10. AIR AND CLIMATE

10.1 Introduction

This chapter identifies, describes and assesses the potential significant direct and indirect effects on air quality and climate arising from the operation of the Proposed Development.

The Proposed Development is located approximately 8 kilometres (km) south of Rosslare Harbour and approximately 15km east of Kilmore Quay in Co. Wexford. The approximate grid reference location for the centre of the site is E711919, N604394. The area of the Proposed Development lands cover approximately 78.8 hectares (ha), in total. A full description of the site is provided in Chapter 4: Description of the Proposed Development, within this EIAR. Due to the non-industrial nature of the Proposed Development and 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 coal or oil-based power stations. Harnessing more energy by means of wind farms will reduce dependency on oil, gas and coal power stations, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment. Some minor indirect emissions associated with the operation of the Proposed Development include vehicular and dust emissions.

10.1.1.1 Relevant Guidance

The air quality and climate section of this EIAR is carried out in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and having regard, where relevant, to guidance listed in Section 1.2.2 of Chapter 1: Introduction.

10.1.1.2 Statement of Authority

This section of the EIAR has been prepared by Ellen Costello and reviewed by Thomas Blackwell. Ellen is an Environmental Scientist who joined MKO in 2019 and has been involved in a number of wind energy EIAR applications. Ellen holds a BSc. (Hons) in Earth Science from Trinity College Dublin and a MSc. in Climate Change: Integrated Environmental and Social Science Aspects from the University of Copenhagen where she focused on renewable energy development in Ireland and its implications on environment and society.

Thomas Blackwell is a Senior Environmental Scientist with MKO with over 15 years of progressive experience in environmental consulting. Thomas holds a BA (Hons) in Geography from Trinity College Dublin and a M.Sc. in Environmental Resource Management from University College Dublin. Prior to taking up his position with MKO in August 2019, Thomas worked as a Senior Environmental Scientist with HDR, Inc. in the United States and held previous posts with private consulting firms in both the USA and Ireland.

10.2 Air Quality

10.2.1 Air Quality Standards

In 1996, the Air Quality Framework Directive (96/62/EC) was published. This Directive was transposed into Irish law by the Environmental Protection Agency Act 1992 (Ambient Air Quality Assessment and Management) Regulations 1999. The Directive was followed by four Daughter Directives, which set out limit values for specific pollutants:

- The first Daughter Directive (1999/30/EC) deals with sulphur dioxide, oxides of nitrogen, particulate matter and lead.
- The second Daughter Directive (2000/69/EC) addresses carbon monoxide and benzene. The first two Daughter Directives were transposed into Irish law by the Air Quality Standards Regulations 2002 (SI No. 271 of 2002).
- A third Daughter Directive, Council Directive (2002/3/EC) relating to ozone was published in 2002 and was transposed into Irish law by the Ozone in Ambient Air Regulations 2004 (SI No. 53 of 2004).
- The fourth Daughter Directive, published in 2007, deals with polyaromatic hydrocarbons (PAHs), arsenic, nickel, cadmium and mercury in ambient air.

The Air Quality Framework Directive and the first three Daughter Directives have been replaced by the Clean Air for Europe (CAFE) Directive (Directive 2008/50/EC on ambient air quality), which encompasses the following elements:

- The merging of most of the existing legislation into a single Directive (except for the Fourth Daughter Directive) with no change to existing air quality objectives.
- New air quality objectives for PM2.5 (fine particles) including the limit value and exposure concentration reduction target.
- The possibility to discount natural sources of pollution when assessing compliance against limit values.
- The possibility for time extensions of three years (for particulate matter PM10) or up to five years (nitrogen dioxide, benzene) for complying with limit values, based on conditions and the assessment by the European Commission.

Table 10.1 below sets out the limit values of the CAFE Directive, as derived from the Air Quality Framework Daughter Directives. Limit values are presented in micrograms per cubic metre (µg/m3) and parts per billion (ppb). The notation PM10 is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. PM2.5 represents particles measuring less than 2.5 micrometres in aerodynamic diameter.

The CAFE Directive was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). These Regulations supersede 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 Ambient Air Quality Assessment and Management Regulations 1999 (S.I. No. 33 of 1999).

Table 10-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu g/m^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of Human Health	1 hour	350	132	Not to be exceeded more than 24 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of human health	24 hours	125	47	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Protection of vegetation	Calendar year	20	7.5	Annual mean	19th Jul 2001

Pollutant	Limit Value Objective	Averaging Period	Limit Value ($\mu g/m^3$)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
Sulphur dioxide (SO_2)	Protection of vegetation	1st Oct to 31st Mar	20	7.5	Winter mean	19th Jul 2001
Nitrogen dioxide (NO_2)	Protection of human health	1 hour	200	105	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Protection of human health	Calendar year	40	21	Annual mean	1st Jan 2010
Nitrogen monoxide (NO) and nitrogen dioxide (NO_2)	Protection of ecosystems	Calendar year	30	16	Annual mean	19th Jul 2001
Particulate matter 10 (PM_{10})	Protection of human health	24 hours	50	-	Not to be exceeded more than 35 times in a calendar year	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$)	Protection of human health	Calendar year	40	-	Annual mean	1st Jan 2005
Particulate matter 2.5 ($PM_{2.5}$) Stage 1	Protection of human health	Calendar year	25	-	Annual mean	1st Jan 2015
Particulate matter 2.5 ($PM_{2.5}$) Stage 2	Protection of human health	Calendar year	20	-	Annual mean	1st Jan 2020
Lead (Pb)	Protection of human health	Calendar year	0.5	-	Annual mean	1st Jan 2005
Carbon Monoxide (CO)	Protection of human health	8 hours	10,000	8,620	-	1st Jan 2005
Benzene (C_6H_6)	Protection of human health	Calendar Year	5	1.5	-	1st Jan 2010

The Ozone Daughter Directive 2002/3/EC is different from the other Daughter Directives in that it sets target values and long-term objectives for ozone rather than limit values. Table 8.2 presents the limit and target values for ozone.

Table 10-2 Target values for Ozone Defined in Directive 2008/50/EC

Objective	Parameter	Target Value for 2010	Target Value for 2020
Protection of human health	Maximum daily 8 hour mean	120 mg/m^3 not to be exceeded more than 25 days per calendar year averaged over 3 years	120 mg/m^3
Protection of vegetation	AOT_{40} calculated from 1 hour values from May to July	18,000 mg/m^3.h averaged over 5 years	6,000 mg/m^3.h
Information Threshold	1 hour average	180 mg/m^3	-
Alert Threshold	1 hour average	240 mg/m^3	-

AOT_{40} is a measure of the overall exposure of plants to ozone. It is the sum of the excess hourly concentrations greater than 80 µg/m^3 and is expressed as µg/m^3 hours.

10.2.1.1 Air Quality and Health

The EPA report '*Air Quality in Ireland 2018'* noted that in Ireland, the premature deaths attributable to poor air quality are estimated at 1,180 people. A more recent European Environmental Agency (EEA) Report, '*Air Quality in Europe – 2019 Report'* highlights the negative effects of air pollution on human health. The report concluded that poor air quality accounted for premature deaths of approximately 412,000 people in Europe in 2016, with regards to deaths relating to $PM_{2.5}$. The estimated impacts on the population in Europe of exposure to NO_2 and O_3 concentrations in 2016 were approximately 71,000 and 15,100 premature deaths per year, respectively. From this, 1,100 Irish deaths were attributable to $PM_{2.5}$, 50 Irish deaths were attributable to nitrogen oxides (NO_x) and 30 Irish deaths were attributable to Ozone (O_3) (Source: *Air Quality in Europe – 2019 Report',* EEA, 2019). These emissions, along with others including sulphur oxides (SO_x) are produced in variable concentrations during fossil fuel-based electricity generation, depending on the fuel and technology used.

10.2.2 Air Quality Zones

The EPA has designated four Air Quality Zones for Ireland:

- Zone A: Dublin City and environs
- Zone B: Cork City and environs
- Zone C: 16 urban areas with population greater than 15,000
- Zone D: 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 lies within Zone D, which represents rural areas located away from large population centres.

10.2.3 Existing Air Quality

The air quality in the vicinity of the Proposed Development site is typical of that of rural areas in the West of Ireland, i.e. Zone D. Prevailing south-westerly winds carry clean, unpolluted air from the Atlantic Ocean onto the Irish mainland.

The EPA publishes Air Monitoring Station Reports for monitoring locations in all four Air Quality Zones. The ambient air quality monitoring carried out closest to the Proposed Development site is in on the premises of Wexford County Council on Hill Street, Wexford, located approximately 19.4 kilometres north-west of the Proposed Development. EPA air quality data is available for Wexford in the report '*Ambient Air Monitoring in Wexford 10th March 2005 – 31st March 2006*', as detailed below. Lower measurement values for air quality parameters would be expected for the Proposed Development site as it lies in a rural location, within Zone D. More recent data is also available for Ozone (O_3) at the Carnsore Point monitoring station which is located within the Proposed Development site.

10.2.3.1 Sulphur Dioxide (SO_2)

Sulphur dioxide data for the 2005-2006 monitoring period in Wexford is presented in Table 10-3.

Table 10-3 Sulphur Dioxide Data for Wexford 2005-2006

Parameter	Measurement
No. of measured values	9166
Percentage Coverage	98.9%
Maximum hourly value	213.6 µg/m^3
98 percentile for hourly values	53.2 µg/m^3
Mean hourly value	10 µg/m^3

During the period of monitoring there were no exceedances of the 350 µg/m^3 hourly limit for the protection of human health. As can be observed from Table 10-3 the maximum hourly value recorded during the assessment period was 53.2 µg/m^3. The 50 µg/m^3 lower assessment threshold (24 hour averaging period) for the protection of human health was exceeded on one occasion during the monitoring period. The directive stipulates that the lower assessment threshold should not be exceeded more than three times in the calendar year. It would be expected that SO_2 values at the Proposed Development (Zone D) would be significantly lower than those recorded at the Wexford monitoring site (Zone C).

10.2.3.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. Particulate matter (PM_{10}) data for the 2005-2006 monitoring period in Wexford is presented in Table 10-4.

The 24-hour limit value for the protection of human health (50 µg/m^3) was exceeded 15 times during the measurement period. As can be observed from Table 10-4 the maximum daily value recorded was 98.3 µg/m^3. The CAFE Directive stipulates that these assessment thresholds should not be exceeded more than 35 times in a calendar year. The upper assessment threshold was exceeded on 83 days and the lower assessment threshold was exceeded on 193 days. The mean of the daily values during the measurement period is below the annual limit value for the protection of human health (40 µg/m^3).

Table 10-4 Particulate Matter (PM_{10}) Data for Wexford 2006-2007

Parameter	Measurement
No. of days	386
No. of measured values	320
Percentage Coverage	82.9%
Maximum daily value	98.3 µg/m^3
Mean daily value	25.3 µg/m^3

10.2.3.3 Nitrogen Dioxide (NO_2)

The values for the concentrations of nitrogen dioxide recorded in Wexford from 2005-2006 are displayed in Table 10-5 below. There were no exceedances of the hourly 100 µg/m^3 lower assessment threshold. The directive stipulates that the lower assessment threshold should not be exceeded more than eighteen times in the calendar year.

The maximum hourly value recorded during the assessment period was 89.2 µg/m^3. The annual lower assessment threshold for the protection of human health was also not exceeded during the assessment period.

The lower assessment threshold for the protection of vegetation was exceeded during the assessment. However, the report indicates that this limit may not be applicable to air quality monitoring in urban areas.

Table 10-5 Nitrogen Dioxide and Oxides of Nitrogen Data for Wexford 2006-2007

Parameter	Measurement
No. of measured values	8,622
Percentage Coverage	93%
Maximum hourly value (NO_2)	89.2 µg/m^3
99.8 percentile for hourly values (NO_2)	47.6 µg/m^3
Mean hourly value (NO_2)	12.6 µg/m^3
Mean hourly value (NO_x)	19.1 µg/m^3 NO_2

10.2.3.4 Carbon Monoxide (CO)

The maximum hourly value of carbon monoxide was 4.4 mg/m^3. On no occasions were values in excess of the 10 mg limit value set out in Directives 2000/69/EC or 2008/69/EC. The carbon monoxide limit value for the protection of human health is 10,000 µg/m^3 (or 10mg/m^3).

Table 10-6 Carbon Monoxide Data for Wexford 2005-2006

Parameter	Measurement
No. of measured values	9,183
Percentage Coverage	99.1%
Maximum hourly value	4.4 mg/m^3
98 percentile for hourly values	1.2 mg/m^3
Mean hourly value	0.3 mg/m^3

10.2.3.5 Ozone (O_3)

The values for the concentrations of ozone recorded in Carnsore Point in 2019 are displayed in Table 10-7 below. The mean annual concentration of ozone recorded was 71 µg/m^3 and on no occasions were values in excess of the 1800 µg/m^3 information threshold value set for the protection of the general population.

Table 10-7 Ozone Data for Carnsore Point 2019

Parameter	Measurement
Annual Mean	71 µg/m^3
Median	72 µg/m^3
% data capture	90%
No. Days > 1800	0

10.2.3.6 Dust

There are no statutory limits for dust deposition in Ireland. The German TA-Luft standard for dust deposition sets a maximum permissible emission level for dust deposition of 350 mg/m^2/day. Recommendations from the Department of the Environment, Health & Local Government[1] apply the Bergerhoff limit of 350 mg/m^2/day to the site boundary of quarries. This limit value can also be implemented with regard to dust impacts from construction activities associated with the Proposed Development.

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, etc., 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.

[1] *DOEHLG (2004) Quarries and Ancillary Activities, Guidelines for Planning Authorities*

The Carnsore Wind Farm is currently operational, and it is proposed to extend the operational life of the wind farm by 15 years. No construction activities will occur as part of the proposed extension of operational life.

10.2.4 Likely, Significant Impacts on Air Quality and Associated Mitigation Measures

10.2.4.1 'Do-Nothing' Scenario

If the Proposed Development were not to proceed the opportunity to further reduce emissions of carbon dioxide, nitrogen oxides (NO_x), and sulphur dioxide (SO_2) to the atmosphere would be lost resulting in a continued dependence on electricity derived from fossil fuels, rather than renewable energy sources, such as the proposed wind farm. This will result in a long term, indirect negative impact on air quality.

Under the Do-Nothing scenario, the existing wind farm would be decommissioned in accordance with the conditions of the current planning permission (ABP Ref. PL26.116487), once this permission expires in 2022. Should the Decommissioning Plan as set out in the current conditions be implemented it may lead to environmental effects on air quality due to the potential increase in emissions from construction plant and vehicles required to remove the existing access tracks and turbine foundations.

There would be exhaust emissions from construction plant and vehicles, and potential dust emissions due to the movement of the same associated with the decommissioning of the wind farm. A Decommissioning Plan will be agreed with the local authority at least 3 months prior to the start of decommissioning works which would include mitigation measures to reduce any potential negative impacts on the environment.

The effect of decommissioning is considered **neutral** in the context of the EIAR.

10.2.4.2 Construction Phase

The Carnsore Wind Farm is currently operational, and it is proposed to extend the operational life of the wind farm by 15 years. No construction activities will occur as part of the proposed extension of operational life, therefore there are **no construction phase impacts** on air quality.

10.2.4.3 Operational Phase

10.2.4.3.1 *Exhaust Emissions*

Exhaust emissions associated with the operational phase of the Proposed Development will arise from machinery and vehicles that are intermittently required on-site for maintenance. This will give rise to a **long-term, imperceptible, negative impact**.

Mitigation Measures

Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order, thereby minimising any emissions that arise.

Residual Impacts

The implementation of the above mitigation measures will result in a residual **long-term, imperceptible, negative impact** upon air quality.

Significance of Effects

Based on the assessment above there will be **no significant direct or indirect effects**.

10.2.4.3.2 *Air Quality*

The Proposed Development, by providing an alternative to electricity derived from coal, oil or gas-fired power stations, will result in emission savings of CO_2, NO_x and SO_2. The production of renewable energy from the Proposed Development will have a **long-term significant positive impact** on air quality. Further details on the carbon dioxide savings associated with the Proposed Development are presented in Section 10.3 below.

Residual Impacts

Production of renewable energy at the Proposed Development will result in a residual **Long-term, significant, positive impact** on air quality.

Significance of Effects

Based on the assessment above there will be a **significant positive direct and indirect effect**.

10.2.4.3.3 *Human Health*

Long-term exposure to chemicals such as SO_2 and NO_x are harmful to human health. The production of clean, renewable energy from the proposed development will offset the emission of these harmful chemicals by fossil fuel powered sources of electricity and, therefore, will have a **long-term, slight, positive impact** on human health. Further information on the impact of the proposed development on human health is contained in Chapter 5: Population and Human Health.

Residual Impact

Long-term, Slight, Positive Impact.

Significance of Effects

Based on the assessment above there will be **no significant direct or indirect effects**.

10.2.4.4 Decommissioning Phase

The potential impacts associated with decommissioning of the Proposed Development in circa 15 years will be similar to those associated with a typical wind farm construction but of a reduced magnitude, due to the reduced scale of the proposed decommissioning works, as outlined in Chapter 4, Section 4.8 of this report.

Any air quality impacts and consequential effects likely to occur during the future decommissioning phase are similar to those which would occur under the Do-Nothing alternative. There would be exhaust emissions from construction plant and vehicles, and potential dust emissions due to the movement of the same associated with the decommissioning of the wind farm. Should mitigation measures within a Decommissioning Plan be implemented, then **no significant effects** upon air quality are envisaged during the decommissioning stage of the Proposed Development.

10.3 Climate

10.3.1 Climate

All relevant legislation and policy in relation to climate is outlined in detail in Chapter 2: Background to the Proposed Development, of this EIAR. A summary of the same is provided in the following sections.

10.3.2 Climate Change and Greenhouse Gases

Although variation in climate is thought to be a natural process, the rate at which the climate is changing has been accelerated rapidly by human activities. Climate change is one of the most challenging global issues facing us today and is primarily the result of increased levels of greenhouse gases in the atmosphere. These greenhouse gases come primarily from the combustion of fossil fuels in energy use. Changing climate patterns are thought to increase the frequency of extreme weather conditions such as storms, floods and droughts. In addition, warmer weather trends can place pressure on animals and plants that cannot adapt to a rapidly changing environment. Moving away from our reliance on coal, oil and other fossil fuel-driven power plants is essential to reduce emissions of greenhouse gases and combat climate change.

10.3.2.1 Greenhouse Gas Emission Targets

Ireland is a Party to the Kyoto Protocol, which is an international agreement that sets limitations and reduction targets for greenhouse gases for developed countries. It is a protocol to the United Nations Framework for the Convention on Climate Change (UNFCCC). The Kyoto Protocol came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, are now binding.

Under the Kyoto Protocol, the EU agreed to achieve a significant reduction in total greenhouse gas emissions in the period 2008 to 2012. Ireland's contribution to the EU commitment for the period 2008 – 2012 was to limit its greenhouse gas emissions to no more than 13% above 1990 levels.

10.3.2.1.1 *Doha Amendment to the Kyoto Protocol*

In Doha, Qatar, on 8th December 2012, the 'Doha Amendment to the Kyoto Protocol' was adopted. The amendment includes:

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

During the first commitment period, 37 industrialised countries and the European Community committed to reduce GHG emissions to an average of five percent against 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; however, the composition of Parties in the second commitment period is different from the first.

Under the protocol, countries must meet their targets primarily through national measures, although market-based mechanisms such as international emissions trading can also be utilised.

10.3.2.1.2 COP21 Paris Agreement

COP21 was the 21st session of the Conference of the Parties (COP) to the United Nations Convention. Every year since 1995, the COP has gathered the 196 Parties (195 countries and the European Union) that have ratified the Convention in a different country, to evaluate its implementation and negotiate new commitments. COP21 was organised by the United Nations in Paris and held from 30th November to 12th December 2015.

COP21 closed on 12th December 2015 with the adoption of the first international climate agreement (concluded by 195 countries and applicable to all). The twelve-page text, made up of a preamble and 29 articles, provides for a limitation of the temperature rise to below 2 degrees Celsius (°C) above pre-industrial levels and even to tend towards 1.5°C. It is flexible and takes into account the needs and capacities of each country. It is balanced as regards adaptation and mitigation, and durable, with a periodical ratcheting-up of ambitions.

10.3.2.1.3 COP25 Climate Change Conference

The 25th United Nations Climate Change conference COP25 was held in Madrid and ran from December 2nd to December 13th, 2019. While largely regarded as an unsuccessful conference, the European Union launched its most ambitious plan, 'The European Green New Deal' which aims to lower CO_2 emissions to zero by 2050. The deal includes proposals to reduce emissions from the transport, agriculture and energy sectors and will affect the technology chemicals, textiles, cement and steel industries. Measures such as fines and pay-outs by member states who rely on coal power will be in place to encourage the switch to renewable clean energies such as wind. On the 4th of March 2020, the European Commission put forward the proposal for a European climate law. This aims to establish the framework for achieving EU climate neutrality. It aims to provide a direction by setting a pathway to climate neutrality and to this end, aims to set in legislation the EU's 2050 climate-neutrality objective. If accepted, this climate law will likely be implemented in 2021. Decisions regarding the global carbon market were postponed until the next Climate Conference (COP26) which was scheduled to be held in Glasgow in November 2020. However, this conference has since been postponed to November 2021, due to the COVID-19 pandemic.

10.3.2.1.4 United Nations Sustainable Development Summit 2015

Transforming our World: the 2030 Agenda for Sustainable Development which includes 17 Sustainable Development Goals (SDGs) and 169 targets was adopted by all UN Member States at a UN summit held in New York in 2015. The Agenda is universally applicable with all countries having a shared responsibility to achieve the goals and targets which came into effect on January 1st, 2016. The goals and targets are to be actions over the 15-year period, are integrated and indivisible i.e. all must be implemented together by each Member State.

The Sustainable Development Goals National Implementation Plan 2018-2020 was published by the Department of Communications, Climate Action & Environment in partnerships with OSI, ESRI Ireland and the Central Statistics Office in 2018. The Plan sets out how Ireland will work to achieve the goals and targets of the Agenda for Sustainable Development both domestically and internationally. Relevant SDGs and how they are implemented into Irish National plans and policies can be found in Table 10-8.

Table 10-8 United Nations Sustainable Development Goals adopted in 2015. https://sustainabledevelopment.un.org/sdgs

SDG	Targets	International Progress to Date (2019)	National Relevant Policy
SDG 7 Affordable and Clean Energy: *Ensure access to affordable, reliable, sustainable and modern energy for all*	› By 2030, ensure universal access to affordable, reliable and modern energy services › By 2030, increase substantially the share of renewable energy in the global energy mix › By 2030, double the global rate of improvement in energy efficiency › By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology › By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	The renewable energy share of total final energy consumption gradually increased from 16.6 per cent in 2010 to 17.5 per cent in 2016, though much faster change is required to meet climate goals. Global primary energy intensity (ratio of energy used per unit of GDP) improved from 5.9 in 2010 to 5.1 in 2016, a rate of improvement of 2.3 per cent, which is still short of the 2.7 per cent annual rate needed to reach target 3 of Sustainable Development Goal 7.	*Ireland's Transition to a Low Carbon Energy Future 2015-2030* *Strategy to Combat Energy Poverty in Ireland* *Ireland's Transition to a Low Carbon Energy Future 2015-2030* *National Mitigation Plan* *National Energy Efficiency Action Plan for Ireland # 4 2017-2020* *Better Energy Programme* *One World, One Future* *The Global Island*
SDG 13 Climate Action: *Take urgent action to combat climate change and its impacts**	Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries Integrate climate change measures into national policies, strategies and planning Implement the commitment undertaken by developed-country parties to the United	In 2017, greenhouse gas concentrations reached new highs, with globally averaged mole fractions of CO2 at 405.5 parts per million (ppm), up from 400.1 ppm in 2015, and at 146 per cent of pre-industrial levels. Moving towards 2030 emission objectives compatible with the 2°C and 1.5°C	*National Adaptation Framework*

SDG	Targets	International Progress to Date (2019)	National Relevant Policy
**Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.*	Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	pathways requires a peak to be achieved as soon as possible, followed by rapid reductions. During the period 1998–2017, direct economic losses from disasters were estimated at almost $3 trillion. Climate-related and geophysical disasters claimed an estimated 1.3 million lives. As of April 2019, 185 parties had ratified the Paris Agreement. Parties to the Paris Agreement are expected to prepare, communicate and maintain successive nationally determined contributions, and 183 parties had communicated their first nationally determined contributions to the secretariat of the United Nations Framework Convention on Climate Change, while 1 party had communicated its second. Under the Agreement, all parties are required to submit new nationally determined contributions, containing revised and much more ambitious targets, by 2020. Global climate finance flows increased by 17 per cent in the period 2015–2016 compared with the period 2013–2014. As at 20 May 2019, 75 countries are seeking support from the Green Climate Fund for national adaptation plans and other adaptation planning processes, with a	*Building on Recovery: Infrastructure and Capital Investment 2016-2021* *National Mitigation Plan* *National Biodiversity Action Plan 2017-2021* *National Policy Position on Climate Action and Low Carbon Development*

SDG	Targets	International Progress to Date (2019)	National Relevant Policy
		combined value of $191 million.	

10.3.2.1.5 Climate Action Network Europe, Off Target Report 2018

The June 2018 '*Off Target Report'* published by the Climate Action Network (CAN) Europe, which ranks EU countries ambition and progress in fighting climate change, listed Ireland as the second worst performing EU member state in tackling climate change. It also projected that Ireland would miss its 2020 climate (20% reduction in greenhouse gases) and renewable (40% increase in overall energy from renewable electricity sources) energy targets. Additionally, it was noted that Ireland is also off course for its 2030 emissions target.

In March 2019, the Minister for Communications, Climate Action, and the Environment, Richard Bruton, announced a renewable electricity target of 70% by 2030 for Ireland. Furthermore, the release of the Climate Action Plan in June 2019 has noted a 30% reduction in greenhouse gases by 2030. Considering only renewable energy from electricity as part of this plan and to meet the required level of emissions reduction by 2030, Ireland will:

Reduce CO_2 eq. emissions from the sector by 50–55% relative to 2030 NDP projections.
Deliver an early and complete phase-out of coal- and peat-fired electricity generation.
Increase electricity generated from renewable sources to 70%, indicatively comprised of:
- at least 3.5 GW of offshore renewable energy;
- up to 1.5 GW of grid-scale solar energy; and
- up to 8.2 GW total of increased onshore wind capacity.

Meet 15% of electricity demand by renewable sources contracted under Corporate PPAs.

Achieving 70% renewable electricity by 2030 will involve phasing out coal and peat-fired electricity generation plants, increasing our renewable electricity, reinforcing our grid (including greater interconnection to allow electricity to flow between Ireland and other countries), and putting systems in place to manage intermittent sources of power, especially from wind.

As detailed in Section 1.5.5 in Chapter 1 of this EIAR, the SEAI monthly electricity generation figures for December 2020 indicate that Ireland hit it's 40% renewable energy target for 2020 with a share of renewable electricity recorded at 40.2%. Reporting on Ireland's target status for 2020 has not yet been published and is due for publication in the coming months. With a renewable share of electricity generation at 70% in mind, it is now more critical than ever that we continue to progress renewable energy development in Ireland so as we are successful in meeting our 2030 target.

The Climate Action Plan noted specific sectors which are required to step-up in order to help Ireland achieve its EU targets. The renewable energy sector was cited alongside the country's commitment to increase onshore wind capacity by up to 8.2 GW. The Proposed Development will help contribute towards this target.

The proposed wind farm development is compatible with the relevant provisions as set out in the Climate Action Plan 2019, relating to the harnessing of renewable energy. In summary, the proposed development will contribute the following:

- Production of 40,000 MWh/yr of electricity which would be sufficient to supply 9,500 Irish households with electricity per year. This calculation is presented in Chapter 4 of this EIAR.
- Helping to meet the target that 70% of our electricity needs will come from renewable sources by 2030.
- Helping to reduce carbon emissions and improving Ireland's security of energy supply.

Further detail on the EU 2030 targets are noted in Chapter 2, Section 2.3 of this EIAR.

10.3.2.1.6 Climate Change Performance Index

Established in 2005, 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 GHG emissions, and ranks their performance in each category and overall. The 2020 CCPI was published in December 2019 and presented at the COP25. While the CCPI 2020 indicated signs of potential reductions in global emissions, no country achieved its Paris Climate targets and therefore the first three places of the ranking system remain unoccupied.

Ireland, ranked the worst performer in the CCPI 2019, climbed 7 places to 41st place and has moved from a "very low" performer to a "low" performer in international performance. However, it remains at "very low" at a national performance level. The CCPI report states that while some improvements have been made, GHG per capita emissions are at a high level and "significant challenges lie ahead in closing Ireland's emission gap, meeting the current (2030) target and aligning Ireland's emission trajectory with a net zero goal for 2050. Therefore, the country still ranks among the bottom ten performers in this indicator."

Recognising Ireland's Climate Action Plan 2019, the CCPI states:

> *"The government must go much further in implementing policies across all sectors that drive sustained emissions reductions over the next decade. Near-term ambition needs to be ratcheted up quickly by specifying deep cuts in fossil fuel and reactive nitrogen usage to put Ireland on a net zero emissions pathway aligned with the Paris temperature goals".*

10.3.2.1.7 Climate Action Plan

The Climate Action Plan 2019 (CAP) was published on the 1st of August 2019 by the Department of Communications, Climate Action and Environment. The CAP sets out an ambitious course of action over the coming years to address the impacts which climate may have on Ireland's environment, society, economic and natural resources. This Plan clearly recognises that Ireland must significantly step up its commitments to tackle climate disruption.

Chapter 1 of the CAP sets out the nature of the challenge which Ireland faces over the coming years. The CAP notes that the evidence for warming of our climate system is beyond dispute with observations showing that global average temperatures have increased by more than 1°C since pre-industrial times. These changes will cause extensive direct and indirect harm to Ireland and its people, as well as to other countries more exposed and less able than we are to withstand the associated impacts environmental impacts such as extremes in weather, flooding, displacement of population by the creation of climate refugees, poorer water quality and poorer air quality. In order to help reduce CO2 emissions and reach our 2030 and 2050 emissions targets, CAP has set out a list of renewable energy goals which includes implementing up to 8.2 GW total of increased onshore wind capacity on the island.

The Proposed Development can assist in reaching this target not only by fulfilling the implementation of renewable energy, it has the capacity to offset 177,319 tonnes of CO2 (refer to Section 10.3.5 below) in its operational lifetime thereby reducing the Greenhouse Gas effect and improving air quality as we transition to cleaner energy industries. Please see Section 10.3.5 for details on Carbon offset calculations.

10.3.2.1.8 Emissions Projections

Ireland's 2020 target under the EU Effort Sharing Decision (ESD[2]) is to achieve a 20% reduction on 2005 levels of non-Emissions Trading Scheme (non-ETS) sector emissions (agriculture, transport, residential, commercial, non-energy intensive industry, and waste). Ireland is set to miss its target for compliance with the ESD as our non-ETS emissions are projected to be 7% below 2005 levels in 2020 under both projected scenarios compared to the target of 20% below 2005 levels by 2020. This projection includes the impact of COVID on the 2020 emissions which due to national lockdowns saw Transport emissions decline but Agriculture emissions largely unaffected. Ireland is projected to exceed the 2020 ESD targets despite the impact of the pandemic.

The Environmental Protection Agency (EPA) publish Ireland's Greenhouse Gas Emission Projections and at the time of writing, the most recent report, *'Ireland's Greenhouse Gas Emissions Projections 2020–2040'* was published in June 2021. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2020, 2030 and 2040 set under the EU ESD and Effort Sharing Regulation (ESR[3]).

The EPA has produced two scenarios in preparing these greenhouse gas emissions projections: a "With Existing Measures" (WEM) scenario and a "With Additional Measures" (WAM) scenario. These scenarios forecast Irelands greenhouse gas emissions in different ways. The WEM scenario assumes that no additional policies and measures, beyond those already in place by the end of 2019 (latest national greenhouse gas emission inventory), are implemented. The WAM scenario assumes that in addition to the existing measures, there is also full implementation of planned government policies and measures to reduce emissions such as those in the 2019 Climate Action Plan.

The EPA Emission Projections Update notes the following key trends:

- Total greenhouse gas emissions are projected to decrease from the latest 2019 levels by 3% by 2030 under the "With Existing Measures" scenario.
- Under the "With Additional Measures" scenario, emissions are estimated to decrease by 20% by 2030.
- Ireland's Non ETS emissions are projected to be 7% below 2005 levels in 2020 under both the 'With Existing Measures' and 'With Additional Measures' scenarios. The target for Ireland is a 20% reduction.
- Ireland exceeded its annual binding limits in 2016, 2017, 2018 and 2019.
- Over the period 2013 – 2020, Ireland is projected to cumulatively exceed its compliance obligations by 12.2 Mt CO_2 (metric tonnes of Carbon Dioxide) equivalent under the 'With Existing Measures' scenario and the 'With Additional Measures' scenario.

The report concludes:

- *"Projections indicate that Ireland will exceed the carbon budget over the period 2021-2030 by 51.3 Mt CO_2 equivalent assuming LULUCF flexibilities described in the Regulation are fully utilised."*
- *"To determine compliance under the Effort Sharing Decision, any overachievement of the binding emission limit in a particular year (between 2013 and 2020) can be banked and used towards compliance in a future year. However, even using this mechanism Ireland will still be in non-compliance according to the latest projections."*
- *"A significant reduction in emissions over the longer term is projected as a result of the expansion of renewables (e.g. wind), assumed to reach 55% by 2030 under the*

[2] *DECISION No 406/2009/EC of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020*
[3] *REGULATION (EU) 2018/1999 on the Governance of the Energy Union and Climate Action*

'With Existing Measures' scenario and 70% by 2030 under the 'With Additional Measures' scenario"

- *"The projects reflect plans to bring Ireland onto a lower carbon trajectory in the longer term. However, Ireland still faces significant challenges in meeting EU 2030 targets in the non-ETS sector and national 2050 reduction targets in the electricity generation, built environment and transport sectors. Progress in achieving targets is dependent on the level of implementation of current and future plans."*

In November 2020 the EPA also published '*Ireland's Provisional Greenhouse Gas Emissions 1990-2019*'. The provisional estimates of Ireland's greenhouse gas figures for the years 1990-2019 are based on the SEAI's final energy balances released in November 2020. The key findings from the report are as follows:

- *"In 2019, Ireland's total national greenhouse gas emissions are estimated to have declined by 4.5% on 2018 levels to 59.9 Mt CO2 equivalent"*
- *The Provisional estimates of greenhouse gas emissions for the period 1990- 2019 indicate that Ireland will exceed its 2019 annual limit set under the EU's Effort Sharing Decision (ESD) by 6.98 Mt CO2eq.*
- *Emissions in the Energy Industries sector show a decrease of 11.2% or 1.19 Mt CO2eq in 2019, which is attributable to a 69% decrease in coal and an 8% decrease in peat used in electricity generation. Electricity generated from wind increased by 16.0% in 2019.*

10.3.3 Programme for Government

The Programme for Government was published in October 2020 and last updated April 2021. In relation to climate change the programme recognises that the next ten years are a critical period in addressing the climate crisis. It is an ambition of the programme to more than halve carbon emissions over the course of the decade (2020-2030). The programme notes that the government are committed to reducing greenhouse gas emissions by an average 7% per annum over the next decade in a push to achieve a net zero emissions by the year 2050. The programme also recognises the severity of the climate challenge as it clarifies that:

"Climate change is the single greatest threat facing humanity"

With regards to energy the programme notes that the government will implement a new National Energy Efficiency Action Plan to reduce energy use, including behavioural and awareness aspects of energy efficiency such as building and data management. Further, the government are also committed to the rapid decarbonisation of the energy sector, along with this it is noted that the necessary steps will be taken to deliver at least 70% of renewable electricity by the year 2030. Some of the measures to achieve this will include the following:

- Hold the first Renewable Electricity Support Scheme (RESS) auction by the end of 2020, with auctions held each year thereafter, including the first RESS auction for offshore wind in 2021.
- Produce a whole-of-government plan setting out how at least 70% renewable electricity generation by 2030 will be delivered and how the necessary skills base, supply chains, legislation, and infrastructure to enable it will be delivered. This new plan will make recommendations for how the deployment of renewable electricity can be sped.
- Finalise and publish the Wind Energy Guidelines, having regard to the public consultation that has taken place.
- Continue Eirgrid's programme 'Delivering a Secure, Sustainable Electricity System' (DS3).
- Strengthen the policy framework to incentivise electricity storage and interconnection.
- Support the clustering of regional and sectoral centres of excellence in the development of low-carbon technologies.

10.3.3.1 Climate Action and Low Carbon Development (Amendment) Bill 2020

The Draft Climate Action and Low Carbon (Amendment) Bill 2020, published in March 2021 and currently before the Seanad, is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050.

The Programme for Government commits to a 7% average yearly reduction in overall greenhouse gas emissions over the next decade, and to achieving net zero emissions by 2050. This Bill will manage the implementation of a suite of policies to assist in achieving this target.

The Bill includes the following key elements, among others:

- Places on a statutory basis a 'national climate objective', which commits to pursue and achieve no later than 2050, the transition to a climate resilient, biodiversity-rich, environmentally-sustainable and climate-neutral economy
- Embeds the process of carbon budgeting into law, Government are required to adopt a series of economy-wide five-year carbon budgets, including sectoral targets for each relevant sector, on a rolling 15-year basis, starting in 2021
- Actions for each sector will be detailed in the Climate Action Plan, updated annually
- A National Long Term Climate Action Strategy will be prepared every five years
- Government Ministers will be responsible for achieving the legally-binding targets for their own sectoral area with each Minister accounting for their performance towards sectoral targets and actions before an Oireachtas Committee each year
- Strengthens the role of the Climate Change Advisory Council, tasking it with proposing carbon budgets to the Minister
- Provides that the first two five-year carbon budgets proposed by the Climate Change Advisory Council should equate to a total reduction of 51% emissions over the period to 2030, in line with the Programme for Government commitment

10.3.4 Climate and Weather in the Existing Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Rosslare, Co. Wexford, is the nearest weather and climate monitoring station to the subject development site that has meteorological data recorded for the 30-year period from 1978 - 2007. The monitoring station is located within the Proposed Development site. Meteorological data recorded at Rosslare over the 30-year period from 1978 - 2007 is shown in Table 10.7 overleaf. The wettest months are October, November, and December. While, July is usually the driest month. August is the warmest month with a mean daily temperature of 15.7° Celsius.

Table 10-9 Data from Met Éireann Weather Station, Rosslare, Co. Wexford 1978 to 2007

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8.8	8.5	9.9	11.3	13.6	16.3	18.3	18.5	16.8	14.0	11.3	9.5	13.1
Mean daily min	4.2	4.1	5.1	6.3	8.6	11.0	12.7	12.9	11.6	9.3	6.7	5.2	8.1
Mean temperature	6.5	6.3	7.5	8.8	11.1	13.6	15.5	15.7	14.2	11.6	9.0	7.4	10.6
Absolute max.	14.1	14.1	15.8	17.9	22.3	25.5	26.2	25.9	22.0	21.5	16.7	14.0	26.2
Absolute min.	-4.4	-3.7	-2.5	-0.1	-0.3	4.7	6.7	7.0	4.0	1.3	-2.5	-3.0	-4.4
Mean num. of days with air frost	1.5	1.3	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	1.1	4.8
Mean num. of days with ground frost	9.4	8.3	6.0	3.5	0.7	0.1	0.0	0.0	0.0	0.7	3.7	7.4	39.8
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	85.7	85.4	85.1	82.1	81.4	82.1	82.6	83.6	84.3	85.3	86.3	86.4	84.2
Mean at 1500UTC	80.8	79.0	77.8	76.1	77.2	77.7	77.2	76.9	77.1	78.7	80.2	82.2	78.4
SUNSHINE (Hours)													
Mean daily duration	2.0	2.6	3.7	5.7	6.9	6.2	6.3	6.0	4.8	3.4	2.4	1.8	4.3
Greatest daily duration	8.2	10.0	11.6	13.4	15.4	15.7	15.6	14.0	12.6	10.5	8.6	7.2	15.7
Mean num. of days with no sun	10.1	8.0	5.4	2.7	1.7	2.0	1.5	1.9	2.7	6.3	8.2	11.0	61.4
RAINFALL (mm)													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean monthly total	88.4	70.8	69.1	59.1	55.7	54.9	49.9	71.6	75.0	109.3	100.9	100.8	905.5
Greatest daily total	42.7	32.0	42.2	32.0	29.4	31.6	41.4	89.2	42.2	88.6	43.8	48.9	89.2
Mean num. of days with >= 0.2mm	17	15	16	13	13	12	12	13	13	17	17	17	175
Mean num. of days with >= 1.0mm	12	11	11	9	9	9	8	9	9	13	12	13	125
Mean num. of days with >= 5.0mm	6	5	4	4	3	3	3	4	4	7	6	7	56
WIND (knots)													
Mean monthly speed	12.4	12.2	11.9	11.2	10.9	9.7	9.5	9.4	10.6	11.5	11.4	12.2	11.1
Max. gust	71	76	66	75	66	50	54	54	64	96	74	80	68.8
Max. mean 10-minute speed	43	44	42	52	40	38	41	36	47	56	48	50	44.8
Mean num. of days with gales	1.4	1.2	0.5	0.8	0.2	0.1	0.2	0.1	0.2	0.6	0.9	1.0	7.1
WEATHER (Mean No. of Days With:)													
Snow or sleet	1.7	2.3	1.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.6	6.2
Snow lying at 0900UTC	0.5	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
Hail	1.2	1.0	1.9	1.3	0.8	0.2	0.1	0.1	0.1	0.4	0.7	0.9	8.7
Thunder	0.2	0.1	0.2	0.2	0.7	0.9	0.8	0.6	0.4	0.6	0.3	0.3	5.2
Fog	1.8	2.2	3.6	3.7	2.9	4.1	4.4	3.4	2.8	1.6	1.7	1.7	33.9

10.3.5 Calculating Savings from the Proposed Development

A simple formula can be used to calculate carbon dioxide emissions reductions (in tonnes CO_2) resulting from the generation of electricity from wind power rather than from carbon-based fuels such as peat, coal, gas and oil. The formula is:

$$t\ CO2 = \frac{A * B * C * D}{1000}$$

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

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

C = The number of hours in a year

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

The Proposed Development will have a maximum export capacity of 11.9MW.

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

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

The most recent data for the carbon load of electricity generated in Ireland is for 2019 and was published in Sustainable Energy Authority Ireland's (SEAI) December 2018 report, '*Energy in Ireland, 2020 Report.'* The emission factor for electricity in Ireland in 2020 was 324 g CO_2/kWh.

The calculation for carbon savings associated with the proposed development is therefore as follows:

$$CO2\ (\text{in tonnes}) = \frac{(11.9 \times 0.35 \times 8{,}760 \times 324)}{1000}$$

$$= 11{,}821 \text{ tonnes per annum}$$

Based on this calculation, approximately 11,821 tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the proposed wind farm. Over the proposed 15-year lifetime extension of the wind farm, therefore, 177,319 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation.

In total, it is estimated that **177,319** tonnes of carbon dioxide will be displaced over the proposed 15-year lifetime of the wind farm.

10.3.6 Likely, Significant Impacts on Climate and Associated Mitigation Measures

10.3.6.1 'Do-Nothing' Scenario

Under the Do-Nothing scenario, the existing wind farm would be decommissioned in accordance with the conditions of the current planning permission (ABP Ref. PL26.116487).

If the Proposed Development were not to proceed, the opportunity to further significantly reduce emissions of greenhouse gas emissions, including CO_2, NO_x and SO_2 to the atmosphere would be lost. The opportunity to contribute to Ireland's commitments under the Kyoto Protocol and EU law would also be lost. This would be a **long-term, indirect, slight negative** impact.

The use of machinery during the decommissioning of the existing wind farm would result in the emission of greenhouse gases. Operations such as the transport of equipment and materials as well as construction personnel are typical examples of machinery use. This impact is considered to be imperceptible, given the insignificant quantity of greenhouse gases that would be emitted. This would likely result in a **short-term, imperceptible, negative** impact.

Mitigation Measures Implemented

All construction machinery will be maintained in good operational order while on-site, minimising any emissions to may occur.

Residual Impact

By maintaining construction equipment in good operational order emissions of greenhouse gasses will be minimised to the greatest extent practicable. The residual impact will likely be a **short term, imperceptible, negative impact** on climate.

Significance of the Effects

Based on the analysis above there was **No Significant Effect** on climate associated with the construction of the grid connection.

10.3.6.2 Construction Phase

The Carnsore Wind Farm is currently operational, and it is proposed to extend the operational life of the wind farm by circa 15 years. No construction activities will occur as part of the proposed extension of operational life, therefore there are **no construction phase impacts** on climate.

10.3.6.3 Operational Phase

10.3.6.3.1 *Greenhouse Gas Emissions*

The proposed development will generate energy from a renewable source. This energy generated will offset energy and the associated GHG emissions from electricity-generating stations dependent on fossil fuels, thereby having a net positive effect on climate. As detailed in Section 10.3.5 above, the proposed development will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 15-year lifespan extension of the wind farm. The proposed project will assist in reducing CO_2 emissions that would otherwise arise if the same energy that the proposed wind farm will generate were

otherwise to be generated by conventional fossil fuel plants. This is a long-term significant positive effect.

Mitigation

None required.

Residual Impact

Long-term, Slight, Positive Impact on climate as a result of reduced greenhouse gas emissions.

Significance of Effects

Based on the assessment above there will be a **direct, long-term slight, positive effect**.

10.3.6.4 Decommissioning Phase

Any impacts and consequential effects likely to occur during the future decommissioning phase in circa 15 years are similar to those which would occur under the Do-Nothing alternative. The use of machinery during the decommissioning of the wind farm would result in the emission of greenhouse gases. Operations such as the transport of equipment and materials as well as construction personnel are typical examples of machinery use. This impact is considered to be imperceptible, given the insignificant quantity of greenhouse gases that would be emitted. Should mitigation measures within an agreed Decommissioning Plan be implemented, then **no significant effects** related to climate are envisaged during the decommissioning stage of the Proposed Development.

10.4 Cumulative Impact Assessment

Potential cumulative effects on air quality and climate between the proposed development and other projects in the vicinity were also considered as part of this assessment. The projects considered as part of the cumulative effect assessment are described in Section 2.7 of this EIAR.

The nature of the Proposed Development is such that it will have a **long-term, slight, positive impact** on the air quality and climate.

The Carnsore Wind Farm is currently operational, and it is proposed to extend the operational life of the wind farm by 15 years. No construction activities will occur as part of the proposed extension of operational life, therefore there are no construction phase cumulative negative effects on air and climate.

There will be no net CO_2 emissions from operation of the Proposed Development. Emissions of CO_2, NOx, SO_2 and dust during the operational phase of the Proposed Development will be minimal, relating to the use of operation and maintenance vehicles on-site, and therefore there will be **no measurable negative cumulative effect** with other projects on air quality and climate.