

13 CLIMATE CHANGE

CONTENTS

13 CLIMATE CHANGE	13-I
13.1 Introduction	13-1
13.2 Statutory and planning context	13-1
13.3 Consultation undertaken	13-3
13.4 Approach to the assessment	13-3
13.5 Established, interim and future environmental baseline	13-14
13.6 Project characteristics and embedded mitigation	13-19
13.7 Assessment of potential effects	13-23
13.8 Further survey and monitoring requirements	13-32
13.9 Opportunities for enhancement	13-32
13.10 Cumulative effects	13-32
13.11 Summary of effects	13-33
13.12 References	13-34

TABLES

Table 13.1: GHG assessment scenarios and timelines	13-9
Table 13.2: Magnitude of change - GHG emissions/savings	13-10
Table 13.3: Matrix to support determining the level of effect	13-11
Table 13.4: Climate change resilience – sensitivity of receptors	13-13
Table 13.5: Climate change resilience – magnitude of change	13-14
Table 13.6: Baseline GHG emissions	13-15
Table 13.7: 'Interim baseline' scope 1 and 2 CO ₂ emissions relating to the Site (tCO ₂)	13-15
Table 13.8: Wales carbon budgets	13-15
Table 13.9: UK carbon budgets	13-16
Table 13.10: UK Government GHG reductions projections from steel sector electrification	13-16
Table 13.11: Baseline climate conditions (1981–2010 monthly averages)	13-17
Table 13.12: Future climate conditions (changes relative to 1981–2010 baseline, RCP8.5, 50th percentile)	13-18
Table 13.13: UKCP18 climate projections - wind speed (metres per second (m/s))	13-18
Table 13.14: Construction materials GHG emissions	13-23
Table 13.15: Construction transport GHG emissions	13-24
Table 13.16: Construction stage GHG emissions summary	13-24
Table 13.17: Construction GHG emissions in context	13-25
Table 13.18: Operational EAF GHG emissions and savings (tCO ₂)	13-26
Table 13.19: Operational EAF GHG emissions and savings in context	13-27
Table 13.20: Scope 1, 2 & 3 operational EAF GHG emissions and savings	13-28
Table 13.21: Operational scope 1, 2 & 3 GHG savings in context	13-29
Table 13.22: Summary of climate change effects	13-33

13.1 Introduction

- 13.1.1 Regulation 4(2) of the Town & Country Planning EIA (Wales) Regulations 2017 requires that the EIA 'must identify, describe and assess... the direct and indirect significant effects of the Proposed Development on [inter alia]... climate...'. Specifically this chapter reports the outcome of an assessment of likely significant effects relating to climate change in terms of:
- The effect of the Proposed Development on climate from greenhouse gas (GHG) emissions / reductions ("climate change mitigation"); and
 - The effects on the Proposed Development itself from climate change ("climate change resilience").
- 13.1.2 Following an initial section setting out the statutory and policy context for considering climate change in EIA, each section is split into two in order to separately address GHG emissions / reductions and climate change resilience matters. This approach reflects key differences between these two climate change aspects (in terms of baseline conditions, sensitive receptors, assessment methodology, magnitude of effect, significance of effect and mitigation measures etc) and is preferred to the alternative approach of preparing two separate climate change ES chapters (mitigation and resilience).

13.2 Statutory and planning context

UK

- 13.2.1 The *Climate Change Act 2008* (Ref. 13.1) ('the Act') forms the basis of the UK's approach to tackling climate change. It requires that UK GHG emissions be reduced and that climate change risks be adapted to. The Act establishes a framework to deliver on these requirements and support the UK's commitment to urgent international action to tackle climate change by setting legally-binding future carbon budgets.
- 13.2.2 The *Climate Change Act 2008 (2050 Target Amendment) Order 2019* (Ref. 13.2) increased the stringency of the legally-binding target for the UK to reduce net GHG emissions from 80% (in the original Act) to 100% (i.e. net zero) by the year 2050, relative to 1990 emissions.
- 13.2.3 UK Government's *Carbon Budget Delivery Plan (March 2023)* (Ref. 13.3) informs Parliament and the public on Government's proposals and policies to enable carbon budgets to be met. Proposal #69 Steel Sector Decarbonisation relates to the proposal for UK steelmaking to be carried out through electrification by 2035 with recycled steelmaking supplemented with ore-based iron imports, and for which emissions reductions forecasts are provided across the UK's 4th, 5th and 6th Carbon Budgets.
- 13.2.4 Although a joint legal case brought by Friends of the Earth, Client Earth and Good Law Project has found the *Carbon Budget Delivery Plan* to be unlawful (*Friends of the Earth and Ors v SSDESNZ*) (Ref. 13.4), this ruling relates to factors such as Government's assumption that the Plan's policies will achieve 100% of their intended emissions cuts, with the quantified target in the Plan instead being required to represent what Government realistically expects to be achieved rather than simply aspirational targets.

- 13.2.5 For the purposes of establishing the contribution of the Proposed Development to Wales' and the UK's net zero trajectories, however, the Plan's GHG reduction projections from steel sector decarbonisation (Proposal #69) are considered the most appropriate context given they are sector and technology-specific (i.e. electrification of steel manufacturing), nationally specific (i.e. UK) and time-bound (covering the UK's carbon budgets).

Wales

- 13.2.6 *The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017* (Ref. 13.5) require consideration of the impact of the Proposed Development on climate change, as well as the vulnerability of the Proposed Development to climate change.
- 13.2.7 *Planning Policy Wales, Edition 12 (2024)* (Ref. 13.6) recognises the vital role the planning system has to play in making development resilient to climate change, decarbonising society and developing a circular economy for the benefit of the built and natural environment and to contribute to the achievement of the well-being goals. In relation to climate change, these wellbeing goals include risks to health, wellbeing and productivity from high temperatures.
- 13.2.8 *The Environment (Wales) Act 2016* (Ref. 13.7) requires Welsh Ministers to set targets for reducing Welsh GHG emissions and set carbon budgets.
- 13.2.9 *Prosperity for All: A Low Carbon Wales - Wales' commitment to tackling climate change (2019)* (Ref. 13.8) sets the foundations for Wales to transition to a low carbon nation and introduced Wales' First Carbon Budget (2016-2020).
- 13.2.10 *The Climate Change Committee (CCC) Advice Report: The Path to a Net Zero Wales (2020)* (Ref. 13.9) recommends a series of stretching GHG emissions reduction targets for Wales' 2nd Carbon Budget (2021-2025), 3rd Carbon Budget (2026-2030) and interim targets for 2030 and 2040 in order for Wales to make a full contribution to the UK's overarching net zero target.
- 13.2.11 *Net Zero Wales Carbon Budget 2 (2021-25) (2021)* (Ref. 13.10) explains that the Senedd passed a suite of legislation to adopt emissions reduction targets and carbon budgets in line with the above CCC recommendations.
- 13.2.12 *Future Wales, the National Plan 2040 (2021)* (Ref. 13.11) sets out the strategy for addressing key national priorities through the planning system including achieving decarbonisation and climate-resilience.

Neath Port Talbot

- 13.2.13 *Neath Port Talbot Local Development Plan 2011-2026 (January 2016)* (Ref. 13.12) guides the future development of the Neath Port Talbot Council (NPTC). It sets out a range of key issues including 'KI 1' relating to the need to address the causes and consequences of climate change. Corresponding overarching objective 'OB 1' and Policy 'SP 1 Climate Change' relate to the need to reduce GHG emissions and adapt to climate change through consideration of its effects in the design and location of new development.

13.3 Consultation undertaken

- 13.3.1 There is no Wales or UK statutory consultee for climate change, however consultation undertaken beyond the formal EIA process has included a meeting with NPTC on 11th April 2024 where the proposed approach to assessing GHG emissions/reductions and climate resilience matters as part of the EIA were discussed. To facilitate discussions the methodology for assessment was summarised in an informal sustainability and greenhouse gasses EIA scoping consultation note which is provided in **ES Appendix 4.1**.

13.4 Approach to the assessment

Guidance

- 13.4.1 The assessment and reporting of climate change effects has been undertaken in accordance with the following Institute of Environmental Management and Assessment (IEMA) guidance, together with professional judgement:
- *IEMA EIA Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2022)* (Ref. 13.13) (“IEMA GHG Guidance”); and
 - *IEMA EIA Guide to: Climate Change Adaptation & Resilience (2020)* (Ref. 13.14) (“IEMA Climate Resilience Guidance”).
- 13.4.2 IEMA’s GHG Guidance states that GHG assessments should seek to quantify the difference in GHG emissions between the proposed project and the baseline scenario, the assessment should seek to present a reasonable worst case, and any exclusions, limitations, assumptions and uncertainties should be reported and justified where appropriate.
- 13.4.3 This guidance recognises, however, that the crux of whether a project’s GHG effect is considered significant (or not) 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.

GHG Emissions – Methodology and significance criteria

Terminology

- 13.4.4 The terms ‘carbon’, ‘carbon dioxide’, ‘carbon dioxide equivalent’ and ‘greenhouse gases’ (GHGs) are used in this chapter. A GHG is any gas in the atmosphere which absorbs and re-emits heat, and thereby keeps the planet’s atmosphere warmer than it otherwise would be. The Kyoto Protocol (Ref. 13.15) is an international treaty for controlling the release of GHGs from human activities, and the GHGs controlled under the treaty are as follows:
- Carbon dioxide (CO₂);
 - Methane (CH₄);
 - Nitrous oxide (N₂O);
 - Hydrofluorocarbons (HFCs);
 - Perfluorocarbons (PFCs);

- Sulphur hexafluoride (SF₆); and
- Nitrogen trifluoride (NF₃)

- 13.4.5 These different GHGs last in the atmosphere for different lengths of time, and they also absorb different amounts of heat. The 'global warming potential' (GWP) of a GHG indicates the amount of warming a gas causes over a given period of time (normally 100 years). GWP is an index, with CO₂ having the index value of 1, and the GWP for all other GHGs is the number of times more warming they cause compared to CO₂, for example CH₄ has a GWP of 29.8.
- 13.4.6 CO₂ is the most common GHG emitted by human activities, in terms of the quantity released and the total impact on global warming. As a result the term 'CO₂' is sometimes used as a shorthand expression for all GHGs, however, this can cause confusion, and a more accurate way of referring to a number of GHGs collectively is to use the term 'carbon dioxide equivalent' or 'CO₂e'.
- 13.4.7 Carbon dioxide equivalent (CO₂e) is a term for describing different GHGs in a common unit. For any quantity and type of GHGs, CO₂e signifies the amount of CO₂ which would have the equivalent global warming impact.
- 13.4.8 A quantity of GHG can be expressed as CO₂e by multiplying the amount of the GHG by its GWP. So if 1kg of CH₄ is emitted, for example, this can be expressed as 29.8kg of CO₂e (1kg CH₄ x 29.8 = 29.8kg CO₂e). 'CO₂e' is therefore a useful term as it allows 'bundles' of GHGs to be expressed as a single number.
- 13.4.9 Baseline emissions for NPTC, Wales and UK, Wales and UK carbon budgets, and UK Government forecasts of decarbonisation from electrification of the UK steel industry reported in this chapter take the form of CO₂ and therefore cover all seven Kyoto Protocol GHGs.
- 13.4.10 The assessment construction stage emissions (from materials manufacture and vehicle movements) also takes the form of carbon dioxide equivalence and hence covers all seven Kyoto Protocol GHGs.
- 13.4.11 Operational data provided by the Applicant relating to the 'established baseline', 'interim baseline' and 'operational EAF' relates to CO₂ only in line with World Steel Association guidance. For integrated steelworks, CO₂ is the primary GHG, accounting for 95% of all GHGs emitted. When comparing operational GHG emissions/savings (in CO₂) with baseline emissions, future carbon budgets and UK Government decarbonisation projections from steel sector decarbonisation (in CO₂e), therefore, a small proportion of GHGs will not be accounted for, ensuring a worse-case approach to the assessment. Further details are provided in the following sections.

Assessment scope & methodology

- 13.4.12 In order to establish the magnitude, level and significance of effect of GHG emissions/reductions from the Proposed Development, the following have been undertaken in accordance with IEMA's GHG Guidance, together with professional judgement. The IEMA guidance states the crux of significance of GHG effect from a project is not whether the project results in GHG emissions, or even the scale of GHG emissions, but whether it makes an appropriate contribution to a science-based net zero trajectory. For this reason the GHG assessment focuses on establishing the contribution

of the project to UK/Wales carbon budgets, as determined by comparing GHG savings/emissions forecast from the Proposed Development to UK Government projections of GHG savings from the uptake of EAFs by the UK steel sector:

- A review of UK, Wales and NPTC legislation, regulations, planning policy and guidance etc relating to climate change, GHG emissions and net zero;
- Estimation of CO₂ emissions in the 'established baseline' scenario (i.e. the steelworks with 'heavy end' as operating in early 2024 and for the majority of the preceding 50+ years);
- Estimation of CO₂ emissions in the 'interim baseline' scenario (i.e. the steelworks as they will operate at the time of any planning determination following the closure of the 'heavy end') plus GHG emissions from the construction of the Proposed Development;
- Estimation of reasonable worst-case CO₂ emissions / savings from the operation of the Proposed Development;
- Establish the Proposed Development's emissions and reductions during construction (CO₂e), 'interim baseline' (CO₂) and operation (CO₂) relative to the 'established baseline' (CO₂) and also 'interim baseline' (CO₂);
- Evaluate forecast GHG emissions from construction and CO₂ savings from the operation of the Proposed Development in the context of 'established baseline' emissions (CO₂), future Wales and UK carbon budgets (CO₂e), and UK Government projections of GHG reductions from the decarbonisation of the UK steel sector from electrification (CO₂e), in order to establish their magnitude;
- Establish the sensitivity of the affected receptor and the duration and geographical scale of effect;
- Establish the contribution of the Proposed Development to UK Government's steel sector decarbonisation projections and, therefore, the UK and Wales net zero trajectories; and
- Establish the level and significance of GHG effect.

Establish GHG emissions/reductions from the Proposed Development

13.4.13 GHG emissions (CO₂e) from the construction of the Proposed Development are forecast using data provided by the Applicant on:

- Construction materials types and quantities (steel, concrete, asphalt, cladding etc); and
- Forecast daily vehicle movements.

13.4.14 GHG emissions (CO₂) in the 'established baseline', 'interim baseline' and operation of the Proposed Development have been estimated by the Applicant using two reporting methodologies: *UK Government GHG Conversion Factors for Company Reporting* (Ref. 13.16) and *World Steel Association's ISO 14404:2013 Calculation method of carbon dioxide emission intensity from iron and steel production* (Ref. 13.17).

13.4.15 ISO 14404:2013 is an international standard setting out a calculation method for CO₂ emissions intensity from iron and steel production and consists of two parts: Part 1: Steel

plant with blast furnace and Part 2: Steel plant with electric arc furnace (EAF). The Applicant utilised industry data sets, World Steel Association ISO 14404:2013 methodology and academic analysis to estimate energy intensities and unit requirements for the different components that go into production for the 'established baseline', 'interim baseline' and operational development.

- 13.4.16 The World Steel Association ISO 14044:2013 approach to assessing CO₂ emissions intensity from iron and steel production, which has been used for this assessment, is focussed exclusively on CO₂ emissions, not CO₂e. Regarding non-CO₂ GHGs, the Applicant has reviewed the data it has on the facility's N₂O and CH₄ emissions. It estimates annual mass emissions of these GHGs from the Port Talbot steelworks using emissions factors taken from credible reference sources. These estimates are used in the Applicant's annual Pollution Inventory reporting in accordance with its environmental permit, and this data is reproduced in Table 5.1 'Pollution Inventory by source emissions, not consistent with local authority emissions by end-user (kt CO₂e)' of *UK Local Authority & Regional Carbon Dioxide Emissions National Statistics: 2005 to 2022* (Ref. 13.18).
- 13.4.17 The Applicant has also performed some non-accredited direct measurement of N₂O and CH₄ emissions, which has confirmed the broad suitability of the emission factors as the basis for ongoing estimates of emissions of these respective GHGs. As a result the Applicant has confidence from these two independent streams of evidence that N₂O and CH₄ account for only approximately 0.5% of total CO₂e emissions from the Port Talbot installation in the current configuration, with CO₂ emissions therefore accounting for 99.5% of operational GHGs (Scope 1 emissions). As a result, accounting for only CO₂ emissions from the operational facility in this assessment does not materially under-represent its total GHG emissions. It should be noted that when Scope 3 emissions are accounted for, then the contribution of non-CO₂ GHGs to the inventory of integrated steelmaking GHG emissions does increase, primarily associated with CH₄ emissions from raw material mining. Scope 1, 2 and 3, CO₂ emissions account for approximately 95% of all GHG emissions after application of GWP (100 years) factors. It should also be noted that UK Government emissions factors and ISO 14404:2013 methodologies differ in terms of their use of emissions factors and their approach to boundary conditions. As a consequence the results derived from the two methods differ slightly.
- 13.4.18 The World Steel Association defines Scope 1, 2 and 3 emissions as follows:
- Scope 1 emissions are direct emissions from site chimneys;
- 13.4.19 Scope 1.1 emissions are direct emissions from the combustion of exported co-product gas. ;
- Scope 2 emissions are the upstream emissions or credits related to procurement/delivery of electricity and steam; and
 - Scope 3 emissions are other upstream emissions or credits related to procurement/delivery of pre-processed materials/co-products.
- 13.4.20 In the context of an integrated steelworks, Scope 1 emissions include those associated with (i) the combustion of blast furnace gas, coke oven gas and BOF gas, (ii) the emissions from the oxidation of residual carbon in hot metal during blowing in the BOF plant, (iii) calcination of limestone and crude dolomite in sintering and, (iv) combustion of fossil fuels imported into the Site to supplement process gases for heating and power generation.

- 13.4.21 In the context of an EAF steelworks, Scope 1 emissions are those associated with the use of chemical energy products such as coal, coke and natural gas use for example steel reheating, steam generation and in the EAF steelmaking process. Some direct emissions also occur from burnt lime, and the oxidation of carbon-containing materials in the ferrous feedstock to the furnace such as carbon in any hot briquetted iron (HBI) or pig iron. At Port Talbot there is no export of process gases beyond the Application Boundary and, as such, Scope 1 and Scope 1.1 emissions at the Site are identical.
- 13.4.22 Scope 2 emissions from an EAF steelworks relate to upstream emissions from the generation of procured/delivered electricity. In the case of the Applicant's proposal, Scope 2 emissions will be a proportion of the emissions from the UK's power generation and distribution grid commensurate with the amount of electricity procured and delivered to the Port Talbot site.
- 13.4.23 Regarding Scope 3 emissions, these relate to embodied CO₂ in process inputs including pig iron, HBI, coal/coke, burnt lime, burnt dolomite, oxygen and electrodes. With the exception of burnt lime (which will be sourced from the UK), Scope 3 emissions will occur outside Wales/the UK. In the context of the interim operating plan, after 'heavy end' closure but before EAF commissioning, Tata Steel is planning to purchase steel slab and hot rolled coil to feed its steel processing operations in Port Talbot and at locations across the UK. The embodied CO₂ emissions within purchased steel slab and coil are Scope 3 emissions and are assumed to occur almost exclusively outside of the UK.
- 13.4.24 Where available, a World Steel Association full scope (i.e. Scope 1, 2 & 3) emissions value (which can typically be expressed both in absolute terms as tonnes of CO₂ or in relative terms as tonnes of CO₂ per tonne of crude steel produced, tCO₂/tcs) has been applied to materials without the application of credits. However, such emissions data are not available for the majority of the sources of imported substrate. In all such cases, environmental product declarations (EPDs) or product carbon footprints (PCFs) have been secured from the supplier. Where specific EPDs and PCFs are also unavailable, the global average EPD-equivalent figure published by the World Steel Association has been applied. The EPD, and EPD equivalent, values have been adapted by the Applicant by applying an adjustment factor to promote equivalence with the World Steel Association emissions values. This adjustment factor has been applied because EPDs and PCFs include a wider Scope 3 CO₂ emissions range than that used within the World Steel Association method for calculating site emissions. This allows emissions for the Proposed Development to be directly compared to those in the established baseline.
- 13.4.25 Scope 3 emissions associated with the inbound transportation of substrate/process inputs and transportation of end products are excluded as they are outside the World Steel Association Scope, but are estimated to equate to only circa 5% to 10% of each substrate/process input's embodied carbon emissions, and the majority of these emissions will again occur outside the UK. Scope 3 transport of raw materials are also not included in the 'established baseline', although analysis on the impact of domestic transport can be found in **Chapter 6: Air Quality, Chapter 7: Noise and Vibration and Chapter 12: Transport and Access**.
- 13.4.26 **Image 13.1** presents the system boundary of the CO₂ emissions assessment for the 'established baseline', 'interim baseline'; and operational Proposed Development scenarios.

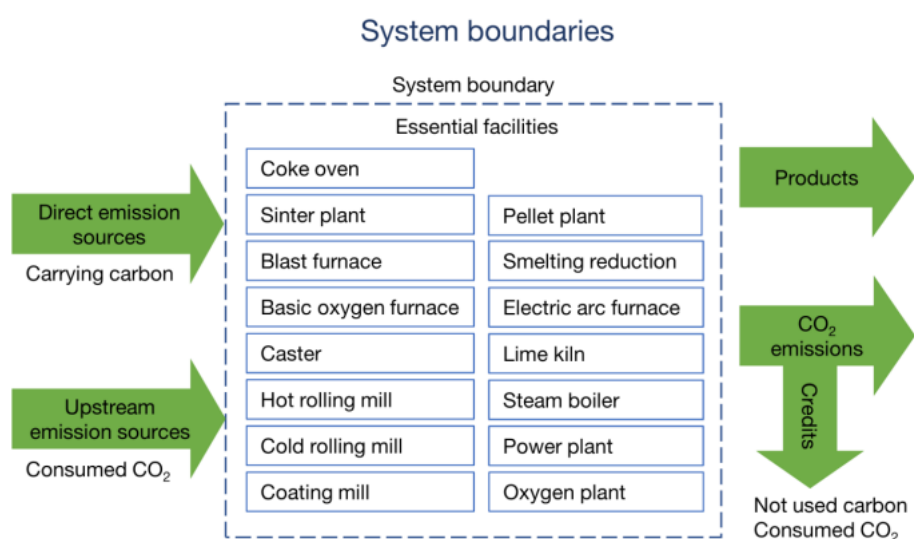


Image 13.1 Operational steelworks CO₂ emissions assessment system boundary
[source: World Steel Association]

- 13.4.27 The GHG emissions effect of the construction and operation of the Proposed Development, and the 'interim baseline' relative to the 'established baseline', is derived by combining annual GHG emissions forecast for these stages, then subtracting the 'established baseline' emissions to determine the difference in GHG emissions/savings between these scenarios.
- 13.4.28 The operational CO₂ emissions data provided by the Applicant covers Scope 1 emissions (i.e. direct emissions e.g. from fuel combustion in plant owned by the Applicant), Scope 2 emissions (i.e. indirect energy emissions from the generation of electricity consumed by the Applicant), and also Scope 3 emissions (other indirect upstream supply emissions such as those associated with production of raw materials such as ferro-alloys and lime. Scope 3 emissions associated with transport of raw materials and end products are not included in the World Steel Association scope and are therefore excluded from this analysis. These are typically between 5% to 10% of total emissions. Comprehensive information on the impact of domestic transport is provided in **Chapter 6: Air Quality**, **Chapter 7: Noise and Vibration** and **Chapter 12: Transport and Access**.
- 13.4.29 Scope 1 and 2 CO₂ emissions data provided by the Applicant relates directly to the application site and Wales/UK carbon budgets given they occur domestically (with the exception of any power imported via the UK's various interconnectors with France or other neighbouring countries, for example). It is therefore the change in Scope 1 and 2 GHG emissions resulting from the construction and operation of the Proposed Development, relative to the established baseline, that are used to appraise its contribution to the Wales and UK net zero trajectories.
- 13.4.30 Scope 2 electricity emission factors applied by the Applicant are sourced from UK Government (in tCO₂e but assumed to all be tCO₂ and therefore overstating emissions), whilst oxygen and nitrogen emissions are adjusted pro-rata according to the ratio of World Steel Association electricity emission factor to the UK Government predicted electricity emission factors.

- 13.4.31 The majority of Scope 3 CO₂ emissions are associated with upstream raw materials and occur outside Wales and the UK. They are therefore not considered when evaluating the contribution of the Proposed Development to UK/Wales net zero trajectories, but are nevertheless reported for completeness and transparency.
- 13.4.32 Operational CO₂ data for the Proposed Development provided by the Applicant models a Reasonable Worst-Case Scenario, to allow for potential variations in raw materials, raw material mix, production levels and final product mix which can all have a significant impact on the overall CO₂ performance of a steelmaking site. It is anticipated that the actual CO₂ emission savings (Scope 1,2 & 3) will be in excess of >50%, greater than the 43.6% stated in this chapter.
- 13.4.33 The annual CO₂ data provided by the Applicant covers the period to March 2031 and relates to the financial year (i.e. April to March). Turley has assumed this financial year data relates to the first calendar year of that period (i.e. 2022-23 financial year data relates to the 2022 calendar year) in order to facilitate comparison with baseline GHG emissions, future carbon budgets and Government steel sector decarbonisation projections which are also based on calendar years. This assumption is considered unlikely to affect the GHG assessment findings or conclusions.

Contextualise GHG emissions/reductions

- 13.4.34 The magnitude of GHG emissions/reductions from the Proposed Development are established in the context of baseline emissions at the Site, NPTC, Wales and UK levels, future baseline emissions in the form of Wales and UK carbon budgets, and also UK Government's projections of GHG reductions from electrification of the UK steel sector.
- 13.4.35 Baseline site emissions are based on data provided by the Applicant for the 'established baseline' scenarios, whilst NPTC, Wales and UK baseline emissions are established for the most recent year available (2022) from *UK Local Authority & Regional Carbon Dioxide Emissions National Statistics: 2005 to 2022*.

Reporting the environmental effect and significance criteria

- 13.4.36 The GHG assessment scenarios and timescales are described in **Table 13.1**.

Table 13.1: GHG assessment scenarios and timelines

Scenario	Description & Timeline
Established Baseline	Operation of the steelworks with 'heavy end' up to early 2024, based on averaged data for the period April 2020 to March 2024.
Interim Baseline	Operation of the steelworks from October 2024 following closure of the 'heavy end' when substrate is imported, until the EAF becomes operational by the end of 2027.
EAF Construction	EAF construction is scheduled to commence in mid-2025 and be completed by the end of 2027.
EAF Operation	EAF operation is scheduled to commence by the end of 2027, and operational GHG emissions have been forecast to March 2031.

Duration of effect

- 13.4.37 The duration of GHG effect is assessed as either 'short-term', 'medium-term' or 'long-term'. Short-term is considered to be up to 0 - 5 years, medium-term is considered to be between 5 and 15 years and long-term is considered to be greater than 15 years. Once released to the atmosphere CO₂ is long-lived (between 300 and 1,000 years) (Ref. 13.19) and as a result GHG effects are considered long-term.

Geographical scale of effect

- 13.4.38 The geographical scale of effect is assessed as either 'local', 'regional', 'national' or 'international'. As recognised by the IEMA GHG Guidance, GHG emissions are not geographically limited and have a global effect. As such the geographical scale of effect is international.

Determining sensitivity of receptor

- 13.4.39 The receptor for GHG emissions is the global climatic system. This receptor has a high sensitivity, given the severe consequences of global climate change and the cumulative contributions of all global GHG emission sources. The sensitivity of the receptor (global climate system) is therefore considered to be high.

Determining the magnitude of change

- 13.4.40 The magnitude of change has been considered as the change in GHG emissions from the construction and operation of the Proposed Development relative to the 'established baseline', future carbon budgets and its contribution to UK / Wales net zero trajectories on a scale of 'large', 'medium', 'small' or 'negligible'.
- 13.4.41 There are currently no agreed thresholds for determining the magnitude of change of GHG emissions in EIA. This assessment has therefore applied the percentage change thresholds presented in **Table 13.2** which have been developed by Turley, together with professional judgement. These percentage thresholds are considered to align with the IEMA GHG Guidance which states "*an indicative threshold of 5% of the UK or devolved administration carbon budget in the applicable time period is proposed, at which the magnitude of GHG emissions irrespective of any reductions is likely to be significant*".

Table 13.2: Magnitude of change - GHG emissions/savings

Magnitude of Change	Description of Change
Large	A large increase/decrease in GHG emissions (e.g. >10%) relative to baseline local/national emissions and/or future carbon budgets and sector decarbonisation pathways
Medium	A moderate increase/decrease in GHG emissions (e.g. 5 to <10%) relative to baseline local/national emissions and/or future carbon budgets and sector decarbonisation pathways
Small	A small increase/decrease in GHG emissions (e.g. 1 to <5%) relative to baseline local/national emissions and/or future carbon budgets and sector decarbonisation pathways

Magnitude of Change	Description of Change
Negligible	A negligible increase/decrease in GHG emissions (e.g. <1%) relative to baseline local/national emissions and/or future carbon budgets and sector decarbonisation pathways

Determining the level of effect

- 13.4.42 The level of effect has been assessed based on the magnitude of change resulting from the Proposed Development and sensitivity of the affected receptor, as well as to other factors that are outlined in more detail in **Chapter 4: Environmental Assessment Methodology**. The level of effect has been assessed based on professional judgement as well as the matrix presented in **Table 13.3**.

Table 13.3: Matrix to support determining the level of effect

Sensitivity (or value / importance)	Magnitude of change			
	Large	Medium	Small	Negligible
High	Major	Major to moderate	Moderate to minor	Negligible
Medium	Major to moderate	Moderate	Minor	Negligible
Low	Moderate to minor	Minor	Minor to negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

- 13.4.43 Whilst the matrix provides ranges, the level of effect is concluded as a single level and not a range, informed by professional judgement. For each effect, it has been concluded whether the effect is 'beneficial' or 'adverse'. A statement is also made as to whether the level of effect is 'Significant' or 'Not Significant', again based on professional judgement.
- 13.4.44 Drawing from the IEMA GHG Guidance, the following terms are used to define the significance of effect:
- Major adverse: where mitigation measures of the project are not in line with a science-based 1.5°C aligned transition to net zero for that project type, and net GHG emissions equate to a large increase (e.g. ≥10%) relative to baseline local/national emissions, future carbon budgets or sector decarbonisation pathway. A project with major adverse effects locks in emissions and does not make a meaningful contribution to a net zero trajectory zero. This effect is significant.
 - Moderate adverse: where mitigation measures of the project are partially in line with a science-based 1.5°C aligned transition to net zero for that project type, and net GHG emissions equate to a medium increase (e.g. 5% to 10%) relative to baseline local/ national emissions, future carbon budgets or sector decarbonisation pathway. A project with moderate adverse effects complies with some up-to-date policy and good practice but is locking in some emissions and makes only a partial contribution to a net zero trajectory. This effect is significant.

- Minor adverse: where mitigation measures of the project are in line with a science-based 1.5°C aligned transition to net zero for that project type, and net GHG emissions equate to a small increase (e.g. <5%) relative to baseline local/national emissions, future carbon budgets or sector decarbonisation pathway. A project with minor adverse effects complies with up-to-date policy and good practice reduction measures and makes a contribution to a net zero trajectory. This effect is not significant.
- Negligible: mitigation measures of the project are fully in line with a science-based 1.5°C aligned transition to net zero for that project type, with minimal residual emissions (e.g. net zero). A project with negligible effects complies with up-to-date policy and best practice and plays a full part in achieving the rate of net zero transition required by nationally set policy. This effect is not significant.
- Beneficial: the project's net GHG impacts are below zero and result in a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the baseline. A project with beneficial effects substantially exceeds net zero requirements with a positive climate impact. This effect is significant.

13.4.45 IEMA's GHG guidance does not delineate between different levels of significance within the beneficial effect category (i.e. minor, moderate or major beneficial). However, this assessment has applied the same percentage thresholds set out in **Table 13.2** to the beneficial effect category in order to derive the following additional level of effects:

- Major beneficial effect: where the project results in a large (i.e. >10%) reduction in GHG emissions relative to baseline local / national emissions, future carbon budgets or sector decarbonisation pathways. This effect is significant;
- Moderate beneficial effect: where the project results in a medium (i.e. 5% to 10%) reduction in GHG emissions relative to baseline local / national emissions, future carbon budgets or sector decarbonisation pathway. This effect is significant; and
- Minor beneficial effect: where the project results in a small (i.e. <5%) reduction in GHG emissions relative to baseline local / national emissions, future carbon budgets or sector decarbonisation pathway. This effect is significant.

Climate change resilience – methodology and significance criteria

Assessment scope & methodology

13.4.46 The methodology applied in the climate change resilience assessment comprises the following principal components in accordance with IEMA Climate Resilience Guidance:

- A review of legislation, regulation, planning policy and guidance etc relating to climate change resilience;
- Establish baseline climate conditions (1981-2010) for the Site area including monthly, seasonal and annual temperatures and rainfall from Mumbles Head, the Met Office's closest automated weather station approximately 9 miles to the west (Ref. 13.20);
- Establish future baseline climate conditions for the Site area from the *Met Office's UKCP18* projections (Ref. 13.21) in the form of changes forecast to the 1981-2010 baseline conditions established above;

- Qualitatively appraise potentially significant effects to the Proposed Development from these future climate changes during the construction and operation of the Proposed Development, drawing on the *UK Climate Change Risk Assessment (2022)* (Ref. 13.22);
- Circulate a Climate Change Resilience Briefing Note to communicate the above baseline climatic conditions and future climate projections to relevant EIA disciplines in order to inform and coordinate their consideration of potentially significant climate resilience effects and associated mitigation measures; and
- Review and summarise potentially significant climate resilience effects identified by relevant ES chapters, and associated mitigation measures proposed, within the Climate Change ES chapter.

Reporting of the environmental effect and significance criteria

- 13.4.47 Determining the magnitude and significance of climate resilience effects is complex given inherent uncertainty of climate projections and the range of potential effects, receptors and sensitivities, as presented in the following sections and tables.

Determining sensitivity of receptor

- 13.4.48 The sensitivity of affected receptors is key in determining the need for mitigation. A review of the *UK Climate Change Risk Assessment* has identified the following potentially sensitive receptors to future climate change effects for the Proposed Development:

- Site workers (construction and operational phases);
- Site operations (construction and operational phases);
- Site infrastructure; and
- Site species and habitats.

- 13.4.49 **Table 13.4** sets out criteria for determining the sensitivity of potential climate resilience effects receptors which have been applied using professional judgement.

Table 13.4: Climate change resilience – sensitivity of receptors

Sensitivity of Receptor	Description
High	Receptor particularly sensitive to the climate effect and potential impacts, and/or, receptor includes safety critical infrastructure which if damaged could result in significant risks to people and/or property. Mitigation is required to reduce the effect as a priority.
Medium	Receptor sensitive to the climate effect and potential effects and mitigation will need to be provided
Low	Receptor has low sensitivity to potential climate effects, additional mitigation may be considered to further reduce sensitivity to the climate effect
Negligible	Receptor has very low sensitivity to potential climate effects and mitigation is unlikely to be required, although could be used to improve resilience.

Determining the magnitude of change

- 13.4.50 The magnitude of change has been considered as the change from the baseline conditions experienced at the sensitive receptor and has been considered on a scale of 'large', 'medium', 'small' or 'negligible'.
- 13.4.51 **Table 13.5** presents the criteria for defining the magnitude of change associated with climate change resilience. These effects can be either positive or adverse, could be seasonal or on-going throughout the year, and could have physical effects (for example on structural elements such buildings and roads), or operational effects (for example on how buildings are operated during climate events).

Table 13.5: Climate change resilience – magnitude of change

Magnitude of change	Description
Large	On-going annual effect with the potential for extreme events to cause operational or structural damage. For example higher temperatures causing a major failure in structures or buildings with the potential for injury.
Medium	Seasonal effect with the potential for climate events to cause operational or structural damage. For example, increased summer maximum temperatures could affect structures through the movement of materials, foundations etc.
Small	Seasonal effect with the potential for minor operational loss. For example, higher summer temperatures could cause overheating which could lead to a loss in operational hours.
Negligible	Increased maintenance required to mitigate annual operational effect. For example, increased winter rainfall could cause damage to drainage systems resulting in additional maintenance requirements.

Determining the level of effect

- 13.4.52 The level of effect attributed has been assessed based on the magnitude of change due to the Proposed Development and the evaluation of the sensitivity of the affected receptor, as well as a number of other factors that are outlined in more detail in **Chapter 4: Environmental Assessment Methodology**. The level of effect has been based on of professional judgement and **Table 13.4** and **Table 13.5** have assisted with this process.

13.5 Established, interim and future environmental baseline

Climate change mitigation

Baseline GHG emissions

- 13.5.1 Baseline GHG emissions from the Site, NPTC's administrative area, Wales and UK are presented in **Table 13.6**. This data relates to 2022 (the latest year for which data is published) for NPTC, Wales and UK, and to a representative baseline for the Site in the 'established baseline' scenario (Scope 1 and 2).

- 13.5.2 Baseline GHG emissions from the Site are an average of those for the 5 year period, between and inclusive of financial years ending 2020 and 2024. Annual production volumes at the Site fluctuate due to demand and asset availability among others, therefore an average of the most recent 5 year period better represents the Site's established emissions than a single year.

Table 13.6: Baseline GHG emissions

Site ('Established Baseline')	NPTC	Wales	UK
6,256,137 tCO ₂	6,275,278 tCO ₂ e	26,835,840 tCO ₂ e	375,929,282 tCO ₂ e

Future baseline GHG emissions

- 13.5.3 Subsequent to the 'established baseline' emissions relating to the operational site as presented above ceasing in 2024 and the EAF becoming fully operational in 2028, an 'interim baseline' period will occur as the Site transitions between blast furnace/heavy end and EAF production. **Table 13.7** presents Scope 1 and 2 emissions estimated across this period.

Table 13.7: 'Interim baseline' scope 1 and 2 CO₂ emissions relating to the Site (tCO₂)

2024	2025	2026	2027	2028
1,976,112	246,839	234,424	241,775	69,714

- 13.5.4 Future baseline GHG emissions for Wales and the UK in the form of carbon budgets are set out below, together with UK Government projections of GHG emissions reductions from the electrification of the UK steel sector.

Wales carbon budgets

- 13.5.5 The following national carbon reduction targets are set in law:
- Carbon Budget 2 (2021 – 2025): 37% average reduction with a 0% offset limit.
 - Carbon Budget 3 (2026 – 2030): 58% average reduction
 - 2030: 63% reduction
 - 2040: 89% reduction
 - 2050: at least 100% reduction (net zero).
- 13.5.6 The above reduction targets are relative to a 1990 baseline (56,332,288 tCO₂e) (Ref. 13.23), from which the carbon budgets presented in **Table 13.8** have been derived by Turley assuming an equal split in emissions between each year within the 5 year carbon budget period.

Table 13.8: Wales carbon budgets

Period	% Reduction on 1990 Emissions	GHG Emissions (tCO ₂ e/year)
1990 (Baseline)	--	56,332,288

Period	% Reduction on 1990 Emissions	GHG Emissions (tCO ₂ e/year)
2 nd Carbon Budget (2021-25)	37%	35,489,341 ⁽¹⁾
3 rd Carbon Budget (2026-30)	58%	23,659,561 ⁽¹⁾
Interim 2030 Target	63%	20,842,946 ⁽¹⁾
Interim 2040 Target	89%	6,196,552 ⁽¹⁾
2050 Target	100%	0

Notes

⁽¹⁾ Estimated by Turley

- 13.5.7 The CO₂ emissions data provided by the Applicant extends to the year 2030, therefore GHG emissions/reductions from the Proposed Development are reported in the context of Wales' 2nd Carbon Budget (2021–25), 3rd Carbon Budget (2026–30) and Interim 2030 Target.

UK carbon budgets

- 13.5.8 **Table 13.9** presents UK carbon budgets up to the year 2037, the latest for which they have currently been set. Annual GHG emissions within each carbon budget have again been estimated by Turley by assuming an equal split between each year within the 5 year carbon budget period.

Table 13.9: UK carbon budgets

Period	GHG Emissions (tCO ₂ e/year)
4 th Carbon Budget (2023–27)	390,000,000 ⁽¹⁾
5 th Carbon Budget (2028–32)	350,400,000 ⁽¹⁾
6 th Carbon Budget (2033–37)	193,000,000 ⁽¹⁾

Notes

⁽¹⁾ Estimated by Turley

- 13.5.9 GHG emissions reductions from the Proposed Development are reported in the context of UK's 4th Carbon Budget (2023–27) and first three years of the 5th Carbon Budget (2028–32).

UK Government projections of GHG reductions from steel sector decarbonisation

- 13.5.10 UK Government's *Carbon Budget Delivery Plan* forecasts GHG emissions reductions from Proposal #69 (UK steel sector electrification) across the 4th, 5th and 6th UK Carbon Budgets, as presented in **Table 13.10**.

Table 13.10: UK Government GHG reductions projections from steel sector electrification

Period	Average Annual GHG Saving (tCO ₂ e)
4 th Carbon Budget (2023–27)	300,000

Period	Average Annual GHG Saving (tCO ₂ e)
5 th Carbon Budget (2028–32)	7,600,000
6 th Carbon Budget (2033–37)	10,300,000

- 13.5.11 These UK Government steel sector decarbonisation projections are relevant to the Proposed Development in terms of their geographical applicability (i.e. relating to the UK), and also sector and technology applicability (i.e. relating to electrification of the steel sector). For this reason they are considered the most suitable basis on which to evaluate the contribution of the Proposed Development to national/sectoral net zero pathways in line with IEMA's GHG Guidance. These UK Government decarbonisation projections for the steel sector are understood to relate to Scope 1 and 2 emissions only.
- 13.5.12 GHG emissions/reductions from the Proposed Development are reported in the context of the first three years of the 5th Carbon Budget (2028-32).

Climate change resilience

Baseline climate conditions

- 13.5.13 Average monthly baseline climate conditions for the period 1981–2010 at the Mumbles Head weather station are presented in **Table 13.11**. Although more recent (1991–2020) baseline climate data is available, the UKCIP climate projections are relative to the 1981–2010 baseline conditions.

Table 13.11: Baseline climate conditions (1981–2010 monthly averages)

Month	Max. temp (°C)	Min. temp (°C)	Rainfall (mm)	Wind speed at 10m agl (knots)
January	7.95	3.95	95.52	15.53
February	7.81	3.57	66.96	14.31
March	9.54	4.84	72.94	13.85
April	11.90	6.32	58.54	12.15
May	14.99	9.20	62.84	12.43
June	17.65	11.78	63.79	10.75
July	19.61	13.92	71.87	11.65
August	19.70	14.01	83.90	11.75
September	17.77	12.38	77.37	12.89
October	14.42	9.86	123.10	15.13
November	11.13	6.92	112.09	14.27
December	8.72	4.65	110.30	15.37
Annual	13.46	8.48	999.22	13.34

Future baseline climate conditions

- 13.5.14 Future baseline climate conditions for the Site area have been obtained from the Met Office's UKCP18 climate projections for the 25 km grid square within which the Site is located (262500, 187500) as presented in **Table 13.12**.
- 13.5.15 These projections comprise predicted changes to baseline conditions for the UKCP18's 'high emissions scenario' (RCP8.5). 50th percentile values are reported which means there is considered to be equal probability of a higher or lower observed value for that projection.
- 13.5.16 Projections are provided for the 2020s and 2030s to inform future baseline climate conditions across the construction and assessed operational phases of the Proposed Development.

Table 13.12: Future climate conditions (changes relative to 1981–2010 baseline, RCP8.5, 50th percentile)

Parameter		2020s	2030s
Temperature	Winter maximum (°C)	+0.60	+0.84
	Summer maximum (°C)	+1.01	+1.36
	Annual maximum (°C)	+0.76	+1.04
Rainfall	Winter (%)	+6.22	+7.01
	Summer (%)	-6.96	-8.81
	Annual (%)	+0.79	+1.46

Wind speed

- 13.5.17 Projected changes in annual and seasonal temperatures and rainfall which could result in severe weather effects such as droughts, floods and heat waves is provided above. The following section provides additional UKCP18 projections for wind speed. High resolution probabilistic projections (as provided above for temperature and rainfall) are not currently available for wind speed from UKCP18. In their absence wind speed projections has been extracted from *UKCP18 Derived Projections of Future Climate over the UK (November 2018)* (Ref. 13.24).
- 13.5.18 This publication provides projected changes across the UK in low resolution of baseline wind speed for the future time when global warming has reached 2°C above pre-industrial levels and as such is considered a reasonable worst case scenario. **Table 13.13** presents projected changes in wind speed for the area of the UK in which the Site is located when global mean warming has reached 2°C above pre-industrial (1850–1900) levels relative to present day (1981–2000) conditions for the calendar year, winter (December–February) and summer (June–August).

Table 13.13: UKCP18 climate projections - wind speed (metres per second (m/s))

Period	Change (m/s)
Winter	+0.6

Period	Change (m/s)
Summer	+0.2
Annual	+0.4

Physical risks

- 13.5.19 Tata Steel's Integrated Report & Annual Accounts 2023–24 (Ref. 13.25), includes a Climate Change Report aligned with the recommendations of the Taskforce on Climate Related Financial Disclosures (TCFD) in which Tata Steel played a crucial role as a founding TCFD member.
- 13.5.20 Tata Steel uses its Enterprise Risk Management (ERM) process to manage climate change related risks across the organisation in an integrated and uniform manner. The process identifies and assesses business risks using a two-pronged approach, i.e., bottom-up and top-down, to ensure comprehensive risk identification and to minimise blind spots, with appropriate early warning indicators and mitigation strategies identified for review by the Risk Management Committee of the Board.
- 13.5.21 As part of the Climate Change Report, Tata Steel has undertaken a detailed and systematic assessment of physical risks in a Climate Risk assessment focusing on its key steelmaking sites including the UK.
- 13.5.22 The principle physical risk identified is the potential for operational disruption to steelmaking activities due to extreme climate (physical) events leading to loss in profitability through operating costs, lost revenue and capex impacts.

Biodiversity

- 13.5.23 **ES Chapter 8: Biodiversity** considers the current baseline and future climatic conditions reported earlier in this chapter. No significant changes to the current baseline are envisaged in the short-term, and there is considerable uncertainty about how any national changes in abundance and distribution of species would affect the current baseline.
- 13.5.24 Several habitats present on site are considered sensitive to climate change according to *Natural England's Climate Change Adaption Manual version 2 (2020)*. Standing water is considered 'high' sensitivity, coastal grazing marsh is considered 'moderate' sensitivity and deciduous woodland is considered 'low' sensitivity. Any proposed mitigation and enhancement of habitats would need to take the resilience of these habitats into account and incorporate methods of controlling the water levels within the Site.
- 13.5.25 The *Nature Recovery Action Plan for Wales* states that the number and range of invasive non-native species is likely to increase with the changing climate, and Natural England's Climate Change Adaption Manual states the presence of environmental pressures (including invasive species) will exacerbate the impacts of climate change.

13.6 Project characteristics and embedded mitigation

Climate change mitigation

- 13.6.1 The Proposed Development comprises the construction and operation of a new EAF, thereby comprising inherent GHG emissions mitigation relative to steel produced

previously by blast furnaces in the 'established baseline'. As such the characteristics of the Proposed Development represent significant inherent climate change mitigation.

Climate change resilience

Major accidents and disasters

13.6.2 As reported in **Chapter 2: Proposed Development**, the potential for major accidents and disasters relating to the operation of the Proposed Development, including risks associated with future climate change including increased flooding and severe weather, will be actively managed through compliance with a range of relevant statutory requirements. These requirements affecting the existing site and the Proposed Development include:

- UK National Risk Register of Civil Emergencies (2020);
- NPTC Local Risk Register;
- COMAH (Upper Tier site);
- Environmental Contingency Plan (ECP) / Environmental Emergency Plan (EEP);
- Major Emergency Plan (MEP) and Local Emergency Plans (LEP);
- Environmental Permit (EPR/BL7108IM);
- Construction (Design and Management) Regulations 2015;
- Hazard Identification Studies (HAZID);
- Hazard and Operability Studies (HAZOP); and
- Internal (i.e. Tata Steel) 'Process Safety Risk Management' and 'Major Accidents Prevention' policies.

Physical risks

13.6.3 The Applicant's 2024 climate related physical risk assessment sets out measures to mitigate key potential physical risks, as follows:

- Undertaken natural hazard and climate change hotspot analysis for key operating locations covering major upstream mining sites, steelmaking facilities and ports that are part of the major supply chain networks;
- Augment structural designs to avoid damage and disruptions due to high wind speed, where applicable; and
- Maximise water recycling within the plants, utilise treated municipal wastewater, harvest rainwater, and increase stormwater recovery to minimise dependency on freshwater demand in operations.

13.6.4 Regarding windspeed, the Proposed Development will result in a reduction in the overall footprint of buildings and other structures at the application site, and present an opportunity to control the structural integrity of the retained and new buildings.

13.6.5 Regarding operational water demand at Port Talbot, mains water is only used for amenities (toilets, canteen etc), with process water either extracted from the Afan or Kenfig rivers, or taken from the on-site operational lagoon. As reported in **Chapter 9:**

Surface Water, Flood Risk and Drainage, the EAF will require circa 71% less water than the 'Established Baseline', and as a result the Applicant proposes to surrender the licence for two abstractions at Port Talbot Dock and the Ffrwd Wyllt, and abstractions from the Afan river will reduce by 33%.

Ground conditions

- 13.6.6 **Chapter 10: Land, Soil and Groundwater** describes several potential effects which may be exacerbated by climate change through increased seasonal variation in groundwater levels, soil moisture content and potential contaminant mobilisation. Sites located on or close to the coast and at risk of flooding or erosion are considered most susceptible to climate change effects.
- 13.6.7 The Lavernock Point to St Ann's Shoreline Management Plan (SMP) encompasses the majority of the south coast of Wales for which the current strategy for addressing coastal erosion and inundation issues is through the maintenance and upgrading of existing defences to reduce the risk to industrial assets. As such no additional mitigation are considered necessary to address potential coastal erosions and inundation risks.
- 13.6.8 Further geotechnical implications from climate change relate to longer hotter summers increasing the zone of seasonal moisture variation in the upper soil horizon leading to additional shrinkage, as well as warmer wetter winters causing rebound of soil moisture levels, leading to swelling. These changes will likely give rise to increases in subsidence and heave issues and hence insurance claims, and such effects can also be exacerbated where building near trees resulting in desiccation.
- 13.6.9 The British Geological Survey (BGS) GeoClimate UKCP18 study (2023) has been consulted for the 2030s and the 2070s, which indicates that it is improbable that foundations at the Site will be affected by increased clay shrink-swell as a result of climate change.

Flood Risk

- 13.6.10 **Chapter 9: Surface Water, Flood Risk and Drainage** sets out how climate change has been considered as part of the flood risk assessment for the Proposed Development. This includes reference to the NRW Flood Map for Planning in the 'Established Baseline' which incorporates the predicted impacts of 100 year of climate change.
- 13.6.11 Climate change may also lead to negative impacts on the baseline water quality receptors such as aquatic fauna (fish, invertebrates) and flora as a result of impacts on water temperature, shading, invasive species and summer flows.
- 13.6.12 Climate change is expected to also affect water resource availability for abstraction from on-site and off-site watercourses and from Dŵr Cymru Welsh Water (DCWW) supplies. Increases in heat waves and low flow periods are predicted to reduce water availability. This is likely to affect both the quantity and the timing of water availability during low flow periods in order to maintain minimum flows for ecological functioning. Similarly, the impacts of climate change are predicted to put pressures on the environmental management of the strategic foul drainage network operated by DCWW.
- 13.6.13 Regarding embedded flood risk mitigation, the following measures are proposed during construction of the Proposed Development:

- Provision of a dewatering system e.g. deep borehole wells at some areas of the Site to ensure the groundwater level is maintained at least 2m to 3m below the excavation level where required to facilitate construction;
- Discharge of pumped groundwater to the existing surface water system;
- Raising of site levels across the proposed build development area to a minimum 6.2m AOD; and
- Implementation of a CEMP incorporating best practice guidance such as Environment Agency Pollution Prevention Guidelines and CIRIA Control of Water Pollution from Construction Sites.

13.6.14 Regarding embedded flood risk mitigation, the following measures are proposed during operation of the Proposed Development:

- Implementation of a surface water drainage strategy to control surface water runoff without increasing flood risk or impacting water quality downstream using sustainable drainage systems (SuDS) to mimic natural drainage processes where possible and managing surface water flooding up to the 1 in 100 year rainfall event including an allowance for climate change;
- Operation under an environmental permit requiring best available techniques (BAT), setting contaminant limits for treated surface water effluent discharged via site outfalls, requiring the monitoring of this discharge, and setting limits on water abstraction; and
- Implementation of an environmental management plan (EMP) as required by the Environmental Permit.

Biodiversity

13.6.15 The Landscape Environmental Management Plan (LEMP) (provided in **Appendix 2.2**) and Biodiversity Net Benefit report prepared for the Proposed Development (provided in **Appendix 8.11**) include a number of prescriptions to promote ecosystem resilience within the Site. Diversity will be enhanced by the creation of new biodiverse habitats, for example the restoration of coastal floodplain grazing marsh. The extent of open ground habitats will be increased, for example through scrub control and bund creation, to create more open mosaic habitat areas.

13.6.16 The removal of invasive species (such as Japanese knotweed) will further improve the natural condition of habitats within the Site. The coastal floodplain restoration areas include watercourse restoration, providing attractive corridors for wildlife to disperse, including from within the SSSI to the south. Additionally, where it is possible to do so, water retention measures are proposed, that will create new ponds and ditches.

13.6.17 As well as increasing biodiversity, these measures aim to reduce water flow during heavy rainfall events, which should aid flood prevention lower down in the catchment. This will provide an ecosystem level solution to the danger of increasingly frequent flooding events as a result of climate change.

13.6.18 Therefore, the implementation of the LEMP will enhance biodiversity and create new opportunities to improve ecosystem resilience within the Application Boundary, including to future climate change effects.

13.7 Assessment of potential effects

Climate change mitigation

Predicted construction effects

Construction materials

- 13.7.1 The Applicant has provided forecasts of construction material types and quantities which Turley has footprinted using emissions factors sourced from *OneClick LCA* (Ref. 13.26) and *IStructE* (Ref. 13.27) databases as presented in **Table 13.14**.

Table 13.14: Construction materials GHG emissions

Material	Quantity	Emissions factor	Emissions (tCO ₂ e)
Reinforced concrete	64,169 m ³	374 kgCO ₂ e/m ³ [ready-mix concrete, normal strength, generic, C32/40 with CEM I, 0% recycled binders, 130kg rebar per m ³] ⁽¹⁾	23,999
Mass concrete	3,200 m ³	309 kgCO ₂ e/m ³ [ready-mix concrete, normal strength, generic, C32/40 with CEM I, 0% recycled binders] ⁽¹⁾	989
CFA piles	1,669 m ³	374 kgCO ₂ e/m ³ [ready-mix concrete, normal strength, generic, C32/40 with CEM I, 0% recycled binders, 130kg rebar per m ³] ⁽¹⁾	624
PCC piles	2,967 m ³	374 kgCO ₂ e/m ³ [ready-mix concrete, normal strength, generic, C32/40 with CEM I, 0% recycled binders, 130kg rebar per m ³] ⁽¹⁾	1,110
Bolt assemblies	80 tonne	2,500 kgCO ₂ e/tonne [structural closed steel sections, UK average] ⁽²⁾	200
Embedded steel	43 tonne	2,800 kgCO ₂ e/tonne [galvanised profiled steel sheet, UK average] ⁽²⁾	120
Reinforcement steel	4,300 tonne	500 kgCO ₂ e/tonne [reinforcement steel (rebar), generic, 97% recycled content] ⁽¹⁾	2,150
Structural steelwork	9,300 tonne	2,500 kgCO ₂ e/tonne [structural closed steel sections, UK average] ⁽²⁾	23,250
Roof cladding	2,200 sqm	30.1 kgCO ₂ e/sqm [galvanized steel façade cladding panel, 9.5 kg/m ² , 0% recycled content] ⁽¹⁾	66
Cladding	32,500 sqm	30.1 kgCO ₂ e/sqm [galvanized steel façade cladding panel, 9.5 kg/m ² , 0% recycled content] ⁽¹⁾	978
Roads	44,912 sqm	34.91 kgCO ₂ e/sqm ⁽¹⁾	1,568
Total			55,055
<u>Notes</u>			
⁽¹⁾ From OneClick LCA database			
⁽²⁾ From IStructE LCA database			

- 13.7.2 In summary, total emissions of 55,055 tCO₂e are forecast from the production of construction materials, with the majority of emissions relating to reinforced concrete and structural steelwork.

Construction transport

- 13.7.3 The Applicant has provided forecasts of worst-case vehicle movements during construction covering both lorry (i.e. materials transport) and cars (i.e. worker transport) in the form of the number of vehicles per working day between August 2025 and December 2027. A total of 1,344 HGV movements and 7,771 car movements are forecast across the construction phase. See **Chapter 6: Air Quality** for details of how these construction vehicle movements compare with operational vehicle movements in the established baseline'.
- 13.7.4 **Table 13.15** presents the total number of HGV and car movements forecast across this period, together with reasonable worst case assumptions made in relation to the average two-way trip distance and vehicle type in order to estimate associated GHG emissions.

Table 13.15: Construction transport GHG emissions

Vehicle type	Forecast number	Assumed average two-way trip distance (km)	Total distance (km) ⁽¹⁾	UK Government emissions factor (kgCO ₂ e/km)	GHG emissions (tCO ₂ e)
Lorries	1,344	100	3,494,400	0.87205 ⁽²⁾	3,407
Cars	7,771	100	20,204,600	0.16664 ⁽³⁾	3,336
Total					6,414

Notes

⁽¹⁾ Assumes a 6-day working week and 100km average two-way trip distance

⁽²⁾ All HGVs (excluded refrigerated), average laden

⁽³⁾ Average car, unknown fuel

Construction GHG emissions summary

- 13.7.5 Drawing on the above assessment of GHG emissions from construction materials and vehicles, **Table 13.16** summarises construction stage emissions assuming an even split of emissions across the construction period.

Table 13.16: Construction stage GHG emissions summary

Emissions source	GHG emissions (tCO ₂ e)			
	2025	2026	2027	Total
Materials	13,764	27,527	13,764	50,055
Vehicles	1,666	3,455	1,294	6,414
Total	15,429	30,982	15,058	61,469

Proposed additional mitigation

- 13.7.6 No additional mitigation measures have been assumed or assessed regarding construction stage GHG emissions.

Residual construction effects

- 13.7.7 In the absence of additional mitigation, residual construction stage effects are as forecast above.

Construction GHG emissions in context

- 13.7.8 **Table 13.17** presents forecast construction stage GHG emissions within the context of baseline emissions at the Site, NPTC, Wales and UK, and also to relevant Wales and UK carbon budgets.

Table 13.17: Construction GHG emissions in context

Year	2025	2026	2027
Construction GHG emissions (tCO₂e)	15,429	30,982	15,058
Construction emissions as a % of 'established baseline' emissions	0.247%	0.495%	0.241%
Construction emissions as a % of NPTC baseline emissions	0.246%	0.494%	0.240%
Construction emissions as a % of Wales baseline emissions	0.057%	0.115%	0.056%
Construction emissions as a % of UK baseline emissions	0.004%	0.008%	0.004%
Wales carbon budgets (tCO₂e)⁽¹⁾	35,489,341	23,659,561	23,659,561
Construction emissions as a % of Wales Carbon Budgets	0.065%	0.131%	0.064%
UK carbon budgets (tCO₂e)⁽¹⁾	390,000,000	390,000,000	390,000,000
Construction emissions as a % of UK Carbon Budgets	0.004%	0.008%	0.004%

Notes:

⁽¹⁾ Annual Wales and UK carbon budgets have been derived by Turley assuming an equal split of emissions between each year of the 5 year carbon budget periods

- 13.7.9 In summary, peak annual construction GHG emissions of 30,982 tCO₂e forecast for 2026 equate to 0.495% of 'established baseline' site emissions, 0.494% of NPTC baseline emissions, 0.115% of Wales baseline emissions, and 0.008% of UK baseline emissions.
- 13.7.10 In relation to carbon budgets, forecast annual construction GHG emissions equate to a maximum of 0.131% of the annual Wales carbon budget and 0.008% of the annual UK carbon budget estimated by Turley, both in 2026.
- 13.7.11 The sensitivity of the receptor is high. The magnitude of change is negligible in relation to baseline GHG emissions at all scales, and also in relation to future carbon budgets at

all scales. In accordance with the matrix in **Table 13.3**, therefore, the level of effect is considered to be **negligible**. This effect is **not significant**.

Predicted operational effects

- 13.7.12 The Applicant has provided GHG emissions data relating to the operational blast furnaces for 5 years up to March 2024 and the operational EAF (from 2027 to 2030). The operational blast furnace emissions, demonstrated by a 5-year average of the Site, form the 'established baseline' scenario against which GHGs forecast from the operation of the EAF are established and the magnitude and significance of net GHG determined, as presented in **Table 13.18**.

Table 13.18: Operational EAF GHG emissions and savings (tCO₂)

Year	2027	2028	2029	2030
'Established baseline' emissions				
Scope 1	6,079,449	6,079,449	6,079,449	6,079,449
Scope 1+2	6,256,137	6,256,137	6,256,137	6,256,137
Operational EAF emissions				
Scope 1	39,757	538,678	702,134	702,134
Scope 1+2	48,588	627,991	802,597	792,872
Operational emissions minus 'established baseline' emissions				
Scope 1	6,039,692	5,540,771	5,377,315	5,377,315
Scope 1+2	-6,207,549	-5,628,146	-5,453,541	-5,463,265

- 13.7.13 In summary, the 'established baseline' scenario comprises total annual Scope 1 and 2 emissions of 6,256,137 tCO₂e. Operation of the EAF is forecast to give rise to Scope 1 and 2 emissions of 48,588 tCO₂ in 2027 (the start of EAF operation), increasing to 627,991 tCO₂ in 2028 (the first full year of EAF operation), to 802,597 tCO₂ in 2029, and 792,872 tCO₂ in 2030, the latest year for which the Applicant has forecast operational EAF emissions.
- 13.7.14 By subtracting 'established baseline' emissions from emissions forecast from the operational EAF, its net operational Scope 1 and 2 GHG effect is established as follows: -6,207,549 tCO₂ in 2027 (i.e. a saving of 6,207,549 tCO₂), -5,628,146 tCO₂ in 2028, -5,453,541 tCO₂ in 2029 and -5,463,265 tCO₂ in 2030.

Operational GHG emissions and savings in context

- 13.7.15 **Table 13.19** presents operational Scope 1 and 2 emissions and savings relative to the 'established baseline' in the context of baseline emissions at the Site, NPTC, Wales and UK, relevant Wales and UK carbon budgets, and UK Government projections of GHG savings from electrification of the UK steel industry, in order to establish the magnitude of change.

Table 13.19: Operational EAF GHG emissions and savings in context

Year	2027	2028	2029	2030
Scope 1+2 operational EAF GHG savings (tCO₂) vs established baseline	6,207,549	5,628,146	5,453,541	5,463,265
Operational GHG savings as a % of 'established baseline' emissions	99.2%	90.0%	87.2%	87.3%
Operational GHG savings as a % of NPTC baseline emissions	98.9%	89.7%	86.9%	87.1%
Operational GHG savings as a % of Wales baseline emissions	23.1%	21.0%	20.3%	20.4%
Operational GHG savings as a % of UK baseline emissions	1.7%	1.7%	1.7%	1.7%
Wales carbon budgets (tCO₂e)	23,659,561	23,659,561	23,659,561	20,842,946
Operational GHG savings as a % of Wales carbon budgets	26.2%	23.8%	23.1%	26.2%
UK carbon budgets (tCO₂e)⁽¹⁾	350,400,000	350,400,000	350,400,000	350,400,000
Operational GHG savings as a % of UK Carbon Budgets	1.8%	1.6%	1.6%	1.6%
UK Government steel sector decarbonisation projections (tCO₂e)	-7,600,000	-7,600,000	-7,600,000	-7,600,000
Operational GHG savings as a % of UK Government steel sector decarbonisation projections	81.7%	74.1%	71.8%	71.9%

Proposed additional mitigation

- 13.7.16 No additional mitigation measures have been assumed or assessed regarding operational stage GHG emissions.

Residual operational effects

- 13.7.17 In the absence of additional mitigation, residual construction stage effects are as forecast above.

Operational GHG savings in context

- 13.7.18 In summary, Scope 1 and 2 savings forecast for the operational EAF from 2027 to 2030 equate to a minimum 87.2% of 'established baseline' site emissions, 86.9% of NPTC baseline emissions, 20.3% of Wales baseline emissions, and 1.7% of UK baseline emissions.
- 13.7.19 Regarding carbon budgets, forecast Scope 1 and 2 savings from the operational EAF equate to a minimum 23.1% of the annual carbon budgets estimated for Wales, and 1.6% of the annual carbon budgets estimated for the UK.
- 13.7.20 Finally, regarding UK Government's projection of annual average GHG savings that can be achieved through electrification of the UK steel industry, the operational EAF is forecast to meet a minimum 71.8% of this projection between 2027 and 2030.

- 13.7.21 The sensitivity of the receptor is high. The magnitude of change is large in terms of the contribution of the Proposed Development to UK Government's steel sector decarbonisation projections. In accordance with the matrix in **Table 13.3**, therefore, the level of effect is considered to be **major beneficial**. This effect is **significant**.

Scope 3 emissions

- 13.7.22 The recent decision of the Supreme Court in *R v (on the application of Finch on behalf of Weald Action Group) v Surrey County Council & others* UKSC 2022/0064 (Ref. 13.28) relating to the assessment of GHG emissions from fossil fuel extraction requires that Scope 3 emissions be included within an EIA assessment where certain conditions are met. However, we note that steel projects are distinguished at paragraph 121 on the basis that: *"...it could reasonably be said that environmental effects of the use of products which the steel will be used to make are not effects of manufacturing the steel. That is because the manufacture of the steel is far from being sufficient to bring about those effects. Such effects will depend on innumerable decisions made "downstream" about how the steel is used and how products made from the steel are used. This indeterminacy regarding future use would also make it impossible to identify any such effects as "likely" or to make any meaningful assessment of them at the time of the decision whether to grant development consent for the construction and operation of the steel factory."* For this reason downstream Scope 3 emissions have not been assessed in this ES.
- 13.7.23 With the exception of GHG emissions from construction of the EAF which are likely to comprise largely Scope 3 indirect emissions from the Applicant's supply chain (e.g. from the manufacture of construction materials and the transport of materials and workers to/from site etc), the focus of the GHG assessment reported above has been Scope 1 and 2 emissions.
- 13.7.24 This is because Scope 1 emissions (e.g. from gas combustion and process emissions) and Scope 2 emissions (e.g. from the generation of consumed electricity) relate to the Site, NPTC, Wales and UK. In the context of the Proposed Development, however, Scope 3 emissions relate principally to embodied carbon associated with process inputs (such as pig iron, coal/coke etc) which, with the exception of lime, are anticipated to be sourced from outside the UK.
- 13.7.25 IEMA's GHG Guidance advises that significance of effect should be determined in relation to the contribution (or otherwise) of the project to the national net zero trajectory, and does require consideration of the contribution (or otherwise) of the project to net zero trajectories in jurisdictions outside the UK, or at the global level.
- 13.7.26 In the interests of transparency, however, **Table 13.20** presents Scope 1, 2 and 3 GHG savings forecast the operational EAF relative to the 'established baseline'.

Table 13.20: Scope 1, 2 & 3 operational EAF GHG emissions and savings

Year	2027	2028	2029	2030
'Established baseline' emissions (tCO₂)				
Scope 1, 2 & 3	6,894,057	6,894,057	6,894,057	6,894,057
Operational EAF emissions (tCO₂)				
Scope 1, 2 & 3	187,111	2,265,079	3,888,635	3,878,894

Year	2027	2028	2029	2030
Operational EAF emissions minus 'established baseline' emissions				
Scope 1, 2 & 3	-6,706,947	-4,628,978	-3,005,422	-3,015,163

13.7.27 In summary, the 'established baseline' scenario comprises total annual Scope 1, 2 and 3 emissions of 6,894,057 tCO₂. Operation of the EAF is forecast to give rise to Scope 1, 2 and 3 emissions of 187,111 tCO₂ in 2027 (the start of EAF operation), increasing to 2,265,079 tCO₂ in 2028 (the first full year of EAF operation), 3,888,635 tCO₂ in 2029, and 3,878,894 in 2030, the final year for which the Applicant has forecast operational EAF emissions.

13.7.28 By subtracting 'established baseline' emissions from emissions forecast from the operational EAF, its net operational Scope 1, 2 and 3 GHG effect is established as follows: -6,706,947 tCO₂ in 2027 (i.e. a saving of 6,706,947 tCO₂), -4,628,978 tCO₂ in 2028, -3,005,422 tCO₂ in 2029, and -3,015,163 in 2030.

13.7.29 UK Government's decarbonisation projections for the steel sector as set out in the *Carbon Budget Delivery Plan* are understood to relate to Scope 1 and 2 emissions only, therefore the exclusion of domestic Scope 3 emissions from inbound substrate shipping does not affect the assessments' conclusions regarding the magnitude or significance of GHG effect.

Scope 1+2+3 emissions savings in context

13.7.30 **Table 13.21** presents operational Scope 1, 2 and 3 GHG savings relative to 'established baseline' emissions.

Table 13.21: Operational scope 1, 2 & 3 GHG savings in context

Year	2027	2028	2029	2030
Operational EAF GHG savings (tCO₂)				
Scope 1, 2 & 3	6,706,947	4,628,978	3,005,422	3,015,163
Operational GHG savings as a % of 'established baseline' emissions	97.3%	67.1%	43.6%	43.7%

13.7.31 In summary, and considering total (i.e. Scope 1, 2 and 3 emissions, including those from outside the UK associated with the production of process inputs such as pig iron and coal/coke), operation of the EAF is forecast to deliver GHG savings of 97.3% in 2027, 67.1% in 2028, 43.6% in 2029, and 43.7% in 2030 relative to the 'established baseline'.

13.7.32 Operational CO₂ data for the Proposed Development provided by the Applicant models a Reasonable Worst-Case Scenario, to allow for potential variations in raw materials, raw material mix, production levels and final product mix which can all have a significant impact on the overall CO₂ performance of a steelmaking site. It is anticipated that the actual CO₂ emission savings (Scope 1,2 & 3) will be in excess of 50%, greater than the 43.6% estimated above.

Net zero steelmaking by 2045

13.7.33 The Applicant has publicly committed to achieving net-zero by 2045 and has an interim

target of a 30% CO₂ reduction by 2030. The Proposed Development will deliver a step change reduction in CO₂ emissions and will exceed the Applicant's 2030 CO₂ reduction target. This is outlined in **Image 13.2**.

13.7.34 The Proposed Development is also an enabler for further decarbonisation options which are under consideration by the Applicant in order to achieve net-zero. These are shown in **Image 13.3** and include measures such as using low-carbon energy to further reduce Scope 1 & 2 CO₂ emissions, and use of low-carbon raw materials, such as Direct Reduced Iron (DRI) produced using hydrogen, to further reduce Scope 3 CO₂ emissions.

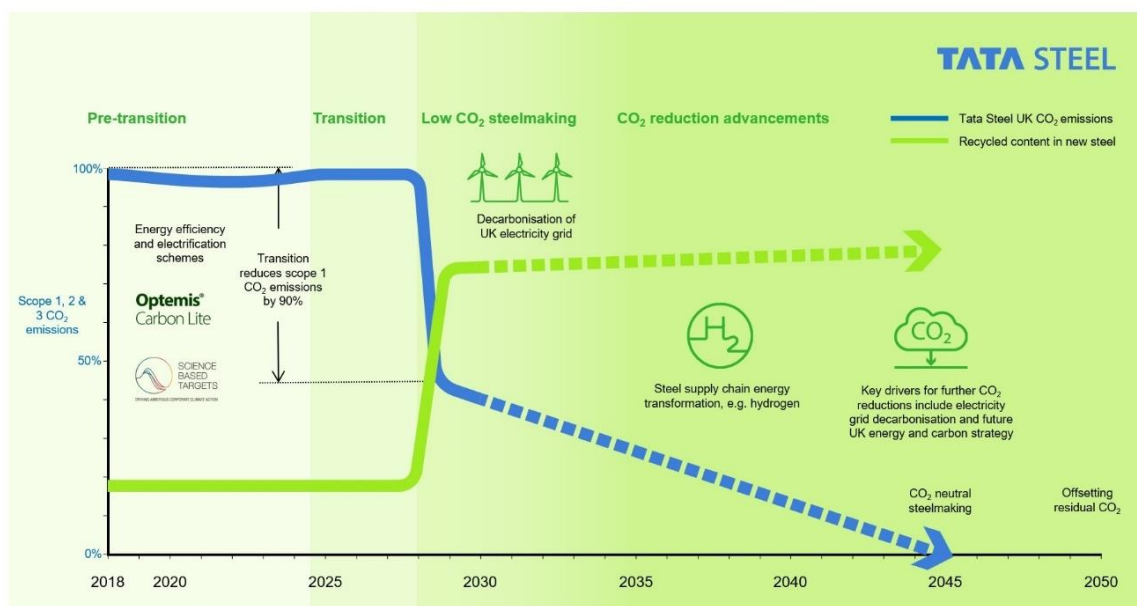


Image 13.2 Roadmap to CO₂ neutral steelmaking [Tata Steel]



Image 13.3 Further decarbonisation options following EAF transition [Tata Steel]

Climate change resilience

Major accidents and disasters

- 13.7.35 The potential for major accidents and disasters is actively managed on the Site to comply with the relevant health and safety regulations as set out in **ES Chapter 2: Project Description**. Reports and consents that will be required for the Proposed Development include updates to the Safety Report and ECP/EEP, a Hazardous Substances Consent (if required), an Environmental Permit (including emergency response plans), and CDM requirements (HAZID and HAZOP). These statutory requirements are intrinsic to the design and operation of the Proposed Development.
- 13.7.36 Other measures proposed for the management of vulnerabilities to major accidents and/or disasters to human health, cultural heritage or the environment are addressed specifically in **ES Chapters 6 to 15**. A summary of the measures proposed in these assessments of vulnerabilities to major accidents and/or disasters is provided in **Appendix 4.2**.

Physical risks

- 13.7.37 Following implementation of mitigation measures set out above, no significant effects are anticipated in relation to wind speed, water availability or ground conditions.

Flood risk

- 13.7.38 Following implementation of the mitigation measures set out above, **ES Chapter 9: Surface Water, Flood Risk and Drainage** concludes, having taking appropriate account of future climate change, negligible adverse effects during construction on water resources and flood risk.
- 13.7.39 Once operational, the Proposed Development is concluded to have a negligible effect (not significant) on water resources and flood risk.

Biodiversity

- 13.7.40 Following implementation of the mitigation measures set out above, and having given due consideration to climate change, **ES Chapter 8: Biodiversity** concludes significant beneficial effects to the following habitat and species types through retention where possible, habitat restoration and enhancement, implementation of the CEMP and LEMP, and biodiversity net benefit;
- Coastal floodplain grazing marsh;
 - Open mosaic habitat;
 - Other habitats;
 - Invertebrates; and
 - Invasive non-native species.
- 13.7.41 No significant construction stage effects are anticipated on other habitats or species including internationally or nationally designated sites, badger, reptiles, breeding birds, wintering birds, or bats.

13.7.42 Regarding operation of the Proposed Development, and again having given due consideration to future climate change, significant beneficial effects are predicted in relation the following habitats and species:

- Bats; and
- Invasive non-native species.

13.8 Further survey and monitoring requirements

13.8.1 The Applicant is required to participate in the UK Emissions Trading Scheme (UK ETS) which replaced the UK's participation in the European Union Emissions Trading Scheme (EU ETS) on 1 January 2021 (Ref. 13.29). Welsh Government worked with the UK and Scottish Governments and Northern Ireland Department of Agriculture, Environment and Rural Affairs (collectively making up the UK ETS Authority) to establish the scheme to increase the climate ambition of the UK's carbon pricing policy, while protecting the competitiveness of UK businesses.

13.8.2 In Wales the UK ETS is regulated by NRW, applies to a range of organisations including energy intensive industries such as steel making, and works on the 'cap and trade' principle. This where a cap is set on the total amount of certain GHGs that can be emitted by sectors covered by the scheme. This limits the total amount of carbon that can be emitted and, as the cap decreases over time, will make a significant contribution to national net zero targets and other legally-binding carbon reduction commitments.

13.9 Opportunities for enhancement

13.9.1 No opportunities have been considered to further enhance the significant climate change mitigation benefits (e.g. GHG reduction) of the Proposed Development, or to further enhance its climate resilience.

13.10 Cumulative effects

Climate change mitigation

13.10.1 IEMA'S GHG guidance recognises the cumulative contributions of all GHG emissions sources to global climate change and the climatic system as sensitive receptor. For this reason the approach to cumulative effects assessment of GHGs differs from many other EIA topics where projects within a geographically bounded study area are considered.

13.10.2 For GHGs, unlike air pollution for example, there is no greater climate change effect from a local GHG emissions source than from one on the other side of the world. Indeed all global cumulative GHG sources are relevant to the effect on climate change, which is taken into account when defining the global climatic system receptor as being of high sensitivity to further emissions.

13.10.3 As set out in the IEMA guidance, effects of GHG emissions from specific cumulative projects should in general not be individually assessed, as there is no basis for selecting any particular (or more than one) cumulative project that has GHG emissions for assessment over any other.

13.10.4 Instead, the contextualisation of GHG emissions incorporates by its very nature the cumulative contributions of other GHG sources which make up that context, whether geographical (in the case of Wales and UK carbon budgets) or sector-bounded (in the case of UK Government steel sector decarbonisation projections). Therefore a form of cumulative assessment of GHG emissions / savings has already been undertaken.

Climate resilience

13.10.5 Refer to **Chapter 8: Biodiversity** and **Chapter 9: Surface Water, Flood Risk and Drainage** and **Chapter 10: Land, Soil and Groundwater** for details of how these assessments have considered cumulative effects.

13.11 Summary of effects

13.11.1 **Table 13.22** summarises the effects concluded in relation to GHG emissions and climate resilience.

Table 13.22: Summary of climate change effects

Receptor	Impact	Potential effect	Additional mitigation proposed	Residual Effect
Climate Change Mitigation / GHGs				
Construction phase				
Global climatic system	GHG emissions	Negligible	No additional mitigation proposed	Negligible (not significant)
Operational phase				
Global climatic system	GHG emissions	Major beneficial	No additional mitigation proposed	Major beneficial (significant)
Climate Change Resilience				
Construction phase				
Site buildings & structures	Wind speed	Negligible	No additional mitigation proposed	Negligible (not significant)
Site buildings & structures	Water resources & flood risk	Negligible	No additional mitigation proposed	Negligible (not significant)
Site buildings & structures	Ground well / shrinkage	Negligible	No additional mitigation proposed	Negligible (not significant)

Receptor	Impact	Potential effect	Additional mitigation proposed	Residual Effect
Site habitats & species	Seasonal temperature & rainfall	Negligible	No additional mitigation proposed	Negligible (not significant)
Operational phase				
Site buildings & structures	Wind speed	Negligible	No additional mitigation proposed	Negligible (not significant)
Site buildings & structures	Water resources & flood risk	Negligible	No additional mitigation proposed	Negligible (not significant)
Site buildings & structures	Ground well / shrinkage	Negligible	No additional mitigation proposed	Negligible (not significant)
Site buildings & processes	Mains water availability	Negligible	No additional mitigation proposed	Negligible (not significant)
Site habitats & species	Seasonal temperature & rainfall	Beneficial	No additional mitigation proposed	Beneficial (significant)

13.12 References

- Ref. 13.1 Climate Change Act 2008 (UK Public General Acts, 2008 c.27)
- Ref. 13.2 Climate Change Act 2008 (2050 Target Amendment) Order 2019 (UK Statutory Instrument 2019 No. 1056)
- Ref. 13.3 HM Government (March 2023). Carbon Budget Delivery Plan
- Ref. 13.4 <https://friendsoftheearth.uk/climate/high-court-judgment-governments-climate-plan>
- Ref. 13.5 The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Welsh Statutory Instruments 2017 No. 567 (W. 136)
- Ref. 13.6 Welsh Government (2024). Planning Policy Wales, Edition 12
- Ref. 13.7 The Environment (Wales) Act 2016. 2016 anaw 3
- Ref. 13.8 Welsh Government (2019). Prosperity for All: A Low Carbon Wales - Wales' commitment to tackling climate change
- Ref. 13.9 Climate Change Committee (2020). Advice Report: The Path to a Net Zero Wales
- Ref. 13.10 Welsh Government (2021). Net Zero Wales Carbon Budget 2 (2021-25)
- Ref. 13.11 Welsh Government (2021). Future Wales, the National Plan 2040
- Ref. 13.12 Neath Port Talbot County Borough Council (2016). Local Development Plan 2011-2026

- Ref. 13.13 IEMA (2022). EIA Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance
- Ref. 13.14 IEMA (2020). EIA Guide to: Climate Change Adaptation & Resilience
- Ref. 13.15 https://unfccc.int/kyoto_protocol
- Ref. 13.16 DESNZ & DEFRA (2023). UK Government GHG Conversion Factors for Company Reporting
- Ref. 13.17 ISO (2013). 14404-1:2013 Calculation method of carbon dioxide emission intensity from iron and steel production — Part 1: Steel plant with blast furnace, Part 2: Steel plant with electric arc furnace (EAF)
- Ref. 13.18 UK Government (2024). Local Authority & Regional Carbon Dioxide Emissions National Statistics: 2005 to 2022
- Ref. 13.19 NASA (2019). The Atmosphere: Getting a Handle on Carbon Dioxide.
<https://climate.nasa.gov/news/2915/the-atmosphere-getting-a-handle-on-carbon-dioxide/>
- Ref. 13.20 Met Office. UK Climate Averages, Mumbles Head (Swansea)
<https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcjm7j5g>
- Ref. 13.21 Met Office (2018). UKCP18 Derived Projections of Future Climate over the UK.
- Ref. 13.22 HM Government (2022). UK Climate Change Risk Assessment 2022
- Ref. 13.23 Climate Change Committee (2023). Progress Report Reducing Emissions in Wales: Charts & Data.
- Ref. 13.24 Met Office (2018). UKCP18 Derived Projections of Future Climate over the UK
- Ref. 13.25 Tata Steel (2024). Integrated Report and Annual Accounts 2023-24.
<https://www.tatasteel.com/media/21241/tata-steel-limited-ir-2024.pdf>.
- Ref. 13.26 OneClick LCA. <https://oneclicklca.com/en/resources/articles/data-for-every-use-case-in-the-built-environment>
- Ref. 13.27 The Institution of Structural Engineers (2022). The Structural carbon tool - version 2.
<https://www.istructe.org/resources/guidance/the-structural-carbon-tool/>
- Ref. 13.28 Supreme Court (2024). JUDGMENT: R (on the application of Finch on behalf of the Weald Action Group) (Appellant) v Surrey County Council and others (Respondents).
<https://www.supremecourt.uk/cases/docs/uksc-2022-0064-judgment.pdf>
- Ref. 13.29 BEIS / DESNZ (2024). Guidance: Participating in the UK ETS.
<https://www.gov.uk/government/publications/participating-in-the-uk-ets/participating-in-the-uk-ets>