9. AIR AND CLIMATE

9.1 Introduction

9.1.1 Background

The site of the Proposed Development which straddles the county boundary between Co. Kerry and Co. Cork is located approximately 6 kilometres southwest of the town of Millstreet and 3 kilometres northwest of the village of Ballyvourney. The townlands in which the Proposed Development is located are listed in Table 1-1 in Chapter 1 of this EIAR. The primary land-uses within and in the vicinity of the site comprise commercial forestry, wind farm development, localised peat extraction and low intensity agriculture. 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 and solar panels has no direct emissions as is expected from coal or oil-based power stations. Harnessing more energy by means of renewable sources 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 construction of the Proposed Development include vehicular and dust emissions.

9.1.2 Statement of Authority

This section of the EIAR has been prepared by Eoin O'Sullivan, with the assistance of Niamh McHugh, both of MKO. Niamh is a Graduate Environmental Scientist who joined the company in 2021 and has since been involved in the preparation of a number of EIARs for wind farms and grid connection applications. Niamh holds a BSc. in Environmental Science from the National University of Ireland, Galway. Eoin is an experienced geo-environmental scientist and has over twelve years' experience in the design, implementation, and interpretation of all phases of geo-environmental and geotechnical site investigations. Eoin also has extensive experience in the preparation of air and climate assessments and reports for EIAs. Eoin is proficient in undertaking detailed quantitative risk assessments for the protection of controlled waters and human health. Eoin holds an MSc in Environmental Engineering and is a Chartered Member of the Chartered Institute of Water and Environmental Management (CWEM) and Chartered Environmentalist (CEnv) with the Society of Environment. This section of the EIAR has also been reviewed by Michael Watson, also of MKO. Michael is a project director and head of the Environmental Team in MKO. Michael has over 20 years' experience in the environmental sector and has been working with MKO since 2014. Michael's professional experience includes managing Environmental Impact Assessments, EPA licence applications, environmental due diligence and general environmental assessment on behalf of clients in the wind farm, waste management public sector, and commercial and industrial sectors nationally.

9.2 Air Quality

9.2.1 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) addresses 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, relates to 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 9-1 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 ($\mu g/m^3$) and parts per billion (ppb). The notation PM_{10} is used to describe particulate matter or particles of ten micrometres or less in aerodynamic diameter. $PM_{2.5}$ 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 9-1 Limit values of Directive 2008/50/EC, 1999/30/EC and 2000/69/EC (Source: EPA)

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	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	1st Jan 2005

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
					calendar year	
Sulphur dioxide (SO_2)	Upper assessment threshold for the protection of Human Health	24 hours	75	28	Not to be exceeded more than 3 times in a calendar year	1st Jan 2005
Sulphur dioxide (SO_2)	Lower assessment threshold for the protection of human health	24 hours	50	19	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
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 dioxide (NO_2)	Upper assessment threshold for the protection of human health	1 hour	140	73	Not to be exceeded more than 18 times in a calendar year	1st Jan 2010
Nitrogen dioxide (NO_2)	Lower assessment threshold for the	1 hour	100	52	Not to be exceeded more than 18 times in	1st Jan 2010

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
	protection of human health				a calendar year	
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 10 (PM_{10})	Upper assessment threshold for the protection of human health	24 hours	30	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
Particulate matter 10 (PM_{10})	Lower assessment threshold for the protection of human health	24 hours	20	-	Not to be exceeded more than 7 times in a calendar year	Based on the indicative limit values for 1 January 2010
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

Pollutant	Limit Value Objective	Averaging Period	Limit Value (µg/m3)	Limit Value (ppb)	Basis of Application of Limit Value	Attainment Date
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 9-2 presents the limit and target values for ozone.

Table 9-2 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	AOT40 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 g/m^3 and is expressed as g/m^3 hours.

9.2.1.1 Air Quality and Health

The Environmental Protection Agency (EPA) report '*Air Quality in Ireland 2020*' noted that in Ireland, the premature deaths attributable to poor air quality are estimated at 1,300 people per annum. A more recent European Environmental Agency (EEA) Report, '*Air Quality in Europe – 2020 Report*' highlights the negative effects of air pollution on human health. The report assessed that poor air quality accounted for premature deaths of approximately 417,000 people in Europe in 2018, 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 2018 were around 55,000 and 20,600 premature deaths per year, respectively. From this, 1,300 Irish deaths were attributable to fine particulate matter ($PM_{2.5}$), 50 Irish deaths were attributable to nitrogen oxides (NO_2) and 60 Irish deaths were attributable to Ozone (O_3) (Source: *Air Quality in Europe – 2020 Report'*, EEA, 2020).

These emissions, along with others including sulphur oxides, carbon monoxide, benzene and lead are produced during fossil fuel-based electricity generation and traffic in various amounts, depending on the fuel and technology used. Whilst there is the potential of such emissions to be generated from the

Proposed Development, a number of mitigation measures will be implemented at this site to reduce the impact from dust and vehicle emissions, which are discussed in Sections 9.3.4 below.

9.2.2 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.

9.2.3 Existing Air Quality

The air quality in the vicinity of the Proposed Development site is typical of that of rural areas in the South 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 most recent report on air quality in Ireland, 'Air Quality in Ireland 2020' was published by the EPA in 2021. The EPA reports provide SO_2, PM_{10}, NO_2 and O_3 concentrations for areas in Zone D.

9.2.3.1 Sulphur Dioxide (SO_2)

Sulphur dioxide data for Cork Harbour, Kilkitt, Askeaton and Letterkenny in 2020 is presented in Table 9-3.

Table 9-3 Average Sulphur Dioxide Data for Zone D Sites in 2020

Parameter	Measurement (ug/m^3)
Annual Mean	4.15
Hourly values > 350	0.5
Hourly max	135.18
Daily values > 125	0
Daily max	25.55

During the monitoring period there were no exceedances of the daily limit values for the protection of human health. As can observed from Table 9-3 the average maximum hourly value recorded during the assessment period was 135.18 µg/m^3. In addition, there were no exceedances of the annual mean limit for the protection of ecosystems. It would be expected that SO_2 values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.3.2 Particulate Matter (PM_{10})

Sources of particulate matter include vehicle exhaust emissions, soil and road surfaces, construction works and industrial emissions. The EPA report[1] provide annual mean PM_{10} concentration for twelve Zone D towns, Tipperary Town, Carrick-on-Shannon, Enniscorthy, Birr, Askeaton, Macroom, Castlebar, Cobh, Claremorris, Kilkitt, Cavan and Roscommon Town. Particulate matter (PM_{10}) data for 2020 is presented in Table 9-4.

Table 9-4 Average Particulate Matter (PM_{10}) Data for Zone D Sites in 2020

Parameter	Measurement (ug/m^3)
Annual Mean	11.17
% Data Capture	75
Values > 50 ug/m^3	Max 5
Daily Max	46.5

Notes: [1-] PM_{10} daily limit for the protection of human health: No more than 35 days >50 $\mu g/m^3$

The daily limit of 50 $\mu g/m^3$ for the protection of human health was not exceeded more than 35 times during the monitoring period. It would be expected that PM_{10} values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.3.3 Nitrogen Dioxide (NO_2)

Nitrogen dioxide data for Emo Court, Birr, Castlebar, Carrick-on-Shannon and Kilkitt in 2020 is presented in Table 9-5.

Table 9-5 Average Nitrogen Dioxide Data for Zone D Sites in 2020

Parameter	Measurement ($\mu g/m^3$)
Annual Mean	7.6
NO_2 Values >200	0
Values > 140 (UAT)	0
Values >100 (LAT)	0
Hourly Max.	54

The annual NO_2 value was below the annual mean limit value for the protection of human health of 40 $\mu g/m^3$. Furthermore the lower and upper assessment thresholds of 100 and 140 $\mu g/m^3$ was not exceeded during the monitoring period. The average hourly max. NO_2 value of 54 $\mu g/m^3$ measured during the monitoring period was below the hourly max threshold of 200 $\mu g/m^3$. It would be expected that NO_2 values at the Proposed Development site would be similar lower than those recorded for the Zone D sites above.

[1] *EPA (2021). Air Quality in Ireland 2020.*

9.2.3.4 Carbon Monoxide (CO)

The EPA report[1] provide rolling 8-hour carbon monoxide concentrations for Birr a zone D site. Carbon Monoxide data for 2020 is presented in Table 9-6.

Table 9-6 Carbon Monoxide Data for Birr - Zone D Site in 2020

Parameter	Measurement
Annual Mean	0.4 mg/m^3
Median	0.4 mg/m^3
% Data Capture	4.2%
Values > 10	0
Max	1.2 mg/m^3

The average concentration of carbon monoxide was 0.4 mg/m^3. The carbon monoxide limit value for the protection of human health is 10,000 µg/m^3 (or 10mg/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. It would be expected that CO values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites above.

9.2.3.5 Ozone (O_3)

The EPA report[1] provide rolling 8-hour ozone concentrations for seven Zone D sites, Emo Court, Kilkitt, Carnsore Point, Mace Head, Castlebar, Valentia and Malin Head. Ozone (O_3) data for 2020 is presented in Table 9-7. As can be observed from Table 9-7 there were no exceedances of the maximum daily eight-hour mean limit of 120 µg/m^3. The legislation stipulates that this limit should not be exceeded on more than 25 days. It would be expected that O_3 values at the Proposed Development site would be similar or lower than those recorded for the Zone D sites below.

Table 9-7 Average Ozone Data for Zone D Sites in 2020

Parameter	Measurement
Annual Mean	62 µg/m^3
Median	63 µg/m^3
% Data Capture	98%
No. of days > 1800	0 days

9.2.3.6 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[2]apply the Bergerhoff limit of 350 mg/m^2/day to the site boundary of quarries. This limit value can also be

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

implemented with regard to dust impacts from construction activities associated with the Proposed Development.

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, 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 Proposed Development site roads.

The potential dust-related impacts on local air quality and the relevant associated mitigation measures are presented in Sections 9.2.4.2 below.

9.2.4 Likely Significant Effects and Associated Mitigation Measures

9.2.4.1 'Do-Nothing' Effect

If the Proposed Development were not to proceed the Permitted Development would not be accessible and would not be able to supply the electricity generated to the national grid. The opportunity to reduce emissions of carbon dioxide, oxides of nitrogen (NOx), and sulphur dioxide (SO_2) to the atmosphere would be lost due to the continued dependence on electricity derived from coal, oil, and gas-fired power stations, rather than renewable energy sources such as the Permitted Development. This will result in an indirect negative impact on air quality nationally, regionally, and locally. Commercial forestry operations and existing land-use practices would continue at the site

9.2.4.2 Construction Phase

9.2.4.2.1 *Exhaust Emissions*

1. Underground Cabling, Substation, Borrow Pits, New Access Roads and Road/Junction Upgrade Works

An area of 22.3 hectares of coniferous forestry will be required to be felled as part of the Proposed Development. This felling will be carried out in accordance with Forest Service guidelines and in compliance with any Felling Licence granted by the Forest Service.

The construction of the underground cabling route, the substation, development of borrow pits, new access roads and road/junction upgrade works will require the use of construction machinery, thereby giving rise to exhaust emissions. This is a short-term slight negative impact, which will be reduced through use of the best practice mitigation measures as presented below. There would be a neutral impact on air quality by not constructing the omitted 38kV substation and battery storage that was previously permitted.

2. Transport to Site

The transport of construction materials to the site will also give rise to exhaust emissions associated with the transport vehicles. This constitutes a slight negative impact in terms of air quality. Mitigation measures in relation to exhaust emissions are presented below.

3. Waste Disposal

Construction waste will arise on the site of the Proposed Development, mainly from excavation and unavoidable construction waste including material surpluses and damaged materials and packaging

waste. Waste management will be carried out in accordance with *Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021) produced by the EPA.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority.
- When stationary, delivery and on-site vehicles will be required to turn off engines.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants is kept to a minimum.
- The majority of aggregate materials for the construction of the Proposed Development will be obtained from an onsite borrow pit. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements.
- The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the Proposed Development site. Therefore, all wastes streams generated on site will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The facility will be local to the Proposed Development site to reduce the amount of emissions associated with vehicle movements. The MRF facility will be local to the Proposed Development site to reduce the amount of emissions associated with vehicle movements. The nearest licensed waste facility to the site is the Macroom Civic Amenity Site, located approximately 16km to the east of the Proposed Development site.

Residual Impact

Following implementation of the mitigation measures above, residual impacts of exhaust emissions for the construction phase of the Proposed Development will have a short-term imperceptible negative impact.

Significance of Effects

Based on the assessment above there will be no significant effects.

9.2.4.2.2 *Dust Emissions*

1. Underground Cabling, Substation, Borrow Pits, New Access Roads and Road/Junction Upgrade Works

The construction of underground cabling route, the substation, development of borrow pits, new access roads and road/junction upgrade works will give rise to dust emissions during the construction phase. This potential effect will not be significant and will be restricted to the duration of the construction phase. Therefore, this is a short-term slight negative impact. Dust suppression mitigation measures to reduce this impact are presented below. There would be a neutral impact on air quality by not constructing the omitted 38kV substation and battery storage that was previously permitted.

An area of 22.3 hectares of coniferous forestry will be required to be felled as part of the Proposed Development. This felling will be carried out in accordance with Forest Service guidelines and in compliance with any Felling Licence granted by the Forest Service.

2. Transport to Site

The transport of construction materials to the Proposed Development site will also give rise to some localised dust emissions during periods of dry weather. This is a short-term slight negative impact. Mitigation measures to reduce the significance of this impact are presented below.

Mitigation

- In periods of extended dry weather, dust suppression may be necessary along haul roads, site roads, around borrow pit areas and other infrastructure to ensure dust does not cause a nuisance. If necessary, water will be taken from stilling ponds in the site's drainage system and will be pumped into a bowser or water spreader to dampen down haul roads and borrow pit to prevent the generation of dust where required. Water bowser movements will be carefully monitored to avoid, insofar as reasonably possible, increased runoff.
- All plant and materials vehicles shall be stored in dedicated areas (on site).
- Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- Construction materials will be transported to the site on specified haul routes only.
- The agreed haul route roads adjacent to the site will be regularly inspected for cleanliness and cleaned as necessary.
- The site access roads will be checked weekly for damage/potholes and repaired as necessary.
- The transport of construction materials to the site that have significant potential to cause dust, will be undertaken in tarpaulin or similar covered vehicles where necessary.
- All construction related traffic will have speed restrictions on un-surfaced roads to 15 kph;
- The transport of dry peat and spoil, which has the significant potential to generate dust, to the on-site borrow pits will be minimised. If necessary, excavated peat and spoil will be dampened prior to transport to the borrow pit.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase (see Appendix 4-3). The CEMP includes dust suppression measures.

Residual Impact

Following implementation of mitigation measures as outlined above, residual impacts of dust generation from the construction phase will have a Short-term Imperceptible Negative Impacts.

Significance of Effects

Based on the assessment above there will be no significant effects.

9.2.4.3 Operational Phase

9.2.4.3.1 *General Air Quality*

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

Mitigation

- Any vehicles or plant brought onsite during the operational phase will be maintained in good operational order that comply with the Road Traffic Acts 1961 as amended, thereby minimising any emissions that arise.
- When stationary, delivery and on-site vehicles will be required to turn off engines.

Residual Impacts

Long-term Imperceptible Negative Impact.

Significance of Effects

Based on the assessment above there will be no significant effects.

9.2.4.3.2 *Human Health*

Whilst the operational phases of the Proposed Development will give rise to minor increases in dust and vehicle emissions, the implementation of the mitigation measures discussed above and good management practices can prevent or minimise potential effects off-site. Good management practice consists of good site design and layout, adopting appropriate working methods, choosing the right equipment and ensuring that the workforce understands the company's responsibilities and is familiar with good working practice and dust suppression techniques. The potential for health effects are considered negligible as the potential for both exhaust and dust emissions will be limited and controlled through site layout design and mitigation measures.

9.2.4.4 Decommissioning Phase

It is not intended that the on-site electrical substation will be removed at the end of the useful life of the Permitted Development, as permanent planning permission is being sought for the substation. By the time the decommissioning of the Permitted Development is to be considered, the proposed 110kV substation and the proposed underground electrical cabling (110kV) from the proposed 110kV electrical substation to the existing 220kV Ballyvouskill will likely form an integral part of the local electricity network, with a number of supply connections and possibly some additional generation connection. Therefore, it is intended that the proposed 110kV substation and underground electrical cabling (110kV) will be retained as a permanent structure and will not be decommissioned.

The underground electrical cabling (33kV) connecting the Permitted Development to the proposed 110kV electrical substation will be removed from the underground cable ducting at the end of the useful life of the renewable energy development. The cabling will be pulled from the cable duct using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at each of the joint bays/pull pits along the underground cabling route. The original pulling pits will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible.

During the construction of the Proposed Development, a number of road and junction improvements and temporary works will be completed to provide access to the site during materials delivery. All these accommodation areas will be re-used during decommissioning. This includes the re-instatement and re-establishment of the temporary access road from the N22 to the old N22 alignment to facilitate the removal of abnormally large vehicle loads. The use of this temporary access road will be carefully managed, and the route will be blocked with traffic bollards when not in use for component removal. On completion of the component removal from the site, the temporary accommodation area will be fully re-instated.

Site roadways could be in use for purposes other than the operation of the development by the time the decommissioning of the Permitted Development is to be considered, and therefore it may be more appropriate to leave the site roads in situ for future use. It is envisaged that the roads will provide a useful means of extracting the commercial forestry crop which exists on the site, along with general agricultural use.

Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential impacts.

9.3 Climate

Climate legislation and policy is outlined in detail in Chapter 2 of this EIAR, however, a summary of the key information is provided in Section 9.3.1 below.

9.3.1 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.

9.3.1.1 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. 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.

9.3.1.1.1 *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, thirty-seven 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.

9.3.1.1.2 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°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.

9.3.1.1.3 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. The European Climate Law was published in the Official Journal on 9 July 2021 and entered into force on 29 July 2021.

9.3.1.1.4 COP26 Climate Change Conference

The UN Climate Change Conference of the Parties (COP26) was held in Glasgow from the 31st of October to the 12th of November 2021. There were four key objectives that had been identified for COP 26 which included:

- Secure global net zero by 2050 and keep 1.5 degrees within reach
- Adapt to protect communities and natural habitats to the already changing climate

- Mobilise climate finance whereby developed countries must deliver on raising $100bn in climate finance per year
- Finalise the Paris Rulebook (rules needed to implement the Paris Agreement) and turn ambitions into action

Although COP26 was considered unsatisfactory in delivering the action and commitments needed to reach the Paris Agreement targets, it did raise the global ambition on climate action. Whilst COP26 failed to meet the 1.5 degree target and did not manage to secure the $100bn in climate finance there were a number key successes which included the following:

- Green finance for the net zero economy – establishment of the Glasgow Financial Alliance for Net Zero of $130 trillion of private capital to accelerate the transition to a net-zero economy.
- Disclosure and transparency for the private sector.
- Increasing the pace of implementing the Paris Agreement.

9.3.1.1.5 *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. Coming 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 9-8.

Table 9-8 United Nations Sustainable Development Goals adopted in 2015. https://sustainabledevelopment.un.org/sdgs

SDG	Targets	International Progress to Date (2020)	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	The renewable energy share of total final energy consumption gradually increased from 17 per cent in 2015 to 17.3 per cent in 2017, though much faster change is required to meet climate goals. Global primary energy intensity (ratio of energy used per unit of GDP) was 5.0 in 2017, which is a 1.7% annual improvement from 2016, but the lowest annual improvement since 2010. Meeting the SDG	*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*

SDG	Targets	International Progress to Date (2020)	National Relevant Policy
	➢ 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	target for 2030 will require an improvement rate of at least 3% per year from now until 2030. Development Goal 7.	*National Energy Efficiency Action Plan for Ireland # 4 2017-2020* *Better Energy Programme* *One World, One Future* *The Global Island*

SDG	Targets	International Progress to Date (2020)	National Relevant Policy
	accordance with their respective programmes of support		
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 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	In 2017, greenhouse gas concentrations reached new highs, with globally averaged mole fractions of CO_2 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 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 March 2020, 189 parties had ratified the Paris Agreement. Parties to the Paris Agreement are expected to prepare, communicate and maintain successive nationally determined contributions, and 186 parties had communicated their first nationally determined contributions to the secretariat of the United Nations Framework Convention on Climate Change, while three parties had communicated its second. Under the Agreement, all parties are required to	*National Adaptation Framework* *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*

**Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.*

SDG	Targets	International Progress to Date (2020)	National Relevant Policy
		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 of December 2019, 81 countries are seeking support from the Green Climate Fund for national adaptation plans and other adaptation planning processes, with a combined value of $203.8 million.	

9.3.1.1.6 *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 counties ambition and progress in fighting climate change listed Ireland as the second worst performing EU member state in tackling climate change.

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 and 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;
  - 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.

This target was subsequently superseded by more ambitious targets under the 2021 Climate Action Plan which aims to increase the proportion of renewable electricity up to 80% by 2030. The 2021 plan assumes full implementation of the 2019 plan.

In October 2021, the SEAI published the 2020 National Energy Balance for the country stating that 42% of electricity generated in 2020 was from renewable sources with 86% of all renewable electricity generated from wind. With a renewable share of electricity generation at 80% in mind for 2030, 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 by facilitating the Permitted Development will help contribute towards this target.

The Proposed Development is compatible with the relevant provisions as set out in the Climate Action Plan 2019 and Climate Action Plan 2021, relating to the harnessing of renewable energy. In summary, by facilitating the Permitted Development, the Proposed Development will contribute the following:

- Production of 94,214 MWh of electricity which would be sufficient to supply 22,432 Irish households with electricity per year.
- Helping to meet the target that 80% of our electricity needs will come from renewable sources by 2030.
- Helping to reduce carbon emissions and improving Ireland's security of energy supply.
- Provision of grid connection infrastructure to support the renewable energy output from the Proposed Development.

Further detail on the EU 2030 targets in noted in Chapter 2.

9.3.1.1.7 *Climate Action Plan 2019*

The *Climate Action Plan* (DCCAE, 2019) which features 183 action plans sets out how Ireland will meet its EU targets to reduce its carbon emissions by 30% between 2021 and 2030 and lay the foundations for achieving net zero carbon emissions by 2050. The CAP sets out an ambitious course of action over the coming years to address the impacts which climate may have on Irelands 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, which are predicted to include:

- Rising sea-levels threatening habitable land and particularly coastal infrastructure,
- Extreme weather, including more intense storms and rainfall affecting our land, coastline and seas;
- Further pressure on our water resources and food production systems with associated impacts on fluvial and coastal ecosystems;
- Increased chance and scale of river and coastal flooding;
- Greater political and security instability;
- Displacement of population and climate refugees;
- Heightened risk of the arrival of new pests and diseases;
- Poorer water quality; and
- Changes in the distribution and time of lifecycle events of plant and animal species on land and in the oceans.

It is also recognised within the Plan that in addition to the above many of the pollutants associated with climate change are also damaging to human health.

It is the ambition of the CAP to deliver a step-change in our emissions performance over the coming decade, so that we will not only meet our EU targets for 2030 but will also be well placed to meet our mid-century decarbonisation objectives.

Chapter 7 of the CAP details the plans surrounding electricity. Within Ireland electricity accounting for 19.3% of Irelands greenhouse gases in 2017, the following is noted:

> *"It is important that we decarbonise the electricity that we consume by harnessing our significant renewable energy resources by doing this we will also become less dependent on imported fossil fuels."*

In 2017 within Ireland a total of 30.1% of electricity produced came from renewable sources, the target to be achieved by 2020 is set at 40%. The CAP goes on to note that 'given our 40% target is based on a percentage of total energy demand, this rising demand makes meeting our 2020 target even more challenging and latest forecasts indicate we may miss this target by 3 to 4 percentage points'. Further to this, while decarbonising electricity is a key aspect of the strategy it is noted that this is against the background of rapid projected growth in electricity demand. It is expected that demand for electricity is forecast to increase by 50% above existing capacity in the next decade. Generation electricity builds of a renewable nature rather than fossil fuels has been marked as essential.

The CAP goes on to note that with regards to policy measures to date that they will not achieve the level of decarbonisation required in the electricity sector to meet the 2030 emissions reduction targets, as such it is listed that 'we must 'reduce our electricity sector emissions to 4-5 Mt in 2030'. In relation to emissions the following is noted:

> *"In 2017, emissions from electricity were 12 Mt and in 2030, despite implementation of Project Ireland 2040 measures, emissions are projected to be 8 Mt. This clearly demonstrates the need for a significant step-up in ambition over existing policy, not only to meet our 2030 targets, but to set us on course to deliver substantive decarbonisation of our economy and society by 2050."*

In the electricity sector, reaching a 70% share of renewable electricity would require 50-55% emissions reduction by 2030.

Under section 7.2 the following targets have been set out to meet the required level of emissions by 2030:

- *"Reduce CO_2 eq. emissions from the sector by 50–55% relative to 2030 Pre-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*
  - *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.

Section 7.2 of the CAP notes the 'Measures to deliver targets' in which efforts to meet the 2030 ambitions which includes increased harnessing of renewable energy. CAP identifies a need for 8.2GW of onshore wind generation and states that in 2017 there was 3.3GW in place, therefore Ireland needs to more than double its installed capacity of wind generation. Accordingly, the CAP presents clear and

unequivocal support for the provision of additional renewable energy generation and presents yet further policy support for increased wind energy.

One of the key targets in relation to forestry is the delivery of '*..an average of 8,000 ha per annum of newly planted forest, and sustainable forest management of existing forests (21 $MtCO_2$eq. cumulative abatement)'.* Ongoing and proposed measures to deliver the target include:

- The investment of nearly €3 billion in forestry, since the late 1980s, which through ongoing sustainable forest management will contribute to delivering abatement of 21 $MtCO_2$eq over the period 2021 to 2030.
- Review of the current afforestation programme to enhance participation rates and inform land use policy to increase the benefits for climate, the environment, and rural communities.
- Commitment by Coillte to replant or restock a total of 34,770 hectares between 2016 and 2020.
- Bord na Móna's estate extends to a little under 80,000 ha. To date a little over 18,000 ha of the cut-away and cut-over peatland has been rehabilitated and the target for 2019 is to complete a further 3,000 ha. By way of additional context, as much as 50,000 ha of the overall estate is currently under consideration for a wide variety of commercial future uses of which renewable energy projects constitute the greatest proportion by far.
- Hedgerows are estimated to cover 3.9% of the Irish landscape or 660,000 km length. The total area of hedgerow and non-forest woodland patches across the landscape could possibly represent a significant carbon sink and could potentially be used as a mitigation option.

9.3.1.1.8 Climate Action Plan 2021

The Climate Action Plan 2021 (CAP 2021) was launched in November 2021. CAP 2021 follows the Climate 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 most critical measure in CAP 2021 is to increase the proportion of renewable electricity to up to 80% by 2030 which also includes an increased target of up to 5 Gigawatts of offshore wind. Other key actions of CAP 2021 by 2030 include the following:

> *"The government will also introduce a small-scale generation scheme for farmers, businesses and communities to generate their own electricity and feed this back into the grid.*
>
> *The plan calls for a significant reduction in transport emissions by 2030. Measures will include enabling 500,000 extra walking, cycling and public transport journeys per day by 2030. We will accelerate the pace of EV (Electric Vehicle) take-up, to reach almost 1 million EVs in the private transport fleet by 2030. We will also increase public transport and rail and bus electrification, including 1,500 electric buses and better rural links. We will increase the biofuels mix to reduce emissions from the existing fleet.*
>
> *A new National Retrofit Plan will drive demand, make retrofitting more affordable, and expand the capacity of the industry, including the training of more skilled workers. Other measures include increased targets for district heating and the public sector, and strengthening building standards for all buildings.*
>
> *This plan will give Irish agriculture a viable future, producing world class food with a lower carbon footprint, thanks to a science-based approach that also improves biodiversity and protects nature.*
>
> *Climate Action Plan 2021 places farmers at the very centre. The targets for agriculture will help make Irish farms more carbon efficient and build a more resilient agri-food sector.*

Farmers know the land better than anyone and are best placed to meet out climate ambitions. They will be backed by an even greater emphasis on science and robust research. There will be a reduction in chemical nitrogen and more targeted use of fertiliser, while maintaining our position as global leader in grass growth through multi-species swards. Other measures include improving the genetics of our herds to reduce emissions and improve productivity. These changes are good for the environment but importantly make sense economically.

Farmers will be incentivised to make these changes and there will be new income streams in areas, such as the generation of renewable energy.

Reducing emissions from land use, and a move to being an overall store of carbon, will involve further bog rehabilitation, increased afforestation, and the rewetting of peat organic soils. A new forestry programme will be prepared for launch in 2023".

CAP 2021 also sets out indicative ranges of emissions reductions for each sector of the economy. The emissions reductions by 2030 by sector are as follows:

- Electricity: 62-81%
- Transport: 42-50%
- Buildings: 44-56%
- Industry/Enterprise: 29-41%
- Agriculture: 22-30% reduction
- Land Use, Land Use Change and Forestry (LULUCF): 37-58%

CAP 2021 assumes full implementation of the 2019 plan.

9.3.1.1.9 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 Greenhouse Gas Emissions (GHG) and ranks their performance in each category and overall. The 2021 CCPI was published in December 2020. While the CCPI 2021 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 41st in 2019, has climbed 2 places to 39th for 2020, and remains as 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. Ireland is one of the worst performing countries in the GHG Emissions category. 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".*

9.3.1.1.10 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.

9.3.1.1.11 *Climate Action and Low Carbon Development (Amendment) Act 2021*

The Climate Action and Low Carbon Amendment Bill 2021, entitled an Act, is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050. This Bill was passed into law in July 2021.

The Programme for Government has committed 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.

9.3.1.1.12 Emissions Projections

Ireland's 2020 target under the EU Effort Sharing Decision (ESD[3]) 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 2021–2040'* was published in June 2022. The report includes an assessment of Ireland's progress towards achieving its emission reduction targets out to 2030 set under the EU ESD and Effort Sharing Regulation (ESR[4]).

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 2020. This is the cut off point for which the latest national greenhouse gas emission inventory data is available, known as the 'base year' for projections. The WAM scenario has a higher level of ambition and includes government policies and measures to reduce emissions such as those in Ireland's Climate Action Plan 2021.

The EPA Emission Projections Update notes the following key trends:

- *Under the With Existing Measures scenario, the projections indicate that Ireland will cumulatively exceed its ESR emissions allocation of 384.3 Mt CO_2 eq by 78.3 Mt CO2 eq over the 2021-2030 period without the use of flexibilities. If both the LULUCF and ETS flexibilities are used the exceedance will reduce to 52.3 Mt CO_2 eq.*
- *Under the With Additional Measures scenario, the projections indicate that Ireland will cumulatively exceed the ESR emissions allocation by 24.2 Mt CO_2 eq over the 2021-2030 period.*
- *The projections show that Ireland can achieve compliance under the ESR (in the With Additional Measures scenario) – using both flexibilities but only with implementation of the Climate Action Plan 2021. Using both flexibilities gives a surplus under the ESR of only 1.6 Mt CO_2 eq, this is a small amount of headroom and only highlights the need for full and rapid implementation of policies and measures in the Climate Action Plan 2021.*

[3] *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*
[4] *REGULATION (EU) 2018/1999 on the Governance of the Energy Union and Climate Action*

9.3.2 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 Cork Airport, Co. Cork, is the nearest weather and climate monitoring station to the Proposed Development site that has meteorological data recorded for the 30-year period from 1981 – 2010. The monitoring station is located approximately 48 kilometres southeast of the site. The wettest months are October and December, and April is usually the driest. July is the warmest month with an average temperature of 15.3°C. the mean annual temperature recorded at Cork Airport was 9.9°C.

Table 9-9 Data from Met Éireann Weather Station at Cork Airport, 1981 to 2010

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
TEMPERATURE (degrees Celsius)													
Mean daily max	8.2	8.3	9.9	11.8	14.4	17.0	18.7	18.5	16.5	13.2	10.3	8.5	12.9
Mean daily min	3.0	3.1	4.0	4.9	7.4	10.0	11.8	11.8	10.2	7.7	5.2	3.7	6.9
Mean temperature	5.6	5.7	6.9	8.4	10.9	13.5	15.3	15.2	13.3	10.5	7.8	6.1	9.9
Absolute max.	16.1	14.0	15.7	21.2	23.6	27.5	28.7	28.0	24.7	21.4	16.2	13.8	28.7
Absolute Min.	-8.0	-4.7	-4.3	-2.3	-0.9	3.7	6.7	5.3	2.3	-0.9	-3.3	-7.2	-8.0
Mean No. of Days with Air Frost	4.6	4.1	1.8	1.2	0.0	0.0	0.0	0.0	0.0	0.2	1.2	3.6	16.7
Mean No. of Days with Ground Frost	12.8	11.8	9.7	7.8	2.1	0.1	0.0	0.0	0.5	2.4	7.3	11.0	65.3
RELATIVE HUMIDITY (%)													
Mean at 0900UTC	89.8	89.4	87.8	83.1	80.6	81.3	83.2	85.4	88.4	90.1	90.7	90.5	86.7
Mean at 1500UTC	83.7	78.9	75.5	71.3	70.9	71.5	72.9	72.8	75.4	80.4	83.4	85.4	76.8
SUNSHINE (Hours)													
Mean daily duration	1.8	2.4	3.3	5.3	6.2	5.8	5.4	5.2	4.3	3.0	2.3	1.7	3.9
Greatest daily duration	8.5	10.0	11.5	13.6	15.5	16.0	15.3	14.4	11.9	10.3	8.7	7.6	16.0
Mean no. of days with no sun	10.1	7.9	6.3	3.1	2.1	2.5	2.0	2.6	3.6	6.4	8.6	11.9	67.1
RAINFALL (mm)													
Mean monthly total	131.4	97.8	97.6	76.5	82.3	80.9	78.8	96.8	94.6	138.2	120.0	133.1	1227.9
Greatest daily total	45.7	49.9	55.2	34.2	34.9	59.7	73.2	60.9	58.9	52.1	47.9	41.9	73.2
Mean num. of days with >= 0.2mm	20	17	19	16	15	14	15	15	16	19	19	19	204

Mean num. of days with >= 1.0mm	16	13	14	11	12	10	10	11	11	15	14	15	152
Mean num. of days with >= 5.0mm	9	6	5	5	5	5	5	5	5	8	7	8	73
WIND (knots)													
Mean monthly speed	12.1	12.0	11.6	10.3	10.1	9.4	9.0	9.0	9.4	10.7	10.9	11.6	10.5
Max. gust	78	83	70	62	59	49	52	54	58	75	66	80	65.9
Max. mean 10-minute speed	52	54	43	40	40	33	40	38	39	48	46	56	44.1
Mean num. of days with gales	2.3	1.8	1.3	0.3	0.3	0	0.1	0.2	0.3	1.0	1.2	1.9	10.8
WEATHER (Mean No. of Days With:)													
Snow or sleet	3.1	3.1	2.0	0.7	0	0	0	0	0	0	0.3	2.2	11.3
Snow lying at 0900UTC	0.7	0.5	0.2	0.1	0	0	0	0	0	0	0	0.5	2.0
Hail	1.0	1.1	1.4	1.9	0.7	0.2	0.1	0.0	0.1	0.3	0.2	0.4	7.4
Thunder	0.2	0.1	0.1	0.1	0.6	0.5	0.8	0.3	0.0	0.4	0.1	0.1	3.3
Fog	7.8	6.8	8.5	7.5	7.6	7.6	8.4	8.8	9.1	8.7	7.6	8.4	96.8

9.3.3 Calculating Carbon Losses and Savings

The carbon losses and savings for the renewable energy development were assessed in the original planning application which was granted by Cork County Council in January 2020 (Ref. No. 19/4972). The carbon calculations as set out in Section 9.2.3 of Chapter 9 Air and Climate estimated that 36,577 tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the renewable energy development. Over the proposed thirty-year lifetime of the renewable energy development, 1,097,310 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. Continuing improvements in turbine technology will result in an installed capacity of at least this figure if not greater.

9.3.4 Likely Significant Effects and Associated Mitigation Measures

9.3.4.1 'Do-Nothing' Effect

If the Proposed Development were not to proceed, the development of the Permitted Development would not be facilitated and the opportunity to further significantly reduce emissions of greenhouse gas emissions, including carbon dioxide (CO_2), oxides of nitrogen (NO_x), and sulphur dioxide (SO_2) from fossil fuels 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 slight negative impact.

9.3.4.2 Construction Phase

9.3.4.2.1 *Greenhouse Gas Emissions*

1. Underground Cabling, Substation, Borrow Pits, New Access Roads and Road/Junction Upgrade Works

The construction of the underground cabling route, the substation, development of borrow pits, new access roads and road/junction upgrade works will require the operation of construction vehicles and plant on site. Greenhouse gas emissions, e.g. carbon dioxide (CO_2), carbon monoxide and nitrogen oxides associated with vehicles and plant will arise as a result of the construction activities. This potential impact will be slight only, given the insignificant quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Therefore, this is a short-term slight negative impact. Mitigation measures to reduce this impact are presented below. There would be a neutral impact on greenhouse gas emissions by not constructing the omitted 38kV substation and battery storage that was previously permitted.

2. Transport to Site

The transport of construction materials to the site, which will occur on specified routes only), will also give rise to greenhouse gas emissions associated with the transport vehicles. This constitutes a slight negative impact in terms of air quality. Mitigation measures in relation to greenhouse gas emissions are presented below.

Mitigation

- All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise.
- Construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority.
- When stationary, delivery and on-site vehicles will be required to turn off engines.
- Users of the site will be required to ensure that all plant and vehicles are suitably maintained to ensure that emissions of engine generated pollutants is kept to a minimum.
- The majority of aggregate materials for the construction of the Proposed Development will be obtained from an onsite borrow pit. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements.
- The expected waste volumes generated on site are unlikely to be large enough to warrant source segregation at the Proposed Development site. Therefore, all wastes streams generated on site will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The facility will be local to the Proposed Development site to reduce the amount of emissions associated with vehicle movements. The MRF facility will be local to the Proposed Development site to reduce the amount of emissions associated with vehicle movements. The nearest licensed waste facility to the site is the Macroom Civic Amenity Site, located approximately 16km to the east of the Proposed Development site.

Residual Impacts

Short-term Imperceptible Negative Impact on Climate as a result of greenhouse gas emissions.

Significance of Effects

Based on the assessment above there will be no significant effects.

9.3.4.3 Operational Phase

9.3.4.3.1 *Greenhouse Gas Emissions*

The proposed 110kV substation components will require periodic maintenance throughout the operational phase. Typically, maintenance traffic will consist of one four-wheel drive vehicle or van per week which will result in the emission of greenhouse gases. This effect is considered to be imperceptible only, given the insignificant quantity of greenhouse gases that will be emitted if any over the 'Do Nothing' scenario.

9.3.4.3.2 *Mitigation Measures*

As the proposed development will have no significant negative effects on climate, mitigation measures are not proposed other than all machinery and plant will be maintained in good operational order while on-site, minimising any emissions that are likely to arise. These measures will minimise any effect that the development might have on climate in the long-term.

Significance of Effects

Based on the assessment above there will be no significant effects

9.3.4.4 Decommissioning Phase

It is not intended that the on-site electrical substation will be removed at the end of the useful life of the Permitted Development, as permanent planning permission is being sought for the substation. By the time the decommissioning of the Permitted Development is to be considered, the proposed 110kV substation and the proposed underground electrical cabling (110kV) from the proposed 110kV electrical substation to the existing 220kV Ballyvouskill will likely form an integral part of the local electricity network, with a number of supply connections and possibly some additional generation connection. Therefore, it is intended that the proposed 110kV substation and underground electrical cabling (110kV) will be retained as a permanent structure and will not be decommissioned.

The underground electrical cabling (33kV) connecting the Permitted Development to the proposed 110kV electrical substation will be removed from the underground cable ducting at the end of the useful life of the renewable energy development. The cabling will be pulled from the cable duct using a mechanical winch which will extract the cable and re-roll it on to a cable drum. This will be undertaken at each of the joint bays/pull pits along the underground cabling route. The original pulling pits will be excavated using a mechanical excavator and will be fully re-instated once the cables are removed. The cable ducting will be left in-situ as it is considered the most environmentally prudent option, avoiding unnecessary excavation and soil disturbance for an underground element that is not visible.

During the construction of the Proposed Development, a number of road and junction improvements and temporary works will be completed to provide access to the site during materials delivery. All these accommodation areas will be re-used during decommissioning. This includes the re-instatement and re-establishment of the temporary access road from the N22 to the old N22 alignment to facilitate the removal of abnormally large vehicle loads. The use of this temporary access road will be carefully managed, and the route will be blocked with traffic bollards when not in use for component removal. On completion of the component removal from the site, the temporary accommodation area will be fully re-instated.

Site roadways could be in use for purposes other than the operation of the development by the time the decommissioning of the Permitted Development is to be considered, and therefore it may be more appropriate to leave the site roads in situ for future use. It is envisaged that the roads will provide a useful means of extracting the commercial forestry crop which exists on the site, along with general agricultural use.

Any impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of less impact. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential impacts.

9.4 Cumulative Assessment

Potential cumulative effects on air quality and climate between the Proposed Development and other developments in the vicinity were also considered as part of this assessment. The developments considered as part of the cumulative effect assessment are described in Section 2.6 of this EIAR..

The Proposed Development by facilitating the Permitted Development, once operational, will have a long-term, moderate, positive impact on the air quality and climate.

During the construction phase of the Proposed Development and other developments as described in Chapter 2 of this EIAR, that are yet to be constructed, there will be minor emissions from construction plant and machinery and potential dust emissions associated with the construction activities. However, once the mitigation proposals, as outlined in Section 9.2.4.2.1 and Section 9.2.4.2.2 are implemented, the Proposed Development will not result in any significant residual effects on air and climate and will not contribute to any cumulative effect when considered in combination with other plans and projects..

There will be no net carbon dioxide (CO_2) emissions from operation of the Proposed Development. Exhaust emissions of carbon dioxide (CO_2), oxides of nitrogen (NO_x), 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 and climate.