East Meath - North Dublin Grid Upgrade Environmental Impact Assessment Report (EIAR): Volume 2

Chapter 8 – Climate

EirGrid

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Contents

8. Climate

8.1 Introduction

This Chapter of the Environmental Impact Assessment Report (EIAR) has considered the likely potential climate impacts associated with the Construction and Operational Phases of the East Meath - North Dublin Grid Upgrade (hereafter referred to as the Proposed Development). It describes the relevant legislation, guidance and methodology applied, identifies the likely potential impacts on receptors, discusses the effects of the impacts and provides details of mitigation. Predicted residual impacts have also been described, where relevant.

The assessment includes the consideration of:

- The vulnerability of the Proposed Development to climate change; and
- The likely potential impact of the Proposed Development on climate.

A glossary of terms relating to this Chapter is provided in Appendix A8.1 in Volume 3 of this EIAR.

8.2 Methodology

8.2.1 Study Area

The Proposed Development will cover a route of approximately 37.5 kilometres (km) in County Meath, and Fingal in north County Dublin (refer to Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR for a full description of the Proposed Development). Unlike the majority of other environmental factors, the consideration of greenhouse gas (GHG) emissions is not determined by a pre-defined geographical area. Different study areas are required to be defined for each aspect of a climate impact assessment.

8.2.1.1 Vulnerability to Changes in Climate

The study area for assessing the vulnerability of the Proposed Development to changes in climate comprises the assets associated with the Proposed Development within the Planning Application Boundary. This area is approximately 142 hectares (ha).

8.2.1.2 Greenhouse Gas Assessment

The study area for the GHG assessment, hereafter referred to as the GHG study area, comprises the construction and operational areas within the Planning Application Boundary. However, the GHG study area also incorporates the transport of construction materials from the supplier within Ireland and the transport of materials off site for waste processing within Ireland. The GHG study area is therefore defined by the largest extent of these activities / elements (i.e., including the transport distances of materials on a national scale) within Ireland.

8.2.2 Relevant Guidelines, Policy and Legislation

8.2.2.1 European Policy Context

There are a range of key International and European Union (EU) level agreements and policy frameworks that have contributed towards shaping Ireland's approach to energy transmission, distribution and storage. These include:

- European Green Deal 2019 (European Commission 2019) - Proposes stricter EU emissions reduction targets for 2030 to at least 50% and towards 55% compared with 1990 levels;
- European Union 'Fit for 55' legislative package (European Commission 2021b) – Aims to make all sectors of the EU's economy fit to meet the 55% reduction target;
- The Paris Agreement (United Nations Framework Convention on Climate Change 2015), which is an agreement to strengthen climate change resilience efforts through increased financing, while curbing GHG emissions via an agreed 'Paris Agreement rulebook' setting out how countries are held accountable for delivering on their climate action promises;
- Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652 (hereafter referred to as the Recast Renewable Energy Directive (RED III)), which established a binding target of at least 42.5% of renewable energy for the EU by 2030;
- Europe 2030 Climate and Energy Framework (European Commission 2014), which established a binding domestic target to reduce GHG emissions by 40% below 1990 levels by 2030; and
- Energy Roadmap 2050 (European Commission 2011), which developed scenarios demonstrating that decarbonising the energy system is technically and economically feasible.

A detailed policy summary is provided in Appendix A8.2 in Volume 3 of this EIAR.

8.2.2.2 National, Regional and Local Planning Policy Context

It is recognised at a national and regional level that, International, European, and national climate change commitments mean that power generation, transport and heat all increasingly have to derive power from sustainably produced electricity. Therefore, national and regional policy places a strong emphasis on the need for new energy systems and transmission grids.

8.2.2.2.1 National Policy Context

The following are those national-level plans, policies, and strategies relevant to the Proposed Development:

- Climate Action and Low Carbon Development (Amendment) Act 2021 (hereafter referred to as the 2021 Climate Act), and the Climate Action Plan 2023 (hereafter referred to as the CAP23) (Government of Ireland 2022a) and the Climate Action Plan 2024 (hereafter referred to as the CAP24) (Government of Ireland 2023) all commit Ireland to achieving a 51% reduction in overall GHG emissions by 2030, relative to 2018 levels, and setting Ireland on a path to reach net-zero by no later than 2050. The CAP24 also reaffirms the commitment from previous climate action plans (including CAP23) to increase the proportion of renewable electricity (i.e., wind and solar) up to 80% by 2030. These documents state that in order to do so there is a need for transformational policies, measures and actions, including strengthening the grid;
- Project Ireland 2040 - National Planning Framework (hereafter referred to as the NPF) (Government of Ireland 2018) sets out key policy principles via National Strategic Outcomes (NSOs), which include supporting and strengthening the economy and a transition to a low carbon, climate resilient society (NSO 3, 6 and 8), providing access to quality services (NSO 4, 7, and 10) and achieving sustainable growth and better environmental resource management (NSO 1 and 9). It states that Ireland's National Energy Policy is focused on three pillars (i.e., sustainability, security of supply, and competitiveness);
- Project Ireland 2040 - National Development Plan 2021-2030 (hereafter referred to as the NDP) (Government of Ireland 2021) represents the national capital investment strategy plan for delivering the NSOs of the NPF, achieved via Strategic Investment Priorities to the year 2030. A core strategic investment priority is a focus on decarbonising energy, in order to, "*create greater links between different energy carriers (such as electricity and hydrogen);*

infrastructures; and consumption sectors (such as transport and heating)." Doing so requires a coordinated programme of investment in, among other things, "*an expanded and strengthened electricity transmission and distribution network*", to support an increase in both renewable and conventional electricity generation;

- The National Energy and Climate Plan 2021-2030 (hereafter referred to as the NECP) (Department of Communications, Climate Action and Environment 2021) is a 10-year plan mandated by the EU to each of its Member States, in order for the EU to meet its overall GHG emissions targets. The NECP establishes key measures to address the five dimensions of the EU (i.e., decarbonisation, energy efficiency, energy security, internal energy markets and research, innovation and competitiveness); and
- The White Paper – Ireland's Transition to a Low Carbon Energy Future 2015-2030 (Department of Communications, Energy and Natural Resources 2021) sets out a framework to guide Ireland's energy policy development. The Proposed Development is considered to be an 'enhanced and extended energy infrastructure' development, which will be critical for economic development, regional development and the secure provision of energy and other services for the Irish society and economy.

Further details on these policies are provided in Appendix A8.2 in Volume 3 of this EIAR.

The purpose of the 2021 Climate Act is to provide for the approval of plans "*for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050*". The 2021 Climate Act will also "*provide for carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy*". It defines the carbon budget as "*the total amount of greenhouse gas emissions that are permitted during the budget period*". The first carbon budget programme proposed by the Climate Change Advisory Council was approved by the Government and adopted by both Houses of the Oireachtas in April 2022 (Government of Ireland 2022b). The carbon budgets (expressed as carbon dioxide equivalent (abbreviated as CO_2e) which is a metric used to compare the emissions of various GHGs, based on their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of CO_2 with the same GWP) comprise three successive five-year budgets. The total emissions allowed under each budget are set out below in Table 8.1, as well as the average annual reduction for each five-year period.

Table 8.1: Ireland's Carbon Budgets 2021-2035

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

CAP24, approved in December 2023, is the third annual update to Ireland's Climate Action Plan. The previous update, CAP23, outlined that the economy-wide carbon budgets will be supplemented by sectoral emissions ceilings, setting the maximum amount of GHG emissions that are permitted in a given sector of the economy during each five-year carbon budget. CAP24 builds upon CAP23 to refine the measures and actions required to deliver the carbon budgets and sectoral emissions ceilings. The sectoral emissions ceilings for each sector are shown in Table 8.2, as reported in CAP24 and the Sectoral Emissions Ceiling Summary Report (Government of Ireland 2022c). The sectoral emissions ceilings for the electricity sector require a 75% abatement to emissions from the 2018 baseline (i.e., 3 $MtCO_2e$ (megatonnes of CO_2 equivalent) per annum by 2030). Further details on CAP24 are provided in Appendix A8.2 in Volume 3 of this EIAR.

Table 8.2: Sectoral Emissions Ceilings

Sector	2018 Baseline Emissions ($MtCO_2e$)	Sectoral Emissions Ceilings for each 5-year Carbon Budget Period ($MtCO_2e$) up to 2030		2030 Emissions Ceiling ($MtCO_2e$)	Reduction in Emissions by 2030 Compared to 2018
		2021-2025 Emissions Ceiling	2026-2030 Emissions Ceiling		
Electricity	10	40	20	3	~75%
Transport	12	54	37	6	~50%
Built Environment – Residential	7	29	23	4	~40%
Built Environment – Commercial	2	7	5	1	~45%
Industry	7	30	24	4	~35%
Agriculture	23	106	96	17.25	~25%
Other (F-gases, petroleum refining and waste)	2	9	8	1	~50%
LULUCF	5	CAP24 puts activity targets in place for the LULUCF Sector reflecting an EU-type approach			
TOTAL	68				
Annual unallocated emissions savings in 2030 (NOTE 1)	-	-	5.25	5.25	-
Unallocated Savings 2026-2030	-	-	26		-
Legally binding Carbon Budgets and 2030 Emission Reduction Targets	-	295	200	34	51%

NOTE 1: 5.25 $MtCO_2e$ of annual emissions reductions are currently unallocated on an economy-wide basis for the second carbon budget period (2026-2030). CAP24 sets out an approach to deal with unallocated savings no later than 2025 and proposes that this may be achieved by focussing on exploring emerging technologies and on the deployment of carbon removal technologies.

8.2.2.2.2 Regional Policy Context

In terms of the regional context, the Proposed Development will be located in the Eastern and Midlands Region of Ireland, and therefore, the relevant regional policy is the Eastern and Midland Regional Assembly (EMRA) Regional Spatial and Economic Strategy 2019-2031 (hereafter referred to as the RSES) (EMRA 2019). The RSES locates the majority of the Proposed Development within the Dublin Metropolitan Area. Key points from the RSES are as follows:

- Climate action is one of three key principles underpinning the RSES vision to create a sustainable and competitive region, to be achieved by securing the transition to a low carbon economy. The RSES expresses support for NSO 8 of the NPF (Government of Ireland 2018), seeking 'Alignment of growth with enabling infrastructure' to ensure quality infrastructure provision and capacity improvement is provided in tandem with new development;
- The RSES states, in relation to the Dublin Metropolitan Area, that the "*Development of the energy distribution and transmission network in the region will enable distribution of more renewable sources of energy to facilitate future energy demand in strategic development areas*". The RSES specifically identifies the need for the "*expansion and upgrading of the grid with the aim of increasing the share of variable renewable electricity that the all-island system can accommodate*"; and
- The RSES expresses support for EirGrid's Grid Implementation Plan 2017 – 2022 (EirGrid 2017) and Transmission Development Plan 2016 - 2026 (hereafter referred to as the TDP) (EirGrid 2016) and any subsequent plans prepared during the lifetime of the RSES, while Objective RPO 10.23 states that the RSES supports:

"*reinforcement of the Greater Dublin Area between Dunnstown and Woodland 400 kV substations to increase the capacity of the often congested and highly loaded Dublin transmission network to enable the transmission system to safely accommodate more diverse power flows and also facilitate future load growth in the area*".

8.2.2.2.3 Local Policy Context

The Proposed Development will be located within the administrative boundaries of Meath County Council (MCC) and Fingal County Council (FCC). This sub-section provides a summary of the relevant local policies and strategies on climate change.

8.2.2.2.3.1 Meath County Council

The MCC Climate Action Strategy 2019-2024 was published in September 2019 (hereafter referred to as the Meath Climate Strategy) (MCC 2019). The Meath Climate Strategy sets several actions on the subject on clean energy, with the primary action (C1) being to "*Build on and support national renewable energy targets and strategy*".

The Local Authority Climate Action Charter (Department of the Environment, Climate and Communications 2019) was signed by MCC in October 2019 and represents a commitment by local authorities to deliver effective climate action on the local and national scale. The Local Authority Climate Action Charter commits local authorities to several actions, including a requirement to deliver on a target of 30% reduction in carbon emissions by 2030 and to ensure that all suppliers provide information on their carbon footprint and steps they plan to take to reduce its impact. Delivering Effective Climate Action 2030 (County and City Management Association 2021) is the local government strategy on climate action published in April 2021. The Meath Climate Strategy provides a stated roadmap at the sectorial level for local authorities to deliver the necessary decarbonisation and adaptation measures required by the Local Authority Climate Action Charter and Climate Action Plans.

MCC adopted the Meath County Development Plan 2021 – 2027 in November 2021 (hereafter referred to as the Meath Development Plan) (MCC 2021), followed by a two-year progress report in December 2023. The Meath Development Plan includes several objectives relating to the promotion of renewable energy alternatives, as summarised in Table 8.3.

Table 8.3: Relevant Mitigation Strategies and Associated Objectives in the Meath Development Plan

Mitigation Strategy / Policy	Associated Objectives
Infrastructure: Renewable Energy	
The Council will endeavour: • To promote the rational uses of energy; • To promote renewable energy; • To promote and disseminate energy information; • To protect the environment; • To reduce energy waste in all sectors of society, and; • To encourage the replacement of imported fossil fuels with regionally generated renewable energy in an effort to ensure security of energy supply, where it is feasible.	INF OBJ 39 To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the county where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
	INF OBJ 41 To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the county and the built environment.
	INF OBJ 47 To investigate the preparation of a Renewable Energy Strategy promoting technologies which are most viable in the county.
	INF OBJ 46 To support the implementation of the actions of the Meath Climate Action Strategy 2019-2024 and review and update the Energy Management Action Plan 2011-2012, 'Think Globally Act Locally'.

Mitigation Strategy / Policy	Associated Objectives
Infrastructure: Energy Networks Infrastructure	
To support and facilitate the development of enhanced electricity and gas supplies, and associated networks…including linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner (INF POL 46).	INF OBJ 50 To seek the delivery of the necessary integration of transmission network requirements to facilitate linkages of renewable energy proposals to the electricity transmission grid in a sustainable and timely manner.
Climate change: residential	
Promote the use of lower carbon fuels in the home.	INF OBJ 41 To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.
Climate change: industry and services	
Promote and facilitate energy efficient building design, operations, environmentally sustainable layout and locations.	INF OBJ 39 To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
Climate change: energy	
Encourage the uptake of more renewable energy sources.	INF POL 34 To promote sustainable energy sources, locally based renewable energy alternatives, where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity, natural and built heritage, residential or local amenities.
	INF POL 35 To seek a reduce greenhouse gas emissions through energy efficiency and the development of renewable energy sources utilising the natural resources of the County in an environmentally acceptable manner consistent with best practice and planning principles.
	INF POL 41 To encourage the development of wind energy, in accordance with Government policy and having regard to the Landscape Character Assessment of the County and the Wind Energy Development Guidelines (2006) or any revisions thereof.
	INF OBJ 39 To support Ireland's renewable energy commitments outlined in national policy by facilitating the development and exploitation of renewable energy sources such as solar, wind, geothermal, hydro and bio-energy at suitable locations within the County where such development does not have a negative impact on the surrounding environment (including water quality), landscape, biodiversity or local amenities so as to provide for further residential and enterprise development within the county.
	INF OBJ 41 To promote the generation and supply of low carbon and renewable energy alternatives, having regard to the opportunities offered by the settlement hierarchy of the County and the built environment.

MCC has prepared its Climate Action Plan 2024 – 2029 (MCC 2024) with the overarching Vision for Meath to "*be a climate resilient, biodiverse rich, environmentally sustainable and climate neutral economy that supports healthy lifestyles and jobs growth*". Objective 2.1 on the theme of Built Environment and Transport is to "*minimise the Council's contribution to climate change by increasing energy efficiency, reducing carbon emissions and encouraging sustainable opportunities for the broader Meath Community*". In working towards this, the MCC Climate Action Plan 2024 – 2029 states that securing renewable energy infrastructure to contribute to national grid decarbonisation will need to be prioritised, and Action BET17 within the MCC Climate Action Plan 2024 – 2029 states the action to *"explore the feasibility of sustainable energy and heating solutions in County Meath".*

The Proposed Development will not be located within any boundaries in County Meath that are subject to Local Plans.

8.2.2.2.3.2 Fingal County Council

The FCC Climate Change Action Plan 2019-2024 was approved in May 2019 (FCC 2019). The Climate Change Action Plan 2019-2024 recognises the uptake of renewable energy as a contributor to climate change mitigation, and the focus area on 'Energy and Buildings' includes objectives to prepare a Local Authority Renewable Energy Strategy (Objective E3) and to "*study potential for viable renewable energy projects on a temporary/permanent basis, on Council controlled lands*" (Objective E23). The 2022 annual progress report for the climate change action plan (FCC 2022) indicates that preparation of the Renewable Energy Strategy is ongoing. The FCC Climate Action Plan 2024-2029 (FCC 2024) states that "developing enabling electricity infrastructure should be supported to maximise Dublin's potential to generate renewable energy". The Draft FCC Climate Change Action Plan 2024 -2029 includes the relevant objectives listed in Table 8.4.

Table 8.4: Relevant Objectives in the FCC Climate Action Plan 2024 – 2029 (FCC 2024)

Policy / Objective Number	Policy / Objective
Energy Planning & Renewables	
E26	Assess potential for viable renewable energy projects on a temporary/permanent basis, on council-controlled lands.
Land Use & Acquisition	
R21	Assess Council lands & buildings for potential for renewable energy, biodiversity; green infrastructure, sustainable agriculture & other sustainable projects.
R22	Develop renewable energy, green infrastructure, biodiversity, sustainable agriculture & other sustainable projects on Council lands & buildings
R23	Identify opportunities for the acquisition of land and buildings by agreement/ CPO for renewable energy/ regeneration/active travel/greenway/green infrastructure projects etc.

Like MCC, FCC is also a signatory to the Local Authority Climate Action Charter (Department of the Environment, Climate and Communications 2019) and therefore committed to deliver on its commitments, including the commitment to deliver on a 30% carbon emissions reduction target by 2030. FCC is also led by the Delivering Effective Climate Action 2030 Strategy (County and City Management Association 2021) for local authorities.

FCC published the latest Fingal Development Plan 2023-2029 in April 2023 (FCC 2023). The Fingal Development Plan 2023-2029 objectives that are relevant to the Proposed Development in the context of climate change are summarised in Table 8.5.

Table 8.5: Relevant Policies, Objectives and Actions in the Fingal Development Plan 2023 – 2029 (FCC 2023)

Policy / Objective Number	Policy / Objective
Climate Action	
Policy CAP10	Climate Mitigation Actions in the Built Environment Promote low carbon development within the County which will seek to reduce carbon dioxide emissions and which will meet the highest feasible environmental standards during construction and occupation. New development should generally demonstrate/provide for: • Building layout and design which maximises daylight, natural ventilation, active transport and public transport use; • Sustainable building/services/site design to maximise energy efficiency; • Sensitive energy efficiency improvements to existing buildings; • Energy efficiency, energy conservation, and the increased use of renewable energy in existing and new developments; • On-site renewable energy infrastructure and renewable energy; • Minimising the generation of site and construction waste and maximising reuse or recycling; and • The use of construction materials that have low to zero embodied energy and CO_2 emissions.
Policy CAP11	Climate Adaptation Actions in the Built Environment Development proposals should demonstrate sustainable design principles for new buildings/ services/site. The Council will promote and support development which is resilient to climate change. This would include: • Measures such as green roofs and green walls to reduce internal overheating and the urban heat island effect; • Ensuring the efficient use of natural resources (including water) and making the most of natural systems both within and around buildings; • Minimising pollution by reducing surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems (SuDS); • Reducing flood risk, damage to property from extreme events– residential, public and commercial; • Reducing risks from temperature extremes and extreme weather events to critical infrastructure such as roads, communication networks, the water/drainage network, and energy supply; and • Promoting and protecting biodiversity and green infrastructure.
Policy CAP13	Energy from Renewable Sources Actively support the production of energy from renewable sources and associated electricity grid infrastructure, such as from solar energy, hydro energy, wave/tidal energy, geothermal, wind energy, combined heat and power (CHP), heat energy distribution such as district heating/cooling systems, and any other renewable energy sources, subject to normal planning and environmental considerations.
Policy CAP16	Offshore Wind Energy Production Support the implementation of the 2014 Offshore Renewable Energy Development Plan (OREDP) and any successor thereof, and to facilitate infrastructure such as grid facilities on the land side of any renewable energy proposals of the offshore wind resource, where appropriate and having regard to the principles set out in the National Marine Planning Framework.
Policy CAP21	Decarbonising Zones Support the designation and implementation of a Decarbonisation Zone or zones within the County in order to address local low carbon energy, greenhouse gas emissions and climate needs.
Policy CAP22	Strategic Energy Zones Support the designation of potential Strategic Energy Zones within the County in conjunction with the Eastern and Midland Regional Authority.
Policy CAP23	Strategic Energy Communities Support the ongoing efforts and future development of Sustainable Energy Communities in Fingal through the SEAI 'Sustainable Energy Communities' Initiative.
Policy CAP24	Dublin Regional Energy Masterplan Support the preparation of the Dublin Regional Energy Masterplan by Codema and to support its implementation in conjunction with neighbouring Dublin Local Authorities, Dublin Metropolitan CARO and other relevant stakeholders.
Employment and Economy	
Objective EE070	Renewable and Alternative Energy Facilitate and encourage the development of the alternative energy sector, in line with a Local Renewable Energy Strategy, and work with the relevant agencies to support the development of alternative forms of energy where such developments do not negatively impact upon the environmental quality, and visual, residential or rural amenity of the area.

Policy / Objective Number	Policy / Objective
Infrastructure and Utilities	
Policy IUP27	Energy Networks and ICT Infrastructure Facilitate and promote the development of energy networks and ICT infrastructure where necessary to facilitate sustainable growth and economic development and support the provision of critical energy utilities and the transition to alternative, renewable, decarbonised, and decentralised energy sources, technologies, and infrastructure.
Policy IUP29	Enhancement And Upgrading Of Existing Infrastructure And Networks Work in partnership with existing service providers, businesses and local community groups to facilitate required enhancement and upgrading of existing infrastructure and networks and support the development of new energy systems, local community sustainable energy generation projects and transmission grids, which will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave, and solar energy.
Policy IUP30	Promote Low Carbon Energy Development Promote more energy-efficient development through the location of housing and employment along district heating hubs, or potential renewable energy locations, where people can connect buildings to energy efficient, low-carbon alternatives.
Policy IUP31	Enhancement and Upgrading Of Existing Infrastructure And Networks Support EirGrid's Grid Development Strategy – Your Grid, Your Tomorrow 2017, Implementation Plan 2017–2022, Shaping our Electricity Future-A Roadmap to achieve our Renewable Ambition 2021 and Transmission Development Plan (TDP) 2020-2029, and the Government's Policy Statement on Security of Electricity Supply November 2021 and any subsequent plans prepared during the lifetime of this Plan, to provide for the safe, secure, and reliable supply of electricity.
Policy IUP32	East Meath-North Dublin Grid Upgrade Support the development of the East Meath-North Dublin Grid Upgrade to strengthen the electricity supply network in anticipation of the future development of renewable energy, onshore and offshore.
Policy IUP33	Renewable Energy Continue to develop and implement climate action and energy related initiatives in Fingal and continue to support the recording and monitoring of renewable energy potential in Fingal in partnership with other stakeholders including the East Midlands Regional Assembly EMRA, the Dublin Energy Agency (Codema) and the Climate Action Regional Office (CARO).
Objective IUO44	Energy Utilities Support the development of enhanced electricity and gas supplies, and associated transmission and distribution networks, to serve the existing and future needs of the County, and to facilitate new transmission infrastructure projects and technologies.
Development Management Standards	
Objective DMSO257	Waste Heat, District Heating and Decentralised Energy Actively encourage the development of low carbon and highly efficient district heating and decentralised energy systems across the County utilising low carbon heat sources such as renewable energy and waste heat recovery and to promote the connection of new developments to district heating networks where such systems exist/can be developed in a given area.

The Proposed Development will pass through the boundary of the Dublin Airport Local Area Plan 2020 (FCC 2020). The policies / objectives in the Dublin Airport Local Area Plan 2020 that relate to climate are listed in Table 8.6.

Table 8.6: Dublin Airport Local Area Plan (FCC 2020)

Policy / Objective Number	Policy / Objective
Climate Action	
CA01	Require that all new developments at the Airport incorporate design solutions aimed at reducing carbon emissions, including the incorporation of renewable energy and energy saving technologies where practicable, including the use of district heating/cooling system.
CA03	Require that all new developments at the Airport incorporate design solutions aimed at reducing carbon emissions, including the incorporation of renewable energy and energy saving technologies where practicable, including the use of district heating/cooling systems.
CA03	Facilitate, where appropriate, sustainable energy development proposals and projects at Dublin Airport.

8.2.2.3 Guidance

The assessment methodology has been derived with reference to the most appropriate guidance documents, which are as follows:

- Institute of Environmental Management and Assessment (IEMA) Guide to Climate Change Resilience and Adaptation (IEMA 2020);
- Technical guidance on the climate proofing of infrastructure in the period 2021 to 2027 (European Commission 2021a);
- Royal Institution of Chartered Surveyors (RICS). Whole Life Carbon Assessment for the Built Environment, 2nd edition. November (RICS 2023);
- Institution of Civil Engineers (ICE). PAS 2080:2023 Carbon Management in Buildings and Infrastructure (ICE 2023);
- Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022); and
- Transport Infrastructure Ireland (TII) Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document. PE-ENV-01104 (TII 2022).

All of the guidance applied is considered current best practice either in the UK, in Ireland or Internationally, and is therefore considered appropriate for application in Ireland in the absence of Irish-specific guidance.

8.2.3 Data Collection and Collation

As the climate impact assessment is desk-based, research data and relevant publications from the following organisations have been reviewed:

- Open-source observed climate average datasets for Dublin Airport, available from Met Éireann (Met Éireann 2023);
- Open-source climate projection datasets for County Meath, available from the World Bank Group Climate Change Knowledge Portal (World Bank Group 2024);
- Baseline county level GHG emissions datasets from the MCC Climate Action Plan 2024 – 2029 (MCC 2024) and the FCC Climate Action Plan 2024-2029 (FCC 2024);
- Baseline national level GHG emissions totals and projections published by Ireland's Environmental Protection Agency (EPA), including the report on Ireland's Greenhouse Gas Emissions Projections 2022 – 2040 (EPA 2023a), Ireland's National Inventory Report (EPA 2023b) and the EPA website (EPA 2023c);
- Material quantities associated with the construction of the Proposed Development based on the calculations in Chapter 4 (Proposed Development Description) and Chapter 16 (Waste) in Volume 2 of this EIAR;
- Carbon emission factors from the Inventory of Carbon and Energy Version 3 database (Circular Ecology 2019) and Life cycle assessment of the transmission network in Great Britain (Harrison et al. 2010);
- Typical GHG emissions associated with the embodied carbon of a three-bedroom house using traditional construction methods, from An embodied carbon and energy analysis of modern methods of construction in housing: A case study using a lifecycle assessment framework (Monahan 2011); and
- Equivalent carbon dioxide emissions per capita from the Central Statistics Office (CSO) (CSO 2023).

8.2.4 Appraisal Method for the Assessment of Impacts

8.2.4.1 Vulnerability to Changes in Climate

A qualitative methodology has been undertaken to identify the vulnerability of the Proposed Development to changes in climate. The methodology has complied with the Guide to: Climate Change Resilience and Adaptation (2020) (IEMA 2020).

Regarding the vulnerability of the Proposed Development to climate change during the Construction Phase, this has been scoped out of the assessment as there are likely to be negligible changes in climate prior to the end of the Construction Phase. The indicative preliminary construction programme for the Proposed Development runs from Q2 2026 to Q4 2029 (refer to Table 4.7 in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR). The future climate projections for 2020 to 2039 in Table 8.12 show a less than 5% change in seasonal accumulated precipitation and a less than 1°c (degree Celsius) change in seasonal maximum / minimum temperature from the 1995 to 2014 baseline. Any construction within this 20 year scenario (i.e., 2020 to 2039) would be subject to the same projected changes in climate.

The vulnerability of the Proposed Development to climate change has been assessed for the Operational Phase. However, the substation upgrade and extension works will be located within the existing substation sites at the time of construction, which have been sited to be resilient to the main risks associated with climate change (mainly flooding). Substations have therefore not been considered further in this vulnerability assessment. The IEMA (2020) guidance represents international best practice for undertaking climate change risk assessments. In compliance with a Guide to: Climate Change Resilience and Adaptation (2020), risks to the Proposed Development associated with the future climate baseline have been identified (refer to Section 8.4) and a significance rating has been determined based on professional judgement (risk is defined as the risk that a weather or climate event occurs and results in an adverse impact). The risk assessment and the determination of significance takes account of embedded design measures that will be in place. The significance rating considers both the perceived likelihood and severity of each risk.

This assessment applies the likelihood criteria defined in Table 4 of the Guide to: Climate Change Resilience and Adaptation (2020). The likelihood of each risk has been determined based on the future climate baseline and professional judgement, as defined in Table 8.7 (the likelihood of each risk occurring relates to the likelihood that a specified risk resulting from climate change should occur).

Table 8.7: Definitions of Likelihood Categories

Likelihood Category	Description (Probability and Frequency of Occurrence)
Very High	The event occurs multiple times during the lifetime of a project (e.g. approximately annually).
High	The event occurs several times during the lifetime of a project (e.g. approximately once every five years).
Medium	The event occurs limited times during the lifetime of a project (e.g. approximately once every 15 years).
Low	The event occurs during the lifetime of a project.
Very Low	The event may occur during the lifetime of a project.

The magnitude of impact ratings (severity refers to the magnitude of a risk upon an asset) for each risk have been assigned in a similar manner, according to the categories in Table 8.8. The best practice Guide to: Climate Change Resilience and Adaptation (2020) states that "definitions of likelihood and magnitude will vary from scheme to scheme, and should be tailored to a specific project". The magnitude of impact ratings are therefore based on the example criteria provided in Table 4 of the Guide to: Climate Change Resilience and Adaptation (2020), with tailoring of the likely impacts to the Proposed Development based on experience and professional judgement.

Table 8.8: Definitions for Magnitude of Impact Categories

Magnitude of Impact	Definition
Very large adverse	Continuous disruption as a result of severe damage to the asset, lasting more than 1 week; OR A severe reduction in asset lifespan.
Large adverse	Intermittent disruption as a result of moderate to severe damage to the asset, lasting more than 1 week; OR A moderate reduction in asset lifespan
Moderate adverse	Intermittent disruption as a result of moderate damage to the asset, lasting less than 1 week; OR A measurable increase in necessary maintenance frequency and costs.
Minor adverse	A small reduction in asset performance or lifespan.
Negligible	Undetectable change in asset performance or lifespan.

The significance of each risk has subsequently been determined based on the likelihood and severity ratings according to the significance matrix in Table 8.9. The significance matrix is aligned with Table 4 of the Guide to: Climate Change Resilience and Adaptation (2020).

Table 8.9: Significance Matrix

	Magnitude of Impact					
		Very large adverse	Large adverse	Moderate adverse	Minor adverse	Negligible
Likelihood	Very High	Significant	Significant	Significant	Significant	Not Significant
	High	Significant	Significant	Significant	Significant	Not Significant
	Medium	Significant	Significant	Significant	Not Significant	Not Significant
	Low	Significant	Significant	Not Significant	Not Significant	Not Significant
	Very Low	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

8.2.4.2 GHG Assessment

The main sources of GHG emissions during the Construction Phase will consist of the embodied carbon within the construction materials used, the transport and road haulage of materials from the supplier to the construction areas, and construction activities, including waste treatment and transport. For a full description of the Construction Phase activities, please refer to Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR.

The methodology for the GHG assessment is in accordance with technical guidance on the climate proofing of infrastructure in the period 2021 to 2027 (European Commission 2021a), as per the scoping consultation responses received (refer to Appendix A1.1 (Summary of Scoping Consultation Responses) in Volume 3 of this EIAR).

The embodied construction emissions for the Construction Phase materials (PAS 2080:2023 Whole Life Cycle (WLC) modules A1-A3) have been calculated using emission factors from the Inventory of Carbon and Energy Version 3 database (Circular Ecology 2019) and Life cycle assessment of the transmission network in Great Britain (Harrison et al. 2010). The Inventory of Carbon and Energy is a leading embodied carbon database for building materials, that is applied in several best practice carbon calculators, including the TII carbon tool for road and light rail projects. The application of carbon factors from peer reviewed literature, such as Life cycle assessment of the transmission network in Great Britain (Harrison et al.2010), is also compliant with scientific best practice. The carbon emissions are calculated, in units of tonnes of CO_2e, by multiplying the emission factor by the quantity of the material that will be used over the entire Construction Phase.

The Construction Phase will require the importation of materials for the Proposed Development works. Table 16.13 in Chapter 16 (Waste) in Volume 2 of this EIAR provides estimated quantities of the major materials required to complete the Construction Phase of the Proposed Development. This GHG assessment has considered the major materials defined in Table 16.13 in Chapter 16 (Waste) and is therefore subject to the same assumptions and limitations as the waste assessment outlined in Chapter 16 (Waste). The major materials and their quantities are as follows:

- 578m^3 (metres cubed) of asphalt, 31,560m^3 of engineered fill and 3,083m^3 of subsoil associated with the Passing Bays, construction platforms and compounds (including Temporary Construction Compounds and Horizontal Directional Drilling (HDD) Compounds) (enabling works);
- 3,666m^3 of asphalt, 42,071m^3 of engineered fill and 31,631m^3 of cement bound granular material associated with the in-road and off-road proposed cable route (permanent works);
- 4,788m^3 of engineered fill associated with the permanent access tracks (permanent works);
- 796m^3 of pre-cast concrete associated with Joint Bays (permanent works);
- 120m^3 of engineered fill, 1,964m^3 of concrete and 127 tonnes of steel associated with Belcamp Substation (permanent works); and
- 107m^3 of concrete associated with Woodland Substation (permanent works).

Additionally, this GHG assessment has accounted for the materials associated with the proposed high - voltage 400 kilovolt (kV) cables. Based on the cable specifications, the total materials associated with the three proposed 400kV cables, for the Proposed Development approximate length of 37.5 kilometres (km), are estimated to be:

- 3,218 tonnes of copper cables;
- 890 tonnes of polyethylene insulation;
- 307 tonnes of aluminium concentric wires;
- 26 tonnes of aluminium sheath; and
- 260 tonnes of polyethylene jackets.

The carbon emissions associated with the transport of the materials from the supplier to the site (PAS 2080:2023 WLC module A4 emissions) have been calculated applying 2023 GHG emission factors from the Greenhouse gas reporting: conversion factors 2023: full set dataset (UK Government 2023)), for average laden and 0% laden HGVs (heavy goods vehicles) (under Freighting Goods). The UK Government-published GHG factors are applied in several best practice tools, including the TII carbon tool for roads and light rail projects. An average vehicle load of 7.5 tonnes was applied to estimate the number of vehicle movements, where required.

The suppliers for the construction materials have not yet been confirmed. Therefore, in accordance with the Whole Life Carbon Assessment (WLCA) for the Built Environment standard (RICS 2023), which represents International best practice guidance for GHG assessments, this GHG assessment has assumed a one-way default transport distance of 20km for cement, 50km for other locally sourced materials (asphalt, cement based granular material (CBGM)) and 120km for nationally sourced materials (precast concrete). The proposed 400kV cables will be sourced from outside of Ireland. However, at this stage, the geographical origin of the proposed cable components cannot be defined, and therefore, this GHG assessment assesses the transport of the proposed cables within Ireland, applying a one-way transport distance of 120km. The transport emissions for each material includes a one-way transport by laden HGV from the supplier to the location of the Proposed Development and a return journey by unladen HGV.

The embodied carbon emissions associated with the construction materials, and the transport of the materials to the location of the Proposed Development, are likely to be the main contributors to the Construction Phase carbon for the Proposed Development. The construction of the Proposed Development is described in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR. At this stage of the

Proposed Development, a contractor has not been appointed, and therefore, the details of construction and installation process (e.g., vehicle types and fuel mix) are not currently available. The carbon emissions associated with the construction and installation processes (PAS 2080:2023 WLC module A5) have therefore been scoped out of this GHG assessment.

On the basis that waste material will be minimised, as far as possible, through best good practice construction methods (see Chapter 16 (Waste) in Volume 2 of this EIAR), the estimation of GHG emissions associated with waste treatment and transport have not been considered further in this assessment.

A 15% uplift has been applied to the total material amounts prior to calculating the embodied carbon and transport emissions.

The Climate Guidance for National Roads, Light Rail and Rural Cycleways (Offline & Greenways) – Overarching Technical Document. PE-ENV-01104 (TII 2022) states:

> "*the Climate Practitioner should use their professional judgement to determine how best to contextualise and assess the significance of a project's GHG impact. The 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 (IEMA, 2022). In the climate assessment, the Climate Practitioner must give regard to two major considerations when assessing the significance of a project's GHG emissions: alignment to Ireland's trajectory towards net zero by 2050; and mitigation of GHG emissions.*"

In relation to determining significance, the Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022) states:

> "*When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its life time, which may be positive, negative or negligible.*
>
> *Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages.*
>
> *Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered*".

The Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance acknowledges that there will be continuing GHG emissions over time but these should be reduced and compatible with national climate change commitments. The Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance also states:

> "*The crux of significance therefore 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*".

In considering the emissions of GHGs, professional judgement, following a proportionate approach, has been used to provide a qualitative description of the nature of the impacts and determine the significance of the impact on climate. This is directly in compliance with the significance principles and examples of criteria set out in the Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance. The assessment included contextualising the predicted GHG emissions against the relevant legislated carbon budgets.

The significance criteria are set out in Table 8.10.

Table 8.10: Significance Criteria for GHG Emissions

Significance	Magnitude	Magnitude Criteria
Significant	Major Adverse	A project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not make a meaningful contribution to Ireland's trajectory towards net zero.
	Moderate Adverse	A project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to Ireland's trajectory towards net zero.
Not Significant	Minor Adverse	A project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve Ireland's trajectory towards net zero.
	Negligible	A project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or net zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.

The EPA Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA 2022) describe the quality of impacts in terms of Positive, Neutral and Negative, where Neutral is defined as impacts that are Imperceptible, within normal bounds of variation.

As part of the assessment of significance outlined in Table 8.10, comparison of the GHG emissions associated with the Proposed Development have been compared to the 2030 electricity sectoral emissions ceiling (3 Mt CO_2e). For further context, the GHG emissions have also been compared to the typical GHG emissions associated with the embodied carbon of a three-bedroom house using traditional construction methods, which was found to be around 50 tonnes CO_2e by a study in 2011 (Monahan 2011). The GHG emissions have also been compared to the CO_2e per capita, where each person in Ireland is currently responsible for a carbon footprint of 12.3 tonnes CO_2e per year, based on 2021 data (CSO 2023).

In the Operational Phase, GHGs associated with the maintenance of the Proposed Development (i.e., PAS 2080:2023 Whole Life Cycle emissions: modules B2-B4) (embodied carbon of the raw materials required for routine operational maintenance)) have been considered but scoped out on the basis that the proposed cables will be located underground and GHG generating activities associated with maintenance will be very low even over the Whole Life Cycle period. Details of the maintenance activities in the Operational Phase are described in Section 4.6 of Chapter 4 (Proposed Development Description) in Volume 2 of the EIAR.

One of the primary objectives of the Proposed Development is to facilitate decarbonisation of the energy supply, by enabling the distribution of electricity obtained from renewable sources. The extent of the renewable electricity distribution that will be facilitated by the Proposed Development is still to be determined. However, over time, this is expected to partially offset the GHGs associated with the transmission losses. On this basis, the GHG emissions associated with operational energy use (i.e., PAS 2080:2023 Whole Life Cycle emissions: module B6), have been considered but scoped out of any further assessment.

8.2.4.3 Limitations and Assumptions

There have been no significant limitations in the preparation of this Chapter. However, please note as stated in Section 8.2.4.2, details relating to the construction activities (e.g., vehicle type and fuel mix, and construction material suppliers) are not available. Default transport distances have therefore been applied in the GHG assessment, as described in Section 8.2.4.2. Construction activities have been scoped out of the GHG assessment as described in Section 8.2.4.2.

8.3 Baseline Environment

8.3.1 Current Climate Baseline

The current climate in Ireland is best described by the 1991 to 2020 climate averages, compiled by Met Éireann (Met Éireann 2023) based on their observation network for a number of parameters, including air temperature, precipitation, sunshine and wind. Climate averages are defined as the mean values of a climate variable over a standard reference period. The Met Éireann weather station at Dublin Airport in North County Dublin, is the nearest weather and climate monitoring station to the Proposed Development.

Table 8.11 describes the Met Éireann 1991 to 2020 climate averages for Dublin Airport. The climate averages show the region of the Proposed Development has a temperate climate, resulting in mild winters and cool summers.

Table 8.11: Dublin Airport 1991 to 2020 Climate Averages

Climate Metrics	Annual	Summer	Winter
Temperature (°C)			
Mean temperature	9.7	14.6	5.3
Mean daily maximum	13.3	18.8	8.3
Mean daily minimum	6.1	10.5	2.4
Rainfall (millimetres (mm))			
Mean accumulated total	772.5	198.4	186.3
Relative humidity (%)			
Mean at 1500 UTC	73.9	68.8	80.8
Sunshine (hours)			
Mean daily duration	4.0	5.3	2.2
Wind (knots)			
Mean monthly speed	10.5	9.2	12.0
Weather (mean accumulated total no. of days with…)			
Snow or sleet	12.5	0.0	8.7
Hail	9.2	0.4	3.3
Thunder	5.0	2.5	0.6
Fog	32.3	7.3	8.2

8.3.2 Future Climate Baseline

The majority of the Proposed Development will be located within the administrative boundary of County Meath, with the remainder of the Proposed Development being located within the administrative boundary of Fingal in North County Dublin. Projected climate changes for County Meath, in terms of temperature and precipitation, are therefore presented in Table 8.12 and, based on professional judgement, are deemed to be representative of both regions. These data utilise the 0.25 (25km) spatial resolution probabilistic dataset from the Sixth Phase of the Coupled Model Inter-Comparison Projects (CMIP6), accessed via the Word Bank Group Climate Change Knowledge Portal (Word Bank Group 2023). The current climate conditions (i.e., observed baseline) refer to the most recent historic climate dataset of 1995 to 2014. The future climate conditions refer to projections made under the high emissions scenario (i.e., SSP5-8.5, where SSP stands for Socio-Economic Pathway) with a 50% probability of occurrence for 2020 to 2039, 2040 to 2059, 2060 to 2079 and 2080 to 2099. These 20-year periods cover the lifespan of the Proposed Development. There is inherent uncertainty associated with all model-based projections. However, the CMIP6 multi-model ensemble, from which these projections derive, represent the latest global state of knowledge on climate change and are therefore appropriate for use in this assessment.

Table 8.12: Range of SSP5-8.5 Climate Projections for County Meath

Climate Metrics	Baseline 1995-2014	Projected Anomaly Change (SSP5-8.5, 50th percentile)			
		2020-2039	2040-2059	2060-2079	2080-2099
Annual mean accumulated precipitation (% change)	852.6mm	1.0	-0.4	0.7	1.4
Winter mean accumulated precipitation (% change)	215.5mm	3.9	5.5	14.4	19.3
Summer mean accumulated precipitation (% change)	209.8mm	-3.2	-7.4	-15.5	-21.1
Annual mean temperature (°c change)	10.0	0.6	1.1	2.1	2.9
Mean winter minimum temperature (°c change)	3.2	0.4	0.9	1.6	2.4
Mean summer maximum temperature (°c change)	18.5	0.7	1.4	2.2	4.0

The climate projections indicate that annual mean accumulated precipitation totals in County Meath (and therefore also in neighbouring Fingal in North County Dublin) are likely to remain similar over the next century. However, seasonal variability in rainfall will become larger, with wetter winters and drier summers anticipated. Local annual mean temperatures are projected to increase by as much as 3°C by 2100, with increases in temperature across all seasons. Mean summer maximum temperatures in the region are projected to increase by up to 4.1°C by the end of the century.

8.3.3 Climate Pollutants

Climate is defined as the average weather over a period of time, whilst climate change is a significant change to the average weather. Climate change is a natural phenomenon but in recent years human activities, through the release of GHGs, have impacted on the climate (Intergovernmental Panel on Climate Change (IPCC) 2015). The release of anthropogenic GHGs is altering the Earth's atmosphere resulting in a 'Greenhouse Effect'. This effect is causing an increase in the atmosphere's heat-trapping abilities resulting in increased average global temperatures over the past 40 years. The release of CO_2 as a result of burning fossil fuels, has been one of the leading factors in the creation of this 'Greenhouse Effect'. The most significant GHGs are CO_2, methane (CH_4) and nitrous oxide (N_2O).

For the purpose of this assessment, the definition outlined in RED III, for GHGs has been used. In Annex V, B. Methodology Point 5 of the Renewable Energy Directive, the relevant GHGs are defined as CO_2, CH_4 and N_2O. CO_2 accounted for 60.4% of total GHG emissions in Ireland in 2022 while CH_4 and N_2O combined accounted for 38.4% (EPA 2023c). GHGs have different efficiencies in retaining solar energy in the atmosphere and different lifetimes in the atmosphere. To compare different GHGs, emissions are calculated on the basis of their Global Warming Potential (GWP) over a 100-year period, giving a measure of their relative heating effect in the atmosphere. The IPCC AR5 Synthesis Report: Climate Change 2014 of the Fifth Assessment Report (AR5) (IPCC 2014), sets out the global warming potential for a 100-year time period (GWP100) for CO_2 as the basic unit (GWP = 1), whereas CH_4 has a global warming potential equivalent to 28 units of CO_2 and N_2O has a GWP100 of 265.

8.3.4 Existing GHG Emissions Baseline

Given the circumstances of Ireland's declaration of a climate and biodiversity emergency in May 2019 and the November 2019 European Parliament approval of a resolution declaring a climate and environment emergency in Europe, in conjunction with Ireland's current failure to meet its EU binding targets under Regulation (EU)2023/857 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999 (hereafter referred to as the GHG Effort Sharing Regulation (ESR)), changes in GHG emissions, either beneficially or adversely, are of more significance than previously viewed prior to these declarations. Thus, the baseline climatic environment is considered a highly sensitive environment for the assessment of impacts.

The sectoral Baseline Emissions Inventories for County Meath and Fingal have been quantified by their respective county councils for a baseline year of 2018 and 2016, respectively, in support of the MCC Climate Action Plan 2024-2029 (MCC 2024) and FCC Climate Action Plan 2024-2029 (FCC 2024), respectively. As shown in Table 8.13, the total GHG emissions in 2018 for County Meath were 4,254 $ktCO_2e$ (kilotonnes carbon dioxide equivalent), equivalent to approximately 6% of the national total in 2018 (~69,998 $ktCO_2e$, as reported in Ireland's National Inventory Report (EPA 2023b)). The total GHG emissions for Fingal in 2018 were 1,641 $ktCO_2e$, which is equivalent to approximately 2% of the national total in 2018 .

Table 8.13: Baseline GHG Emissions' Inventory for County Meath and Fingal

Emissions Category	2018 County Meath Emissions ($ktCO_2e$)	2018 Fingal Emissions ($ktCO_2e$)
Industrial Processes	1,230 (28%)	-
Transport	419 (10%)	739 (45%)
Residential	353 (8%)	328 (20%)
Manufacturing and Commercial Services	556 (13%)	509 (31%)
Agriculture	1,054 (25%)	16 (1%)
Waste	378 (9%)	16 (1%)
LULUCF	264 (6%)	-
Public Services[a]	8 (<1%)	49 (3%)
F-gases	0.0004 (<1%)	-
Total[b]	**4,254**	**1,641**

a. (e.g. municipal, social housing and wastewater)
b. Apparent discrepancies may arise due to the rounding of totals, subtotals and percentages

Data published in 2023 (EPA 2023c) showed that Ireland's 2022 GHG emissions were estimated to be 60.8 $MtCO_2e$. Ireland's provisional 2022 GHG ESR emissions were 46.08 Mt CO_2e, and therefore, exceeded its 2022 ESR Annual Emissions Allocation of 42.36 Mt CO_2e. This indicates that Ireland is not in compliance with its 2022 ESR annual limit. The sector with the highest emissions is agriculture at 38.4% of the total, followed by transport at 19.1%. The energy industries contribute 16.6% of the total. It is predicted that Ireland will exceed both its new 2030 target under the ESR, to limit its GHG emissions by at least 42% by 2030 (EPA 2023c), and its national target to achieve a reduction of 51% in total GHG emissions by 2030 (EPA 2023a).

8.4 Potential Impacts

8.4.1 'Do Nothing' Scenario

In a Do Nothing scenario, it is anticipated that climate conditions experienced at the location of the Proposed Development will be the same as the existing baseline described in Section 8.3.1.

In a Do Nothing scenario, the Proposed Development would not be constructed and there would therefore be no surplus materials, construction activities or operational maintenance required. It is therefore assumed that no GHG emissions are associated with the Do Nothing scenario, and the impact in the absence of the Proposed Development is assessed as Neutral.

8.4.2 Construction Phase

8.4.2.1 Greenhouse Gas Assessment

During the Construction Phase, the Proposed Development has the potential to affect Earth's climate by causing (either directly or indirectly) the emission of GHGs, such as CO_2, into the atmosphere. Construction activities will include the excavation of cable trenches and associated Joint Bays, temporary construction

activities, including the requirement for Passing Bays, site works and ancillary staff facilities and parking will also be required. All activities have the potential to impact on GHG emissions generation.

The total estimated embodied carbon and material transport emissions for the Proposed Development are equivalent to 27,161 tonnes of CO_2e. These emissions are presented for different aspects of the Construction Phase in Table 8.14. The majority of the emissions are associated with the embodied carbon in the proposed 400kV cables, due to the relatively high embodied carbon associated with producing the copper conductor and aluminium sheath. However, as aluminium and polyethylene associated with the proposed cables are relatively lightweight, the transport emissions associated with the proposed cables are lower than those for the enabling works and other permanent works.

Table 8.14: Full Construction Phase Embodied Carbon GHG Emissions

Emission Type	GHG Emission (tonnes CO_2e)
Enabling Works	
Embodied Material Carbon	627
Materials Transport Carbon	688
Enabling Works: Total Carbon	1,315
Permanent Works	
Embodied Material Carbon	4,835
Materials Transport Carbon	1,791
Permanent Works: Total	6,626
Cables	
Embodied Material Carbon	15,773
Materials Transport Carbon	103
Cables: Total	15,876
Total	
Total Emissions (PAS 2080:2023 WLC Modules A1-A4)	**23,818**
Total (with 15% uplift)	**27,390**

As shown in Table 8.14, the estimated total GHG emissions associated with the construction of the Proposed Development is 27,390tCO_2e. These construction emissions would occur over the anticipated 42-month Construction Phase (between 2026 and 2029 as outlined in Chapter 4 (Proposed Development Description) in Volume 2 of this EIAR). This equates to average annual emissions of 7,826 tonnes CO_2e per year. The associated construction emissions, therefore, represent a very small percentage (i.e., 0.3%) of the 2030 electricity sectoral emissions ceiling (i.e., the 2030 electricity sectoral emissions ceiling is 3MtCO_2e). The annual Construction Phase GHG emissions associated with the Proposed Development are equivalent to the GHG emissions arising from the construction of 157 three-bedroom houses using traditional construction methods and to the annual carbon footprint for 636 people in Ireland. All Construction Phase emissions will occur within the 2026-2030 carbon budget period for Ireland, from which the 2030 electricity sectoral emissions are derived.

With respect to the 2030 electricity sectoral emissions ceiling, the relatively minor contribution to existing GHG emissions and the fact that the Proposed Development will support the transmission of energy from renewable sources, the magnitude of impact is classed as Minor Adverse and the potential impact is assessed as Not Significant.

8.4.3 Operational Phase

8.4.3.1 Vulnerability to Changes in Climate

A full description of potential risks that may impact the Proposed Development and their associated vulnerability rating are presented in Table 8.15. The information in Table 8.15 and the significance rating is based on experience of similar schemes and professional judgement, according to the criteria outlined in Table 8.7, Table 8.8 and Table 8.9. The criteria are in compliance with the Guide to: Climate Change Resilience and Adaptation (2020) (IEMA 2020).

Table 8.15: Projected Climate Change Risks

Risk ID	Climate Aspect	Potential Risk	Design Mitigations / Adaptations	Likelihood	Magnitude of Impact	Significance of Impact Rating
R1	High Temperatures	Inability to perform maintenance activities in high temperatures (>32°C) due to increased level of discomfort for staff.	The proposed cable route will not require specific or routine maintenance activities along the cable trench or Joint Bay locations. Routine maintenance will be required for link boxes and communication chambers. However, this will be at a frequency of once per annum and so is not likely to be affected by high temperatures.	Medium	Minor adverse	Not Significant
R2	High Temperatures	Increase in temperature could result in increased risk of structural failure from thermal expansion of trenches. This may lead to increased maintenance costs and disruption to operations.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant
R3	High Temperatures	Increase in temperature could result in increased risk of structural failure from thermal expansion of metallic features and on concrete structures, resulting in need for repair. This may lead to increased risk of damage to underground cables during road repair activities.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant
R4	High Temperatures	Increase in temperature could result in increased risk of surface failure from thermal expansion, melting and deformation of road crossing sections. This may lead to increased maintenance costs and disruption to operations.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant
R5	High temperatures, freeze-thaw	Rising temperatures will reduce risk of freeze-thaw events which lead to erosion, cracking and spalling of metallic features and	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Low	Moderate adverse	Not Significant

Risk ID	Climate Aspect	Potential Risk	Design Mitigations / Adaptations	Likelihood	Magnitude of Impact	Significance of Impact Rating
		concrete structures. However, the risk will still occur.				
R6	Precipitation	Increases in winter precipitation could increase groundwater levels with the potential to cause ground movements. This may damage buried cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Medium	Minor adverse	Not Significant
R7	Precipitation	Increase in winter precipitation could lead to accumulation of water within open trenches, reducing access for repairs, maintenance and emergency events.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions.	Medium	Minor adverse	Not Significant
R8	Precipitation	Increase in winter precipitation, in particular, extreme precipitation events, may increase the rate of soil erosion, exposing and damaging cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions. Proposed cables will be protected as they will be buried underground within a cement bound granular material surround.	Low	Moderate adverse	Not Significant
R9	Precipitation	Increase in winter precipitation could result in flooding, reducing access to cable structures, communication equipment and link boxes for maintenance.	The proposed cable route will not require specific or routine maintenance activities along the cable trench or Joint Bay locations. Routine maintenance will be required for link boxes and communication chambers. However, this will be at a frequency of once per annum and so is not likely to be affected by flooding.	Low	Minor adverse	Not Significant
R10	High temperatures and drought	Increase in temperature and drought may cause soil creep and instability of earthwork slopes (where cables are buried in sloped verge / sloped field edge) if soils dry out. This may damage buried cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions. Proposed cables will be protected as they will be buried underground within a cement bound granular material surround.	Low	Moderate adverse	Not Significant
R11	Precipitation and temperature	Cyclic wetting and drying may result in soil shrink-swell action, increasing the risk of ground movement including landslip or subsidence. This may damage buried cables.	The Proposed Development is designed to ensure that infrastructure can operate in varying climatic conditions. Proposed cables will be protected as they will be buried underground within a cement bound granular material surround.	Low	Moderate adverse	Not Significant

Based on the qualitative review of risks to the Proposed Development associated with a changing climate, no further assessment of climate vulnerability in the Operational Phase is considered necessary.

8.4.3.2 Greenhouse Gas Assessment

As stated in Section 8.2.4.2, the assessment of GHGs for the Operational Phase has been scoped out, although it is acknowledged that this phase of the Proposed Development will facilitate processes that result in the emission of GHGs (e.g. transmission losses). However, the Proposed Development is essential to meeting the CAP24 (Government of Ireland 2023) target of up to 80% renewable energy generation by 2030, which requires the transportation of electricity from offshore renewable sources (refer to the Step 4B – Route Options and Evaluation Report which is included in Volume 5 (Supporting Documents) of this EIAR).

It is therefore concluded that the net impact of the Proposed Development over its life cycle will be consistent with national policy requirements and will support Ireland's national commitment to achieving net zero.

8.5 Mitigation and Monitoring Measures

8.5.1 Construction Phase

8.5.1.1 Vulnerability to Changes in Climate

The vulnerability of the Proposed Development to climate change during the Construction Phase has been scoped out of this assessment.

8.5.1.2 Greenhouse Gas Assessment

Given the sensitivity of the global atmosphere to GHG emissions, and the importance of reducing GHG emissions to meet GHG reduction targets on a trajectory towards net zero, mitigation measures are proposed to reduce emissions, as far as practicable.

EirGrid has developed the 'Shaping Our Electricity Future' Roadmap (EirGrid 2023), which was updated in July 2023 to align with previous CAP23 (Government of Ireland 2022) and the carbon budget programme. CAP24 (Government of Ireland 2023) has subsequently been published and shares the same key targets for renewable energy generation as CAP23. EirGrid has committed to and will publicly report on their sustainability performance in relation to the following targets:

- Reduce absolute Scope 1 (emissions from sources that EirGrid owns or controls directly) and Scope 2 (emissions caused indirectly by EirGrid based on the energy it uses) GHG emissions by 50%;
- Reduce Scope 3 (emissions that EirGrid is indirectly responsible for up and down its value chain. They exclude emissions produced by EirGrid itself or resulting from activities or assets controlled by EirGrid) GHG emissions related to dispatch of electricity generation by 35% per megawatt hour within the same timeframe; and
- Reduce all other absolute Scope 3 GHG emissions by 30% by 2030, using 2019 as a base year.

The following good practice measures will be implemented to reduce GHG emissions during the Construction Phase of the Proposed Development:

- Investigating and implementing sustainable reuse of any materials won from excavation;
- The reuse, where possible of materials and waste generated from construction works;
- Procuring locally sourced materials where reasonably practicable to reduce transportation emissions;
- Careful consideration of material quantity requirements to avoid over-ordering and generation of waste materials, while also reducing transportation-related emissions; and

- The appointed contractor will develop and implement a plan to reduce energy consumption and GHG emissions throughout construction, including, for example:
    - Monitoring of fuel and mains electricity use on site (site accommodation to have motion activated lighting and use lower power lighting techniques such as light-emitting diodes (LEDs));
    - Training of plant operatives in fuel efficient driving techniques or use of appropriate technology on construction vehicles (e.g. stop – start); and
    - Consideration of renewable / and or low carbon energy sources to power Temporary Construction Compounds and HDD Compounds.

8.5.2 Operational Phase

8.5.2.1 Vulnerability to Changes in Climate

The vulnerability of the Proposed Development to changes in climate was assessed in Section 8.4.3.1. Table 8.15 describes the embedded design measures included in the design of the Proposed Development which will assist in mitigating potential impacts, such that no significant risks were identified. Therefore, no further mitigation measures to improve the Proposed Development's resilience to climate change are required for the Operational Phase.

8.5.2.2 Greenhouse Gas Assessment

The party responsible for maintenance of the assets (the Electricity Supply Board (ESB) and its appointed contractor(s)) will ensure that the following mitigation measures are implemented to reduce GHG emissions during the Operational Phase of the Proposed Development:

- Locally sourced, low carbon materials will be used, where technically feasible for asset replacements; and
- Regular planned preventative maintenance checks will be implemented to optimise operational efficiency.

In addition, the compensation of unavoidable residual emissions will be considered during the detailed design stage of the Proposed Development.

One of the objectives of the Proposed Development is to facilitate the transmission of energy derived from renewable sources. The extent of the renewable electricity distribution that will be facilitated by the Proposed Development is still to be determined. However, EirGrid are committed to increasing the distribution of energy from renewable sources, and through facilitating this, GHG emissions owing to the Proposed Development will be offset over time.

8.6 Residual Impacts

There are no residual impacts associated with climate vulnerability. Where GHG emissions cannot be avoided, the goal of the EIA process is to reduce a project's residual emissions at all stages. According to IEMA, GHG emissions from projects will contribute to climate change and may be considered significant (IEMA 2022). The Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA 2022) suggests that the level of significance is not only based on GHG emissions of a project, but how this project contributes, or not, towards achieving science-based targets and net-zero.

8.6.1 Construction Phase

Opportunities for carbon reduction (through the implementation of mitigation measures) have been identified in Section 8.5. However, the effects of the mitigation are not quantifiable at this stage of the

Proposed Development. Therefore, there will be residual GHG emissions owing to the construction of the Proposed Development, as calculated in Section 8.4.2, the magnitude of which have been deemed to be Minor adverse and the predicted residual impact will be Not Significant.

8.6.2 Operational Phase

Estimating the net impact of GHGs from the Proposed Development on system-wide GHG emissions is beyond the scope of this assessment. However, the integration of renewable electricity generation from areas outside of Dublin is a key driver underpinning the need for the Proposed Development, as stated in Chapter 2 (Need for the Proposed Development) in Volume 2 of this EIAR. Considering the need to transition to net zero by 2050, it follows that the Proposed Development can be considered as supportive of system-wide decarbonisation.

With the application of the mitigation measures, as outlined in Section 8.5, it is likely that the GHG emissions from the construction and operation of the Proposed Development will be reduced. However, the magnitude of emissions will remain as Minor adverse, and the predicted residual impact will be Not Significant.

8.7 Conclusion

An assessment of the effects of climate change on the Proposed Development and of the effect of the Proposed Development on the climate has been undertaken. The Proposed Development has been designed so that it will not be susceptible to the effects of climate change. Although, the Proposed Development is expected to result in some direct GHG emissions during the Construction Phase (and to a very small extent during the Operational Phase), the magnitude of the direct GHG emissions have been estimated for the Construction Phase and are considered to be Minor Adverse, and therefore, the impact is assessed as Not Significant. As outlined in Chapter 2 (Need for the Proposed Development) in Volume 2 of this EIAR, the Proposed Development will help to meet the CAP24 (Government of Ireland 2023) target of up to 80% renewable energy generation by 2030. This includes the transmission of electricity from offshore and onshore renewable sources thus allowing for a sustainable growth in energy demand, while also supporting the uptake of renewably sourced electricity in other sectors. It is anticipated that the Proposed Development's role in providing a low-carbon electricity grid will, over time, partially offset the direct emissions resulting from the Construction and Operational Phases.

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