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LONGFORDPASS, LITTLETON, LANESPARK AND DERRYVELLA BOGS – APPLICATION FOR SUBSTITUTE CONSENT

Remedial Environmental Impact Assessment Report

Chapter 14 – Climate

Prepared for:
Bord na Móna Energy Ltd

BnM

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14. CLIMATE

14.1 Introduction

This chapter evaluates the climate-related impacts resulting from Bord na Móna Energy Ltd (hereafter referred to as Bord na Móna) peat extraction and ancillary activities at the Application Site. The assessment covers three distinct phases of the project: the Peat Extraction Phase (1988–2017), the Current Phase (July 2017 to present) and the Remedial Phase. As outlined in Chapter 1 - Introduction, Volume 2, the evaluation of historical impacts begins in 1988, which marks the latest date for the transposition of the EIA Directive into Irish legislation.

The baseline climate conditions have been established using published data from the Environmental Protection Agency (EPA). For this assessment, impacts have been measured against the most up-to-date climate policies and guidance, which are likely more stringent than those in place during earlier years. Therefore, if the Application Site demonstrates no significant effects under current policy standards, it is reasonable to conclude that significant impacts were unlikely under previous, less stringent policies.

The principal climate concern associated with the project is the loss of carbon sink capacity due to peat removal from the Application Site. A detailed description of the Application Site is provided in Chapter 4 - Description of the Development, Volume 2.

14.1.1 Statement of Authority

This chapter has been prepared by Brian Cronin, a Senior Environmental Scientist with a BSc in Environmental Science from University College Cork and an MSc in Environmental Engineering from Trinity College Dublin. He is member of the Institution of Engineers of Ireland (MIEI). Brian has ten years of postgraduate experience, working in contaminated land and remediation consulting, and in Environmental Impact Assessment. He has experience working on various renewable energy projects preparing chapters of the EIAR for wind farms, specialising in various disciplines including air quality, climate, hydrology and water quality.

This chapter has been reviewed by Jim Hughes. Jim has over 20 years' experience in planning and environmental consultancies and in managing the preparation of Environmental Impact Assessment for large infrastructure projects including linear infrastructure, large scale commercial developments and renewable energy projects. Jim holds a BA in Public Administration and Development, MSc in Town Planning and a HDip in SEA and EIA Management.

14.1.2 Limitations and Difficulties

Historical climate data from 1988 to the present were examined to establish a baseline. However, data covering this exact period were not consistently available across all sources. As a result, the earliest available data from each source were used to define the baseline. Trends in greenhouse gas (GHG) emissions from 1990 to 2023 were also reviewed to support the baseline environmental assessment, as outlined in Section 14.3.2. Data on GHG emissions prior to 1990 were not available for analysis.

In addition, annual diesel consumption was not available for the specific bogs for which substitute consent is being sought. Records of diesel consumption were reported for the entire Littleton Bog Group in the Annual Environmental Reports submitted to the EPA under the IPC Licence P0499-01. As such, a conservative assumption was made that the diesel consumed across the four bogs in question was equal to the diesel consumed across the entire bog group (14 bogs). Greenhouse Gas Emissions calculated within this chapter as a result of diesel consumption is therefore likely to represent a significant overestimate.

No other limitations were encountered in the preparation of this chapter.

14.2 Methodology

14.2.1 EPA Description of Effects

The significance of effects of peat extraction and ancillary activities shall be described in accordance with the EPA guidance document Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR), May 2022. Details of the methodology for describing the significance of the effects are provided in Chapter 1 - Introduction, Volume 2.

The rating of potential environmental effects of the peat extraction and ancillary activities undertaken at the Application Site on climate is based on the criteria presented in Table 3.4 of the EPA (2022) document titled Guidelines on the Information to Be Contained in Environmental Impact Assessment Reports. These criteria consider the quality, significance, duration and types of effects to be identified.

14.2.2 Relevant Climate Guidelines, Policies and Legislation

Since 1988, the beginning of the assessment period for the Application Site, climate-related policy and legislation has undergone significant development. In recent years, climate targets and associated policies have become increasingly stringent, driven by a growing recognition of climate change and its far-reaching impacts.

14.2.2.1 Legislation

In 2015, the Government of Ireland enacted the Climate Action and Low Carbon Development Act 2015 (No. 46 of 2015), establishing a legislative framework to guide Ireland's transition to a low-carbon, climate-resilient, and environmentally sustainable economy by 2050. This long-term goal is referred to in the Act as the 'National Transition Objective'.

The Act introduced several key provisions, including the development of a National Adaptation Framework and the establishment of the Climate Change Advisory Council. The Council is tasked with providing independent, evidence-based advice to the Government on climate policy and plays a central role in reviewing and recommending national mitigation and adaptation plans, as well as monitoring compliance with Ireland's climate obligations.

Under Section 15 of the Act (as amended), planning authorities and other public bodies are required to perform their functions in a manner that is consistent, insofar as practicable, with:

> *(a) the most recent approved climate action plan,*
> *(b) the most recent approved national long term climate action strategy,*
> *(c) the most recent approved national adaptation framework and approved sectoral adaptation plans,*
> *(d) the furtherance of the national climate objective, and*
> *(e) the objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State*

Following Ireland's declaration of a climate and biodiversity emergency in May 2019, and the European Parliament's resolution declaring a climate and environmental emergency in November 2019, the Irish Government approved the publication of the General Scheme for the Climate Action (Amendment) Bill 2019 in December of that year. This was subsequently followed by the enactment of the Climate Action and Low Carbon Development (Amendment) Act 2021 (No. 32 of 2021), referred to hereafter as the 2021 Climate Act. The purpose of the 2021 Climate Act was to give statutory effect to the key objectives outlined in the Climate Action Plan (CAP).

The 2021 Climate Act aims to support the transition to a climate-resilient, biodiversity-rich, and climate-neutral economy by no later than 2050. It introduces statutory provisions for carbon budgets and sets decarbonisation target ranges for specific sectors. A carbon budget is defined as the total allowable greenhouse gas (GHG) emissions within a given budget period.

The Act replaces references to a national mitigation plan with the Climate Action Plan (2019) and a series of National Long-Term Climate Action Strategies. It also requires the Minister for the Environment, Climate and Communications to request each local authority to prepare a five-year Local Authority Climate Action Plan, outlining both mitigation and adaptation measures.

Regarding carbon budgets, the Act stipulates that the Climate Change Advisory Council will propose a budget aligned with national climate objectives. This budget is then finalised by the Minister and approved by the Government for five-year periods, beginning with the first budget period from 1 January 2021 to 31 December 2025. Budgets are to be prepared for three consecutive periods (see Table 14-1) and may be revised in response to new EU or international obligations, or significant scientific developments.

The Minister is also responsible for setting sectoral emissions ceilings, which define the maximum GHG emissions permitted for each sector during a budget period. These ceilings may vary by sector. The sectoral ceilings for 2030 were published in July 2022 and are presented in Table 14-2. The Application Site is likely to fall under the LULUCF (Land Use, Land Use Change, and Forestry) category, which currently does not have an assigned emissions ceiling.

It is important to note that sectoral emissions ceilings were not in place during peat extraction and ancillary activities at the Application Site from 1988 to 2017. As such, these historic activities were not subject to compliance with carbon budgets or sectoral emissions limits.

Table 14-1: Carbon budget periods

Budget Period	Carbon Budget (Mt CO_2e)	Reduction Required
2021-2025	295	Reduction of 4.8% per annum for the first budget period
2026-2030	200	Reduction of 8.3% per annum for the second budget period
2031-2035	151	Reduction of 3.5% per annum for the third provisional budget period

Table 14-2: Sectoral emission ceilings 2030

Sector	Baseline (Mt CO_2e)	Carbon budgets (Mt CO_2e)		2030 GHG Emissions (Mt CO_2e)	Indicative percentage reductions in final year of 2025-2030 period (relative to 2018)
	2018	2021-2025	2026-2030		
Transport	12	54	37	6	50
Electricity	10	40	20	3	75
Built environment - residential	7	29	23	4	40
Built environment - commercial	2	7	5	1	45
Industry	7	30	24	4	35
Agriculture	23	106	96	17.25	25
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
LULUCF	5	Reflecting the continued volatility for LULUCF baseline emissions to 2030 and beyond, CAP25 reaffirms the ambitious activity targets established in previous iterations. This follows an EU-aligned methodology, focusing on high-impact measures in forestry and peatland rehabilitation to meet the sector's fixed 2030 reduction target of 0.626 Mt CO_2eq			
Total	68				
Unallocated savings	-	-	26	-5.25	-
Legally binding carbon budgets and 2030 emission reduction targets	-	295	200	-	51

14.2.2.2 Policy

Due to the location of the Application Site, the relevant County Development Plans (CDPs) would have been for North Tipperary County Council up until the merging of North and South Tipperary councils in 2014. Thereafter, the Tipperary County Development Plan would be the relevant CDP. The North Tipperary County Development Plan 2010 (as varied) and its subsequent variations (2011, 2015, 2016) began to incorporate climate-related considerations more directly than previous CDPs, particularly through:

- The Renewable Energy Strategy 2016;
- Strategic Environmental Assessment (SEA) processes; and
- Policies supporting sustainable development and energy efficiency.

The 2010 CDP contained a chapter titled "Chapter 8: Climate Change, Energy & Flooding"; with the Core Aim being:

> *"To ensure that the county continues to be a leader in addressing climate change through the facilitation of appropriately located renewable energy developments and through supporting energy efficiency in all sectors of the economy."*

North Tipperary and South Tipperary County Councils were merged in 2014, and the next CDP of relevance to the Application Site was the current CDP for Tipperary - the Tipperary County Development Plan 2022-2028. Climate change is identified as a core challenge and a cross-cutting theme throughout the Tipperary County Development Plan 2022-2028. The Plan acknowledges the increasing frequency of extreme weather events in Tipperary—such as storms, droughts, and flooding—and the need for urgent action to reduce emissions and build resilience. The CDP emphasizes:

- The goal of achieving net zero greenhouse gas emissions by 2050;
- The importance of planning for low-carbon homes and commercial developments;
- The need to facilitate sustainable transport; and,
- Support for renewable energy and circular economy initiatives.

Chapter 3 of the latest CDP: Low-Carbon Society and Climate Action includes Planning Objective 3-A:

> *"Support and facilitate the implementation of European and National objectives for climate adaptation and mitigation, and to prepare a Climate Action Plan for Tipperary in compliance with the Climate Action and Low Carbon Development (Amendment) Bill (DECC, 2020) and any review thereof".*

The Irish Government published its first Climate Action Plan (CAP) in June 2019 (Government of Ireland, 2019). This initial plan assessed the status of key sectors—Electricity, Transport, Built Environment, Industry, and Agriculture—and outlined broad measures required to achieve ambitious decarbonisation targets. It also introduced governance structures for implementation, including carbon-proofing of policies, the establishment of carbon budgets, strengthening the Climate Change Advisory Council, and enhancing accountability to the Oireachtas.

Subsequent updates followed:

- CAP 2021 (published November 2021);
- CAP23 (published December 2022), accompanied by an Annex of Actions in March 2023;
- CAP24 (published in December 2023 and updated in May 2024); and
- CAP25 (published April 2025)

CAP25 is the third annual statutory update to Ireland's Climate Action Plan under the Climate Action and Low Carbon Development (Amendment) Act 2021. As the final plan of Ireland’s first five-year carbon budget period (2021–2025), it builds on the economy-wide carbon budgets and sectoral emissions ceilings established in 2022. CAP25 continues the trajectory of previous plans, providing a refined roadmap for decisive action to halve emissions by 2030 and achieve net-zero by 2050.

In relation to peatlands, CAP25 reaffirms that the rehabilitation of bogs and the development of associated amenity and tourism opportunities remain a national priority. The plan includes the following action relevant to peatlands:

- Action JM/25/4: Support the restoration and rehabilitation of degraded peatlands.

Investment continues through Ireland's National Recovery and Resilience Plan, funded by the EU Recovery and Resilience Facility, which provides €108 million for the Enhanced Decommissioning, Rehabilitation and Restoration Scheme (EDRRS). This scheme aims to rehabilitate approximately 33,000 hectares of peatlands across 82 Bord na Móna bogs.

CAP25 also maintains and refines key metrics for wetland carbon abatement by 2030:

- 65,900 hectares of exploited peatlands to be rehabilitated in total by 2030.
- Continued progress under the LIFE Peatlands and People project, which has entered its final phase (2025–2027) to ensure the long-term sustainability of restoration outcomes and visitor experiences.

14.2.2.3 Guidance

The amount of carbon naturally cycled through the Earth's atmosphere, water bodies, soils, and living organisms far exceeds the volume added by human activities. However, the United Nations Framework Convention on Climate Change (UNFCCC) and the Intergovernmental Panel on Climate Change (IPCC) focus specifically on anthropogenic GHG emissions when setting climate targets. This is because human-induced emissions have the potential to disrupt the natural balance of the carbon cycle and increase the atmosphere's capacity to trap heat.

Carbon from biogenic sources, such as pristine peatlands, originates from atmospheric CO_2 absorbed through photosynthesis. Under natural conditions, this carbon would eventually return to the atmosphere through decomposition. As such, these emissions are not classified as anthropogenic and are excluded from international accounting frameworks like the Kyoto Protocol and the EU 20-20-20 targets (IPCC, 2006).

However, when peat is extracted, drained, milled, or burned for energy, these activities alter the natural carbon cycle and are considered anthropogenic emissions.

14.2.3 Desk Review

As part of the assessment, a desktop review was carried out to determine background information on the Application Site. The following sources of information were utilised in the desktop review:

- EPA IPC/IE Licence Register - Littleton Bog Group IPC Licence P0499-01 (https://epawebapp.epa.ie/terminalfour/ippc/ippc-view.jsp?regno=P0499-01, Accessed 21/10/2025)
- Met Eireann Historical 30-Year Average Meteorological Data for Mullingar Station (1978 – 2008) (https://www.met.ie/climate-ireland/1981-2010/mullingar.html, Accessed 23/10/2025)

This assessment will examine changes in carbon dioxide (CO_2) emissions associated with the dewatering of the bog to facilitate peat extraction and ancillary activities, as well as the subsequent decommissioning of the Application Site.

Given the partially retrospective nature of the assessment, the focus of this chapter is on existing or previously implemented measures aimed at mitigating the likely significant effects of peat extraction and ancillary activities at the Application Site. Any remaining or residual environmental impacts are also evaluated.

14.2.4 Carbon & Peatlands

A research project commissioned by Bord na Móna and conducted by the Forest Ecosystem Research Group at University College Dublin (Wilson & Farrell, 2007), titled CARBAL – Carbon Gas Balances in Industrial Cutaway Peatlands in Ireland, examined the carbon dynamics of industrial cutover peatlands. The study defined carbon balance as the net difference between carbon sequestered by vegetation and carbon released through autotrophic and heterotrophic respiration, methane (CH_4) emissions, and dissolved organic carbon (DOC) losses. A positive carbon balance indicates a net carbon sink, while a negative balance indicates a net carbon source.

The report explored various post-industrial land use scenarios, including commercial afforestation, natural regeneration, and wetland creation. It highlighted that pristine peatlands typically act as long-term carbon sinks due to high water tables, which promote conditions where photosynthetic carbon uptake exceeds respiratory losses. However, these ecosystems are also significant sources of CH_4, contributing approximately 23% of global emissions. CH_4 emissions are closely linked to water table levels, with lower tables reducing emissions. In pristine peatlands, plant-mediated transport accounts for 50–97% of CH_4 emissions.

Peat extraction significantly alters CO_2 dynamics. Drainage lowers the water table and reduces peat moisture content, while the removal of surface vegetation eliminates the system's carbon sequestration capacity, turning the peatland into a net CO_2 source. However, CH_4 emissions are substantially reduced or eliminated due to increased oxygenation and the absence of vegetation that facilitates CH_4 transport.

The study also reviewed evidence suggesting that the carbon sink function can be restored relatively quickly after peat extraction ceases, provided the water table is maintained near the surface and vegetation recolonization occurs rapidly. Rewetting and vegetation recovery can lead to renewed CH_4 emissions, though at lower levels than those observed in pristine peatlands.

In a wetland creation scenario involving a 60-hectare lake, the study found that all microsites acted as net carbon sources. CH_4 emissions peaked during summer due to higher temperatures and substrate availability, while winter emissions were lower due to elevated water tables. Vegetation recolonisation was identified as a critical step toward long-term carbon accumulation via photosynthesis. The study concluded that maintaining a high water table is essential, as aerobic decomposition occurs up to 10,000 times faster than anaerobic decomposition. A high water table not only reduces CO_2 emissions but also supports vegetation recovery, potentially restoring the peatland's carbon sink function over time. The long-term goal for wetland creation is to achieve a carbon balance where CH_4 losses are offset by CO_2 uptake.

Further research by Wilson et al. (2015) assessed emission factors across industrial and domestic Irish bogs to develop country-specific estimates. The study reported emission factors of 1.7 (±0.47) and 1.64 (±0.44) t CO_2-C ha^{-1} yr^{-1} for industrial and domestic sites, respectively—significantly lower than the Tier 1 emission factors in the IPCC 2013 Wetlands Supplement. Variations in emission factors were primarily attributed to differences in soil temperature, with Ireland's temperate oceanic climate contributing to relatively mild winters and cool summers.

14.2.5 Field Survey

No climate-specific field surveys have been completed to inform the preparation of this chapter.

14.2.6 Consultation

As part of the assessment, a scoping letter was sent out to various organisations, including the Department for Climate, Energy and the Environment; Department of Housing, Local Government and Heritage; the Environmental Protection Agency; Transport Infrastructure Ireland; the Office of Public Works; and others. Correspondence related to these consultations can be found in Table 2-5 of Chapter 2 - Background, Volume 2, in this rEIAR.

Of the responses received to date, there is one which makes reference to Climate. The Irish Peatland Conservation Council (IPCC) have asked that this substitute consent application be evaluated as "a critical assessment of the profound environmental debt incurred through decades of industrial extraction". The responses from IPCC state that the historical peat extraction has impacted carbon sequestration and is now being felt in the context of a national Climate and Biodiversity Emergency. We have considered this response from IPCC in the preparation of this rEIAR chapter.

No other climate-specific consultation was conducted.

14.2.7 Study Area

Unlike other disciplines, defining a specific study area for climate assessment is less straightforward, as climate impacts are not confined to a particular geographic location. Instead, climate-related impacts are evaluated in the context of Ireland's obligations under national and EU climate targets and policies. Accordingly, the study area for this assessment is the entire Republic of Ireland.

14.2.8 Impact Assessment Methodology

The following methodology has been applied to estimate the carbon and greenhouse gas (GHG) emissions associated with peat extraction and ancillary activities from 1988 to the present. Detailed calculations supporting this assessment are provided in Appendix 14.1, Volume 3. For the purposes of this assessment, the definition of GHGs follows Council Directive 2009/28/EC on the promotion of energy from renewable sources. According to Annex V, C. Methodology Point 5 of the Directive, the relevant GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—the three most significant contributors to climate change.

14.2.8.1 Peat Extracted

Bord na Móna peat extraction records describe annual extraction volumes of peat from the Application Site over the Peat Extraction Phase. With an average moisture content of 53.8% and assuming a carbon content in peat of 49% (Wilson et al. 2013) the annual average amount of carbon lost from the extraction of peat is then estimated using the following function:

$$(1-0.538) \times 0.49 \times \text{annual tonnage} = \text{Extracted peat } tCO_2\text{-eq } yr^{-1}$$

14.2.8.2 Emissions to atmosphere

The following information from Evan et al. (2017) is used to estimate the total emission of greenhouse gases associated with the Application Site.

Table 14-3: Emission factors for extractive peatlands from Table 4.1 pp. 39 of Evans et al. (2017)

	Direct CO_2 (Evans et al. 2017)	CO_2 from DOC* (IPCC 2014)	CO_2 from POC** (Evans et al. 2016)	Direct CH_4 (Evans et al. 2017)	CH_4 from drainage channels (IPCC 2014)	N_2O Direct (Evans 2017) + Indirect (IPCC 2006)
Industrial extration	6.44	1.14	5.0	0.20	0.68	0.38
Domestic extraction	4.73	1.14	0.89	0.20	0.68	0.27

All values in tCO_2-eq ha^{-1} yr^{-1}
*DOC = dissolved organic carbon
**POC = particular organic carbon

14.2.8.2.1 Direct CO_2 from Peat Extraction Areas

The peat extraction areas across the Application Site are determined during each peat extraction season (i.e. March to October) on the basis of peat tonnages required and site conditions.

The estimated average annual amount of direct CO_2 atmospheric emissions is therefore:

Total area subject to peat extraction (ha)×6.44 = Total emitted Carbon tCO_2-eq yr^{-1}

14.2.8.2.2 Methane (CH_4) from Drains and Ditches

The total combined length of drainage ditches within the Application Site was estimated. For the purposes of the calculation, it is assumed that each drain is a consistent 1m in width. The total emission arising from the drains is calculated as:

(Overall Length of Drain x Width of drains) (ha) x 0.68 = Carbon emission tCO_2-eq $ha^{-1}yr^{-1}$

14.2.8.2.3 Methane (CH_4) from Peat Extraction Areas

The average annual amount of direct methane CH_4 from the peat extraction areas is determined based on the production areas:

Total area subject to peat extraction (ha) × 0.2 = Carbon emission tCO_2-eq yr^{-1}

14.2.8.2.4 Surface Runoff

The emission rates for Dissolved Organic Carbon (DOC) and Particulate Organic Carbon (POC) were combined into an overall emission rate of 6.14 tCO_2-eq ha-1 yr-1. The total estimated amount of carbon lost through runoff was determined as follows:

Total area subject to peat extraction (ha) × 6.14 = Carbon emission tCO_2-eq yr^{-1}

14.2.8.2.5 Transport

Diesel consumption records were maintained for the entire Littleton Bog Group IPC Licence P0499-01 (14 bogs total). The Application Site comprises only a subset of this bog group, and diesel consumption specific to the Application Site could not be isolated from the wider Littleton Bog Group data. Therefore, we have adapted diesel consumption for the entire bog group in our carbon calculation. It is important to note that this constitutes a significant overestimation of the carbon emissions resulting from diesel consumption at the Application Site.

Diesel consumption records are available from the years 2006, 2008, 2009, 2010, 2013, 2014 and 2015. This data has been used to determine the average diesel consumption between 2006 and 2015: 655,695 litres per year.

Using conversion factors for "Gasoil/Diesel" provided by SEAI (43,308 MJ/t, 1,183 L/t, 7.33×10-5 tCO_2/MJ) the annual average amount of CO_2 generated by Bord na Móna machinery at the Application Site during this period was 1759 tCO_2 yr^{-1}.

14.3 Establishment of Baseline (July 1988)

14.3.1 Greenhouse Gas Emissions and Climate Baseline

While natural variations in climate have always occurred, the pace of change has accelerated significantly due to human activities. Climate change is now recognised as one of the most pressing global challenges, primarily driven by elevated concentrations of greenhouse gases (GHGs) in the atmosphere. These emissions largely originate from the combustion of fossil fuels for energy. Reducing reliance on coal, oil, and other fossil fuel-based energy sources is essential to lowering GHG emissions and mitigating climate change.

For the purposes of this assessment, the definition of GHGs follows Council Directive 2009/28/EC on the promotion of energy from renewable sources. According to Annex V, C. Methodology Point 5 of the Directive, the relevant GHGs are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O)—the three most significant contributors to climate change. Climate refers to the average weather conditions over time, while climate change denotes a substantial shift in these averages. Although climate change is a natural phenomenon, recent changes have been strongly influenced by anthropogenic GHG emissions, which are altering the Earth's atmosphere and intensifying the 'Greenhouse Effect'. This effect enhances the atmosphere's heat retention capacity, leading to rising global temperatures over recent decades. Among these gases, CO_2 from fossil fuel combustion is a major contributor.

National GHG emission trends are reported annually by the Environmental Protection Agency (EPA). The most recent publication, Ireland's Provisional Greenhouse Gas Emissions 1990–2024 (EPA, 2025), provides an overview of emissions in 2024 and trends since 1990. Ireland's provisional greenhouse gas emissions in 2024 were 5.4% below 1990 levels, marking a second consecutive year of below the baseline, according to the EPA. Key 2024 trends included an 8.9% reduction in Energy Industries emissions, an all-time low driven by the phase-out of peat, and a 1.7% decrease in Agriculture due to lower cattle numbers. Plate 14-1 (EPA 2025) illustrates these sectoral trends over the 1990-2024 period.

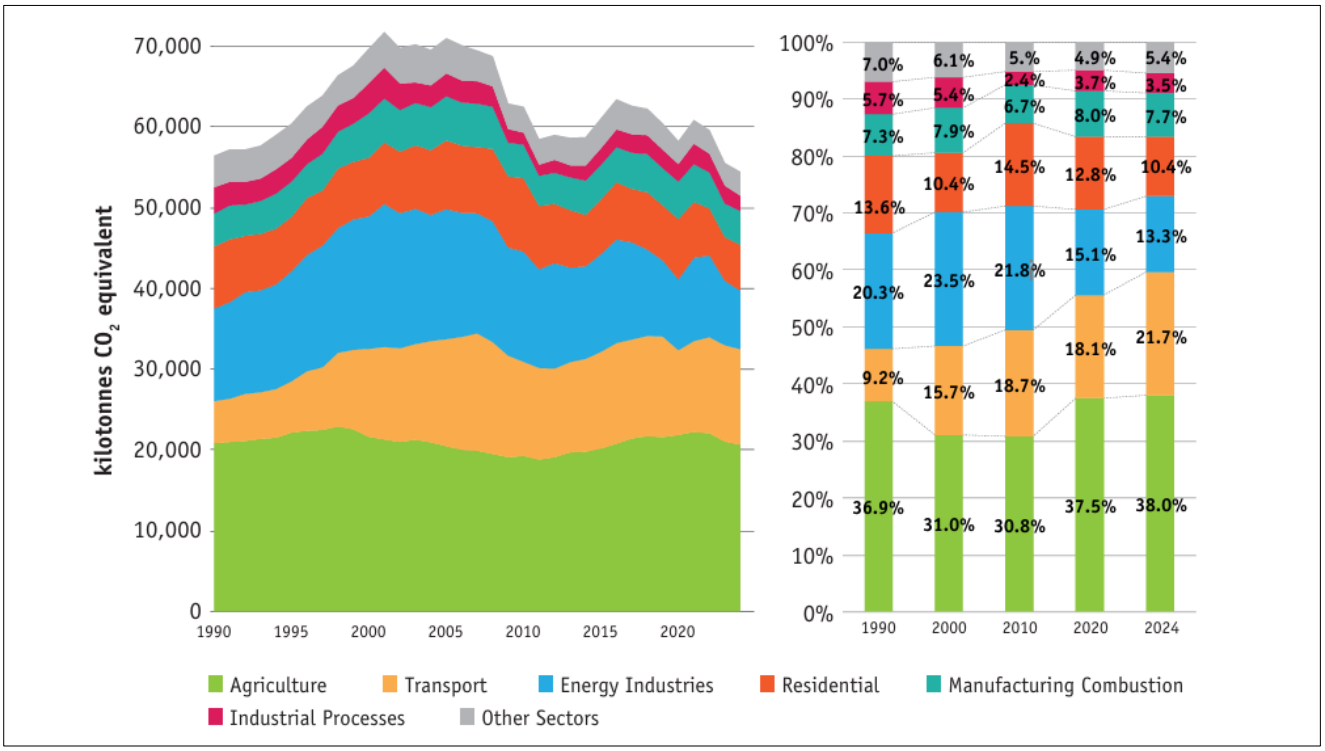

Plate 14-1: Trends in emissions for largest sectors 1990-2023 (Figure 25 [EPA, 2024])

It is evident from the EPA report that emissions in 1990—used as a proxy for the 1988 baseline—were lower than those recorded in 2022. Consequently, any increase in historical GHG emissions is considered more significant due to the lower baseline levels.

Regarding Ireland's current climate emissions baseline and compliance with the EU Effort Sharing Regulation (EU 2018/842) and national carbon budgets (see Table 14.1), EPA data published in July 2024 indicates that Ireland exceeded its 2023 annual emissions limit by 2.27 Mt CO_2e, without applying flexibility mechanisms. Table 14.4 presents the sectoral breakdown of 2023 emissions, with Agriculture accounting for the largest share (37.6%), followed by Transport (21.4%). Total national emissions (excluding LULUCF) were estimated at 55.01 Mt CO_2e, while provisional total emissions including LULUCF reached 60.62 Mt CO_2e.

By the end of 2024, Ireland had utilized approximately 82% (241.1 Mt CO_2e) of its total 295 Mt CO_2e carbon budget allocated for the first five-year cycle (2021–2025). This leaves just 18% for the final year of the period.

Table 14-4: National Greenhouse Gas Emissions in 2024

Category	2024 GHG emissions ($MtCO_2e$)	% of total GHG emissions
Electricity	7.20	12.5%
Transport	11.66	20.2%
Buildings (Residential)	5.61	9.7%
Buildings (Commercial and Public)	1.45	2.5%
Industry	6.00	10.4%
Agriculture	20.41	35.4%
Other*	1.42	2.5%
LULUCF	3.90	6.8%
National total excluding LULUFC	53.75	93.2%
National total including LULUFC	57.65	100.0%
Reproduced from latest emissions data on www.epa.ie *Other includes petroleum refining, F-gases and waste (emissions from solid waste disposal on land, solid waste treatment (composting and anaerobic digestion), wastewater treatment, waste incineration and open burning of waste).		

14.3.2 Meteorological Data

Ireland experiences a temperate, oceanic climate, characterised by mild winters and cool summers. The closest weather and climate monitoring station to the site, with long-term robust data, is located in Mullingar, Co. Westmeath, approximately 99 km north of the site. This Met Éireann station has recorded meteorological data over a 30-year period from 1979 to 2008.

Table 14.5 presents the data collected during this period. October was identified as the wettest month, while April was typically the driest. July recorded the highest average temperature, with a mean of 15.2°C. This dataset is considered representative of the weather conditions at the site for the July 1988 baseline.

Table 14-5: Monthly and Annual, Mean and Extreme Values in Weather data from Met Eireann Station in Mullingar (1979 - 2008)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
Temperature (degrees C)													
mean daily max	7.4	7.9	9.8	12.1	14.9	17.3	19.2	18.9	16.7	13.2	9.9	7.9	12.9
mean daily min	1.5	1.5	2.8	4.1	6.3	9.2	11.1	10.8	8.9	6.2	3.5	2.2	5.7
mean temperature	4.5	4.7	6.3	8.1	10.6	13.2	15.2	14.8	12.8	9.7	6.7	5	9.3
absolute max	13.8	15.4	19.1	21.6	25	28.3	29.7	29.1	25	20.1	17.3	14.6	29.7
min. maximum	-3.2	-0.6	1.4	4.1	0	10.1	10.9	11.4	10.6	6.3	2.7	-1.7	-3.2
max. maximum	11.6	11.5	11.5	12.5	12.7	15.3	17.4	18	16.8	15.4	12.5	12.4	18
absolute min.	-14.9	-6.6	-8	-4.4	-2.6	0.2	3.8	2.1	0	-4.4	-6.9	-12.4	-14.9
mean no. of days with air frost	9.9	8.9	5.5	3.1	0.4	0	0	0	0	1.5	5.4	8.2	43
mean no. of days with ground frost	17.9	16.2	14	10.8	5.1	0.8	0	0.1	1.7	6.3	12.1	15.4	100.4
mean 5cm soil	3.3	3.3	5	8.1	11.8	14.8	16.3	15.5	12.8	8.9	5.7	4.1	9.1
mean 10 cm soil	3.7	3.7	5.1	7.6	11	14.1	15.8	15.2	12.8	9.3	6.2	4.5	9.1
mean 20 cm soil	4.3	4.4	5.8	8.1	11.4	14.3	16.1	15.8	13.7	10.3	7.2	5.2	9.7
Relative humidity (%)													
mean at 0900 UTC	90.8	89.8	87.6	81.9	78.3	79.7	82.1	84.8	87.6	89.9	91.7	91.8	86.3
mean at 1500 UTC	83.4	77.8	72.8	68.1	67.1	69.1	69.9	70.6	72.1	77	82.2	85.9	74.7
Sunshine (hours)													
mean daily duration	1.8	2.5	3.2	4.9	5.8	5	4.6	4.6	3.9	3.2	2.2	1.6	3.6

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Year
greatest daily duration	8.2	9.9	10.9	13.6	15.4	15.9	15.3	14.4	12.2	10.1	8.6	7.3	15.9
mean no. of days with no sun	10.3	7.2	5.3	2.9	1.9	2.2	1.8	1.9	3.3	5.7	8.4	11	62
Rainfall (mm)													
mean monthly total	91.7	72	78.3	62.1	68.7	70.5	61.8	80.8	73.8	102.1	82.4	97.1	941.3
greatest daily total	30.3	24.7	29.5	27.6	26.1	52.9	26.6	58.2	42.1	48.8	43.7	38.8	58.2
mean no. of days with >= 0.2 mm	19	17	20	15	16	16	16	17	17	19	18	19	209
mean no. of days with >= 1.0 mm	15	13	15	11	12	11	11	13	12	14	13	14	154
mean no. of days with >= 5.0 mm	6	5	5	4	5	4	3	5	4	6	6	7	60
Wind (knots)													
mean monthly speed	9	9.1	9.1	7.7	7.3	6.7	6.4	6.3	6.7	7.5	7.8	8.3	7.6
max. gust	67	71	59	56	58	48	48	50	51	59	62	73	58.5
max. mean 10-minute speed	38	36	36	30	34	26	27	28	32	36	32	39	32.8
mean no. of days with gales	0.3	0.1	0.1	0	0	0	0	0	0	0.1	0	0.2	0.8
Weather (mean no. of days with)													
snow or sleet	5	4.4	3.5	1.6	0.2	0	0	0	0	0	0.4	2.7	17.8
snow lying at 0900UTC	2.7	0.9	0.8	0.1	0	0	0	0	0	0	0.1	1	5.7
hail	0.6	0.9	2	2	1.1	0.2	0.1	0.1	0.1	0.5	0.2	0.3	8.1
thunder	0.1	0.2	0.2	0.3	0.9	0.9	1.2	0.8	0.1	0.1	0.1	0.1	4.9
fog	3.4	3	2.4	2	1.8	1.3	1.9	2.9	4	4.1	4.1	4.3	35.1

14.4 Assessment of Significant Climate Effects

14.4.1 'Do-Nothing' Option

As outlined in the EPA Guidelines (May 2022), the description of 'Do-Nothing Effects' relates to the environment as it would be in the future should the proposed project not be carried out. The assessment period of this rEIAR commenced in 1988, a time at which peat extraction was already well-established at the site. In the context of this rEIAR, the Project has been ongoing since the baseline assessment year of 1988. As outlined in Section 3.3, peat extraction activities commenced at the Application Site in 1941 with the installation of drainage.

The 'Do-Nothing' option is defined as the Project (as described in Section 4.3 of Chapter 4 - Description of the Development, Volume 2) having ceased at the Application Site in 1988.

In the event of the cessation of the Project at the Application Site in 1988, it is assumed that those lands which by that point had not been subject to the installation of drainage and peat extraction would have remained as a relatively intact raised bog with varying raised bog habitats (such as bog woodland, fen, sphagnum mosses).

Subsequently, other land-use practices may also have taken place on the Application Site such as agricultural or commercial forestry, or other commercial or non-commercial uses. Under this 'Do-Nothing' option, IPC Licence Ref. P0499-01 would not have been granted by the EPA in 2001, and associated decommissioning and planned rehabilitation would not have occurred.

For those lands which as of 1988 had been subject to the installation of drainage in preparation for peat extraction but not peat extraction itself, it is assumed in the 'do-nothing' scenario that drainage would have remained insitu. Maintenance works to keep established drainage channels clear would have ceased as of 1988 in the 'do-nothing' scenario. It is likely that these areas would have been subject to natural recolonisation of the bog surface. Minor third party turbary activities likely would have occurred along the intact bog edges as was common practice at sites such as the Application Site.

Peat extraction was underway at the Application Site prior to the required date for the transposition of the EIA Directive in 1988. If peat extraction and related activities ceased from 1988 onwards, then the various residual effects, described throughout this rEIAR, would not have occurred.

However, consideration must be given to the following:

- The legislative mandate given to Bord na Móna in the form of the Turf Development Act 1946, as amended to acquire and develop peatlands; and,
- The uncertainty with respect to the planning status of the activity did not arise until 2019 and was not evident in 1988.

Therefore, this 'Do-Nothing' option was not the chosen option. Peat extraction and ancillary activities have occurred at the Application Site from July 1988 onwards. A decision to cease peat extraction at the Application Site was taken in 2017 and the Application Site needs to be considered in the context of regularising (without prejudice) the planning status of the lands to facilitate future development (subject to planning consent as required). The Application Site has and will continue to revegetate, and there will be a change from areas of cutover peatland to revegetated peatland. These are described in the individual chapters of the rEIAR.

In the event that Substitute Consent is not granted, in effect, the "Do Nothing" option represents the current situation as at the date of the application for Substitute Consent. As part of Bord na Móna's statutory obligations under IPC Licence requirements, Cutaway Bog Decommissioning and Rehabilitation Plans will continue to be implemented for the Application Site separate to, and independent of, the Substitute Consent application. The implementation of the plans is included in the impact assessment below.

The role of cutaway/cutover peatlands such as the Application Site as a significant potential resource for amenity, tourism, biodiversity enhancement and conservation, improvement in air quality, climate mitigation, renewable energy development and education are part of Bord na Móna's vision for the Application Site. The regularisation of the planning status of the Application Site is a significant facilitator in ensuring the sustainable use and management of these peatlands. If this does not occur, the opportunity to continue employment and alternative use of the Application Site for the potential resources and activities mentioned above will be significantly restricted.

14.4.2 References to Project Phases

For the purposes of this rEIAR, the Project is defined under three different timeframes termed 'phases':

- 'Peat Extraction Phase': peat extraction and ancillary activities at the Application Site from July 1988 to the cessation of peat extraction in 2017 (July 1988 – 2017). The Peat Extraction Phase is described in detail in Sections 4.4 to Section 4.7 of Chapter 4 - Description of Development, Volume 2.
- 'Current Phase: the management of the Application Site since 2017 to present day including decommissioning works and Rehabilitation Phase 1 works. The Current Phase is described in detail in Section 4.7 and Section 4.8 of Chapter 4 - Description of Development, Volume 2.
- 'Remedial Phase': the activities intended to be carried out at the Application Site into the future (Rehabilitation Phase 2 works). The Remedial Phase is described in detail in Section 4.9 of Chapter 4 - Description of Development, Volume 2.

14.4.3 Peat Extraction Phase (1988–2017)

Research indicates that lowering the water table accelerates peat oxidation, which in turn leads to increased CO_2 emissions. This effect is further exacerbated by the removal of vegetation and the exposure of underlying peat (Holmgren et al., 2006; Waddington & Price, 2000). However, the water table at the Application Site had already been lowered prior to 1988. Drainage may also have diminished the peat's ability to retain dissolved and particulate organic carbon. Carbon losses through leaching of these forms are typically calculated as a proportion of the gaseous carbon emissions from the peat.

Unless the site is rewetted or revegetated, the peat removed, or the remaining peat fully oxidised, degraded bogs will continue to act as sources of greenhouse gases. Due to drainage and vegetation removal, the peatland shifted from being a net CO_2 sink to a net CO_2 source (Wilson, 2013).

Using the assessment methodology outlined in Section 15.2.8, CO_2 emissions from peat extraction between July 1988 and 2017 were estimated. Over this 30-year period, a total of 4,840,011 tonnes of CO_2eq were released (see Appendix 14.1, Volume 3), averaging 161,334 tonnes CO_2eq per year. This annual figure represents approximately 0.48% of Ireland's non-ETS 2030 target of 33,381 kilotonnes of CO_2eq, as defined in Commission Implementing Decision (EU) 2020/2126 of 16 December 2020.

There was also potential for GHG emissions from vehicles accessing the Application Site. However, these GHG emissions were not considered significant in the context of Ireland's climate budgets and sectoral emissions ceilings (see Tables 14.1 and 14.2). Vehicle-related emissions likely decreased over time due to improvements in engine technology and fuel efficiency. Nonetheless, the primary source of GHG emissions during the Peat Extraction Phase was the removal of peat and the associated loss of carbon storage.

Overall, the extraction of peat and the resulting release of GHG emissions from the Application Site led to a long-term, direct, negative, and significant effect on the climate.

14.4.4 Current Phase (2017 – Present Day)

Since peat extraction ceased in 2017, carbon losses directly associated with extraction activities, and their impact on climate, are no longer relevant to the current phase. From 2017 to the present, Application Site activities have been limited to decommissioning and Rehabilitation Phase 1 works (refer to Section 4.8 of Chapter 4 - Description of the Development, Volume 2.

There may be minor GHG emissions, such as CO_2, resulting from vehicle movements during this phase. However, as outlined in Chapter 13 - Material Assets (including traffic and transport), Volume 2, traffic levels are expected to be minimal. Consequently, vehicle-related emissions are not anticipated to have a significant impact on Ireland's climate budgets or sectoral emissions ceilings (see Tables 14.1 and 14.2).

Fertilisers have been used at the Application Site during the Current Phase. While some fertilisers, such synthetic nitrogen-type fertilisers are a source of greenhouse gas emissions (N_20), the fertilisers which have been used on the Application Site are rock phosphate fertilisers. While there are GHG emissions associated with the mining, processing and transport of rock phosphate fertilisers, applying rock phosphate to the soil does not typically trigger the microbial processes that release N20. In fact, maintaining optimal soil phosphorous can actually reduce overall emissions by improving nitrogen use efficiency and promoting carbon sequestration via improved growth of vegetation, pulling more CO2 out of the atmosphere (Teagasc 2022).

Any climate effects during this phase are considered short-term, imperceptible, and neutral.

14.4.5 Remedial Phase

The primary objective of the Remedial Phase is to re-wet the bogs, which will help restore their function as carbon stores and enhance their potential to act as carbon sinks. Research by Wilson et al. (2012), referenced in Section 14.2.4, demonstrates that rehabilitating peatlands can offset some of the carbon emissions resulting from peat extraction.

However, the carbon sink capacity of the land following re-wetting will not fully match its original potential prior to peat removal in 1988. The goals of the Remedial Phase align with several key actions and priorities outlined in Ireland's Climate Action Plan 2025 (CAP25), particularly those focused on peatland rehabilitation in the midlands region.

While the enhanced carbon sink function will be less than its pre-extraction state, the Application Site will nonetheless contribute to Ireland's progress toward achieving net zero emissions by 2050. The effect on climate is considered long-term, neutral, and not significant.

14.4.6 Risk of Major Accidents and Natural Disaster

There are no records of any significant major accidents or disasters in relation to climate at the Application Site. Furthermore, the Current Phase and Remedial Phase are not predicted to result in any such accidents or disasters due to the minor level of works involved, when compared to the historic activities at the Application Site.

14.4.7 Cumulative and Indirect Effects

This assessment is based on IEMA and TII guidance which states that:

> *"the identified receptor for the GHG Assessment is the global climate and impacts on the receptor from a project are not geographically constrained, the normal approach for cumulative assessment in EIA is not considered applicable. By presenting the GHG impact of a project in the context of its alignment to Ireland's trajectory of net zero and any sectoral carbon budgets, this assessment will demonstrate the potential for the project to affect Ireland's ability to meet its national carbon reduction target. This assessment approach is considered to be inherently cumulative".*

The GHG emissions associated with the peat extraction and ancillary activities and the loss of the carbon sink potential of the land has been carried out in this assessment with the predicted emissions compared with Ireland's climate targets and emissions ceilings.

14.5 Control and Monitoring Measures

No specific control measures were implemented at the Application Site with respect to climate during the Peat Extraction Phase.

14.6 Residual Effects

14.6.1 Peat Extraction Phase (1988–2017)

Historic peat extraction at the Application Site has resulted in the removal of a natural carbon sink which has caused emissions of naturally sequestered CO_2 and other GHGs. The effect on climate as a result of this is considered direct, long-term, negative and significant.

14.6.2 Current Phase (2017 – Present Day)

There are no carbon losses associated with peat removal on-site during the Current Phase as peat extraction has ceased. Vehicle emissions and embedded emissions from the mining and processing of the fertilisers are not significant and are likely to be offset by carbon sequestration of vegetation growth. The effect on climate is short-term, imperceptible and neutral.

14.6.3 Remedial Phase

The primary focus of the Cutaway Bog Decommissioning and Rehabilitation Plans is re-wetting the bogs which will aid in restoring the ability of the Application Site to act as a carbon sink. With the restoration of the carbon sink potential of the land, albeit, to a lesser extent than the potential prior to the historic removal of the peat, the Application Site will aid in Ireland's trajectory towards net zero by 2050. Vehicle emissions and embedded emissions from the mining and processing of the fertilisers are not significant and are likely to be offset by carbon sequestration of vegetation growth. The effect on climate is considered long-term, neutral and not significant.

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