Proposed Derrygreenagh Power Project
Environmental Impact Assessment Report

Chapter 18: Climate

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There are no appendices relating to this EIAR chapter.

FIGURES

There are no figures relating to this EIAR chapter.

18.0 CLIMATE

18.1 Introduction

18.1.1 This chapter of the Environmental Impact Assessment Report (EIAR) describes the likely significant effects from the Proposed Development and Overall Project upon climate change, as well as the likely significant effects of climate change upon the Proposed Development and Overall Project.

18.1.2 A full description of the existing Site is presented in **Chapter 4,** while details of the Proposed Development and Overall Project are presented in **Chapter 5** of this EIAR. Consideration of reasonable alternatives is discussed in **Chapter 3.**

18.1.3 The Irish Environmental Protection Agency (EPA) *Guidelines on the information to be contained in Environmental Assessment Reports* (EPA, 2022a) have been considered in the development of this Chapter. However, it is important to note that climate change effects are highly nuanced and are inherently and fundamentally different to other environmental effects assessed in other EIAR chapters and should therefore be assessed accordingly. This is because climate change is a complex global phenomenon with a wide-ranging receiving environment and complex timescales. Furthermore, determining climate change effects requires desktop studies which rely upon available datasets, and a climate change assessment is therefore constrained to the limitations, baselines and timeframes of such datasets. Cumulative effects, which are assessed in other EIAR chapters, are not sensible for climate change assessment. In order to provide an appropriate technical methodology for the assessment of climate change effects, best practice guidelines are referenced throughout this chapter, and the terminologies and definitions of these referenced guidelines have been used instead of that of the EPA guidelines due to their being more appropriate for the climate change assessment. It should be noted that this approach to climate change chapters for EIARs is widely accepted and consistent with best practice.

18.1.4 The assessment of climate effects can be divided into two categories as required by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) and in line with the Institute of Environmental Management and Assessment (IEMA) guidance for climate change mitigation (IEMA, 2022) and adaptation (IEMA, 2020):

- **Climate Change Risk (CCR):** assessment of the vulnerability and resilience of the Proposed Development and Overall Project to the likely significant effects of climate change; and
- **Lifecycle Greenhouse Gas (GHG):** assessment of the likely significant effects to the climate of GHG emissions due to the Proposed Development and Overall Project, over the life of the Proposed Development and Overall Project.

18.1.5 This chapter has been prepared in compliance with Section 15(1) of the Climate Action and Low Carbon Development (Amendment) Act 2021 (GOI, 2021) in order to allow the competent authority (i.e., An Bord Pleanala) to, in so far as practicable, perform its functions in a manner consistent with:

- The most recent approved climate action plan,
- The most recent approved national long term climate action strategy,
- The most recent approved national adaptation framework and approved sectoral adaptation plans,
- The furtherance of the national climate objective, and

- The objective of mitigating greenhouse gas emissions and adapting to the effects of climate change in the State.

Statement of Authority

18.1.6 The names of the consultants who prepared this Chapter are as follows:

- Christopher Williams – Sustainability Consultant, AECOM
- Ben Murray – Associate Director, AECOM

18.1.7 The expertise of the consultants who prepared this Chapter is detailed in Appendix 1B.

18.2 Methodology

Climate Change Risk (CCR) Assessment

18.2.1 The methodology for assessment of Climate Change Risk (CCR) in this chapter has been developed in line with appropriate industry guidance for assessing climate change resilience and adaptation namely IEMA (IEMA, 2020), EU Commission Notice (2021/C 373/01) *Technical guidance on the climate proofing of infrastructure in the period 2021-2027* (EC, 2021a), and with consideration given to the EPA *Guidelines on the information to be contained in Environmental Assessment Reports* (EPA, 2022a)

18.2.2 The assessment includes all infrastructure and assets associated with the Proposed Development and Overall Project. It assesses the resilience against both gradual climate change *i.e*., chronic climate-related hazards and the risks associated with an increased frequency of severe weather events *i.e*., acute events.

Asset Components

18.2.3 When conducting a robust climate change risk and adaptation assessment, it is important to understand the individual components that make up the asset as each may be vulnerable to different climate variables in different ways. The key asset components that have been considered in this climate assessment include:

- Main assets (Power Plant Area, Electricity Grid Connection, and Gas Connection Corridor).
- Construction assets, plant and equipment.
- Staff and visitors on site.

Climate Variables

18.2.4 Key chronic and acute climate variables are identified taking into consideration the context of the Proposed Development and Overall Project, as per the IEMA guidance (IEMA, 2020). These are the variables which are assessed when assessing the climate change projection data, in order to assess the potential risks facing the Proposed Development and Overall Project.

18.2.5 Given the location of the Proposed Development and Overall Project and the classification of the asset as a Power Plant with electrical transmission infrastructure and gas connection infrastructure with ancillary buildings, the following chronic and acute variables were identified as relevant:

- **Temperature related:** changing air temperature, heat stress, temperature variability and frost days.
- **Wind-related:** changing wind patterns, storms.
- **Water-related:** changing precipitation patterns, drought, heavy precipitation and pluvial flooding. Coastal flooding is deemed not relevant due to the inland location of the Proposed Development and Overall Project.

Climate Baseline Data

18.2.6 For the purposes of the CCR assessment, a climate baseline is required in order to assess the extent of change when assessing climate projection data. Therefore, the climate baseline data must match the timeframe of the baseline used in the climate change models which are used for projection data. This assessment is conducted by means of a desktop study using available climate datasets. Therefore, the timeframes and locations used for the climate change data are subject to how the datasets have been defined.

18.2.7 For the purposes of the CCR assessment, the baseline conditions are based upon historic Met Éireann climate data (Met Éireann, 2020). This data was obtained from the closest meteorological station to the Site with the most complete set of historical climatic data which sufficiently covers the key variables identified in Section 18.2.4. The closest meteorological station appropriate for the purposes of the CCR assessment is Dublin Airport Weather Station, approximately 70km east of the Site. Data was collected for the climate variables described previously for the period 1981-2000. This baseline period was chosen as it matches the baseline period which the available climate change projections were based on.

Climate Change Projection Data

18.2.8 For this CCR assessment, two climate change scenarios were reviewed to provide decision-makers with a more holistic understanding of the range of potential climate futures possible, which is essential when understanding risk and developing appropriate risk mitigation measures (IEMA, 2020). These climate change projections used for this CCR assessment were based on Representative Concentration Pathway (RCP) 4.5 and RCP 8.5.

18.2.9 An RCP is a potential GHG concentration trajectory which represents a potential climate change scenario, considering socio-economic factors, climate policy, and climate action. RCP scenarios are adopted by the Intergovernmental Panel on Climate Change (IPCC) and are published in the IPCC Fifth Assessment Report, also known as the IPCC AR5 (IPPC, 2014). The RCPs include a stringent mitigation scenario (RCP 2.6), two intermediate scenarios (RCP 4.5 and RCP 6.0) and one scenario with very high GHG emissions (RCP8.5).

18.2.10 The different RCP scenarios are illustrated graphically in **Plate 18-1.**

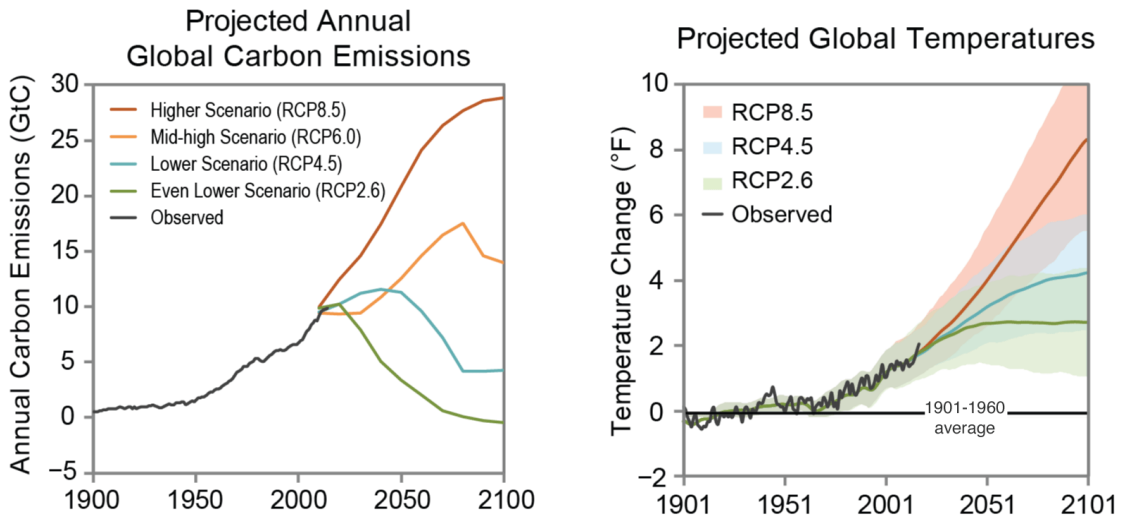

Plate 18-1. Illustration of RCP trajectories

18.2.11 RCP 4.5 is an intermediate scenario and represents a less steep decline in GHG emissions than the targets in RCP 2.6. RCP 4.5 represents a useful 'middle-of-the-road' scenario which accounts for an intermediate level of global climate change mitigation.

18.2.12 RCP 8.5 was also considered for this assessment as it represents a worst-case scenario in terms of climate change, which entails the scenario with the highest GHG emissions and the least action to address it. This scenario is useful in risk and contingency planning. This pathway has the highest emissions concentration and is marked by inadequate policy response and increased potential for physical asset damage. The RCP 8.5 scenario is useful as it allows one to plan for the worst potential climate change risks.

18.2.13 The climate change projection data used was gathered from Climate Ireland's *'Climate Data Explorer'* online platform (Climate Ireland, 2022a). The data available on this platform is based on Nolan and Flanagan's 2020 Ensemble of regional climate model projections for Ireland. The Climate Data Explorer provides climate change projection data for a variety of climate variables for a defined range of 20-year time slices. Due to the way these climate change models have been defined; this projection data is relative to a baseline period of 1981-2000. Whilst it is best practice to consider climate change projections from multiple time horizons, 2041-2060 is the timeframe for which most supporting data was available. This period is relevant as it encompasses the large majority of the design life of the asset.

Risk Assessment

18.2.14 Using the climate change projection data gathered, a series of risks were identified for the climate hazards determined to be relevant to the Proposed Development and Overall Project. For each risk identified, the asset components impacted were noted. With this information, an initial assessment of Climate Change Risk was undertaken based on an analysis of likelihood and consequence. Risk mitigation measures were then subsequently identified which reduce risk and increase resilience, after which a residual assessment of risk was performed. Risk mitigation measures are measures included in the design and operation of the Proposed Development and Overall Project that work to mitigate climate risk.

18.2.15 This assessment was informed by the risk framework and the descriptors of likelihood and consequence adopted from EU Technical guidance (EC, 2021a). The likelihood and consequence descriptors and the risk matrix are provided in **Table 18-1** and **Table 18-2**, respectively. The risk matrix is provided in **Table 18-3** below. When assessing the consequence of a specific risk, several categories were considered including:

- Asset damage / engineering / operational.
- Health and safety.
- Environmental.
- Social.
- Financial (for single extreme event of annual average impact).
- Reputation.
- Cultural heritage and cultural premises.

Table 18-1: Assessment of Likelihood (EC, 2021a)

Likelihood term	Qualitative	Quantitative
Rare	Highly unlikely to occur	5%
Unlikely	Unlikely to occur	20%
Moderate	As likely to occur as not	50%
Likely	Likely to occur	80%
Almost certain	Very likely to occur	95%

Table 18-2: Assessment of Consequence (EC, 2021a)

RISK AREAS	MAGNITUDE OF CONSEQUENCE				
	Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Asset damage, engineering, operational	Impact can be absorbed through normal activity	Adverse event that can be absorbed by taking business continuity actions	A serious event that requires additional emergency business continuity actions	A critical event that requires extraordinary / emergency business continuity action	Disaster with the potential to lead to shut down or collapse or loss of the asset / network
Health and safety	First aid case	Minor injury, medical treatment	Serious injury or lost work	Major or multiple injuries, permanent injury or disability	Single or multiple fatalities
Environment	No impact on baseline environment. Localised in the source area. No recovery required	Localised within site boundaries. Recovery measurable within one month of impact	Moderate harm with possible wider effect Recovery in one year	Significant harm with local effect Recovery longer than one year. Failure to comply with environmental regulations / consent	Significant harm with widespread effect. Recovery longer than one year. Limited prospect of full recovery
Social	No negative social impact	Localised, temporary social impacts	Localised, long-term social impacts	Failure to protect poor or vulnerable groups. National, long-term social impacts	Loss of social licence to operate. Community protests
Financial	x % IRR < 2% of turnover	x % IRR 2-10% of turnover	x % IRR 10-25% of turnover	x % IRR 25-50% of turnover	x % IRR > 50% of turnover
Reputational	Localised, temporary impact on public opinion	Localised, short-term impact on public opinion	Local, long-term impact on public opinion with adverse local media coverage	National, short-term impact on public opinion. negative national media coverage	National, long-term impact with potential to affect the stability of the government
Cultural Heritage and cultural premises	Insignificant impact	Short term impact. Possible recovery or repair.	Serious damage with wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society

Table 18-3: Risk Matrix as adopted from EU Technical guidance (EC, 2021a)

		CONSEQUENCE				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
LIKELIHOOD	**Rare**	Low (NS)	Low (NS)	Medium (NS)	High (S)	Extreme (S)
	Unlikely	Low (NS)	Low (NS)	Medium (NS)	High (S)	Extreme (S)
	Moderate	Low (NS)	Medium (NS)	High (S)	Extreme (S)	Extreme (S)
	Likely	Medium (NS)	High (S)	High (S)	Extreme (S)	Extreme (S)
	Almost certain	High (S)	High (S)	Extreme (S)	Extreme (S)	Extreme (S)
NS – Not significant; S - Significant						

Greenhouse Gas (GHG) Assessment

18.2.16 The study area for the Proposed Development and Overall Project is not one which can be easily defined as it relates to Greenhouse Gas Emissions (GHG). The effects of GHGs are not geographically constrained and, subsequently, all development has the potential to result in a cumulative effect in terms of GHGs.

18.2.17 The study area for the GHG assessment, considers all direct GHG emissions that may arise due to the construction, operational and decommissioning phases of the Proposed Development and Overall Project. This includes direct emissions arising onsite e.g., from the combustion of fuel used in construction plant as well as indirect emissions from activities offsite, such as transport of materials, waste and workers and embedded carbon in construction materials and products.

Sensitive Receptors

18.2.18 The global climate has been identified as a sensitive receptor for the GHG assessment. The effects of GHGs are not geographically constrained and, subsequently, all development has the potential to result in a cumulative effect in terms of GHGs. For the purpose of assessing the impact on this receptor, GHG emissions arising from the Proposed Development and Overall Project have been presented in the context of Ireland's national GHG inventory and carbon reduction targets.

GHG Calculation

18.2.19 A lifecycle approach to calculating the GHGs has been adopted. This approach considers specific timescales and emissions from different lifecycle phases of a proposed development: construction phase, operational phase and decommissioning phase.

18.2.20 GHG emissions, arising from the construction and operational activities, and embodied carbon in materials of the Proposed Development and Overall Project, have been calculated by multiplying activity data by a relevant emission factor, in accordance with the GHG Protocol methodology (WRI & WBCSD, 2004), which is the best practice approach as cited in the IEMA guidance (IEMA, 2022):

Activity data x GHG emissions factor = GHG emissions in mass of CO_2e

18.2.21 Activity data is a quantifiable measure of activity, such as operating hours or volumes of fuels used. Emission factors convert the activity data into GHG emissions. Activity data has been sourced from the Applicant, however, where specific data is not available, a mix of assumptions and industry benchmarks have been used to fill data gaps, in line with the IEMA guidance (IEMA, 2022). Choice of assumptions has been informed by

information from the Applicant, as well as industry best practice and assumptions used for similar assessments, all in accordance to IEMA guidance (IEMA, 2022).

18.2.22 Emission factors and calculation methods have been sourced from publicly available sources, including Sustainable Energy Authority of Ireland (SEAI) (SEAI, 2021), UK Department for Business, Energy and Industrial Strategy (BEIS) (BEIS, 2021), National Highways (National Highways, 2021) and the Bath University ICE (Bath University, 2019). These are widely accepted as industry best practice sources and are in in accordance with IEMA guidance (IEMA, 2022).

18.2.23 In line with the GHG Protocol (WRI & WBCSD, 2004), when calculating GHG emissions, the seven Kyoto Protocol GHGs have been considered, specifically:

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Sulphur hexafluoride (SF_6)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Nitrogen trifluoride (NF_3).

18.2.24 These gases are referred to in this Chapter under the encompassing definition of 'GHGs', with the unit of tCO_2e (tonnes CO_2 equivalent) or $MtCO_2e$ (mega tonnes of CO_2 equivalent).

18.2.25 **Table 18-4** outlines the potential GHG activity sources associated with the lifecycle stages of the Proposed Development and Overall Project. These emission sources have been identified based on the context of the Proposed Development and Overall Project, information from the Applicant, and assumptions used for similar projects, all in accordance with IEMA guidance (IEMA, 2022).

Table 18-4: Potential Sources of GHGs

PHASE	ACTIVITY	PRIMARY EMISSIONS SOURCES
Baseline	Existing Bord na Móna depot site (Derrygreenagh Works) Peat lands Agricultural lands	Derrygreenagh Works fuel and energy use
Site Enabling and Construction Phase	Pre-construction activity within Site (inc. demolition works within Power Plant Area)	Fuel consumption from construction plant, vehicles and generators. Loss of carbon stocks.
	Raw material extraction and manufacturing	Embodied GHGs in the materials used for construction of the Proposed Development and Overall Project as a result of the excavation, processing and transportation.
	Transport to Site	Fuel used for transportation of construction materials to Site.
	Construction activity within the Site	Energy (electricity, fuel, etc.) consumption from plant, vehicles, and generators.

PHASE	ACTIVITY	PRIMARY EMISSIONS SOURCES
	Transport of construction workers	Fuel consumption for transportation of construction workers to / from Site.
	Waste disposal	Fuel used for transportation of waste materials from Site.
Operational Phase	Operation of the Proposed Development and Overall Project	Operational energy use in buildings (e.g., any liquid fuels, gases and purchased electricity). Combustion of fuel (gas and distillate fuel) to produce energy.
	Building / infrastructure maintenance	Maintenance of buildings and infrastructure / assets in operational stage.
Decommissioning Phase	Transport to the Site	Fuel used for transportation of demolition plant and machinery to Site.
	Demolition activity within the Site	Energy (electricity, fuel, etc.) consumption from plant, vehicles, and generators.
	Transport of workers	Fuel consumption for transportation of workers to / from Site.
	Waste disposal	Fuel used for transportation of waste materials from Site.

GHG Significance Criteria

18.2.26 The IEMA guidance on GHG (IEMA, 2022) states that the following three principles need to be considered when evaluating the significance:

- All project GHG emissions will contribute to climate change.
- Climate change has the potential to lead to significant environmental consequences that may affect all topics in the EIA Directive (e.g., Biodiversity, Water, Landscape, Geology, Air Quality, Human Health).
- As such that any GHG emissions or reductions from a project might be considered significant.

18.2.27 Based on these principles, the IEMA guidance states that *"the significance of a project's emissions should therefore be based on its net impact over its lifetime, which may be positive, negative or negligible"* (IEMA, 2022).

18.2.28 The guidance has identified two major considerations when assessing the significance of a project's GHG emissions: alignment to a trajectory towards net zero by 2050, and mitigation of GHG emissions. It is down to the professional judgment of the practitioner to determine how best to contextualise and assess the significance of a project's GHG impact.

- **Alignment to 2050 Net Zero Trajectory**: The IEMA guidance states that the crux of assessing significance is "not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". The trajectory of GHG emissions associated with the Proposed Development and Overall Project has therefore been factored into the assessment criteria.
- **GHG Mitigation**: The IEMA guidance also emphasises the importance of implementing GHG mitigation measures to help minimise GHG emissions, regardless of the magnitude of emissions, and states that the level of mitigation

should be used to assess the significance of GHG emissions. This has therefore been factored into the assessment criteria for the GHG assessment.

18.2.29 Based on the above two considerations, and in line with criteria outlined in the IEMA guidance, the following significance table, as shown in **Table 18-5**, will be used to assess the significance of GHG emissions arising as a result of the Proposed Development and Overall Project.

Table 18-5 : Significance of Effects for GHGs Impact Assessment (IEMA, 2022)

EFFECTS	SIGNIFICANCE LEVEL	DESCRIPTION
Significant adverse	Major adverse	• The project's GHG impacts are not mitigated; • The project has not complied with do-minimum standards set through regulation, nor provide reductions required by local or national policies; and • No meaningful contribution to Ireland's trajectory towards net zero.
	Moderate adverse	• The project's GHG impacts are partially mitigated; • The project has partially complied with do-minimum standards set through regulation, and have not fully complied with local or national policies; and • Falls short of full contribution to Ireland's trajectory towards net zero.
Not Significant	Minor adverse	• The project's GHG impacts are mitigated through 'good practice' measures; • The project has complied with existing and emerging policy requirements; and • Fully in line to achieve Ireland's trajectory towards net zero.
	Negligible	• The project's GHG impacts are mitigated beyond design standards; • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero.
Beneficial	Beneficial	• The project's net GHG impacts are below zero and it causes a reduction in atmosphere GHG concentration; • The project has gone well beyond existing and emerging policy requirements; and • Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

18.2.30 It is suggested that sectoral, local, or national carbon budgets can be used, as available and appropriate, to contextualise a project's GHG impact. IEMA guidance states that the significance of a project should not be determined based on whether it will release GHG emissions, or the magnitude of the GHG emissions. Significance should be evaluated by establishing if the project will contribute to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero.

Assumptions and Limitations

Climate Change Risk (CCR) Assessment

18.2.31 Climate change projections, by their very nature, are associated with a range of assumptions and limitations. There are inherent uncertainties associated with climate projections. Climate projections are not predictions of the future but are rather a projection based on the best available data and science.

18.2.32 To account for this uncertainty, a 'high' emissions scenario (RCP 8.5) has been included in this assessment, which is consistent with the precautionary principle.

Greenhouse Gas (GHG) Assessment

18.2.33 There is currently no specific carbon emissions threshold, which if exceeded, is considered significant. Assessment of significance of emissions therefore cannot be judged objectively.

18.2.34 To address this, the assessment has used a combination of approaches. The GHG emissions are put into context using national carbon budgets. In addition to this, using the latest version of IEMA guidance, the significance of emissions has been assessed based on '*whether the Proposed Development contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050*'.

18.3 Policy, Regulatory and Guidance Framework

18.3.1 This section identifies and briefly describes the policy, regulation, and guidance of relevance to the assessment of potential climate and climate change impacts associated with the construction, operation and decommissioning of the Proposed Development and Overall Project.

Policy

International

18.3.2 **Paris Agreement** (Conference of the Parties No. 21, 2016): A legally-binding agreement within the UN Framework Convention on Climate Change which requires all signatories to strengthen their climate change mitigation efforts to hold the increase in the global average temperature to well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels this century (UNFCCC, 2016). The Agreement works on five-year cycles and countries take actions to reduce GHGs through nationally determined contributions (NDCs).

18.3.3 **United Nations Sustainable Development Goals** (UN, 2015): The UN SDGs are a global call for action by all countries – developed and developing – to promote prosperity while protecting the planet. The goals were agreed to by UN member states in 2015 and reflect the economic, social and environmental dimensions of sustainable development. The following SDGs are of relevance to the Proposed Development and overall project:

- SDG 7: Affordable and clean energy
- SDG 8: Decent work and economic growth
- SDG 11: Sustainable cities and communities
- SDG 12: Responsible consumption and production
- SDG 13: Climate action

EU

18.3.4 **European Green Deal and European Climate Law:** Policy initiatives by the European Commission aim to improve the quality of life in the EU by making Europe net zero by 2050 (EC, 2019). Under the European Green Deal a series of ambitious packages have been launched to make the EU's climate, energy, land use, transport and taxation policies fit for reducing net GHG emissions. Amongst these initiatives are the EU Strategy on Climate Adaptation, and the EU Taxonomy for Sustainable Activities. The European Climate Law 2021 writes into law the objectives set out above in the European Green Deal for Europe's economy and society to become climate-neutral by 2050.

18.3.5 **EU Effort Sharing Legislation:** Establishes binding annual GHG emission targets for Member States for the period 2021-2030. These targets concern emissions from most sectors not included in the EU ETS, such as transport, buildings, agriculture, and waste.

18.3.6 **EU Directive 2011/92/EU amended by Council Directive 2014/52/EU** (Official Journal of the EU, 2014): An EU Directive on the assessment of the effects of certain public and private projects on the environment. Annex IV specifically requires that EIAs require information to be included on 'the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change'.

18.3.7 **EU Emissions Trading System (Directive 2003/87/EC (as amended))** (EC, 2021b). The EU's current binding target for 2030 is to cut GHG emissions by at least 40% below 1990 levels. This target is split across the EU Emissions Trading System (ETS) and non-

ETS sectors. The ETS is a 'cap and trade' system whereby an EU-wide limit, or cap, is set for the overall volume of GHG that can be emitted by qualifying stationary installations (including power plants) and the aviation sector. The cap is reduced over time so that total emissions fall. It covers about 45% of EU emissions, but only about 29% of total emissions in Ireland (GOI, 2019). Since 2021, the overall European emissions cap has reduced by an annual rate of at least 2.2%.

National

18.3.8 **Climate Action and Low Carbon Development (Amendment) Act 2021** (GOI, 2021): This Act commits Ireland to move to a climate resilient and climate neutral economy by 2050. The Act brings in a requirement for 5-year carbon budgets to commence in 2021, the first two budgets demonstrating a 51% reduction against a 2018 baseline by 2030.

18.3.9 **Climate Action Plan 2024** (GOI, 2023a): This Plan provides a detailed plan to achieve a 51% reduction in GHG emissions by 2030 and achieve net zero emissions by no later than 2050. The Climate Action Plan sets out the roadmap for achieving Ireland's carbon budgets and reaching net zero by 2050. The carbon budgets, proposed by the Climate Change Advisory Council, were adopted 6 April 2022 and are outlined in **Table 18-6** below.

Table 18-6: Proposed Carbon Budgets (GOI, 2023a)

	2021-2025	2026-2030	2031-2035 (Provisional)
Carbon Budget (Mt CO_2e)	295	200	151

18.3.10 The plan continues to recognise the importance of delivering and accelerating the development of a highly flexible power system supporting the roll out of renewables including the provision of 2GW gas-fired power generation.

18.3.11 **National Energy and Climate Plan (NECP) 2021-2030** (DCCAE, 2020a): The 2020 NECP incorporates all planned energy and climate policies and measures identified up to the end of 2019. The Plan has been created in part to support the EU's 2050 net zero target and strategy to develop an energy union to provide EU consumers secure, sustainable, competitive, and affordable energy through the five dimensions. The five dimensions include:

- Security, solidarity and trust;
- A fully integrated internal energy market;
- Energy efficiency;
- Climate action, decarbonising the economy; and
- Research, innovation and competitiveness.

18.3.12 **White Paper Ireland's Transition to a Low Carbon Energy Future 2015-2030** (DCCAE, 2020b): This white paper confirms the need to enhance energy security and to provide a reliable supply of gas to meet demand as part of a sustainable energy transition to a low carbon future.

18.3.13 **National Adaptation Framework (NAF)** (GOI, 2018): Prepared under the Climate Action and Low Carbon Development Act 2015, the NAF was launched in January 2018 setting out the national strategy to reduce the vulnerability of the country to the negative effects of climate change and to avail of positive impacts.

Regional

18.3.14 **Offaly Climate Change Adaptation Strategy 2019-2024** (Offaly Co. Co., 2019): Formed under the NAF, this strategy sets out the strategic priorities, measures, and responses for climate adaptation within the county.

18.3.15 **Offaly County Development Plan (CDP) 2021-2026** (Offaly Co. Co., 2021): The strategic vision of this CDP is to create a sustainable and competitive county that supports the health and wellbeing of its people and places. Chapter 3 "Climate Action and Energy" of the CDP sets out County Offaly's approach in minimising the negative impacts of climate change and enhancing climate resilience while actively directing and facilitating effective positive climate action.

18.3.16 **Westmeath Climate Change Adaptation Strategy** (Westmeath Co. Co., 2019): This strategy takes on the role as the primary instrument at local level to bring forward the implementation of climate resilient actions.

18.3.17 **Westmeath County Development Plan (CDP)** (Westmeath Co. Co., 2021): This CDP sets out the Council's proposed policies and objectives for the development of the county from over the 2021-2027 period.

18.3.18 **Local Authority Climate Action Plans (CAPs)** (GOI, 2023b): By March 2024, all local authorities in Ireland will be required to implement local authority CAPs, as per the Climate Action and Low Carbon Development (Amendment) Act 2021. These plans will include climate change risk assessment, baseline emissions inventories, and proposals for decarbonisation zones, at a local authority level.

Regulation

EU

18.3.19 **European Communities (Greenhouse Gas Emissions Trading) Regulations 2012** (GoI, 2012): These Regulations implement Directive 2003/87/EC and provide for the implementation in Ireland of a scheme for greenhouse gas emissions allowance trading within the European Community.

18.3.20 **F-Gas Regulation 2014** (EC, 2014): The F-gas Regulation was introduced to control emissions of fluorinated greenhouse gases. The F-gas Regulation states that electrical switchgear shall not be subject to leak checks if it is equipped with a pressure or density monitoring device.

National

18.3.21 **S.I. No. 93 of 1999 European Communities (Environmental Impact Assessment) (Amended) Regulation, 1999** (GoI, 1999). Article 25 (2) (b) of this Regulation specifically requires an environmental impact statement to contain (Irish Statute Books, 1999): "*a description of the aspects of the environment likely to be significantly affected by the proposed development, including in particular…climatic factors"*.

Guidance

International

18.3.22 **Institute of Environmental Management and Assessment (IEMA) *Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation*** (IEMA, 2020): Best practice methodological guidance to conducting a climate change risk assessment for an environmental impact assessment report, in accordance with the EU Directive 2011/92/EU (as amended by EU Directive 2014/52/EU).

18.3.23 **Institute of Environmental Management and Assessment (IEMA) Assessing Greenhouse Gas Emissions and Evaluating their Significance** (IEMA, 2022): Best practice methodological guidance to conducting a greenhouse gas assessment for an environmental impact assessment report, in accordance with the EU Directive 2011/92/EU (as amended by EU Directive 2014/52/EU).

18.3.24 **PAS 2080:2023 Carbon Management in Infrastructure** (BSI, 2023): Global standard for best practice carbon management in infrastructure.

18.3.25 **World Resource Institute (WRI) & World Business Council for Sustainable Development (WBCSD) (2004).** ***A Corporate Accounting and Reporting Standard. The Greenhouse Gas Protocol. Revised Edition*** (WRI & WBCSD, 2004): Global standard for best practice GHG accounting.

18.3.26 **Royal Institute of Charted Surveyors (RICS) Whole Life Carbon Assessment for the Built Environment** (RICS, 2017): Best practice guidance for consistent and accurate carbon measurement in the built environment, in alignment to the PAS 2080:2023 standard.

18.3.27 **The Intergovernmental Panel on Climate Change (IPCC) Climate Change 2023: Synthesis Report** outlines that holding the global average temperature increase to 1.5°C limit this century is still achievable through sharing and implementing best practices, technology, effective policy measures, and mobilising sufficient finance.

18.3.28 **European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment** (EC, 2013): Aims to help Member States improve the way in which climate change is integrated in environmental impact assessments carried out across the EU.

National

18.3.29 **Environmental Protection Agency (EPA)** ***Guidelines on the information to be contained in Environmental Impact Assessment Reports*** **(EPA 2022a):** Provides guidelines for compiling EIARs in Ireland.

18.3.30 The latest **EPA Greenhouse Gas Emissions 1990-2022 inventory data** (EPA, 2023b) (updated July 2023) **and 2022-2040 projections** (EPA, 2023c) (updated June 2023) indicate that energy sector emissions dropped in 2022 from the previous year by 1.8% but that arresting growth in emissions in line with objectives is a challenge in the context of a growing economy.

18.4 Baseline Environmental Conditions and Constraints

18.4.1 The Study Area with regard to Climate, is not something that can be confined to regional or localised areas, as outlined in Section 18.2 above. It is not sensible to consider an individual baseline study area for the individual elements of the Proposed Development and Overall Project, given the geographical nature of this climate assessment and the localised nature of the area.

18.4.2 It is against this backdrop that the baseline environmental conditions and constraints described below are applicable to all the elements of the Proposed Development and Overall Project, i.e., the Power Plant Area, the Electrical Grid Connection, and the Gas connection Corridor.

Climate Change Risk (CCR) Assessment

18.4.3 The baseline for the CCR assessment is established according to the methodology described in Section 18.2.

18.4.4 To effectively use climate change projections for the purpose of a risk assessment, it is necessary to first understand the historical climate conditions experienced at the location.

Past Extreme Events

18.4.5 The following events are examples of extreme climatic conditions experienced at Dublin Airport Weather Station (closest weather station to the Proposed Development and Overall Project appropriate for the CCR assessment) in the past 50 years:

- Highest recorded temperature was 28.7 °C in August 1990.
- Lowest recorded temperature was -7.9 °C in December 1995.
- Highest daily rainfall was 92.6mm on 11 June 1993.
- Highest ten-minute mean wind speed was 55 knots on 24 December 1997.

Climate Change Projection Data

18.4.6 In understanding how the climate is expected to change in the future it is important to consider broad, qualitative trends as well as location specific, quantitative projection data. Both are presented below.

Qualitative Projection Data

18.4.7 Future trends for key climate variables in Ireland are summarised in **Table 18-7** below using information available from Climate Ireland's[1] '*Essential Climate Information'*.

[1] Climate Ireland is designed and developed by the Centre for Marine and Renewable Energy (MaREI) at University College Cork (UCC) and the Irish Centre for High End Computer (ICHEC) at the National University of Ireland, Galway and as part of the EPA-funded project A Climate Information Platform for Ireland (ICIP).

Table 18-7: Key Messages – Climate Change Projections Ireland (Climate Ireland, 2022b)

CLIMATE VARIABLE	KEY TREND	KEY MESSAGE
Surface air temperature	Average surface air temperatures are expected to increase everywhere and across all seasons.	An increase in the intensity and duration of heatwaves is expected.
Precipitation	An increase in seasonality in precipitation can be expected with significant decreases projected for spring and summer and increases for winter.	An increase in the occurrence of extreme rainfall events is likely.
Hydrology	Increasing seasonality in hydrological regimes can be expected with decreased summer and increased winter flows likely.	Flood risk is expected to increase across Ireland while increases in the frequency of drought conditions is also expected.
Windspeed	An increase in the intensity of extreme windstorms is expected.	Projections indicate a decrease in wind speeds for summer and increases for winter.
Sea level rise	Sea levels are expected to increase for all Irish coastal areas.	Projected changes in sea level will magnify the impacts of changing storm surge and wave patterns in coastal areas.
Waves and surges	A decrease in mean and extreme wave heights are expected by the end of the century.	The magnitude and intensity of storm wave heights are expected to increase.

18.4.8 Storms and associated high wind speeds are a major natural hazard risk identified in Ireland. Most notable high impact storm events were those that occurred during the winters of 2013/2014 and 2015/2016, resulting in widespread disruption from high winds and persistent flooding (McCarthy *et al.,* 2016). Future projections show an increase in the number of very intense winter storms over Ireland from the middle of the century. It should be noted that because extreme storms are rare events, storm projections should be considered with a level of caution (EPA, 2015).

Quantitative Projection Data

18.4.9 The quantitative climate change projection data for the Proposed Development and Overall Project is presented in **Table 18-8** alongside the climate baseline data for the study area. As previously discussed in Section 18.2, the climate change scenarios adopted of this CCR assessment were RCP 4.5 and RCP 8.5.

Table 18-8: Climate Change Baseline and Projection Data

CLIMATE VARIABLE	BASELINE (1981-2000)	CLIMATE CHANGE PROJECTION RCP4.5 (2041-2060)	CLIMATE CHANGE PROJECTION RCP8.5 (2041-2060)	PROJECTED CHANGE IN LIKELIHOOD	CLIMATE PROJECTION SOURCE
Temperature					
Mean annual maximum daily temperature (°C)	13.2	+1.2°C (14.4°C)	+1.5°C (14.7°C)	↑	Climate Ireland, 2022
Mean annual minimum daily temperature (°C)	6.3	+1.2°C (7.5°C)	+1.5°C (7.8°C)	↑	Climate Ireland, 2022

CLIMATE VARIABLE	BASELINE (1981-2000)	CLIMATE CHANGE PROJECTION RCP4.5 (2041-2060)	CLIMATE CHANGE PROJECTION RCP8.5 (2041-2060)	PROJECTED CHANGE IN LIKELIHOOD	CLIMATE PROJECTION SOURCE
Mean summer maximum daily temperature (°C)	18.6	+1.3°C (19.9°C)	+1.7°C (20.3°C)	↑	Climate Ireland, 2022
Mean winter minimum daily temperature (°C)	2.8	+1°C (3.8°C)	+1.5°C (4.3°C)	↑	Climate Ireland, 2022
Number of frost days per annum	24.4	-39.0% 14.9	-52.1% 11.7	↑↓	Climate Ireland, 2022
Heatwaves (no.)	-	4.4	6.3	↑	Climate Ireland, 2022
Highest temperature for baseline period (°C)	28.7	-	-	-	Met Éireann, 2022
Lowest temperature for baseline period (°C)	-7.9	-	-	-	Met Éireann, 2022
Rainfall					
Mean annual rainfall (mm)	747.2	-3.9% (718.1)	-1.7% (734.5)	↑↓	Climate Ireland, 2022
Mean summer rainfall (mm)	185.7	-8.2% (170.5)	-8.4% (170.1)	↓	Climate Ireland, 2022
Mean winter rainfall (mm)	191.2	-3.10% (185.3)	+2% (195.0)	↑↓	Climate Ireland, 2022
Wettest month on average (mm)	December	-	-	-	Met Éireann, 2022
Driest month on average (mm)	July	-	-	-	Met Éireann, 2022
Wet days >20mm (%)	3.8	+8.5% (4.1)	+13.8% (4.3)	↑	Climate Ireland, 2022
Very wet days >30mm (%)	1.0	+35.0% (1.4)	+36.5% (1.4)	↑	Climate Ireland, 2022
Summer dry days (%) (5 consecutive days where daily precipitation <1mm)	-	+18.5%	+17.6%	-	Climate Ireland, 2022
Highest daily rainfall (mm) for baseline period	92.6	-	-	-	Met Éireann, 2022
Other					
Snowfall	-	-51.2%	-61.6%	↓	Climate Ireland, 2022
Mean wind speed (knot)	10.1	-1.60% (9.9)	-2.30% (9.9)	↓	Climate Ireland, 2022
Highest gust (knot)	76	-	-	-	Met Éireann, 2022
Potential Evapotranspiration (mm)	1.5	+5.0% (1.6)	+5.7% (1.6)	↑	Climate Ireland, 2022
Sea level rise (m)	-	+0.2	+0.2	↑	World Bank, 2022
Storms	The number of very intense storms is projected to increase over the North Atlantic region in the future (2041-2060), under RCP8.5. Projections suggest that the winter track of these storms may extend further south and over Ireland more often. Under RCP4.5, the projections of future intense storm tracks have a similar, but weaker signal.			-	EPA, 2015

Table 18-9: Climate Variables Definitions (Climate Ireland, 2022b)

CLIMATE VARIABLE	DEFINITION
Summer dry days	Projected change number of dry periods defined as at least 5 consecutive days on which daily precipitation <1mm
Heatwaves	Periods of at least three consecutive days where maximum temperatures exceed >95% of the normal monthly distribution
Wet days	Projected change (%) in number of days with rainfall >20mm
Very wet days	Projected change (%) in number of days with rainfall >30mm
Frost days per annum	Projected change (%) in the number of days when minimum temperatures are <0°C
Wind speed	Projected change (%) in windspeed at 10m elevation
Sea level rise	Median projections of regional sea level rise, relative to a 1995-2014 baseline
Snowfall	Projected change (%) in the snowfall

Greenhouse Gas Assessment

18.4.10 The baseline environment or the “Do Nothing Scenario” refers to the scenario in which the Proposed Development and Overall Project is not progressed. In this baseline scenario, the existing area would remain in its current state (i.e., cutaway bog) and the Proposed Development and Overall Project would not be developed.

18.4.11 The existing site was previously used as a base for historic Bord na Móna peat harvesting operations and includes an existing office, stores and workshop complex (Derrygreenagh Works) in situ on the Power Plant Area. The site is no longer used for peat harvesting, but the existing infrastructure is still present. Consequently, there are no activities on the existing site which cause material GHG emissions. Therefore, there are no significant GHG emissions associated with the baseline scenario.

18.4.12 For the purposes of the GHG assessment, in accordance with the methodology described in Section 18.2, the baseline scenario refers to the state of zero GHG emissions due to the Proposed Development and Overall Project.

18.5 Predicted Impacts

Do-Nothing Scenario – Climate Change Risk (CCR) Assessment

18.5.1 As explained in the methodology in Section 18.2 and the description of the baseline in Section 18.4, the study area of the CCR assessment is the climate change risks facing the Proposed Development and Overall Project. In the Do-Nothing Scenario, the Proposed Development and Overall Project does not go ahead, and therefore there are no climate change risks facing the Proposed Development and Overall Project since the Proposed Development and Overall Project do not exist.

18.5.2 The Do-Nothing Scenario therefore represents a state of no climate change risks facing the Proposed Development and Overall Project, for the purposes of this CCR assessment.

Do-Nothing Scenario – Greenhouse Gas (GHG) Assessment

18.5.3 As explained in the methodology in Section 18.2 and the description of the baseline in Section 18.4, the study area of the GHG assessment is the GHG emissions resulting from the Proposed Development and Overall Project. In the Do-Nothing Scenario, the Proposed Development and Overall Project does not go ahead, and therefore there are no GHG emissions from the Proposed Development and Overall Project since it does not exist. Furthermore, as explained in Section 18.4., there are no material GHG emissions from the existing site of the Proposed Development and Overall Project.

18.5.4 The Do-Nothing Scenario therefore represents a state of zero GHG emissions due to the Proposed Development and Overall Project, for the purposes of this GHG assessment.

Power Plant Area - Climate Change Risk (CCR) Assessment

18.5.5 The initial climate change risks (i.e., before considering mitigation measures) for the Power Plant Area are presented in the risk register in **Table 18-10**.

Table 18-10: Initial climate change risk register for Power Plant Area

RISK IDENTIFICATION							INITIAL RISK						SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
			Power Plant Area	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
Construction													
1	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) result in an inaccessible construction site or health and safety risk to workers, causing restricted working hours and a delay in operations.		•	•	Construction disruption Health and safety	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
2	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) cause damage to construction materials, plant, and equipment.		•		Construction asset damage	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Not significant
3	Extreme temperatures	Extreme temperatures result in unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Rare	Minor	Low	Not significant
4	Extreme rainfall	Extreme rainfall results in flooded areas and unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
Operation													
5	Extreme heat	Extreme heat causes overheating of electrical equipment, as well as heat damage, deformation, cracking and thermal expansion of building surfaces and pavements.	•			Asset damage	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
6	Extreme heat	Extreme heat leads to increase in ambient temperature of buildings, impacting the thermal comfort of building users.			•	Health and safety	Rare	Minor	Low	Rare	Minor	Low	Not significant
7	Extreme heat	Extreme heat results in reduced efficiency in CCGT and OCGT operations.	•			Engineering / operational	Unlikely	Minor	Low	Moderate	Minor	Low	Not significant
8	Extreme rainfall	Extreme rainfall event leads to flooding of surfaces which has implications on safety, asset damage, and the operation of the plant.	•		•	Asset damage / engineering / operational Health and safety	Rare	Moderate	Low	Unlikely	Moderate	Medium	Not significant
9	Extreme weather events (e.g., storms)	Extreme weather events such as storms cause damage to plant infrastructure and equipment, causing stoppages in operation.	•		•	Asset damage / engineering / operational Health and safety	Rare	Moderate	Low	Unlikely	Moderate	Medium	Not significant

18.5.6 As seen **Table 18-10**, the CCR assessment identified nine risks for the Power Plant Area, four related to construction and five related to operation. **Table 18-11** below highlights the initial risk profile for both climate change scenarios assessed.

Table 18-11: Initial Risk Profile for the Power Plant Area

RISK RATING	MODERATE EMISSIONS SCENARIO RCP 4.5 2040-2060	HIGH EMISSIONS SCENARIO RCP 8.5 2040-2060
	Initial risk profile	**Initial risk profile**
Low	6	6
Medium	3	3
High	0	0
Extreme	0	0

18.5.7 Of the risks identified, four were related to extreme temperatures, three were related to storms, and two were associated with extreme rainfall, particularly with regards to pluvial flooding. The three '**Medium'** risks relate to extreme storms in the construction phase, as well as extreme storms and flooding in the operational phase, which pose the risks of asset damage and endangering the health and safety of people of site. The rest of the risks are of a relatively lower likelihood and consequence and are therefore rated as '**Low'**.

18.5.8 Using the risk matrix in **Table 18-3** which includes the significance criteria for Climate Change Risk, the significance of climate change risk for the Power Plant Area can be assessed. According to the significance criteria in **Table 18-3**, all risks are deemed '**Not Significant**' for the Power Plant Area. Therefore, it can be concluded that climate change risk is '**Not Significant**' for the Power Plant Area.

Power Plant Area - Greenhouse Gas Assessment

Power Plant Area - Construction Phase Impacts and Effects

18.5.9 To assess the magnitude of the climate change impacts through GHGs associated with construction of the Power Plant Area, the emissions that would be associated with the Power Plant Area activities have been calculated and shown in **Table 18-12** based on the assumptions listed below, as informed by information from the Applicant, industry best practice and assumptions from similar assessments:

- The infrastructure area footprint (m^2) of the Power Plant Area was used to estimate construction phase emissions using RICS benchmarks (RICS, 2017). These embodied carbon emission factors cover GHG emissions associated with the manufacturing of raw materials as well as the GHG emissions associated with the construction process.
- It has been assumed that, subject to successful grant of planning permission, the construction phase of the Power Plant Area will begin in 2024 and will be complete in 2027.

Table 18-12: Power Plant Area Construction GHG Emissions

LIFECYCLE STAGE	PROJECT ACTIVITY / EMISSION SOURCE	GHG EMISSIONS (tCO_2e)
Construction	Upfront embodied carbon - Power Plant Area	42,180

18.5.10 As stated in Section 18.2.26, all emissions are considered significant. To contextualise the level of significance, emissions are compared to the Irish carbon budgets. The emission contribution from the construction of the Power Plant Area are shown in **Table 18-13**.

Table 18-13: Power Plant Area Construction GHG Emission Compared to Carbon Budget

CARBON BUDGET	TOTAL BUDGET ($MtCO_2e$)	TOTAL CONSTRUCTION EMISSIONS WITHIN PERIOD ($MtCO_2e$)	% CONTRIBUTION OF CONSTRUCTION EMISSIONS TO CARBON BUDGET
2021-2025	295	0.02109	0.007%
2026-2030	200	0.02109	0.011%

Power Plant Area - Operational Phase Impacts and Effects

18.5.11 To assess the magnitude of the climate change effects through GHGs associated with operating and maintaining the Power Plant Area, the Applicant has identified three scenarios which represent the range of potential operational scenarios over the lifetime of the Power Plant Area.

18.5.12 These three scenarios are assessed in order to assess the full picture of potential lifetime GHG effects associated with the Power Plant Area.

18.5.13 All three scenarios use the following assumptions, as provided by the Applicant:

- The operational life of the Power Plant is assumed to be 25 years;
- The operational phase is assumed to begin in 2028;
- CCGT efficiency is 59%; and
- OCGT efficiency is 37%.

18.5.14 Scenario 1 represents normal operation as anticipated by the Applicant. This is the most likely operational scenario. This scenario is comprised of the following assumptions, as provided by Applicant:

- CCGT operates on natural gas at 540 MWe for 6239 hours per year;
- CCGT operates on distillate at 540 MWe for 2 hours per month, for testing purposes;
- OCGTs operate on natural gas at total of 140 MWe for 292 hours per year; and
- OCGTs operate on distillate at total of 140 MWe for 2 hours per month, for testing purposes.

18.5.15 Scenario 2 represents the plant running at the maximum possible operating hours its design can achieve. This is not likely to be done in practice, but this scenario is assessed to indicate the maximum extent of GHG emissions the plant can emit if it is run on natural gas for the maximum possible operating hours its design can achieve. This scenario is comprised of the following assumptions, as provided by the Applicant:

- CCGT operates on natural gas at 570 MWe for 8,736 hours per year;
- CCGT operates on distillate at 570 MWe for 2 hours per month, for testing purposes;
- OCGTs operate on natural gas at total of 140 MWe for 8,736 hours per year; and
- OCGTs operate on distillate at total of 140 MWe for 2 hours per month, for testing purposes.

18.5.16 Scenario 3 represents the emergency scenario where the plant switches to distillate as its main fuel source. This is not likely to be done in practice, but this scenario is assessed to indicate the maximum extent of GHG emissions the plant can emit if it is run on distillate for the maximum possible operating hours its design can achieve. This scenario is comprised of the following assumptions, as provided by the Applicant:

- CCGT operates on natural gas at 570 MWe for 500 hours per year;
- CCGT operates on distillate at 570 MWe for 8,260 hours per year;
- OCGTs operate on natural gas at total of 140 MWe for 500 hours per year; and
- OCGTs operate on distillate at total of 140 MWe for 8,260 hours per year.

18.5.17 Calculated according to the methodology described in Section 18.2, the GHGs from operating the Power Plant Area over the assumed 25-year nominal design life, according to the three scenarios, are displayed in **Table 18-14**.

Table 18-14: Operational GHG Emissions (Power Plant only)

LIFECYCLE STAGE	PROJECT ACTIVITY / EMISSION SOURCE	Scenario	ANNUAL GHG EMISSIONS (tCO_2e/yr)	LIFETIME GHG EMISSIONS (tCO_2e)
Operation	Operational energy use	Scenario 1	1,393,853	34,846,324
		Scenario 2	2,802,376	70,059,391
		Scenario 3	3,888,823	97,220,572

18.5.18 As presented in **Table 18-14**, the lifetime GHG emissions of normal operation of the plant are estimated to be approximately 34,846,324 tCO_2e. Annual GHG emissions of normal operation of the plant are estimated to be approximately 1,393,853 tCO_2e.

18.5.19 However, if the plant is run on natural gas at the maximum operating hours it is designed to be capable of, the plant can result in maximum lifetime emissions of up to 70,059,391 tCO_2e, which equates to maximum annual emissions of up to 2,802,376 tCO_2e.

18.5.20 In the emergency case where the plant switches to distillate as its main fuel source, maximum emissions can be even higher, up to 97,220,572 tCO_2e, with annual emissions equating to 3,888,823 tCO_2e.

18.5.21 In light of Ireland's national climate objective to achieve net zero carbon by 2050, and in line with IEMA guidance on *Assessing Greenhouse Gas Emissions and Evaluating their Significance* (IEMA, 2022), the GHG effect of the Power Plant Area under each of the three scenarios has been reviewed in line with Ireland's current carbon budgets to 2035 (**Table 18-15**).

Table 18-15: Operational Emissions of Power Plant Area Compared to Carbon Budgets

CARBON BUDGET	TOTAL BUDGET (Mt CO_2e)	TOTAL OPERATIONAL EMISSIONS WITHIN PERIOD (Mt CO_2e)	% OF CONTRIBUTION OF OPERATIONAL EMISSIONS
2026-2030	200	4.18	2.09%
		8.41	4.20%
		11.67	5.83%
2031-2035	151	6.97	4.62%
		14.01	9.28%
		19.44	12.88%

18.5.22 It should be noted that the overall assessment of significance of a development may be affected by whether it is viewed in isolation, or relative to a counterfactual scenario in which the development does not go ahead. When viewed in isolation, the Power Plant Area will result in an increase in carbon dioxide emissions to the atmosphere.

18.5.23 When considering the plant in isolation before the consideration of any GHG mitigation measures, the GHG effects of the Power Plant Area can be defined using the criteria set out in **Table 18-5** as '**Major Adverse**' which would be classified as '**Significant**'. This is because, when viewed in isolation and before considering any embedded GHG mitigation measures, the GHG effects of the Power Plant Area are not mitigated and the Power Plant Area makes no meaningful contribution to Ireland's trajectory towards net zero.

18.5.24 However, the embedded GHG mitigation measures considered in the design of the Power Plant Area are discussed in Section 18.6, and the residual GHG effects viewed in the broader context of the Irish energy policy are considered in Section 18.7.

Power Plant Area - Decommissioning Phase Impacts and Effects

18.5.25 The Power Plant Area will have a design life of 25 years. At the end of the design life, the Power Plant Area would either be decommissioned, or the lifetime could potentially be extended. Decommissioning or extension of the lifetime of the asset would therefore be expected to commence in 2052.

18.5.26 At the end of its operating life, all above-ground equipment associated with the Power Plant Area will be decommissioned and removed from the Site. It is not envisaged that the electrical grid connection infrastructure or gas connection corridor would be subject to decommissioning. Once constructed the grid connection will be an important part of Ireland's National Grid Infrastructure which will be managed by EirGrid and ESB as TAO, while the gas connection corridor will be managed by Gas Networks Ireland (GNI).

18.5.27 Prior to removing the plant and equipment, all residues and operating chemicals will be cleaned out from the plant and disposed of at a suitably licenced facility. The bulk of the plant and equipment will have some limited residual value as scrap or recyclable materials and may be recycled following decommissioning. In contrast to the construction emissions, there will be no materials required (*i.e.*, concrete, stone, etc.) during the decommissioning phase, which typically accounts for the majority of construction phase emissions. Emission factors for the disposal of wastes are typically lower than the emission factors for the production of the same materials (the embodied carbon). Decommissioning activities are also envisaged to take place over a much shorter period of time (i.e., <1 year) compared to the construction phase.

18.5.28 Decommissioning activities requiring the use of plant and machinery will therefore emit GHGs, but the emissions are expected to be significantly less than those calculated for the construction phase given the shorter duration. The impacts are therefore not likely to be significant in terms of the Republic of Ireland's (ROI's) national GHG inventory or the ability of the ROI to meet its carbon budgets.

18.5.29 During decommissioning, the Integrated Pollution Control (IPC) licence for the Power Plant Area will be amended to surrender the lands associated with the Power Plant Area. The surrender of the licence for this area will be subject to a Closure, Restoration and Aftercare Management Plan (CRAMP) which will be prepared at a later date and will be agreed with the EPA.

Electricity Grid Connection – Climate Change Risk Assessment

18.5.30 The initial climate change risks (i.e., before considering mitigation measures) for the Electricity Grid Connection are presented in the risk register in **Table 18-16**.

Table 18-16: Initial climate change risk register for Electricity Grid Connection

RISK IDENTIFICATION							INITIAL RISK						SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
			Electricity Grid Connection	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
Construction													
1	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) result in an inaccessible construction site or health and safety risk to workers, causing restricted working hours and a delay in operations.		•	•	Construction disruption Health and safety	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
2	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) cause damage to construction materials, plant, and equipment.		•		Construction asset damage	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Not significant
3	Extreme temperatures	Extreme temperatures result in unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Rare	Minor	Low	Not significant
4	Extreme rainfall	Extreme rainfall results in flooded areas and unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
Operation													
5	Extreme heat	Extreme heat causes overheating of electrical equipment, as well as heat damage to electrical infrastructure.	•			Asset damage	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
6	Extreme heat	Extreme heat leads causes heat stress for maintenance workers.			•	Health and safety	Rare	Minor	Low	Rare	Minor	Low	Not significant
7	Extreme rainfall	Extreme rainfall event leads to flooding which can damage substations and underground cables, disrupting electricity connection.	•			Asset damage / engineering / operational Health and safety	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Not significant
8	Extreme weather events (e.g., storms)	Extreme weather events such as storms cause damage to overhead lines disrupting electricity connection.	•			Asset damage / engineering / operational Health and safety	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Not significant

18.5.31 The climate change risk assessment identified eight risks for the Electricity Grid Connection, four related to construction and four related to operation. **Table 18-17** below highlights the initial risk profile for both climate change scenarios assessed.

Table 18-17: Initial Risk Profile for the Electricity Grid Connection

RISK RATING	MODERATE EMISSIONS SCENARIO RCP 4.5 2040-2060	HIGH EMISSIONS SCENARIO RCP 8.5 2040-2060
	Initial risk profile	Initial risk profile
Low	5	5
Medium	3	3
High	0	0
Extreme	0	0

18.5.32 Of the risks identified, three were related to extreme temperatures, three were related to storms, and two were associated with extreme rainfall, particularly with regards to pluvial flooding. The three '**Medium'** risks relate to extreme storms in the construction phase, as well as extreme storms and flooding in the operational phase, which pose the risks of asset damage and endangering the health and safety of people of site. The rest of the risks are of a relatively lower likelihood and consequence and are therefore rated as '**Low'**.

18.5.33 Using the risk matrix in **Table 18-3** which includes the significance criteria for climate change risk, the significance of climate change risk for the Electricity Grid Connection can be assessed. According to the significance criteria in **Table 18-3,** all risks are deemed **'Not Significant'** for the Electricity Grid Connection. Therefore, it can be concluded that climate change risk is **'Not Significant'** for the Electricity Grid Connection.

Electricity Grid Connection - Greenhouse Gas Assessment

Electricity Grid Connection - Construction Phase Impacts and Effects

18.5.34 To assess the magnitude of the climate change impacts through GHGs associated with construction of the Electricity Grid Connection, the emissions that would be associated with the Electricity Grid Connection activities have been calculated and shown in **Table 18-18** based on the assumptions listed below which are based on information received by the Applicant, industry best practice, and assumptions from similar assessments:

- The infrastructure area footprint (square meterage of substations and metres of overhead line and underground cable) of the Electricity Grid Connection was used to estimate construction phase emissions using RICS benchmarks (RICS, 2017) and literature factors (Gareth *et al.*, 2010).
- It has been assumed that, subject to successful grant of planning permission, the construction phase of the Electricity Grid Connection will begin in 2024 and will be complete in 2027.

Table 18-18: Electricity Grid Connection Construction GHG Emissions

LIFECYCLE STAGE	PROJECT ACTIVITY / EMISSION SOURCE	GHG EMISSIONS (tCO_2e)
Construction	Upfront embodied carbon - Electricity Grid Connection	13,306

18.5.35 As stated in Section 18.2.26, all emissions are considered significant. To contextualise the level of significance, emissions are compared to the Irish carbon budgets. The emission contribution from the construction of the Electricity Grid Connection are shown in **Table 18-19**.

Table 18-19: Electricity Grid Connection Construction GHG Emission Compared to Carbon Budget

CARBON BUDGET	TOTAL BUDGET ($MtCO_2e$)	TOTAL CONSTRUCTION EMISSIONS WITHIN PERIOD ($MtCO_2e$)	% CONTRIBUTION OF CONSTRUCTION EMISSIONS TO CARBON BUDGET
2021-2025	295	0.00665	0.002%
2026-2030	200	0.00665	0.003%

Electricity Grid Connection - Operational Phase Impacts and Effects

18.5.36 The Electricity Grid Connection, once operational, will be limited to intermittent maintenance and monitoring activities and therefore will not result in material operational emissions. As a result, operational emissions from the Electricity Grid Connection are deemed immaterial for the purposes of this assessment.

Electricity Grid Connection – Decommissioning Phase Impacts and Effects

18.5.37 The Electricity Grid Connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (ESBNI and EirGrid for electricity) as part of the national grid electricity. Upon decommissioning of the Power Plant Area, the 220 kV substation and 400 kV substation and associated transmission infrastructure will remain insitu and form part of the national grid infrastructure.

18.5.38 There will be no decommissioning phase emissions associated with the Electricity Grid Connection.

Gas Connection Corridor – Climate Change Risk Assessment

18.5.39 The initial climate change risks (i.e. before considering mitigation measures) for the Gas Connection Corridor are presented in the risk register in **Table 18-20**.

Table 18-20: Initial climate change risk register for the Gas Connection Corridor

RISK IDENTIFICATION							INITIAL RISK						SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
			Gas Connection Corridor	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
Construction													
1	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) result in an inaccessible construction site or health and safety risk to workers, causing restricted working hours and a delay in operations.		•	•	Construction disruption Health and safety	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
2	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) cause damage to construction materials, plant, and equipment.		•		Construction asset damage	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Not significant
3	Extreme temperatures	Extreme temperatures result in unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Rare	Minor	Low	Not significant
4	Extreme rainfall	Extreme rainfall results in flooded areas and unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
Operation													
5	Extreme heat	Extreme heat leads causes heat stress for maintenance workers.			•	Health and safety	Rare	Minor	Low	Rare	Minor	Low	Not significant
6	Extreme rainfall	Extreme rainfall event leads to flooding which can damage underground pipelines, disrupting gas supply.	•			Asset damage / engineering / operational Health and safety	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Not significant

18.5.40 The climate change risk assessment identified six risks for the Gas Connection Corridor, four related to construction and two related to operation. **Table 18-21** below highlights the initial risk profile for both climate change scenarios assessed.

Table 18-21: Initial Risk Profile for the Gas Connection Corridor

RISK RATING	MODERATE EMISSIONS SCENARIO RCP 4.5 2040-2060	HIGH EMISSIONS SCENARIO RCP 8.5 2040-2060
	Initial risk profile	Initial risk profile
Low	4	4
Medium	2	2
High	0	0
Extreme	0	0

18.5.41 Of the risks identified, two were related to extreme temperatures, two were related to storms, and two were associated with extreme rainfall, particularly with regards to pluvial flooding. The two '**Medium'** risks relate to extreme storms in the construction phase, as well as flooding in the operational phase, which pose the risks of asset damage and endangering the health and safety of people of site. The rest of the risks are of a relatively lower likelihood and consequence and are therefore rated as '**Low'**.

18.5.42 Using the risk matrix in **Table 18-3** which includes the significance criteria for climate change risk, the significance of climate change risk for the Gas Connection Corridor can be assessed. According to the significance criteria in **Table 18-3**, all risks are deemed **'Not Significant'** for the Gas Connection Corridor. Therefore, it can be concluded that climate change risk is **'Not Significant'** for the Gas Connection Corridor.

Gas Connection Corridor - Greenhouse Gas Assessment

Gas Connection Corridor - Construction Phase Impacts and Effects

18.5.43 To assess the magnitude of the climate change impacts through GHGs associated with construction of the Gas Connection Corridor, the emissions that would be associated with the Gas Connection Corridor activities have been calculated and shown in

18.5.44 **Table** 18-22 based on the assumptions listed below which are based on information provided by the Applicant, industry best practice, and assumptions from similar assessments:

- The infrastructure area footprint (metres of pipeline) of the Gas Connection Corridor was used to estimate construction phase emissions using the emission factor from the National Grid Carbon Interface Tool (National Grid, 2023).
- It has been assumed that, subject to successful grant of planning permission, the construction phase of the Gas Connection Corridor will begin in 2024 and will be complete in 2027.

Table 18-22: Gas Connection Corridor Construction GHG Emissions

LIFECYCLE STAGE	PROJECT ACTIVITY / EMISSION SOURCE	GHG EMISSIONS (tCO_2e)
Construction	Upfront embodied carbon - Gas Connection Corridor	3,453

18.5.45 As stated in Section 18.2.26, all emissions are considered significant. To contextualise the level of significance, emissions are compared to the Irish carbon budgets. The emission contribution from the construction of the Gas Connection Corridor are shown in **Table 18-23**.

Table 18-23: Gas Connection Corridor Construction GHG Emission Compared to Carbon Budget

CARBON BUDGET	TOTAL BUDGET ($MtCO_2e$)	TOTAL CONSTRUCTION EMISSIONS WITHIN PERIOD ($MtCO_2e$)	% CONTRIBUTION OF CONSTRUCTION EMISSIONS TO CARBON BUDGET
2021-2025	295	0.00173	0.001%
2026-2030	200	0.00173	0.001%

Gas Connection Corridor - Operational Phase Impacts and Effects

18.5.46 The Gas Connection Corridor, once operational, will be limited to intermittent maintenance and monitoring activities and therefore will not result in material operational emissions. As a result, operational emissions from the Gas Connection Corridor are deemed immaterial for the purposes of this assessment.

Gas Connection Corridor – Decommissioning Phase Impacts and Effects

18.5.47 The Gas Connection Corridor will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks. At the end of its design life, it is expected that the gas connection pipeline may have residual life remaining, and the operational life may be extended if appropriate and/or the asset refurbished and retained as part of the national transmission network. The end-of-life of the Gas Connection Corridor is therefore determined by the transmission asset operators and service operators and is not definitive at this stage.

18.5.48 There will be no decommissioning phase emissions associated with the Gas Connection Corridor.

18.6 Mitigation and Enhancement Measures

18.6.1 A number of mitigation measures have been considered in the design (i.e., are embedded in the design) of the Proposed Development and Overall Project which mitigate the effects of its GHG emissions and climate change risks.

18.6.2 With regards to climate change risks, mitigation measures refer to measures which reduce the impact of climate change risks on the Proposed Development and Overall Project.

18.6.3 With regards to GHG emissions, mitigation measures refer to measures to reduce the amount of GHG emissions associated with the Proposed Development and Overall Project.

Power Plant Area – Climate Change Risk Assessment

18.6.4 The following climate change risk mitigation measures are embedded in the design of the Power Plant Area, and are applicable for mitigating climate change risks across construction, operating and decommissioning phases.

- Flood protection designed to withstand 1:1000 year flood;
- For periods of drought, site water abstraction is capable of exceeding the daily site water requirement;
- Infrastructure is to be maintained and monitored for degradation due to extreme temperatures; and
- Emergency procedures are to be implemented against extreme weather events.

Power Plant Area – Greenhouse Gas Assessment

Construction Phase

18.6.5 The following GHG mitigation measures are embedded in the design of the Power Plant Area and are applicable to the construction phase:

- Implement policies to source materials locally where possible;
- Use of secondary aggregates and lower carbon materials; and
- Implement a green procurement policy that considers life cycle analysis of materials.

Operation Phase

18.6.6 The following GHG mitigation measures are embedded in the design of the Power Plant Area and are applicable to the operation phase:

- Monitor operational energy efficiency;
- Minimise secondary fuel use;
- Maintain assets as per manufacturer specification;
- Strive for optimal operation beyond Industrial Emissions (IE) compliance;
- Monitor policy developments to enable smooth transition to hydrogen combustion in line with plans for the gas network; and
- Funds set aside for climate and energy efficiency purposes.

Decommissioning Phase

18.6.7 The following GHG mitigation measures are embedded in the design of the Power Plant Area and are applicable to the decommissioning phase:

- Segregation of waste materials;
- Reuse, repurpose and upcycling of waste; and
- Use local channels for waste treatment.

Electricity Grid Connection – Climate Change Risk Assessment

18.6.8 The following climate change risk mitigation measures are embedded in the design of the Electricity Grid Connection, and are applicable for mitigating climate change risks across construction, operating and decommissioning phases.

- Flood protection designed to withstand 1:1000 year flood;
- Infrastructure is to be maintained and monitored for degradation due to extreme temperatures; and
- Emergency procedures are to be implemented against extreme weather events.

Electricity Grid Connection – Greenhouse Gas Assessment

Construction Phase

18.6.9 The following GHG mitigation measures are embedded in the design of the Electricity Grid Connection and are applicable to the construction phase:

- Implement policies to source materials locally where possible;
- Use of secondary aggregates and lower carbon materials; and
- Implement a green procurement policy that considers life cycle analysis of materials.

Operation Phase

18.6.10 The following GHG mitigation measures are embedded in the design of the Electricity Grid Connection and are applicable to the operation phase:

- Maintain assets as per manufacturer specification; and
- Appropriate monitoring, detection and maintenance of SF_6 to prevent leakage in substations.

Decommissioning Phase

18.6.11 The Electricity Grid Connection will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (ESBNI and EirGrid for electricity) as part of the national grid electricity. Upon decommissioning of the Power Plant Area, the 220 kV substation and 400 kV substation and associated transmission infrastructure will remain in situ and form part of the national grid infrastructure.

18.6.12 There will be no decommissioning phase emissions associated with the Electricity Grid Connection and therefore no mitigation measures are required.

Gas Connection Corridor – Climate Change Risk Assessment

18.6.13 The following climate change risk mitigation measures are embedded in the design of the Gas Connection Corridor, and are applicable for mitigating climate change risks across construction, operating and decommissioning phases.

- Flood protection designed to withstand 1:1000 year flood;
- Infrastructure is to be maintained and monitored for degradation due to extreme temperatures; and
- Emergency procedures are to be implemented against extreme weather events.

Gas Connection Corridor – Greenhouse Gas Assessment

Construction Phase

18.6.14 The following GHG mitigation measures are embedded in the design of the Gas Connection Corridor and are applicable to the construction phase:

- Implement policies to source materials locally where possible;
- Use of secondary aggregates and lower carbon materials; and
- Implement a green procurement policy that considers life cycle analysis of materials.

Operation Phase

18.6.15 The following GHG mitigation measures are embedded in the design of the Gas Connection Corridor and are applicable to the operation phase:

- Maintain assets as per manufacturer specification; and
- Appropriate monitoring of infrastructure performance.

Decommissioning Phase

18.6.16 The Gas Connection Corridor will be managed by the transmission asset operators (TAO) and transmission service operators (TSO) (GNI for gas) as part of the national gas networks. At the end of its design life, it is expected that the gas connection pipeline may have residual life remaining, and the operational life may be extended if appropriate and/or the asset refurbished and retained as part of the national transmission network. The end-of-life of the Gas Connection Corridor is therefore determined by the transmission asset operators and service operators and is not definitive at this stage.

18.6.17 There will be no decommissioning phase emissions for the Gas Connection Corridor and therefore no mitigation measures are required.

18.7 Residual Effect

18.7.1 The residual effect is assessed based on the predicted impacts discussed in Section 18.5 in conjunction with the embedded mitigation measures discussed in Section 18.6.

18.7.2 For the climate change risk assessment, mitigation measures reduce the risk ratings for the initial climate change risks identified in Section 18.5, to result in residual risk ratings. The risk ratings are reduced in accordance with the methodology described in Section 18.2.

18.7.3 For the GHG assessment, residual effects of mitigation measures cannot be quantified numerically due to a lack of quantifiable benchmarks at the required level of granularity and specificity. Instead, the impact of mitigation measures on the significance ranking of the GHG effects is discussed qualitatively in line with the significance ranking criteria in **Table 18-5**.

Power Plant Area – Climate Change Risk Assessment

18.7.4 The residual climate change risks for the Power Plant Area, after considering the embedded mitigation measures discussed in Section 18.6, are presented in the residual risk register in **Table 18-24**.

Table 18-24: Residual climate change risk register for the Power Plant Area

RISK IDENTIFICATION							INITIAL RISK						MITIGATION MEASURES									SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Embedded Mitigation Measures	Responsibility	Residual risk rating							Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)				
			Power Plant Area	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating			Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating		
Construction																						
1	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) result in an inaccessible construction site or health and safety risk to workers, causing restricted working hours and a delay in operations.		•	•	Construction disruption Health and safety	Rare	Minor	Low	Unlikely	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
2	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) cause damage to construction materials, plant, and equipment.		•		Construction asset damage	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
3	Extreme temperatures	Extreme temperatures result in unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Rare	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Insignificant	Low	Rare	Insignificant	Low		Not significant
4	Extreme rainfall	Extreme rainfall results in flooded areas and unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Unlikely	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
Operation																						
5	Extreme heat	Extreme heat causes overheating of electrical equipment, as well as heat damage, deformation, cracking and thermal expansion of building surfaces and pavements.	•			Asset damage	Rare	Minor	Low	Unlikely	Minor	Low	Designed to Irish building standards; designed to withstand a range of temperatures Infrastructure is to be maintained and monitored for degradation due to extreme temperatures	Designer, Operator	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
6	Extreme heat	Extreme heat leads to increase in ambient temperature of buildings, impacting the thermal comfort of building users.			•	Health and safety	Rare	Minor	Low	Rare	Minor	Low	Designed to Irish building standards; designed for thermal comfort in a range of temperatures	Designer	Rare	Insignificant	Low	Rare	Insignificant	Low		Not significant

RISK IDENTIFICATION							INITIAL RISK						MITIGATION MEASURES									SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Embedded Mitigation Measures	Responsibility	Residual risk rating							Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
			Power Plant Area	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating			Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating		
7	Extreme heat	Extreme heat results in reduced efficiency in CCGT and OCGT operations.	•			Engineering / operational	Unlikely	Minor	Low	Moderate	Minor	Low	The power plant is designed to operate over a large range of ambient conditions with negligible change in efficiency	Designer	Unlikely	Insignificant	Low	Moderate	Insignificant	Low		Not significant
8	Extreme rainfall	Extreme rainfall event leads to flooding of surfaces which has implications on safety, asset damage, and the operation of the plant.	•		•	Asset damage / engineering / operational Health and safety	Rare	Moderate	Low	Unlikely	Moderate	Medium	Flood protection designed to withstand 1:1000 year flood	Designer	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
9	Extreme weather events (e.g., storms)	Extreme weather events such as storms cause damage to plant infrastructure and equipment, causing stoppages in operation.	•		•	Asset damage / engineering / operational Health and safety	Rare	Moderate	Low	Unlikely	Moderate	Medium	Designed to Irish building standards; design takes into consideration wind loadings. Emergency procedures are to be implemented against extreme weather events	Designer, Operator	Rare	Minor	Low	Unlikely	Minor	Low		Not significant

18.7.5 It is evident that after considering embedded mitigation measures, all climate change risks are classified as '**Low'** for the Power Plant Area. According to the risk matrix in **Table 18-3**, residual effects of climate change risks for the Power Plant Area are therefore deemed '**Not Significant'**.

Power Plant Area – Greenhouse Gas Assessment

Construction Phase

18.7.6 The GHG effects of the construction phase of the Power Plant Area are mitigated by good practice measures as discussed in Section 18.6 and contribute to less than 0.02% of the respective Irish carbon budgets as discussed in Section 18.5. Therefore, according to the significance criteria defined in **Table 18-5**, the residual GHG effects of the construction phase of the Power Plant Area are deemed '**Minor Adverse**' and therefore '**Not Significant'**.

Operational Phase

18.7.7 The GHG effects of the operational phase of the Power Plant Area are partially mitigated by the embedded mitigation measures discussed in Section 18.6. However, when viewed in isolation, the residual operational GHG emissions of the Power Plant Area can contribute to approximately 2.09% of the 2026-2030 Irish carbon budget and approximately 4.62% of the 2031-2035 Irish carbon budget in the anticipated normal operation scenario, as discussed in Section 18.5, thus falling short of full contribution towards Ireland's trajectory to net zero. Therefore, according to the significance criteria in **Table 18-5**, the residual GHG effects of the Power Plant area, when viewed in isolation, can be classified as '**Moderate Adverse**' and therefore '**Significant**'.

18.7.8 However, in the context of Irish energy policy, the significance is viewed differently. The Power Plant Area will provide a significant contribution to the electricity supply system at times of peak demand, which would contribute to providing a secure energy supply to the national grid. Furthermore, a key component of Ireland's decarbonisation strategy is to target 80% renewable electricity generation by 2030. To allow this uptake of renewable energy to happen it is necessary to have in place sources of energy generation that can be efficiently dispatched to cover any imbalances in supply and demand. As solar and wind power energy generation is variable, depending on local weather conditions, it is necessary to have a reliable, dispatchable generation capacity in place. As the use of coal for electricity generation is reduced, the *National Energy and Climate Plan 2021-2030* (DCCAE, 2020a) identifies natural gas as a relatively lower-carbon option to provide an energy generation baseline and contribute to the security of supply. It is envisaged that the Power Plant Area (710MW total capacity – gas fuelled), once operational, could lead to the permanent closure and replacement of the existing Moneypoint Power Station (800MW total capacity, which is fuelled entirely by coal at the time of writing). The electricity generated from the Power Plant Area could lead to an average annual reduction in GHG of approximately 2 $MtCO_2e$ per annum when compared to Moneypoint Power Station.

18.7.9 Whilst Ireland is moving towards decarbonising the grid, lower carbon energy generation sources are required as an important part of the overall transition fuel mix in order to ensure Ireland's energy security. There is a strong argument for applying this broader approach to assessing significance, particularly when applied to electricity generation capacity. The process for generating, transmitting and distributing electricity is an inherently interconnected system. And the transition to a net-zero future explicitly requires the replacement of existing high-carbon emissions sources with lower emissions sources that deliver a similar function in terms of dispatchable electricity generation that can provide security of supply.

18.7.10 It is reasonable therefore to view the Power Plant Area not as an isolated, standalone piece of generating capacity but as an element within an interconnected system that will be part of a wider move to replace existing, unabated high-carbon electricity generation installations.

18.7.11 In addition, the Power Plant has been designed with the capability to run on hydrogen blend fuels, should this become a feasible fuel option in future. This makes the Power Plant adaptable to a low-carbon fuel source in line with Ireland's net-zero trajectory. While there is future potential to run the Power Plant on a blend of hydrogen, it is not proposed as part of this planning application, nor is it assessed or modelled in this EIAR. Any future use of hydrogen at a later date will be subject to a detailed assessment and separate planning application.

18.7.12 Therefore, when viewed in a broader context, as per the IEMA guidance (IEMA, 2022), 'The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for a project of this type'. The residual GHG effects of the Power Plant Area can therefore be said to be '**Minor Adverse'** and therefore '**Not Significant'**, as it does comply with existing and emerging policy requirements and is fully in line with Ireland's trajectory towards net zero.

Decommissioning Phase

18.7.13 The GHG effects of the decommissioning phase of the Power Plant Area are mitigated by good practice measures as discussed in Section 18.6 and deemed immaterial according to the discussion in Section 18.5. Therefore, according to the significance criteria defined in **Table 18-5**, the residual GHG effects of the decommissioning phase of the Power Plant Area are deemed '**Minor Adverse**' and therefore '**Not Significant'**.

Electricity Grid Connection – Climate Change Risk Assessment

18.7.14 The residual climate change risks for the Electricity Grid Connection, after considering the embedded mitigation measures discussed in Section 18.6, are presented in the residual risk register in **Table 18-25**.

Table 18-25: Residual climate risk register for the Electricity Grid Connection

RISK IDENTIFICATION							INITIAL RISK						MITIGATION MEASURES									SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Embedded Mitigation Measures	Responsibility	Residual risk rating							Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
			Electricity Grid Connection	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating			Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
Construction																						
1	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) result in an inaccessible construction site or health and safety risk to workers, causing restricted working hours and a delay in operations.		•	•	Construction disruption Health and safety	Rare	Minor	Low	Unlikely	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
2	Extreme weather events (e.g., storms)	Extreme weather events (e.g. storms) cause damage to construction materials, plant, and equipment.		•		Construction asset damage	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
3	Extreme temperatures	Extreme temperatures result in unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Rare	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Insignificant	Low	Rare	Insignificant	Low	Not significant
4	Extreme rainfall	Extreme rainfall results in flooded areas and unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Unlikely	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
Operation																						
5	Extreme heat	Extreme heat causes overheating of electrical equipment, as well as heat damage to electrical infrastructure.	•			Asset damage	Rare	Minor	Low	Unlikely	Minor	Low	Designed to Irish building standards; designed to withstand a range of temperatures Infrastructure is to be maintained and monitored for degradation due to extreme temperatures	Designer, Operator	Rare	Minor	Low	Unlikely	Minor	Low	Not significant
6	Extreme heat	Extreme heat leads causes heat stress for maintenance workers.			•	Health and safety	Rare	Minor	Low	Rare	Minor	Low	Maintenance work to be scheduled to avoid unfavourable weather	Operator	Rare	Insignificant	Low	Rare	Insignificant	Low	Not significant
7	Extreme rainfall	Extreme rainfall event leads to flooding which can damage substations and underground cables, disrupting electricity connection.	•			Asset damage / engineering / operational Health and safety	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Flood protection designed to withstand 1:1000 year flood	Designer	Rare	Minor	Low	Unlikely	Minor	Low	Not significant

RISK IDENTIFICATION							INITIAL RISK						MITIGATION MEASURES									SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Embedded Mitigation Measures	Responsibility	Residual risk rating							Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)			
			Electricity Grid Connection	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating			Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating	
8	Extreme weather events (e.g., storms)	Extreme weather events such as storms cause damage to overhead lines disrupting electricity connection.	•			Asset damage / engineering / operational Health and safety	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Designed to Irish building standards; design takes into consideration wind loadings. Emergency procedures are to be implemented against extreme weather events	Designer, Operator	Rare	Minor	Low	Unlikely	Minor	Low	Not significant

18.7.15 It is evident that after considering embedded mitigation measures, all climate change risks are classified as '**Low**' for the Electricity Grid Connection. According to the risk matrix in **Table 18-3**, residual effects of climate change risks for the Electricity Grid Connection are therefore deemed '**Not Significant'**.

Electricity Grid Connection – Greenhouse Gas Assessment

Construction Phase

18.7.16 The GHG effects of the construction phase of the Electricity Grid Connection are mitigated by good practice measures as discussed in Section 18.6 and contribute to less than 0.004% of the respective Irish carbon budgets as discussed in Section 18.5. Therefore, according to the significance criteria defined in **Table 18-5**, the residual GHG effects of the construction phase of the Electricity Grid Connection are deemed '**Minor Adverse**' and therefore '**Not Significant'**.

Operation Phase

18.7.17 The GHG effects of the operational phase of the Electricity Grid Connection are mitigated by good practice measures as discussed in Section 18.6 and deemed immaterial as discussed in Section 18.5. Therefore, according to the significance criteria defined in **Table 18-5**, the residual GHG effects of the operational phase of the Electricity Grid Connection are deemed '**Minor Adverse**' and therefore '**Not Significant'**.

Decommissioning Phase

18.7.18 There will be no decommissioning phase emissions associated with the Electricity Grid Connection, and therefore mitigation and residual effects are not relevant.

Gas Connection Corridor – Climate Change Risk Assessment

18.7.19 The residual climate change risks for the Gas Connection Corridor, after considering the embedded mitigation measures discussed in Section 18.6, are presented in the residual risk register in **Table 18-26**.

Table 18-26: Residual climate change risk register for the Gas Connection Corridor

RISK IDENTIFICATION							INITIAL RISK						MITIGATION MEASURES									SIGNIFICANCE
Risk ID	Climate variable	Risk statement	Receptors			Impact type	Initial risk rating						Embedded Mitigation Measures	Responsibility	Residual risk rating							Significance
							RCP4.5 (2041-2060)			RCP8.5 (2041-2060)					RCP4.5 (2041-2060)			RCP8.5 (2041-2060)				
			Gas Connection Corridor	Construction assets, plant and equipment	Staff and visitors on-site		Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating			Likelihood	Consequence	Risk rating	Likelihood	Consequence	Risk rating		
Construction																						
1	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) result in an inaccessible construction site or health and safety risk to workers, causing restricted working hours and a delay in operations.		•	•	Construction disruption Health and safety	Rare	Minor	Low	Unlikely	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
2	Extreme weather events (e.g., storms)	Extreme weather events (e.g., storms) cause damage to construction materials, plant, and equipment.		•		Construction asset damage	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
3	Extreme temperatures	Extreme temperatures result in unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Rare	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Insignificant	Low	Rare	Insignificant	Low		Not significant
4	Extreme rainfall	Extreme rainfall results in flooded areas and unsuitable conditions for certain construction activities causing delays in construction.		•		Construction disruption	Rare	Minor	Low	Unlikely	Minor	Low	Contractor to monitor weather and plan works accordingly	Contractor	Rare	Minor	Low	Unlikely	Minor	Low		Not significant
Operation																						
5	Extreme heat	Extreme heat leads causes heat stress for maintenance workers.			•	Health and safety	Rare	Minor	Low	Rare	Minor	Low	Maintenance work to be scheduled accordingly to avoid unfavourable weather.	Operator	Rare	Insignificant	Low	Rare	Insignificant	Low		Not significant
6	Extreme rainfall	Extreme rainfall event leads to flooding which can damage underground pipelines, disrupting gas supply.	•			Asset damage / engineering / operational Health and safety	Rare	Moderate	Medium	Unlikely	Moderate	Medium	Flood protection designed to withstand 1:1000 year flood	Designer	Rare	Minor	Low	Unlikely	Minor	Low		Not significant

18.7.20 It is evident that after considering embedded mitigation measures, all climate change risks are classified as '**Low**' for the Gas Connection Corridor. According to the risk matrix in **Table 18-3**, residual effects of climate change risks for the Gas Connection Corridor are therefore deemed '**Not Significant'**.

Gas Connection Corridor – Greenhouse Gas Assessment

Construction Phase

18.7.21 The GHG effects of the construction phase of the Gas Connection Corridor are mitigated by good practice measures as discussed in Section 18.6 and contribute to approximately 0.001% of the respective Irish carbon budgets as discussed in Section 18.5. Therefore, according to the significance criteria defined in **Table 18-5**., the residual GHG effects of the construction phase of the Gas Connection Corridor are deemed '**Minor Adverse**' and therefore '**Not Significant'**.

Operation Phase

18.7.22 The GHG effects of the operational phase of the Gas Connection Corridor are mitigated by good practice measures as discussed in Section 18.6 and deemed immaterial as discussed in Section 18.5. Therefore, according to the significance criteria defined in **Table 18-5**, the residual GHG effects of the operational phase of the Gas Connection Corridor are deemed '**Minor Adverse**' and therefore '**Not Significant'**.

Decommissioning Phase

18.7.23 There will be no decommissioning phase emissions associated with the Gas Connection Corridor and therefore mitigation and residual effects are not relevant.

18.8 Cumulative Effects

18.8.1 The potential cumulative effects of the Proposed Development and Overall Project in combination with the other projects described in **Chapter 1** of this report have been considered in terms of impacts on climate and climate change. There are a number of proposed or permitted housing developments within the vicinity of the Proposed Development and Overall Project. The cumulative assessment also considers the proposed future renewable infrastructure application within the Bord na Móna Energy Park Bogs. A description of the developments is provided in **Chapter 1**, and where appropriate the application documentation, EIAR and NIS.

18.8.2 The IEMA guidance (IEMA, 2022) makes it clear that the standard approach to cumulative effects assessment for GHGs differs from that taken for many other environmental disciplines.

18.8.3 The environmental receptors for disciplines such as air quality, noise, traffic, landscape and visual intrusion etc. will generally be located in relatively close proximity to the source. The receptor for GHGs, however, is the entire global climate.

18.8.4 The current IEMA guidance states that:

> *"All global cumulative GHG sources are relevant to the effect on climate change, and this should be taken into account in defining the receptor (the atmospheric concentration of GHGs) as being 'high' sensitivity to further emissions.*
>
> *"Effects of GHG emissions from specific cumulative projects should not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other."*

18.8.5 In essence, there is no difference in the impact on the global climate of a tonne of carbon dioxide equivalent emitted at the Proposed Development and Overall Project compared to the same mass of CO_2e emitted anywhere else on the planet.

18.8.6 Similarly, cumulative effects assessment is not sensible for climate change risks. The climate change risks identified for the Proposed Development and Overall Project are a function of global climate change and the influence from specific individual projects cannot be individually assessed.

18.8.7 Therefore, is it considered that cumulative effects are not relevant for this climate change assessment.

18.9 References

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