Borrisbeg Grid Connection

Chapter 10 Climate

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10.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) identifies, describes and presents an assessment on the likely significant effects for the Proposed Grid Connection on climate during the construction and operational phases.

The assessment includes a Climate Change Risk (CCR) Assessment to identify the vulnerability of the Proposed Grid Connection to climate change and a Greenhouse Gas (GHG) Assessment which assesses the impact of the Proposed Grid Connection on climate during the construction and operation phases.

10.1.1 Statement of Authority

Dr. Clare Noone is a Senior Scientist, in the RPS Sustainability Department, with over 18 years' experience working in the fields of air quality and climate change and related policy. Clare holds a PhD in Atmospheric Physics from the Centre for Climate and Air Pollution Studies, School of Physics, University of Galway, and a BSc in Physics from the University of Galway. Clare is a lead author of Ireland's first 5-Year Assessment Report (5YAR) on Climate Research and is currently a series editor for one of Palgrave's long-established book series Energy, Climate and the Environment. Clare was an expert reviewer of the IPCC AR6 Synthesis Report. Clare has considerable experience, in local and regional air pollution, sustainability, climate change, climate adaptation, climate mitigation, renewable energy, biodiversity, radiation safety, climate communication and engagement, high-resolution weather forecasting, and air quality modelling. Clare's climate and air quality background positions her as a key team member for data collation, analysis and technical input to numerous environmental assessments, Strategic Environmental Assessments (SEA), Environmental Impact Assessments (EIA) and Appropriate Assessments (AA). Clare consulted on the SEA AA of the Climate action plan 2023 where her role involved assessment of CAP actions, preparation of all statutory documentation, attendance at meetings and workshops. Clare was also a contributing author to the SEA report on the Climate Action plan 2024 (CAP24). Clare supported DECC in the extensive policy review and revision process which forms the development of the NECP 2024.

10.2 Relevant Legislation, Policy and Guidelines

The following details the relevant guidelines, policy and legislation which drive the need for the climate assessment as well as outlining the relevant criteria for assessing impacts to climate.

10.2.1 Legislation

In relation to climate, the following legislation is relevant for this chapter:

- Climate Action and Low Carbon Development Act 2015 ('the 2015 Act'); and
- Climate Action and Low Carbon Development (Amendment) Act 2021 ('the 2021 Amendment Act').

The **National Policy Position on Climate Action and Low Carbon Development (2014)** recognises the threat of climate change for humanity; anticipates and supports mobilisation of a comprehensive international response to climate change, and global transition to a low-carbon future; recognises the challenges and opportunities of the broad transition agenda for society; and

aims, as a fundamental national objective, to achieve transition to a competitive, low-carbon, climate-resilient and environmentally sustainable economy by 2050.

The **Climate Action and Low Carbon Development Act 2015** facilitates the approval of plans for Ireland in relation to climate change to aid the transition to a low carbon, climate resilient and environmentally sustainable economy by the end of 2050. In line with this objective, a national mitigation plan and national adaptation framework were required to be produced by the Minister to the Government for approval. The **Climate Action and Low Carbon Development (Amendment) Act 2021** further strengthens the governance framework on climate action, and through this Act, Ireland has:

- Set economy-wide carbon budgets and sectoral emission ceilings (SECs) for the periods 2021-25 and 2026-30;
- Established pathways to deliver the SECs, incorporating 26 $MtCO_2eq.$ in unallocated emissions savings for the second carbon budget period; and
- Defined a delivery approach through specific measures and actions to meet emissions ceilings, which are estimated to require €119bn in capital investment between 2022-2030.

The 2021 Act places the national climate objective of achieving, by no later than 2050, the "transition to a climate resilient, biodiversity-rich, environmentally sustainable, and climate-neutral economy" on a statutory footing. The 2021 Amendment Act also replaced the 2015 Act's requirement for a National Mitigation Plan with a requirement for the preparation of an annual update to the Climate Action Plan and to prepare, not less frequently than once every five years, a national long term climate strategy.

10.2.2 Policy and Guidance

The first **Climate Action Plan 2019 (CAP19)** was formulated on a non-statutory basis. It set out many measures, key objectives, and targets to address the climate change agenda. There have since been two updates building on the 2019 plan – the first in 2021 (CAP21) which set out a wide range of policies aimed at decarbonisation in relation to the particular sectors of the economy, and the second in 2022 (CAP23). The DECC is required to publish an update to CAP annually. The **Climate Action Plan 2025 (CAP25)** is the latest update of the CAP, building upon the measures and actions of CAP24. The CAP25 at present outlines the actions required to 2035 and beyond to achieve the ambition of halving Ireland's GHG emissions by the end of the decade and aiming for carbon neutrality by 2050. CAP25 sets out a number of high-impact actions that need to be taken. Covering the following sectors: electricity, industry, enterprise, housing, heating, transport, agriculture, waste, and the public sector.

The 2021 Act also requires local authorities to prepare **Local Authority Climate Action Pans (LA CAPs)** and formal instruction was issued by the Minister of the DECC in February 2023 to all local authorities to prepare their plans, with guidelines prepared to assist in their preparation. These plans will help ensure that the national climate objective can be achieved through all levels of the planning hierarchy, from the Climate Action Plan, down through the three Regional Spatial and Economic Strategies (RSESs) and forthcoming **Regional Renewable Electricity Strategies**, and through the LA CAPs.

The **Long-term Strategy on Greenhouse Gas Emissions Reductions** was published in July 2023 as part of the actions proposed under CAP23 and as a requirement under the Climate Action and Low Carbon Development (Amendment) Act 2021. This strategy sets out indicative pathways, beyond 2030, towards achieving carbon neutrality for Ireland by 2050. A long-term strategy is also a requirement of the Regulation on the governance of the energy union and climate action (EU) 2018/1999. It covers the following with a perspective of at least 30 years:

- Total GHG reductions and enhancements of removals by sinks;

- Emission reductions and enhancements of removals in individual sectors, including electricity, industry, transport, the heating and cooling and buildings sector (residential and tertiary), agriculture, waste and land use, land-use change and forestry (LULUCF);
- Expected progress on transition to a low GHG economy, including greenhouse gas intensity, CO_2 intensity of gross domestic product, related estimates of long-term investment, and strategies for related research, development and innovation;
- The expected socio-economic effect of the decarbonisation measures, including aspects related to macro-economic and social development, health risks and benefits and environmental protection; and
- Links to other national long-term objectives, planning and other policies and measures, and investment.

First published in 2018, the **National Adaptation Framework** contained Ireland's strategy for the application of climate adaptation measures to reduce the vulnerability of the State to the negative effects of climate change, and to seek opportunities for any positive effects that may occur. This framework is currently being reviewed in line with the requirements of the Climate Action and Low Carbon Development Act 2015-2021 and an update to the NAF has been published for public consultation. Following consultation, the new NAF will be finalised and will replace the 2018 NAF.

Twelve **Sectoral Climate Change Adaptation Plans** were published in June 2020 in line with the National Adaptation Framework and CAP19. These sectoral plans identified the key risks faced across sectors including agriculture, biodiversity, built and archaeological heritage, transport infrastructure, electricity and gas networks, communications, flood risk management, water quality and services infrastructure and health. The plans detail the approach being taken to address these risks and build climate resilience for the future. The plans include actions that:

- Mainstream adaptation into key sectoral plans and policies;
- Identify and understand the key vulnerabilities, risks, and opportunities facing specific sectors, as well as major risks crosscutting different sectors;
- Ensure climate-proofing of strategic emergency planning;
- Identify and collect information on the costs and benefits of adaptation within specific sectors;
- Build capacity within sectors to cope with climate change;
- Identify and address key research gaps within their sectors;
- Improve co-ordination with the local government sector; and
- Develop appropriate monitoring and verification systems within sectors.

In relation to carbon budgets, the Climate Action and Low Carbon Development (Amendment) Act states '*A carbon budget, consistent with furthering the achievement of the national climate objective, shall be proposed by the Climate Change Advisory Council, finalised by the Minister and approved by the Government for the period of 5 years commencing on the 1 January 2021 and ending on 31 December 2025 and for each subsequent period of 5 years (in this Act referred to as a 'budget period')*'.

The carbon budget is to be produced for three sequential budget periods, as shown in Table 10-1. The carbon budget can be revised where new obligations are imposed under the law of the European Union or international agreements or where there are significant developments in scientific knowledge in relation to climate change. In relation to the sectoral emissions ceiling, the Minister for the Environment, Climate and Communications (the Minister for the Environment) shall

prepare and submit to government the maximum amount of GHG emissions that are permitted in different sectors of the economy during a budget period and different ceilings may apply to different sectors. The sectorial emission ceilings for 2030 were published July in 2022 and are shown in Table 10-2.

Table 10-1: 5-Year Carbon Budgets 2021-2025, 2026-2030 and 2031-2025 (Department of the Taoiseach, 2022)

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

Table 10-2: Sectoral Emission Ceilings 2030 (Department of the Taoiseach, 2022)

Sector	Baseline (Mt CO_2e)	Carbon Budgets (Mt CO_2e)		2030 Emissions (Mt CO_2e)	Indicative Emissions % Reduction in Final Year of 2025- 2030 Period (Compared to 2018)
	2018	2021-2025	2026-2030		
Transport	12	54	37	6	50
Electricity	10	40	20	3	75
Built Environment - Residential	7	29	23	4	40
Built Environment - Commercial	2	7	5	1	45
Agriculture	23	106	96	17.25	25
Land Use, Land-use Change and Forestry (LULUCF)	5	TBC	TBC	TBC	TBC
Industry	7	30	24	4	35
Other (F-gases, waste, petroleum refining)	2	9	8	1	50
Unallocated Savings	-	7	5	-5.25	-
Total	**68**	**TBC**	**TBC**	**-**	**-**
Legally Binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	-	51

10.3 Methodology

10.3.1 Zone of Influence

The Zone of Influence (ZoI) for climate includes the national environment (Ireland), where the receptor is the climate and the global atmosphere. Effects arising from the potential impacts on climate are considered to impact on a national level. National, regional, and local data has been considered where relevant and available. Carbon dioxide (CO2) emissions have a global climate warming effect. This is regardless of their rate of release, location, or the weather when released into the atmosphere. This is unlike pollutants that affect local air quality where the rate of release,

location, and prevailing weather, as well as the amount of pollutant, determines the local concentrations and the impact.

Any amount of CO2 released into the atmosphere will contribute to climate warming, the extent of which is determined by the magnitude of the release. Although CO2 emissions are typically expressed as kilograms or tonnes per year, there is a cumulative effect of these emissions because CO_2 emissions have a warming effect which lasts for 100 years or more.

10.3.2 Sources of Information to Inform the Assessment

This analysis was undertaken by means of a desktop assessment based on available relevant guidance and information sources and other chapters of this EIAR. The following information sources have been consulted in relation to the assessment:

- Key materials, resources, and cut/fill balance inputs from the description of the Proposed Grid Connection; see Chapter 3 – Development Description;
- Environmental Protection Agency (EPA) Greenhouse Gas Emissions Inventories and Projections;
- Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool (https://thinkhazard.org/en/);
- Met Éireann Major Weather Event Database (https://www.met.ie/climate/major-weather-events); and
- Climate Data Tool from Climate Ireland (https://www.climateireland.ie/#!/tools/climateDataExplorer).

Table 10-3, outlines the existing studies, datasets and information used to inform the assessment on climate that was collected through a detailed desktop review. No site-specific baseline surveys were undertaken as part of the assessment for climate. The baseline data presented in this section is derived from EPA inventories and projections, and Met Éireann monitoring network, and may be taken as representative of the background conditions.

Table 10-3 : Summary of Key Desktop Reports

Title	Source	Year
Ireland's Greenhouse Gas Emissions Inventory 1990-2022	EPA	2023
Ireland's Greenhouse Gas Emissions Projections 2023-2050	EPA	2024
30 Year Averages: Dublin Airport	Met Éireann	2022
Met Éireann Monthly Values for Dublin Airport and Casement	Met Éireann	2024
Climatological Note No. 14: A Summary of Climate Averages for Ireland 1981-2010	Met Éireann	2012
ICCA, Volume 1, Irelands Climate Change Assessment Report	EPA	2024
ICCA, Volume 2, Irelands Climate Change Assessment Report	EPA	2024
ICCA, Volume 3, Irelands Climate Change Assessment Report	EPA	2024

10.3.3 Embodied Carbon Quantification

During the construction phase one of the main source of climate impacts will be as a result embodied carbon associated with the proposed construction materials and activities for the Proposed Grid Connection. Embodied carbon refers to the sum of the carbon needed to produce a good or service. It incorporates the energy needed in the mining or processing of raw materials, the manufacturing of products and the delivery of these products to site. The embodied carbon of the Proposed Grid Connection has been quantified as part of the construction phase assessment. The construction stage embodied GHG emissions have been calculated under the following headings using TII Carbon Tool:

- Embodied Carbon of Materials;
- Transport of materials;
- Construction Activities.

10.3.4 GHG Assessment: Construction and Maintenance Phase Climate Emissions

As per the EU guidance document *Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment* (European Commission, 2013) the climate baseline is first established with reference to EPA data on annual GHG emissions. The impact of the Proposed Grid Connection on climate is determined in relation to this baseline.

The carbon emissions from materials (including transport) and construction/maintenance plant and operations are calculated by multiplying the emission factor by the quantity of the material that will be used over the entire construction / maintenance phase. The outputs are expressed in terms of tCO_2e (tonnes of carbon dioxide equivalent).

The construction stage embodied GHG emissions have been calculated under the following headings using TII Carbon Tool.

- Embodied Carbon of Materials;
- Transport of materials;
- Construction Activities.

The Proposed Grid Connection construction includes the permanent 110kV substation, a short grid route along a local road (approximately 900m) and agricultural land (approximately 1.2km), and the erection of two end masts to connect to an existing 110kV overhead line. The assessment focused on the land preparation for the Proposed Grid Connection, transport of material to site and the construction on site.

Sand and Stone Requirements

Sand and Stone volumes have been estimated using the following methodology:

- The soil beneath the substation, temporary construction compound and end masts will be excavated and replaced with construction grade granular fill up to the existing ground level.
- Roads will generally comprise approximately 500mm of granular fill (constructed in layers and finished with a capping layer). Geotextiles separators will be placed on the subgrade and geogrids will be installed within the road build-up, as required by the site engineer.

The total stone fill required is 15,000 m^3, which includes a 12.5% contingency factor.

10.3.5 CCR Assessment: Vulnerability of the Proposed Grid Connection to Climate Change

The TII guidelines for CCRA outlines an approach for undertaking a risk assessment where there is a potentially significant impact on the Proposed Grid Connection due to climate change. The risk assessment assesses the sensitivity and exposure of the impact occurring to a receptor, leading to the evaluation of the significance of the impact.

The assessment methodology is a two-stage process, with the first stage being a climate vulnerability assessment. If the results of this first phase indicate the climate hazard is a vulnerability, then the second stage of the assessment is carried out and referred to as a climate change risk assessment.

The Stage 1 Vulnerability Analysis is a combination of sensitivity analysis and exposure analysis and is undertaken through the following methodology:

- In undertaking the sensitivity analysis, the asset categories and climate hazards to be considered in the climate screening must be identified and the list of asset categories and climate hazards include:
  - Asset categories - Pavements; drainage; structures; utilities; landscaping; signs, light posts, associated auxiliary buildings, and fences; and
  - Climate hazards - Flooding (coastal); flooding (pluvial); flooding (fluvial); extreme heat; extreme cold; wildfire; drought; extreme wind; lightning and hail; fog.
- Determine the sensitivity (low, medium, or high) of each asset category to each of the climate hazards by assigning a sensitivity score of 1 to 3.
- Using the historic climate data, assess the level of exposure for each climate hazard within the Proposed Grid Connection.
- Take the product of sensitivity and exposure, for each climate hazard and each asset category identified. Any climate hazards with vulnerabilities marked as high have been included in the Stage 2 detailed climate change risk assessment.

The Stage 2 climate change risk assessment is a combination of a likelihood analysis and impact analysis:

- The asset categories considered in the climate screening have formed the key project receptors in this assessment as well as any critical connecting infrastructure and significant parts of the surrounding environment.
- Define the climate baseline (historic extreme climate events) using historic climate conditions and gathering climate change projection data to understand future climate conditions.
- The probability levels of future climate projections are determined for the CCR Assessment using relevant resources such as Climate Ireland (2023).

The climate data gathered is used to identify climate-related risks to the project to generate a comprehensive list of risks based on the climate change hazards that have been deemed relevant to the Proposed Grid Connection and location.

10.3.6 Assessment Criteria and Significance

10.3.6.1 EU and National Targets and Objective

The **European Green Deal** is the EU's long-term growth strategy which aims to make Europe climate-neutral by 2050 and put renewable energy at the heart of the energy system. As part of the Green Deal, with the **European Climate Law**, the EU has set itself a binding target of achieving climate neutrality by 2050. As an intermediate step towards climate neutrality, the EU has raised its 2030 climate ambition, committing to cutting emissions by at least 55% by 2030. The EU is working on the revision of its climate, energy, and transport-related legislation under the so-called 'Fit for 55 packages' in order to align current laws with the 2030 and 2050 ambitions.

The **Fit for 55 Package** comprises a set of proposals to revise and update EU legislation and includes for new initiatives with the overall aim of ensuring that EU policies are in line with the Council and the European Parliament‘s climate goals of reducing net GHG emissions by at least 55% by 2030. It includes for an update to the **Emissions Trading Scheme (ETS)** with new provisions such as extension to cover maritime emissions and a revision of rules applying to the aviation sector. The changes to the EU ETS have now been agreed under **Directive 2023/959** (amending Directive 2003/87/EC and Decision (EU) 2015/1814) and were to be implemented in national regulation by December 31, 2023, at the latest.

The Fit for 55 Package also includes for a suite of new rules, revisions and targets across many aspects, including: a social justice fund; a carbon border adjustment mechanism, which targets imports of products in carbon-intensive industries, to operate in parallel with the ETS; new rules to increase the EU-level GHG emissions reduction target for 2030 from 29% to 40%; a binding EU commitment to reduce emissions and increase removals from LULUCF with binding national targets for each Member State; CO_2 emissions standards for vans and cars; reducing methane emissions in the energy sector; a provisional agreement on sustainable aviation fuels (SAFs – advanced biofuels and electrofuels) via the **ReFuel Aviation** proposal; a provisional deal on new rules for decarbonised fuels in shipping via the **FuelEU** maritime initiative; new rules under the **Alternative Fuels Infrastructure Regulation (AFIR)**, which includes for charging stations to be installed every 60 km and hydrogen fuel refuelling stations; revision of the RED **(RED III)**; new rules to accelerate energy efficiency and the energy performance of buildings (new buildings should be zero-emission by 2030 and existing buildings transformed into zero-emission buildings by 2050); a hydrogen and decarbonised gas market package; and a proposal to revise the directive on the taxation of energy products and electricity.

The **REPowerEU Plan** is focused on rapidly reducing the European Union's reliance on Russian fossil fuels by progressing the clean energy transition and fostering increased collaboration throughout and across Member States to create a more resilient European energy system. REPowerEU expands the 'Fit for 55' proposals by setting forward additional actions to save energy by reducing demand and consumption, diversify energy sources and supplies, accelerate fossil fuel substitution, and improve investment frameworks facilitating reforms, faster permitting, and innovation.

The 2020 **EU Effort Sharing Decision (ESD)** target commits Ireland to reducing emissions from those sectors that are not covered by the emissions trading scheme (i.e. agriculture, transport, residential, non-energy intensive industry, commercial services, and waste) to 20% below 2005 levels. The Non-ETS (Emissions Trading System) sector (i.e. road transport, buildings, agriculture, waste and small industry) accounts for approx. 60% of the EU's emissions[1], and 78.5% of total emissions in Ireland.[2] The **Effort Sharing Regulation [ESR] (EU) 2018/842** as amended in March

[1] Fit for 55: reducing emissions from transport, buildings, agriculture and waste. Available at: https://www.consilium.europa.eu/en/infographics/fit-for-55-effort-sharing-regulation/

[2] SEAI: Share of greenhouse gas emissions in Ireland in 2022. Available at: CO_2 Emissions [Accessed April 2024]

2023 by **Regulation (EU) 2023/857** enshrines a GHG emissions reduction target for Ireland of -42% by 2030, relative to 2005 levels.

The **Renewable Energy Directive [RED] EU 2018/2001 (recast to 2030, RED II)** entered into force in December 2018 and sets a target of at least 32% for renewable energy, at EU-wide level, by 2030. A further revision, **RED III (Directive (EU) 2023/2413)** (part of the Fit for 55 Package) aims to increase the target for the EU's renewable energy to 42.5% by 2030. This directive sets specific targets for Member States in sectors such as industry (e.g. industry will need to increase the use of renewable energy by 1.6% annually), transport (e.g. targets regarding use of advanced biofuels and renewable fuels on non-biological origin, such as hydrogen), and buildings, heating and cooling (renewable targets will gradually increase with a binding increase annually, with minimum annual averages calculated per Member State). RED III also strengthens the sustainability criteria for the use of biomass for energy, in order to reduce the risk of unsustainable bioenergy production; Member states will need to ensure that the cascading principle is applied. The revised directive also includes for permit procedures for renewable energy to be accelerated in the context of the REPowerEU plan. Member states are required to designate acceleration areas where renewable energy projects will undergo simplified and 'fast-tracked' permit-granting processes. On 6 August 2025 Ireland introduced new regulations: the European Union (Planning and Development) (Renewable Energy) Regulations 2025 to transpose certain requirements of RED III into Irish law. The objective of these new regulations is to ensure a faster deployment of renewables, establish better environmental safeguards, ensure energy security and align the nations climate action goals with EU targets. Without these new laws in place, Ireland risked failing to meet its EU and national climate goals.

The **revised Energy Efficiency Directive [EED] (EU) 2023/1791**, a revision to the **amending Energy Efficiency Directive (EU) 2018/2002**, came into force in October 2023. The revised EED raises the ambition of the EU in becoming more energy efficient. This Directive makes it binding for EU nations to collectively reduce their final energy consumption (FEC) by 11.7% by 2030. The Directive puts a strong focus on energy poverty, fully decarbonised district heating and cooling, optimisation of energy savings in the industrial sector and an annual energy savings obligation. Member States have agreed to help achieve this cumulative target by setting indicative national contributions in their updated NECPs using a combination of objective criteria which reflect national circumstances (such as energy intensity, GDP per capita, energy savings potential and earlier efforts made on energy efficiency). On 20 February 2024, the Government of Ireland approved Ireland's indicative national energy efficiency contribution under Article 4 of the EED. Ireland's indicative national energy efficiency contribution is 10.451 Mtoe in Final Energy Consumption (FEC) and 11.294 Mtoe in Primary Energy Consumption (PEC) by 2030, which represents a 12.6% reduction in Ireland's FEC relative to 2022. This reduction in every use is extremely ambitious, particularly in the context of Ireland's fast-growing population, and goes beyond what would be delivered by existing policies.

The **Regulation on the Governance of the Energy Union (EU) 2018/1999** sets out "*the necessary legislative foundation for reliable, inclusive, cost-efficient, transparent and predictable governance of the Energy Union and Climate Action (governance mechanism), which ensures the achievement of the 2030 and long-term objectives and targets of the Energy Union in line with the 2015 Paris Agreement on climate change following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, through complementary, coherent and ambitious efforts by the Union and its Member States, while limiting administrative complexity*." Under the 2018 Regulation, to help achieve the EU's 2030 and 2050 targets and track progress, each EU Member State (MS) is required to produce an integrated **National Energy and Climate Plan (NECP)** setting out their national energy and climate targets and policies. The first NECPs were produced (including by Ireland) in 2019. Under Article 14(1) of the Regulation, Member States must submit their final updated NECP to the EC and every 10 years thereafter. In the European Commission's assessment of Ireland's draft updated NECP 2021-2030 (version 1 submitted to the EC in December 2023), the EC states: "*The European Green Deal, the fast-evolving geopolitical context and the energy crisis have led the EU and its Member States to accelerate the energy transition, and to set more*

ambitious energy and climate objectives, with a strong focus on the diversification of energy supplies. These developments are reflected in the legislative framework adopted under the 'Fit for 55' package and the REPowerEU Plan. Ireland's draft updated national energy and climate plan ('the draft updated NECP' or 'the plan'), submitted on 8 December 2023, partially considers this new geopolitical and legislative framework."

The European Climate Law, **Regulation (EU) 2021/1119**, amends Regulation (EU) 2018/1999. It sets a binding EU target of a net domestic reduction in GHG emissions by at least 55% (compared with 1990 levels) by 2030 and undertakes to set a climate target for 2040 within 6 months of the first global stocktaking under the Paris Agreement. **Regulation (EU) 2018/842** sets binding annual GHG emissions reductions over the 2021–2030 period for Member States in order to fulfil the EU's target of reducing its GHG emissions by 30% below 2005 levels by 2030 in certain sectors listed in Article 2 of the Regulation and also contributes to achieving the objectives of the Paris Agreement.

The **EU Adaptation Strategy 2021** outlines a long-term vision for the EU to become a climate-resilient society, fully adapted to the unavoidable impacts of climate change by 2050. This strategy aims to reinforce the adaptive capacity of the EU and the world and minimise vulnerability to the impacts of climate change, in line with the Paris Agreement and the European Climate Law. The law recognises adaptation as a key component of the long-term global response to climate change and requires Member States and the Union to enhance their adaptive capacity, strengthen resilience and reduce vulnerability to climate change. It also introduces a requirement for the implementation of national strategies. The three main objectives of this Strategy include improving knowledge and managing uncertainty; supporting policy development at all levels and all relevant policy fields; and speeding up adaptation implementation. The Climate Action and Low Carbon Development Act 2015 provides a legal definition for adaptation as adjustment to any system designed or operated by humans, including an economic, agricultural, or technological system, or any naturally occurring system, including an ecosystem, that is intended to counteract the effects of climate change, prevent or moderate environmental damage resulting from climate change, or confer environmental benefits. In the context of climate change, risks emerge from the interactions between climate change and related hazards (heatwaves, floods, droughts etc.), exposure and vulnerability. Risk is in constant evolution as the frequency and intensity of weather extremes increase and as exposure and vulnerability change. Therefore, adaptation should be seen as iterative risk management process[3], that responds to the dynamics and evolution of risk, where emphasis is placed on ongoing processes of assessment, action, monitoring, evaluation, learning and improvement. Widespread, pervasive impacts to ecosystems, people, settlements, and infrastructure have resulted from observed increases in the frequency and intensity of climate and weather extremes, including hot extremes on land and in the ocean, heavy precipitation events, drought, and fire weather. These extremes are occurring simultaneously, causing cascading impacts that are increasingly difficult to manage.

A key target for Ireland is a 42% reduction in GHG emissions which is required under the Effort Sharing Regulation. **Table 10-4** compares Ireland's ESR share with the broader EU-wide GHG emissions reduction targets.

[3]IPCC (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability https://report.ipcc.ch/ar6/wg2/IPCC_AR6_WGII_FullReport.pdf

Table 10-4: Key Targets for GHG Emissions Reductions by 2030

By 2030	Previous (pre-Fit for 55 Package)	Current	Relative to
EU economy-wide target	40%	At least 55%	1990
EU ETS contribution	43%	62%	2005
EU ESR contribution	30%	40%	2005
Ireland's legally binding ESR target	***30%***	***42%***	***2005***

10.3.6.2 Assessment Criteria for GHG Assessment

The 2022 TII guidelines state that the climate assessment is not solely based on whether a project emits GHG emissions alone but how it makes a relative contribution towards achieving a science based 1.5°C aligned transition towards net zero (as recommended in the 2022 IEMA guidance). The guidance states that the impact assessment must give regard to two major considerations when assessing the significance of a project GHG emissions including:

- The extent to which the trajectory of GHG emissions from the project aligns with Ireland's GHG trajectory to net zero by 2050; and
- The level of mitigation taking place.

The TII criteria for defining magnitude in this chapter for the GHG Assessment are outlined in **Table 10-5.**

The CAP25 target of greatest relevance to the construction and maintenance phases is the commitment to decrease embodied carbon in construction materials produced and used in Ireland by at least 30% by 2030. As such, the impacts of both construction and operation/maintenance phases are compared against the criteria in **Table 10-5**.

Table 10-5: TII Significance Matrix for the GHG Assessment

Effects	Magnitude of Impact	Definition	EPA EIA 2022 Rating
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 absolute contribution to Ireland's trajectory towards net zero.	Significant/Very Significant/Profound
	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.	Moderate

Effects	Magnitude of Impact	Definition	EPA EIA 2022 Rating
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.	Slight
	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.	Imperceptible
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.	Positive

The Proposed Grid Connection will facilitate the connection of the Consented Wind Farm (ABP Planning Reference 318704) to the national grid. A formula can be used to calculate CO_2e reductions resulting from the generation of electricity from wind power rather than from carbon-based fuels such as peat, coal, gas and oil. The formula is:

$$CO_2e \text{ (in tonnes)} = (A \times B \times C \times D)/1000$$

where:

- A = …… The rated capacity of the wind energy development in MW
- B = …… The capacity or load factor, which takes into account the intermittent nature of the wind, the availability of wind turbines and array losses etc.
- C = …… The number of hours in a year
- D = …… Carbon load in grams per kWh (kilowatt hour) of electricity generated and distributed via the national grid.
  - For the purposes of this calculation, the rated capacity of the Consented Wind Farm is assumed to be 63 MW (based on 9 No. 7 MW turbines).
  - A load factor of 0.36 (or 36%) has been used for the Consented Wind Farm
  - The number of hours in a year is 8,760.
  - A conservative figure for the carbon load of electricity generated by natural gas in Ireland was sourced from Sustainable Energy Authority Ireland's (SEAI) December 2022 report, *'Energy in Ireland.'* The provisional emission factor for electricity generated in Ireland in 2022 was 296 g CO_2/kWh.
- The calculation for carbon savings is therefore as follows:

CO_2e (in tonnes) = (63 x 0.36 x 8,760 x 296)/ 1000

= 58,808 tonnes per annum.

10.3.6.3 Assessment Criteria for CCR Assessment

The CCR Assessment is undertaken in two phases with an initial climate screening phase followed by a more detailed analysis. The detailed analysis is subject to the outcome of the screening phase, which helps ensure that the cost and effort associated with climate proofing is proportional to the benefits. The climate screening is intended to provide an indication of the project's vulnerability to climate change. The screening is broken down into three steps: a sensitivity analysis; an exposure analysis; and when combined make up the vulnerability assessment. To undertake the sensitivity analysis, a score is applied for each asset category (embankments, walls, etc.) against each climate hazard (flooding, extreme temperature, etc.). Table 10-6 provides the definitions and scoring used when assessing sensitivity.

Table 10-6: Sensitivity Definition and Scoring

Level	Definition	Scoring
High sensitivity	The climate hazard will or is likely to have a major impact on the asset category.	3
Medium sensitivity	It is possible or likely the climate hazard will have a moderate impact on the asset category.	2
Low sensitivity	It is possible the climate hazard will have a low or negligible impact on the asset category.	1

The aim of the exposure analysis is to identify which climate hazards are relevant to the Proposed Grid Connection location e.g., flooding could represent a significant hazard for a project located next to a river in a floodplain. Therefore, whilst sensitivity analysis focuses on the type of project, exposure focuses on location. The hazards assessed are the same as those used for the sensitivity analysis. To undertake the exposure analysis, an exposure score is applied for each climate hazard at the project location. The allocation of exposure level is informed by the high-level climate data collected. **Table 10-7** shows the exposure definitions and scoring.

Table 10-7: Exposure Definition and Scoring

Level	Definition	Scoring
High exposure	It is almost certain or likely this climate hazard will occur at the project location i.e., might arise once to several times per year.	3
Medium exposure	It is possible this climate hazard will occur at the project location i.e., might arise a number of times in a decade.	2
Low exposure	It is unlikely or rare this climate hazard will occur at the project location i.e., might arise a number of times in a generation or in a lifetime.	1

The vulnerability assessment combines the outcomes of the sensitivity and exposure analysis with the aim to identify the key vulnerabilities and the potentially significant climate hazards associated with the Proposed Grid Connection. To complete the vulnerability assessment, the product of sensitivity and exposure for each climate hazard and each asset category identified and mapped as per **Table 10-8**.

Table 10-8: Vulnerability Matrix

Sensitivity	Exposure: Low (1)	Exposure: Medium (2)	Exposure: High (3)
Low (1)	1	2	3
Medium (2)	2	4	6
High (3)	3	6	9

Any high vulnerabilities (score >5) are then subjected to the second stage - a climate risk assessment using a combination of likelihood analysis and impact analysis. The likelihood analysis looks at how likely the identified climate hazards are to occur within a given timescale. **Table 10-9** presents the likelihood analysis key used for this assessment.

Table 10-9: Likelihood Analysis Key

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%

The impact analysis investigates the consequences of the climate hazards and also refers to the severity and magnitude. **Table 10-10** provides guidance to ranking the risk areas and this table was taken from the European Commission (2021) technical guidance on the climate-proofing of infrastructure in the period 2021-2027.

Table 10-10: Consequence Analysis Key

Risk areas	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 license to operate. Community protests

Risk areas	Insignificant	Minor	Moderate	Major	Catastrophic
Financial	x % internal rate of return (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 a wider impact to tourism industry	Significant damage with national and international impact	Permanent loss with resulting impact on society

Table 10-11 presents summary outcome of the assessment of likelihood and consequence of each climate hazard in the form of a climate risk matrix.

Table 10-11: Climate Risk Matrix

		Magnitude of Consequence				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Likelihood	**Rare**	Low	Low	Medium	High	Extreme
	Unlikely	Low	Medium	Medium	High	Extreme
	Moderate	Low	High	High	Extreme	Extreme
	Likely	Medium	High	High	Extreme	Extreme
	Almost Certain	High	High	Extreme	Extreme	Extreme

Sensitivity Analysis

As per the TII Guidance, a sensitivity analysis was carried out on all construction elements (construction compounds, processing areas, etc.) as well as asset categories including pavements; drainage; structures; utilities; landscaping; signs, light posts, and fences. The sensitivity analysis was used to identify which climate hazards are relevant to the construction phase of the Proposed Grid Connection. The sensitivity of the Proposed Grid Connection to the climate hazards is assessed irrespective of the project location. Table 10-12 presents the sensitivity analysis and the rationale for the sensitivity score for the construction of the Proposed Grid Connection.

Table 10-12: Sensitivity Analysis of Climate Hazards to the Construction of the Proposed Grid Connection

Climate Hazard	Sensitivity	Sensitivity Score
Flooding (Coastal)	N/A	N/A
Flooding (Pluvial)	Low sensitivity to Pluvial flooding.	1
Flooding (Fluvial)	Low sensitivity to Fluvial flooding.	1

Climate Hazard	Sensitivity	Sensitivity Score
Extreme heat	Low sensitivity to extreme heat, as concrete may be sensitive to extreme heat.	1
Extreme Cold	Low sensitivity to extreme cold.	1
Wildfire	All assets are considered to have a medium sensitivity to wildfires. Can cause some surface damage to the asset band, may lead to road closures impacting with economic or social impacts.	2
Extreme Wind	Extreme wind is not predicted to significantly affect the various elements of the Proposed Grid Connection due to the nature of the grid connection and its design. Construction sites could be affected by extreme winds.	2
Drought	Low sensitivity to drought on all assets.	1
Lightning and hail	Low sensitivity to lightning and hail for all assets. Potential for short term interruptions to works.	1
Fog	Medium sensitivity	2

Exposure Analysis

An exposure analysis was also carried out on the construction phase of the Proposed Grid Connection based on the known climate hazards presented in Table 10-12. Given that the construction phase is anticipated to take place within the medium term, the analysis focusses on the current climate hazards but the long-term future climate hazards are also considered as appropriate. Table 10-13 presents the rationale for the exposure scoring for the construction phase.

Table 10-13: Exposure Analysis based on Past and Predicted Climate Events

Climate Event	Detail	Exposure Score
Flooding (Coastal)	N/A	N/A
Flooding (Pluvial)	Medium	2
Flooding (Fluvial)	Medium	2
Extreme heat	Low exposure according to the Think Hazard! Tool.	1
Extreme Cold	Low exposure	1
Wildfire	Medium - there is between a 10% and 50% chance of experiencing weather that could support a hazardous wildfire that may poses some risk of life and property loss in any given year.	2
Extreme Wind	Severe wind is rated as medium exposure.	2
Drought	Drought is rated as medium exposure. Only one recorded drought has been recorded nationally in 2018.	2
Lightning and hail	Lightning and hail are rated as medium exposure.	2
Fog	Fog is rated as medium.	2

The approach to assessing the climate risk associated with the operation phase is analogous to that presented for the construction phase. The sensitivity of the longer term operation phase has slight

variation to the short term construction phase ; The exposure criteria apply to both phases and the exposure data presented in Table 10-13 is also applied for the operation phase. Table 10-14 resents the sensitivity analysis and the rationale for the sensitivity score for the operation phase of the Proposed Grid Connection.

Table 10-14: Sensitivity Analysis of Climate Hazards to the Operation of the Proposed Grid Connection

Climate Hazard	Sensitivity	Sensitivity Score
Flooding (Coastal)	N/A	
Flooding (Pluvial)	Medium sensitivity	1
Flooding (Fluvial)	Medium sensitivity	1
Extreme heat	Low sensitivity	1
Extreme Cold	Low sensitivity	1
Wildfire	Medium sensitivity	2
Drought	Low sensitivity to drought	1
Extreme Wind	Medium sensitivity to extreme wind	2
Lightning and hail	Low sensitivity to lightning and hail for all assets.	1
Fog	Low sensitivity to fog for all assets.	1

10.3.7 Data Limitations

There were no difficulties or limitations encountered when carrying out this assessment.

10.3.8 Consultations

Relevant stakeholders consulted through an EIA scoping exercise undertaken on the 14th July 2025 are listed below. No responses have been received to date.

- Department of Climate, Energy and the Environment (DCEE)
- Environmental Protection Agency (EPA)
- Transport Infrastructure Ireland (TII)
- An Taisce
- Sustainable Energy Authority of Ireland (SEAI)
- Department of Agriculture, Food and the Marine (DAFM)

10.4 Description of the Existing Environment

10.4.1.1 Baseline Macroclimate

Ireland declared a climate and biodiversity emergency in May 2019 and in November 2019 there was European Parliament approval of a resolution declaring a climate and environment emergency in Europe. This, in addition to Ireland's current failure to meet its EU binding targets under Regulation 2018/842 (European Union, 2018) results in changes in GHG emissions either beneficial or adverse being of more significance than previously considered prior to these declarations.

Ireland has seen an increase in major weather events over time. Truly extreme heat events that are rare in the present climate are projected to become more common under all scenarios. Changes will be larger for the very infrequent, 1-in-50-year events (based upon present climate) than for 1-in-10-year events. The change would be considerably greater under Late action than in Early action scenarios. Extreme cold events are conversely projected to become rarer, with greater reductions in the occurrence of what today would constitute 1-in-50-year events than in 1-in-10-year events. Extreme precipitation events are projected to become more frequent, with changes in rarer 50-year events being more marked than 10- and 20-year return periods. Under the Late action scenario, the annual maximum daily rainfall that used to occur once every 50 years, on average, will become approximately twice as frequent. The shortening of recurrence times that is projected out to mid-century or so can be stabilised or even reversed under the early action scenarios by the end of the century.[4.]

Climate system tipping points represent thresholds beyond which components of the Earth system permanently switch to new states. Tipping points would have considerable impacts, including sea level rise from collapsing ice sheets, dieback of the Amazon rainforest and carbon release from thawing permafrost. Several such tipping points would have implications for Ireland either through further shifting global climate or altering the regional climate in the North Atlantic and north-western Europe. For Ireland, the Atlantic Meridional Overturning Circulation (AMOC) is the most immediately important potential tipping point for the Irish climate, given the importance of the North Atlantic in determining our climate and agricultural productivity. The AMOC will almost certainly weaken over the 21st century, and a full collapse cannot be ruled out. If there were to be a collapse in the AMOC, as has occurred repeatedly in the past during rapid climate transitions of past glacial phases, winters would become considerably colder and summers warmer, and there would likely be an increase in storminess and potential implications for sea levels. These would have very profound implications for the Irish climate and society.

Future global sea level rise projections over the coming centuries have large uncertainties. Particular concern relates to retrograde ice sheets where much of the ice sheet is grounded below present-day sea level, which could reach tipping points whereby they become committed to collapsing over a multi-centennial period. The largest such ice sheet is the West Antarctic Ice Sheet (WAIS), which alone could contribute several metres of sea level rise. Historical global emissions may have already committed it to its long-term collapse. Both the Greenland and Antarctic ice sheets have been considerably smaller in past warm periods, but proxies cannot determine the pace of past ice sheet collapse. Under late action scenarios, highly uncertain ice sheet instabilities mean that 2m of sea level rise this century cannot be ruled out.

In Ireland, and in line with global patterns, annual average temperatures are now approximately 0.9°C higher than they were in the 1900s. In Ireland the last 30 years show an almost 7% increase in annual precipitation. Global sea level increased by approximately 0.20 m between 1901 and 2018, and recent studies have highlighted greater than expected sea level rise in Cork and Dublin.

[4] Clare Noone, Deirdre McClean, Danielle Gallagher, Jennifer McElwain and Peter Thorne, 2023, IRELAND'S CLIMATE CHANGE ASSESSMENT Summary for Policymakers in Volume 1: Climate Science – Ireland in a Changing World, Environmental Protection Agency, Ireland, 22 pp, https://www.epa.ie/publications/monitoring--assessment/climate-change/ICCA_Volume-1-SPM.pdf

Climate change under early, middle, and late action climate model scenarios show very different futures for Ireland. All model projections show higher temperatures and an increase in annual precipitation; extreme events will become more common and more extreme.

Figure 10-1 shows the annual minimum and maximum temperate change for Ireland in response to global temperature changes. It is projected that as global temperatures increase as a result of global warming, there will be an increase in average maximum summer temperatures and average minimum winter temperatures. Furthermore, it is projected that there will be a decrease in average summer precipitation and increase in average winter precipitation.

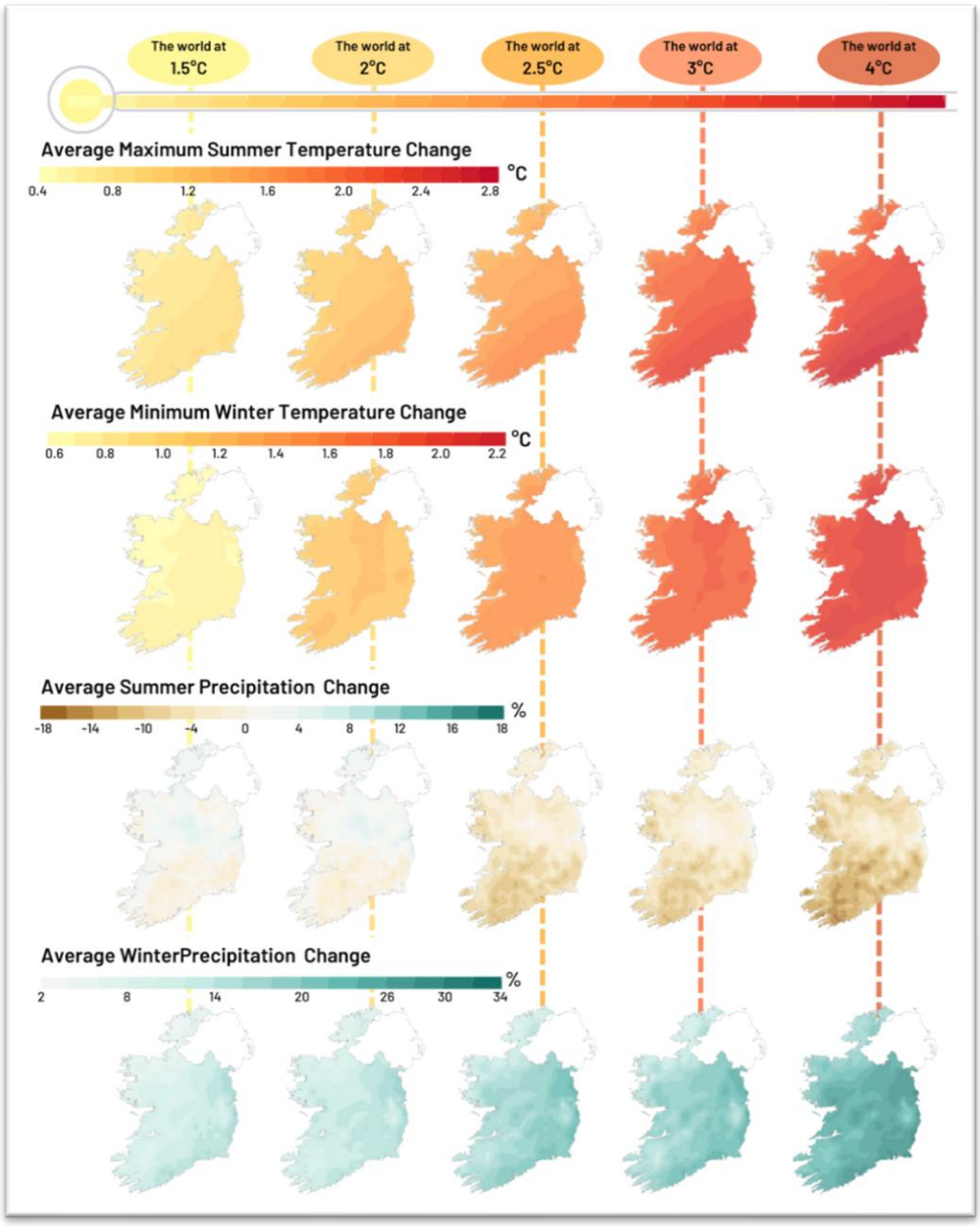

Figure 10-1 : Average Projected Temperature and Precipitation Change for Ireland (Met Éireann TRANSLATE) [5]

[5] Source: Met Éireann, TRANSLATE: One Climate Resource for Ireland. Available at: https://www.met.ie/science/translate

10.4.1.2 Climate Extremes

Future projections of changes for variables such as temperature and precipitation for a selection of time periods, scenarios and global warming levels are taken from Met Éireann's TRANSLATE project - O'Brien and Nolan (2023)). Climate extreme projections from CMIP5 for Ireland are shown below for Annual R30mm (Very Wet Days, **Figure 10-2**) and Annual Number of Heatwaves for RCP8.5/Late Action scenario's, for middle (2021-2050) and late century (2041-2070) -**Figure 10-3.**

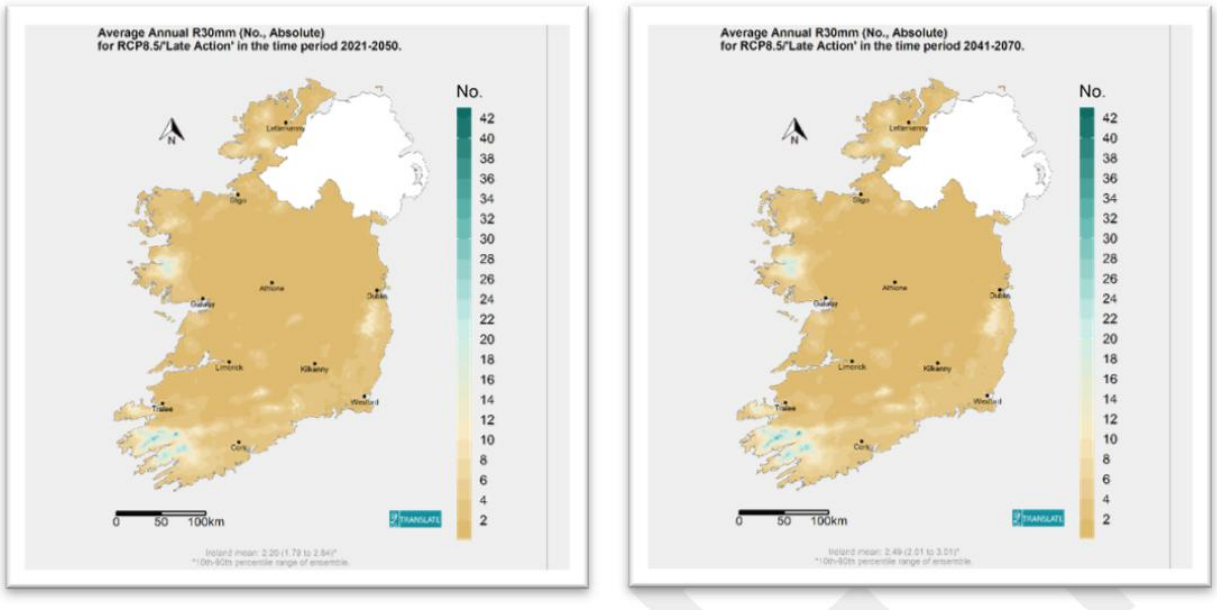

Figure 10-2 : Annual R30mm (Very Wet Days)-Climate Ireland, Met Eireann Translate

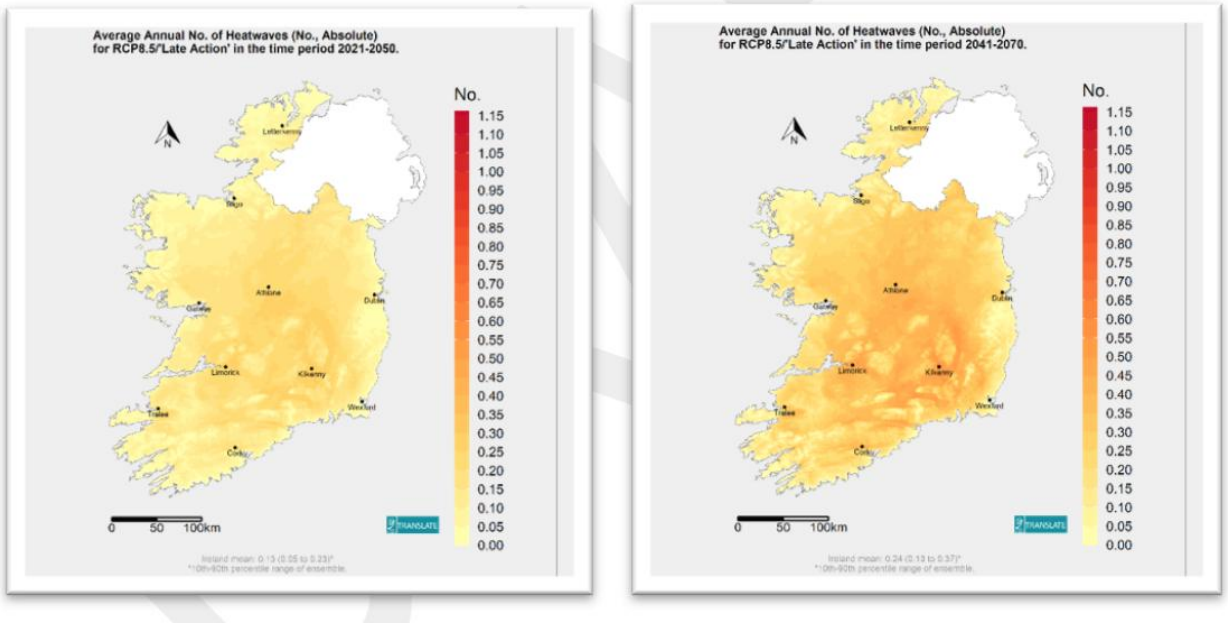

Figure 10-3 : Annual Number of Heatwaves - CMIP5 – Climate Ireland, Met Eireann Translate

10.4.1.3 Baseline Climate

The closest representative Met Éireann meteorological station to the Study Area is located at Gurteen, Co. Tipperary. This station provides comprehensive long-term data on climate variables relevant to the study area. The following data detailed in Table 10-15 is based on the 30-year average meteorological records from 2008 to 2025, unless otherwise specified. All data are sourced from Met Éireann.

Table 10-15: 30 Year Average Meteorological Data from Tipperary station Gurteen (Annual Values from 2008-2025, source: www.met.ie)

Parameter	30-Year Average
Mean Temperature (°C)	9.7
Mean Annual Total Rainfall	893
Mean Wind Speed (knots)	8.2

10.4.1.4 Temperature

Long term temperature records are shown in Tables 10-16 and 10-17.

Table 10-16: 30 Year Average Data for Temperature at Tipperary (Annual Values from 2008-2025, source: www.met.ie)

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Daily Max	7.85	8.85	10.49	13.19	16.04	18.38	19.56	18.89	17.01	13.90	10.21	8.37	13.5
Mean Daily Min	1.89	2.49	2.29	3.81	6.55	9.06	11.22	10.79	8.96	6.78	3.95	2.52	5.84
Mean Temperature	4.9	5.7	6.4	8.5	11.3	13.7	15.4	14.9	13.0	10.3	7.1	5.5	9.7

Table 10-17: Monthly Values for Mean Temperature for Tipperary 2020-2024 (source: www.met.ie)

Temperature (°C)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
2020	6.0	5.7	6.1	9.7	11.9	13.6	14.4	15.4	12.9	9.5	8.1	4.8	9.8
2021	3.7	6.0	7.3	7.3	9.5	13.7	17.2	15.3	14.8	11.6	7.8	7.0	10.1
2022	5.7	6.7	6.7	8.4	12.1	13.4	16.3	15.9	12.9	11.9	8.7	3.4	10.2
2023	5.8	7.2	7.3	9.0	12.4	15.8	14.9	15.6	14.6	11.0	7.4	7.2	10.7
2024	4.4	7.5	7.5	9.1	12.7	12.9	14.7	15.0	12.4	11.0	7.8	6.9	10.2
Mean	5.1	6.6	7.0	8.7	11.7	13.9	15.5	15.4	13.5	11.0	8.0	5.9	10.2

10.4.1.5 Wind

The 30-year record for wind is shown in Table 10-18.

Table 10-18: 30 Year Average Data for Wind at Tipperary (Annual Values from 2008-2025, source: www.met.ie)

Wind (knots)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Speed	8.88	9.75	8.84	8.07	7.83	7.21	7.11	7.69	7.45	8.10	8.38	9.13	8.21
Max. Gust	67	65	53	49	45	45	39	47	54	55	58	60	67

10.4.1.6 Rainfall

Long term rainfall records are shown in Tables 10-19 and 10-20.

Table 10-19: 30 Year Average Data for Rainfall at Tipperary (2008-2025, source: www.met.ie)

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Mean Monthly Total	82.59	77.75	72.79	53.77	60.67	69.84	80.72	82.62	73.07	92.59	97.80	94.58	78.23
Greatest Daily Total	27.1	28.1	35.8	30.4	42.1	73.9	39.2	72.2	40.6	53.2	62.8	42.4	73.9

Table 10-20: Monthly Values for Total Rainfall for Tipperary 2020-2024 (source: www.met.ie)

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
2020	63.70	220.10	64.20	39.20	15.20	55.30	112.90	100.30	52.70	103.10	79.40	99.70	1005.80
2021	90.90	87.80	64.60	13.40	96.50	22.00	110.40	58.20	55.80	81.10	34.30	78.40	793.40
2022	46.60	133.60	47.40	50.10	56.20	90.50	33.20	25.10	106.70	159.80	106.90	82.90	939.00
2023	85.40	18.50	111.60	54.80	42.90	66.70	163.30	96.30	121.40	123.10	81.20	115.00	1080.20
2024	68.80	124.30	115.30	76.60	63.60	48.60	47.00	58.10	53.40	70.50	60.10	61.00	847.30
Mean	71.08	116.86	80.62	46.82	54.88	56.62	93.36	67.60	78.00	107.52	72.38	87.40	1005.80

10.4.1.7 Baseline Climate Vulnerability

Details of current climate hazards impacting the baseline environment as derived from the Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool[6] is summarised in **Table 10-21** to illustrate the current climate hazard threat to the area of the Proposed Grid Connection. *ThinkHazard!* provides a general view of the hazards, for a given location, that should be considered in project design and implementation to promote disaster and climate resilience. The tool highlights the likelihood of different natural hazards affecting project areas (very low, low, medium and high), provides guidance on how to reduce the impact of these hazards, and where to find more information.

Table 10-21 : Observed Hazard Level

Hazard Type	Hazard Level
Coastal Flood	No Data
Pluvial Flood	Medium
Fluvial Flood	Medium
Extreme Heat	Low
Wildfire	Medium

In Tipperary, river flood hazard is classified as **medium** based on modelled flood information currently available to 'Think Hazard!' tool. This means that there is a chance of more than 20% that potentially damaging and life-threatening river floods occur in the coming 10 years.

Wildfire hazard in the area is classified as **medium** according to the information that is currently available to this tool. This means that there is between a 10% and 50% chance of experiencing weather that could support a hazardous wildfire that may poses some risk of life and property loss in any given year.

In addition to the hazard types listed in **Table 10-21**, this analysis also has due regard for past major weather events which are used to inform future potential hazards and adaption. **Table 10-22** presents a list of historically recorded extreme weather events recorded nationally which have been derived from the Met Éireann Major Weather Events database.

[6] Global Facility for Disaster Reduction and Recovery 'Think Hazard!' tool. Available at: https://thinkhazard.org/en/

Table 10-22:National Major Weather Events

Year	Event	Climate Hazard
2025	Storm Eowyn	Strong Winds
2024	Storm Isha	highest sustained and gust wind speeds
2023	Storm Babet	Extreme Flooding
2023	Winter Storms	Strong Wind/Extreme Rainfall
2022	Highest Temperature Recorded in Ireland since 1887 (July 2022)	High Temperature
2022	Storm Eunice	Strong Wind
2021	Storm Barra	Strong Wind
2020	Storm Ellen	Strong Wind
2018	Heatwaves and Drought	High Temperature
2018	Snowstorm Emma & Beast from the East	Snowfall
2018	Storm Doris	Strong Wind
2018	Storm Eleanor	Strong Wind
2017	Storm Dylan	Strong Wind
2017	Storm Ophelia	Strong Wind
2017	Heavy Rain	Extreme Rainfall
2016	Storm Jake	Strong Winds
2015	Storm Frank	Strong Winds
2015	Storm Eva	Strong Winds
2015	Storm Desmond	Flooding
2015	Storm Darwin	High Temperature
2013/14	Winter Storms	Cold snaps
2011	Tropical Storm Katia	Strong winds
2010	Winter Cold Spell	Cold snaps
2009/10	Winter Cold Spell	Cold snaps/ Frost
2009	Severe Flooding	Flooding
2008	Heavy Rain and Flooding	Extreme Rainfall
2006	High Temperature/ Heatwave	High Temperature
2003	Heavy Rainfall/ Cloud Burst	Extreme Rainfall
2002	Severe Flooding in Eastern Areas	Flooding
2002	Coastal flooding along the eastern and southern coasts	Flooding
2000	Severe flooding in east and southern coasts	Flooding
1998	Hurricane-force winds over north and northeast	Strong Wind
1997	Windstorm	Strong Wind
1986	Hurricane Charley	Strong Wind

Source: Met Éireann, Major Weather events. Available at: https://www.met.ie/climate/major-weather-events

10.5 Description of the Likely Significant Effects

10.5.1 Do-Nothing Scenario

If the Proposed Grid Connection did not receive a grant of permission, the site will continue to function as it does at present, with no changes made to the current land-use and potential for impacts on climate through the construction and operation of the Proposed Grid Connection would not occur.

If the Proposed Grid Connection were not to proceed, the Consented Wind Farm would not be constructed, therefore the indirect short term construction phase impacts and long term operational phase impacts, (which have been determined to not have significant environmental effects, refer to An Coimisiún Pleanála ((ACP) Planning Reference 318704), will not occur.

Likewise, the indirect positive contribution the proposal grid connection to meeting National and EU targets for the production and consumption of electricity from renewable resources by 2030 and the reduction of greenhouse gas emissions.

10.5.2 Construction Phase

10.5.2.1 Greenhouse Gases

Pre-Mitigation Impacts

There is the potential for a number of GHG emissions to atmosphere during the construction of the Proposed Grid Connection. GHG emissions for the construction phase have been estimated using the TII carbon Tool. A summary of the results from the carbon calculation exercise are detailed in **Table 10-23**. The following assumptions are included:

- The total stone fill required is 15,000 m^3, including a 12.5% contingency factor (approximately 30,000 tonnes)[7]
- Stone will be sourced locally within 20 km of the site.
- Each HGV is assumed to carry 24 tonnes of stone.

  The emission factor for grid connection cable laying is not available in the TII tool and has been excluded from the assessment.

Table 10-23 : Estimated GHG Emissions associated with the Construction Phase of the Proposed Grid Connection

Life Cycle Stage	tCO_2e
Embodied Carbon of Materials	224.1
Transport of material to site	26.0
Construction Site Operations (Excavation)	15.6
Total	265.7

[7] Highway UK Conversion factor Stone: general 2.00 tonnes/ m^3 Source: Bath Inventory - Version 2.0 (2011)

Mitigation

- Construction staff will be trained how to inspect and maintain construction vehicles and plant to ensure good operational order while onsite, thereby minimising any emissions that arise. The Site Supervisor/Construction Manager produce and follow a site inspection and machinery checklist which will be followed and updated if/when required.
- All plant and materials vehicles shall be stored in dedicated areas (on Site). Machinery will be switched off when not in use.
- Construction materials will be transported to the site on specified routes only, unless otherwise agreed with the Planning Authority.
- Areas of excavation will be kept to a minimum, and stockpiling will be minimised by coordinating excavation, spreading and compaction.
- The expected waste volumes generated onsite are unlikely to be large enough to warrant source segregation at the Site. Therefore, all wastes streams generated onsite will be deposited into a single waste skip which will be covered. This waste material will be transferred to a licensed /permitted Materials Recovery Facility (MRF) by a fully licensed waste contractor where the waste will be sorted into individual waste streams for recycling, recovery or disposal. The MRF facility will be local to the Site to reduce the emissions associated with vehicle movements. There are several licenced waste treatment facilities located outside of Thurles, approximately 18km to the south of the Site.
- A Construction and Environmental Management Plan (CEMP) will be in place throughout the construction phase.
- Aggregate materials for the construction of site access tracks and all associated infrastructure will all be locally sourced, where possible, which will further reduce potential emissions.
- Where possible, low carbon intensive construction materials will be sourced and utilised onsite.

Residual Impact

The construction of the permanent 110kV substation, temporary construction compound, underground grid connection cabling, and end masts will require the operation of construction vehicles on and off-site, and the transport of workers to and from the site. GHG associated with vehicles, such as carbon dioxide (CO2) will arise as a result of construction activities. This impact will be short-term and slight, given the quantity of GHG's that will be emitted, and will be restricted to the duration of the construction phase.

Significance of Effects

Based on the assessment above there will be short-term, minor adverse (TII 2022 rating), and in terms of EIA (EPA 2022), a short term slight effect on climate.

10.5.2.2 Climate Change Vulnerability

Pre-Mitigation Impacts

The design of the Proposed Grid Connection takes into account the potential for flood risk within the surrounding area. The 110kV substation, temporary construction compound and majority of the grid connection cable route are located outside the modelled 100-year and 1000-year flood zones and are therefore located in Flood Zone C (Low Risk). The grid connection end masts and a section of

the grid route are inside the 100-year and 1000-year flood zones; however, due to the underground nature of the grid connection and above ground structure of the end masts, they will have no potential to increase flood risk. The proposed access road within the flood zone will be constructed as close to ground level as possible. Refer to section 8.5.3.6 of Chapter 8 Hydrology and Hydrogeology and Appendix 8-1 Stage III Flood Risk Assessment. The sensitivity of the Proposed Grid Connection to climate hazard is detailed in Table 10-24**.**

Climate Change Risk Assessment

Based on the estimated sensitivity and exposure of the construction phase as discussed in section 10.3.6.3, the vulnerability assessment of the construction phase is summarised in **Table 10-24**.

Table 10-24: Vulnerability Analysis for the Construction Phase

		Exposure		
		Low	**Medium**	**High**
Sensitivity	**Low**	Extreme Heat/Cold, Pluvial and Fluvial Flooding	Drought, Lightening and hail.	
	Medium		Wildfires, Extreme Winds, Fog	
	High			

Mitigation

- A CEMP has been prepared for the Proposed Grid Connection and is included in Appendix 3- 2 of this EIAR. Section 6 of the CEMP details the Emergency Response Procedure to be adopted in the event of an emergency in terms of site health and safety and environmental protection. Upon a grant of planning permission for the Proposed Grid Connection, the CEMP will be updated prior to the commencement of the development. The CEMP will be a live document maintained by the contractor that will work to ensure that potential risks of major accident and/or disaster are identified, avoided and mitigated, as necessary. Refer to Appendix 3-2 for the CEMP that sets out the minimum standards to be employed by the contractor.
- The Proposed Grid Connection is designed and will be constructed in line with current best practice and, as such, mitigation against the risk of natural disasters such as flooding and fire will be embedded through the design. In accordance with the provision of the European Commission 'Guidance on the preparation of Environmental Impact Assessment Reports' 2017, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures.
- Please refer to chapter 16 Schedule of Environmental Commitments which details all proposed mitigation and monitoring measures for the construction phase of the Proposed Grid Connection.
- Potential effects associated with contamination during construction are addressed fully in Chapter 7 Land Soil and Geology and Chapter 8 Hydrology and Hydrogeology of this EIAR. The mitigation measures outlined therein to protect environmental receptors as well as the procedures and measures described in the CEMP will ensure that the risk from these sources is imperceptible.

Residual Impact

Based on the above, the vulnerability of the construction phase to climate change is considered to be Low and short term in duration.

Significance of Effects

Based on the above, the effects on the Proposed Grid Connection from climate change during the construction phase are not significant in both TII and EIA terms (EPA 2022).

10.5.3 Operational Phase

10.5.3.1 Greenhouse Gases

Pre-Mitigation Impacts

58,808 tonnes of CO_2 will be displaced per annum from the largely carbon-based traditional energy mix by the Consented Wind Farm. Over the 30-year lifetime of the wind farm therefore, 1,764,240 tonnes of carbon dioxide will be displaced from traditional carbon-based electricity generation. The GHG emissions associated with the construction of the grid connection is 265.7 tCO_2e. This represents 0.02% of the total amount of carbon dioxide emissions that will be offset by the Consented Wind Farm over its operational life. If the Proposed Grid Connection does not receive a grant, the offsetting benefits of the Consented Wind Farm will not be fulfilled.

Mitigation

None Proposed.

Residual Impact

By facilitating the connection of the Consented Wind Farm to the grid, the grid connection indirectly supports the displacement of CO_2e from fossil fuel-based electricity generation. In the long-term there will be a long term beneficial (TII 2022) or imperceptible positive effect (EPA 2022) effect on Climate as a result of reduced GHG emissions.

Significance of Effects

Based on the above, the effects on the Proposed Grid Connection on climate change during the operational phase are beneficial in terms of Climate and are considered positive imperceptible in EIA EPA 2022 terms.

10.5.3.2 Climate Change Risk Assessment

The Proposed Grid Connection will result in some GHG emissions during construction and more minor GHG emissions during operation – however these GHG emissions must be considered in the context of the overall purpose of the grid Connection. The Proposed Grid Connection will indirectly displace fossil fuels and will have a net positive impact on Climate through its transmission of renewable energy onto the national grid. The Proposed Grid Connection will implement a number of best practice mitigation measures to reduce GHG emissions which will reduce the impact to climate.

Based on the estimated sensitivity and exposure, the vulnerability of the operational phase is summarised in **Table 10-25**.

Table 10-25: Vulnerability Analysis for the Operation Phase

Sensitivity	Exposure: Low	Exposure: Medium	Exposure: High
Low	Extreme Heat/Cold, Pluvial and Fluvial Flooding	Drought, Lightning and Hail, Fog	
Medium		Wildfires, Extreme Wind	
High			

Mitigation

- The Proposed Grid Connection is designed and will be constructed in line with current best practice and, as such, mitigation against the risk of natural disasters such as flooding and fire will be embedded through the design. In accordance with the provision of the European Commission 'Guidance on the preparation of Environmental Impact Assessment Reports' 2017, a Risk Management Plan will be prepared and implemented on site to ensure an effective response to disasters or the risk of accidents. The plan will include sufficient preparedness and emergency planning measures.
- Please refer to chapter 16 Schedule of Environmental Commitments which details all proposed mitigation and monitoring measures for the operational phase of the Proposed Grid Connection.
- Potential effects associated with contamination during operation are addressed fully in Chapter 7 Land Soil and Geology and Chapter 8 Hydrology and Hydrogeology of this EIAR. The mitigation measures outlined therein to protect environmental receptors as well as the procedures and measures described in the CEMP will ensure that the risk from these sources is imperceptible.

Residual Impact

Based on the above, the vulnerability of the construction phase to climate change is considered to be Low and long term in duration.

Significance of Effects

Based on the above, the effects on the Proposed Grid Connection from climate change during the operational phase are not significant in both TII and EIA terms (EPA 2022).

10.6 Decommissioning Phase

The Grid Connection infrastructure will remain in place as it will become part of the National Electricity Grid under the ownership and control of the ESB and EirGrid.

10.7 Cumulative and In Combination Effects

The potential for impact between the Proposed Grid Connection with the Consented Wind Farm, other proposed or consented wind projects within the surrounding landscape, and other relevant non-wind projects (existing, permitted or proposed) has been carried out with the purpose of identifying what influence the Proposed Grid Connection will have on climate and from climate change. How these factors interact when considered cumulatively and in combination with relevant existing, permitted or proposed projects and plans in the vicinity of the Site has also been undertaken. Please see Chapter 15 for Interactions and Cumulative Effects for the detailed cumulative assessment methodology. Please refer to Appendix 15-1 for a comprehensive listing of the considered cumulative and in combination with relevant existing, permitted or proposed projects and plans in the vicinity of the Site.

As demonstrated in the assessments above, there are no significant effects on climate arising from the construction and operation of the Proposed Grid Connection and the vulnerability of the Proposed Grid Connection to climate change is low during the construction and operation phases.

The Proposed Grid Connection will be constructed at the same time as the Consented Wind Farm and will operate alongside it, facilitating the transmission of renewable electricity to the national grid.

Following a detailed assessment of the potential for any further impact when considered in combination with any or all of the plans and projects set out in set out in Appendix 15-1 (including the Consented Wind Farm), the Proposed Grid Connection, with mitigation measures in place, is found to have no potential for significant in-combination or cumulative effects on climate or from climate change during the construction phase. The Proposed Grid Connection, in combination with the Consented Wind Farm will indirectly have a long term beneficial positive imperceptible (EIA, EPA 2022) effect on Climate during the operational phase. The construction and operation of the Proposed Grid Connection is necessary to enable the Consented Wind Farm to provide capacity to meet new demand for electricity, to support economic growth for Ireland, and facilitate future connections to new renewable generation, helping to meet national Climate Action Plan targets.

10.8 References

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23. Climate Ireland, Climate Change Projection Maps viewer https://www.climateireland.ie/data-explorer/