

11. CLIMATE

11.1 Introduction

This chapter identifies, describes, and assesses the potential significant direct and indirect effects on climate arising from the construction, operation and decommissioning of the Proposed Development and has been completed in accordance with the EIA guidance and legislation set out in Chapter 1: Introduction. The full description of the Proposed Development is detailed in Chapter 4 of this EIAR.

The objective of this assessment is to assess the potential effects that the Proposed Development may have on Climate and sets out proposed mitigation measures to avoid, reduce or offset any potential significant effects that are identified.

The aim of the Proposed Development when in operation is to reduce the input of carbon intensive energy into the national grid and reduce the amount of greenhouse gas emissions being released to the atmosphere that are associated with electricity generation and use. Harnessing more energy by means of renewable sources will reduce dependency on fossil fuels, thereby resulting in a reduction in harmful emissions that can be damaging to human health and the environment.

11.1.1 Background

The Proposed Development site is located approximately 5.5km northeast of the village of Kilgarvan Co. Kerry, and approximately 6km west of Coolea, Co. Cork. It is proposed to access the wind farm site via the existing wind farm entrance off the N22 at Cloonkeen.

Current land use on the site comprises wind energy, as this project involves the Proposed Repowering of the Existing Kilgarvan Wind Farm. Other land uses on the site include low-intensity agriculture and small areas of coniferous forestry. Land use in the wider landscape of the site comprises a mix of agriculture, low density residential areas, commercial forestry and wind energy.

It is intended that the Proposed Development will connect into the national grid via the existing onsite Coomagearlahy 110kV substation. There are minor upgrades to the substation proposed as part of this application in order to ensure that the existing onsite 110kV Coomagearlahy substation is in compliance with current EirGrid specifications, which are detailed in Section 4.3.6 of Chapter 4. There will be no upgrade works or alterations to the existing overhead line which connects the existing onsite substation to Clonkeen 110kV substation.

11.1.2 Relevant Guidance

The Climate section of this EIAR is carried out in accordance with the 'EIA Directive' as amended by Directive 2014/52/EU and has been prepared in accordance with guidance listed in Section 1.6.2 of Chapter 1: Introduction. Due to the nature of the Proposed Development, a wind farm project, the following methodology and guidance was utilised for the climate section of this EIAR:

- 'Calculating Carbon Savings from Wind Farms on Scottish Peat Lands' (University of Aberdeen and the Macauley Institute 2008); and
- 'Wind Farms and Carbon Savings' (Scottish Natural Heritage, 2003).
- Macauley Institute Carbon Calculator for Wind Farms on Scottish Peatlands (Version 1.8.1) (2022)
- Transport Infrastructure Ireland (TII) Carbon Assessment Tool (Version 0.7.4) (TII, 2020)

Consideration has also been given to the ‘Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107’ (Transport Infrastructure Ireland, December 2022 (2022a)), Climate Assessment of Proposed National Roads – Standard and Overarching Technical Documentation (Transport Infrastructure Ireland December 2022b/c) and Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document, GE-ENV-01106 (TII 2022d).

11.1.3 Scoping and Consultation

The scope for this chapter of the EIAR has also been informed by consultation with statutory consultees, bodies with environmental responsibility and other interested parties. This consultation process and the List of Consultees is outlined in Section 2.6 of this EIAR. Matters raised by Consultees in their responses with respect to climate are summarised in Table 11-1 below.

Table 11-1 Summary of Climate Related Scoping Response

Consultee	Description	Addressed in Section
Transport Infrastructure Ireland (TII)	<p>TII recommends that the development include the following points relating to climate:</p> <ul style="list-style-type: none"> › The developer, in preparing EIAR, should have regard to TII’s Environmental Assessment and Construction Guidelines, including the ‘Guidelines for the Treatment of Air Quality During the Planning and Construction of National Road Schemes’ (National Roads Authority (NRA), 2006). 	<p>Section 11.1.2.</p> <p>Due to the interrelationship between air quality and climate consideration has also been given to Chapter 10 of this EIAR: Air Quality.</p>

11.2 Statement of Authority

This section of the EIAR has been prepared by Brodie Ní Thuathail and Catherine Johnson and reviewed by Ellen Costello, all of MKO. Brodie is a Graduate Environmental Scientist, having joined the company in September 2023. Brodie holds a BCL in Corporate Law and an MSc in Environmental Leadership from the University of Galway. Catherine is an Environmental Scientist and Climate Practitioner at MKO with over one year of consultancy experience in climate and sustainability. Prior to joining MKO in 2022, Catherine worked as an Environmental Social Governance (ESG) analyst for Acasta in Edinburgh. Catherine has expertise in international climate law and policy, earth science, and sustainability/ESG processes. Catherine has a BSc in Earth and Ocean Science and an LLM in Global Environment and Climate Change Law. Ellen is a Project Environmental Scientist and Climate Practitioner with over four years of consultancy experience with MKO and has been involved in a range of projects including climate and sustainability context reports for masterplans and commercial developments, renewable energy infrastructure projects, and the compilation of numerous chapters including the preparation of climate assessments for Environmental Impact Assessment Reports. Ellen holds a BSc. in Earth Science and a MSc. in Climate Change: Integrated Environmental and Social Science Aspects where she focused her studies on climate adaptation and mitigation, and its implications on environment and society.

11.3

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 the world today and is primarily the result of increased levels of greenhouse gases in the atmosphere. Increasing human emissions of carbon dioxide and other greenhouse gases cause a positive radiative imbalance at the top of the atmosphere, meaning energy is being trapped within the climate system. The imbalance leads to an accumulation of energy in the Earth system in the form of heat that is driving global warming.^{1,2} Greenhouse gases come primarily from the combustion of fossil fuels in energy use.

In March 2023 the European Environment Agency (EEA) published the European Climate Risk Assessment.³ This assessment states that Europe is the fastest warming continent on the planet and is warming at about the twice the global rate. The average global temperature in the 12-month period between February 2023 and January 2024 exceeding pre-industrial levels by 1.5°C. 2023 was the warmest year on record over more than 100,000 years globally, at 1.48°C above pre-industrial levels, with the world's ocean temperature also reaching new heights.

The Intergovernmental Panel on Climate Change (IPCC), in their AR6 Synthesis Report: Climate Change 2023⁴, state that widespread and rapid changes in the atmosphere, ocean, cryosphere and biosphere have occurred. This has led to widespread adverse impacts and related losses and damages to people and nature due to the pressures of climate change and the inability to 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 mitigate the human activity catalysing climate change.

11.3.1

International Greenhouse Gas Emission and Climate Targets

Globally, governance relating to climate change has changed significantly since 1994 when the United Nations Framework Convention on Climate Change (UNFCCC) entered into force. Greenhouse gas emissions have been a primary focus of climate related international agreements for almost two decades.

International greenhouse gas emission and climate targets play an important role in stimulating and enabling action for developed and developing nations. The following sections provide an overview of the international agreements that have played key roles in establishing climate governance.

11.3.1.1

Kyoto Protocol

The Kyoto Protocol was adopted on 11 December 1997; this Protocol operationalised the UNFCCC and was the first international agreement that committed countries to reduce their greenhouse gas emissions. It set limitations and reduction targets for greenhouse gases for developed countries (Annex I countries) and set a special obligation for certain countries to provide financial resources and facilitate technology transfer to developing countries (Annex II countries). The EU, and therefore Ireland, was both an Annex I and Annex II country.

¹ Hansen, J.; Sato, M.; Kharecha, P. et al. *Earth's Energy Imbalance and Implications. Atmospheric Chemistry and Physics* 2011, 11 (24), 13421–13449. <https://doi.org/10.5194/acp-11-13421-2011>

² von Schuckmann, K.; Palmer, M. D.; Trenberth, K. E. et al. *An Imperative to Monitor Earth's Energy Imbalance. Nature Climate Change* 2016, 6 (2), 138–144. <https://doi.org/10.1038/nclimate2876>.

³ European Environment Agency (2023) *European Climate Risk Assessment* <https://climate-adapt.eea.europa.eu/en/eu-adaptation-policy/key-eu-actions/climate_risk_assessment/index_html/>

⁴ IPCC AR6 Synthesis Report: *Climate Change 2023*. <https://www.ipcc.ch/report/sixth-assessment-report-cycle/>

The Kyoto Protocol came into effect in 2005, as a result of which, emission reduction targets agreed by developed countries, including Ireland, became binding for the first time.

Under the Kyoto Protocol, the EU agreed to achieve a significant reduction in total greenhouse gas emissions in the period 2008 to 2012. These EU emission targets are legally binding in Ireland. Ireland's contribution to the EU commitment for the period 2008 – 2012 (the first commitment period) was to limit its greenhouse gas emissions to no more than 13% above 1990 levels. Ireland achieved its Kyoto Protocol targets under the EU burden-sharing agreement.

11.3.1.1.1 **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;
 - The amendment entered into force on 31 December 2020
- › A revised list of greenhouse gases 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 greenhouse gases emissions to an average of 5% below 1990 levels. During the second commitment period, Parties committed to reduce greenhouse gases emissions by at least 18% below 1990 levels in the eight-year period from 2013 to 2020. The composition of Parties in the second commitment period is different from the first; however, Ireland and the EU signed up to both the first and second commitment periods. 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.

Although the 1997 Kyoto Protocol and 2012 Doha Amendment were in force in 2020, the 2015 Paris Agreement superseded the Kyoto Protocol as the principle regulatory instrument governing the global response to climate change.

11.3.1.2 **Conference of the Parties**

Every year since 1995, the Conference of the Parties (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, and is the supreme decision-making body of the UNFCCC.

The following details the most significant COPs in terms of impact on climate action as well as a summary of the most recent COP, COP28, which took place in Dubai.

11.3.1.2.1 **COP21 Paris Agreement**

COP21 was the 21st session of the COP to the UNFCCC. 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.

11.3.1.2.2 COP25 Climate Change Conference- Madrid

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 CO₂ 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.

11.3.1.2.3 COP28 Climate Change Conference – Dubai

The 28th COP for the UNFCCC (COP28) took place in Dubai from the 30th of November 2023 to the 13th of December 2023.

COP28 resulted in a landmark deal to ‘transition away’ from fossil fuels, the UAE Consensus. The agreement calls for ‘transitioning away from fossil fuels in energy systems, in a just, orderly, and equitable manner.’ This is the first time in 28 years that fossil fuels have been mentioned in a COP outcome. However, it is noted that the text of ‘phase out as soon as possible inefficient fossil fuel subsidies’ does not address energy poverty or the just transition. The UAE Consensus also calls for more explicit near-term goals in the lead up to 2050, calling for the world to cut greenhouse gas emissions by 43% by 2030 as compared to 2019 levels. However, many island states have criticised that despite the text being an improvement over previous agreements, there is a litany of loopholes that will enable destructive environmental practices to continue and do not assuage their concerns over rising sea levels and other climate change impacts.

COP28 concluded the first ever Global Stocktake under the Paris Agreement. The Global Stocktake recognises that the world is not on track to meet 1.5°C and will require Parties to align their national targets and measures with the Paris Agreement. Parties have two years to submit their Nationally Determined Contributions for 2035, these need to be aligned with the best available science and the outcomes of the Global Stocktake.

An unusual aspect that came out of COP28 in the final hours of discussion was the number of decisions and documents which remain unfinished and not signed off. Notably, discussions on carbon markets collapsed in the final days of COP28 as no consensus could be reached on the country-to-country trading regimes or rules for the market in relation to Article 6 of the Paris Agreement. Negotiations will be continued at COP29 in Azerbaijan.

11.3.1.3 United Nations Sustainable Development Goals Report 2023

Transforming our World: the 2030 Agenda for Sustainable Development which includes 17 Sustainable Development Goals (SDGs), and 169 targets was adopted by all UN Member States at a UN summit held in New York in 2015. The agenda is universally applicable with all countries having a shared responsibility to achieve the goals and targets which came into effect on January 1st, 2016. The goals and targets are to be actions over the 15-year period, are integrated and indivisible i.e., all must be implemented together by each Member State. On 10th July 2023, the United Nations published ‘The

*Sustainable Development Goals Report 2023*⁵, highlighting that the lasting impacts of the COVID-19 pandemic, the war in Ukraine and subsequent refugee crisis, and the increasing consequences of the climate crisis have hindered the achievement of the SDGs. The report stipulates that due to these unprecedented events, the world is falling short of meeting most of the SDGs by 2030, especially in terms of climate action. An assessment of the around 140 targets for which trend data is available shows that about half of these targets are moderately or severely off track; and over 30% have either seen no movement or regressed below the 2015 baseline.

The Sustainable Development Goals National Implementation Plan 2022-2024 ('the SDG Plan')⁶ was published by the Department of Communications, Climate Action & Environment in partnerships with all Government Departments, key stakeholders, and based on input from two public consultation processes. The SDG Plan identifies that, overall, the world is not on track to achieve the global Goals by 2030. The SDG Plan sets out how Ireland will work to achieve the goals and targets of the Agenda for Sustainable Development both domestically and internationally. Ireland's first National Implementation Plan provided a framework for Ireland to work towards the implementation of the SDGs; the new Implementation Plan aims to build on the structures and mechanisms from the first Plan and to develop and integrate additional approaches in areas identified as requiring further action.

In September 2023, the UN Summit on the SDGs took place in New York and was co-facilitated by Ireland and Qatar. Representing the halfway mark to achieving the SDGs by 2030, it marked the beginning of a new phase of accelerated progress towards the SDGs with high-level political guidance on transformative and accelerated actions. The Global Sustainable Development Report 2023⁷ was published in September 2023. The previous Global Sustainable Development Report (2019)⁸ found that for some targets the global community was on track, but for many others the world would need to quicken the pace. In 2023, the situation is much more worrisome owing to slow implementation and a confluence of crises. The 2023 Report goes on to highlight the current standing of each SDG and its relevant indicators. A 2023 UN Special Report⁹ found that over 30% of the SDGs have seen either no improvement or reverse trends in progress. The push for transformation to achieve the SDGs will come by through shifts in six key entry points:

1. *Human Well Being and Capabilities*
2. *Sustainable and Just Economies*
3. *Food Systems and Healthy Nutrition*
4. *Energy Decarbonisation with Universal Access*
5. *Urban and Peri-Urban Development*
6. *Global Environmental Commons*

The Proposed Development will contribute to Entry Point 4 due to the clean and renewable energy it will provide over its operational life. The phase out of fossil fuels in a manner that is globally and domestically just, while strengthening the transition to renewables by increasing energy efficiency and encouraging behavioural change will be key to achieving the relevant SDGs to the Proposed Development.

Relevant SDGs to the Proposed Development and how they are implemented into Irish National plans and policies can be found in Table 11-2.

⁵ *The Sustainable Development Goals Special Report (2023)* <https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf>

⁶ *National Implementation Plan for the Sustainable Development Goals 2022-2024*. Available at: <https://www.gov.ie/en/publication/e950f-national-implementation-plan-for-the-sustainable-development-goals-2022-2024/>

⁷ *Global Sustainable Development Report 2023* https://sdgs.un.org/sites/default/files/2023-09/FINAL%20GSDR%202023-Digital%20-110923_1.pdf

⁸ *Global Sustainable Development Report 2019* https://sdgs.un.org/sites/default/files/2020-07/24797GSDR_report_2019.pdf

⁹ *The Sustainable Development Goals Report 2023: Special Edition* <https://unstats.un.org/sdgs/report/2023/The-Sustainable-Development-Goals-Report-2023.pdf>

Table 11-2 Sustainable Development Goals Report 2023, Relevant SDGs to the Proposed Development, and Implementation into Irish National Plans

SDG	Targets	International Progress/ downfalls to Date (2023) ¹⁰	National Relevant Policy
SDG 7 Affordable and Clean Energy: <i>Ensure access to affordable, reliable, sustainable and modern energy for all</i>	<ul style="list-style-type: none"> ➤ By 2030, ensure universal access to affordable, reliable and modern energy services ➤ By 2030, increase substantially the share of renewable energy in the global energy mix ➤ By 2030, double the global rate of improvement in energy efficiency ➤ By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology ➤ By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support 	<p>The war in Ukraine and global economic uncertainty continue to cause significant volatility in energy prices, leading some countries to raise investments in renewables and others to increase reliance on coal, putting the green transition at risk.</p> <p>The share of renewable sources in total final energy consumption amounted to 19.1% globally in 2020, or 2.4 percentage points higher than in 2015. Part of this progression is due to lower final energy demand in 2020, as the pandemic disrupted social and economic activities worldwide. The electricity sector shows the largest share of renewables in total final energy consumption (28.2% in 2020) and has driven most of the growth in renewable energy use, while the heat and transport sectors have seen limited progress over the past decade.</p> <p>The rate of improvement in primary energy intensity, which had already slowed in recent years, dropped to 0.6% in 2020. This makes it the worst year for energy intensity improvement since the global financial crisis. This slowdown was influenced by a shift in the economic structure during Covid towards more energy-intensive industrial production, combined with only modest rates of technical efficiency improvements, in the context of low energy prices.</p>	<p><i>Ireland's Transition to a Low Carbon Energy Future 2015-2030;</i> <i>Energy Poverty Action Plan;</i> <i>Ireland's Transition to a Low Carbon Energy Future 2015- 2030;</i> <i>National Mitigation Plan;</i> <i>National Energy Efficiency Action Plan;</i> <i>One World, One Future;</i> <i>The Global Island Economic Recovery Plan</i> <i>Project Ireland 2040: National Planning Framework;</i> <i>Project 2040;</i> <i>National Development Plan 2021-2030;</i> <i>Climate Action Plan 2024</i></p>

¹⁰ United Nations, the 17 Goals – Sustainable Development <<https://sdgs.un.org/goals>>

SDG	Targets	International Progress/ downfalls to Date (2023) ¹⁰	National Relevant Policy
SDG 9: Industry, Innovation, and Infrastructure <i>Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation</i>	<ul style="list-style-type: none"> › Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all. › Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry’s share of employment and gross domestic product, in line with national circumstances, and double its share in least developed countries › Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities 	<p>The manufacturing industry’s recovery from COVID-19 remains incomplete and uneven: some high-income regions achieved record-high manufacturing value added per capita in 2022 but levels in least developed countries were not much higher than the 2015 baseline.</p> <p>Global carbon dioxide (CO2) emissions from energy combustion and industrial processes grew by 0.9% in 2022 to a new all-time high of 36.8 billion tonnes. Emissions shrank by more than 5% in 2020, but rebounded past pre – pandemic levels in 2021, growing more than 6% in tandem with economic stimulus and a surge in coal demand even as renewables capacity additions scaled record heights. CO2 growth in 2022 was well below GDP growth of 3.2%.</p>	<p><i>National Development Plan 2021-2030;</i> <i>National Economic Recovery Plan;</i> <i>Climate Action Plan 2024;</i> <i>National Implementation Plan on Persistent Organic Pollutants;</i> <i>Waste Action Plan for a Circular Economy;</i> <i>National Waste Prevention Programme;</i> <i>A Better World</i></p>
SDG 11: Sustainable Cities and Communities <i>Make cities and human settlements inclusive, safe, resilient and sustainable</i>	<ul style="list-style-type: none"> › By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums › By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons 	<p>Climate change, the Covid-19 pandemic, and conflicts tend to have a disproportionate impact on cities. These factors mean that the world is far from achieving the goal of sustainable cities. In many developing countries, slum populations have been growing, putting at risk the target of adequate housing for all by 2030. Since 2015, the number of countries with national disaster risk reduction strategies has more than doubled.</p> <p>According to 2022 data from 1,507 cities in 126 countries, only 51.6% of the world’s urban population has convenient access to public transport, with considerable variations across regions.</p>	<p><i>Rebuilding Ireland Action Plan for Housing and Homelessness;</i> <i>Housing for All;</i> <i>EU Regulation 1370/2007 on Public Passenger Transport Services by Rail and by Road;</i> <i>Project Ireland 2040</i></p>

SDG	Targets	International Progress/ downfalls to Date (2023) ¹⁰	National Relevant Policy
	<ul style="list-style-type: none"> › Strengthen efforts to protect and safeguard the world’s cultural and natural heritage › By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management › By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement holistic disaster risk management at all levels 	<p>Data for 2020 from 1,072 cities in 120 countries indicate that more than three-quarters of these cities have less than 20% of their area dedicated to open public spaces and streets, about half of the proportion recommended.</p> <p>By the end of 2022, 102 countries reported having local governments with disaster risk reduction strategies, an increase from 51 countries in 2015.</p>	<p><i>National Planning Framework;</i> <i>National Clean Air Strategy;</i> <i>Rural Development Programme 2014-2022;</i> <i>National Implementation Plan on Persistent Organic Pollutants;</i> <i>Waste Action Plan for a Circular Economy;</i> <i>National Waste Prevention Programme;</i> <i>A Better World</i></p>
<p>SDG 12 Responsible Consumption and production: <i>Ensure sustainable consumption and production patterns.</i></p>	<ul style="list-style-type: none"> › By 2030, achieve the sustainable management and efficient use of natural resources. › By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment › Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle 	<p>Unsustainable patterns of consumption and production are the root cause of the triple planetary crisis:</p> <ul style="list-style-type: none"> 7. <i>Climate Change</i> 8. <i>Biodiversity Loss</i> 9. <i>Pollution</i> <p>The world is seriously off track in its effort to halve per-capita food waste and losses by 2030. The COVID-19 pandemic has had significant impacts on consumption and production patterns, with disruptions to global supply chains and changes in consumer behaviour. Responsible consumption and production must be an integral part of the recovery from the pandemic. But the global economy also needs to speed up the decoupling of economic growth from resource use by maximizing the</p>	<p><i>National Implementation Plan on Persistent Organic Pollutants;</i> <i>Waste Action Plan for a Circular Economy;</i> <i>National Waste Prevention Programme;</i> <i>Climate Action Plan 2024</i> <i>Tourism Action Plan;</i> <i>National Clean Air Strategy;</i> <i>Towards Responsible Business: Ireland’s</i></p>

SDG	Targets	International Progress/ downfalls to Date (2023) ¹⁰	National Relevant Policy
	<ul style="list-style-type: none"> ➤ Promote public procurement practices that are sustainable, in accordance with national policies and priorities. ➤ Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products 	<p>socio-economic benefits of resources while minimizing their negative impacts. Reporting on corporate sustainability has tripled since the beginning of the SDG period, but the private sector will need to significantly improve reporting on activities that contribute to the SDGs.</p> <p>Global data showed a rise in fossil fuel subsidies in 2021, after a brief fall in 2020 which was largely caused by a drop in energy prices. In 2021, Governments spent an estimated \$732 billion on subsidies to coal, oil, and gas, against \$375 billion in 2020. This brings the subsidies back to pre-2015 levels. High oil and gas prices in 2022 will likely bring a new increase, as subsidies are often linked to the price of energy.</p>	<p><i>Second National Plan on Corporate Social Responsibility (CSR) 2017-2020;</i> <i>Sustainable, Inclusive and Empowered Communities 2019-2024;</i> <i>Climate Action Plan 2024</i></p>
<p>SDG 13 Climate Action: <i>Take urgent action to combat climate change and its impacts*</i></p> <p><i>*Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.</i></p>	<ul style="list-style-type: none"> ➤ 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 ➤ Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning 	<p>The world is on the brink of a climate catastrophe and current actions and plans to address the crisis are insufficient. Without transformative action starting now and within this decade to reduce greenhouse gas emissions deeply and rapidly in all sectors, the 1.5°C target will be at risk and with it the lives of more than 3 billion people. Failure to act leads to intensifying heatwaves, droughts, flooding, wildfires, sea-level rise, and famines. Emissions should already be decreasing now and will need to be cut almost by half by 2030 - a mere seven years from now.</p> <p>Global temperatures have already hit 1.1°C, rising due to increasing global greenhouse gas emissions, which reached record highs in 2021. Real-time data from 2022 show emissions continuing an upward trajectory. Instead of decreasing emissions as required by the target to limit warming, carbon dioxide levels increased from 2020 to 2021 at a rate higher than the average annual growth rate of the last decade and is already 149% higher than pre-industrial levels. Projected cumulative future CO2 emissions over the lifetime of existing and currently planned fossil fuel infrastructure exceed the total cumulative net CO2 emissions</p>	<p><i>National Adaptation Framework;</i> <i>Building on Recovery: Infrastructure and Capital Investment 2016-2021;</i> <i>National Mitigation Plan;</i> <i>National Biodiversity Action Plan 2017-2021;</i> <i>National Policy Position on Climate Action and Low Carbon Development;</i> <i>Project 2040: National Development Plan 2021-2030;</i> <i>Climate Action Plan 2024;</i></p>



SDG	Targets	International Progress/ downfalls to Date (2023) ¹⁰	National Relevant Policy
		in pathways that limit warming to 1.5°C (>50%) with no or limited overshoot.	<i>National Dialogue on Climate Action; Agriculture, Forest, and Seafood Climate Change Sectoral Adaptation Plan; The National Strategy on Education for Sustainable Development in Ireland</i>

11.3.1.4 Climate Change Performance Index 2024

Established in 2005, the Climate Change Performance Index (CCPI)¹¹ 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 and ranks their performance in each category and overall. The 2024 CCPI was published in December 2023. While the CCPI 2024 indicates 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 37th in 2023, has fallen 6 places to 43rd for 2024, and remains as a “low” performer in international performance. The CCPI states that Ireland’s policies are missing a long-term strategy for phasing out fossil fuel infrastructure and shifting investments from natural gas towards an emissions-neutral energy supply. Rebound effects from economic growth in emissions-intensive sectors (such as agriculture and land use) cause absolute emissions to remain high. The chance to integrate clear sanctions into the framework has so far been missed.

However, the CCPI experts welcome Ireland’s medium-term offshore wind and solar plans. The country’s offshore wind offers considerable opportunities for capitalising on renewable energy and (over the long term) potential for electricity export.

Ireland has moved to the ‘low’ category in 2024 from the ‘very low’ category in 2023 on the Greenhouse Gas Emissions ratings despite falling to 54th in 2024 in the world from 47th in 2023. Ireland remains in the ‘Medium’ category in the Renewable Energy rating table; however, Ireland has fallen from 23rd in 2023 to 31st in 2024.

11.3.1.5 State of the Global Climate 2023

In March 2023, the World Meteorological Organisation (WMO) published a report entitled the ‘*State of the Global Climate 2023*’.¹² This report provided a summary on the state of the climate indicators in 2023 with sections on key climate indicators, extreme events and impacts. The key messages in the report include:

- › 2023 was the warmest year on record at 1.45 ± 0.12 °C above the pre-industrial average.
- › Concentrations of the three main greenhouse gases – carbon dioxide, methane, and nitrous oxide – reached record high observed levels.

The State of the Global Climate report goes on to state that renewable energy generation, primarily driven by the dynamic forces of solar radiation, wind and the water cycle, has surged to the forefront of climate action for its potential to achieve decarbonization targets. There has been a substantial worldwide energy transition, with renewable capacity additions increasing by nearly 50% from 2022, totalling 510 gigawatts (GW).¹³ This growth represents the highest rate observed in the past two decades, signalling a significant momentum toward achieving the clean energy goal set at COP28 meeting in 2023 to triple renewable energy capacity globally to 11,000 GW by 2030.

Alterations in the physical climate can trigger a series of repercussions on national advancement and the pursuit of SDGs (Section 11.3.1.3 above). The interconnections between the climate emergency and development pathways can foster synergistic endeavours, resulting in positive benefits for communities and human well-being (refer to Chapter 5 of this EIAR for more details). This synergy serves as a

¹¹ Climate Change Performance Index 2024 <<https://ccpi.org/>>

¹² WMO (2024) State of the Global Climate 2023 <<https://library.wmo.int/records/item/68835-state-of-the-global-climate-2023>>

¹³ IEA (2024), Renewables 2023, IEA, Paris <<https://www.iea.org/reports/renewables-2023>>

potent driver for adapt to climate change and lay the groundwork for the global energy transition. Emphasizing wind energy and other renewable sources enables the global energy transition towards sustainability.

11.3.2 National Greenhouse Gas Emission and Climate Targets

11.3.2.1 Programme for Government

The Programme for Government – Our Shared Future (‘Programme for Government’)¹⁴ 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”

11.3.2.2 Climate Action and Low Carbon Development (Amendment) Act 2021

The Climate Action and Low Carbon (Amendment) Act 2021 (the ‘2021 Act’) is a piece of legislation which commits the country to move to a climate resilient and climate neutral economy by 2050. This 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 achieve net zero emissions by 2050. This Act will manage the implementation of a suite of policies to assist in achieving these annual targets.

The Act 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 (CCAC) should equate to a total reduction of 51% emissions over the period to 2030, in line with the Programme for Government commitment.

¹⁴ Programme for Government – Our Shared Future. <https://assets.gov.ie/130911/fe93e24e-dfe0-40ff-9934-de2b44b7b52.pdf>

11.3.2.3 Climate Change Advisory Council 2023

The CCAC was established on 18th January 2016 under the Climate Action and Low Carbon Development Act 2015. The CCAC aims to provide independent evidence-based advice and recommendations on policy to support Ireland’s Just Transition to a biodiversity-rich, environmentally sustainable, climate-neutral, and resilient society.

The Annual Review 2023¹⁵ is the seventh annual review carried out by CCAC and details the CCAC concerns that the necessary national actions are not taking place or being enabled at the required speed, going on to state that ‘at the current rate of policy implementation, Ireland will not meet the targets set in the first and second carbon budget periods unless urgent action is taken immediately, and emissions begin to fall much more rapidly.’

11.3.2.4 Carbon Budgets

The first national carbon budget programme proposed by the CCAC, approved by Government and adopted by both Houses of the Oireachtas in April 2022 comprises three successive 5-year carbon budgets. The total emissions allowed under each budget are shown in Table 11-3.

Table 11-3 Proposed Carbon Budgets of the Climate Change Advisory Council

	2021 – 2025 Carbon Budget 1	2026 – 2030 Carbon Budget 2	2031 – 2035 Provisional Carbon Budget 3
	All Gases		
Carbon Budget (Mt CO ₂ eq)	295	200	151
Annual Average Percentage Change in Emissions	-4.8%	-8.3%	-3.5%
The figures are consistent with emissions in 2018 of 68.3 Mt CO ₂ eq reducing to 33.5 Mt CO ₂ eq in 2030 thus allowing compliance with the 51% emissions reduction target by 2030			

Ireland has expended 47% of its emissions for the first carbon budget period in the budget first two years. Thus, only 53% is leftover, requiring a 12.4% reduction in emissions each year to stay in budget.

11.3.2.5 Sectoral Emissions Ceilings

The Sectoral Emissions Ceilings (SEC) were launched in September 2022. The objective of the initiative is to inform on the total amount of permitted greenhouse gas emissions that each sector of the Irish economy can produce during a specific time period. The SEC, alongside the annual published Climate Action Plan, provide a detailed plan for taking decisive action to achieve a 51% reduction in overall greenhouse gas emissions by 2030.

Section C of the Climate Action and Low Carbon Development (Amendment) Act 2021 provides the minister with a method of preparing the SEC within the bounds of the carbon budget. The SEC for each 5-year carbon budget period were approved by the government on the 28th of July 2022 and are shown in Table 11-4 below.

¹⁵ Climate Change Advisory Council 2023 Review

<https://www.climatecouncil.ie/councilpublications/annualreviewandreport/CCAC-AR-2023-FINAL%20Compressed%20web.pdf>

Table 11-4 Sectoral Emission Ceilings 2022

Sector	Sectoral Emission Ceilings for each 5-year carbon budget period (MtCO ₂ eq.)	
	2021 – 2025 Carbon Budget 1	2026 – 2030 Carbon Budget 2
Electricity	40	20
Transport	54	37
Built Environment- Residential	29	23
Built Environment- Commercial	7	5
Industry	30	24
Agriculture	106	96
LULUCF ¹	Yet to be determined	Yet to be determined
Other (F-Gases, Waste & Petroleum refining)	9	8
<i>Unallocated Savings</i>		-26
Total ²	Yet to be determined	Yet to be determined
Legally binding Carbon budgets and 2030 Emission Reduction Targets	295	200

¹ Finalising the Sectoral Emissions Ceiling for the land-use, Land-use Change and Forestry (LULUCF) sector has been deferred for up to 18 months to allow for the completion of the Land-use Strategy

² Once LULUCF sector figures are finalised, total figures will be available.

The electricity sector is the third largest emitting sector in Ireland and the successful decarbonisation of this sector could lead to decarbonisation in other sectors, such as the electrification of transport and heating. The CCAC Annual 2023 Review states that the electricity sector has been set one of the smallest SEC and the steepest decline in emissions of all sectors with emission ceilings of 40MtCO₂eq for the first carbon budget period (2021–2025) and 20MtCO₂eq for the second carbon budget period (2026–2030) (further detailed in Section 11.3.2.3 and Section 11.3.2.4 above). This equates to a headline target of a 75% reduction in emissions in the sector from 2018 levels by 2030, which will be achieved by increasing the share of renewable electricity to 80%, encompassing 9GW of onshore wind capacity, at least 5GW of offshore wind capacity, with 2 GW earmarked for green hydrogen production, and 8GW of solar photovoltaic capacity, supported by a range of actions set out in the Climate Action Plan 2024 (CAP 24).

11.3.2.6 Climate Action Plan 2024

CAP 2024¹⁶ was launched in December 2023. Following on from Climate Action Plans 2019, 2021, and 2023, CAP 2024 sets out the roadmap to deliver on Ireland’s climate ambition. It aligns with the legally

¹⁶ Department of the Environment, Climate and Communications (2023) Climate Action Plan 2024. Available at: <https://www.gov.ie/en/publication/79659-climate-action-plan-2024/#new-approach-to-the-2024-annex-of-actions>

binding economy-wide carbon budgets and sectoral ceilings that were agreed by Government in July 2022 following the Climate Action and Low Carbon Development (Amendment) Act 2021, which commits Ireland to a *legally binding target of net-zero greenhouse gas emissions no later than 2050, and a reduction of 51% by 2030*. CAP 2024 seeks to build on the progress made under Climate Action Plan 2023 by delivering policies, measurements and actions that will support the achievement of Ireland's carbon budgets, SECs, and 2030 and 2050 climate targets.

Six Vital High Impact Sectors were identified within Climate Action Plan 2023¹⁷ relating to the SEC (Section 11.3.2.5 above). CAP 2024 provides a more detailed breakdown of these Six Vital High Impact Sectors as many sectors have since developed their own independent, but complimentary, analytical approaches to emissions reductions. These sectors and their associated targets, as stated in Climate Action Plan 2023, are detailed below.

Powering Renewables – 75% Reduction in emissions by 2030

The CAP notes in the Irish context that:

“We will facilitate a large-scale deployment of renewables that will be critical to decarbonising the power sector as well as enabling the electrification of other technologies.

- › *Accelerate the delivery of onshore wind, offshore wind, and solar.*
- › *Dial up to 9 GW onshore wind, 8 GW solar, and at least 7 GW of offshore wind by 2030 (with 2 GW earmarked for green hydrogen production).*
- › *Support at least 500 MW of local community-based renewable energy projects and increased levels of new micro-generation and small-scale generation.*
- › *Phase out and end the use of coal and peat in electricity generation.*
- › *New, dynamic Green Electricity Tariff will be developed by 2025 to incentivise people to use lower cost renewable electricity at times of high wind and solar generation.*

Achievement of the 75% reduction in emissions by 2030 and the decarbonisation of the grid in Ireland would assist in the achievement of the Electricity sectoral emission ceiling.”

Building Better – 45% (Commercial/Public) and 40% (Residential) Reduction in Emissions by 2030

The CAP notes in the Irish context that:

“We will increase the energy efficiency of existing buildings, put in place policies to deliver zero-emissions new builds, and continue to ramp up our retrofitting programme.

- › *Ramp up retrofitting to 120,000 dwellings to BER B2 by 2025, jumping to 500,000 by 2030.*
- › *Put heat pumps into 45,000 existing and 170,000 new dwellings by 2025, up to 400,000 existing and 280,000 new dwellings by 2030.*
- › *Generation up to 0.8 TWh of district heating by 2025 and up to 2.5 TWh by 2030.*

Achievement of the 45% (Commercial/Public) and 40% (Residential) reduction in emissions by 2030 would assist in the achievement of the Built Environment (Commercial/Residential) sectoral emission ceiling.”

¹⁷ Department of the Environment, Climate and Communications (2022) Climate Action Plan 2023 – Summary Document

Turning Transport Around – 50% Reduction in Emissions by 2030

The CAP notes in the Irish context that:

“We will drive policies to reduce transport emissions by improving our town, cities, and rural planning, and by adopting the Avoid-Shift-Improve approach: reducing or avoiding the need for travel, shifting to public transport, walking, and cycling and improving the energy efficiency of vehicles.

- › *Change the way we use our road space.*
- › *Reduce the total distance driven across all car journeys by 20%.*
- › *Walking, cycling and public transport to account for 50% of our journeys.*
- › *Nearly 1 in 3 private cars will be an Electric Vehicle.*
- › *Increase walking and cycling networks.*
- › *70% of people in rural Ireland will have buses that provide at least 3 trips to the nearby town daily by 2030.*

Achievement of the 50% reduction in emissions relating to transport by 2030 would assist in the achievement of the Transport sectoral emission ceiling.”

Making Family Farms More Sustainable – 25% Reduction in Emissions by 2030

The CAP notes in the Irish context that:

“We will support farmers to continue to produce world class, safe and nutritious food while also seeking to diversify income through tillage, energy generation and forestry.

- › *Significantly reduce our use of chemical nitrogen as a fertilizer.*
- › *Increase uptake of protected urea on grassland farms to 90-100%.*
- › *Increase organic farming to up to 450,000 hectares, the area of tillage to up to 400,000 ha.*
- › *Expand the indigenous biomethane sector through anaerobic digestion, reaching up to 5.7TWh of biomethane.*
- › *Contribute to delivery of the land use targets for afforestation and reduced management intensity of organic soils.*

Achievement of a 25% reduction in emissions by 2030 in agriculture and farming practices would assist in the achievement of the Agriculture sectoral emission ceiling.”

Greening Business and Enterprise – 35% Reduction in Emissions by 2030

The CAP notes in the Irish context that:

“We’re changing how we produce, consume, and design our goods and services by breaking the link between fossil fuels and economic progress. Decarbonising industry and enterprise are key to Ireland’s economy and future competitiveness.

- › *Reduce clinker content in cement and substitute products with lower carbon content for construction materials, ensuring 35% reduction in emissions by 2030 (against 2018).*
- › *Reduce fossil fuel use from 64% of final consumption (2021) to 45% by 2025 and further by 2030.*
- › *Increase total share of heating to carbon neutral to 50-55% by 2025, up to 70-75% by 2030.*
- › *Significantly grow the circular economy and bioeconomy.*

Achievement of a 35% reduction in emissions by 2030 in relation to Irish production and consumption would enable a more circular economy and assist in the achievement of the Industry and Other sectoral emission ceilings.”

Changing our land use

The CAP notes in the Irish context that:

The first phase of the land use review will tell us how we are using our land now. Then, we can map, with evidence, how it can be used most effectively to capture and store carbon and to produce better, greener food and energy.

- › *Increase our annual afforestation rates to 8,000 hectares per annum from 2023 onwards.*
- › *Rethink our Forestry Programme and Vision.*
- › *Promote forest management initiatives in both public and private forests to increase carbon sinks and stores.*
- › *Improve carbon sequestration of 450,000 ha of grasslands on mineral soils and reduce the management intensity of grasslands on 80,000 ha of drained organic soils.*
- › *Rehabilitate 77,600 hectares of peatlands.*

By improving the manner in which Ireland utilises its land use, Ireland can achieve emission reductions and mitigate the ongoing climate and biodiversity crisis’s. The LULUCF sectoral emission ceiling will be set after completion of the Land-use Strategy. Exact reduction target for this sector is yet to be determined.”

Adaptation

CAP 2024 highlights the need for adaptation to climate change. Adaptation is the process of adjustment to actual or expected climate change and its effects. Observations show that Irelands climate is changing in terms of coastline, sea level rise, seasonal temperatures, and changes in typical weather patterns. Climate change is expected to have diverse and wide-ranging impacts on Ireland’s environment, society, and economic development, including managed and natural ecosystems, water resources, agriculture and food security, the built environment, human health, and coastal zones.

Climate Sectoral Adaptation Planning¹⁸ includes for 12 sectoral adaptation plans that describe and assess the extent of the risks presented by climate change to a sector, and present contingency plans to address these risks and ensure climate resilience. They include actions to mainstream adaptation into policy and administration at sectoral level to improve the resilience of existing and planned critical infrastructure, systems, and procedures, to the effects and variability of climate change, as well as to improve cooperation and coherence within and across sectors, as well as on a local and national level.

11.3.2.7 Irelands Climate Change Assessment

In 2023 the EPA published Irelands Climate Change Assessment (ICCA).¹⁹ This assessment provides a comprehensive overview and breakdown of the state of knowledge around key aspects of climate change with a focus on Ireland. The ICCA report is presented in four volumes.

- › Volume 1: Climate Science – Ireland in a Changing World
- › Volume 2: Achieving Climate Neutrality in 2050

¹⁸ Department of the Environment, Climate and Communications (2020) Sectoral Adaptation Planning. <https://www.gov.ie/en/collection/51df3-sectoral-adaptation-planning/>

¹⁹ Environmental Protection Agency (2023) Irelands Climate Change Assessment <<https://www.epa.ie/our-services/monitoring-assessment/climate-change/irelands-climate-change-assessment-icca/>>

- > Volume 3: Being Prepared for Irelands Future
- > Volume 3: Realising the Benefits of Transition and Transformation

The ICCA Synthesis Report states that having peaked in 2001, Irelands greenhouse gas emissions have reduced in all sectors except agriculture. However, Ireland currently emits more greenhouse gases per person than the EU average. The report goes on to state that there has been an identified gap in policy that indicates that Ireland will not meet its statutory greenhouse gas emission targets. Already Ireland has seen significant and ongoing deterioration in environmental quality, including declines in water quality, biodiversity and ecosystem quality. Developing a climate-resilient Ireland will require sufficient public and private investment and financial support in ways that adequately recognise the value of ecosystem services and the importance of societal wellbeing.

There are well-established ‘no-regret options’ that need to happen now, which can get Ireland most of the way to net zero carbon dioxide emissions. Beyond that, there are ‘future energy choices’ relating to the scale and magnitude of technologies that will assist in achieving Ireland statutory climate targets. Ireland’s no-regret options are demanding reduction (e.g. through energy efficiency and reduced consumption), electrification (e.g. electric vehicles and heat pumps), deployment of market-ready renewables (e.g. wind energy and solar photovoltaics) and low-carbon heating options (e.g. district heating). Irelands future choices include hydrogen, carbon capture and storage, nuclear energy and electro-fuels.

Achieving net zero carbon dioxide emissions by 2050 requires significant and unprecedented changes to Ireland’s energy system. Policies tailored to suit different stages of technology development are critical for achieving a net zero energy system. Established technologies, such as wind energy, solar photovoltaics and bioenergy, will be key in meeting short-term emission reduction targets (i.e. 2030), whereas offshore wind infrastructure is expected to be the backbone of future energy systems (i.e., 2050).

The ICCA serves as a stark warning: Ireland stands to face a myriad of challenges in efforts to mitigate and adapt to climate change at the almost halfway mark to 2030. Further decisive action is imperative to mitigate the escalating impacts of climate change on Irelands environment, economy, and society that are highlighted throughout the four volumes of the ICCA.

11.3.2.8 Greenhouse Gas Emissions Projections

In its approach to decarbonising, the EU has split greenhouse gas emissions into two categories, the Emissions Trading System (ETS) and the non-ETS. Emissions from electricity generation and large industry in the ETS are subject to EU-wide targets which require that emissions from these sectors be reduced by 43% by 2030, relative to 2005 levels. Within the ETS, participants are required to purchase allowances for every tonne of emissions, with the amount of these allowances declining over time to ensure the required reduction of 43% in greenhouse gas emissions is achieved at EU-level²⁰.

Emissions from all other sectors, including agriculture, transport, buildings, and light industry are covered by the EU Effort Sharing Regulation (ESR²¹). This established binding annual greenhouse gas emission targets for Member States for the period 2021–2030. Ireland is required to reduce its emissions from these sectors by 30% by 2030, relative to 2005 levels. Under the EU Green Deal, the targets for the ETS and non-ETS sectors will be revised upwards in order to achieve the commitment, at EU level, to reach an economy-wide 2030 reduction in emissions of at least 55%, compared to 1990 levels.

²⁰ Department of the Environment, Climate and Communications (2023) - Climate Action Plan 2024
<https://www.gov.ie/en/publication/79659-climate-action-plan-2024/>

²¹ Regulation (EU) 2018/842 of the European Parliament and of the Council of 30 May 2018 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement and amending Regulation (EU) No 525/2013 (Text with EEA relevance)

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 2022–2040’* was published in June 2023. The report includes an assessment of Ireland’s progress towards achieving its emission reduction targets out to 2030 set under the ESR.

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 Ireland’s greenhouse gas emissions in different ways. The WEM scenario forecasts Ireland emissions including all national policies and measures implemented by the end of 2021, the latest inventory year. 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 2023, that are not yet implemented. As implementation of policies and measures occurs, they will be migrated into the WEM Scenario.

The EPA Emission Projections Update notes the following key trends:

- Ireland is not on track to meet the 51% emissions reduction target by 2030 (as compared to 2018 levels) – expected to achieve a total reduction of 29% under a WAM scenario
 - Ireland will only achieve an 11% reduction under a WEM scenario
- Almost all sectors are projected to breach their SEC for 2025 and 2023 in both WAM and WEM scenarios
 - Only the residential sector will achieve their SEC
- Projected that Ireland could meet the original EU ESR target of 30% emissions reductions by 2030 (compared to 2005) – this goal has since been updated to a 42% reduction which will require full and rapid implementation of CAP 2023 measures and further measures to be implemented
- Energy sector emissions are projected to decrease by 50-60% between 2021-2030
 - Achievement of the 80% renewable energy target is expected
- Transport emissions are expected to decrease between 1-35% between 2021-2030
- Emissions from LULUCF are projected to increase over the period 2021-2030 as forestry reaches harvesting age
 - Planned policies for the sector are expected to reduce the extent of emissions increase

11.3.3 Local Greenhouse Gas Emission and Climate Targets

11.3.3.1 Kerry County Council Local Authority Climate Action Plan 2024-2029

The Kerry County Council Local Authority Climate Action Plan 2024-2029²² (Kerry LACAP) was adopted and published in February 2024.

The Kerry LACAP highlights the current state of climate action in Ireland, and how Kerry County Council will be responsible for enhancing climate resilience, increasing energy efficiency, and reducing greenhouse gas emissions, across its own assets and service. It also demonstrates a broader role that the Kerry Council will take to inspire, lead, and facilitating other sectors to meet their own targets and ambitions. The Kerry LACAP will help address the mitigation of greenhouse gases, the implementation of climate change adaptation measures, and will strengthen the alignment between national climate policy and the delivery of effective local climate action.

²² Kerry County Council Local Authority Climate Action Plan 2024-2029.
<http://docstore.kerrycoco.ie/KCCWebsite/climateplan/adoptedplannew.pdf>

Overall, the greenhouse gas emissions generated from County Kerry equated to 5,209 tCO₂ in the baseline years, 2016 - 2018²³. Although the percentages of greenhouse gas emissions per sector within County Kerry have not been made publicly available, the top three emitting sectors in the baseline years were agriculture, transport, and the built environment. Kerry County Council, along with all public sector entities, must reduce greenhouse gas emissions by 51% by 2030, as compared to 2018, in line with the National Climate Action Plan 2024 (Section 11.3.2.6).

The Kerry LACAP assesses climate risk relevant to Ireland and to County Kerry, this, plus the evidence baseline, inform the climate objectives and actions that will be undertaken by Kerry County Council to assist in the achievement of national and international climate targets.

The Kerry County Development Plan 2022-2028²⁴ sets out the overall strategy for the proper planning and sustainable development of the County over a 6-year period. Energy and planning policy relating to renewable energy, as well as objectives on sustainability and climate for County Kerry is outlined in Chapter 12 of the Kerry County Development Plan.

11.4

Climate and Weather in the Existing Environment

Ireland has a temperate, oceanic climate, resulting in mild winters and cool summers. The Met Éireann weather station at Cork Airport which is located approximately 58 kilometres to the east of the site, is the nearest weather and climate monitoring station to the Proposed Development that has meteorological data recorded for the 30-year period from 1981-2010. Meteorological data recorded at the Cork Airport weather station over the 30-year period from 1981-2010 is shown in Table 11-5 below. The wettest months are October and December, with April and July being the driest. July is the warmest month with an average temperature of 15.3° Celsius.

More recent monthly meteorological data recorded at Cork Airport, located approximately 58km southeast of the site, from January 2021 to January 2024 is available at: <https://www.met.ie/climate/available-data/monthly-data>. October 2023 was the wettest month in this time period, with 307.2mm of rainfall recorded, while August 2022 was the driest month with 14.2mm of rainfall. July 2021 was the warmest month in this time period, with a mean monthly temperature of 16.6° Celsius. The coldest months were January 2021 and December 2022, both with a mean monthly temperature of 4.7° Celsius.

²³ Kerry County Council Local Authority Climate Action Plan 2024-2029 Baseline Evidence Summary Report (Annex C) <<http://docstore.kerrycoco.ie/KCCWebsite/climateplan/annnc.pdf>>

²⁴ Kerry County Development Plan 2022-2028 <<https://cdp.kerrycoco.ie/>>

Table 11-5 Data from Met Éireann Weather Station at Cork Airport from 1981-2010

	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	80.09	76.8	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 $\geq 0.2\text{mm}$	20	17	19	16	15	14	15	15	16	19	19	19	204
Mean num. of days with $\geq 1.0\text{mm}$	16	13	14	11	12	10	10	11	11	15	14	15	152
Mean num. of days with $\geq 5.0\text{mm}$	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	57	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	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	0.0	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	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

11.5 Calculating Carbon Losses and Savings from the Proposed Development

11.5.1 Background

In addition to the combustion of fossil fuels, greenhouse gases are also released through natural processes such as the decomposition of organic material (which is composed of carbon). Bogs and peatlands are known to store large amounts of carbon. Due to the waterlogged nature of these habitats, stored carbon is not broken down and released into the atmosphere. The construction of wind farms on bog and peat habitats may affect the natural hydrological regime, thus exposing and drying out the peat and allowing the decomposition of carbon. It is therefore necessary to demonstrate that any wind farm constructed on such sites saves more carbon than is released. The site of the Proposed Development is situated on agricultural land and peatland with small sections being covered by coniferous forestry; note, in line with the Forest Service's published policy²⁵ on granting felling licences for wind farm developments, areas cleared of forestry for access roads, and any other wind farm-related uses will be replaced by replanting at an alternative site or sites. The Forest Service policy requires replacement or replanting on a hectare for hectare basis for the footprint of the infrastructure developments. For this reason, the carbon balance between the use of renewable energy and the loss of carbon stored in the peat will be assessed in this section of the EIAR.

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

The carbon balance of wind farm developments in peatland habitats has attracted significant attention in recent years. When developments such as wind farms are proposed for peatland areas, there will be direct impacts and loss of peat in the area of the development footprint. There may also be indirect impacts where it is necessary to install drainage in certain areas to facilitate construction, or from the reinstatement of extracted peat. The works can either directly or indirectly allow the peat to dry out, locally, which permits the full decomposition of the stored organic material with the associated release of the stored carbon as CO₂. It is essential therefore that any wind farm development in a peatland area saves more CO₂ than is released.

The original EIAR for the Existing Kilgarvan Wind Farm did not include a discussion on carbon losses and savings. The data required to determine the embodied carbon of the Existing Kilgarvan Wind Farm 28 no. existing turbines is not available, therefore only emissions from the removal of the existing 28 no. turbines from the site as part of the construction phase of the Proposed Development are included in the below calculations.

11.5.2 Methodology for Calculating Losses

A methodology was published in June 2008 by scientists at the University of Aberdeen and the Macaulay Institute with support from the Rural and Environment Research and Analysis Directorate of the Scottish Government, Science Policy and Co-ordination Division. The document, '*Calculating Carbon Savings from Wind Farms on Scottish Peat Lands*', was developed to calculate the impact of

²⁵ Department of Agriculture, Food, and the Marine, *Tree Felling and Reforestation Policy*
<<https://www.gov.ie/en/publication/19b8d-tree-felling-licences/>>

wind farm developments on the soil carbon stocks held in peat. This methodology was refined and updated in 2011 based on feedback from users of the initial methodology and further research in the area. The web-based version of the carbon calculator, which supersedes the excel based versions of the tool, was released in 2016 and is currently available as Version 1.8.1 which was last updated in 2023. The tool provides a transparent and easy to follow method for estimating the impacts of wind farms on the carbon dynamics of peatlands. Previously guidance produced by Scottish Natural Heritage in 2003 had been widely employed to determine carbon payback in the absence of any more detailed methods.

Although the loss of carbon fixing potential from plants on peat land is not substantial, it is nonetheless calculated for areas from which peat is removed and the areas affected by drainage. This calculation can take account of the annual gains due to the carbon fixing potential of the peat land and the time required for any habitat restoration. The carbon sequestered in the peat itself represents a much more substantial potential source of carbon loss. During wind farm construction, carbon is lost as a result of peat excavation and peat drainage. The amount of carbon lost is estimated using default values from the IPCC (IPCC, 1997) as well as by more site-specific equations derived from the scientific literature and updated emission factors. Carbon gains due to habitat improvement and site restoration are calculated in a similar fashion.

Peatlands are essentially unbalanced systems. When flooded, peat soils emit less carbon dioxide but more methane than when drained. In waterlogged soils, carbon dioxide emissions are usually exceeded by plant fixation, so the net exchange of carbon with the atmosphere is negative and soil carbon stocks increase. When soils are aerated, carbon emissions usually exceed plant fixation, so the net exchange of carbon with the atmosphere is positive. In order to calculate the carbon emissions resulting from the removal or drainage of the peat, the Macauley Institute method accounts for emissions occurring if the peat had been left in-situ and subtracts these from the emissions occurring after removal and drainage.

The Macauley Institute methodology states that the total volume of peat impacted by the construction of the wind farm is strongly correlated to the extent of the peatland affected by drainage at the site.

The drainage of peat soils leads to continual loss of soil carbon until a new steady state is reached, when inputs are approximately equal to losses. For peats, this steady state approximates 0% carbon, so 100% carbon loss from drained peats is assumed if the site is not restored after decommissioning of the wind farm. The amount of carbon lost is calculated on the basis of the annual emissions of methane and carbon dioxide, the area of drained peat, and the time until the site is restored. In the case of the Proposed Development site, the model has been prepared on the basis that restoration will not occur upon decommissioning of the Proposed Development (i.e., site roads and hardstands will be left in situ) however, as detailed in Section 4.10, refer to Appendix 4-5 of the EIAR for details in relation to decommissioning. Please note, the removal of the 28 no. turbines which make up the Existing Kilgarvan Wind Farm is included as part of the construction phase of the Proposed Development and is further detailed in Chapter 4 Description of this EIAR and in the CEMP (Appendix 4-3). However, the data required to determine the embodied carbon of the Existing Kilgarvan Wind Farm 28 no. existing turbines is not available, therefore only emissions from the removal of the existing 28 no. turbines from the site as part of the construction phase of the Proposed Development are included in the below calculations.

The effects of drainage may also reduce dissolved and particulate organic carbon retention within the peat. Losses of carbon dioxide due to leaching of dissolved and particulate organic carbon are calculated as a proportion of the gaseous losses of carbon from the peat. The Macauley Institute method assumes that published good practice is employed in relation to avoiding the risk of peat landslides. As detailed in Section 8.3.8 in Chapter 8 of this EIAR: Land Soils and Geology, the Proposed Development has been the subject of a peat stability risk assessment; further details are contained within Appendix 8-1 of this EIAR.

Clear-felling of existing forestry surrounding turbine locations is necessary to allow for the construction of the Proposed Development footprint, the erection of the 11 no. proposed turbines, and to protect local bat populations. Forestry may be felled earlier than originally planned due to the wind farm

development, so limiting the nature and longevity of the resulting timber produced. If a forestry plantation was due to be felled with no plan to replant, the effect of the land use change is not attributable to the wind farm development and is omitted from the calculation. If, however, the forestry is felled for the development, as is the case for the Proposed Development, the effects are judged to be attributable to the wind farm development. Carbon losses as a result of felling are calculated from the area to be felled, the average carbon sequestered annually, and the lifetime of the wind farm. Alterations in soil carbon levels following felling are calculated using the equations for drainage and site restoration already described.

The outputs of the Macauley Institute web-based carbon calculator are included in Appendix 11-1 of this EIA, 'Carbon Calculations'.

In addition to the Macauley Institute methodology described above, where possible, carbon emissions or losses associated with embodied carbon of materials used in the construction, operational and decommissioning phase of the Proposed Development have been identified. Embodied carbon refers to the emissions associated with procuring, mining and harvesting raw materials, the transformation of those materials into construction products, transporting them to site, installation of these materials during a construction phase, and the subsequent replacement, removal, and disposal of these materials upon decommissioning.²⁶ Please note, the data required to determine the embodied carbon of the Existing Kilgarvan Wind Farm 28 no. existing turbines is not available, therefore only emissions from the removal of the existing 28 no. turbines from the site as part of the construction phase of the Proposed Development are included in the below calculations. The full life cycle and embodied carbon of the 11-no. new proposed turbines have been taken account of in the Macauley Institute model. The emissions associated with the embodied carbon, along with the construction phase transport movements, of the remaining features of the site are considered using the Transport Infrastructure Ireland (TII) Carbon Tool (TII 2022)²⁷. The TII Carbon Tool is customised for road and light rail projects in Ireland, using emission factors from recognised sources during the construction, maintenance and operation of TII projects in Ireland.

Section 15.1.4 in Chapter 15 of this EIA outlines traffic generation numbers relative to quantum of materials required for the construction of the Proposed Development, the details of which have been utilised to determine the emissions associated with these activities and are included in Appendix 11-1.

11.5.3 Carbon Losses and Savings Calculations

11.5.3.1 Carbon Losses

The Scottish Government online carbon calculator was used to assess the effects of the Proposed Development in terms of potential carbon losses taking into account peat removal and reinstatement, drainage, habitat improvement, forestry felling and site restoration. The online calculator is pre-loaded with information specific to the CO₂ emissions from the United Kingdom's electricity generation plant, which is used to calculate emissions savings from proposed wind farm projects in the UK. However, due to the availability of Irish specific carbon intensity emission factors for the Irish electricity generation plant, the CO₂ emissions savings from the Proposed Development have been calculated separately from the online carbon calculator as set out in Section 11.5.3.2 below.

In relation to embodied carbon and associated transport movements of all other ancillary elements of the Proposed Development, the TII Carbon Tool has been utilised to assess the impacts of the Proposed Development in terms of potential carbon losses in regard to construction phase transport emissions and embodied carbon.

²⁶ Irish green Building Council – What is embodied carbon? <<https://www.igbc.ie/what-is-embodied-carbon/>>

²⁷ Transport Infrastructure Ireland Carbon Tool for Road and Light Rail Projects: User Guidance Document <https://www.tiipublications.ie/library/GE-ENV-01106-01.pdf>

A copy of the outputs is provided as Appendix 11-1 of this EIAR, ‘Carbon Calculations’. Where available and relevant, site-specific information was inserted into the online carbon calculators. Otherwise, default values were used.

The main CO₂ losses due to the Proposed Development are summarised in Table 11-6.

Table 11-6 CO₂ Losses from the Proposed Development

Origin of Losses	CO ₂ Losses (tonnes CO ₂ equivalent) of the Proposed Development	
	Expected	Maximum
Losses due to turbine life of 11 no. new proposed turbines (e.g., manufacture, construction, decommissioning)	62,691	63,719
Losses due to backup	47,189	54,748
Losses from reduced carbon fixing potential	795	1474
Losses from soil organic matter and due to leaching of dissolved and particulate organic carbon (CO ₂ loss from removed and drained peat)	4,545	16,397
Losses associated to forestry felling	4,112	4,884
Losses associated to embodied carbon in construction materials	4,052	4,052
Losses associated to construction transport movements	120	120
Total	123,504	145,394

The worksheet models and online tools calculate that the Proposed Development will give rise to 123,504 tonnes of CO₂ equivalent losses over its 35-year life. Of this total figure, the proposed wind turbines directly account for 62,691 tonnes, or 51%. Losses due to backup account for 47,189 tonnes, or 38%. Losses from reduced carbon fixing potential accounts for 1% or 795 tonnes. Losses from soil organic matter, i.e., CO₂ loss from removed and drained peat, will equate to 4,545 tonnes, or 4%. Losses due to forestry felling account for 4,112 tonnes or 3%. Losses due to embodied carbon accounts for 4,052 tonnes or 3% and losses due to construction phase transport emissions accounts for 0.10% or 120 tonnes.

The figure of 795 tonnes of CO₂ arising from ground activities associated with the Proposed Development is calculated based on the entire development footprint being “Acid Bog”, as this is one of only two choices the model allows (the other being Fen). The habitat that will be impacted by the development footprint comprises predominantly cutover bog, coniferous forestry and agriculture rather than the acid bog assumed by the model that gives rise to the 795 tonnes and therefore the actual CO₂ losses are expected to be lower than this value.

The values discussed above are based on the assumption that no habitat enhancement or afforestation activities will take place as part of the Proposed Development. As detailed in Section 4.3.11 of this EIAR, the estimated 8.9 ha of coniferous forestry that will be permanently felled for the footprint of the

Proposed Development infrastructure will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that will be issued in respect of the Proposed Development. Similarly, as detailed in Appendix 6-8 a Blanket Bog Rehabilitation and Management Plan for the Proposed Development has identified enhancement activities such as restoring an area of former lowland blanket bog that has been damaged by drainage and afforestation. Taking into account the afforestation and habitat enhancement that will take place, the actual CO₂ losses for forestry felling and reduced carbon fixing potential are expected to be lower than the values detailed in Table 11-6, over the life-time of the project.

The figure of 4,052 tonnes of CO₂ arising from the embodied carbon of construction materials associated with the Proposed Development is calculated based on the types of materials available in the TII Carbon tool such as, concrete, steel, cement and granular fill and assumes that each HGV or LGV will be carrying material at its full capacity. The figure of 120 tonnes of CO₂ arising from transport movements associated with construction activities associated with the Proposed Development is calculated based on the assumption that material will be imported locally or from a port/city location where applicable. Details on the assumptions made for the modelling of embodied carbon and construction phase transport emissions are included in Appendix 11-1.

The values discussed above are based on the assumption that the hydrology of the Proposed Development and habitats within the site are not restored during decommissioning of the Proposed Development. As detailed in the Decommissioning Plan, Appendix 4-5, 11 no. new turbines will be dismantled and removed offsite in a similar manner to how they will be transported to the site originally. It is not intended to remove the concrete foundations from the ground as it is considered that its removal will be the least preferred options in terms of having potential effects on the environment. The associated foundations will be backfilled and covered with soil material. The electrical cabling connecting within the site, connecting the turbines to the existing onsite 110kV Coomagearlahy substation, will be pulled from the cable duct. 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 with no environmental impact associated with leaving the ducting in situ. The removal of the existing 28 no. turbines of the Existing Kilgarvan Wind Farm will be incorporated into the construction phase of the Proposed Development and is further detailed in Chapter 4 of this EIAR.

Taking into account the proposals incorporated in the Decommissioning Plan, the actual CO₂ losses are expected to be lower than the values detailed in Table 11-6.

11.5.3.2 Carbon Savings

According to the model described above, the Proposed Development will give rise to total losses of 123,504 tonnes of carbon dioxide.

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

$$\text{CO}_2 \text{ (in tonnes)} = \frac{\text{A} \times \text{B} \times \text{C} \times \text{D}}{1000}$$

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

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

C = The number of hours in a year

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

For the purposes of this calculation, the rated capacity of the Proposed Development is assumed to be 72.6 MW (based on 11 No. 6.6 MW turbines).

A load factor of 0.37 (or 37%) has been used for the Proposed Development²⁸

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

A conservative figure for the carbon load of electricity generated by natural gas in Ireland was sourced from Sustainable Energy Authority Ireland's (SEAI) December 2022 report, 'Energy in Ireland.' The provisional emission factor for electricity generated in Ireland in 2022 was 297.4 g CO₂/kWh²⁹.

The calculation for carbon savings is therefore as follows:

$$\begin{aligned} \text{CO}_2 \text{ (in tonnes)} &= \frac{(72.6 \times 0.37 \times 8,760 \times 297.4)}{1000} \\ &= 69,982 \text{ tonnes per annum} \end{aligned}$$

Based on this calculation, **69,982** tonnes of carbon dioxide will be displaced per annum from the largely carbon-based traditional energy mix by the Proposed Development. Over the proposed 35-year lifetime of the development, therefore, **2,449,370** tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation.

Based on the Scottish Government carbon calculator as presented above in Section 11.5.3.1, 123,099 tonnes of CO₂ will be lost to the atmosphere due to changes in the soil and ground conditions and due to the construction and operation of the Proposed Development. This represents 5% of the total amount of carbon dioxide emissions that will be offset by the Proposed Development. The 123,504 tonnes of CO₂ that will be lost to the atmosphere due to changes in soil and ground conditions and due to the construction and operation of the Proposed Development will be offset by the Proposed Development in approximately 21 months of operation.

As detailed in Section 11.5.3.1 above, habitat enhancement and afforestation activities will take place as part of the Proposed Development. As detailed in Section 4.3.11 of this EIAR, the estimated 8.9ha that will be permanently felled for the footprint of the Proposed Development infrastructure will be replaced or replanted on a hectare for hectare basis as a condition of any felling licence that will be issued in respect of the Proposed Development.

11.6 Likely Significant Effects and Associated Mitigation Measures

11.6.1 'Do-Nothing' Effect

If the Proposed Development were not to proceed, the opportunity to further significantly reduce emissions of greenhouse gas emissions, including carbon dioxide (CO₂), oxides of nitrogen (NO_x), and

²⁸ Eirgrid, 2022 Enduring Connection Policy 2.3 Constraints Report for Solar and Wind

<<https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.3-Solar-and-Wind-Constraints-Report-Results-for-Area-H2-v1.0.pdf>>

The Proposed Development is located within the E wind region for Ireland with an associated capacity factor of 37%.

²⁹ SEAI have published the Energy in Ireland 2023 Report which states that carbon intensity of electricity may be 259 gCO₂/kWh for 2023. As this is a provisional value and subject to change it has not been used for the purposes of calculating carbon savings for the Proposed Project.

sulphur dioxide (SO₂) from fossil fuels to the atmosphere would be lost. The opportunity to contribute to Ireland's commitments under the Paris Agreement and EU law would also be lost. This would be a long-term slight negative effect.

11.6.2 Construction Phase

11.6.2.1 Greenhouse Gas Emissions

Removal of Existing Infrastructure and Construction of New Infrastructure

The removal of the 28 no. turbines comprising the Existing Kilgarvan Wind Farm and construction of the 11 no. new proposed turbines and associated foundations and hardstanding areas, meteorological mast, access roads, temporary construction compounds, underground cabling, site drainage, spoil management areas, forestry felling, and all ancillary works and apparatus (as outlined in Chapter 4 of this EIAR) will require construction materials (such as cement), and the operation of vehicles and plant on and off-site. Greenhouse gas emissions, e.g., carbon dioxide (CO₂), carbon monoxide and nitrogen oxides, associated with the production of construction materials, and operation of vehicles and plant will arise as a result of the construction activities. This effect will be short-term and slight only, given the quantity of greenhouse gases that will be emitted to the atmosphere, and will be restricted to the duration of the construction phase. Mitigation measures to reduce this effect are presented below.

Some potential long-term slight negative impacts will occur due to the removal of carbon fixing vegetation and habitat. This has been avoided where possible by the design and layout of the Proposed Development which utilises the majority of existing infrastructure on the site. This impact will be long-term and slight only, given the quantity of greenhouse gases that will be emitted to the atmosphere.

Transportation to and from the site

The transport of turbines and construction materials to the site, which will occur on specified routes only (see Section 4.4 in Chapter 4 of this EIAR), will also give rise to greenhouse gas emissions associated with the transport vehicles and exhaust emissions. This effect will be short-term and slight only, given the quantity of greenhouse gases that will be emitted, and will be restricted to the duration of the construction phase. Mitigation measures to reduce this impact are presented below.

Waste Disposal

Construction waste will arise from the Proposed Development from excavation and unavoidable construction waste including material surpluses, damaged materials and packaging waste, along with the removal of the 28 no. turbines which make up the Existing Kilgarvan Wind Farm.

The existing 28 no. turbines onsite will be removed from site in accordance with Orsted policy, whereby all elements of the turbines will be recycled and reused, and no components will be sent to landfill. A methodology for the decommissioning of the turbine blades is set out below:

- › Blades will be segmented into approximately 9 pieces using an excavator mounted shear;
- › Technicians will remove root rings and any other associated metal for recycling;
- › The construction crew will ensure that there are no contaminants present (e.g. oils, brake dust, grease rubber hoses);
- › Blade segments will then be lifted via telehandler to a suitable container for transport (e.g. 40 cubic yard RORO skips and/or trailer mounted articulated bulk carriers);
- › Segments will then be transported to suitable licenced processing facilities, such as Kenmare Transfer Station (W0086), Coolcaslagh Transfer Station (W0072) or Killarney Waste Disposal Unlimited Company (W0217) to be shredded;

The shredded output will be used in a suitable licenced cement co-processing or a waste-to-energy facility. The turbine nacelle and tower sections are metallic and can therefore also be recycled. The tower will be broken out into its original tower sections and will be transported offsite to a suitable licenced or waste processing facility, such as Kenmare Transfer Station (W0086), Coolcaslagh Transfer Station (W0072) or Killarney Waste Disposal Unlimited Company (W0217).

This potential impact will be short-term and slight only, given the quantity of greenhouse gases associated with the generation and management of these waste streams that will be emitted to the atmosphere, and will be restricted to the duration of the construction phase. Waste management will be carried out in accordance with *Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects* (2021) produced by the EPA.

Mitigation & Monitoring Measures for the Proposed Development

- › All construction vehicles and plant will be maintained in good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
- › When stationary, delivery and on-site vehicles will be required to turn off engines.
- › Turbines and construction materials will be transported to the site on specified routes only unless otherwise agreed with the Planning Authority (see Section 15.1 Chapter 15 for details)
- › The majority of all rock and hardcore materials for the construction of the Proposed Development will be obtained from the proposed extension to the existing borrow pit on site. This will significantly reduce the number of delivery vehicles accessing the site, thereby reducing the amount of emissions associated with vehicle movements.
- › The Construction and Environmental Management Plan (CEMP) (Appendix 4-3) includes a Waste Management Plan (WMP) which outlines the best practice procedures that will occur during the construction phase relating to waste material. The WMP will outline the methods of waste prevention and minimisation by recycling, recovery and reuse at each stage of the construction of the Proposed Development.
 - Section 3.9 of the CEMP (Appendix 4-3) for this EIAR refers to the methodology that will be utilised to manage onsite waste. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor,
 - The MRF facility will be local to the Proposed Development site where possible to reduce the amount of emissions associated with vehicle movements.
 - Disposal of waste will be seen as a last resort
- › Where applicable, low carbon intensive construction materials will be sourced and utilised onsite.

Residual Effect

Following implementation of the mitigation measures above, residual effects of greenhouse gas emissions arising from the construction phase of the Proposed Development will have a short-term, imperceptible, negative effect. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent, imperceptible, negative effect on Climate.

When considering these greenhouse gas emissions within the context of the national Electricity Sector Emissions Ceilings detailed in Section 11.3.2.5, Carbon Budget 1 (2021-2025) has an Electricity Sector budget of 40 MtCO₂eq. and Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 MtCO₂eq for large-scale deployment of renewables. As detailed in Section 11.5.3.2, the Proposed

Development will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Development. Therefore, while there will be greenhouse gas emissions associated with the construction of the Proposed Development, this will take place under the Electricity sector emissions ceiling and will be offset by the operation of the Proposed Development within its operational life.

Significance of Effects

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

11.6.3 Operational Phase

11.6.3.1 Greenhouse Gas Emissions

Removal of Existing Infrastructure and Construction of New Infrastructure

The Proposed Development will generate energy from a renewable source. This energy generated will offset energy and the associated emission of greenhouse gases from electricity-generating stations dependent on fossil fuels, thereby having a positive effect on climate. As detailed in Section 11.5.3.2 above, the Proposed Development will displace carbon dioxide from fossil fuel-based electricity generation, over its proposed 35-year operational lifespan. The Proposed Development will assist in reducing carbon dioxide (CO₂) emissions that would otherwise arise if the same energy were otherwise to be generated by conventional fossil fuel plants. This is a long-term significant positive effect on climate.

Some potential long-term slight negative impacts that may occur during the operational phase of the Proposed Development are the release of carbon dioxide to the atmosphere due to maintenance and monitoring activities, and the removal of carbon fixing vegetation and habitat.

Transport to and from the site

In the unlikely event that a turbine blade is damaged and must be replaced during the operational phase, the effects described in Section 11.6.2.1 will be the same. Emissions resulting from routine maintenance at are included in the section above.

Waste Disposal

Waste is not proposed to be generated on the site during the operational phase, any waste that does arise will be minimal and any impact will be short-term and imperceptible. Waste management will be carried out in accordance with 'Best Practice Guidelines on the Preparation of Resource and Waste Management Plans for Construction & Demolition Projects' (2021) produced by the EPA.

Mitigation

- › Ensure that all maintenance and monitoring vehicles will be maintained in good operational order while onsite, and, when stationary, be required to turn off engines thereby minimising any emissions that arise.
- › When stationary, delivery and on-site vehicles will be required to turn off engines.
- › 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 MRF facility will be local to the site to reduce the emissions associated with vehicle movements

- › As detailed in Appendix 6-8, a Blanket Bog Enhancement Plan has been developed and will be applied at a suitable location within the site as identified by Dr, John Conaghan, the botanical specialist
 - The restoration area will be monitored for the lifetime of the wind project in accordance with the plan.
- › No removal/clearance of habitats or movement of construction machinery will occur outside of the development works area/footprint during the construction phase, where the works area/footprint will be clearly marked for associated site staff.
- › Afforestation of the 8.9ha of forestry being felled for the Proposed Development will be completed as per the Forest Service's policy on granting felling licenses for wind farm development (Section 4.3.11 of Chapter 4 of this EIAR).

Residual Effect

Following implementation of the mitigation measures above, in particular the Blanket Bog Enhancement Plan (Appendix 6-8), the loss of carbon fixing vegetation and in particular peat habitat over the lifetime of the Proposed Development will be partially offset by the Blanket Bog Enhancement Plan and using the precautionary principle, will have a potential long-term imperceptible negative effect on Climate. However, the Proposed Development will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year operational lifespan. Therefore, while there will be greenhouse gas emissions associated with the operational phase of the Proposed Development (i.e. arising from maintenance and monitoring activities detailed in Section 11.6.3.1 above), these will be offset within the proposed 35-year operational lifespan.

Long-term Moderate Positive Effect on Climate as a result of reduced greenhouse gas emissions.

Significance of Effects

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

11.6.4 Decommissioning Phase

The wind turbines proposed as part of the Proposed Development are expected to have a lifespan of approximately 35 years. Following the end of the operational life of the wind farm, the wind turbines may be retained and the operational life extended or replaced with a new set of turbines, subject to planning permission being obtained. In the event that neither of the above options are implemented, the Proposed Development will be decommissioned fully as agreed with the Planning Authority. The existing onsite 110kV Coomagearlahy substation will remain in place and will continue to form a permanent part of the national electricity grid.

Upon decommissioning of the Proposed Development, the wind turbines will be disassembled in reverse order to how they were erected. All above ground turbine components would be separated and removed off-site for recycling. Turbine foundations would remain in place underground and will be covered with earth and reseeded as appropriate. Leaving the turbine foundations in-situ is considered a more environmentally prudent option, as to remove that volume of reinforced concrete from the ground could result in significant environment nuisances such as noise, dust and/or vibration. Site roadways will be left in situ, for future forestry operations and for local landowners to access their lands. Underground cables will be removed, and the ducting left in place.

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

A Decommissioning Plan is included as Appendix 4-5 of this EIAR, the detail of which will be agreed with the local authority prior to any decommissioning. The potential for effects during the decommissioning phase of the Proposed Development has been fully assessed in the EIAR.

11.7 Cumulative Assessment

The potential for impact between the Proposed Development, and other relevant developments has been carried out with the purpose of identifying what influence the Proposed Development will have on the surrounding environment when considered cumulatively and in combination with relevant existing permitted or proposed projects and plans in the vicinity of the site, as set out in Chapter 2 of this EIAR. Please see Section 2.8 of Chapter 2 for cumulative assessment methodology.

The other plans and projects considered as part of this cumulative effect assessment are presented in Appendix 2-2 of this EIAR. Forestry operations in the neighbouring townlands have also been considered as part of this cumulative assessment. The cumulative project list was prepared following a review of planning files (An Bord Pleanála and Local Authority files), EPA search engines, development plans and National Roads Office/Transport Infrastructure Ireland road projects. Relevant developments with potential cumulative effects on Air Quality, within 1km of the Proposed Development are presented below in Table 11-7 below. This is in line with the Transport Infrastructure Ireland (TII) Publication Air Quality Assessment of Proposed National Roads – Standard PE-ENV-01107, December 2022.

Table 11-7 Developments with the potential to cause cumulative effects on Climate alongside the Proposed Development.

Planning Ref.	Description	Decision
KCC Ref: 16458	Rock armour existing river bank together with all other ancillary works	Conditional Permission
KCC Ref 171252	Import soil and stone for the raising of an agricultural field in order to improve the agricultural output of the field, the construction of a new entrance and a new haul road to link with the existing farm road	Conditional Permission
KCC Ref 18496	Retain an existing development at this site, the development consists of an existing 30 metre high telecommunications support structure carrying telecommunications equipment, together with existing equipment, container and associated equipment within a fenced compound as previously granted under local authority ref. no. 11/990. The development will continue to form part of the meteor mobile communications Ltd Existing and future telecommunications and broadband network	Conditional Permission
KCC Ref. 18794	(1)Retain existing dwelling house and shed within revised site boundaries and (2) permission to construct side and proch extensions on to existing dwelling house and all associate site works	Conditional Permission
KCC Ref 191325	The installation of battery arrays, located within container units (18 number units, each 30m2 by	Conditional Permission

Planning Ref.	Description	Decision
	c.2.6m tall), a control building (c.160.5m2 by c.6.4m tall) and transformer (c.5m tall). the development will include for ancillary infrastructure including security fencing, lighting, cctv, internal access roads and drainage. the overall development site is c.1.6ha. the application includes a natura impact statement (nis)	
KCC Ref 21887	Construct a new garage and greenhouse, including all associated site works to facilitate their construction, which will be ancillary to the existing dwelling	Conditional Permission
CCC Ref 116225	Completion of erection of 1 no. wind turbine of 80m hub height and 90m diameter rotor blade, on site tracks, cabling and hard standing as permitted under Planning Reg. No. 06/8273	Unconditional Permission
CCC Ref 174167	A solar photovoltaic panel array consisting of up to 37,800 m2 of solar panels on ground mounted steel frames, 2 no. electricity control cabins, underground cables & ducts, inverter units, hardstanding area, boundary security fence, CCTV, all associated site works and services	Conditional Permission
CCC Ref 068273	Erection of 1 no. wind turbine of 80m hub height and 90m diameter rotor blade, on site tracks, cabling and hardstanding	Conditional Permission

11.7.1 Construction Phase

During the construction phase of the Proposed Development and other permitted or proposed projects and plans in the area as set out in Section 2.8 in Chapter 2 of this EIAR, that are yet to be constructed, there will be greenhouse gas emissions arising from production of construction materials (such as cement), and the operation of construction vehicles and plant. These will be restricted to the duration of the construction phase, and as such will give rise to emission over a short-term duration. However, once emitted to the atmosphere, the greenhouse gas emissions that will arise from construction phase activities will have a permanent imperceptible negative effect on Climate.

11.7.2 Operational Phase

The nature of the Proposed Development is such that, once operational, it will have a long-term, moderate, positive impact on climate. However, as noted above, the Proposed Development will offset the **123,504** tonnes of CO₂ associated with the construction and operational phase that will be lost to the atmosphere (Section 11.5.3.1) in approximately **21** months of operation.

When considering these greenhouse gas emissions within the context of the Electricity Sector Emissions Ceilings detailed in Section 11.3.2.4, Carbon Budget 1 (2021-2025) has an Electricity Sector budget of 40 MtCO₂eq. and Carbon Budget 2 (2026-2030) has an Electricity Sector budget of 20 MtCO₂eq for large-scale deployment of renewables. As detailed in Section 11.5.3.2, the Proposed Development will displace carbon dioxide from fossil fuel-based electricity generation, over the proposed 35-year lifespan of the Proposed Development. Therefore, while there will be greenhouse gas emissions associated with

the construction of the Proposed Development, this will take place under the Electricity sector emissions ceiling and will be offset by the operation of the Proposed Development within its operational life. Thus, there will be no cumulative effects arising on climate from the Proposed Development and other permitted or proposed projects and plans in the area as set out in Section 2.7 in Chapter 2 of this EIAR.

11.7.3 Decommissioning Phase

The works required during the decommissioning phase are described in Section 4.10 in Chapter 4: Description of the Proposed Development. Any cumulative impact and consequential effect that occurs during the decommissioning phase are similar to that which occur during the construction phase, be it of a lesser magnitude. The mitigation measures prescribed for the construction phase of the Proposed Development will be implemented during the decommissioning phase thereby minimising any potential cumulative effects.