TDR

8.99 The operational phase of the wind farm will result in positive impacts on air quality due to the displacement of fossil fuels as an energy source.

8.100 In terms of dust emissions during the operational phase. There will be no dust generating activities once the Proposed Project is operational. As such, operational phase assessment of dust emissions is not required and can be scoped out.

8.101 A diesel generator of sufficient power to operate critical functions of the substation will be located at the proposed substation, to be operated only as a back-up/emergency power supply. Emissions from the diesel generator will comprise carbon dioxide, nitrogen oxide and particulate matter. However, in consideration of the highly infrequent nature of operations (i.e. back-up/emergency) and the relatively small magnitude of emissions (i.e. a single diesel generator), the impact is considered imperceptible. Therefore, there will be no significant direct emissions to atmosphere under the operational phase of the wind farm.

8.102 Maintenance vehicles will access the Main Wind Farm Development Site for periodic monthly maintenance during the operational period, however, due to the low traffic movements involved, the traffic emission impact will be imperceptible along with any impacts from dust emissions.

8.103 Effects related to vehicle emissions will greatly reduce during the operational phase of the Proposed Project (i.e. maintenance vehicle activities only), and no significant effects are anticipated. During operations, the Proposed Project will result in the avoidance of emissions from fossil fuel generators which is a positive effect on regional air quality.

Cable Routes

8.104 The operational phase of the GCR which connects to the proposed onsite substation will result in positive and significant impacts on air quality due to the displacement of fossil fuels as an energy source.

8.105 Once the proposed GCR is constructed there will be no significant direct emissions to the atmosphere.

8.106 Maintenance vehicles will carry out point works along the proposed GCR to address any issues during the operational period. However, given the low and infrequent traffic movements involved, the dust and traffic emissions impact will be imperceptible.

Potential Impacts – Decommissioning

Wind Farm and TDR

8.107 There will be truck movements associated with removing the wind turbines from the wind farm, resulting in vehicular emissions and dust. However, the number of truck movements will be significantly less than the construction phase and will potentially result in a slight temporary impact in relation to dust. There will also be emissions from machinery on site including for the movement of soil to cover the foundations, however, this is not likely to result in significant impacts.

8.108 The Substation, internal ducts, all internal access roads and turbine hard standings within the Main Wind Farm Development Site will be left in situ, resulting in no additional truck movements and no impact from emissions from machinery along the GCR.

Cable Routes

8.109 During the decommissioning phase, the proposed GCR infrastructure including substation and ancillary electrical equipment will form part of the national grid and shall be left in situ. Therefore the impact of the decommissioning phase will be **'not significant'** in terms of the EIA regulations.

Mitigation Measures

Construction Phase

8.110 A CEMP has been prepared and is included in **Technical Appendix 2-1**. This includes the following recommended mitigation measures that have been determined in consideration of the IAQM construction assessment and will be implemented in full during the construction phase of the Proposed Project relevant to air quality:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager;
- Display the head or regional office contact information;
- The internal access roads will be constructed prior to the commencement of other major construction activities. These roads will be finished with graded aggregate;
- A water bowser will be used to spray work areas (wind turbine area, cable route and Over-run Areas) and haul roads as required, especially during periods of excavation works coinciding with dry periods of weather, to suppress dust migration from the site;
- All loads which could cause a dust nuisance will be covered to minimise the potential for fugitive emissions during transport;
- Gravel will be used at the site exit point to remove any dirt from tyres and tracks before travelling along public roads;

- Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable;
- Where re-vegetation is not possible, hessian, mulches or tackifiers will be used as soon as practicable;
- The access and egress of construction vehicles will be controlled to designated locations, along defined routes, with all vehicles required to comply with onsite speed limits;
- Construction vehicles and machinery will be serviced and in good working order;
- Concrete wash water from washout of chutes on site associated with the ready-mix concrete delivery will be disposed of at a licenced facility;
- Wheel washing facilities will be provided at the entrance/exit point of the Main Wind Farm Development Site;
- It will be ensured that there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits;
- The developer in association with the contractor will implement dust control measures as part of the CEMP (**Technical Appendix 2-1**). In the event the Planning Authority decides to grant permission for the Proposed Development, the final CEMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Planning Authority.

All vehicles will switch off engines when stationary – no idling vehicles;

- Exhaust emissions from vehicles operating within the Main Wind Farm Development Site, including trucks, excavators, diesel generators or other plant equipment, will be controlled by the contractor by ensuring that emissions from vehicles are minimised through regular servicing of machinery. In addition, a Construction Traffic Management Plan (CTMP) will be implemented, covering vehicle routing, signage, road condition monitoring and engagement with Mayo County Council. A CTMP is provided as **Technical Appendix 14-4** of **Chapter 14** of this EIAR This will ensure that all HGVs and AILs will access the Main Wind Farm Development Site via approved routes, avoiding sensitive areas and peak traffic times with the following mitigation measures;
- Dry sweeping of large areas will be avoided; where cleaning is required, road sweeping will be undertaken using suction sweepers;
- Vehicles entering and leaving sites will be covered to prevent escape of materials during transport;
- On-site haul routes will be inspected for integrity and necessary repairs will be instigated to the surface as soon as reasonably practicable;
- All inspections of haul routes will be recorded and any subsequent action in a site log book;
- Hard surfaced haul routes, will be regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Cutting, grinding or sawing equipment will be fitted with or used in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;

- An adequate water supply will be transported to the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment will be minimised and fine water sprays will be used on such equipment wherever appropriate;
- Equipment will be readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
- Site layout will be planned so that machinery and dust causing activities are located away from receptors, as far as is possible;
- Site runoff of water or mud will be avoided;
- Materials that have a potential to produce dust from site will be removed as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below;
- Covering, seeding or fencing of stockpiles will be undertaken to prevent wind whipping; and
- Bonfires and burning of waste materials will be avoided.

Operational Phase

8.111 During the operational phase of the Proposed Project, the works onsite will be limited to maintenance associated with the proposed wind farm and BESS components. Although the intensity of activity will be only a small fraction of the construction phase, all employees and contractors that are on site will ensure that machinery used is properly maintained and is switched off when not in use to avoid unnecessary exhaust emissions from maintenance traffic.

8.112 In the event that components of the turbines require replacement or repair, measures stipulated for the control of dust and emissions during the construction phase will be implemented.

Decommissioning Phase

8.113 The proposed access tracks across the Main Wind Farm Development Site and the collector circuit cable will be left in situ.

8.114 Leaving the access tracks and collector cabling in place results in limited decommissioning works being required (i.e. turbine foundations will be covered over and allowed to re-vegetate naturally), therefore any dust emissions from construction vehicles will be very minor. Therefore, no mitigation measures are proposed.

9.3 The substation and underground GCR will also be left in situ and taken in charge by Eirgrid / ESBN, as part of the national grid, resulting in no decommissioning works required. No mitigation measures are proposed.

Cumulative Effects

8.115 Cumulative effects are those which result from incremental changes caused by other past, present, or reasonably foreseeable actions or developments together with those generated by the Proposed Project. Therefore, the potential impacts of the Proposed

Project cannot be considered in isolation but must be considered in addition to impacts already arising from existing or planned development.

8.116 This air quality impact assessment herein indicates that the Proposed Project will not contribute to a significant increase in local air pollution by way of excessive air / dust emissions.

Dust emissions generated from construction works

8.117 Cumulative effects with regard to dust emissions from the construction phase of the development are likely to occur where dust generating activities from separate developments are in close proximity and likely to occur at the same time.

8.118 In recognition of the applied IAQM screening distances, there are no human receptors located within 250m and no ecological receptors within 50m of the Proposed Project and any other development sites, there is not considered to be a risk of cumulative effects.

8.119 The IAQM construction guidance (IAQM, 2024) states that, with the implementation of the recommended mitigation, effects will be **'not significant'** in terms of the EIA regulations. As such, potential cumulative effects associated with construction phase dust emissions are likely to be '**not significant'** in terms of the EIA regulations.

Road traffic emissions generated from vehicle movements

8.120 Emissions from relevant projects and plans have been considered where necessary, specifically where the Main Wind Farm Development Site, GCR and Over-run Areas along the TDR overlap with the study area of other developments. Nearby developments, including Oweninny Phase 3 Wind Farm, Sheskin South Wind Farm, and the Mayo Green Hydrogen Plant have been considered. The locations of these developments are illustrated **in Figure 2-7** whilst their descriptions are outlined in **Table 2-5.**

8.121 The potential for cumulative effects to arise is limited to the construction phase given that the construction timescales have the potential to overlap, when increased numbers of HGVs and light construction traffic may be present on the local and regional road network. Construction traffic associated with all schemes will be temporary, and time-limited, with the Main Wind Farm Development Site, GCR and Over-run Areas along the TDR subject to an approximate two-year construction period. While some overlap between construction activities may occur, any associated increase in traffic-related emissions will be short-term, localised and reversible, with traffic levels returning to baseline conditions following completion of construction works.

8.122 Baseline pollutant concentrations in the study area are 'well below' relevant air quality limit values, and the short-term increases in emissions associated with construction traffic are unlikely to result in exceedances. In addition, construction traffic will also be subject to traffic management measures and best practice controls, including the use of defined haul routes and measures to minimise congestion and idling.

8.123 Accordingly, no residual or long-term cumulative effects on air quality are anticipated, and cumulative effects associated with construction-phase road traffic emissions are considered '**not significant'** in terms of the EIA Regulations.

Residual Effects

8.124 Following the implementation of the outlined mitigation measures, dust emissions from the Main Wind Farm Development Site, GCR and Over-run Areas along the TDR, residual effects are concluded to be negligible and '**not significant'** in terms of the EIA Regulations.

Conclusion

8.125 The effect on air quality impact has been assessed using appropriate guidance. Following the implementation of mitigation measures, potential residual effects due to the Proposed Project are considered **'not significant'** under the EIA Regulations.

CLIMATE CHANGE & GREENHOUSE GAS ASSESSMENT

Introduction

8.126 In this section of the EIAR chapter potential climate change impacts have been assessed in relation to the Proposed Project's contribution to increasing or decreasing gaseous emissions with global warming potential covered by the Kyoto Protocol (1997)[2] and Paris Agreement (2015)[3]. The impact of climate change and adaption of the Proposed Project have been considered following the IEMA EIA guide to Climate Change Resilience and Adaption[4].The assessment has been completed for the entire project including grid connection route and a range of turbines based on their rated capacity from 5.7 MW, 6 MW and 7 MW.

8.127 This chapter is structured in two parts:

- Greenhouse Gas Assessment, which evaluates the Proposed Project's contribution to global warming potential; and
- Climate Change Resilience, which considers the potential impacts of climate change on the Proposed Project and its ability to adapt.

Statement of Authority

8.128 The Climate Change impact assessment presented in this chapter was prepared by SLR Consulting Ireland.

8.129 Luke Moseley MSc, BSc, is a Managing Consultant in SLR's Carbon & Energy Management team within the ESG Strategic Advisory technical discipline. Luke has six years of professional experience delivering and managing Scope 1, 2, and 3 greenhouse gas (GHG) emissions and energy calculations, including the development of GHG inventories across a diverse range of projects and clients. In his career he has contributed to climate chapters for multiple renewable energy projects and supported clients in developing decarbonisation strategies and net zero pathways.

8.130 This chapter has been supported and reviewed by Nicola Herschell MSc, MIEMA, CEnv. Nicola is a Technical Director in SLR's Carbon & Energy Management team within the ESG Strategic Advisory technical discipline. Nicola has over 14 years professional experience, with 8 years in her current role at SLR, where she manages a team of consultants. Nicola has worked with a wide variety of large, high profile, multi-site organisations to help manage their reporting requirements and to ensure both Group and site-level compliance with the full suite of carbon and energy legislation, with particular specialism in the EU/UK Emissions Trading Scheme, GHG permitting, Climate Change Agreements, Climate disclosures, Streamlined Energy & Carbon Reporting, and the GHG Protocol.

Legislative Framework / Policy Context

Legislation Context

8.131 The following legislation is relevant to the Proposed Project:

- EIA Directive 2014/52/EU[5].

[2] United Nations (1997) Kyoto Protocol to the United Nations Framework Convention on Climate Chate Available at: Kyoto Protocol to the United Nations Framework Convention on Climate Change. | UNFCCC Accessed: June 2025
[3] United Nations (2015) Paris Agreement Available at: ADOPTION OF THE PARIS AGREEMENT - Paris Agreement text English Accessed: June 2025
[4] IEMA, (2020). Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation
[5] European Union (2014) Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014 amending Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment Accessed: June 2025

- Climate Action and Low Carbon Development Act 2015

Renewable Energy Directive (including amendments and revisions)[6].International Agreements

8.132 The following agreements are relevant to the Proposed Project:

- Kyoto Protocol (1997)[7].
- Paris Agreement (2015)[8].

Planning Policy Context

National

8.133 The following planning policy is relevant to the Proposed Project:

- National Planning Framework First Revision (Government of Ireland, April 2025).
- National Adaption Framework[9].
- Sectoral Planning Guidelines for Climate Change Adaption[10].
- Climate Action Plan[11].

Regional

8.134 The following planning policy is relevant to the Proposed Project:

- Regional Spatial & Economic Strategy for the Northern & Western Regional Assembly[12].

Local

8.135 The following planning policy is relevant to the Proposed Project:

9.4 County Mayo Council Local Authority Action Plan[13] .

Guidance

8.136 The following guidance is relevant to the Proposed Project:

- Institute of Environmental Management and Assessment (IEMA) Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)[14].
- The Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol) (2021)[15].
- Publicly Available Standard (PAS) 2080:2016 – Carbon Management in Infrastructure.

[6] European Union (2023) Renewable Energy Directive Available at: Renewable Energy Directive Accessed: June 2025
[7] United Nations (1997) Kyoto Protocol to the United Nations Framework Convention on Climate Chate Available at: Kyoto Protocol to the United Nations Framework Convention on Climate Change. | UNFCCC Accessed: June 2025
[8] United Nations (2015) Paris Agreement Available at: ADOPTION OF THE PARIS AGREEMENT - Paris Agreement text English Accessed: June 2025
[9] DECC, (2024) National Adaption Framework Available at: gov.ie - National Adaptation Framework (NAF) Accessed: June 2025
[10] DECC (2024) Sectoral Planning Guidelines for Climate Change Adaption Available at: gov.ie - Sectoral Planning Guidelines for Climate Change Adaptation Accessed: June 2025
[11] DECC (2025) Climate Action Plan 2025 Available at: gov.ie - Climate Action Plan 2025 Accessed: September 2025
[12] Northern & Western Regional Assembly (2020) "Regional Spatial and Economic Strategy" Available at: RSES for Northern & Western Region - Northern & Western Regional Assembly Accessed: June 2025
[13] County Mayo Council (2024 Climate Action Plan 2024-2029. Available at Mayo County Council's Climate Action Plan Accessed: June 2025
[14] IEMA, (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance. 2nd Edition
[15] World Resources Institute, World Business Council for Sustainable Development, (2001). The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard. World Resource Institute, Revised Edition.

- Royal Institution of Chartered Surveyors (RICS): Whole Life Carbon Assessment for the Built Environment, 2nd edition (2023)[16].
- Guidance on Integrating Climate Change and Biodiversity into EIA[17].
- European Commission (2016) Climate Change and Major Projects[18].
- Sector Planning Guidelines for Climate Change Adaption[19].

Background and Baseline

Baseline Environment

8.137 The Main Wind Farm Development Site currently comprises a commercial conifer plantation established on cutover peatland. Plantation forestry on peat soils is generally considered an inefficient land use, as drainage and soil disturbance reduce the peatland's natural carbon storage function and can lead to ongoing greenhouse gas emissions. In its current state, the site provides limited carbon sequestration benefits compared to intact peatland or alternative land uses.

8.138 If the Proposed Project does not proceed, the baseline environment is likely to continue evolving under current land management practices. The plantation forest will remain, with ongoing drainage and soil oxidation contributing to gradual carbon losses from the peat substrate. Over time, this could result in further degradation of peatland and reduced biodiversity value.

8.139 Additionally, Ireland will need to identify alternative sites for renewable energy generation to meet legally binding climate targets. Securing such sites may be challenging due to environmental constraints and grid limitations, and failure to deliver renewable capacity could lead to continued reliance on fossil fuel generation, increasing national greenhouse gas emissions.

Greenhouse Gas Assessment

8.140 Emissions associated with the Proposed Project will be associated with:

- Combustion of fossil fuels from maintenance vehicles and construction plant.
- Loss of sequestration potential from land use change and land management of the underlying environment.
- The embodied emissions from material extraction, manufacturing and delivery of turbines and other construction materials.

8.141 The Proposed Project will contribute to renewable electricity generation capacity, thus avoiding emissions from electricity generation based on fossil fuels.

8.142 The Republic of Ireland has legally binding targets set by the Climate Action and Low Carbon Development (Amendment) Act 2021 to achieve climate neutrality by 2050, with an interim target of a 51% reduction in greenhouse gas emissions by 2030 compared to 2018 levels. The Act establishes a statutory framework for carbon budgeting, requiring the government to

[16] RICS (2023). Whole Life Carbon Assessment for the built Environment. 2nd edition. Available at: Whole life carbon assessment (WLCA) for the built environment Accessed: June 2025
[17] European Commission (2013) Directorate-General for Environment, *Guidance on integrating climate change and biodiversity into environmental impact assessment*, Publications Office, Available at: **https://data.europa.eu/doi/10.2779/11735** Accessed: June 2025
[18] European Commission (2016) Climate Change and Major Projects Available at: major_projects_en.pdf Accessed: June 2025
[19] DECC (2024) Sectoral Planning Guidelines for Climate Change Adaption Available at: gov.ie - Sectoral Planning Guidelines for Climate Change Adaptation Accessed: June 2025

adopt a series of five-year carbon budgets and sectoral emission ceilings, and mandates annual updates to the Climate Action Plan to detail actions for each sector.

8.143 Each carbon budget represents the total amount of greenhouse gases that can be emitted nationally during a five-year period. The carbon budget programme is proposed by the Climate Change Advisory Council, approved by the government and adopted by the House of the Oireachtas. The current carbon budget programme consists of three 5-year budgets and came into effect in April 2022. The budgets for the period are as follows:

- 2021-2025: 295 MtCO2eq - an average reduction in emissions of 4.8% per annum for the first budget.
- 2026-2030: 200 MtCO2eq - an average reduction in emissions of 8.3% per annum for the second budget.
- 2031-2035: 151 MtCO2eq (provisional) - an average reduction in emissions of 3.5% per annum for the third budget.

8.144 The sectoral emissions ceilings set out the maximum amount of greenhouse gas emissions that are permitted in different sectors of the economy during a budget period. In July 2022, the government approved the sectoral emissions ceilings for the first two carbon budget periods (2021-2025 and 2026-2030). The sectoral emissions ceilings for electricity in the 2021-2025 and 2026-2030 budget periods are as follows:

- 2021-2025: 40 MtCO2eq.
- 2026-2030: 20 MtCO2eq.

Resilience to Climate Change

8.145 The potential implications of climate change on the wind farm design have been assessed to ensure resilience throughout its operational life. This review considered projected changes in temperature, precipitation, wind patterns, and extreme weather events based on Met Éireann's TRANSLATE report and national adaptation frameworks. Key risks such as high winds, flooding, and seasonal variability were evaluated against turbine specifications, drainage design, and operational protocols.

8.146 Design measures incorporated include turbines rated for extreme wind conditions, robust site drainage to manage increased rainfall, and remote monitoring systems to maintain operational safety during adverse weather. These measures align with the National Adaptation Framework and sectoral planning guidelines, ensuring compliance with best practice for climate resilience.

Greenhouse Gas Assessment

Introduction

8.147 Wind turbines and BESS provide an important mechanism for the reduction of carbon dioxide (CO_2), and other GHG emissions into the atmosphere by reducing the consumption of fossil fuel generated electricity. However, during their manufacture, construction and decommissioning, wind farms and BESS can themselves result in the emissions of GHGs, particularly in embodied carbon of materials and instances where natural carbon stores, such as peat, are present and potentially impacted by the development.

8.148 This chapter provides an analysis of the GHG emissions associated with the manufacture, construction and decommissioning of the Proposed Project. It further provides an estimate of the avoided emissions which the Proposed Project would make if electricity would otherwise be produced by fossil fuel power generation.

8.149 This provides an indication of the whole life carbon inventory of the Proposed Project, together with an understanding of the emissions 'pay-back' period. Once emissions resulting from the manufacture, construction and decommissioning of the Proposed Project have been paid back (avoided) by the wind farm.

8.150 The assessment includes all GHGs, and not just carbon. The results are presented as tonnes of CO_2 equivalent (tCO_2e), where equivalence means having the same warming effect as CO_2 over 100 years.

Scope and Methodology

8.151 The Proposed Project is expected to deliver GHG savings over its lifetime, however, it also has the potential to cause GHG emissions through the following pathways:

- Disturbance of underlying habitats.
- Combustion of fossil fuels from maintenance vehicles and construction plan.
- Embodied carbon in turbines and other infrastructure.

8.152 The assessment has been undertaken across a range of turbine ratings, specifically 5.7 MW, 6 MW, and 7 MW. The methodology applied remains consistent for all scenarios, with the only variable factor being the turbine rating.

8.153 The whole life carbon inventory of the Proposed Project has been undertaken using calculations with project specific data relating to the characteristics of the Proposed Project and receiving environment to enable the calculations of GHG emissions, removals and avoided emissions to be quantified across the project lifecycle stages (construction, operation and decommissioning/site restoration).

8.154 The emissions calculation method for each category is outlined below. This is a modified version of the NatureScot (formerly SNH) guidance[20]. The calculation of the whole life carbon inventory uses a methodology that follows those developed by Nayak et al, 2008[21] and further research (Nayak et al., 2010[22] and Smith et al., 2011[23]).

8.155 The modifications are to make the tool more modern and appropriate by incorporating Ireland-specific emission factors published by the Irish Government and updating life cycle assessment (LCA) emission factors for turbine manufacture, construction, and decommissioning based on more recent research.

8.156 The emissions, removals and avoided emissions are combined to establish the overall (net) carbon effect of the Proposed Project, as well as its 'carbon payback period'.

8.157 Results from this assessment are reported below in accordance with IEMA's Environmental Impact Assessment guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)[24]. Any project that causes GHG to be avoided, or removed from the atmosphere, has a beneficial effect that is always significant.

Avoided Emissions

8.158 Avoided emissions have been calculated based on the total annual energy output of the proposed wind farm, derived from the number of turbines, their rated capacity, and a capacity factor. This annual energy generation (MWh/year) is multiplied by the SEAI grid

[20] Scottish Gov (2022) "Carbon Calculator for Wind Farms on Scottish Peatlands: Factsheet"
[21] Nayak Et al, (2008) "Calculating Carbon Savings from Wind Farms on Scottish Peat Lands: a new Approach"
[22] Nayak et al., (2010) "Calculating carbon budgets of wind farms on Scottish peatlands". Mires and Peat, 4, Article 9.
[23] Smith et al., (2011) "Calculating carbon savings from wind farms on Scottish peatlands – a new approach"
[24] IEMA, (2022). Assessing Greenhouse Gas Emissions and Evaluating their Significance. 2nd Edition

electricity emissions factor (tCO_2e/MWh) and the operational lifetime of the wind farm to estimate total avoided emissions. The calculation steps are as follows:

- $Rated\ Capacity\ (MWh/year)\ = No.of\ turbines\ \times Power\ Rating\ (MW) \times 365 \times 24$
- $Annual\ Energy\ Generation\ (MWh) = Rated\ Capacity\ \times Capacity\ Factor\ (\%)$
- $Annual\ Avoided\ Emissions\ (tCO2e) = Annual\ Energy\ Generation\ \times Emission\ Factor\ (tCO2e/MWh)$
- $Lifetime\ Avoided\ Emissions\ (tCO2e) = Annual\ Avoided\ Emissions\ \times Lifetime\ (years)$

Embodied emissions turbine life

8.159 The embodied emissions associated with the project include manufacture, construction, and decommissioning of all major components: wind turbines, foundations, substation, Battery Energy Storage System (BESS), and associated infrastructure. Emissions are estimated using typical life-cycle emission factors for each component:

- Windfarm: A value of 2,070 expressed as tCO_2e per MW of installed capacity[25]
- Concrete foundations: A value of 0.316 $kgCO_2e/m^3$
- BESS expressed as tCO2e per MWh installed storage capacity

8.160 The total embodied emissions are calculated by multiplying the relevant emission factor by the quantity of each component (e.g., installed capacity, material volume, or storage size). These values are then aggregated to provide the overall construction-phase carbon footprint.

Backup energy

8.161 The reserve capacity required per year is estimated to account for additional generation needed to balance variability and maintain system reliability. This includes:

- A capacity factor of 5% applied to the annual energy generation to represent backup requirements.
- 10% to represent reduced thermal efficiency of the reserve power generation

8.162 The total backup emissions are calculated by using the SEAI grid electricity emission factors as follows:

$$Reserve\ Capacity\ (MWh/year) = Annual\ Energy\ Generation\ \times Capacity\ Factor\ (5\%) \times Additional\ Emissions\ (10\%)$$

$$Annual\ Backup\ Emissions\ (tCO2e) = Reserve\ Capcity\ \times Emission\ Factor\ (tCO2e/MWh)$$

$$Total\ Backup\ Emissions\ (tCO2e) = Annual\ Backup\ Emissions\ \times Lifetime\ (years)$$

Reduced Carbon Fixing Potential

8.163 The loss of carbon sequestration potential is estimated based on the total area of bog land permanently lost due to construction and the area affected by drainage. These areas (m^2)

[25] Kaldellis & Apostolou (2017) "Life cycle energy and carbon footprint of offshore wind energy. Comparison with onshore counterpart."

are converted to hectares and multiplied by a carbon accumulation factor of 78 tCO_2e/hectare, representing the long-term sequestration potential of peatland.

8.164 The accumulation factor is derived from the following formula:

- $Carbon\ Accumulation\ Factor\ (tCO2e/ha) = 0.25\ (tC/ha/yr)\ \times Regeneration\ Time\ (years)\ \times Lifetime\ (years) \times\ 3.667$

Where 0.25 tC/ha/yr is the typical peat carbon sequestration rate, and 3.667 is the conversion factor from carbon to CO_2.

8.165 This represents the total carbon that would have been sequestered if the Proposed Project had not occurred.

Soil Organic Matter

8.166 Greenhouse gas emissions associated with peat disturbance are calculated based on the carbon content of peat and generic emission rates for peat soils as recommended by the IPCC[26]. Two sources are considered:

- Removed peat: emissions from the volume of peat excavated during construction.
- Drained peat: emissions from areas affected by drainage, where oxidation of peat leads to carbon release.

8.167 The calculation uses the estimated area and volume of peat affected, combined with IPCC default emission factors for peatland disturbance, to quantify total emissions over the project lifetime.

DOC & POC leaching

8.168 Emission losses from soil due to dissolved organic carbon (DOC) and particulate organic carbon (POC) leaching are estimated using generic rates for peat bogs as recommended by the IPCC[31]. These losses occur when soil organic matter decomposes and carbon is mobilized into watercourses, contributing to downstream emissions. The calculation considers the carbon content of peat and applies default leaching factors (DOC 26% and POC 8%) to the affected area and drainage conditions, ensuring consistency with international guidelines for peatland disturbance.

Forest felling

8.169 The emissions associated with forestry removal are calculated based on the loss of carbon sequestration potential from felled plantation areas. The total area of forest to be cleared (in hectares) is multiplied by the average annual carbon sequestration rate in timber and the operational lifetime of the Proposed Project. The sequestration rate applied is 3.6 tC/ha/year, as reported by Cannell (1999) . The result is then converted to CO_2 equivalent using the standard conversion factor of 3.667 (C to CO_2).

Whole Life Carbon Assessment

8.170 Excel calculations were used to assess greenhouse gas (GHG) emissions from the Proposed Project including foundations for both turbines and the substation and the impact on underlying habitats. Research for BESS was undertaken and special considerations on the avoided emissions taken which have been included within the total.

8.171 Research shows that majority of emissions from BESS come from the manufacturing stage. Lithium-ion batteries, the most common type used in such projects, were assumed for this

[26] IPCC (2019). 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories

development. Based on a worst-case scenario for energy storage duration, total emissions from manufacturing, building, and eventually removing the BESS are estimated to be 89 tCO_2e/MW of installed capacity. It has been assumed for this assessment that the installed capacity of the BESS will match the generation capacity of the proposed turbines.

8.172 Combined emissions from the Proposed Project including manufacturing, construction, and decommissioning are estimated at 162,947 tCO_2e. However, the Proposed Project will also result in annual GHG savings of 57,888 - 71,091 tCO_2e when compared to the grid average electricity based on the turbine rated capacity of 5.7 - 7 MW and a capacity factor of 35%. This means the Proposed Project will offset its emissions within approximately 4 years after starting operation.

8.173 In addition to emissions from materials and infrastructure, the Proposed Project may cause the release of carbon stored in the ground. This includes potential loss of peat and other organic soils that act as long-term carbon sinks as described in methodology section above. Disturbance of these carbon-rich areas during construction can lead to additional emissions, which are predicted to amount to approximately 46,420 tCO_2e and have been included in the overall carbon balance.

8.174 Assuming a total operational life of up to 35 years, the Proposed Project is projected to result in lifetime emissions savings of 1,785,538 – 2,206,043 tCO_2e. A summary table has been provided in **Table 8.9**

Table 8.9 Whole Life Carbon Assessment Summary

Category	Emissions Value 5.7 MW (tCO_2e)	Emissions Value 6 MW (tCO_2e)	Emissions Value 7 MW (tCO_2e)
1. Avoided Emissions	-2,026,086	-2,132,722	-2,488,176
2. Turbine Life (manufacture, construction, decommissioning)	162,947	171,020	197,930
3. Backup Energy	28,944	30,467	35,545
4. Reduced Carbon Fixing Potential	1,138	1,138	1,138
5. Soil Organic Matter	32,020	32,020	32,020
6. DOC & POC leaching	1,342	1,342	1,342
7. Forest Felling	14,157	14,157	14,157
TOTAL	**-1,785,538**	**-1,882,577**	**-2,206,043**

Table 8.10 Project Impact on National Carbon Budgets (Worst Case)

Budget Name	Period	Emissions Budget ($MtCO_2e$)	Project emissions ($MtCO_2e$)	Proportion of Project Emissions Against Budget (%)
Carbon Budget 2	2026-2030	200	-0.052	-0.03%
Carbon Budget 3	2031-2035	151	-0.289	-0.19%
Carbon Budget 4	2036-2040	120	-0.289	-0.24%

8.175 Overall, the Proposed Project is expected to have a Significantly Beneficial impact by reducing carbon emissions and contributing to national climate change goals.

Cumulative Effects

8.176 The Irish Government has set ambitious goals to reach net-zero greenhouse gas emissions by 2050. Expanding renewable energy sources, such as onshore wind, plays a key role in achieving this target.

8.177 The Proposed Project, which includes both wind turbines and a BESS, is expected to contribute up to 214,208 MWh of additional renewable capacity. This will support the shift away from fossil fuels and help reduce overall emissions and provide energy security.

8.178 When considered alongside other renewable energy projects across Ireland, the Proposed Project is likely to contribute positively to overall emissions savings. By offsetting the need for fossil fuel-based electricity, these projects together will support national efforts to lower greenhouse gas emissions, combat climate change and bolster energy security by decreasing dependence on imported fossil fuels. They would contribute substantially to the fulfilment of the national policy objectives and targets as outlined in the National Planning Framework.

8.179 The cumulative effect of the Proposed Project, along with other renewable energy generation and storage initiatives, is expected to be **Significantly Beneficial** as it will allow Ireland to meet its legally binding climate commitments.

Summary of Effects

8.180 The Proposed Project is expected to produce greenhouse gas (GHG) emissions during the manufacturing, construction, and decommissioning phases. The main sources of these emissions include the production of wind turbines and the disturbance of carbon-rich land such as peat and forestry.

8.181 However, these emissions are predicted to be offset within approximately 4 years of the development becoming operational, when compared to average grid electricity. Over its full operational lifetime of 35 years, the development is expected to result in total emissions savings of between 1,785,538 – 2,206,043 tCO_2e.

8.182 By helping to reduce national greenhouse gas emissions, the Proposed Project supports the targets set out in Ireland's Climate Change legislation and contributes to its renewable energy goals. When looked at both individually and as part of a wider shift toward renewable energy, the overall effect is considered to be **Significantly Beneficial** in accordance with IEMA's Environmental Impact Assessment guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022).

8.183 All construction, operational, and decommissioning activities will follow best practice guidance and mitigation measures as outlined in the project's Construction Environmental Management Plan (CEMP). These measures are designed to minimise emissions associated with construction transportation and site activities, and to ensure appropriate site restoration. these measures provide additional assurance that potential minor or temporary impacts remain controlled and do not escalate to significant levels.

Resilience to Climate Change

Assessment Methodology

8.184 The vulnerability of the Proposed Project to climate-related risks has been assessed in accordance with the recommendations in the IEMA EIA Guide to Climate Change Resilience and Adaptation.[27].

8.185 The assessment considers how projected climate trends may affect the Proposed Project during its operational life and evaluates whether design measures provide sufficient resilience.

Future Climate Change Projections

8.186 The analysis draws on the TRANSLATE (Translating Climate Science for Ireland) report published by Met Éireann (2024), which provides high-resolution projections for temperature, rainfall, wind, and extreme weather events across Ireland. Key projected trends include:

- Increased Temperature:
  - Ireland is expected to experience a significant rise in average temperatures. By mid-century, annual temperatures could increase by 1–1.6°C, with the largest warming in the east and southeast.
- Changes in the frequency and intensity of rainfall events:
  - Winters are projected to become wetter (up to 14% more rainfall in some regions), while summers may become drier (up to 20% less rainfall in the south and east). This shift could increase the risk of both flooding in winter and drought in summer.
- Sea level rise:
  - Sea levels around Ireland are projected to rise by 0.3–0.4 meters by the end of the century, increasing coastal flooding risks.
- Increased windstorms:
  - Changes in average wind speeds are projected to be modest, but there may be more frequent extreme wind events, especially in winter.

Climate Risks

8.187 Given the nature of the Proposed Project, the potential for effects related to the vulnerability to climate change are likely to be limited to those effects associated with extreme weather, mechanical failure or structural damage.

8.188 Relevant types of weather incidents which may have an impact on the Proposed Project include:

- High winds and storm events.
- High rainfall leading to flooding.
- Extreme cold leading to ice loading.
- Dunkelflaute events (prolonged low-wind periods during high demand).

[27] IEMA, (2020). Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation

- Seasonal wind variability:
  - TRANSLATE projects ≤6% summer wind reduction by 2100, increasing reliance on storage during low-generation periods. Winter storm intensification raises physical damage risks to wind turbines and BESS infrastructure.

8.189 Extreme wind and storm events can increase mechanical stress on turbine blades and towers, raising the risk of damage and temporary shutdowns. Heavy rainfall may overwhelm drainage systems, causing localised flooding around foundations and access tracks, which could restrict maintenance access. Ice loading during prolonged cold spells can reduce turbine efficiency and create safety hazards from ice shedding.

8.190 Prolonged low-wind periods (Dunkelflaute) during high demand could strain the BESS, risking shortfalls in renewable supply. Seasonal wind variability, including projected summer reductions of up to 6%, may lower generation capacity, while intensified winter storms could increase physical damage risks to turbines and BESS infrastructure.

8.191 These factors could affect turbine integrity, battery storage performance and site accessibility during extreme conditions.

Design Resilience Mitigation Measures

8.192 Severe weather resilience is a core component of the wind farm design. Measures of design include:

- Turbine specifications designed to withstand potential extreme wind speeds.
- Robust drainage systems to manage increased rainfall and prevent flooding.
- Remote monitoring and control capability to maintain operational safety during hazardous conditions
- BESS designed for temperature extremes and integrated with grid flexibility measures.

Significance of Effects

8.193 Taking these measures into account, the effect of projected climate change on the Proposed Project is considered **not significant** in terms of the EIA Regulations. The design ensures that the development remains resilient to foreseeable climate risks throughout its operational life.

Climate Change Summary

Impact of The Proposed Project on Climate Change

8.194 The wind farm and BESS will support Ireland in meeting its energy generation emission targets by displacing fossil fuel-based electricity generation.

8.195 Estimated whole life emissions (manufacturing, construction, decommissioning) are approx. 160,277 tCO_2e, plus emissions from peat disturbance and backup energy. The expected annual avoided emissions are between 57,888-71,091 tCO_2e, leading to a payback period of ~4 years

8.196 Over a 35-year operational life, the project will save 1.79–2.21 million tCO_2e, making its overall effect **Significantly Beneficial** under EIA Regulations and IEMA guidance.

8.197 Contribution to Ireland's legally binding targets (51% GHG reduction by 2030 and net-zero by 2050) is positive, though proportionally small (≤0.24% of national carbon budgets).

Impact of Climate Change on The Proposed Project

8.198 The Proposed Project's vulnerability to climate change was assessed using the IEMA EIA Guide to Climate Change Resilience and Adaptation and climate projections from Met Éireann's TRANSLATE report. Key risks considered include increased temperatures, wetter winters, drier summers, and more frequent extreme windstorms.

8.199 Relevant risks include high winds, heavy rainfall leading to flooding, ice loading, and prolonged low-wind periods affecting energy storage. Seasonal wind variability and storm intensification were also considered for wind turbine and BESS infrastructure.

8.200 The wind farm incorporates robust design measures such as extreme wind-rated turbines, enhanced drainage systems, and remote monitoring capability. With these measures in place, the effect of climate change on the Proposed Project is considered **'not significant'** in terms of the EIA regulations.

Conclusion and Statement of Significance

8.201 The effect on air quality and climate has been assessed using appropriate guidance. Following the implementation of mitigation measures, potential residual effects due to the Proposed Project are considered '**not significant'** under the EIA Regulations.