AECOM

SSE Tarbert Next Generation Power Station

Environmental Impact Assessment Report (EIAR)
Volume I
Chapter 17 Climate

SSE Generation Ireland Limited

November 2023

Delivering a better world

Prepared for:

SSE Generation Ireland Limited.

Prepared by:

AECOM Ireland Limited
4th Floor
Adelphi Plaza
Georges Street Upper
Dun Laoghaire
Co. Dublin A96 T927
Ireland

T: +353 1 238 3100
aecom.com

Table of Contents

Plates

Tables

Appendices (EIAR Volume II)

Figures (EIAR Volume III)

No Figures

17. Climate

17.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) considers the impact of the Proposed Development on the climate as a result of greenhouse gas emissions that may arise during the construction, operation and decommissioning phases. This chapter also considers the impact of climate change on the Proposed Development.

Full details on the background and Site history are provided in EIAR Volume I Chapter 4 (Existing Site and Conditions), and details of the Proposed Development are provided in Chapter 5 (Description of the Proposed Development) and the Planning Statement submitted with the planning application.

17.1.1 Purpose and Scope

The assessment of climate impacts can be divided into two categories as required by the European Union (Planning and Development) (Environmental Impact Assessment) Regulations 2018 (S.I. No. 296 of 2018) and in line with the Institute of Environmental Management and Assessment (IEMA) guidance for climate change mitigation and adaptation (2020), and guide to assessing greenhouse gas emissions and evaluating their significance (2022).

- **Lifecycle Greenhouse Gas (GHG) Assessment:** assessment of the impact of GHG emissions, arising over the life of the Proposed Development, on the climate.
- **Climate Change Resilience (CCR):** assessment of the vulnerability and resilience of the Proposed Development to the projected impacts of climate change.

17.1.2 Assumptions and Limitations

The assessments presented in this chapter are subject to the following assumptions and limitations:

- Due to the nature of GHG emissions i.e., they are not geographically constrained and the receptor being the global climate, a quantitative assessment of cumulative GHG effects is not appropriate. Consequently, consideration of effects on the climate of GHG emissions from the Proposed Development together with other arbitrarily selected developments is not considered to be applicable.
- There are inherent uncertainties associated with climate change projections, as detailed in Section 17.2.6. To overcome these, current climate change data and science has been incorporated into the assessment and proven effective approaches undertaken to assess similar project types have been replicated.
- Further assumptions specific to the GHG and CCR assessments are detailed in their respective sections.

17.2 Legislation, Policy, and Guidance

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

17.2.1 International Legislation, Policy, and Guidance

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

Kyoto Protocol: An international agreement linked to the United Nations Framework Convention on Climate Change (UNFCCC), which commits its Parties by setting internationally binding emission reduction targets. The current Effort Sharing Decision (ESD) commits Ireland to a 39% reduction in GHG emissions for the period 2021 to 2030.

Paris Agreement: (Conference of the Parties No. 21, 2016): A legally binding agreement within the UN framework convention on climate change which requires all signatories to strengthen their climate change mitigation efforts to keep global warming to below 2°C this century.

EU Emissions Trading System: (Directive 2003/87/EC (as amended)): This directive of 13 October 2003 established a scheme for GHG emission allowance trading within the Community and amending Council Directive 96/61/EC. The EU's current binding target for 2030 is to cut GHG emissions by at least 40% below 1990 levels. This target is split across the EU Emissions Trading System (ETS) and non-ETS sectors. The ETS is a 'cap and trade' system where an EU-wide limit, or cap, is set for the overall volume of GHG that can be emitted by power plants, industry factories and the aviation sector. The cap is reduced over time so that total emissions fall. It covers about 45% of EU emissions, but only about 29% of total emissions in Ireland. Since 2021, the overall European emissions cap has reduced by an annual rate of at least 2.2%.

European Green Deal: Policy initiatives by the European Commission aiming to improve the quality of life in the EU by making Europe GHG neutral by 2050. Under the European Green Deal a series of ambitious packages have been launched to make the EU's climate, energy, land use, transport and taxation policies fit for reducing net GHG emissions. Amongst these initiatives are the EU Strategy on Climate Adaptation and the EU Taxonomy for sustainable activities.

EU Renewable Energy Directive (RED-II): Directive 2018/2001 (recast) on the promotion of the use of energy from renewable sources. On 14 July 2021, the European Commission proposed the revision of the RED II under the "Fit for 55" package of legislative proposals, in view to achieve climate neutrality in the EU by 2050, including the intermediate target of a 55% net reduction in greenhouse gas emissions by 2030. SSE is committed to sourcing HVO that is third-party certified to RED II standards under the

International Sustainability and Carbon Certification (ISCC). This stipulates that HVO will be sourced from 100% waste feedstocks, the raw materials for which are grown on a seasonal basis so there is no long-term 'carbon debt'. Supplied HVO will comply with the RED II (Directive (EU) 2018/2001) which provides specific sustainability criteria and the carbon intensity of individual biofuels, including an assessment of the feedstocks used and the emissions from its production, processing, and supply, and will be certified accordingly by a third party. There is an existing HVO supply chain and infrastructure in Ireland which the Proposed Development will utilise.

17.2.2 National Legislation, Policy and Guidance

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

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

Sectoral Emissions Ceilings 2022: To further support carbon budget targets, in 2022 the government set sectoral emissions ceilings for electricity, transport, the built environment, industry, agriculture, and land use change. For the electricity sector, a ceiling of 3MtCO_2e has been set for 2030, equating to a 75% reduction in emissions against 2018 levels.

Climate Action Plan 2023: This updated Plan provides a detailed plan to achieve a 51% reduction in GHG emissions by 2030, compared to 2018 levels, and achieve net zero emissions by no later than 2050. The Climate Action Plan was published December 2022 and sets out of the roadmap for achieving Ireland's carbon budgets and reaching net zero by 2050. The carbon budgets, proposed by the Climate Change Advisory Council, were adopted 6th April 2022, and are outlined in Table 17.1. Key measures to support these targets include an accelerated transition towards renewable energy, supported by a minimum of 2GW of new flexible gas-fired power generation for quick response power generation.

Table 17.1: Proposed Carbon Budgets for Ireland

	2021-2025	2026-2030	2031-2035
Carbon Budget (Mt CO_2e)	**295**	**200**	**151**
Electricity Sectoral Budget (Mt CO_2e)	**40**	**20**	**N/A**

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

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

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

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

17.2.3 Local Policy

Kerry County Development Plan 2022-2028: The Kerry County Development Plan 2022-2028 incorporates aims, objectives, policies, and guidelines to provide for the proper planning and sustainable development of County Kerry (Co. Kerry). This plan details the importance of the development of energy infrastructure within Co. Kerry and outlines the Council's intention to '*support and provide for the sustainable development of indigenous energy resources, with an emphasis on renewable energy supplies, in the interests of economic progress and the proper planning and sustainable development of the county.'*

Kerry County Council Climate Change Adaption Strategy 2019-2024: This strategy sets out a framework of actions and measures that Kerry County Council (KCC) proposes to undertake to further embed climate adaptation into all of the local authority's areas of responsibility and to assist communities in adapting to climate change. It outlines the goal to increase capacity for climate resilient infrastructure, centred around the effective management of climate risk, informed investment decisions and positive contribution towards a low carbon society.

17.2.4 Client Policy

SSE Net Zero Acceleration Policy: SSE's commitment to net-zero targets have led to a pledge to invest £18bn in low-carbon energy and electricity infrastructure by the end of March 2027. SSE also targets net zero GHG emissions across its scope one and scope two emissions by 2040 and for remaining scope three emissions by 2050. Additionally, SSE aims to increase its renewable energy output fivefold by 2031.

17.2.5 Climate Context

The Intergovernmental Panel on Climate Change (IPCC) has confirmed in its Assessment Reports that the anthropogenic influence on the climate system is clear and growing with impacts observed across all continents and oceans. The concentration of CO_2 in our atmosphere has significantly increased due to human activities, with observed levels of global atmospheric CO_2 rising from their pre-industrial levels of 280 parts per million (ppm) up to 417.81ppm as of April 2022. Given CO_2 is a GHG that absorbs and radiates heat, these increases have resulted in the warming of Earth's atmosphere. According to an ongoing temperature analysis by NASA, the average global temperature on Earth has increased by at least 1.1°C since 1880, with the rate of warming since 1981 at roughly 0.18°C per decade.

The IPCC's Fifth Assessment Report (AR5) (2014) developed Representative Concentration Pathways (RCPs) to aid understanding of how the global climate may change in the future. RCPs describe four different 21st Century pathways of GHG emissions depending on the level of mitigation action undertaken between now and then. They are based on global research and existing literature and comprise a stringent mitigation pathway (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0) and a high emissions scenario (RCP8.5) shows the emission trajectories and projected global temperatures up to 2100 in terms of the IPCC's RCPs.

These emission pathways are used for developing climate change projections which can then be used by policymakers, scientists, and other professionals to estimate and plan for climate risks and impacts.

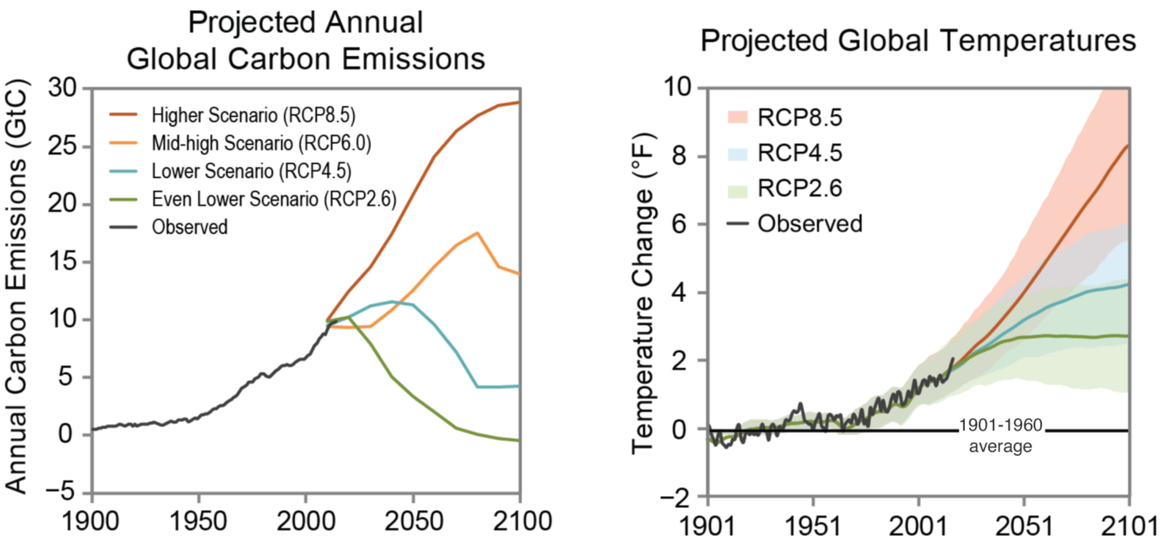

Plate 17.1: Annual Global Historical Temperature with Projected Annual Global Carbon Emissions (left) and Projected Global Temperatures (right)

17.2.6 Climate Change Uncertainty

Climate change projections introduce inherent uncertainty as a result of limitations associated with available measurements and challenges in evaluating causation in complex and multi-component processes. Uncertainty in climate change projections is derived from multiple sources including:

- Uncertainty in how GHG emissions will change overtime due to key unknowns in the drivers of this change. Such drivers include economic and population growth, lifestyle, and behavioural changes, associated changes in energy use and land use, technology, and climate policy.
- Variable confidence levels in how well the climate models predict different climate variables. For example, climate models perform less well in their simulation of large-scale precipitation

patterns than for surface temperature. The certainty in the IPCC's key assessment findings is expressed as a qualitative level of confidence (from *very low* to *very high*).

Such reasons highlight the importance to use a range of projection scenarios when considering how climate may change in the future, and to allow for the participants in the risk assessment process and the ultimate user of the risk assessment outcomes to be cognisant of the inherent uncertainty.

17.3 Methodology

17.3.1 Climate Change Risk Assessment

The methodology in this chapter has been developed in line with appropriate industry guidance for assessing climate change resilience and adaptation such as IEMA's EIA Guide to Climate Change Resilience and Adaptation and in accordance with the EU Commission Notice (2021/C 373/01) Technical guidance on the climate proofing of infrastructure in the period 2021-2027.

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

17.3.1.1 Asset Components

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

- Critical plant equipment e.g., stack, gas turbine.
- Mechanical and electrical services
- Administration building
- Workshop
- Associated Infrastructure
- Roads, pavements
- Drainage
- Construction assets (plant, equipment, and workers)
- Staff and visitors on-site

17.3.1.2 Climate Change Data

Climate Variables

Given its location along the shoreline and the classification of the Proposed Development as a power station with ancillary buildings, the following chronic and acute variables were identified as relevant:

- **Temperature related:** changing air temperature, heat stress, temperature variability, frost days.

- **Wind-related**: changing wind patterns, storms.
- **Water-related**: changing precipitation patterns, sea level rise, drought, heavy precipitation, flood (including pluvial and coastal).

Climate Baseline Data

For the purposes of the CCR assessment, the baseline conditions are based upon historic climate change data. This data was obtained from Met Éireann, recorded by the closest meteorological station to the Site with the largest range of historical data and a similar geographic context (i.e., coastal, sea-level elevation). The closest meteorological station to the Site that fits the above criteria is Shannon Airport. Historic average data was collected for the climate variables described previously for the period 1981-2000. This baseline period was chosen because it matches the baseline period for the available climate change projections from Climate Ireland. The historical data collected is provided in Table 17.10**.**

Climate Change Projection Data

For this CCR assessment, two climate change scenarios were reviewed to provide decision-makers with a more holistic understanding of the range of potential climate futures possible, which is essential when understanding risk and developing appropriate adaptation measures. These climate change projections were based on RCP 4.5 and RCP 8.5.

RCP 4.5 is an intermediate scenario and represents a less steep decline in GHG emissions than the targets in RCP 2.6. It requires that CO_2 emissions start declining by 2045 and halve in value between 2050 and 2100. And decline to about 75% of the CH4 levels of 2040. It also requires that SO_2 emissions decline to approximately 20% of those of 1980-1990.

RCP 8.5 was also used as it represents a worst-case scenario, which is useful in risk and contingency planning. This pathway has the highest emissions concentration and is marked by inadequate policy response and increased potential for physical asset damage.

The climate change projection data used was gathered from Climate Ireland's 'Climate Data Explorer' online platform. The data available on this platform is based on Nolan and Flanagan's 2020 Ensemble of regional climate model projections for Ireland. The Climate Data Explorer provides climate change projection data for a variety of climate variables for the period 2041-2060 (compared to a 1981-2000 baseline). Whilst it is best practice to consider climate change projections from multiple time horizons, 2041-2060 is the timeframe for which most supporting data was available. This period is relevant as it encompasses the entire planned design life of the Proposed Development. The climate change projection data collected is provided in Table 17.10.

Risk Assessment

Using the climate change projection data gathered in Table 17.10 a series of risks were identified for the climate hazards determined to be relevant to the Proposed Development. For each risk identified, the asset components impacted were noted and the planned or embedded controls identified. In this instance, embedded controls represent measures already included in the design and operation of the Proposed Development that work to mitigate climate risk. With this information, an initial assessment of climate change risk was undertaken based on an analysis of likelihood and consequence. Adaptation measures were then subsequently identified to further reduce risk and increased resilience, after which a residual assessment of risk was performed. The full climate change risk register can be found in EIAR Volume II Appendix 17A. To represent a worst-case-scenario, the risk register only considers a RCP 8.5 climate change scenario.

This assessment was informed by the risk framework and the descriptors of likelihood and consequence adopted from EU Technical Guidance on the Climate Proofing of Infrastructure in the Period 2021-2027. The likelihood descriptors for climate hazards and impacts, and the definition of consequence are provided in Table 17.2 and Table 17.3.

Table 17.2: Level of consequence definitions

Level of consequence of climate impact	Definition of Consequence
Catastrophic	Disaster with the potential to lead to shut down or collapse of asset/network
Major	A critical event that requires extraordinary / emergency business continuity actions
Moderate	A serious event that requires additional emergency business continuity actions
Minor	An adverse event that can be absorbed by taking business continuity actions
Insignificant	Impact can be absorbed through normal activity

Using the ratings for likelihood and consequence climate change risks (likelihood x consequence = risk) are then classified by levels of risk, as per Table 17.3. Risks classed as 'Medium', 'High' or 'Extreme' are considered significant.

When assessing the consequence of a specific risk, several categories were considered including:

- Asset damage
- Health & safety
- Environmental
- Social
- Financial
- Reputation

- Cultural heritage and cultural premises

Table 17.3 presents the criteria for assessing the likelihood of a climate hazard occurring, based on the data collected from Climate Ireland's Data Explorer. An example of a climate hazard occurring could be an increase in summer temperatures.

Table 17.3: Climate hazard occurrence likelihood descriptors

Likelihood of hazard	Description (probability)
Very Likely	90-100% probability that the hazard will occur.
Likely	66-90% probability that the hazard will occur.
Possible, about as likely as not	33-66% probability that the hazard will occur.
Unlikely	10-33% probability that the hazard will occur.
Very Unlikely	0-10% probability that the hazard will occur.

The criteria displayed in Table 17.4 is used to assess the likelihood of a climate related impact occurring as a result of a specific climate hazard. A climate impact is considered an effect that a climate hazard may have on the Proposed Development. For example, increased summer temperatures leading to unsuitable working conditions for construction. This assessment is based on UKCP18 data and knowledge of site-specific conditions.

Table 17.4: Climate impact occurrence likelihood descriptors

Likelihood Category	Description (Qualitative)	Probability (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	90%

The definitions for consequence of climate change impacts is presented in Table 17.5, and have been adapted from those displayed in the EU technical guidance for assessing climate change risk. The level of consequence defines how severely a climate impact will influence the Proposed Development.

Table 17.5: Level of consequence definitions

Level of consequence of climate impact	Definition of Consequence
Catastrophic	Disaster with the potential to lead to shut down or collapse of asset/network
Major	A critical event that requires extraordinary / emergency business continuity actions
Moderate	A serious event that requires additional emergency business continuity actions
Minor	An adverse event that can be absorbed by taking business continuity actions
Insignificant	Impact can be absorbed through normal activity

Using the ratings for likelihood and consequence climate change risks (likelihood x consequence = risk) are then classified by levels of risk, as per Table 17.6. Risks classed as 'Medium', 'High' or 'Extreme' are considered significant.

Table 17.6: Risk Matrix

		Measure of Consequence				
		Insignificant	**Minor**	**Moderate**	**Major**	**Catastrophic**
Likelihood of climate-related impact occurring	**Rare**	Low	Low	Medium	High	Extreme
	Unlikely	Low	Low	Medium	High	Extreme
	Moderate	Low	Medium	High	Extreme	Extreme
	Likely	Medium	High	High	Extreme	Extreme
	Almost Certain	High	High	Extreme	Extreme	Extreme

17.3.2 Greenhouse Gas Assessment Methodology

The study area for the GHG assessment, considers all direct and indirect GHG emissions that may arise from the construction, operation, and decommissioning of the Proposed Development. This includes direct emissions arising onsite e.g., from the combustion of fuel used in construction plant as well as indirect emissions from activities offsite that are sufficiently linked to the Proposed Development, such as transport of materials, waste and workers and embedded carbon in construction materials and products. This assessment has been conducted in line with IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance, PAS 2080 Carbon Management in Infrastructure and the ISO 14064 standard.

17.3.2.1 Sensitive Receptors

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

17.3.2.2 GHG Calculation

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

GHG emissions, arising from the construction and operational activities, and embodied carbon in materials of the Proposed Development, have been calculated by multiplying activity data by a relevant emission factor:

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

Activity data is a quantifiable measure of activity, such as operating hours or volumes of fuels used. Emission factors convert the activity data into GHG emissions. Activity data has been sourced from the Applicant, however, where specific data is not available, a mix of assumptions and industry benchmarks have been used to fill data gaps. Where this is not possible, then a qualitative approach to assessing the GHG impacts has been followed, in line with the IEMA guidance.

Emission factors and calculation methods have been sourced from publicly available sources, including Sustainable Energy Authority of Ireland (SEAI), UK Department for Energy Security and Net Zero (DESNZ), National Highways, Royal Institute of Chartered Surveyors (RICS), Institute of Civil Engineers – Civil Engineering Standard Method of Measurement Fourth Edition (CESMM4), and the Bath University Institute of Civil Engineers (ICE) Embodied Carbon Database.

In line with the GHG Protocol, when calculating GHG emissions, the seven Kyoto Protocol GHGs have been considered, specifically:

- Carbon dioxide (CO_2);
- Methane (CH_4);

- Nitrous oxide (N_2O);
- Sulphur hexafluoride (SF_6);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen trifluoride (NF3).

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

Table 17.7 outlines the GHG activity sources present and proposed that are potentially relevant to baseline conditions and construction and operational phases of the Proposed Development.

Table 17.7: Potential Sources of GHG Emissions

Phase	Activity	Primary Emissions Sources
Pre-construction (Enabling)	On site pre-construction activity i.e., enabling works, demolition of existing structures.	GHG emissions from fuel consumption by construction plant and vehicles, generators on-site, and worker commuting
	Transportation and disposal of earthworks/waste	GHG emissions from the vehicles required to transport and the associated waste emissions
Product Manufacture	Raw material extraction and manufacturing of products / materials	Embodied GHG emissions associated with product and material manufacture
	Transport of products / materials to Site	GHG emissions from fuel consumption of transport vehicles.
Construction	On-site construction activity	Energy (electricity, fuel, etc.) consumption from construction plant and vehicles, generators on-site and material consumption
	Transport of construction workers	Energy consumption from worker commuting.
	Transportation and disposal of earthworks/ waste	GHG emissions from transportation and disposal/treatment of earthworks and construction waste
Operations	Operation of the Proposed Development	GHG emissions from energy use, fuel consumption, additional traffic, provision of potable water and treatment of wastewater

Phase	Activity	Primary Emissions Sources
	Transportation and disposal of waste	GHG emissions from the transportation and disposal of operational waste.
	Building and grounds maintenance	GHG emissions associated with replacement materials/products
	Emissions displacement	Avoided or displaced emissions through use of any renewable energy systems of offsetting.
	Landscaping	Changes in GHG emissions/sinks from landscaping and re-vegetation
Decommissioning	Removal and/or renewal of the Proposed Development	GHG emissions arising from fuel consumption of plant and vehicles, and the disposal or recycling of materials.

17.3.2.3 GHG Significance Criteria

The IEMA guidance states that the following three principles need to be considered when evaluating the significance of GHG impacts on the climate in EIA:

- all project GHG emissions will contribute to climate change;
- climate change has the potential to lead to significant environmental consequences that may affect all topics in the EIA Directive (e.g., Biodiversity, Water, Landscape, Geology, Air Quality, Human Health); and
- GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit, as such that any GHG emissions or reductions from a project might be considered significant.

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

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

The IEMA guidance also emphasises the importance of implementing GHG mitigation measures to help minimise GHG emissions, regardless of the magnitude of emissions, and states that the level of mitigation should be used to assess the significance of GHG emissions. This has therefore been factored into the assessment criteria for the GHG assessment.

Based on the above two considerations, and in line with criteria outlined in the IEMA guidance, the following significance table, as shown in Table 17.8, will be used to assess the significance of GHG emissions arising as a result of the Proposed Development.

Table 17.8: Significance of Effects for GHG Impact Assessment

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

Effects	Significance Level	Description
		• Well 'ahead of the curve' for Ireland's trajectory towards net zero, provides a positive climate impact.

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

17.3.2.4 Alignment to 2050 Net Zero Trajectory

The IEMA guidance states that the crux of assessing significance is "not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". The trajectory of GHG emissions associated with the Proposed Development has therefore been factored into the assessment criteria.

17.4 Baseline and Projected Environment

17.4.1 CCR Assessment

17.4.1.1 Climate Baseline Data

To effectively use climate change projections for the purpose of a risk assessment, it is necessary to first understand the historical climate conditions experienced at the location. Baseline climate data is provided in Table 17.10 whilst Section 17.4.1.2 provides information on past extreme events experienced at the Site of the Proposed Development.

17.4.1.2 Past Extreme Events

The following events are examples of extreme climatic conditions experienced at or near the Site in the past:

- Orange wind warning in April 2023 for Co. Kerry, where wind speeds reached up to 110km/hr.
- Road closure of the N67 approximately twice per year due to high tide and overtopping of the sea wall creating surface water..
- Major 'violent' storms Eunice, Barra and Ellen since 2020. Resulted in winds of >100km/hr and significant rainfall.

17.4.1.3 Climate Change Projection Data

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

Qualitative projection data

Future trends for key climate variables in Ireland are summarised using information available from Climate Ireland's '*Essential Climate Information'*.

Table 17.9: Key Message - Climate Change Projections Ireland

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

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

<u>Quantitative Projection Data</u>

The quantitative climate change projection data for the Site is presented in Table 17.10 alongside the climate baseline data for the study area. Definitions of the climate variables considered for this assessment are provided in Table 17.11. As previously discussed, the climate change scenarios adopted of this CCR assessment were RCP 4.5 and RCP 8.5.

Table 17.10: Climate Change Baseline and Projection Data

Climate Variable	Baseline (1981-2000)	Climate Change Projection RCP4.5 (2041-2060)	Climate Change Projection RCP8.5 (2041-2060)	Projected Change in Likelihood
Temperature				
Mean annual maximum daily temperature (°C)	**14.0**	+1.1 (15.1)	+1.4 (15.4)	↑
Mean annual minimum daily temperature (°C)	**7.4**	+1.1 (8.5)	+1.4 (8.8)	↑
Mean summer maximum daily temperature (°C)	**19.3**	+1.2 (20.5)	+1.6 (20.9)	↑
Mean winter minimum daily temperature (°C)	**3.5**	+0.9 (4.4)	+1.3 (4.8)	↑
Number of frost days per annum	**16.7**	-52.3% (8.0)	-63.8% (6.0)	↓
Number of heatwaves per annum	**2**	3.9	6.2	↑
Highest temperature for baseline period (°C)	**30.6**	-	-	
Lowest temperature for baseline period (°C)	**-8.2**	-	-	
Rainfall				
Mean annual rainfall (mm)	**985.3**	-1.5% (970.5)	-1.0% (975.4)	↓
Mean summer rainfall (mm)	**214.8**	-3.7% (206.9)	-8.3% (197.0)	↓
Mean winter rainfall (mm)	**278.9**	-0.4% (277.8)	+2.1% (284.8)	↕
Wettest month on average (mm)	**December (110.3)**			
Driest month on average (mm)	**April (57.4)**			

Climate Variable	Baseline (1981-2000)	Climate Change Projection RCP4.5 (2041-2060)	Climate Change Projection RCP8.5 (2041-2060)	Projected Change in Likelihood
Wet days >20mm (days per annum)	**4.2**	+12.5% (4.7)	+21.8% (5.1)	↑
Very wet days >30mm (days per annum)	**0.75**	+20.7% (0.9)	+29.9% (1.0)	↑
Highest daily rainfall (mm) for baseline period	**44.3**			
Other				
Sea level rise (m)		0.2	0.25	
Snowfall		-61%	-67.8%	↓
Potential Evapotranspiration (mm)	**1.6**	+2.7% (1.64)	+2.8% (1.65)	↑
Mean wind speed (knots)	**9.23**	-2.3% (9.01)	-2.8% (8.97)	↓
Storms	The number of very intense storms is projected to increase over the North Atlantic region in the future (2041-2060), under RCP8.5, projections suggest that the winter tack of these storms may extend further south and over Ireland more often. Under RCP4.5, the projects are similar, though with a weaker signal.			

Table 17.11: Climate Variables Definition

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

Climate Variable	Definition
Snowfall	Projected change (%) in the snowfall

17.4.2 GHG Assessment

The baseline environment or the "Do Nothing Scenario" refers to the scenario in which the Proposed Development is not developed. As the Site is located on already developed (brownfield) land of the Tarbert Power Station, which is due to cease operation in December 2023, the baseline emissions for the Site is currently considered zero as no carbon will be sequestered or emitted at the Site when the Proposed Development is due to begin construction. Land use change is not considered due to Site already consisting of inactive developed land (brownfield).

17.5 Potential Impacts

17.5.1 CCR Assessment

17.5.1.1 Initial Risk Profile

The initial CCRA risk rating is shown in Table 17.12. Using the methodology described in Section 17.3.1, a total of 11 climate change risks were identified for the construction and operation stages of the Proposed Development. Due to the similarity of the two future baseline scenarios (RCP 4.5 and RCP 8.5) to 2060, the same climate change risks were identified for each scenario.

The medium risk identified related to the vulnerability of the Proposed Development to inundation from coastal flooding from the Shannon estuary. The Proposed Development falls within Flood Zone A for tidal/coastal flooding (EIAR Chapter 12: Water Environment), meaning there is a high probability of coastal flood events within the Site boundary. This indicates that flood defence measures above standard practice are required for appropriate flood risk mitigation.

Table 17.12: Initial CCRA Risk Rating

Risk Rating	Moderate emissions scenario RCP 4.5 2040-2060	High emissions scenario RCP 8.5 2040-2060
	Initial risk profile	**Initial risk profile**
Low	10	10
Medium	1	1
High	0	0
Extreme	0	0

17.5.1.2 Embedded Controls

As aforementioned, planned, or embedded controls represent measures already included in the design and operation of the Proposed Development that work to mitigate the climate risk. These measures are usually included in the design and / or operation of an asset as they represent best practice design or management. Table 17.13 provides embedded controls adopted for the Proposed Development.

Table 17.13: Embedded Controls

Project Phase	Embedded Controls
Construction	Monitor weather forecasts and plan work schedules, accordingly, avoiding work during periods of extreme temperature/heatwaves and extreme rainfall. More detail to be provided in the CEMP.
Design	Sea level storm surge protection for the Site boundary. More detail can be found in EIAR Volume I, Chapter 12: Water Environment. Use of resilient and sustainable materials. Avoid topographic low points and install drainage as detailed in EIAR Volume I, Chapter 12: Water Environment, to prevent surface water flooding. OCGT to be raised above peak flood level to prevent flood damage.
Operation	Storm water management plans Storage of pollutant material will be adequately protected from extreme weather and flood damage. Minimise maintenance during extreme weather events (e.g., strong winds). Maintenance of the drainage system to be included within general site management.

17.5.1.3 Adaptation Measures

Climate change adaptation for infrastructure projects is the process of adjustment to actual or expected climate and its effect to increase resilience, moderate harm and exploit beneficial opportunities. There are a range of measures or options that are available and appropriate for addressing climate change adaptation often described as either Grey, Green or Soft:

- **Grey Actions -** Technical or engineering-oriented responses to climate impacts, for example the construction of a sea wall in response to sea level rise or the consideration of climate change projections in the design of drainage structures
- **Green Action** - Use nature-based solutions to enhance the resilience of human and natural systems, for example the addition of green spaces to infrastructure projects to counteract urban heat island effect, or the use of drought and heat tolerant species in landscaping.
- **Soft Actions -** Alterations in behaviour, regulation, or systems of management such as increased monitoring of climate change impacts during operation, or the consideration of climate risk in asset management plans. They are flexible and inexpensive to implement.

In the identification and implementation of adaptation measures, it is critical that early engagement between the relevant stakeholders occurs i.e., engineers, environmental assessment professionals or asset owners. Early and proactive engagement is the most effective way of eliminating and reducing climate change impacts on a project, thereby reducing the need for additional and costly measures late in design or during operation.

Table 17.14: Adaptation Measures Identified

Project Phase	Adaptation Measures	Proposed / Implemented
Construction	Contractor to monitor weather forecasts to ensure adequate protections for construction crews. Contractor to develop and follow the Construction Environmental Management Plan (CEMP), which will be prepared as part of the planning application.	Proposed
Operation	Flood defence scheme to protect power station at a level of +4.8mAOD	Implemented

As described in EIAR Volume II, Appendix 12A: Flood Risk Assessment, the Proposed Development is located within Flood Zone A for coastal/tidal flooding. Due to this, the Flood Risk assessment has recommended a flood defence scheme of +4.8mAOD to adequately protect the Proposed Development. The flood risk assessment considers a Mid-Range Future Scenario (MRFS) for future climate change impacts, showing significant flooding during a 10% AEP event, with floodwater reaching levels of 3.5mAOD during these events. Given this, the recommendation of +4.8mAOD is considered sufficient to mitigate the flood risk for the Proposed Development. Further details on the flood risk to the Site and proposed flood defences, please refer to EIAR Volume I, Chapter 12: Water Environment.

17.5.2 GHG Assessment

The quantity and significance of the GHG emissions associated with the Proposed Development are presented in Section 17.6.2.

17.6 Residual Impacts

17.6.1 CCR Assessment

17.6.1.1 Residual Risk Profile

Residual risk represents the risk profile resulting after the implementation of adaptation measures. The residual risk rating for the Proposed Development, (assuming the implementation of the identified adaptation measures), is summarised in Table 17.15.

As described above, the flood defence scheme as presented in EIAR Volume II, Appendix 12A: Flood and Drainage Risk Assessment, is considered sufficient to reduce the profile of the medium risk identified.

Table 17.15: Residual Risk Profile

Risk Rating	Moderate emissions scenario RCP 4.5 2040-2060		High emissions scenario RCP 8.5 2040-2060	
	Initial risk profile	Residual risk profile	Initial risk profile	Residual risk profile
Low	10	11	10	11
Medium	1	0	1	0
High	0	0	0	0
Extreme	0	0	0	0

17.6.1.2 Significance

Assuming all proposed adaptation measures are successfully implemented, no significant climate change risks have been identified for the Proposed Development. For a full breakdown of identified climate risks and their embedded and proposed adaptation measures, refer to Appendix 17A, EIAR Volume II.

17.6.2 GHG Assessment

17.6.2.1 Construction Phase Impacts and Effects

To assess the magnitude of impacts on the climate through GHGs associated with construction of the Proposed Development, the emissions that will be associated with the project activities have been calculated and listed in Table 17.16 and Table 17.17 based on the assumptions listed:

- Construction is expected to begin in Q3 2024 and last up to 29 months.
- Construction is assumed as 67 hours per week.
- The embodied carbon of construction products has been estimated using RICS benchmarked emissions factors. This approach has been taken due to a lack of available information on construction materials associated with operational plant. As the vast majority of emissions associated with the Proposed Development will occur during operation, this approach is considered valid.
- Calculations of the embodied carbon associated with waste disposal and enabling works are derived for the Proposed Development.
- Construction materials transport emissions have been calculated based on the estimated daily traffic generation in Chapter 14 Traffic and Transport (EIAR Volume I) and are assumed to be a 50km round trip.
- Worker commute trips are assumed to be 50km (round trip), and are also derived from the estimated traffic during construction as found in Chapter 14 Traffic and Transport (EIAR Volume I)
- Emissions are assumed to occur at a constant rate during the construction phase.

Table 17.16: Construction Phase GHG Emissions

Lifecycle Phase	Emissions Source	Emissions (tCo2e)	% Construction Phase Emissions
Product	Embodied carbon of materials and products	8,205	78.90
	Materials and product transport	18	0.17
Construction	Enabling works	702	6.75
	Fuel usage onsite	1,404	13.50
	Waste disposal	36	0.35
	Worker commute	34	0.33
	Total	**10,399**	
	Annual	**4,303**	

As stated in Section 17.3.2.3, all emissions are considered significant. To contextualise the level of significance, emissions are compared to the Irish carbon budgets. Emissions from the construction of the Proposed Development contribute considerably less than 1% of any carbon budget, refer to Table 17.17 for the complete breakdown of emissions over the construction period in comparison to Ireland's national carbon budgets.

Table 17.17: Construction GHG Emissions

Carbon Budget	Total Budget (tCO2e)	Total Project Emissions within budget period (tCO2e)	% Contribution of construction emissions
2021-2025	295,000,000	5,379	0.002
2026-2030	200,000,000	5,020	0.003

.

17.6.2.2 Operational Phase Impacts and Effects

To assess the magnitude of the climate change impacts through GHGs associated with operating and maintaining the Proposed Development, the GHGs that will be associated with the Proposed Development operational phase activities have been calculated and listed in Table 17.18, based on the assumptions detailed:

- Energy supplied to Site is assumed to be grid average electricity and its associated emissions were calculated using SEAI 2023 emissions factors. SEAI have not published forecasted emissions factors for the Irish electricity grid, therefore it is assumed the carbon intensity of the grid will remain constant over the operational lifespan of the Proposed Development. This is considered a conservative worst-case-scenario approach, as it is likely the future carbon intensity of the electricity grid will be lower compared to present day.

- The Proposed OCGT is assumed to operate for 1,800 hours/year.
- The Proposed OCGT will be fuelled by HVO.
- For the assumed operational hours, the Proposed Development is expected to consume 170,000 m^3 of HVO annually.
- Operational emissions are based on a design life of 25 years.
- Fuel transport to Site is assumed to be via 100% laden diesel fuelled HGVs. Transport distance is assumed as 250 km (one-way) to allow for flexibility in the source of the HVO fuel. Transport emissions have been calculated on a tonne.km basis.
- SSE is committed to sourcing HVO that is third party Certified to RED-II under the ISCC. HVO will be sourced from 100% waste feedstocks, the raw materials for which are grown on a seasonal basis so there is no long-term “carbon debt”. Supplied HVO will comply with RED-II standards, which provides specific sustainability criteria and the carbon intensity of individual biofuels, including an assessment of the feedstocks used and the emissions from its production, processing and supply, and will be certified accordingly by a third party. There is an existing HVO supply chain and infrastructure in Ireland which the Proposed Development will utilise. The transport of HVO from this existing infrastructure to the Site has been considered in this GHG impact assessment.
- Emissions factors for HVO have been sourced from the UK DESNZ Government Conversion Factors for Company Reporting of Greenhouse Gas Emissions (2023) The emissions factor for the combustion of HVO is considered as 0.036 $kgCO_2e$/litre. The Well-To-Tank emissions factor for HVO, which includes emissions that occur up to the point of delivery is considered as 0.28 $kgCO_2e$/litre.

Table 17.18: Operational GHG Emissions

Lifecycle Phase	Project Activity / Emissions Source	Annual Emissions (tCO_2e)	Total Lifecycle Emissions (tCO_2e)	% of Project Operational Emissions
Operational Phase	Fuel usage on-site (Scope 2 – HVO Consumption)	6,049	151,215	9.86%
	Fuel usage on-site (Scope 3 – HVO WTT)	47,335	1,183,370	77.19%
	Energy usage on-site (Scope 2 – Electricity Generation)	4,440	111,000	7.24%

Lifecycle Phase	Project Activity / Emissions Source	Annual Emissions (tCO_2e)	Total Lifecycle Emissions (tCO_2e)	% of Project Operational Emissions
	Energy usage on-site (Scope 3 – Electricity T&D)	516	12,900	0.84%
	Water Use	39	976	0.06%
	Fuel Transport to Site (HGV within Ireland)	2,942	73,560	4.8%
	Total	**61,321**	**1,533,021**	

As presented in Table 17.18, the majority of emissions associated with the operational phase are the Scope 3 Well-To-Tank (WTT) emissions relating to the HVO fuel upstream of the Proposed Development. This is expected for an OCGT using HVO. The relative proportion of emissions associated with its WTT component is much higher for HVO when compared to traditional fuel sources, explaining its higher proportion of scope 3 emissions. Despite this, HVO is an overall far lower-carbon intensity fuel. This is summarised in Plate 17.2.

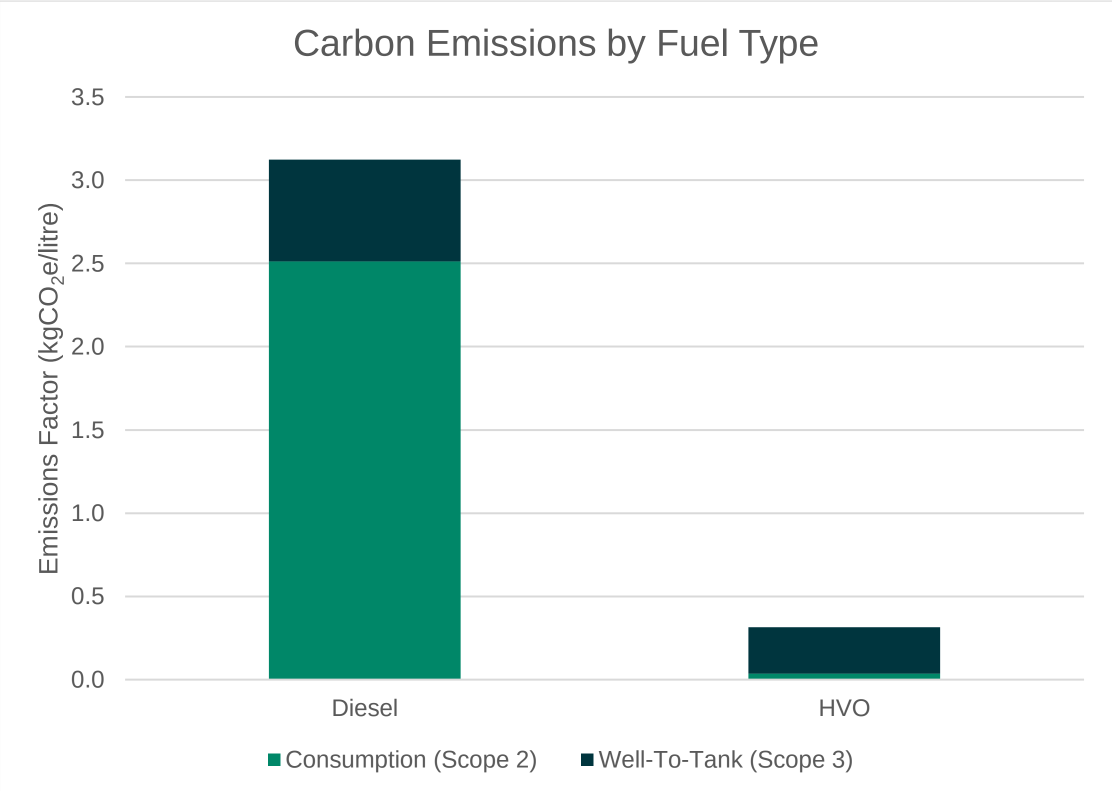

Plate 17.2: Comparative use and WTT emissions factors of Diesel and HVO fuels. Emissions factors sourced from *DESNZ (2023), 'GHG emissions factors for company reporting'.*

17.6.2.3 Decommissioning Phase Impacts and Effects

The GHG impacts that will occur during the decommissioning phase of the Proposed Development have estimated in accordance with the following assumptions.

- Direct demolition emissions have been calculated using benchmarked demolition emission factors from the CESMM4.
- As details surrounding the decommissioning phase is not currently available, it is assumed that worker transport and fuel use during decommissioning will be equivalent to the emissions that occurred during the construction phase. This is considered a worst-case-scenario as construction methods and plant fuel types are expected to decarbonise into the future.

The emissions expected to occur during the decommission phase of the Proposed Development have been summarised in Table 17.19.

Table 17.19: GHG impacts during decommissioning phase.

Lifecycle Phase	Emissions Source	Emissions (tCo2e)	% Decommissioning Phase Emissions
Decommissioning	Embodied	19	1%
	Fuel use	1,404	97%
	Worker Transport	34	2%
	Total	**1,457**	

17.6.2.4 Significance

In light of Ireland's national climate objective to achieve net zero carbon by 2050, and in line with IEMA guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance, the GHG impact of the Proposed Development (construction, operation and decommissioning) has been reviewed in line with Ireland's current carbon budgets to 2035 (Table 17.19), noting that the Proposed Development is proposed to begin construction in Q2 2024, with the construction period lasting up to 29 months. The Proposed Development has a design life of 25 years.

For the purpose of this assessment all GHG emissions associated with the Proposed Development have been considered in the context of Irish national carbon budgets. This includes the scope 3 emissions (WTT) associated with the production of HVO fuel. While a proportion of these emissions may occur outside of Ireland, carbon emissions are not geographically restrained, with the receptor being the global climate. This comparison is therefore considered a conservative worst-case-scenario approach.

Table 17.20: GHG Emissions and Ireland's Carbon Budgets

Carbon Budget Year	Total Budget (tCO_2e)	Total Project Emissions within budget period (tCO_2e)	% of contribution of Proposed Development emissions
2021-2025	295,000,000	5,379	0.002
2026-2030	200,000,000	240,084	0.12
2031-2035	151,000,000	306,604	0.2

To provide further context, the emissions of the Proposed Development have also been compared against the carbon budget for the electricity sector, as defined in the GoI Sectoral Emissions Ceilings (2022). The proportion of Proposed Development GHG emissions in relation to sectoral budgets is presented in Table 17.20.

Table 17.21: GHG Emissions and Ireland's Electricity Sectoral Carbon Budget

Sectoral Carbon Budget Year	Total Budget (tCO_2e)	Total Project Emissions within budget period (tCO_2e)	% of contribution of Proposed Development emissions
2021-2025	40,000,000	5,379	0.01
2026-2030	20,000,000	240,084	1.2

As per the IEMA guidance on assessing the significance of GHG emissions (Table 17.14), the Proposed Development is considered Minor Adverse, and therefore Not Significant when considering the ability of Ireland to achieve its stated net zero target.

When assessing the significance of the emissions associated with the Proposed Development it is important to consider the emissions that would arise in the case of a 'do-nothing' scenario where the Proposed Development does not go ahead. In this case, energy to support the national grid would need to be generated from an alternative source. For this assessment, the emissions associated with the energy output of the proposed OCGT is compared to emissions from sourcing equivalent energy (630,00 MWh) from a diesel fuelled OCGT and a natural gas fuelled OCGT. The efficiency of the OCGT turbine is assumed to be 40%, as advised in a written parliamentary response from the UK Department for Energy and Climate Change (2015). This comparison only considers the embodied and WTT emissions associated with each fuel source, not the embodied carbon associated with the construction of energy generation infrastructure (i.e., operational emissions only), this allows for a direct comparison between the predicted carbon intensity Proposed Development and that of alternative energy generation infrastructure. The results of this comparison are presented in Table 17.20.

Table 17.22: Energy Alternatives Analysis

Energy Source	Annual Emissions (tCO_2e)	Difference in Annual Emissions	% of Proposed Development Emissions
HVO OCGT	53,381	0	100%
Natural Gas OCGT	382,686	+329,304	717%
Diesel OCGT	511,945	+458,564	959%

As displayed in Plate 17.2, a HVO fuelled OCGT as present in the Proposed Development represents a significant reduction in emissions when compared to alternative methods of energy production and therefore contributes to an overall reduction in GHG emissions in relation to Ireland's carbon budgets.

17.7 Cumulative Effects

17.7.1 Interaction of Effects between the Various Elements of the Proposed Development

The potential cumulative impacts form the interactions between various elements of the Proposed Development, as described in Chapter 20: Interactions, have been considered in terms of impacts on Climate. Due to the proximity, scale and timelines associated with each element, there is potential for interaction as part of the Proposed Development.

17.7.2 Cumulative In-Combination Effects

Climate change is the result of cumulative impacts. As it is the result of innumerable minor activities, a single activity may itself result in a minor or insignificant impact, though when combined with many other activities, the cumulative effect could become significant. The GHG emissions assessment by its nature is a cumulative assessment and considers whether the Proposed Development will contribute significantly to emissions on a national level. By comparing the Proposed Development against the national inventory, as being representative of the global climate, the cumulative impact of the Proposed Development is being considered on a national scale.

The global climate is the receptor for climate change impacts and has the ability for holding GHG emissions. Regardless, as stated by IEMA, all GHG emissions are considered significant and therefore would contribute to climate change. While the impact of any individual proposed development may be limited, it is the cumulative impact of many proposed developments over time that could have a significant effect on climate change.

When addressing the cumulative impact of the Proposed Development it should also be considered on a sectoral scale. As previously noted, while the Proposed Development will result in direct emissions from the combustion of HVO, this is seen as necessary energy generation and produces significantly less GHG emissions than traditional alternatives. Additionally, the Proposed Development comprises a key component of the transition to low-carbon energy by providing flexibility to allow for intermittent renewable energy (e.g., wind or solar) to be maximised.

17.8 Summary

17.8.1 Climate Change Risk Assessment

The CCRA has concluded that given the implementation of the above adaptation measures there are no significant residual climate change risks present for the Proposed Development.

17.8.2 Greenhouse Gas Assessment

GHG emissions from the construction and operation of the Proposed Development are deemed Not Significant and no further mitigation measures are proposed.

17.9 References

European Commission (EC) (2014). Regulation (EU) No 517/2014 of the European Parliament and of the Council. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32014R0517&qid=1608306002561 [Accessed 12/07/2023]

World Resource Institute (WRI) & World Business Council for Sustainable Development (WBCSD) (2004). A Corporate Accounting and Reporting Standard. The Greenhouse Gas Protocol. Revised Edition. Available at: http://ghgprotocol.org/sites/default/files/standards/ghg-protocol-revised.pdf [Accessed 03/07/2023].

United Nations Framework Convention on Climate Change (UNFCCC) (2016). Conference of the Parties, Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015. Available at: https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf [Accessed 03/07/2023].

European Commission (EC) (2021b). EU Emissions Trading System (EU ETS). Available at: https://ec.europa.eu/clima/policies/ets_en#:~:text=The%20EU%20ETS%20framework&text=The%20legislative%20framework%20of%20the%20EU%20ETS%20for%20phase%204,contribution%20to%20the%20Paris%20Agreement [Accessed 03/07/2023].

European Commission (EC) (2019). The European Green Deal. Communication from the Commission. COM (2019) 640 Final. Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1576150542719&uri=COM%3A2019%3A640%3AFIN [Accessed 03/08/2022].

Government of Ireland (GoI) (1999). S.I. No. –3 of 1999 - European Communities (Environmental Impact Assessment) (Amendment) Regulations, 1999. Available at: http://www.irishstatutebook.ie/eli/1999/si/93/made/en/print [Accessed 03/07/2023].

Government of Ireland (GoI) (2021). Climate Action and Low Carbon Development (Amendment) Act 2021. Available at: https://www.irishstatutebook.ie/eli/2021/act/32/section/15/enacted/en/html [Accessed on 02/07/2023]

Government of Ireland (GoI) (2022). Climate Action Plan 2023. Available at: https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/ [Accessed 31/05/2023].

Department of the Environment, Climate and Communications (2020). Ireland's National Energy and Climate Plan 2021-2030. Available at: https://www.gov.ie/en/publication/0015c-irelands-national-energy-climate-plan-2021-2030/ [Accessed 05/07/2023]

Government of Ireland (GoI) (2018). National Adaptation Framework. Planning for a Climate Resilient Ireland. Available at: https://www.gov.ie/en/publication/fbe331-national-adaptation-framework/ [Accessed 03/07/2022].

Government of Ireland (GoI) (2022). Sectoral Emissions Ceilings. Available at: https://www.gov.ie/en/publication/76864-sectoral-emissions-ceilings/ [Accessed 22/09/2023]

Department of Communications, Climate Action & Environment (DCCAE) (2020b). The White Paper: Ireland's Transition to a Low Carbon Energy Future 2015-2030. Available at: https://www.gov.ie/en/publication/550df-the-white-paper-irelands-transition-to-a-low-carbon-energy-future-2015-2030/ [Accessed 03/08/2022].

Kerry County Council (KCC) (2022). Kerry County Development Plan 2022-2028. Available at: http://docstore.kerrycoco.ie/KCCWebsite/planning/devplan/volonewritten.pdf [Accessed on 01/07/2023]

KCC (2022). Draft Climate Action Plan 2022-2028. Available at: https://consult.kerrycoco.ie/en/consultation/draft-kerry-county-development-plan-2022-2028/chapter/23-climate-action [Accessed on 06/07/2023]

KCC (2019). Climate Change Adaption Strategy 2019-2024. Available at http://docstore.kerrycoco.ie/KCCWebsite/environment/climate.pdf [Accessed on 04/07/2023]

Intergovernmental Panel on Climate Change (IPCC) (2014). Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp. Available at: https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf [Accessed 30/07/2023].

Institute of Environmental Management and Assessment (IEMA) (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation.

European Commission (EC) (2021a). EU Commission Notice (2021/C 373/01) Technical guidance on the climate proofing of infrastructure in the period 2021-2027. Available at: https://op.europa.eu/en/publication-detail/-/publication/23a24b21-16d0-11ec-b4fe-01aa75ed71a1/language-en [Accessed 04/08/2023].

Met Éireann (2022). Historical Data. Available at: https://www.met.ie/climate/available-data/historical-data

Climate Ireland (2022a). Climate Data Explorer. Available at: https://www.climateireland.ie/#!/tools/climateDataExplorer

Climate Ireland (2022b). Essential Climate Information. Available at: https://www.climateireland.ie/#!/tools/climateInformation/essentialClimateInformation

McCarthy, M., Spillane, S., Walsh, S. and Kendon, M., 2016. The meteorology of the exceptional winter of 2015/2016 across the UK and Ireland. Weather, 71(12), pp.305-313.

Environmental Protection Agency (EPA) (2015). Ensemble of regional climate model projections for Ireland. Research 159. Available at: https://www.epa.ie/publications/research/climate-change/research-159-ensemble-of-regional-climate-model-projections-for-ireland.php [Accessed 02/07/2023].

Institute of Environmental Management and Assessment (IEMA) (2017). Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance.

Sustainable Energy Authority of Ireland (SEAI) (2021b). Conversion Factors. Available at: https://www.seai.ie/data-and-insights/seai-statistics/conversion-factors/ [Accessed 18/08/2023].

UK Department of Energy Security and Net Zero (DESNZ) (2023). Greenhouse gas reporting: conversion factors 2023 (online). Available: https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023 [Accessed 19/07/2023].

National Highways (2021). National Highways Carbon Tool v2.4. Available at: https://nationalhighways.co.uk/suppliers/design-standards-and-specifications/carbon-emissions-calculation-tool/

Bath University (2019). The ICE Database. Version 3.0. Available at: https://circularecology.com/embodied-carbon-footprint-database.html [Accessed 19/07/2023].

Royal Institute of Chartered Surveyors, (2022). Embodied Carbon Database

UK Parliament (2015), Written questions, answers and statements, Question for Department for Energy and Climate Change, Fossil Fuelled Power Station: Carbon Emissions and Nitrogen Oxides. Available at: https://questions-statements.parliament.uk/written-questions/detail/2015-11-26/17799

aecom.com
aecom.com