# 10 AIR AND CLIMATE

## 10.1 INTRODUCTION

This chapter describes the likely significant impacts of the construction, operation, and decommissioning of the proposed Shronowen wind farm development on air quality and climate.

### 10.1.1 Scope of Assessment

The aim of this assessment is to consider whether the proposed development including wind turbines, grid connection, site infrastructure and replacement forestry lands would be likely to result in significant air quality and climate impacts. The cumulative effect of the proposed development in combination with neighbouring existing and permitted developments is then assessed to determine any likely significant air quality and climate impacts.

The potential impacts and likely effects of the decommissioning phase will be of similar magnitude, if not slightly less, than the construction phase. Therefore, the outcome of the construction phase assessment should be taken as representative of the decommissioning phase impacts.

There will be approximately 3.15 ha of trees felled to facilitate wind farm infrastructure (See **Chapter 2** for full details). Any machinery used in the harvesting of the trees will have a negligible impact on local air quality, significantly less than any plant and machinery used during the proposed development construction phase. These replanting activities have been scoped out from further assessment.

The felled trees will be re-planted elsewhere. This will ensure no net loss of carbon sequestering trees. However, the potential impact of the early felling of the trees on carbon sequestration has been assessed.

Once constructed there will be no emissions from the grid connection. The construction of the grid connection is considered in over construction impact assessment.

### 10.1.2 Methodology

At a local level, the existing air quality at the Shronowen site was characterised. The scale and duration of the construction works was examined and its potential to significantly impact on local air quality assessed. Mitigation measures are described to minimise the potential effects.

The local climate was characterised based on 30-year averages measured at a representative weather observatory. The compatibility of the project with the 2019 national Climate Action Plan (CAP) was examined.

### 10.1.3 Assessment Criteria

#### *10.1.3.1 Air Quality*

In the European Union (EU), directives set down Air Quality Standards to protect health, vegetation, and ecosystems. The Ambient Air Quality and Cleaner Air for Europe (CAFÉ) Directive (2008/50/EC) was published in May 2008 and was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011).

There will be some pollutants named in the CAFÉ directive arising during construction from plant and machinery exhaust emissions. These include carbon dioxide ($CO_2$), sulphur dioxide ($SO_2$), nitrogen oxides ($NO_x$), carbon monoxide (CO), and particulate matter ($PM_{10}$). However, these emissions will be minor and temporary, will be quickly dispersed and will not exceed the limit values (refer to **Appendix 10-1** for a table of the limit values) as set out in the CAFÉ Directive 2008/50/EC.

There is greater potential for temporary nuisance to occur as a result of fugitive dust from the excavation and transport of soil and materials during construction. The National Roads Authority (NRA) has published guidance for assessing dust impacts at a local level from road construction ('*Guidelines for the Treatment of Air Quality during the Planning and Construction of National Road Schemes*' (2011)). Similar construction methodologies to road construction will be used during the proposed wind farm development therefore it is considered appropriate to adopt the criteria described in **Table 10-1**, which are taken from the aforementioned NRA guidance document.

Error! Reference source not found. provides a list of distances at which dust could be expected to result in a nuisance from construction sites for impacts such as soiling, particulate matter $(PM)_{10}$ deposition and vegetation effects. These distances present the potential for dust impact with standard mitigation in place. The proposed Shronowen wind farm is considered a moderate construction site. The likely effect of this is dealt with in more detail at section 10.3.1.1. below.

**Table 10-1 Assessment Criteria for the impact of dust from construction with standard mitigation in place**

| Source | | Potential distance for significant effects (distance from source) | | |
|---|---|---|---|---|
| **Scale** | **Description** | **Soiling** | **$PM_{10}$** | **Vegetation** |
| **Major** | Large construction sites, with high use of haul roads | 100m | 25m | 25m |
| **Moderate** | Moderate sized construction sites, with moderate use of haul roads | 50m | 15m | 15m |
| **Minor** | Minor construction sites, with limited use of haul roads | 25m | 10m | 10m |

#### *10.1.3.2 Climate Change*

The potential impact of the proposed development on climate is assessed primarily by demonstrating that the wind farm aligns completely with the provisions set out in the national Climate Action Plan 2019, specifically those relating to renewable energy.

To demonstrate that the carbon savings will significantly out-weigh any potential carbon losses a methodology made available by the Scottish Government (2019) in tabular spreadsheet format titled *Calculating carbon savings from wind farms on Scottish peatlands* was applied to this development.

This 'carbon calculator' is the Scottish Government's tool provided to support the process of determining the carbon impact of wind farm developments in Scotland. The purpose of the tool is to assess, in a comprehensive and consistent way, the carbon impact of wind farm developments. This is done by comparing the carbon costs of wind farm developments with the carbon savings attributable to the wind farm.

As there is no comparable Irish version it is considered appropriate to adopt the Scottish methodology which has been tried and tested and subject to audit by the Scottish Environmental Protection Agency. This is dealt with in further detail in section 10.3.1.6 below.

### 10.1.4 Statement on Limitations and Difficulties Encountered

It has been possible to determine the significance of the impact. It is universally accepted that replacing fossil fuel generated electricity with wind generated and other forms of renewable electricity has a positive rather than negative effect nationally and globally on air quality and climate. The information provided in this chapter is considered sufficient to enable an informed decision to be made on the significance of the potential impacts of the project on air quality and climate.

### 10.1.5 Competency of Assessor

This assessment has been carried out by Peter Barry (Malachy Walsh and Partners). Peter (BSc MSc) is an Environmental Scientist with 20 years' experience as an Environmental Assessment Practitioner. Peter has prepared numerous technical chapters for wind farm developments including Noise and Vibration, Shadow Flicker and Air Quality and Climate. Peter has presented evidence on all three topics as expert witness at Oral Hearing.

## 10.2 EXISTING RECEIVING ENVIRONMENT

### 10.2.1 Local Air Quality

Representative Environmental Protection Agency (EPA) ambient air quality data has been used to characterise the existing air quality in the area.

The EPA's Air Quality Index for Health (AQIH) is a number from one to ten that describes the current air quality in a region. A ranking of 10 means the air quality is 'Very Poor' and a ranking of 1 – 3 inclusive means that the air quality is 'Good'. The AQIH is calculated on an hourly basis using representative sampling from each region.

There are six regions as follows: Dublin, Cork, large towns (>15,000 population), small towns (5,000 – 15,000 population), rural east and rural west.

The AQIH is based on measurements of five air pollutants all of which can harm health. The five pollutants are:

- Ozone gas
- Nitrogen dioxide gas
- Sulphur dioxide gas
- $PM_{2.5}$ particles and
- $PM_{10}$ particles

There is no accompanying health message for at risk groups and the general population in areas classed as 'Good'. Outdoor activities can be enjoyed as usual, the air quality does not pose a health risk.

In areas of 'Fair to Poor' air quality, AQIH ranking 4 to 10, certain types of outdoor activity should be restricted or avoided for at risk individuals and the general population depending on the AQIH ranking.

The AQIH is calculated every hour. The index was accessed via the EPA's website (https://gis.epa.ie/EPAMaps/) on the 17th September 2020. The air quality for the region where the Shronowen wind farm is proposed (Rural West AQIH Region 6) is currently ranked as '2 - Good'. Refer to **Figure 10-1.**

The nearest air quality station to the site is in a sub urban site in Tralee. This station monitors Sulphur Dioxide and is in a suburban area. As of September 17th, 2020, the air quality index characterised by this station was classified as 'Good'.

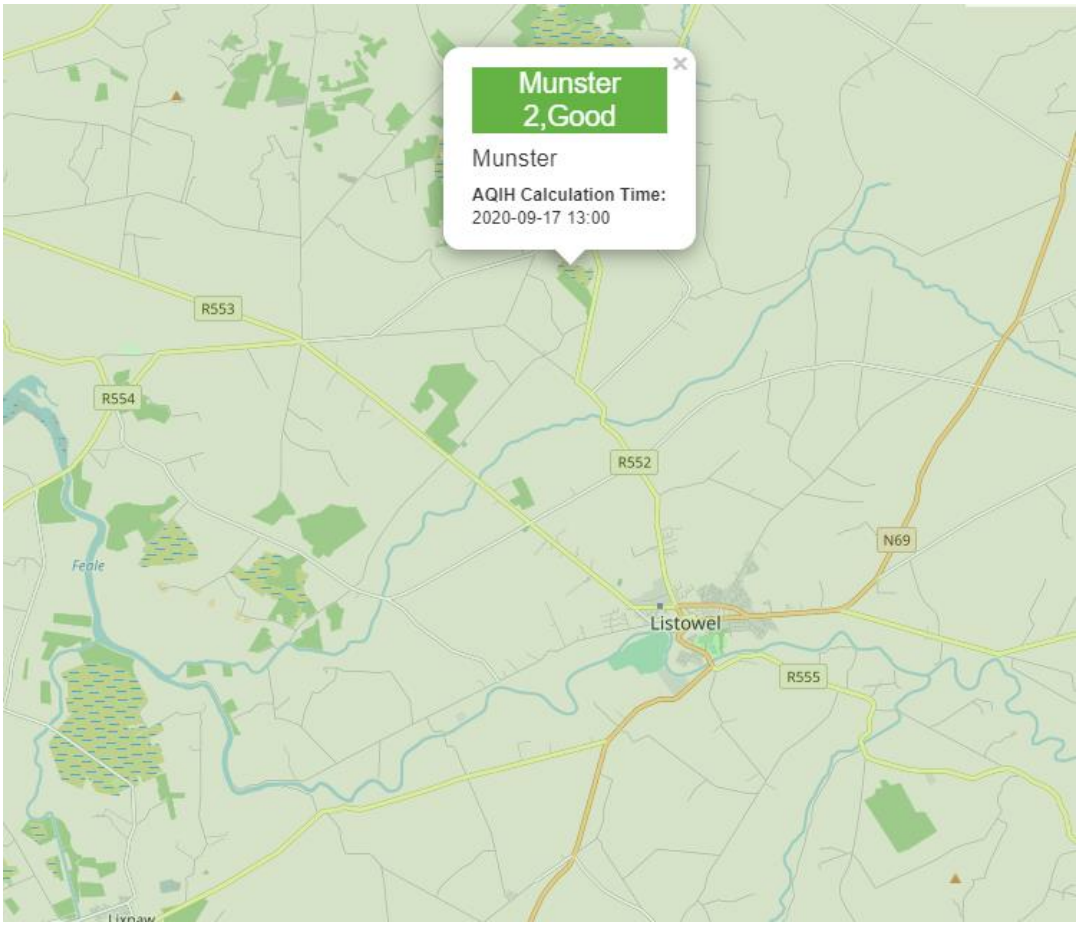


**Figure 10-1 Air Quality Shronowen**

### 10.2.2 Global Climate

Every year, the World Meteorological Organisation (WMO) issues a Statement on the State of the Global Climate. It is based on data provided by National Meteorological and Hydrological Services and other national and international organisations. Some of the key messages in the WMO *Statement on the State of the Climate 2019* are as follows:

- Global mean temperature for January to October 2019 was 1.1 ± 0.1°C above pre-industrial levels. 2019 is likely to be the 2nd warmest year on record. The past five years are the five warmest years on record, and the past decade, 2010-2019, is the warmest decade on record. Since the 1980s, each successive decade has been warmer than any preceding decade since 1850.
- Global atmospheric mole concentrations of greenhouse gases reached record levels in 2018 with carbon dioxide ($CO_2$) reaching 407.8±0.1 parts per million, 147% of pre-industrial levels. Measurements from individual sites indicate that concentrations of $CO_2$ continued to increase in 2019. Methane and nitrous oxide, both important greenhouse gases, also reached record levels.
- In May of 2019, the Mauna Loa Observatory in Hawaii, which has tracked atmospheric $CO_2$ levels since the late 1950s detected 415.26 parts per million (ppm) $CO_2$ in the atmosphere. The last time Earth's atmosphere contained this much $CO_2$ was more than three million years ago.
    - (Since then, on May 3rd 2020 an average daily $CO_2$ level of 418.12ppm was measured, setting a new record)

- The ocean absorbs over 90% of the heat trapped in the Earth's system because of rising concentrations of greenhouse gases. Ocean heat content, which is a measure of this heat accumulation, reached record levels again in 2019.
- In 2019, the global mean sea level reached its highest value since the beginning of the high-precision altimetry record (January 1993).
- Extreme heat conditions are taking an increasing toll on human health and health systems. Greater impacts are recorded in locations where extreme heat occurs in contexts of ageing populations, urbanisation, urban heat island effects, and health inequities. In 2018, a record 220 million vulnerable persons over age of 65 were exposed to heatwaves, compared with the average for the baseline of 1986-2005, breaking the previous record set in 2015 by 11 million.

#### *10.2.2.1 National Oceanic and Atmospheric Administration Monthly Report August 2020*

According to the National Oceanic and Atmospheric Administration monthly Climate Report for August 2020, the years 2019, 2018, 2017, 2016, 2015, 2014, 2013, 2010, 2005 (tied) and 1998 are the hottest 10 years on record.

The report states the Northern Hemisphere had its warmest summer on record in 2020, surpassing both 2019 and 2016, which were previously tied for hottest. The months of June, July and August were 1.17 °C above the 20th-century average.

The report notes that the 2020 season has seen an exceptionally high number of named storms, reaching the letter V (Vicky) as of Monday 14 September. Vicky is the earliest 20th Atlantic named storm on record. The old record was set by Vince on October 9, 2005. The season lasts until 30 November.

#### *10.2.2.2 United in Science Report 2020*

The United in Science 2020 report, the second in a series, is coordinated by the World Meteorological Organization (WMO), with input from the Global Carbon Project, the Intergovernmental Panel on Climate Change, the Intergovernmental Oceanographic Commission of UNESCO, the UN Environment Programme and the UK Met Office. It presents the very latest scientific data and findings related to climate change to inform global policy and action. Key findings in the report include:

- Atmospheric $CO_2$ concentrations showed no signs of peaking and have continued to increase to new records. Benchmark stations in the WMO Global Atmosphere Watch (GAW) network reported $CO_2$ concentrations above 410 parts per million (ppm) during the first half of 2020.
- $CO_2$ emissions in 2020 will fall by an estimated 4% to 7% in 2020 due to COVID-19 confinement policies.
- During peak lockdown in early April 2020, the daily global fossil $CO_2$ emissions dropped by an unprecedented 17% compared to 2019.
- By early June 2020, global daily fossil $CO_2$ emissions had mostly returned to within 5% (1%–8% range) below 2019 levels, which reached a new record of 36.7 Gigatonnes (Gt) last year, 62% higher than at the start of climate change negotiations in 1990.
- The world is set to see its warmest five years on record and is not on track to meet agreed targets to keep global temperature increase well below 2 °C or at 1.5 °C above pre-industrial levels.

### 10.2.3 Local Climate

There are a total of 25 synoptic stations located throughout Ireland. These stations are operated by Met Éireann. The parameters measured and recorded at these stations include rainfall, temperature, wind speed and direction, relative humidity, solar radiation, clouds, atmospheric pressure, sunshine hours, evaporation, and visibility.

The nearest synoptic station to the proposed Shronowen development site is Shannon Airport. The climate of the proposed wind farm is best represented by data collected at this station. The average monthly precipitation, rainfall, and wind speeds for the 30-year period between 1981 and 2010 are summarised in **Table 10-2** below.

**Table 10-2 Shannon Airport 1981-2010 Averages**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Year |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TEMPERATURE (degrees Celsius)** | | | | | | | | | | | | | |
| mean temperature | 6 | 6.2 | 7.8 | 9.5 | 12 | 15 | 16 | 16 | 14 | 11.2 | 8.3 | 6.3 | 10.7 |
| **SUNSHINE (hours)** | | | | | | | | | | | | | |
| mean daily duration | 1.6 | 2.3 | 3.2 | 5.1 | 5.8 | 5.2 | 4.5 | 4.5 | 3.9 | 2.9 | 2 | 1.4 | 3.5 |
| **RAINFALL (mm)** | | | | | | | | | | | | | |
| mean monthly total | 102 | 76 | 79 | 59 | 65 | 70 | 66 | 82 | 76 | 105 | 94 | 104 | 978 |
| *Greatest Daily Total* | *38.2* | *29* | *28* | *40* | *25* | *41* | *40* | *51* | *52* | *36.9* | *27* | *41* | *52.3* |
| ***WIND (Knots)*** | | | | | | | | | | | | | |
| *Mean Monthly Speed* | *10.3* | *10* | *10* | *9* | *8.9* | *8.5* | *8.5* | *8.2* | *8.4* | *9.2* | *9.1* | *9.4* | *9.1* |
| *Max. Gust* | *75* | *80* | *65* | *62* | *59* | *51* | *52* | *55* | *62* | *71* | *66* | *83* | *83* |
| ***WEATHER (Mean No. Of Days With..)*** | | | | | | | | | | | | | |
| *Snow Or Sleet* | *2.3* | *2.3* | *1.4* | *0.5* | *0* | *0* | *0* | *0* | *0* | *0* | *0.1* | *1.3* | *8* |
| *Hail* | *3.6* | *3.3* | *3.4* | *2.2* | *1.2* | *0.1* | *0.1* | *0.1* | *0.3* | *0.9* | *1.1* | *2.4* | *18.6* |
| *Thunder* | *0.9* | *0.5* | *0.4* | *0.3* | *0.5* | *0.5* | *0.8* | *0.4* | *0.2* | *0.4* | *0.4* | *0.5* | *5.7* |
| *Fog* | *3.3* | *2* | *2.1* | *1.9* | *1.5* | *1.4* | *1.4* | *2* | *2.9* | *2.9* | *3.9* | *4.2* | *29.6* |

### *10.2.4 Do-nothing Scenario*

Should the proposed development not proceed the air quality and local climate are unlikely to change in the near future.

## 10.3 LIKELY SIGNIFICANT EFFECTS

### 10.3.1 Construction Phase

During the construction phase there will be emissions from vehicle exhausts. The movement of machinery, construction vehicles and the use of generators during the construction phase will generate exhaust fumes containing predominantly carbon dioxide ($CO_2$), sulphur dioxide ($SO_2$), nitrogen oxides ($NO_x$), carbon monoxide (CO), and particulate matter ($PM_{10}$).

There will be dust generated from moving and transporting soil and materials in and around the construction site and on public roads. Weather conditions will play an important role in the quantity of dust generated. The potential for fugitive dust emissions is greatest during periods of prolonged dry weather.

#### *10.3.1.1 Dust Emissions*

Using the NRA criteria listed in **Table 10-1**, the construction of the wind farm can be characterised as a moderate-sized construction site. Therefore, dust is unlikely to cause an impact at sensitive receptors beyond 50 m of the source, with standard mitigation measures in place. There is a minimum separation of 500 m between the nearest dwelling and major construction element, i.e. turbine foundation and hardstanding (refer to **Figure 10-2**), therefore dust is unlikely to be a significant impact at the nearest dwellings. Standard mitigation measures for dust prevention and control are presented in **Section 10.4**.

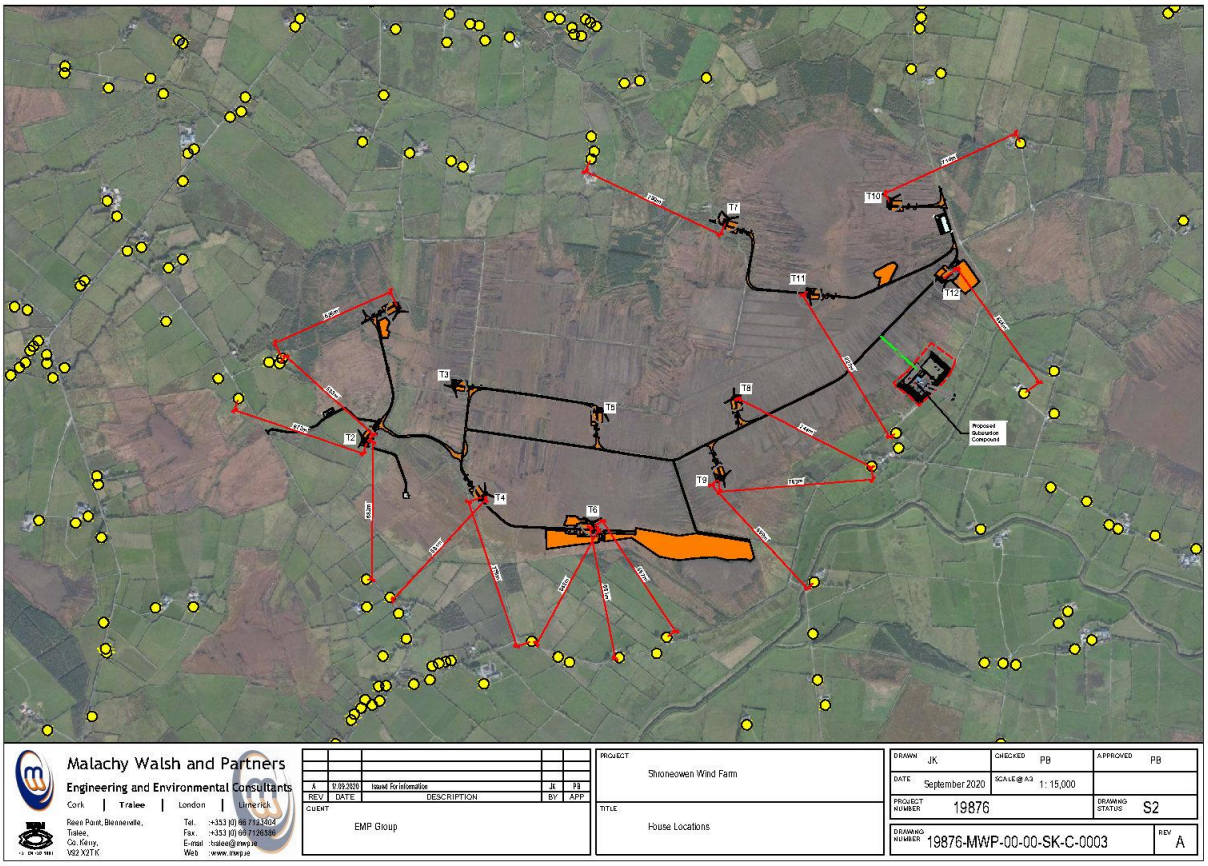


**Figure 10-2 Wind Farm Infrastructure and Nearest Dwellings**

#### *10.3.1.2 Vehicle Emissions*

Exhaust emissions from construction and delivery vehicles during construction are unlikely to have an adverse impact on local air quality and will not impact significantly on local, regional or national Air Quality Standards given the scale of plant and machinery involved, the high levels of dispersion, and the limited extent and duration of the works.

Overall, there will be no significant impact on air quality and climate at the dwellings in Figure 10-2 for the short-term duration of the construction phase.

#### *10.3.1.3 Operational Phase Air Quality*

Once operational, there will be no direct emissions to the atmosphere from the wind farm. The $CO_2$ offset by the wind farm will further assist Irelands $CO_2$ reduction commitments under the Paris Agreement and Ireland's Climate Action Plan 2019. The electricity generated will displace electricity from coal, oil and gas fired power plants, thus reducing emissions from these power plants.

In the context of this project contributing to the commitments in the Climate Action Plan, there will be a long-term significant positive effect on human health.

#### *10.3.1.4 Compatibility with Climate Policy and Targets*

In recognition of the need to limit global temperatures, the Paris Agreement came into existence in 2015. It follows on from the Kyoto Protocol with the intention of accelerating progress towards decarbonisation, climate resilient and sustainable societies. The primary aim of the Paris Agreement is to limit global temperature rise to well below 2 degrees Celsius.

Under the agreement Ireland has committed to renewable energy targets for 2020 including a target of 40% electricity to come from renewable sources. The Government's 2019 Climate Action Plan (CAP) highlights the fact that in 2017, 30.1% of electricity was produced from renewable sources and that rising demand for electricity will make meeting the 2020 target of 40% unlikely.

The Shronowen wind farm is aligned with current energy and climate policy, aims and objectives, which primarily seek to increase the production of electricity from renewable sources (refer to **Section 10.3.3.3**)

#### *10.3.1.5 2019 Climate Action Plan*

To help meet the required level of emissions reduction by 2030, the CAP sets a target of up to 8.2 Giga Watts (GW) total of onshore wind capacity. By its very nature, the proposed wind farm will contribute to achieving this target and move Ireland one step closer towards decarbonisation and ultimately a net zero GHG emissions society.

The proposed development is fully compatible with the provisions relating to renewable energy set out in the CAP, summarised as follows:

- The project will contribute directly to the CAP commitment that 70% of national electricity will come from renewable sources by 2030, up from 30%.
- The project will contribute directly towards meeting Ireland's renewable energy production targets by 2030 and 2040.
- The project will contribute directly to the specific objectives for onshore wind capacity in Ireland by 2025 and 2030.

- The project will contribute directly to the objectives of the CAP through the provision of grid connection infrastructure to support the renewable energy output.
- The technology to be used is recognised as a least cost technology by the CAP.

The project will lead to a reduction in greenhouse gas emissions by using a least cost technology recognised in the CAP.

#### *10.3.1.6 Carbon Savings and Losses from the Wind Farm*

Once operational, the electricity generated by the wind farm will displace electricity that would otherwise have been produced by burning fossil fuels. This will also displace the associated greenhouse gas emissions. However, there will be some carbon losses due to the manufacturing process of the wind turbines and the drainage and excavation of organic soil/ peat during the construction phase.

Bogs and peatlands thrive under waterlogged conditions. Under such anaerobic conditions, organic material does not readily decompose, therefore, the carbon content of the material remains in-situ. This is often referred to as a carbon sink.

The drainage and excavation of undisturbed peat will lead to the drying out and therefore decomposition of organic material and release of $CO_2$ into the atmosphere.

While there is peat across the site, it is not by definition a pristine fen or acid bog. The site is highly modified and has been drained to facilitate commercial forestry and agriculture. The hydrological regime across the site has already been significantly altered.

To demonstrate that the carbon savings will significantly outweigh any potential carbon losses a methodology made available by the Scottish Government in an excel worksheet titled *Calculating carbon savings from wind farms on Scottish peatlands* was applied to this development.

As mentioned earlier, this is an established methodology which has been approved by the Scottish government and Scottish Environmental Protection Agency (EPA). Submissions made by the developers using this tool are regularly audited by the Scottish EPA. In the absence of an Irish equivalent, it is considered appropriate to use this tool for the proposed development.

Early felling of forestry is required to facilitate the turbines and associated infrastructure, including the roads to facilitate access and the substation. These trees may be felled earlier than originally planned because of the Wind Farm. The carbon losses over the lifetime of the Wind Farm are calculated from the area to be felled and the average carbon that would have been sequestered annually. Any felled forestry will be replanted resulting in no net loss.

The theoretical worst case carbon losses due to the proposed Wind Farm are presented in **Table 10-3**. The results are theoretical worst case as the site is not an undisturbed acid or fen bog. Areas of the site are being harvested for peat. The actual results will be much lower than those calculated.

**Table 10-3 CO2 Losses due to Wind Farm**

| Source | $CO_2$ Losses (tonnes $CO_2$ equivalent) |
|---|---|
| **Losses due to turbine manufacture, construction & decommissioning** (loss due to energy required to manufacture, construct, and decommission the wind turbines) | 50450 |
| **Losses due to reduced plant fixation** (plants lost during excavation) | 1460 |
| **Losses from soil organic matter** (aerobic decomposition of organic matter) | 86764 |
| **Losses due to leaching** (leaching losses of dissolved and particulate organic C associated with movement of water through the soil) | 2309 |
| **Losses due to felling forestry** (losses to due the reduced fixing potential of the trees) | 1248 |
| **Total** | **142,231** |

The calculations show 142,231 tonnes of $CO_2$ equivalent losses over the wind farm's 30-year lifespan, with 50,450 tonnes $CO_2$ equivalent or 35% of the losses from the turbine life. The remainder accounts for 91,781 tonnes or 65% of the $CO_2$ equivalent losses. The early felling of the forestry accounts of 1,248 tonnes $CO_2$ equivalent losses or 1% of the total.

The calculation spreadsheet uses counterfactual emissions factors to calculate the payback period. There is no clear guidance on the appropriate emission factors to use in Ireland. A grid mix emission factor of 0.375 t CO2 MWh-1 sourced from the SEAI document *Energy Related $CO_2$ emissions in Ireland 2005 to 2018* was used as the counterfactual emissions factor. This resulted in a payback time of **1.8** years.

This is a long term moderate positive effect. It is consistent with emerging trends, reflecting a move away from fossil fuel generated electricity in favour of renewable electricity generation.

### 10.3.2 Decommissioning Phase

The scale of works involved during the decommissioning phase will primarily involve the dismantling and removal of the wind farm infrastructure off-site and the dust generating activities will be greatly reduced when compared to the construction phase. Similarly, emissions from plant and machinery exhausts will be lower than those anticipated for the construction phase. Where possible materials will be recovered and recycled, minimising the energy required for disposal.

### 10.3.3 Cumulative Effects

There will be no carbon dioxide or any other GHG emissions once the wind farm is operational, except for occasional operational and maintenance vehicles exhausts. This effect will be imperceptible. Therefore, there will be no measurable adverse cumulative effect with other developments (refer to **Chapter 1**).

There will be no significant cumulative impacts from the temporary construction phase on either air quality or climate.

Should this wind farm and other renewable electricity generation projects become operational, the combined beneficial cumulative effects will be greater than those described in this chapter. The tonnes of $CO_2$ emissions avoided and the improvement to air quality, especially in our towns and cities will be greatly enhanced. The potential cumulative impact with other renewable energy projects will be a long term significant positive effect on air quality and climate.

As there is no emission to atmosphere there will be no cumulative impact to air quality with ongoing forestry operations.

### 10.3.4 Risk of Major Accidents and Disasters

Given the temporary nature of the construction stage and the scale of the proposed project, as well as the environmental protection measures that will be implemented from the outset, the risk of disasters (typically considered to be natural catastrophes such as a very severe weather event) or accidents (fuel spill, traffic accident, peat slide) is considered low.

A review of the national flood hazard mapping website (www.floodmaps.ie) indicates there is no history of flooding in the site. Notwithstanding this, in the case of the occurrence of a severe weather event such as flooding during construction, construction work will cease.

Best construction practice including that for health and safety will be employed to minimise the risk of any accidents occurring. All work on site will be carried out in compliance with the ***Safety, Health and Welfare at Work Acts 2005 to 2014***, the Health and Safety (Construction) Regulations 2013, as amended and all relevant legislation and work practice to ensure that the construction areas, site environs and public roads remain safe for all users.

During the operational life of the wind farm, particularly in the context of climate change, there is the potential for increased storm events and severe weather. Wind turbines are designed for specific wind parameters and will shut down during high wind speed events. Therefore, the potential effects of climate change on the operational development may involve curtailment, where the turbines will be restricted from operation due to severe winds but does not present a likely risk of a major accident and disaster.

## 10.4 MITIGATION

### 10.4.1 Construction Phase

#### *10.4.1.1 Dust Generation*

Construction phase generated dust can be minimised by the following measures, which are also incorporated into the site-specific Construction and Environmental Management Plan.

- The use of water as a dust suppressant, a water bowser to spray access tracks and crane hardstanding areas during any extended dry periods when fugitive dust emissions could potentially arise;
- Public roads will be inspected regularly for cleanliness and cleaned as necessary;
- All loads entering and leaving the site will be covered during dry periods to prevent dust becoming a nuisance on site;
- Control of vehicle speeds passing over access roads and crane hardstanding areas within the site;
- Wheel wash facilities will be implemented at the site entrance from the public road to facilitate removal of any material collected by vehicles entering or leaving the site and preventing its deposition on public roads;
- Site stockpiling of materials will be designed and laid out to minimise exposure to wind;
- Daily site inspections will take place to examine dust measures and their effectiveness.

#### *10.4.1.2 Construction Traffic Emissions*

Construction traffic emissions will be reduced using the following measures:

- Ensure regular maintenance of plant and equipment. Carry out periodic technical inspection of vehicles to ensure they perform most efficiently;
- Implementation of the Traffic Management Plan (appended to this EIAR) to minimise congestion;
- All site vehicles and machinery will be switched off when not in use - no idling.

### 10.4.2 Operational Phase

The proposed wind farm will displace of 1,858,770 tonnes of $CO_2$ over its lifetime. This is a long-term beneficial effect. There will be a small amount of $CO_2$ emissions to atmosphere due to potential decomposition of organic material because of the drainage and excavation of peaty soil. As demonstrated through worst case calculations, this will be offset very quickly over the life of the wind farm. Any reduction in carbon sequestration because of the early felling of forestry to facilitate wind farm infrastructure will also be quickly off-set. Any trees felled will be re-planted in another location resulting in no net loss.

It is not expected that any negative impacts to the air or climate will occur during the operational phase, therefore no mitigation measures are required.

### 10.4.3 Decommissioning Phase

Impacts resulting from the decommissioning phase are expected to be similar in nature, but smaller in scale in comparison to the construction phase. Therefore, similar mitigation measures such as those related to dust and construction vehicles are recommended.

Turbine components will be removed at decommissioning stage however it is envisaged that access roads will remain in place. Hardstand and turbine foundation areas will be left in situ and covered with soil to match the existing landscape. As such, the decommissioning phase of the project will require minimal earthworks. The potential impacts associated with decommissioning will be like those associated with construction but of a reduced magnitude because extensive excavation and wet concrete handling will not be required. The impact of the development on land and soils at decommissioning phase is considered a slight negative long-term impact.

## 10.5 RESIDUAL IMPACTS

### 10.5.1 Construction Phase

| Potential Impact | Significance of Unmitigated Impact | Mitigation | Residual Impact |
|---|---|---|---|
| Deterioration in local air quality and dust nuisance at nearby residences. | Short term negligible to slight negative impact. | Refer to **Section 10.4.1** | No significant impact. |

### 10.5.2 Operational Phase

| Potential Impact | Significance of Unmitigated Impact | Mitigation | Residual Impact |
|---|---|---|---|
| Displacement of fossil fuel electricity and associated air pollutants and greenhouse gas emissions. | Long term significant beneficial effect on air quality and climate. | Not required | Long term significant beneficial effect on air quality and climate. |

## 10.6 CONCLUSION

The proposed wind farm project will facilitate decarbonisation objectives at local and national levels as set out in the 2019 National Climate Action Plan and the 2017 - 2023 without adverse impact to air quality or the climate.

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