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ENVIRONMENTAL IMPACT ASSESSMENT REPORT (EIAR) FOR THE PROPOSED DREHID WIND FARM AND SUBSTATION, CO. KILDARE

VOLUME 2 – MAIN EIAR

CHAPTER 6 –AIR AND CLIMATE

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Date: **May 2025**

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6. AIR AND CLIMATE

6.1 Introduction

This section describes the existing air and climate environment of the proposed development. It examines the various elements of the construction, operational and decommissioning phases of the proposed development which have the potential to impact on air quality and climate. Mitigation measures and the residual impacts after the proposed mitigation measures have been implemented are also described.

A detailed description of the Proposed Development assessed in the EIAR is contained in Chapter 3.

The Proposed Development assessed in this EIAR comprises the following key elements:

- The 'Proposed Wind Farm' (consisting of 11 turbines, turbine foundations and hardstanding areas, new access tracks, underground electrical and communications cabling, drainage, temporary site compounds and associated works; The Proposed Wind Farm also includes the 'Proposed Recreation and Amenity Trail');
- The 'Proposed Substation' (110 kV substation and loop-in connection to the existing overhead lines);
- Turbine delivery route (TDR).

The Proposed Development for which consent is being sought by North Kildare Wind Farm Limited (the Applicant) is described in Chapter 3.

6.1.1 Air Quality

In order 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 (2002/3/EC): Ozone;
- 4th Daughter Directive (2001/107/EC): Polyaromatic hydrocarbons, arsenic, nickel, cadmium and mercury in ambient air.

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. The fourth Daughter Directive (2004/107/EC) will be included in CAFE at a later stage. The limit and target values for both Directives are outlined below.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2022 (S.I. No. 739/2022). It replaces the Air Quality Standards Regulations 2002 (S.I. No. 271 of 2002), 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). 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) and the Air Quality Standards (Amendment) and Arsenic, Cadmium, Mercury, Nickel and Polycyclic Aromatic Hydrocarbons in Ambient Air (Amendment) Regulations 2016 (S.I. No. 659 of 2016). Table 6-1 details the limit values for pollutants as per the CAFE Directive.

Table 6-1: Limit Values of CAFE Directive 2008/50/EC

Pollutan	Limit Value Objective	Averaging Period	Limit Value (ug/m3	Limit Value (ppb)	Basis of Application of the Limit Value
SO_2	Protection of human health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year
SO_2	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year
SO_2	Protection of vegetation	calendar year	20	7.5	Annual mean
SO_2	Protection of vegetation	1 Oct to 31 Mar	20	7.5	Winter mean
NO_2	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year
NO_2	Protection of human health	calendar year	40	21	Annual mean
NO + NO_2	Protection of ecosystems	calendar year	30	16	Annual mean
PM_{10}	Protection of human health	24 hours	50		Not to be exceeded more than 35 times in a calendar year
$PM_{2.5}$	Protection of human health	calendar year	40		Annual mean
$PM_{2.5}$ - stage 1	Protection of human health	calendar year	25		Annual mean
$PM_{2.5}$ - stage 2	Protection of human health	calendar year	20		Annual mean
Lead	Protection of human health	calendar year	0.5		Annual mean
Carbon Monoxide	Protection of human health	8 hours	10,000	8620	Not to be exceeded
Benzene	Protection of human health	calendar year	5	1.5	Annual mean

There are no statutory limits for dust deposition, however, the TA Luft (German Government 'Technical Instructions on Air Quality') (TA Luft 2002)state a guideline value of maximum 350 mg/m^2/day.

There are no limit values in relation to ozone, however, the 3rd Daughter Directive sets target values. These are detailed in Table 6-2 along with information threshold and alert threshold values.

Table 6-2: Target Values for Ozone

Objective	Calculation	Target Value for 2020
Protection of Human Health	Maximum daily 8-hour mean	120 µg/m^3
Protection of vegetation	AOT40*, calculated from 1-hour values from May to July	6000 µg/m^3-h
Information threshold	1-hour average	180 µg/m^3
Alert Threshold	1-hour average	240 µg/m^3
*The sum of the differences between hourly ozone concentration and 40 ppb for each hour when the concentration exceeds 40 ppb during a relevant growing season, e.g. for forest and crops.		

Air Quality and Health

Generally, air quality in Ireland is acceptable. However, in the short term, when compared with WHO guideline values and EEA reference level values; ozone, particulate matter and PHAs are of concern and NO2 is expected to increase as traffic on our roads increase.

The use of fossil fuel-based electricity generation leads to NOx and SOx emissions; however, wind generation does not produce any NOx or SOx emissions. An operational substation will not produce these emissions either.

6.1.2 Climate - Overview

Carbon dioxide (CO_2) is a greenhouse gas which, if released in excessive amounts, can lead to increases in global temperatures known as 'global warming' or the 'greenhouse effect' which can influence climate change. Once the Proposed Development is constructed it will have a long-term positive impact by providing a sustainable energy source. Should the Proposed Development not be developed, fossil fuel power stations will be the primary alternative to provide the required quantities of electricity. This will further contribute to greenhouse gas and other emissions, and hinder Ireland in its commitment to meet its target to increase electricity production from renewable sources and to reduce greenhouse gas emissions.

At the Paris climate conference (COP21) in December 2015 ('the Paris Agreement'), 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C above pre-industrial levels and to limit the increase to 1.5°C. Under the agreement, Governments also agreed on the need for global emissions to peak as soon as possible, recognising that this will take longer for developing countries and to undertake rapid reductions thereafter in accordance with the best available science.

The International Panel on Climate Change (IPCC) has put forward its clear assessment (IPCC, 2011) that the window for action on climate change is rapidly closing and that renewable energy sources such as wind will have to grow rapidly if we are to limit global warming. In this regard the Government enacted the Climate Action and Low Carbon Development Act 2015 which provides for the approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a low carbon, climate resilient and environmentally sustainable economy.

Under the Kyoto Protocol and the Doha Amendment, during the first commitment period, 37 industrialized countries and the European Community committed to reduce GHG emissions to an average of five percent below 1990 levels. During the second commitment period, Parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020.

The revised Energy Efficiency Directive and the revised Renewable Energy Directive entered into force in October and November 2023 respectively. These recast directives include a binding renewable energy target for the EU for 2030 of at least 42.5% (and aiming for 45%), up from the 32% target put forward in the 2018 version of the legislation. This legislation will help the EU meet the Paris Agreement goals.

The main aims of this legislation in terms of renewable energy production are:

- Raise the EU's binding renewable target for 2030 to 42.5% (with a further indicative target of 2.5%), up from the 32% target on the previous Directive and almost doubling the existing share of renewable energy in the EU.
- Reaffirm the EU's determination to gain its energy independence through a faster deployment of home-grown renewable energy, and to meet the EU's 55% greenhouse gas emissions reduction target for 2030.
- A massive scaling-up and speeding-up of renewable energy across power generation, industry, buildings and transport will reduce energy prices over time and decrease the EU's dependence on imported fossil fuels.
- A financial framework for investors is to be established to facilitate investment in renewable energy projects;
- Increases competition and market integration of renewable electricity;
- Will reduce dependence on energy imports and increase energy security;
- Improves the design and stability of support schemes for renewables.

The Government published an updated Climate Action Plan 2024 (CAP24) in December 2023. This third updated action plan follows on from the inaugural plan of 2019 which was a result of the Irish Government declaring a climate and biodiversity emergency on 9th May 2019. As of April 2025, Climate Action Plan 2025 (CAP25) has been published, with the government's website stipulating that CAP25 is to be read in conjunction with CAP24.

The CAP provides a framework for delivering the Government's target of a 51% reduction (relative to 2018) in greenhouse gas (GHG) emissions by 2030. CAP24 follows the *Climate Action and Low Carbon Development (Amendment) Act* 2021, which commits Ireland to a legally binding target of net zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030. The Act provides a governance framework for annual revisions of the Climate Action Plan and the development of a National Long-Term Climate Action Strategy at least once every ten years. As part of this plan, the Government is also committed to reducing emissions by an average 7% per annum by 2030. The CAP24 is underpinned by a series of sectoral emissions reduction ambitions and enabling actions.

CAP24 sets out an objective to more than double Ireland's onshore wind energy capacity to 9 GW by 2030 in order to meet new renewable energy targets and reduce emissions.

Key actions shown for the electricity sector include:

- The electricity system must achieve a 75% reduction in CO_2, reaching 3MtCO2eq in the final year of 2026-20230 carbon budget period.
- Deliver 9 GW onshore wind by 2030 (with 6GW by 2025).
- Complete a revised version of Shaping our Electricity Future to define required new grid construction and reinforcements to achieve sectoral ceilings and carbon budgets.
- As an urgent priority, establish the investment framework and competitive market, arrangements needed to deliver zero carbon system services.

- Phase out and end the use of coal and peat in electricity generation.
- Ensure that the granting of consent for the development of renewable energy projects and the connection of same to the grid are presumed to be in the overriding public interest.
- Publish a regulatory decision on green electricity tariffs to incentivise people to use lower cost renewable electricity at times of high wind and solar generation.

The following actions regarding electricity within CAP24 include:

- Action EL/24/1: Accelerating Renewable Electricity Taskforce to publish programme of work.
- Action EL/24/3: Revision to the National Planning Framework to include regional capacities for the allocation of national targets at a regional level in order to inform local development plan policy.
- Action EL/24/4: Publish Regional Renewable Electricity Strategies.
- Action EL/24/5: Publish the Revised Wind Energy Development Guidelines for onshore wind.
- Action EL/24/6: Publish revised methodology for Local Authority Renewable Energy Strategies.
- Action EL/24/7: Publish new Electricity Generation Grid Connection Policy
- Action EL/24/8: Deliver onshore and offshore RESS auctions as per the annual RESS auction calendar.
- Action EL/24/13: Publish annual report setting out identifiable public benefits delivered by renewable energy sector.
- Action EL/24/15: Submit to DECC timelines of large-scale onshore grid development projects to be delivered in 2024 and publish an appropriate version.
- Action EL/24/18 Issue suite of recommendations papers on market options to incentivise low/no carbon flexible demand from the electricity sector.

CAP25 reiterates many of these objectives outlined in CAP24, including the need to double Ireland's onshore wind energy capacity to 9 GW by 2030 in order to meet new renewable energy targets and reduce emissions. The CAP25 comprises a number of new, strategic actions however much of the detail behind the actions is still contained within CAP24. The key CAP25 actions of relevance to this project include:

- It establishes a target for Carbon Budget 1 (2021-2025) of 40 MtCO2eq, requiring a 75% across all sectors. Current EPA projections indicating an overshoot of over 1 MtCO2eq.
- It establishes a target for Carbon Budget 2 (2026-2030): 20 MtCO2eq requiring a 75% across all sectors. Current EPA projections indicating an overshoot of over 5MtCO2eq.
- Align, as relevant, with the Accelerating Renewable Electricity Taskforce Implementation Plan which sets out a roadmap for the actions to be taken in the near-term to help meet our 2030 targets.
- Action EL/25/1: Manage the Renewable Electricity Support Scheme
- Action El/25/2: Publish a long Duration Energy Storage Procurement recommendations paper
- Action EL/25/3: Development a data sharing framework regarding Low Carbon Technologies connection to the electricity grid
- Action EL/25/4: Develop Smart-flex standards roadmap
- Action EL/25/5: Develop consumer-led flexible demand processes

The policies and objectives of CAP24/CAP25 are reflected in the National Energy & Climate Plan (NECP) 2021-2030, which was published in July 2024.

The NECP was prepared to incorporate all planned policies and measures that were identified up to the end of 2019 and will collectively deliver a 30% reduction by 2030 in non-ETS (emissions trading system) greenhouse gas emissions (from 2005 levels). The NECP was drafted in line with the current EU effort-sharing approach, before the Government committed to its higher level of ambition, and therefore does not reflect this higher commitment. Further iterations of the NECP will reflect the current government's stronger climate governance.

6.1.2.1 Climate Change Performance Index

The Climate Change Performance Index (CCPI) is an independent monitoring tool which tracks countries climate protection performance. It assesses individual countries based on climate policies, energy usage per capita, renewable energy implementation and Greenhouse Gas Emissions (GHG) and ranks their performance in each category and overall.

The 2024 CCPI was published in December 2023. While the 2024 CCPI indicated signs of potential reductions in global emissions, no country achieved a "very high" and therefore the first three places of the ranking system remain unoccupied.

Ireland has fallen 6 places from its 2023 rank to 43rd out of 64 globally ranked countries and remains at "low" in international performance.

6.1.3 Carbon Emissions

CO_2 emissions occur naturally in addition to being released with the burning of fossil fuels. All organic material is composed of carbon, which is released as CO_2 when the material decomposes. Organic material acts as a store of carbon. Peatland habitats are significant stores of organic carbon. The vegetation on a peat bog slowly absorbs CO2 from the atmosphere when it is alive and converts it to organic carbon. When the vegetation dies, in the acidic waterlogged conditions of bogs and peatlands, the organic material does not decompose fully and the organic carbon is retained in the ground.

When developments such as wind farms are proposed for peatland areas, there will be direct impacts and loss of peat in the area of the development footprint which may result in decomposition of the stored organic material with the associated release of the stored carbon as CO_2. It is essential therefore that any wind farm development in a peatland area displaces more CO_2 produced from fossil fuel sources than it releases during the construction, operation and decommissioning of the wind farm site. Later sections of this chapter will demonstrate how the Proposed Development will displace more CO2 produced from fossil fuels than will be released in construction, operation and decommissioning of the project.

There is approximately 0.0 m – 5.4 m of peat on site. The site is not located on active bog or fen habitats. The Site currently comprises pasture land; and plantation forestry. Peat is generally found underlying the forestry in the northern portion of the site, whereas peat is generally not found underlying the pasture lands in the southern portion of the site. The Proposed Development has been sensitively situated to avoid areas with the most carbon storage value, and avoids the high bog .

The Scottish Carbon Calculator Tool[1] was used to calculate whole life carbon emissions and carbon savings as a result of the proposed development. Input data used in the calculations is presented in Appendix 7.1, Volume III of this EIAR.

[1] https://informatics.sepa.org.uk/CarbonCalculator/index.jsp

Ireland's Carbon Emissions

Ireland's greenhouse gas (GHG) emissions are tracked and projected by the EPA for submission to the EU UNFCCC annually. Carbon dioxide emissions are reported alongside methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulphur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).

According to the EPA[2], for 2023, national greenhouse gas emissions (excluding LULUCF) were estimated at 55.01 million tonnes carbon dioxide equivalent (Mt CO2eq) which is 6.8% lower (or 4.00 Mt CO2eq) than emissions in 2022 (59.00 Mt CO2eq) and follows a 2.0% decrease in emissions reported for 2022.

Emissions in the Energy Industries sector showed a decrease of 21.6% in 2023 which is attributable to reduction in coal, fuel oil and natural gas use in electricity generation.

SEAI estimate that 38.9% of electricity generation was from renewable sources in 2022 (SEAI, 2023). The estimated amount of CO_2 avoided through the use of renewable electricity sources reached 5.5 Mt CO_2 in 2022. Ireland's installed capacity for wind generation to the end of 2022 was 4.54 GW.

The EPA's latest projections report, 'Ireland's Greenhouse Gas Emissions Projections 2022-2040' (June 2023[3]) projected Ireland's greenhouse gas emissions under two scenarios: The With Existing Measures scenario and the With Additional Measures scenario. The With Existing Measures (WEM) scenario incorporates the anticipated impact of policies and measures that were in place (and legislatively provided for) by the end of 2018. The With Additional Measures (WAM) scenario includes all policies and measures included in the WEM scenario, but also includes Government plans not yet implemented. For example, the WAM scenario includes the target of 945,000 Electric Vehicles on the road by 2030 in CAP23. The full value of this ambition is not currently in the With Existing Measures scenario as actions still remain to be taken that would deliver it. Figure 6-1 illustrates the WEM and WAM projected emissions in relation to Energy Industries.

[2] https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/
[3] EPA '2020 Greenhouse Gas Emissions Projections' 2020-2040.

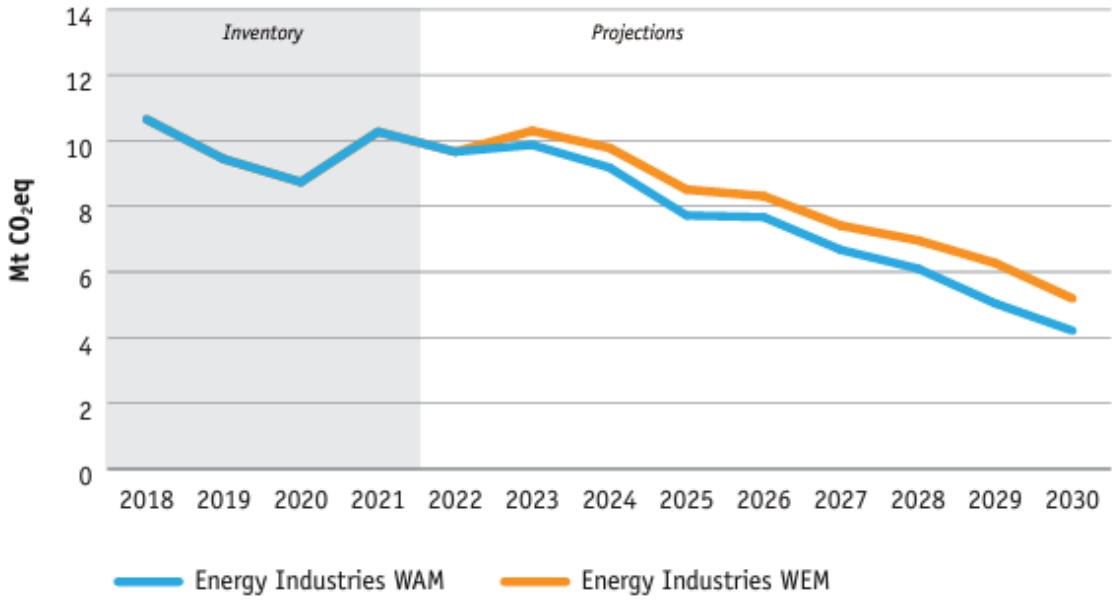

Figure 6-1: Greenhouse Gas Emissions Projections from the Energy Industries Sector under the WEM and WAM scenarios out to 2030 (from SEAI 2023)

According to 'Ireland's Greenhouse Gas Emissions Projections 2022-2040' (EPA, 2023), emissions from the energy industries sector are projected to decrease by 60% from 10.3 to 4.2 Mt CO_2eq over the period 2021 to 2030 under the "With Additional Measures" scenario.

On 14th May 2018, the European Council adopted a regulation on greenhouse gas emission reductions. The regulation sets out binding emission reduction targets for Member States in sectors falling outside the scope of the EU emissions trading system for the period 2021- 2030. In the National Energy and Climate Plan 2020, the results of the government projections show that, Ireland will exceed the carbon budget over the period 2021 – 2030 by approximately 32 Mt CO_2 equivalent with full use of the ETS and LULUCF flexibilities (DoECC, 2020).

6.2 Methodology

The primary land-uses within and in the vicinity of the Site comprises agriculture, commercial forestry and sections of peat bog. The Drehid Landfill facility is in operation, approximately 1.6 km south of the Proposed Development site, which operates under EPA Industrial Emissions License W0201. A review of the license compliance reports shows that there are no air quality issues associated with emissions from the landfill.

As the production of energy from wind turbines has no direct emissions to air, and due to the general character of the surrounding environment, air quality sampling was deemed to be unnecessary for this EIAR. It is expected that air quality in the existing environment is good, since there are no major sources of air pollution (e.g. heavy industry) in the vicinity of the site.

The production of energy from wind turbines has no direct emissions as is expected from fossil fuel based power stations. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor short term or temporary indirect emissions associated with the construction of the Proposed Development include vehicular and dust emissions.

As the operation of wind turbines does not give rise to emissions (with the exception of back-up generators which would not be in use regularly), in respect of air and climate, this chapter focuses on the potential emissions which may arise during the construction and decommissioning phases of the Proposed Development. The Scottish Windfarm Carbon Assessment Tool was used to predict the carbon savings for the wind farm for an operational period of 35 years.

6.2.1 Air Quality

A review of existing air quality monitoring data undertaken by the Environmental Protection Agency (EPA) was reviewed and used to characterise the existing environment.

The impact assessment methodology involved the review and assessment of the construction methods for the proposed development and associated infrastructure to identify the potential for air emissions during construction and decommissioning.

To assess the impacts of construction dust emissions, the Institute of Air Quality Management (IAQM) guidance document: '*Guidance on the Assessment of Dust from Demolition and Construction*'[4] was used, as is recommended in Transport Infrastructure Ireland's (TII) Air Quality Assessment of the NRA's *Assessment Criteria for the Impact of Dust Emissions from Construction Activities with Standard Mitigation In Place*[5] .. This approach involves a number of "steps" to assess the potential impact of dust on nearby receptors.

The steps involved in the dust impact assessment, as prescribed by the IAQM, are as follows:

1. Screen the requirement for a dust impact assessment
2. Assess the risk of dust impacts by:
   - 2A The scale and nature of the works – the "magnitude" of the potential dust emission
   - 2B The sensitivity of the surrounding area
   - 2C Combining 2A and 2B into a risk matrix to assess the risk of dust impacts
3. Identify site-specific mitigation measures
4. Examine the residual impacts and whether or not these are significant
5. Prepare a Dust Assessment Report

[4] http://iaqm.co.uk/wp-content/uploads/guidance/iaqm_guidance_report_draft1.4.pdf
[5] https://www.tiipublications.ie/library/PE-ENV-01107-01.pdf

Step 1, the screening process, has been set out by the IAQM to be deliberately conservative. One of the threshold criteria which will trigger the requirement for a dust impact assessment, for example, is that a human receptor exists within 350 m of the site boundary. As this is the case for The Proposed Development, the screening process indicates that a dust impact assessment is required.

Step 2 of the process will be carried out in the Impact Assessment section of this chapter (section 6.4). Step 3 will be carried out in the Mitigation Measures section of this chapter (6.6). Step 4 will be covered by the Residual Impacts section (6.7) and step 5 will therefore be addressed by writing the process and results of the dust impact assessment into this chapter.

6.2.2 Climate

A desk-top study assessment was undertaken of available climatic information to characterise the existing environment. The climatic conditions for the wider geographical area have been derived from historical meteorological measurements compiled by Met Éireann. Lullymore Nature Centre weather station was first identified as being the closest weather station to the site of the Proposed Development, located approximately 10 km southwest of the site. However, the data collected at this weather station is minimal, with no air temperature data recorded since December 2023, and no rainfall data recorded since July 2024. As such, weather data was sourced from the next closest weather station with sufficient data, which was identified as Mullingar weather station, approximately 35 km northwest of the Proposed Development site. These meteorological measurements were accessed in November 2024 (source www.met.ie/climate).

In terms of climatic impact, the appraisal considered the net impact that operating the Proposed Development will have in terms of CO_2 and its displacement of CO_2 from other energy sources over the carbon losses caused by its manufacturing, transportation, construction and decommissioning using the Scottish Carbon Calculator tool.

In addition to the CO_2 factored for emissions purposes, greenhouse gas (GHG) emissions are also factored into the overall carbon calculation. GHG are associated with the manufacture, transport, construction, operation (linked to backup generation) and decommissioning of wind turbines.

The impact assessment considered the positive impacts the Proposed Development will have on contributing to national targets for the reduction of greenhouse gas emissions. The results are described below and in summary the proposed development will result in the production of energy from a renewable source which, once fed into the National Grid, has the potential to avoid several thousand tonnes of carbon dioxide (CO_2) annually that would have been released had the energy been generated by the average/typical/traditional Irish power generation mix.

Figures from the Sustainable Energy Authority of Ireland (SEAI, 2024) indicate that the CO_2 displacement by wind generation was 4.55Mt CO2 in 2023.

The amount of CO_2 that could potentially be avoided on an annual basis due to the proposed development is estimated based on the expected output of the wind farm. The net displacement value may increase or decrease somewhat, as the generation mix in Ireland develops, under different fuel price scenarios and as demand changes over time, and as more storage, interconnection and demand side management (smart meters) come online. Refer to Section 6.4.3 for details of the calculations for carbon saving as a result of the Proposed Development.

As mentioned above, monthly meteorological data from Met Eireann was reviewed in November 2024 to gain an understanding of the existing climatic condition of the site. These meteorological measurements provided measurements of total rainfall, maximum daily air temperature, minimum daily air temperature, mean wind speed, mean 10 cm soil temperature, potential evapotranspiration (mm), and evaporation (mm) for Mullingar weather station.

The Scottish National Heritage carbon calculator which accounts for all stages of the Proposed Development, was used to determine the long term effect of the Proposed Development on climate. The impact assessment also involved a review of activities associated with the construction, operational and decommissioning phases to determine impacts on both the micro and macro climates of the site.

6.2.3 Carbon Emissions

Previously, guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of any more detailed methods. Concerns were raised about the methods of calculating carbon savings for large scale wind farms being developed in Scotland as many of the developments were located on peatlands and forestry which can contain large carbon stocks and which are poorly protected. The methodology for calculating carbon losses was created in 2008 by scientists at the University of Aberdeen and the Macauley Institute with support from the Rural and Environment Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. The methodology was first developed as a spreadsheet calculator and later and an online calculator tool to assess the potential impacts of wind farm developments on the soil carbon stocks held in peat. The tool provides a straightforward method for estimating the impacts of wind farms on the carbon dynamics of peatlands. The tool also provides guidance when figure inputs are unknown. The carbon calculator, whilst designed for Scottish wind farm developments is used for assessing Irish wind farm developments due to the similarity in development sites, i.e. high ground on peatlands which contain forestry in a similar climate.

The calculator was created to calculate the loss of carbon from acidic bog or fen habitat and defines peat soils as soils with a surface horizon greater than 50 cm deep. The calculator takes into account the carbon fixing potential from peatland plants (which is small) and calculates the total area of peat excavation and the total area of peat affected by drainage, using the annual gains due to carbon fixing potential and the time required for any habitat restoration. Carbon stored within the peat itself represents a large potential source of carbon which can be lost during excavation and drainage. Forestry on proposed wind farm sites can affect wind energy yields and therefore clear felling is generally required. Carbon losses as a result of felling are calculated from the area to be felled, the average carbon sequestered annually, and the lifetime of the wind farm. The calculator also takes into account the carbon emissions from the life cycle analysis of the wind turbines and the back up source in order to calculate carbon savings and carbon payback times of a wind farm. Site specific capacity factor is also required to provide a realistic payback time for a site. The calculator also takes into account a grid mix emission factor. The calculator uses default values from the Intergovernmental Panel on Climate Change (IPPCC, 1997) as well as site specific equations from scientific literature to calculate carbon loss.

In keeping with guidance, specific figures have been inputted wherever possible and where this information was not available the guidance provided by the calculator was used. The assumption to use the fossil fuel generation emission factor was made based on the reality that additional wind generation will displace fossil fuel generation (Scot. Gov., 2018). With regards to the windfarm characteristics the following presumptions for the Site were made: the lifetime of the windfarm is 35 years the capacity factor is 35% and the fraction of output to back up is 1.75% (i.e. 5% of capacity factor). With regards to the characteristics of the ‘peatland’ before development, it is worth noting that the site has been cultivated and is dominated by conifer plantation meaning that the carbon content of the peat is much lower than that of an actual peatland habitat, with carbon having been released during the drainage and cultivation of the site.

An average depth of peatland was provided for the site (1.39 m). Whilst the carbon content for dry peat, dry bulk density and extent of drainage around drainage features was unknown and were likely to be below the figures provided in the accompanied guidance, guidance figures were used, which are provided with the Scottish Carbon Calculator. Also, whilst 28.4 ha of forestry is to be clear felled, forestry will be replanted elsewhere, and the carbon calculator does not take the re-planting into account. It is therefore highly likely that the carbon loss figure for the Proposed Development will be slightly higher than the actual carbon loss for the site.

The Scottish Carbon Calculator was used to assess the impacts of the Proposed Development in terms of potential carbon losses and savings taking into account the whole life of the development including materials manufacture, transport and installation and all construction activities including peat removal, drainage, and forestry felling The online version of the Scottish carbon calculator was not available at the time of writing this EIAR. As such, FT made direct contact with the Directorate for Energy and Climate Change in Scotland to request a Microsoft Excel-based version of the tool. This tool was provided by the Directorate and utilised by FT to complete the assessment. A copy of the outputs is provided as Appendix 6.2, Volume III of this EIAR. A summary of the main CO_2 losses due to the proposed development are summarised in Section 6.4.3.

6.3 Existing Environment

6.3.1 Air Quality

European air quality legislation requires that each member state be defined in terms of Zones and Agglomerations for air quality, with Ireland divided into four zones. The EPA has designated four zones within Ireland[6]:

- Zone A: Dublin City and its environs
- Zone B: Cork City and its environs
- Zone C: 24 cities and towns (such as Galway, Limerick and Waterford cities and towns such as Naas, Newbridge, Celbridge, Leixlip) with a population of greater than 15,000
- Zone D covers the remainder of the country.

These zones were defined to meet the criteria for air quality monitoring, assessment and management described in the Framework Directive and Daughter Directives. The site of the Proposed Development, including the GCR are located in Zone D. While the port of entry for the turbine delivery has not yet been identified, the majority of the TDR is located within Zone D also.

[6] EPA. Air Quality Zones

The air quality in each zone is monitored by the EPA and classified with respect to upper and lower assessment thresholds based on measurements over the previous five years. The number of monitoring locations required is dependent on population size and whether ambient air quality concentrations exceed the upper assessment threshold, are between the upper and lower assessment thresholds, or are below the lower assessment threshold. The Air Quality In Ireland Report 2022 (EPA 2023) noted that Ireland's overall air quality was good, however there are localised issues across the country impacting negatively on the air quality. The report showed that: particulate matter PM2.5, originating primarily from the domestic burning of solid fuels, and NO2, primarily an emission from road transport; are the main threats to good air quality in Ireland. The WHO published new air quality guidelines (AQGs) in 2021 based on the impacts of pollutants on human health. So far Ireland is failing to meet these guidelines. It is estimated that there are approximately 1,300 premature deaths annually in Ireland due to poor air quality from fine particulate matter ($PM_{2.5}$). The Air Quality Index for Health map on the EPA website, shows that the current air quality within the Site, GCR and TDR is classed as Good.

The EPA undertakes continuous ambient air monitoring at various stations in Ireland. Although no data is available on air quality in the immediate vicinity? of the Proposed Development, it is expected that the air quality data from the nearest stations to the Proposed Development are representative of the air quality at the Site. In the case of the Proposed Development, the closest EPA monitoring station is Station 102, Edenderry Library, Co. Offaly (approximately 10 km west of the Proposed Development site). Station 102 monitors NO_2, SO_2, PM_{10} and $PM_{2.5}$.

A summary of data collected at these monitoring stations is found in the following sections. The EPA allows a maximum of 6 months' of data to be exported to CSV files. Therefore, data for 31st May 2024 to 14th November 2024 has been used to create the summary tables below.

6.3.1.1 Particulate Matter (PM10)

Particulate matter are very small particles which can be either solid or liquid. Some of these particles occur naturally, while many are man-made. Particulate matter is referred to as PM. The number following the PM is used to show how small the PM is. The EPA monitors two types of PM and compare levels to limit values in the CAFE (Clean Air for Europe) Directive and WHO guidelines. These are PM_{10} and $PM_{2.5}$.

Particulate matter (PM_{10}) data for the 31st May 2024 to 14th November 2024 monitoring period at Station 102 is presented in Table 6-3. The maximum daily value of PM_{10} recorded during the period was 54.36 µg.m-3 which is above the threshold of 50 µg.m-3 which must not be exceeded any more than 35 times in a year. Of the 6 months of data examined, this threshold was exceeded once on 11th November 2024 which is representative of less than 35 exceedances per year. Therefore, it is assumed that the PM_{10} concentrations throughout the year are compliant with the CAFE Directive. The mean daily value recorded during the period was 13.10 µg.m-3 which does not exceed the threshold in the CAFE Directive of 40 µg.m-3 annual mean concentration.

Table 6-3: Particular Matter (PM10) data from Station 102, Edenderry Library 31/05/2024-14/11/2024

Parameter	Measurement
No. of Days	168
No of measure values	168
Percentage coverage	100%
Maximum daily value	54.36 µg.m-3
Mean daily value	13.10 µg.m-3

6.3.1.2 Particulate Matter (PM2.5)

Particulate matter ($PM_{2.5}$) data for the 31st May 2024 to 14th November 2024 monitoring period at Station 102 is presented in Table 6-4. The mean daily PM2.5 concentration is below the threshold value (mean daily value of 9.45 µg.m-3) and is therefore compliant with the CAFE Directive.

Table 6-4: Particular Matter (PM2.5) data from Station 102, Edenderry Library 31/05/2024-14/11/2024

Parameter	Measurement
No. of Days	168
No of measure values	168
Percentage coverage	100%
Maximum daily value	51.17 µg.m-3
Mean daily value	9.45 µg.m-3

6.3.1.3 Sulphur Dioxide (SO2)

Sulphur Dioxide for the period of 31st May 2024 to 14th November 2024 recorded at Station 102, Edenderry Library is presented in Table 6-5. Neither the hourly limit value nor the 24-hour limit value as set out in the CAFE Directive were exceeded during the monitoring period.

Table 6-5: Sulphur Dioxide Data from Station 102, Edenderry Library 31/05/2024-14/11/2024

Parameter	Measurement
Number of Hours	3976
No. of measured values	3996
Percentage Coverage	99%
Maximum hourly value	79.78 µg.m-3
98 percentile for hourly values	12.23 µg.m-3
Mean hourly value	2.22 µg.m-3
Maximum 24 hour mean	12.55 µg.m-3
98 percentile for 24-hour mean	12.45 µg.m-3

6.3.1.4 Nitrogen Dioxide (NO2)

Nitrogen dioxide for the 31st May 2024 to 14th November 2024 monitoring period in at Station 102 is presented in Table 6-6. The hourly limit values for the protection of human health were not exceeded during the assessment. Neither the hourly threshold (200 µg.m-3) nor the annual mean threshold (40 µg.m-3) values were exceeded during the monitoring period.

Table 6-6: Nitrogen Dioxide Data from Station 102, Edenderry Library 31/05/2024-14/11/2024

Parameter	Measurement
No. of Hours	3996
No of measure values	3977
Percentage coverage	99%
Maximum hourly value (NO2)	78.63 µg.m-3
98 percentile for hourly rates (NO2)	23.01 µg.m-3
Mean hourly value (NO2)	7.00 µg.m-3

6.3.1.5 Dust

The WHO[7] defines dust as: "Airborne contaminants (which) occur in the gaseous form (gases and vapours) or as aerosols. In scientific terminology, an aerosol is defined as a system of particles suspended in a gaseous medium, usually air in the context of occupational hygiene, is usually air. Aerosols may exist in the form of airborne dusts, sprays, mists, smokes and fumes". In more general terms, dust is an airborne particulate matter ranging in diameter from 10 to 50 microns which is generated by organic and inorganic matter such as coal, grain, metal, ore, rock and wood. Dust can be generated by activities which process organic and inorganic matter. Dust can be stirred up from inert states through weather and wind conditions and deposit on all parts of the surrounding environment.

There are no statutory limits for dust deposition in Ireland. However, EPA guidance suggests that a deposition of 10 mg/m2/hour can generally be considered as posing a soiling nuisance. This equates to 240 mg/m2/day. The EPA recommends a maximum daily deposition level of 350 mg/m2/day when measured according to the TA Luft Standard 2002.

Construction dust has the potential to be generated from on-site activities such as excavation and backfilling. The extent of dust generation at any site depends on the type of activity undertaken, the location, the nature of the dust, (i.e. soil, sand, peat)and the weather. In addition, dust dispersion is influenced by external factors such as wind speed and direction and/or, periods of dry weather. Construction traffic movements also have the potential to generate dust as they travel along the haul route.

[7] https://www.who.int/occupational_health/publications/en/oehairbornedust3.pdf

6.3.2 Climate

Climate is defined by the EPA as "the average weather over a period of time". Climate change is a term that is used to describe a "significant change in the measures of climate, such as temperature, rainfall, or wind, lasting for an extended period – decades or longer. [8]" There is scientific evidence[9] which suggests that the current climate is rapidly warming, having reached approximately 1°C above pre-industrial levels in 2017, increasing at a rate of 0.2 °C per decade. Warmer weather places pressure on flora and fauna which cannot adapt to a rapidly changing environment. In Ireland, the pressure on flora and fauna is mitigated due to the dominant influence of the Gulf Stream on Ireland's climate. Consequently, Ireland does not suffer from the extremes of temperature experienced by many other countries at similar latitudes.

The climatic conditions for the wider geographical area have been derived from historical meteorological measurements compiled by Met Éireann at Mullingar weather station which is approximately 35 km northwest the Site. These meteorological conditions are presented in Table 6-7 the period January 2022 – October 2024 (source www.met.ie/climate).

[8] https://www.epa.ie/climate/communicatingclimatescience/whatisclimatechange/

[9] IPCC Special Report "Global Warming of 1.5°C": https://www.ipcc.ch/sr15/download/#chapter

Table 6-7: Climate Records January 2022- October 2024

Total rainfall in millimetres for MULLINGAR WEATHER STATION

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	83.1	91.9	117.3	97	57.1	49.4	65.6	82.7	47.5	59.9			TBC
2023	81.1	29.8	141.4	82.8	36.4	53.3	178.8	114.3	132.9	104.5	71.2	132	1158.5
2022	47.6	131.8	46.2	48.7	53.4	100.6	31.6	35.2	104.1	208.8	109.3	84.5	1001.8
LTA	91.9	75.5	76.3	62.2	66.3	71.2	73.6	85.6	80.9	101.9	91.3	99.7	

Mean temperature in degrees Celsius for MULLINGAR WEATHER STATION

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	4.4	7.0	7.0	8.7	13.0	12.7	14.5	14.5	12.3	10.5			TBC
2023	5.3	6.8	6.9	8.7	12.3	15.9	14.5	15.3	14.3	10.8	6.8	6.5	10.4
2022	5.1	6.2	6.6	8.1	12.0	13.5	16.2	15.5	12.9	11.2	8.2	3.4	9.9
LTA	4.5	4.9	6.1	7.9	10.6	13.2	15.0	14.6	12.5	9.7	6.6	5.0	9.2

Mean wind speed (knots) for MULLINGAR WEATHER STATION

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
2024	6.4	6.6	7.2	6.8	5.2	5.2	5.0	6.6	5.5	6.4			TBC
2023	6.5	6.4	6.7	6.5	5.0	5.7	5.8	5.9	5.6	5.2	5.6	7.9	6.1
2022	5.6	8.7	6.0	6.4	6.3	5.9	4.9	4.6	4.8	7.0	7.5	5.5	6.1
mean	8.5	8.5	8.5	7.3	6.9	6.4	6.2	6.1	6.6	7.2	7.5	8.0	7.3

6.4 Impact Assessment

6.4.1 Do-Nothing Impact

6.4.1.1 Proposed Wind Farm

If the Proposed Wind Farm does not proceed, local air quality and the microclimate will remain unchanged. On a national scale, there will be an increase in greenhouse gas emissions if increasing future electricity needs are not met by alternative renewable sources which has the potential to contribute to air pollution and climate change. The opportunity to contribute to Ireland's commitments under the Kyoto Protocol and to meet national targets as set out in the Climate Action Plan would also be lost.

6.4.1.1 Proposed Substation

If the Proposed Substation does not proceed, local air quality and the microclimate will remain unchanged. If the wind farm development proceeds but the substation does not, there would be short-term negative impacts on air quality associated with some alternative grid connection route, for example by trenching a cable into the road network to the nearest available point of connection. It is understood that there are no available points of connection within a feasible distance, therefore the magnitude and extent of dust impacts would be significant if a cable were to be trenched into the road network. Local residents living adjacent to the trenching and ducting works would be impacted by emissions.

In addition, the opportunity for other potential future renewable energy projects in the area which could have connected into the substation will be lost.

6.4.1.2 Proposed Development

If neither element of the development is constructed (neither the wind farm nor the substation), on a national scale, there will be an increase in greenhouse gas emissions if increasing future electricity needs are not met by alternative renewable sources which has the potential to contribute to air pollution and climate change. The opportunity to contribute to Ireland's commitments under the Kyoto Protocol and to meet national targets as set out in the Climate Action Plan would also be lost. The opportunity for other potential future renewable energy projects in the area which could have connected into the substation will also be lost.

6.4.2 Air Quality

6.4.2.1 Construction Phase Impacts

6.4.2.1.1 Proposed Wind Farm

The principal sources of potential air emissions during the construction of the Proposed Wind Farm will be from dust arising from earthworks, construction of the new access tracks, the temporary storage of excavated materials, the movement of construction vehicles, loading and unloading of aggregates/materials and the movement of material around the site.

Dust emissions arise when particulate matter becomes airborne making it available to be carried downwind from the source. Dust emissions can lead to elevated PM_{10} and $PM_{2.5}$ concentrations and may also cause dust soiling. The amount of dust generated and emitted from a working site and the potential impact on the surrounding areas varies according to:

- The type and quantity of material and working methods
- Distance between site activities and sensitive receptors
- Climate/local meteorology and topography

Table 6-8: IAQM descriptions for the magnitude of an earthworks project

Source	
Scale	**Description**
Large	Total site area greater than 10,000m^2, potentially dusty soil type, more than 10 heavy earth-moving vehicles active at any one time, formation of bunds greater than 8 m in height, total material moved greater than 100,000 tonnes .
Medium	Total site area greater 2,500m^2, moderately dusty soil type, 5-10 heavy earth-moving vehicles active at any one time, formation of bunds 4 to 8 m in height, total material moved 20,000 tonnes to 100,000 tonnes.
Small	Total site area less than 2,500m^2, soil type with large grain size (e.g. sand), less than 5 heavy earth-moving vehicles active at any one time, formation of bunds less than 4 m in height, total material moved less than 20,000 tonnes, earthworks during wetter months.

Source: IAQM, 2014[4]

Applying the IAQM criteria in Table 6-8, the overall construction of the Proposed Wind Farm is considered a large scale construction site as the site area is greater than 10,000m^2 and potentially dusty soil types such as clays are present throughout much of the site. The “magnitude” of the potential emissions is therefore “large”.

There are nine human receptors within 100m of the red-line boundary of the site. Due to the small number of receptors, and distance from the source of the dust emissions, the “sensitivity” of the area is considered to be “low”.

Combining the large magnitude of the earthworks with the low sensitivity, the IAQM guidance indicates that the Risk of Dust Impacts are “Low Risk” for the Proposed Development. This will apply during the construction stage. The Low Risk dust impacts may result in slight to moderate residual impacts arising from fugitive dust emissions during particular construction activities. These will be localised in nature and as they will be associated with particular elements of the construction phase, they will be temporary in nature and will not result in any permanent residual impacts.

Dust emissions during the operational stage will be negligible, following the same guidance. As turbine foundations will be left in-situ following decommission, the Risk of Dust Impacts during the decommissioning stage would be considered “Low Risk” at worst, if not negligible.

Construction vehicles and plant emissions have the potential to increase concentrations of compounds such as NO_2, Benzene and PM_{10} in the receiving environment. Local receptors may be exposed to these emissions. This exposure would be slight and short duration (but also recurring) as the setting is rural and will allow for emissions to rapidly dilute in the open air.

It is not predicted that an air quality impact will occur due to traffic at the Proposed Wind Farm as the impacts will fall below the screening criteria set out in the UK DMRB guidance (UK Highways Agency 2007), on which the TII guidance (specified in the methodology of this chapter in Section 5.2.1) is based. This UK DMRB guidance states that road links meeting one or more of the following criteria can be defined as being 'affected' by a Proposed Development and should be included in the local air quality assessment:

- Road alignment change of 5 metres or more;
- Daily traffic flow changes by 1,000 AADT or more;
- HGVs flows change by 200 vehicles per day or more;
- Daily average speed changes by 10 km/h or more; or
- Peak hour speed changes by 20 km/h or more.

On the surrounding road network as detailed in Chapter 13 Traffic and Transportation, there will be an increase in traffic volumes over a construction period of 18 months.

The estimated increase in traffic volumes is equivalent to 31 HGVs (or 62 no. 2-way HGV trips) per day estimated throughout most of the construction period, ramping up to 155.5 HGVs per day (or 311 no. 2-way HGV trips per day estimated for a relatively short period, when stone is being imported to site to build out the access tracks and turbine hardstandings.

None of the criteria set out in the UK DMRB are met. Therefore, the air quality assessment model is not required in this instance.

Some receptors have the potential for dust soiling due to trucks travelling along local routes. This is a temporary, moderate impact. Mitigation measures for this are described in Section 6.6.

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.

6.4.2.1.2 Proposed Substation

The principal sources of potential air emissions during the construction of the Proposed Substation will be as listed above for the wind farm, but on a smaller scale.

Applying the IAQM criteria in Table 6.8, the construction of the Proposed Substation is considered a medium construction site. The closest receptor to the red-line boundary of the site is an involved landowner and is more than 100 m away. The second closest receptor to the site, which is not an involved landowner is the house centred on ITM coordinates 676791, 738462; which is located to the 145 m north of the proposed grid connection location, where two masts will be constructed to connect into the existing overhead line). No receptors within 100 m of the boundary is considered to be a "low" sensitivity. Therefore, applying the IAQM matrix of magnitude vs sensitivity, the Risk of Dust Impacts during the construction phase of the substation are "Low Risk".

Construction vehicles and plant emissions have the potential to increase concentrations of compounds such as NO_2, Benzene and PM_{10} in the receiving environment. Local receptors may be exposed to these emissions. This exposure would be slight and short duration (but also recurring) as the setting is rural and will allow for emissions to rapidly dilute in the open air.

It is not predicted that an air quality impact will occur due to traffic at the Proposed Substation as the impacts will fall below the screening criteria set out in the UK DMRB guidance (UK Highways Agency 2007), on which the TII guidance is based.

Some receptors have the potential for dust soiling due to trucks travelling along local routes. This is a temporary, slight impact. Mitigation measures for this are described in Section 6.6.

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.

6.4.2.2 Operational Phase Impacts

6.4.2.2.1 Proposed Wind Farm

Once the Proposed Wind Farm is constructed there will be no significant direct emissions to the atmosphere.

Maintenance vehicles will access the Proposed Wind Farm site during the operational period. However, due to the low traffic movements involved, the impact will be imperceptible. The operational phase of the Proposed Wind Farm will result in positive impacts on air quality due to the displacement of air-polluting fossil fuels as an energy source.

6.4.2.2.2 Proposed Substation

Once the Proposed Substation is constructed there will be no significant direct emissions to atmosphere.

Maintenance vehicles will access the Proposed Substation during the operational period. However, due to the low traffic movements involved, the impact will be imperceptible. The operational phase of the Proposed Substation will result in indirect, positive impacts on air quality due to the displacement of fossil fuels, provided the substation is being used to feed renewable electricity from the Proposed Wind Farm onto the national grid.

6.4.2.3 Decommissioning Phase Impacts

6.4.2.3.1 Proposed Wind Farm

In terms of decommissioning, there will be truck movements associated with removing the proposed wind turbines, earthmoving to cover foundations and landscaping resulting in vehicular emissions and also dust. However, the number of truck movements will be significantly less than the construction phase and will potentially result in a slight temporary impact. 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.

6.4.2.3.2 Proposed Substation

During the decommissioning phase, the proposed grid connection infrastructure including the substation and ancillary electrical equipment will form part of the national grid and shall be left in situ. Therefore, there are no expected impacts associated with decommissioning of the substation.

If the Proposed Substation is required to be decommissioned, the impacts would be similar to those described above for the Proposed Wind Farm but on a smaller scale. This would constitute a slight, temporary negative impact on air quality due to dust and vehicular emissions.

6.4.2.4 Climate

There is the potential for greenhouse gas emissions to the atmosphere during the construction, operation and decommissioning phases of the Proposed Development such as those arising from construction vehicles, the use of on-site generators, pumps, and excavation works. The potential climatic impacts arising from these emissions are assessed hereunder with respect to micro and macro climates.

6.4.2.4.1 Microclimate

6.4.2.4.2 Proposed Wind Farm

The significance of impacts associated with the conversion of vegetated surfaces to un-vegetated surfaces is assessed through the consideration of the area of the land experiencing such a change.

The Proposed Wind Farm site is predominately agricultural pasture lands and conifer plantation. Due to the nature of the development, comprising roads of 4.5 m width and hardstanding locations within the context of the greater area which comprises large swathes of predominantly vegetated surfaces, there will be no direct or indirect impact on air temperature and microclimate because of the relatively small proportion of new permanent hardstanding surface.

6.4.2.4.3 Proposed Substation

The total area of proposed new permanent hardstanding surface associated with the Proposed Substation will be smaller than that of the Proposed Wind Farm. Therefore, again, due to the small fraction of land take relative to the surrounding area, there will be no direct or indirect impact on air temperature and microclimate due to the Proposed Substation.

6.4.2.5 Macroclimate

6.4.2.5.1 Proposed Wind Farm

Carbon dioxide (CO_2) is a greenhouse gas which if released in excessive amounts can lead to increases in global temperatures known as ‘global warming’ or ‘greenhouse effect’ which can influence climate change. Section 6.4.3 details the carbon savings that have been calculated for the Proposed Wind Farm.

Should the Proposed Wind Farm not be developed, fossil fuel power stations will be the primary alternative to provide the required quantities of electricity. This will further contribute to greenhouse gas and other air pollutant emissions, as well as hindering Ireland in its commitment to meet its target to increase electricity production from renewable sources and to reduce greenhouse gas emissions.

The Proposed Wind Farm offers Ireland an indigenous form of sustainable electricity and would provide for security of supply against our dependence on imports in addition to the positive impact on the macroclimate.

6.4.2.5.2 Proposed Substation

The Proposed Substation, provided it is utilised to feed renewable electricity onto the national grid, will have an indirect, positive impact on the macroclimate. The Proposed Substation will form part of the future grid infrastructure which is necessary to dispense with the carbon-intensive fossil fuel electricity generation described in the previous section.

6.4.3 Carbon Balance

6.4.3.1 Proposed Wind Farm

In terms of carbon losses and savings, the online Scottish Windfarm Carbon Assessment Tool (https://informatics.sepa.org.uk/CarbonCalculator/index.jsp) was used to estimate carbon savings as a result of the proposed construction, operation and decommissioning of the Proposed Wind Farm. The assumptions are located in Section 6.2.3 and Appendix 6.1 details the inputs to the model.

Carbon Losses

Based on the Scottish Windfarm Carbon Assessment Tool, the total expected losses due to the Proposed Wind Farm will be 141,353 tonnes of CO_2. This represents 10.9% of the total amount of CO_2 emissions that will be offset by the Proposed Development. Losses include the manufacture, construction and decommissioning of turbines, losses due to reduced carbon fixing potential and losses from soil organic matter. Values for these figures are presented in Table 6-9.

Carbon Gain through Avoided Emissions

In total, it is estimated that 1,302,595 tonnes of CO_2 emissions will be displaced over the proposed thirty five-year lifetime of the wind farm i.e. 37,217 tonnes of CO_2 per annum, when compared to the current mix of grid electricity in Ireland (229.9 gCO2/MWhr according to SEAI[10]) . This will assist in realising the ambitious goals of the Climate Action Plan 2025. From an operational perspective, the Proposed Wind Farm will displace the emission of CO_2 from other less clean forms of energy generation, predominantly gas, and will assist Ireland in meeting its renewable energy targets and obligations. The burning of fossil fuels for energy creates greenhouse gases, which contributes significantly to climate change. These and other emissions also create acid rain and air pollution.

For the Proposed Wind Farm with 11 no. turbines assuming an MEC of 52.8 MW at 35% capacity factor, and operational period of 35 years, the payback time for the manufacture, construction, and decommissioning phases (including carbon losses from soil, vegetation clearance etc.) of the Proposed Wind Farm is expected to be 3.8 years. It is worth noting that while the payback time was 2.7 years when the wind farm was proposed in 2018, it is now 3.8 years due to increased low-carbon energy sources contributing to the grid mix. The payback time is now 3.8 years as the Proposed Development is no longer offsetting the emissions from such a fossil-fuel-heavy grid mix as was the case in 2018.

[10] https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors

As discussed in Section 6.1.4, the carbon calculator was created to calculate carbon loss from acid bog habitats. The site has been cultivated and drained in the past, with the southern part of the site containing negligible peat, and the northern part of the site comprising conifer plantation on well-drained peat. The site does not function as an acid bog and therefore does not contain the same high levels of carbon. The calculator is therefore an over-estimate of impact.

Table 6-9: Carbon Balance Results

Origin of Losses	Total CO_2 Losses (tonnes $C0_2$ equivalent)	
	Expected	Maximum
Turbine manufacture, construction and decommissioning	49,879	52,091
Losses due to Backup	34,967	34,967
Felling of Forestry	13,122	13,861
Losses due to reduced carbon fixing potential	317	618
Losses from soil organic matter	43,068	49,933
Total Expected Losses	141,353	152,534
Emissions Savings	**Expected $C0_2$ emission savings (tonnes CO_2 per Annum)**	
Versus fossil fuel electricity generation	69,934	69,934
Energy output from windfarm	**MWh**	
Estimated Annual Output	161,885 MWh	161,885 MWh
Carbon payback time	**Years**	
Fossil fuel mix of electricity generation	2.0	2.2

6.4.3.2 Proposed Substation

The carbon emissions associated with the Proposed Substation will be mostly “embodied carbon” associated with the manufacture of the steel components of the Proposed Substation, as well as the embodied carbon associated with sourcing and transporting the stone and concrete aggregates for the construction of the Proposed Substation. There will also be a small proportion of carbon storage lost by excavating the shallow peat required for constructing the substation foundation. Emissions and loss of carbon storage associated with the substation will be low compared to that of the Proposed Wind Farm.

The Proposed Substation in and of itself would not offset carbon emissions. However, it would constitute necessary infrastructure to enable the offset of carbon emissions by way of connecting renewable energy projects to the national grid, and thereby represents an indirect, positive effect.

6.5 Cumulative Impacts

In terms of cumulative impacts, negative cumulative impacts in relation to air quality would only occur if a large development was located in the vicinity of the site and was in the process of construction at the same time.

There is a number of active planning applications, consented developments and active construction works in the surrounding area. However, only large projects within 5 km are considered as having the potential to act cumulatively with the Proposed Development.

There are a number of large projects and activities which are consented, ongoing or operational within 5 km of the Proposed Development. These are tabulated in Table 6-10 below.

Table 6-10: Cumulative developments within 5 km of the Proposed Development

Development	Direction from Proposed Development site	Distance from Proposed Development site (km)	Status
Timahoe North Solar Farm	**E**	**Adjoining eastern boundary**	**Producing power, nearing completion**
The consented development comprises (a) the construction and operation of 2 areas of solar photovoltaic arrays mounted on metal frames over an area of approximately 200ha, and having a maximum overall height of 3 metres over ground level; (b) Internal solar farm underground cabling; (c) 2 no. temporary construction compounds; (d) recreation and amenity works, including looped walk (upgrade of existing tracks and provision of new tracks, car parking and vehicular access); (e) 1 no. Battery Storage compound; (f) upgrade of existing tracks and provision of new site access roads; (g) site drainage; (h) forestry felling and replanting; (i) permanent signage; and (j) all associated site development and ancillary works. The proposed renewable energy development will have an operational life of 35 years from the date of commissioning. The solar farm has been in construction since 2022 and is exporting power to the grid since September 2024. Construction is nearing completion at the time of writing this EIAR and is expected to be minor works at this time such as snagging.			
Mulgeeth Solar Farm	**NE**	**Adjoining eastern boundary**	**Refused consent (may be appealed)**
Kildare planning reference 2460568. Consent is for a period of 10 years to construct and complete a solar PV energy development with a total site area of 80.9 hectares, comprising of the construction of PV panels mounted on metal frames, transformer stations, GRP units, internal access tracks, perimeter fencing with CCTV cameras and access gates, electrical cabling and ducting, temporary construction compounds, widening of an existing entrance, landscaping and all ancillary infrastructure and associated works. The solar farm would be operational for 35 years. The export capacity to grid is estimated to be c. 56MW MEC.			
Coolcarrigan Solar Farm	**SE**	**3.7 km**	**Granted consent**
Kildare planning reference 2360073. Consent for a 10-year permission, for the construction and operation of a renewable energy development within a site boundary of c. 114 ha. The proposed development will consist of a development area of circa 71.7 ha including solar on fixed on ground mounted frames with a maximum height of 3 metres, 1 No. battery storage compound, 1 No. customer switchgear container, 1 No. 110kv grid connected single storey substation, 1 No. single storey customer substation and all associated electrical plant, inverter units, electrical transformers, battery units, cooling equipment, underground cabling and ducting, boundary fencing, security entrance gates, CCTV, upgrading of existing access road and new internal access roads and all associated ancillary activities. The proposed development will have a 35-year operational life from the date of commissioning. Revised by significant further information which consists of Provision of quantum of energy			

Development	Direction from Proposed Development site	Distance from Proposed Development site (km)	Status
export (of up to 80MW) in the proposed development and storage capacity of proposed battery compound (of up to 80MWh).			
Hortland Solar Farm	**E**	**3.9 km**	**Operational since 2022**
An existing solar farm with a total site area of 38.08 hectares. The consented development included two electrical substation buildings, six electrical transformer and inverter station modules, solar PV panels ground mounted on support structures, vehicular access, access gates and internal access tracks, one spare parts container, security fencing, electrical cabling and ducting, CCTV cameras and other ancillary infrastructure, drainage, temporary construction compound, landscaping and habitat enhancement as required and associated site development works and services.			
Dysart Solar Farm	**NE**	**2.5 km**	**Granted consent**
10 year permission for the construction of an up to 25 MW solar PV farm comprising approximately 86,200 no. photovoltaic panels on ground mounted frames within a site area of 35.6 hectares and associated ancillary development including 20 no. transformer stations, 20 no. auxiliary transformer stations, 20 no. inverters, 1 no. client side substation, 1 no. single storey storage building, 1 no. single storey communications building, 1 no. single storey DNO building, 6 no. CCTV security cameras mounted on 4 metre high poles and perimeter security fencing (2 metres high) and localized improvements to an existing agricultural access from the adjoining L1004 road to the south.			
A number of residential developments	**N**	**2.8 km**	**Granted consent**
There are a number of consented large residential developments in Enfield which have been integrated into one large project. The planning references are Meath Co. Co. Reg Ref. 21/1449, 21/1461, 21/1462, 23/272. The consents include 99 residential units (21/1449), 67 residential units (21/1461) 77 residential units (21/1462) and a further 77 residential units (23/272); all with ancilliary infrastructure such as public open space, car parking, bicycle parking etc.			
Johnstown Estate Renovations	**N**	**2 km**	**Granted consent**
Kildare planning reference 23/613. The proposed works are principally to the existing banquet hall and conference centre located to the south of the main hotel building and associated external landscaped areas. The proposed external works comprise: (i) the provision of a new 210 sq.m. store room extension (5.450m in height) over existing service yard to the rear (east) of the building; (ii) a 136 sq.m. extension to the south east corner of the building to provide a new glazed orangery bar; (iii) demolition of existing single storey draught lobby (30 sq.m.) and construction of a new 60 sq.m. extension (4.050m in height) on the northern side of the building to provide for a bar area (44 sq.m.) and 2 no. store rooms (8sq.m. each); (iv) a new 20 sq.m. entrance lobby with an external canopy to the southern side of the building; (v) 2 no. new external seating areas to the east and west of the proposed entrance lobby; (vi) a new vehicular circulation layout with roundabout and water feature to the front of the proposed entrance lobby, loading bay, access ramp, external stair case, footpaths; (vii) relocation of the approved bike store located in the service yard (Reg. Ref. 22/1089) underneath proposed store building; and, (viii) the provision of a landscaped seating deck to the south of the building. Proposed internal works comprise reconfiguration of existing conference and banqueting accommodation to provide (a) 2 no. conference banqueting suites (320sq.m. and 280 sq.m.), (b) 2 no. meeting rooms (180 sq.m. and 110 sq.m.). (c) reception lobby (135 sq.m.) and (d) associated toilets, storage, cloakrooms and staff areas. Retention permission is sought for 4 no. accessible car parking spaces provided to the front of the hotel (southwest facade) and existing landscaping works comprising an existing timber pergola structure to south of the hotel development. The development also includes all other associated engineering works, landscaping, and ancillary works necessary to facilitate the development.			

Development	Direction from Proposed Development site	Distance from Proposed Development site (km)	Status
Restoration of 5 ha of agricultural land	**N**	**3.2 km**	**Granted Consent**
Meath planning reference TA200121. The development comprises: a) use of existing stockpiles for site restoration (b) importation of inert excavation spoil comprising natural materials of clay, silt, sand, gravel or stone for the purposes of restoration of a previously extracted area (QY/54) to restore the site to a beneficial agricultural and ecological after use (5.85 hectares) (c) Temporary Portacabin Offices and Staff Facilities 100sqm. (d) Wheel Wash and weighbridge 134m2 (e) Site entrance and access road (f) Lockable access gate at the pit entrance (g) All other ancillary buildings, plant and facilities for the restoration, and all ancillary site works. The application is accompanied by an Environmental Impact Statement (Environmental Impact Assessment Report) and associated documents. The application relates to a restoration development for the purpose of an activity requiring a Waste Permit to be issued by the Meath County Council. Significant further information/revised plans submitted on this application			
Blackwood Equestrian Centre	**SE**	**2.5 km**	**Granted consent**
Kildare planning reference 191031. Proposed two storey stable block, consisting of 6 no. horse stables & 7 no. pony stables, a wheelchair accessible toilet & two no. stairwells at ground floor level, tack room, kitchen/dining/lounge area for refreshment purposes (for staff and patrons of the livery centre only), male and female changing rooms and toilets and an office at first floor level (total floor area 494.6 sq.m), proposed horse walker (305.8 sq.m) and horse lunge (305.8sq.m) with proposed dungheap/effluent tank (18.5 sq.m). Existing concrete slab to be demolished and removed off site to authorised waste facility and to install proposed exercise area (1732 sq.m) to include 6 no. floodlights & equine fencing along the existing driveway and proposed exercise area. Permission is sought to install a septic tank and percolation area, 8 no. car parking spaces, gravel pathway to forest, proposed signage (2m sq) at existing gate and all associated site works at the above address. Permission is also sought to retain existing storage shed (24sq.m) and existing driveway.			
Drehid Land Fill Extension	**S**	**0.5 km**	**Granted consent**
ABP reference 317292. Increase in waste material at disposal facility at Drehid Waste Management Facility to accept 440,000 tonnes per annum of non-hazardous waste material.			
Mixed Use Development in Enfield	**N**	**3.9 km**	**Granted consent**

Development	Direction from Proposed Development site	Distance from Proposed Development site (km)	Status
The development will consist of: The construction of a mixed-use development including a 4 storey over ground floor level mixed use building (c.7,953 sq. m) comprising ground floor lobby (c.169 sq. m), bulky goods retail at ground (c.1,062sq,m) and first floor (c.l,219sq.m), ground floor cafe (c.304 sq. m), ground floor gym (c.352sq. m), first floor health centre (c.822 sq. m), second, third and fourth floor office and conference space (c.2,733 sq. m), core, circulation and plant facilities across all levels (c.1,292 sq.m) and 227 no. car and 80 no. cycle parking spaces to serve the building; 80 no. residential units comprising 1 3 no. 2 storey four-bedroom terraced housing units, 67 no. 2 storey three- bedroom terraced housing units with associated private open space in the form of rear gardens and terraces, 164 no. car and 320 no. cycle residential parking spaces plus 60 visitor cycle parking spaces; c.4,224 sq. m of landscaped public open space; a 2 storey creche facility (c.400 sq. m) with 12 no. car parking spaces; green roofs; solar panels; a two-lane access road linking the development to the roundabout where the R148 meets Dublin Road, providing 2 no. multimodal, priority-controlled junctions and segregated pedestrian and cyclist facilities with a controlled crossing; provision of roadway to access the development from the south via the existing roundabout on the Dublin Road; an internal road and shared surface network, including walkways and its associated infrastructure; watermain, foul and surface water drainage, extension to the proposed foul network and connection to the pump station (permitted under ABP-308357- 20), extension to the proposed watermain, connecting to the existing DN 300 HDPE adjacent to the R148 roundabout, an attenuation pond at the north east of the site (1770 sq.m); and all other ancillary site development works including hard and soft landscaping, boundary treatments, lighting, SuDs, and above and below ground services to facilitate the development.			
Royal Oaks Residential Development	**N**	**3.9 km**	**Granted consent**
Meath planning reference 2492, which is an extension of duration of reference SH304296. Construction of 133 no. dwelling units, creche and associated site works.			
68 residential units in Johnstown Bridge	**N**	**1.8 km**	**Granted consent**
Kildare planning reference 22488. Development of 68 No residential units comprising 59 No houses (10 No. 2 bed, 31 No. 3 bed and 18 No. 4 bed) and 9 No. maisonette apartments (8 No. 1 bed and 1 No. 2 bed) and a retail unit/cafe measuring 77.2 sq m, with heights ranging from two storeys to two storeys with attic accommodation over. The development also proposes a new vehicular entrance off Johnstown Road, ancillary car-parking; cycle parking; a pump station; hard and soft landscaping; lighting ;balconies; solar panels; boundary treatments; bin storage; ESB substation and all associated site works above and below ground.			

It is clear from Table 6-10 that there is a lot of solar energy development proposed, in construction or operational within 5 km of the solar farm. Operational solar farms will not have any negative cumulative impacts in terms of air quality and climate; in fact these developments will act cumulatively to result in positive impacts on air quality and climate due to the displacement of fossil fuel alternatives. Such developments might have a negative cumulative effect with the Proposed Development if both projects were being constructed at the same time. While there is potential for this to be the case, the majority of the proposed solar farms are located to the east and are likely to utilise different haul routes during the construction phase, so that cumulative vehicular emissions would not be significant. Dust emissions from the construction phase of two projects being constructed together would be unlikely to act cumulatively as dust emissions typically settle out of the air over short distances.

Of the other developments listed above which are not solar farm developments, the projects which represent the most potential to act cumulatively with the Proposed Development in terms of air quality and climate would be the projects which share the same haul route as the Proposed Development. In particular, there is a consented development to construct 68 residential units in Johnstown Bridge, including landscaping, parking and other facilities. There is the potential for significant cumulative effects on dust emissions if both projects are running in tandem with HGV trips through Johnstown Bridge. However, with the implementation of suitable mitigation measures as set out in Section 6.6 and within the CEMP, it is not expected that residual effects would be significant. Furthermore, this project will likely be built before the Proposed Development as it has entered the planning system earlier, and therefore the construction phase will not act cumulatively.

The proposed development to extend the existing Drehid Waste Management Facility to provide for acceptance of up to 440,000 tonnes per annum of non-hazardous waste material. Based on planning permission granted in September 2024, and the requirement for the project to attain waste licence before the construction can begin, it is assumed that construction will commence in late 2025 or early 2026. The extension of the landfill will be delivered on a phased basis, with 12 phases of extension proposed, each phase requiring 6 months for construction, 36 months of operation (filling with waste) and 24 months of capping. It is likely that the phased construction programme of the landfill extensions will overlap with the construction of the Proposed Development. This could have the potential to act cumulatively with the Proposed Development. However, given the relatively small size of each phase of the landfill extension, it is not expected that any one stage of the phased development would be such that it would constitute a significant cumulative impact.

There is significant residential and mixed-use development proposed and on-going at Enfield. While these projects may act cumulatively with one-another, they are at sufficient distance from the Proposed Development that they are not expected to act cumulatively with the Proposed Development.

Cumulative impacts on climate associated with the construction phase of the Proposed Wind Farm, acting cumulatively with the Proposed Substation, due to greenhouse gas emissions from plant and machinery associated these works, will be short term and not significant.

Emissions of carbon dioxide (CO_2), oxides of nitrogen (NOx), sulphur dioxide (SO_2) or dust emissions during the operational phase of the Proposed Development will be minimal, relating to the use of operation and maintenance vehicles onsite, and therefore there will be no measurable negative cumulative effect with other developments on air quality.

The cumulative impact on the climate during the decommissioning phase will be similar in nature to the construction phase but will be of reduced magnitude and temporary in duration.

In terms of climate, the Proposed Development will act cumulatively with other renewable energy projects in reducing CO_2 emissions by displacing fossil fuel in the production of electricity, resulting in a slight-moderate positive impact on climate.

6.6 Mitigation Measures

6.6.1 Air Quality

6.6.1.1 Construction Phase

A Construction and Environmental Management Plan (CEMP) has been prepared and is included in Appendix 3.2. This includes for the following mitigation measures during the construction phase of the Proposed Development relevant to air quality:

- The internal access roads will be constructed prior to the commencement of other major construction activities. These roads will be finished with graded aggregate which compacts, preventing dust
- A water bowser will be available to spray work areas and haul roads, especially during periods of excavations works coinciding with dry periods of weather, in order 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;
- Earthworks and exposed areas/soil stockpiles will be re-vegetated to stabilise surfaces as soon as practicable.
- The access and egress of construction vehicles will be controlled and directed 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;
- A wheel washing facility will be provided at the main entrance of the Proposed Development as described in the CEMP accompanying this EIAR (Appendix 3.2);
- The developer in association with the contractor will be required to implement the dust control plan as part of the CEMP (a CEMP is contained in Appendix 3.2). In the event the Planning Authority decides to grant permission for the Proposed Wind Farm, the final CEMP will address the requirements of any relevant planning conditions, including any additional mitigation measures which are conditioned by the Planning Authority;
- Ensure all vehicles switch off engines when stationary – no idling vehicles; and
- Exhaust emissions from vehicles operating within the 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.

6.6.1.2 Operational Phase

As the operation of the Proposed Development will have positive impacts on air quality, mitigation measures are considered unnecessary.

6.6.1.3 Decommissioning Phase

Mitigation measures for the removal of wind turbines and all other site works from the Proposed Development site will be the same as the construction phase with respect to dust control and minimisation. The proposed access tracks across the Proposed Wind Farm site will likely be left in situ and utilised as farm tracks and forest roads following decommissioning and no mitigation measures are proposed. In terms of the Proposed Substation, this will be left in situ and taken over by EirGrid and so no mitigation measures are proposed.

6.6.2 Climate

It is considered that the Proposed Development will have an overall positive impact in terms of carbon reduction and climate change. It will assist Ireland in meeting the binding renewable energy target for the EU of 32% by 2030. Also, it will aid in increasing the onshore wind capacity, as per the Climate Action Plan 2025. In terms of renewable energy, an increase in electricity generated from renewable sources is to increase up to 80% by 2030, with 9GW of increased onshore wind capacity. This will be achieved by:

- Phasing out fossil fuels
- Harnessing renewable energy
- Micro-generation; and

- Other measures.

As no significant impacts on climate are predicted during construction, operation and decommissioning no mitigation measures are necessary or proposed. In terms of the operational phase, the operation of the Proposed Development will have a positive effect on climate due to the displacement of fossil fuels.

6.7 Residual Impacts

6.7.1 Air Quality

Following the implementation of the above mitigation measures, the Proposed Development will result in slight to moderate residual impacts arising from fugitive dust emissions during construction activities involving excavations, vegetation clearance or earthmoving. These will be localised in nature and as they will be associated with particular elements of the construction phase, they will be temporary in nature and will not result in any permanent residual impacts.

Impacts related to vehicle emissions will reduce significantly following construction and no significant impacts are anticipated. There will be a low level of maintenance traffic during the operational period, which will have an imperceptible impact.

Impacts on air quality due to vehicle emissions and dust during the decommissioning phase are expected to be similar in nature to the construction phase but of a smaller magnitude. They will be temporary in nature and result in slight to moderate residual impacts. There will be no permanent residual impacts due to the decommissioning phase.

During operations, the Proposed Development will result in the avoidance of emissions from fossil fuel generators which is a positive effect on air quality.

6.7.2 Climate

There will be positive residual impacts from the operation of the Proposed Development in terms of the displacement of fossil fuel energy generation, and replacement with renewable energy.

Section 6.4.3 assessed the potential impacts on climate as a result of the Proposed Development through microclimate and macroclimate. At the microclimate level, the Proposed Development will involve the construction of hardstanding surfaces (hardstandings, access tracks, structures) which represent a relatively small infrastructure footprint relative to the surrounding agricultural fields and the forestry which will remain unchanged. The assessment found that this relatively small increase in hardstanding would not negatively impact the vegetation necessary to maintain a microclimate.

In terms of macroclimate, it is estimated that an annual average output[11] of 161,885 MWh for the Proposed Development will result in the net displacement of 69,934 tonnes of CO_2 per annum (when compared with a fossil fuel grid mix). This results in a positive impact by removing the GHG emissions that would have otherwise been part of the output of traditional energy generation (i.e. gas, coal, biomass, peat, etc). Potential impacts to climate can have the potential to affect human health and the environment.

[11] Per Scottish Wind Farm Calculation Tool

No direct or indirect impact on air temperature, microclimate or macroclimate has been associated with the development of the Proposed Development due to the location of the site which is predominately of agricultural fields and forestry.

Should the Proposed Development not be developed, fossil fuel power stations will likely be the primary alternative to provide the required quantities of electricity. This will further contribute to greenhouse gas and other air pollutant emissions, as well as hindering Ireland in its commitment to meet its target to increase electricity production from renewable sources and to reduce greenhouse gas emissions.

It is therefore considered that there will be a net positive residual impact on climate as a result of the Proposed Development due to the displacement of 69,934 tonnes of CO_2 per annum (when compared with a fossil fuel grid mix).

6.8 Conclusion

There are no significant impacts expected on Air Quality or Climate as a result of the construction, operation and decommissioning of the Proposed Development.

There are no significant cumulative impacts expected on Air Quality and Climate as a result of other existing or the proposed developments.

There will be a long term positive residual impact on air quality and climate as a result of the Proposed Development due to the displacement of fossil fuels.

The mitigation measures identified in this Chapter will be adopted and implemented by the Contractor and have been incorporated into the construction stage CEMP included in Appendix 3.2.

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