One Earth Solar Farm

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Volume 2: Aspect Chapters

Chapter 14: Carbon and Climate Change

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Contents

Glossary

Term	Definition
CCGT	Combined Cycle Gas Turbine is a highly efficient power generation technology that uses both a gas turbine and a steam turbine to produce electricity.
CCS	Carbon Capture and Storage is a climate change mitigation technology that captures carbon dioxide emissions from industrial processes and power generation, preventing them from entering the atmosphere.
CO_2e	Carbon dioxide equivalent is a standard unit used to measure and compare the impact of different greenhouse gases on global warming. It expresses the effect of various gases in terms of the amount of carbon dioxide that would have the same global warming potential (GWP).
DCO	Development Consent Order is part of the Planning Act 2008 and is a legal instrument used in the UK to grant approval for certain types of large-scale infrastructure projects, such as power plants, transportation networks, and other developments that may have significant environmental or societal impacts.
GHG	A greenhouse gas is a gas which is present in the Earth's atmosphere and released through anthropogenic activities, within the atmosphere they absorb and emit infrared radiation, contributing to global warming.
GWP	Global Warming Potential is a measure of how much heat a greenhouse gas traps in the atmosphere over a specific period, compared to carbon dioxide.
Net Zero	Refers to balancing the amount of greenhouse gases emitted into the atmosphere with the amount removed, resulting in no overall increase in global emission. Achieving net zero is essential for limiting global warming to 1.5°C or 2°C above pre-industrial levels, as outlined in the Paris Agreement.
RCP	Representative Concentration Pathway refers to a set of climate scenarios that describe possible future greenhouse gas concentration trajectories and their impact on global climate change. Developed for the Intergovernmental Panel on Climate Change (IPCC), RCPs help model how different levels of emissions will affect global temperatures, sea levels, and ecosystems by 2100
UKCP18	UK Climate Projections 2018 are the latest set of climate projections for the UK, providing detailed information on how the UK's climate might change up to the year 2100. It includes data on temperature, rainfall, sea-level rise, and extreme weather events to support climate risk assessments and adaptation planning.

List of Abbreviations and Acronyms

Term	Definition
AQC	Air Quality Consultants Ltd
BESS	Battery Energy Storage Systems
CCC	Climate Change Committee
CCGT	Combined Cycle Gas Turbine
CCR	Climate Change Resilience
CCS	Carbon Capture and Storage
CdTe	Cadmium telluride
CEMP	Construction Environmental Management Plan
CH_4	Methane
CIGS	Copper Indium Gallium Selenide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
CoCP	Code of Construction Practice
CTMP	Construction Traffic Management Plan
DCO	Development Consent Order
DEMP	Decommissioning Environmental Management Plan
DESNZ	Department for Energy Security and Net Zero
DfT	Department for Transport
DLUHC	Department for Levelling Up, Housing and Communities
DTMP	Decommissioning Traffic Management Plan
EIA	Environmental Impact Assessment
ES	Environmental Statement

Term	Definition
GHG	Greenhouse Gas
GWh	Gigawatt hour
GWP	Global Warming Potential
HFCs	Hydrofluorocarbons
HMSO	His Majesty's Stationery Office
HV	High voltage
HVAC	Heating, Ventilation and Air Conditioning
IBC	Intermediate Bulk Containers
ICCI	In-Combination Climate Change Impact
IEMA	Institute of Environmental Management and Assessment
km	Kilometre
kWh	Kilowatt hour
$MTCO_2e$	Megatonne of carbon dioxide equivalent
MW	Megawatt
MWh	Megawatt hour
NF_3	Nitrogen trifluoride
NGCC	Natural Gas Combined Cycle
NPPF	National Planning Policy Framework
NPS	National Policy Statement
oCEMP	Outline Construction Environmental Management Plan
oCTMP	Outline Construction Transport Management Plan
oDEMP	Outline Decommissioning Environmental Management Plan
OEMP	Operational Environmental Management Plan
oSTP	Outline Staff Travel Plan

Term	Definition
PEIR	Preliminary Environmental Information Report
PV	Photovoltaic
RCP	Representative Concentration Pathway
RICS	Royal Institution of Chartered Surveyors
SF_6	Sulphur hexafluoride
STP	Staff Travel Plan
TCO_2e	Tonne of carbon dioxide equivalent
UKCP18	UK Climate Projections 2018
UNFCCC	United Nations Framework Convention on Climate Change

14. Climate Change

14.1 Introduction

14.1.1 This Chapter of the Environmental Statement (ES) has been prepared by Logika and presents an assessment of the likely significant environmental effects of the Proposed Development with regards to Carbon and Climate Change.

14.1.2 The Carbon and Climate Change assessment is presented in three parts, as was defined by the Scoping Opinion (see **ES Volume 3, Scoping Opinion [EN010159/APP/6.23]**):

- Part A: Greenhouse Gas (GHG) Assessment which provides a quantification of the GHG emissions resulting from the Proposed Development during the construction, operational (including maintenance) and decommissioning phases, taking a whole lifecycle approach. As the Proposed Development will provide renewable electricity, which reduces resilience on fossil fuels, the assessment compares the lifecycle GHG emissions associated with the Proposed Development against other forms of electrical energy generation; principally natural gas power stations as this remains a significant portion of UK energy generation which the Proposed Development would replace. The assessment also presents the mitigation measures and specific design measures provided by the Proposed Development to minimise its GHG footprint;
- Part B: Climate Change Resilience (CCR) Assessment which assesses the ability of the Proposed Development to adapt to and be resilient to potential future changes in climate such as hotter drier summers, warmer wetter winters, and increased storminess; and
- Part C: In-Combination Climate Change Impact (ICCI) Assessment which assesses the extent to which potential future climate change alters the environmental effects assessed by other Environmental Impact Assessment (EIA) disciplines such as (but not limited to) flood risk, air quality, and noise and vibration.

14.1.3 Details of the cumulative effects assessment are presented separately within **ES Volume 2, Chapter 18: Cumulative Effects [EN010159/APP/6.18]**.

14.1.4 This Chapter is supported by the following appendices located within **ES Volume 3: Technical Appendices Supporting ES Volumes 1 and 2 [EN010159/APP/6.21]**:

- Appendix 14.1: Summary of Relevant Legislation, Policy and Technical Guidance; and

- Appendix 14.2: Greenhouse Gas Assessment Technical Methodology1.

14.2 Relevant Legislation, Policy and Technical Guidance

14.2.1 A summary of the relevant legislation, policy and technical guidance applicable to Carbon and Climate Change is set out below, **ES Volume 3, Appendix 14.1: Summary of Relevant Legislation, Policy and Technical Guidance [EN010159/APP/6.21]** provides further detail.

Legislation

- The Climate Change Act 2008;
- The Climate Change Act 2008 (2050 Target Amendment) Order 2019[2];
- The Carbon Budget Order 2021[3];
- Energy Act 2023[4];
- Net Zero Strategy: Build Back Greener[5];
- The Clean Growth Strategy[6];
- Decarbonising Transport: A Better, Greener Britain[7]; and
- The Energy White Paper: Powering our Net Zero Future[8].

Policy

- Overarching National Policy Statement (NPS) for Energy (EN-1)[9];
- NPS for Renewable Energy Infrastructure (EN-3)[10];
- NPS for Electricity Networks Infrastructure (EN-5)[11];

[1] This presents the calculations of the existing/baseline emissions from the current use of the Site and the GHG footprint for the Proposed Development.
[2] HMSO (2019) *The Climate Change Act 2008 (2050 Target Amendment) Order 2019.*
[3] HMSO (2021) *The Carbon Budget Order 2021.*
[4] HMSO (2023) *Energy Act 2023.*
[5] HM Government (2021) *Net Zero Strategy: Build Back Greener.*
[6] HM Government (2017) *The Clean Growth Strategy.*
[7] DfT (2021) *Decarbonising Transport: A Better, Greener Britain.*
[8] HMSO (2020) The *Energy White Paper. Powering our Net Zero Future*. Available: https://www.gov.uk/government/publications/energy-white-paper-powering-our-net-zero-future
[9] DESNZ (2023) *Overarching National Policy Statement for Energy (EN-1)*. Available: https://assets.publishing.service.gov.uk/media/64252f3b60a35e00120cb158/NPS_EN-1.pdf
[10] DESNZ (2023) *National Policy Statement for Renewable Energy Infrastructure (EN-3)*. Available: https://assets.publishing.service.gov.uk/media/64252f5f2fa848000cec0f52/NPS_EN-3.pdf
[11] DESNZ (2023) *National Policy Statement for Electricity Networks Infrastructure (EN-5)*. Available: https://assets.publishing.service.gov.uk/media/65a78a5496a5ec000d731abb/nps-electricity-networks-infrastructure-en5.pdf

- National Planning Policy Framework (NPPF)[12], specifically Paragraphs 8, 20 and 161 in relation to adaptation, mitigation and climate change resilience; and Paragraphs 164 to 168 in relation to the reduction of carbon emissions through design and reduced energy consumption;
- Newark and Sherwood Amended Core Strategy13, specifically 'Core Policy 9 Sustainable Design' and 'Core Policy 10 Climate Change';
- Central Lincolnshire Local Plan 2018-204014, specifically 'Policy S14 Renewable Energy', 'Policy S16 Wider Energy Infrastructure' and 'Policy S17 Carbon Sinks'; and
- Bassetlaw Local Plan 2020-2038[15], specifically 'Policy ST50 Reducing Carbon Emissions, Climate Change Mitigation and Adaptation and 'Policy ST51 Renewable Energy Generation'.

Technical Guidance

- Planning Practice Guidance for Climate Change[16];
- Institute of Environmental Management and Assessment (IEMA) Guidance on Assessing Greenhouse Gas Emissions and Evaluating their Significance[17];
- The Greenhouse Gas Protocol Corporate Accounting and Reporting Standard (GHG Protocol)[18];
- PAS 2080:2023 Carbon Management in Buildings and Infrastructure[19];
- Climate Change Committee (CCC) Net Zero Technical Report[20];
- CCC Sixth Carbon Budget[21];
- HM Government, Carbon Budget Delivery Plan[22];

[12] Ministry of Housing, Communities & Local Government (2024) *National Planning Policy Framework*. Available: https://assets.publishing.service.gov.uk/media/675abd214cbda57cacd3476e/NPPF-December-2024.pdf
[13] Newark and Sherwood District Council (2019) *Amended Core Strategy.* Available: https://www.newark-sherwooddc.gov.uk/media/newark-and-sherwood/images-and-files/planning-policy/pdfs/core-strategy/ACS2019.pdf
[14] Central Lincolnshire Joint Strategic Planning Committee (2023) *Central Lincolnshire Local Plan 2018-2040*. Available: https://www.n-kesteven.gov.uk/sites/default/files/2023-04/Local%20Plan%20for%20adoption%20Approved%20by%20Committee.pdf
[15] Bassetlaw District Council (2024) *Bassetlaw Local Plan 2020-2038*. Available: https://www.bassetlaw.gov.uk/media/gn1kjm1b/adopted-bassetlaw-local-plan-2020-2038.pdf
[16] HM Government (2019) *Planning Practice Guidance Climate Change*. Available: https://www.gov.uk/guidance/climate-change
[17] IEMA (2022) *Assessing Greenhouse Gas Emissions and Evaluating their Significance. 2nd Edition.*
[18] World Resources Institute, World Business Council for Sustainable Development (2001) *The Greenhouse Gas Protocol, A Corporate Accounting and Reporting Standard. World Resource Institute, Revised Edition.*
[19] BSI (2023) *PAS 2080: 2023 Carbon Management in Buildings and Infrastructure.* Available: https://www.bsigroup.com/siteassets/pdf/en/insights-and-media/insights/brochures/pas_2080.pdf
[20] CCC (2019) *Net Zero, Technical Report.*
[21] CCC (2021) *Sixth Carbon Budget.*
[22] HM Government (2023) *Carbon Budget Delivery Plan.*

- Royal Institution of Chartered Surveyors (RICS) Whole life carbon assessment for the built environment[23];
- IEMA Environmental Impact Assessment Guide to Climate Change Resilience and Adaptation[24];
- UK Climate Projections 2018 ('UKCP18')[25];
- UK Climate Projections: Headline Findings[26];
- The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting[27]; and
- UK Climate Change Risk Assessment 2022[28].

PART A: GREENHOUSE GAS ASSESSMENT

14.3 Assessment Methodology and Significance Criteria

Study Area and Scope

14.3.1 GHGs are gaseous compounds that have been identified as contributing to a warming effect in the earth's atmosphere. The primary GHG of concern with respect to the Proposed Development is CO_2 which is emitted from combustion sources such as vehicular transport and energy plant. It is therefore relevant to the energy required to manufacture goods and materials used to construct and operate the Proposed Development, as well as comparing renewable energy generated by the Proposed Development to conventional forms of energy generation. Other GHGs also contribute to climate change and these are accounted for based on their Global Warming Potential (GWP). The combined effect of all GHG emissions will be presented as CO_2e and will account for the seven GHGs included in the United Nations Framework Convention on Climate Change (UNFCCC's) Kyoto Protocol: CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, and NF_3. It is not possible to accurately quantify individual contributions of each GHG to total CO_2e, but the following key points are relevant:

[23] RICS (2023) *Whole life carbon assessment for the built environment, 2nd edition.*
[24] IEMA (2020) *Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation.*
[25] Met Office UK (2018) *UK Climate Projections.*
[26] Met Office UK (2019) *UK Climate Projections: Headline Findings.*
[27] Defra (2018) *The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting.*
[28] HMSO (2022) *UK Climate Change Risk Assessment 2022.*

- The predominant GHG relating to the Proposed Development is CO_2. Based on the Department for Energy Security and Net Zero (DESNZ) data[29], CO_2 accounts for over 98% of total CO_2e emissions from combustion of fuels such as diesel and generation of UK electricity;
- The other major components making up an estimated 1-2% of total CO_2e emissions, based on DESNZ data, are CH_4 and N_2O which are minor by-products of combustion;
- All other GHG emissions are likely to contribute <1% of total CO_2e, although specific emissions contributions from upstream mining, refining, processing and manufacturing processes are not known; and
- There will be no direct emissions of SF_6 (see **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5]**), as SF_6 will not be used in the electrical switchgear or any other infrastruture of the Proposed Development. This meets the requirements of paragraph 2.11.17 of NPS EN-3.

14.3.2 GHGs contribute to climate change, which is a global environmental effect and, as such, the study area for the assessment is not limited by any specific geographical scope or defined by specific sensitive receptors. Instead, the GHG assessment focuses on the likely amount of GHG emissions produced by the Proposed Development from construction, operation (including maintenance) and decommissioning. It compares these against other forms of electrical energy generation (principally natural gas power stations as this remains the significant portion of energy generation in the UK). GHGs can be either direct or indirect. With regards to the Proposed Development, direct emissions relate to those associated with the operation and maintenance of the solar farm itself (e.g. the BESS system, solar modules, substations etc.). Indirect GHG emissions are emissions that are a consequence of the activities of the Proposed Development but are produced by external sources such as emissions from materials transport and construction staff travel. The Proposed Development can influence these emissions but does not have full control over them.

14.3.3 Taking account of the above, the assessment has taken a whole lifecycle approach to develop a GHG footprint for the Proposed Development, considering GHG emissions from the following sources:

[29] DESNZ (2024) *Greenhouse gas reporting: conversion factors 2024.*

- **Construction Phase**: Direct and indirect GHG emissions resulting from the Proposed Development over the construction period. The construction period is anticipated to last approximately two years starting in 2027. For the purposes of this assessment, the calculation of GHG emissions arising from construction related activity is based on current day emission factors, thereby ensuring a conservative worst-case assessment as these are anticipated to decrease between now and 2027 due to decarbonisation of construction methods;
- Operational **Phase:** (including maintenance): Direct and indirect GHG emissions resulting from the operation (including maintenance) of the completed Proposed Development, anticipated to occur over a 60-year lifetime, commencing in 2030. The assessment examines the lifecycle GHG emissions of the Proposed Development over its 60-year lifetime; and
- **Decommissioning Phase:** Direct and indirect GHG emissions resulting from decommissioning the Proposed Development at the end of its 60-year operational lifetime (assumed to be in 2090). A conservative worst-case approach has been adopted that assumes current day emission factors, even though decomissioning methods in 2090 are expected to result in lower emissions.

Activities Contributing to GHG Emissions

14.3.4 The following activities contribute to GHG emissions from the construction of the Proposed Development and are included in the scope of the assessment:

- Emissions embodied in the materials and products used to construct the Proposed Development;
- Construction transport including shipping and delivery of raw materials and products, other service vehicle movements, and staff transport; and
- On-Site machinery used to construct the Proposed Development.

14.3.5 The following activities contribute to GHG emissions from the operation (including maintenance) of the Proposed Development and are included in the scope of the assessment:

- Operational transport associated with service and maintenance vehicles accessing the Proposed Development;
- The net energy generated by the Proposed Development and exported to the national grid, accounting for energy lost in storage and transmission on Site, and any energy used on-Site, for example from heating, ventilation and air conditioning (HVAC) systems for the BESS; and
- The repair and maintenance of the Proposed Development (including the replacement of modules, as set out in **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5]**.

14.3.6 The following activities contribute to GHG emissions from the decommissioning of the Proposed Development at the end of its 60-year operational lifetime and are included in the scope of the assessment:

- On-Site decommissioning activity;
- Transportation and disposal of waste materials; and
- Staff transport.

14.3.7 A small number of minor activities have been scoped out, consistent with guidance published by IEMA[17] which recommends that activities with GHG emissions that individually are less than 1% and in total equal less than 5% of the lifecycle emissions of a development can be scoped out of an assessment. The GHG emissions scoped out of this GHG assessment are as follows:

- Any change in the sequestration capacity of the Site. The Site is currently used as agricultural land and will have net GHG emissions associated with the cultivation of arable crops. The Proposed Development will retain most of the existing grassland on the Site and the DCO application includes a range of measures to retain and enhance habitats and wider biodiversity, as discussed in **ES Volume 2, Chapter 6: Biodiversity [EN010159/APP/6.6]**. The result of these measures will be to help improve the carbon sequestration potential of the Site, although the net change relative to the baseline will be very small. Overall, the net change in GHG emissions from land use will be inconsequential in the overall context of the whole lifecycle GHG emissions from the Proposed Development;
- Water usage during the cleaning of solar modules will be cleaned using a tractor mounted cleaning system with a rotating 'car-wash' type brush. It is anticipated that water would be brought to the Site in 1 m^3 intermediate bulk containers (IBC). The panel cleaning requirements for the Proposed Development can only be accurately determined once operational and the level of dust/dirt gathered can be judged appropriately; therefore, to present a worst-case assessment, a two-year cleaning cycle is assumed. As outlined within the **Outline Operational Environmental Management Plan [EN010159/APP/7.5]** (oOEMP), to avoid water run-off pollution and damage to the panels, no cleaning products will be used. Taking account of the above, GHG emissions associated with water use (including water treatment and supply) are scoped out of the GHG assessment as these are expected to result in very small contributions (<1%) to lifetime GHG emissions of the Proposed Development. Notwithstanding this, these emissions will be minimised through measures detailed within the oOEMP **Outline Operational Environmental Management Plan [EN010159/APP/7.5]**; and
- GHG emissions associated with operational lighting as these are also expected to result in very small contributions (<1%) to lifetime GHG emissions of the Proposed Development. As above, these emissions will be minimised through measures including the implemetation of the **Outline Landscape and Ecology Managment Plan [EN010159/APP/7.7]** (oLMEP).

Establishing Baseline Conditions

14.3.8 The existing Site's baseline GHG emissions, are established by taking account the total emissions from current land use such as agricultural activities and the carbon sequestered by natural and semi-natural habitats.

Receptors and Receptor Sensitivity

14.3.9 The assessment of GHGs does not include identification of local sensitive receptors, as GHG emissions do not directly affect specific locations, but lead to indirect effects by contributing to climate change.

Determining Effect Significance

14.3.10 For GHG emissions there are no recognised significance criteria and thresholds that relate to the quantum of GHG emissions released (i.e. no thresholds for absolute GHG emissions above or below which effects are considered significant). In this absence, the approach to classifying and defining likely significant effects therefore relies on IEMA guidance[17] and applying expert judgment on the significance of the Proposed Development's lifecycle GHG emissions, taking into account their context with regards to the UK's carbon budgets, compliance with national, regional and local policy and alignment with net zero trajectories, and adopted mitigation measures.

14.3.11 The IEMA guidance[17] defines five distinct levels of significance (see **Table 14.1**) which are not solely based on whether a development emits GHG emissions alone, but the degree to which the development's GHG emissions are consistent with science-based 1.5°C aligned emission trajectories towards net zero. For the UK, these trajectories are effectively defined by carbon budgets, including any sectoral pathways that are designed to achieve the UK's 2050 net zero target.

14.3.12 IEMA guidance[17] identifies three underlying principles to inform the assessment of significance, as follows:

"1. The GHG emissions from all projects will contribute to climate change, the largest interrelated cumulative environmental effect

2. The consequences of a changing climate have the potential to lead to significant environmental effects on all topics in the EIA Directive (e.g., human health, water, land use, air quality)

3. GHG emissions have a combined environmental effect that is approaching a scientifically defined environmental limit; as such, any GHG emissions or reductions from a project might be considered to be significant."

14.3.13 Based on these principles, IEMA conclude that:

"When evaluating significance, all new GHG emissions contribute to a negative environmental impact; however, some projects will replace existing development or baseline activity that has a higher GHG profile. The significance of a project's emissions should therefore be based on its net impact over its' life time, which may be positive, negative or negligible

Where GHG emissions cannot be avoided, the goal of the EIA process should be to reduce the project's residual emissions at all stages

Where GHG emissions remain significant, but cannot be further reduced, approaches to compensate the project's remaining emissions should be considered"

14.3.14 The first point above is important in the context of the Proposed Development, as it is designed to provide zero emission energy that will reduce the reliance upon high-emission forms of power generation (principally natural gas power stations). The GHG assessment will therefore consider the Proposed Development's lifecycle GHG emissions against other forms of electricity generation (including fossil fuels, nuclear and renewables).

14.3.15 In advising on the significance of any net change in GHG emissions resulting from a development, IEMA identify that in order to limit the adverse effects from climate change, global temperature change needs to be limited to well below 2°C, aiming for 1.5°C. The implication of this objective is that global emissions need to fall to net zero by 2050.

14.3.16 The UK's response to limiting climate change is enshrined in law through the Climate Change Act 2008**Error! Bookmark not defined.** which requires the UK economy to be net zero by 2050 following a trajectory set through five-yearly carbon budgets. The 2050 target (and interim budgets set to date) are, according to the CCC, compatible with the required magnitude and rate of GHG emissions reductions required in the UK to meet the goals of the Paris Agreement[30], thereby limiting severe adverse effects.

14.3.17 It follows, therefore, that the significance of any net change of GHG emissions resulting from a development is not so much whether a development emits GHG emissions, nor even the magnitude of GHG emissions alone, but whether it contributes to reducing GHG emissions consistent with a trajectory towards net zero by 2050.

14.3.18 To establish the significance of the GHG emissions from the Proposed Development, an assessment has been made on:

[30] International treaty adopted at the Conference of Parties 21 in Paris in December 2015 setting global goal to limit climate change to less than 2°C, preferably to 1.5°C compared to pre-industrial levels.

- The Proposed Development's consistency with national, regional and local policy requirements, since these are specified to ensure the economy decarbonises in line with the UK's net zero target; and
- The degree to which the Proposed Development has sought to mitigate its GHG emissions.

14.3.19 Examining each of these dimensions allows the assessment to make professional judgement on the likely significance of effects based on a set of significance criteria established in the IEMA guidance[17], summarised in **Table 14.1**.

Table 14.1 GHG Significance Criteria (based on IEMA Guidance[17])

Significance Rating	Description	Criteria to Determine Significance of Net GHG Emissions
Major Adverse	A development with major adverse effects is locking in emissions and does not make a meaningful contribution to the UK's trajectory towards net zero.	The development's net GHG impacts are: • not mitigated or are only compliant with do-minimum standards set through regulation; and • do not provide further reductions required by existing local and national policy for developments of this type.
Moderate Adverse	A development with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.	The development's net GHG impacts are: • partially mitigated; and • may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for developments of this type.
Minor Adverse	A development with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.	The development's net GHG impacts are: • fully consistent with applicable existing and emerging policy requirements; and • in line with good practice design standards for developments of this type.
Negligible	A development with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.	The development's net GHG impacts are: • reduced through measures that go well beyond existing and emerging policy; and • better than good practice design standards for developments of this type, such that radical decarbonisation or net zero is achieved well before 2050.
Beneficial	A development with beneficial effects substantially exceeds net zero requirements with a positive climate impact.	The development's net GHG impacts are: • below zero; and • it causes a reduction in atmospheric GHG concentrations, whether directly or indirectly, compared to the without-development baseline.

14.3.20 The IEMA guidance[17] states:

"A project that is compatible with the budgeted, science based 1.5°C trajectory (in terms of rate of emissions reduction) and which complies with up-to-date policy and 'good practice' reduction measures to achieve that has a minor adverse effect that is not significant. It may have residual emissions but is doing enough to align with and contribute to the relevant transition scenario, keeping the UK on track towards net zero by 2050 with at least a 78% reduction by 2035 and thereby potentially avoiding significant adverse effects."

"A project that achieves emissions mitigation that goes substantially beyond the reduction trajectory, or substantially beyond existing and emerging policy compatible with that trajectory, and has minimal residual emissions, is assessed as having a negligible effect that is not significant. This project is playing a part in achieving the rate of transition required by nationally set policy commitments."

"A project that causes GHG emissions to be avoided or removed from the atmosphere has a beneficial effect that is significant."

14.3.21 IEMA also advises that:

"Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant."

"A modification to this approach is required for the very largest-scale developments, those that in themselves have magnitudes of GHG emissions that materially affect the UK's or a devolved administration's total carbon budget. 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. A project that meets this threshold can in itself materially affect achievement of the carbon budget."

"Meeting the minimum standards set through existing policy or regulation cannot necessarily be taken as evidence of avoiding a significant adverse effect, and it is recommended that practitioners consider and have reference also to emerging policy/standards and the guidance of expert bodies such as the CCC on necessary policy developments, particularly for multi-phased projects with long timescales."

"A key goal of EIA is to inform the decision maker about the relative severity of environmental effects such that they can be weighed in a planning balance. Therefore, it is essential to provide context for the magnitude of GHG emissions reported in the EIA in a way that aids evaluation of these effects by the decision maker."

14.3.22 Therefore, the assessment of significance is established over two steps as follows:

Step 1: Establish Context of GHG Emissions

14.3.23 Context for decision making is provided by quantifying the net change in whole lifecycle GHG emissions associated with the Proposed Development (including emissions from embodied carbon, construction transport and construction staff travel, construction site activities, operational transport, operational repair, maintenance and replacement, and decommissioning of the Proposed Development at the end of its' operational lifetime) against two counterfactual baseline scenarios, and subsequent comparison of these net emissions against the GHG emission budgets for the UK as published by DESNZ[31].

14.3.24 In addition, a lifetime carbon intensity for the electricity generated by the Proposed Development will be calculated (i.e. gCO_2e/kWh taking account of all construction, operational and decommissioning emissions) for comparison to other energy generation forms that the Proposed Development is designed to replace as part of the UK's transition to net zero (principally natural gas power stations).

Step 2: Determine Significance of Effects

14.3.25 Significance of effects is established through applying the criteria detailed in **Table 14.1** based on professional judgement that considers:

- Step 2a: The consistency of the Proposed Development with national, regional and local policies designed to limit GHG emissions and meet the UK's net zero target; and
- Step 2b: The robustness, timeliness and efficacy of mitigation measures adopted by the Proposed Development to avoid, reduce and compensate GHG emissions.

14.3.26 In terms of mitigation, IEMA recommends that mitigation should in the first instance seek to avoid GHG emissions. Where GHG emissions cannot be avoided they should be further reduced at source, and as a last resort approaches should be considered that compensate the Proposed Development's remaining emissions, for example through offsetting.

Consultation

14.3.27 As set out in the **Consultation Report [EN010159/APP/5.1]**, a number of consultation activities have been undertaken. Full details and key issues raised and discussed in respect of Carbon and Climate Change at and before scoping are set out in **ES Volume 3, Appendix 2.1: Scoping Report [EN010159/APP/6.21]** and **ES Volume 3: Scoping Opinion**

[31] DESNZ (2021) Carbon Budgets. Available: https://www.gov.uk/guidance/carbon-budgets#setting-of-the-fourth-carbon-budget-2023-2027

[EN010159/APP/6.23]. No actionable feedback has been received in respect of Carbon and Climate Change following scoping.

Assumptions, Exclusions and Limitations

14.3.28 It is necessary to make a number of assumptions when carrying out a GHG assessment, although assumptions made have generally sought to reflect a realistic worst-case scenario. Key assumptions made in carrying out the GHG assessment include:

- A number of emission sources were scoped out, as detailed in Paragraph 14.3.7, although these are all minor in EIA terms (<1% of the Proposed Development's GHG footprint individually, and <5% of the Proposed Development's GHG footprint when combined) and would not affect the conclusions of the assessment;
- Some of the materials data used to calculate embodied GHG emissions requires some characteristics to calculate the emissions to be estimated, such as material thicknesses and densities, or specific material types. Given a Rochdale envelope approach has been undertaken (see **ES Volume 1, Chapter 2: EIA Methodology [EN010159/APP/6.2]**), in these cases, assumptions based on industry standards have been made and are considered conservative;
- As a worst-case scenario (due to the potential for higher GHG emissions) shipping of a range of key products and materials have been assumed to be imported from China via the Suez Canal including solar modules, cables, inverters, transformers, and the BESS;
- In relation to construction traffic movements (trips and distances) assumptions have been made based on the average distances to the nearest UK ports;
- Assumptions have been made in relation to the number and activity of Site plant and equipment during construction, from a list of required construction plant included in **ES Volume 1, Chapter 5: Description of the Proposed Development [EN010159/APP/6.5]**);
- Assumptions have been made on the rate of future decarbonisation of electricity generation in line with the DESNZ GHG conversion factors[29];
- Assumptions have been made on the rate of future decarbonisation of transport in line with the Department for Transport's (DfT's) WebTAG data book[32];

[32] DfT (2024) *TAG data book May 2024 v1.23. Available:* https://www.gov.uk/government/publications/tag-data-book

- It is also assumed that the HVAC system, DC-DC converters and inverters will be replaced three times during the 60-year operational lifetime, with the switchgear being replaced once and transformers being replaced twice over this time period. Additionally, the battery cells are assumed to be replaced six times over the operational lifetime of the Proposed Development;
- It is assumed that the Proposed Development will export a total of 1,080,000 MWh of renewable electricity in the first year of operation (2030). Over the 60-year lifetime of the Proposed Development, the total expected electricity export is 60,566,940 MWh. This assumes a 0.45% per annum degradation rate of the solar modules, with one replacement after 30 years;
- GHG emissions from decommissioning vehicles and staff transport during the decommissioning phase have been assumed to be equal to the construction vehicle and staff transport emissions generated during the construction phase, taking account the decarbonisation of transport. On-Site activities during decommissioning have been conservatively assumed to be 50% of the emissions from those activities undertaken during the construction phase, based on the likelihood of low emission technologies and plant being available at the time when the Proposed Development is being decommissioned; and
- During the decommissioning phase at the end of the Proposed Development's operational lifetime, an assumption has been made that 100% of solar modules will be recycled with all other components having a 70% recycling and 30% landfill rate as outlined within **ES Volume 3, Appendix 2.3: Materials and Waste Impact Assessment [EN010159/APP/6.21].**

14.4 Baseline Conditions

Existing Baseline

14.4.1 The Site presently consists of arable managed land and thus there are agricultural activities that will result in GHG emissions. Agriculture is a net emitter of GHGs due to the emissions associated with farm machinery, soil erosion and use of products such as fertilisers and pesticides. The Site currently hosts approximately 1,409ha of agricultural land, with part of the land consisting of natural and semi-natural habitats such as woodland, grassland, scrub and hedgerows. These land uses sequester carbon by absorbing CO_2 from the atmosphere which is stored in the soil.

14.4.2 Current GHG emissions from the Site resulting from the existing agricultural land uses and natural and semi natural habitats are estimated to be around 450 tonnes CO_2e per year. The calculation of these emissions is provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21].**

Future Baseline

14.4.3 Future baseline GHG emissions for the Site are assumed to be the same as the current baseline, which assumes a 'business as usual' scenario whereby the Proposed Development is not implemented and the Site continues to be managed as agricultural land.

14.4.4 Over the 60-year lifetime of the Proposed Development, the baseline GHG emissions from the Site, taking account of the agricultural uses and natural and semi-natural habitats that occupy it, will be 27,000 tonnes CO_2e.

14.4.5 It is likely that GHG emissions from farming in the future will be lower, as farming techniques and technologies improve in the future. However, for the purposes of the assessment, this has not been accounted for and as such, the "business as usual" future baseline presents a worst-case scenario as it is based on current farming methods.

14.4.6 Although the existing land use is one way to consider baseline emissions within a GHG assessment, it is also appropriate to consider the future baseline emissions as an alternative project or scenario. This is in line with IEMA guidance[17] recommendations. For GHG assessments in the renewable energy sector, it is common practice to consider the baseline emissions associated with the generation of electricity using alternative means of energy, including fossil fuels and natural gas but also nuclear and other renewable energy sources (solar, wind, hydropower etc). Outside renewables, natural gas remains the major contributor to UK electricity in 2024 at 35% of total national electricity.

14.4.7 As NPS EN-1 sets out at paragraph 3.3.61, for the UK to transition its energy supply to net zero by 2050 and decarbonise the national electricity grid, there must be a rapid transition from use of fossil fuelled power stations towards renewable energy generation. Over the past two decades, the UK has seen considerable reductions in grid average carbon intensity which is driven largely by the development of renewable energy projects such as the Proposed Development, enabling reduced use and eventual shutdown of numerous coal and other fossil fuelled power stations. However, the UK's demand for electricity grows and is predicted to continue to grow substantially. Many more renewable energy projects are therefore required.

14.4.8 With this in mind there are two alternative baseline scenarios considered in the assessment:

- Alternative Baseline 1 assumes that energy from the Proposed Development will allow the phase out of existing fossil fuel power stations in the UK and the energy generated by the Proposed Development will therefore displace energy generated by natural gas CCGT power stations;

- Alternative Baseline 2 assumes that an alternative technology to the Proposed Development will be operated (an 'Alternative Baseline'). The focus is on a new natural gas fired power station operating with Carbon Capture and Storage (CCS) technology, although comparison to the carbon intensity of other renewable energy schemes is also provided.

14.4.9 In relation to Alternative Baseline 1, it is assumed that the electricity would be generated using an unabated natural gas-fired CCGT power station to 2035, and from then until 2090 the CCGT power station would have a Carbon Capture and Storage system (CCS) installed (see paragraph 4.9.25 of NPS EN-1). It has been assumed that this CCS system would reduce direct GHG emissions by 90%; this percentage reduction is considered appropriate based on publications on typical large scale carbon capture efficacy[33]. This approach has been adopted as it is part of the UK's industrial decarbonisation strategy to use CCS technology, which may apply to fossil-fuel power stations.

14.4.10 The operational emissions from unabated natural gas fired CCGT power stations are assumed to be 375 gCO_2e/kWh, which is taken from the Government's 2023/2024 fuel mix disclosure data[34]. From 2035, this is assumed to reduce to 37.5 gCO_2e/kWh to account for CCS.

14.4.11 For Alternative Baseline 1 it is assumed that 1,080 GWh (gigawatt hours) of electricity will be generated in year 1 (equal to that expected to be generated by the Proposed Development) and that the electricity generated reduces by 0.45% per annum due to solar module degradation[35]. The standard unit of measurement of electricity is the kilowatt hour (kWh). The 1,080 GWh generated to 1,080,000,000 (one billion and eighty million) kWh per year.

14.4.12 GHG emissions from Alternative Baseline 1 (CCGT) are 4,077,358 tonnes of CO_2e.

14.4.13 In relation to Alternative Baseline 2, **Table 14.2** presents the lifecycle emissions from other forms of energy generation considered in this assessment.

[33] Feron, P., Cousins, A., Jiang, K., Zhai, R., Thiruvenkatachari, R. and Burnard, K. (2019) Towards zero emissions from fossil fuel power stations. International Journal of Greenhouse Gas Control, 87, pp.188-202.

[34] DESNZ (2024) Fuel mix disclosure data table: https://www.gov.uk/government/publications/fuel-mix-disclosure-data-table/fuel-mix-disclosure-data-table

[35] The 0.45% reduction is applied up to year 30 and then reset to 1,080 GWh/yr to account for proposed replacement of Solar Modules.

Table 14.2 Lifecycle GHG Emissions from Various Forms of Energy Generation (gCO_2e/kWh)[36]

Energy Source	Energy Generation Form	Lifecycle GHG Emissions (gCO_2e/kWh)	
		Lower Threshold	Upper Threshold
Fossil Fuel – Natural Gas	Natural Gas Combined Cycle (NGCC) plant without CCS	403	513
	NGCC with CCS	92	221
Hydropower	Hydropower (360 MW)	6.1	11
	Hydropower (660 MW)	85	147
Nuclear	Average Nuclear Power Station	5.1	6.4
Photovoltaic (PV)	Poly-silicon, ground mounted	23	82
	Cadmium telluride (CdTe), ground mounted	8	28
	Copper Indium Gallium Selenide (CIGS), ground mounted	7.4	27
Wind	Onshore	7.8	16
	Offshore, concrete foundation	13	23
	Offshore, steel foundation	12	21

14.5 Environmental Measures

Construction Phase

14.5.1 The **Outline Construction Environmental Management Plan [EN010159/APP/7.4]** (oCEMP) and **Outline Construction Traffic Management Plan [EN010159/APP/7.9]** (oCTMP) are submitted alongside the DCO application. The documents detail the measures included to codify best-practice working measures to reduce environmental impacts, including GHG emissions, and includes the principles of the Considerate Constructors Scheme, as well as measures to minimise the creation of waste and to maximise the use of materials with lower embodied GHG emissions.

[36] Luxembourg Institute of Science and Technology (LIST) (2021) *Life cycle assessment of electricity generation options.* Available: https://unece.org/sites/default/files/2021-09/202109_UNECE_LCA_1.2_clean.pdf

14.5.2 With respect to minimising the number of vehicle movements and subsequent emissions, the oCTMP (see **Outline Construction Traffic Management Plan [EN010159/APP/7.9])** provides measures to consolidate the delivery of materials on-Site, as well as ways to promote the most sustainable methods of construction workers to get to the Site.

Operational Phase (including Maintenance)

14.5.3 The **Outline Operational Environmental Management Plan [EN010159/APP/7.5]** (oOEMP) is submitted alongside the DCO application. The document provides management procedures which will reduce GHG emissions associated with the operation and on-going maintenance of the Proposed Development.

Decommissioning Phase

14.5.4 The **Outline Decommissioning Environmental Management Plan [EN010159/APP/7.6]** (oDEMP) will be secured by DCO requirement. This provides management procedures for the removal and treatment of materials on-Site during decommissioning and minimise traffic movements during decommissioning.

14.6 Assessment of Likely Significant Effects

14.6.1 The GHG assessment considers the net GHG emissions resulting from the Proposed Development and is structured as follows:

- Quantification of the net GHG emissions from the Proposed Development over:
- The construction phase;
- The operational phase;
- The decommissioning phase;
- The whole lifetime of the Proposed Development – i.e. from the beginning of the construction phase to the end of the decommissioning phase;
- Carbon intensity and energy offset of the Proposed Development compared to natural gas-fired electricity generation (i.e. counterfactual scenario);
- Contextualisation of the Proposed Development's lifecycle GHG emissions against the UK's carbon budgets;
- Assessment of the likely significant effects; and
- Assessment of mitigation and residual effects.

Quantification of Whole Life GHG Emissions from the Proposed Development

Construction Phase

Embodied GHG Emissions in Materials used in the Construction of the Proposed Development

14.6.2 Embodied GHG emissions in the materials used for construction of the Proposed Development are 531,892 tonnes CO_2e. A breakdown of embodied GHG emissions by source is shown in **Table 14.3**. The major contributors to the Proposed Development's embodied GHG emissions are the solar modules and BESS. Further details of the calculation of embodied GHG emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21]**.

Construction Transport

14.6.3 Emissions from construction transport (including shipping of goods and materials, and construction staff travel) are 38,298 tonnes CO_2e. Further details of the calculation of construction transport emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21]**.

Construction Site Emissions

14.6.4 Emissions from construction plant and machinery used during construction are 12,279 tonnes CO_2e. Further details of the calculation of construction plan and machinery emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21]**.

Summary Construction Phase GHG Emissions

14.6.5 A summary of the construction phase GHG emissions is provided below in **Table 14.3**.

Table 14.3 Construction Phase GHG Emissions Summary

Construction Phase Component	GHG Emissions (TCO_2e)	% of Construction Phase Emissions
Embodied GHG Emissions		
Solar Modules	212,583	36.5%
Mounting Structures	39,499	6.8%
Cabling (Low Voltage Distribution Cables and Grid Connection Cables)	42,057	7.2%

Construction Phase Component	GHG Emissions (TCO_2e)	% of Construction Phase Emissions
Power Conversion Stations (PCS) (Inverters, Transformers and Switchgear)	32,232	5.5%
Battery Energy Storage Systems (BESS)	162,941	28.0%
Onsite Substations and Ancillary Buildings	39,758	6.8%
Hard surfacing	1,962	0.3%
Fencing	860	0.1%
Embodied GHG Emissions Total	**531,892**	**91.3%**
Construction Transport		
Materials Transport - Road	8,382	1.4%
Materials Transport - Shipping	29,818	5.1%
Construction Staff Travel	98	0.0%
Construction Transport Total	**38,298**	**6.6%**
Construction Site Activities	**12,279**	**2.1%**
TOTAL	**582,468**	**100.0%**

Operational Phase (including Maintenance)

Operational Transport

14.6.6 Emissions from operational transport during the 60-year lifetime are 105 tonnes CO_2e. Further details of the calculation of operational transport emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21]**.

Repair, Maintenance and Replacement

14.6.7 Emissions from repair, maintenance and replacement during the operational lifetime of the Proposed Development are 1,381,910 tonnes CO_2e.

14.6.8 This estimate is considered very conservative since it does not account for decarbonisation of the supply chain (e.g. reduced carbon intensity of the

manufacture of replacement components) that is expected in the period until the Proposed Development is decommissioned (anticipated to be in 2090).

14.6.9 Further details of the calculation of repair, maintenance and replacement emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21]**.

Decommissioning Phase

Decommissioning Site Emissions

14.6.10 Emissions from Site plant and machinery used during decommissioning of the Proposed Development at the end of its operational lifetime are assumed to be 50% of those during the construction phase; thus, these emissions are 6,139 tonnes CO_2e. This arbitrary percentage reduction has been applied in the absence of available information and is considered appropriate. It is intended to reflect the likely improvement in technology and techniques that will be available in the future (at the time the Proposed Development is decommissioned) that will have lower associated emissions than those currently available.

Decommissioning Staff Transport

14.6.11 Emissions from staff transport during decommissioning of the Proposed Development are assumed to be equal to those during the construction phase but taking account of transport decarbonisation in line with the DfT's WebTAG data book[32]: thus, these emissions are 24 tonnes CO_2e. This represents a worst-case scenario as the decommissioning phase will likely require less staff than the construction phase.

Transportation and Disposal of Waste Materials

14.6.12 Emissions from decommissioning transport are 6,695 tonnes CO_2e. Further details of the calculation of construction transport emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21].**

14.6.13 Emissions from the disposal of waste materials during decommissioning of the Proposed Development are estimated at 1,519 tonnes CO_2e. 100% of solar modules are assumed to be recycled during decommissioning, with a 70% recycling and 30% landfill rate of all other components.

14.6.14 Further details regarding the calculation of the transportation and disposal of waste materials emissions are provided in **ES Volume 3, Appendix 14.2: Greenhouse Gas Assessment Technical Methodology [EN010159/APP/6.21]**.

Whole Life GHG Emission Footprint

14.6.15 A summary of the whole life GHG emissions footprint for the Proposed Development is provided in **Table 14.4**.

Table 14.4: Whole Life GHG Emissions Summary

Component	GHG Emissions (TCO_2e)	% of Total Emissions
Construction		
Embodied GHG Emissions	531,892	27.0%
Construction Transport	38,298	1.9%
Construction Site Activities	12,279	0.6%
Construction Total	**582,468**	**29.5%**
Operation (including Maintenance)		
Operational Transport	105	0.01%
Operational Repair, Maintenance and Replacement	1,381,910	70.1%
Operation Total	**1,382,016**	**70.1%**
Decommissioning		
Construction Site Activities	6,139	0.3%
Staff Transport	24	0.0%
Transportation and disposal of waste materials	1,519	0.1%
Decommissioning Total	**7,682**	**0.4%**
TOTAL	**1,972,166**	**100.0%**

Carbon Intensity and Energy Offset

Replacement of Existing Fossil Fuels (Alternative Baseline 1)

14.6.16 The Proposed Development will provide renewable electricity that would otherwise be generated via alternative means with higher carbon intensity, such as CCGT which utilises the burning of natural gas. Specifically, the Proposed Development is supportive of government policy to transition the national grid to renewables, enabling the removal of fossil fuel generated fuel electricity (e.g.,

natural gas) from the grid. Alternative Baseline 1 therefore compares the lifecycle carbon emissions of the Proposed Development to that of a natural gas-fired power generation using CCGT, with CCS assumed to be installed in the future. In this scenario the baseline emissions are 4,077,358 TCO_2e, which is more than twice the Proposed Development's lifecycle emissions of 1,972,166 TCO_2e. This represents a carbon emissions saving of -2,105,192 TCO_2e. It should be noted this value excludes indirect emissions from the operation of the CCGT power station including construction of the CCS and fuel supply chain emissions which would further increase the potential carbon emissions avoided.

14.6.17 The 'payback' period – i.e. the period when direct CCGT emissions would exceed the lifecycle emissions of the Proposed Development would be only three years (assuming a CCGT does not have CCS fitted by 2030).

14.6.18 Overall, it is demonstrated that the Proposed Development will lead to avoided GHG emissions by replacing electricity currently generated by more carbon intensive methods (such as natural gas CCGT) and enable the removal of fossil fuel generation from the UK electricity grid.

Alternative to Other New Energy Schemes (Alternative Baseline 2)

14.6.19 Based on total whole lifecycle GHG emissions of 1,972,166 tonnes CO_2e, the lifecycle carbon intensity of electricity generated by the Proposed Development is 32.6 gCO_2e/kWh.

14.6.20 Utilising the carbon intensity values presented in **Table 14.2** for other forms of energy generation (including fossil fuel, nuclear and renewable energy sources), the carbon intensity of the electricity generated by the Proposed Development towards the lower end of the range for that generated from the poly-silicon, ground mounted solar energy sources in **Table 14.2** and is therefore indicative of good practice for a ground-mounted solar PV system. It also falls considerably below the carbon intensity values for electricity generated by fossil fuel power stations, even when taking account of CCS.

14.6.21 Whilst the carbon intensity of electricity generated by the Proposed Development is higher than the benchmark data for nuclear or onshore wind, the following should be noted:

- Nuclear power stations have a considerably longer construction period spanning decades, whereas the construction period of the Proposed Development is only two years, allowing renewable electricity to be generated much earlier. Additionally, nuclear power plants produce radioactive waste and require several decades to be safely decommissioned. In comparison, the Proposed Development will be fully decommissioned within two years, including the removal of all above-ground infrastructure and permissive paths to return grassland to landowners; and

- Wind electricity generation is not considered feasible for the Site given its geographic location as detailed in as detailed within Section 4.6 within **ES Volume 1, Chapter 4: Alternatives** and **Design Evolution [EN010159/APP/6.4]**.

14.6.22 It should be noted that NPS EN-1[9] emphasises that to ensure reliable electricity systems during the transition to net zero 2050, the UK must adopt a diverse mix of renewable energy sources (including solar projects) to come forward in conjunction.

Assessment of Significance of Effects

14.6.23 The assessment of the significance of the GHG emissions is informed through IEMA guidance[17] detailed in **Section 14.6** and follows a two-step process detailed below.

Step 1: Establish Context

14.6.24 The GHG emissions from the Proposed Development are compared to the UK's carbon budgets to establish context.

14.6.25 The UK has legislated a 2050 net zero target following recommendations and analysis completed by the CCC[20]. To meet this target, the CCC sets carbon budgets to establish carbon emissions limits. The construction emissions (occurring between 2027 and 2029) coincide with the UK's 4th and 5th carbon budgets, which cover the periods 2023-2027 and 2028-2032 respectively. The operational emissions of the Proposed Development (occurring from 2030 onwards) coincide with the UK's 5th and 6th carbon budgets, which cover the periods 2028-2032 and 2033-2037, respectively. There are no official UK carbon budgets available for the period 2038 onwards, however these have been projected forward to 2052 based on the 6th carbon budget.

14.6.26 **Table 14.5** summarises both the gross and net changes in GHG emissions from the Proposed Development, taking account of both the construction and operational phases, of as a percentage of the UK's 4th, 5th, 6th, 7th, 8th and 9th carbon budgets. The net emissions take into account CCGT with CCS technology from 2030 to demonstrate the savings in CO_2e emissions within the budget periods spanning from 2028 to 2052.

Table 14.5 Gross and Net GHG Emissions from the Proposed Development as % of UK's Carbon Budgets

UK Budget	Period	Budget Value ($MTCO_2e$)	Gross GHG Emissions due to the Proposed Development ($MTCO_2e$)	% of UK Carbon Budget	Net GHG Emissions due to the Proposed Development ($MTCO_2e$)	% of UK Carbon Budget
4th Carbon Budget	2023 - 2027	1,950	0.29	0.01%	0.29	0.01%
5th Carbon Budget	2028 - 2032	1,725	0.36	0.02%	-0.85	-0.05%
6th Carbon Budget	2033 - 2037	965	0.12	0.01%	-0.82	-0.1%
7th Carbon Budget	2038 - 2042	540	0.12	0.02%	-0.1	-0.02%
8th Carbon Budget	2043 - 2047	302	0.12	0.04%	-0.1	-0.03%
9th Carbon Budget	2048 - 2052	169	0.16	0.1%	-0.0	-0.02%

14.6.27 **Table 14.5** shows that the gross GHG emissions as a percentage of carbon budgets are no greater than 0.1% and therefore very small. Much of the embodied GHG emissions (which make up the majority of construction emissions and emissions from operational replacement parts) will be emitted abroad during product manufacture and is therefore not included within the UK's carbon budgets. Embodied carbon emissions in the supply chain are also likely to decarbonise during the operational lifetime of the Proposed Development, but this is not captured in the modelling. As such, the comparison is conservative.

14.6.28 While the Proposed Development will result in operational residual emissions post 2030, it will enable substantial emissions reductions relative to the electricity generation from CCGT with or without CCS technology.

Step 2: Determine Significance

14.6.29 The significance of effects is established through applying the criteria detailed in **Table 14.1**. This requires judgments on:

- The consistency of the Proposed Development with national, regional and local policies designed to limit GHG emissions and meet the UK's net zero target; and
- The robustness, timeliness and efficacy of mitigation measures adopted by the Proposed Development to avoid, reduce and compensate GHG emissions.

14.6.30 Each is considered further below.

Step 2a: Consistency of the Proposed Development with National, Regional and Local Policies

National

14.6.31 The key relevant national policies and legislation are the Energy Act 2023[4], NPS EN-1[9], EN-3[10], EN-5[11] and the NPPF[12]. Paragraph 160 of the NPPF specifically relates to the use and supply of renewable and low carbon energy, and Annex 3 identifies solar farms as being essential infrastructure.

14.6.32 This framework provides support for solar development and recognises the role of solar energy developments in the transition to a net zero economy by 2050.

14.6.33 The whole lifecycle GHG assessment provided in this Chapter also satisfies the requirements of NPS EN-1 that a whole lifecycle GHG assessment be included in the ES for all nationally significant energy projects.

14.6.34 Overall, the Proposed Development is demonstrated to result in lifecycle GHG benefits and contribute in the transition to net zero and is supported by key national policy.

Regional

14.6.35 'Policy S14 Renewable Energy' and 'Policy S16 Wider Energy Infrastructure' within the Central Lincolnshire Local Plan 2018-2040[14] state that the Central Lincolnshire Joint Strategic Planning committee is supporting the transition to a net zero carbon future and recognises and supports the need for significant investment in new energy infrastructure. As such, it seeks to maximise appropriately located renewable energy generated in Central Lincolnshire.

14.6.36 It places a presumption of favour of permissions for renewable energy infrastructure and schemes provided that they demonstrate to have acceptable direct, indirect, individual and cumulative impacts.

14.6.37 The DCO application for the Proposed Development complies with the requirements of Policy S14 or Policy S16.

Local

14.6.38 The Proposed Development supports the requirements of Core Policies 9 and 10 within the Newark and Sherwood Amended Core Strategy[13] which highlight the importance of renewable energy, efficient design, waste minimisation and climate resilience and adaptation.

14.6.39 The Bassetlaw Local Plan 2020-2038[15]**Error! Bookmark not defined.** specifically refers to "green energy" within its overarching vision. Within the Plan, it states:

"A secure, reliable, affordable net zero and low carbon energy mix will be helping to reduce locally produced greenhouse gas emissions. Significant new renewable energy infrastructure will make meaningful contributions across the District, in part through maximising opportunities for net zero energy generation at the former power station sites, whilst the increasing provision of localised renewable and low carbon technologies will better enable residents and businesses to transition to a net zero carbon district by 2050".

14.6.40 The Proposed Development facilitates the transition to net zero energy generation, moving away from reliance on former power station sites, through the provision of renewable energy.

Summary

14.6.41 Overall, the Proposed Development is consistent with relevant national, regional and local policies relating to GHG emissions.

Step 2b: Robustness, Timeliness and Efficacy of Mitigation

14.6.42 The principles of the IEMA guidance[17] are that where GHGs cannot be avoided, mitigation (in the form of environmental measures) should be provided to minimise GHGs.

14.6.43 Environmental measures including embedded and additional mitigation adopted by the Proposed Development to minimise GHG emissions from the construction, operational and decommissioning phases are described in **Section 14.5**.

Summary of GHG Assessment

14.6.44 The assessment of significance has followed a two-step process consistent with IEMA guidance[17] and is summarised below in **Table 14.6**.

Table 14.6 Assessment of Significance

Step	Description	Assessment	Applicable IEMA rating
Step 1	Context	The Proposed Development's gross emissions contribute to a very small component of the UK's 4th, 5th and 6th carbon budgets (0.01%, 0.02% and 0.01% respectively). When considering whole life GHG emissions, the Proposed Development will result in a net reduction in GHG emissions through provision of renewable electricity compared to electricity generated from fossil fuels (e.g., CCGT).	**Beneficial Significant**
Step 2	Consistency with National, Regional and Local Policy	The Proposed Development is fully consistent with applicable existing and emerging policy requirements.	
	Robustness, Timeliness and Efficacy of Mitigation	The Proposed Development has adopted measures to avoid and minimise GHG emissions during the construction, operational and decommissioning phases and will support the transition to net zero by or before 2050.	

14.6.45 Based on **Table 14.6** and with reference to IEMA's significance criteria (see **Table 14.1**) the GHG assessment therefore finds that the effects are **indirect**, **long-term**, **UK-wide** and of **beneficial significance**. This is a judgement based on the balance of the effects, but applying considerable weight to the Proposed Development resulting in a net reduction in GHG emissions from power generation compared to electricity generated from fossil fuels (e.g., CCGT).

PART B: CLIMATE CHANGE RESILIENCE (CCR) ASSESSMENT

14.7 Assessment Methodology and Significance Criteria

14.7.1 This part of the ES chapter provides a qualitative assessment of the embedded mitigation and resilience of the Proposed Development to climate change. The assessment methodology takes into account the recommendations in the IEMA *EIA guide to Climate Change Resilience and Adaptation*[24] which presents a framework for the consideration of climate change resilience and adaption in the EIA process. It recognises a need for a proportionate approach to the assessment, due to the uncertainties associated with predicting how the environment will respond to climate change.

Study Area and Scope

14.7.2 The study area for CCR, unlike other disciplines, focuses on the impact that climate will have on the Proposed Development (as opposed to the impact of the

Proposed Development on the environment). The study area is therefore the footprint of the Proposed Development, split into its constituent parts (receptors).

14.7.3 The Proposed Development has an anticipated lifespan of 60 years. Climate projections from UKCP18[25] for the period up to 2090 (the year which the Proposed Development is anticipated to be decommissioned) have used the Representative Concentration Pathway (RCP) 8.5 – high emissions scenario. RCP8.5 has been used as it represents a worst-case emissions scenario with regards to climate policy, land use, and technological development.

Establishing Baseline and Future Climatic Conditions

14.7.4 The current baseline for the CCR assessment is the current climate at the Site. Historic climate data has been obtained from the Met Office website, recorded by the closest Met Office station to the Site which is at RAF Waddington near Lincoln, approximately 15 km southeast of the Site. The current climate hazards for the Site has been identified based on the Flood Risk Assessment.

14.7.5 The future baseline conditions have been defined by potential climate risks identified in the UK Climate Change Risk Assessment[28], National Adaptation Programme[27], and the Key Climate Projections: Headline Findings produced by the Met Office UK[26]. These are based on the UKCP18 dataset[25].

Receptors and Receptor Sensitivity

14.7.6 The receptors for the review of CCR are the Proposed Development itself, including all infrastructure, assets, and workers on-Site during operation and decommissioning. The sensitivity of the receptors has not been defined for the CCR review as only a review of the impacts is required in line with UK industry (IEMA) guidance[24], rather than an assessment of the significance.

Determining Effect Significance

14.7.7 It is standard practice in EIA to distinguish between construction, operational and decommissioning effects of the Proposed Development on the environment. The CCR assessment is required to establish any significant effects of climate change on the Proposed Development. The focus of the assessment is in the future when it is anticipated that changes from the existing climate will have occurred, and these may pose risks in relation to the operational function of the Proposed Development and potentially during its decommissioning. As such, this component of the assessment does not explicitly consider climate risks during the construction period since these works will largely be happening in a period which is not subject to significant additional climate change to that already experienced, and those risks are well established and managed through standard practices.

14.7.8 Resilience to climate change is principally considered in the design of the Proposed Development which needs to anticipate future risks and build in

appropriate adaptation measures. There is, therefore, a focus on measures adopted by the Proposed Development to address future climate change.

14.7.9 The CCR assessment starts by establishing potential receptors, potential climate risks and considers the significance of that risk through an assessment of likelihood and consequence, taking into account embedded design measures adopted by the Proposed Development. As a further step, the CCR assessment identifies additional mitigation (as required) to address any significant effects and concludes on the residual risks.

14.7.10 To summarise, climate change by its nature occurs over many decades and future changes, as modelled by UKCP18[25], consider climate change in the 2050s and beyond. The focus of the CCR assessment is on the operational and decommissioning phases of the Proposed Development and the risks it may face due to future climate change. This takes into account design measures that are adopted during the construction of the Proposed Development and any additional operational measures that may be required in the future.

14.7.11 The assessment is carried out over four steps, as follows, in accordance with the IEMA guidance[24].

Step 1: Establish Relevant National, Regional and Local Policy Requirements

14.7.12 This step establishes any relevant policy that informs the assessment of climate risks, and requirement for measures to manage those risks (known as adaptation measures).

Step 2: Identify Receptors

14.7.13 During this stage, relevant receptors associated with the Proposed Development which may be affected by climate change (e.g. change in average weather conditions and extreme events) are identified.

Step 3: Identify Potential Impacts of Climate Change on Receptors and Confirm Mitigation

14.7.14 This stage comprises the identification of potential impacts of changes in a range of climate variables on the receptors identified in Step 1. This is undertaken using professional judgement and identifies the design measures adopted by the Proposed Development to mitigate the impacts, taking into account policy requirements identified in Step 1.

Step 4: Assess the Significance of Effects of Climate Change on Receptors

14.7.15 This step assesses the significance of each hazard based on scoring the likely consequence and likelihood of that hazard arising, using a five-point scale described in **Table 14.7** and **Table 14.8**. The assessment of significance and scoring of likelihood and consequence are based on IEMA guidance[24].

Table 14.7 Qualitative Description of Consequence

Measure of Consequence	Description
Negligible	No damage to a development, minimal adverse effects on health, safety and the environment or financial loss. Little change to service and disruption lasting less than one day.
Minor Adverse	Localised disruption or loss of service. No permanent damage to a development, minor restoration work required: disruption lasting less than one day. Small financial losses and/or slight adverse health or environmental effects.
Moderate Adverse	Limited damage to a development and loss of service with damage recoverable by maintenance or minor repair. Disruption lasting more than one day but less than one week. Moderate financial losses. Adverse effects on health or the environment.
Large Adverse	Extensive damage to a development and severe loss of service. Disruption lasting more than one week. Early renewal of 50-90% of a development. Permanent physical injuries and/or fatalities. Major financial loss. Significant effect on the environment, requiring remediation.
Very Large Adverse	Permanent damage to a development and complete loss of service. Disruption lasting more than one week. Early renewal of >90% of a development. Severe health effects or fatalities. Extreme financial loss. Very significant loss to the environment requiring remediation and restoration.

Table 14.8 Qualitative Description of Likelihood

Measure of Likelihood	Description
Very High	The event occurs multiple times during the lifetime of a development e.g., approximately annually.
High	The event occurs several times (approximately 12 events) during the lifetime of a development.
Medium	The event occurs limited times (approximately 4 events) during the lifetime of a development.
Low	The event occurs once during the lifetime of a development.
Very Low	The event may occur once during the lifetime of a development or may not occur at all.

14.7.16 These determinants (**Table 14.7** and **Table 14.8**) are combined to assess the significance of effects on receptors, as shown in **Table 14.9**. The assessment is qualitative and uses expert judgement based on knowledge of similar schemes, engagement with other technical assessments in the ES and a review of relevant literature.

14.7.17 The assessment of significance takes embedded mitigation adopted by the Proposed Development into account.

Table 14.9 Significance of Effects Matrix

Likelihood of Hazard Occurring	Consequence of Hazard Occurring				
	Negligible	Minor Adverse	Moderate Adverse	Large Adverse	Very Large Adverse
Very High	Not Significant	Significant	Significant	Significant	Significant
High	Not Significant	Significant	Significant	Significant	Significant
Medium	Not Significant	Not Significant	Significant	Significant	Significant
Low	Not Significant	Not Significant	Not Significant	Significant	Significant
Very Low	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant

Step 5: Establish Further Adaptation Measures and Determine Residual Effects

14.7.18 In the fifth step, further adaptation measures for any significant effects are identified through expert opinion, based on knowledge of similar schemes, and any residual effects of climate change on receptors are assessed using the criteria set out in **Table 14.7** to **Table 14.9**.

Consultation

14.7.19 As set out in **Consultation Report [EN010159/APP/5.1]**, a number of consultation activities have been undertaken. Full details and key issues raised and discussed in respect of Carbon and Climate Change at and before scoping are set out in **ES Volume 1, Chapter 2: EIA Methodology [EN010159/APP/6.2].** No specific feedback has been received in respect of Carbon and Climate Change following scoping.

Assumptions, Exclusions and Limitations

14.7.20 The CCR assessment outlines the potential impacts of climate change on the Proposed Development based on a qualitative assessment and professional judgement using knowledge of similar schemes. The UKCP18[25] projections are the most up-to-date projections of climate change for the UK.

14.7.21 UKCP18 provides probabilistic projections of future climate for a range of emissions scenarios. Future GHGs emissions, and the resulting pathway, is uncertain. A precautionary approach, consistent with IEMA guidance[24] has therefore been adopted by selecting a high emissions scenario (RCP8.5) and

long-term time slice (2090s) which offer the longest-term projections into the Proposed Development's operational lifetime.

14.7.22 The embedded adaptation measures incorporated within the Proposed Development are based on information provided by the Applicant. The determination of significance has been undertaken under the assumption that industry design standards will be adhered to where detailed design information is unavailable.

14.8 Baseline and Future Climatic Conditions

Existing Baseline

14.8.1 Historic climate data have been identified from the meteorological monitor station located at RAF Waddington near Lincoln[37], approximately 15 km southeast of the Site, which is the closest site metrological site to the Proposed Development. Historic climate data for the 30-year period of 1981-2010 and 1991-2020 (the standard baseline for climate data), are summarised in **Table 14.10**.

Table 14.10 Historic Climate Data Summary

Climate Factor	Month (1981-2010)	Value	Month (1991-2020)	Value
Warmest month on average (Average daily mean temp °C)	July	21.3	July	21.6
Coldest month on average (Average daily mean temp °C)	January	1.2	January	1.6
Mean annual rainfall levels (mm)	-	614.55	-	614.8
Wettest month on average (Average monthly rainfall) (mm)	August	60.3	October	61.4
Driest month on average (Average monthly rainfall) (mm)	February	36.8	February	38.4

14.8.2 When comparing the 30-year climate averages between 1981-2010 and 1991-2020, there are increases in temperature in terms of the warmest and coldest month, no change in the mean annual rainfall level and a slight increases in rainfall during the wettest month and a decrease in rainfall during the driest month.

[37] Met Office (2024) *Waddington (Lincolnshire) UK Climate Averages.* Available: https://www.metoffice.gov.uk/research/climate/maps-and-data/uk-climate-averages/gcrws0hwg

14.8.3 The Met Office historic 10-year averages for RAF Waddington station identify gradual warming in both the winter and summer periods between 1973 and 2022, with no clear trends in average rainfall. Information on average daily mean temperatures (°C) and mean monthly rainfall (mm) is summarised in **Table 14.11**.

Table 14.11 Historic 10-year Averages for Temperature and Rainfall for RAF Waddington Region

Climate Period	Climate Variables			
	Average Daily Mean Temperatures (°C)		Mean Monthly Rainfall (mm)	
	Winter (Oct-Mar)	Summer (Apr-Sep)	Winter (Oct-Mar)	Summer (Apr-Sep)
1973-1982	5.4	13.1	53.0	50.3
1983-1992	5.7	13.2	47.3	50.2
1993-2002	6.3	13.7	50.7	52.7
2003-2012	6.3	14.3	45.7	59.9
2013-2022	6.8	14.4	51.9	49.8

14.8.4 There has been a significant human influence on the observed warming in the UK annual temperature since 1950. Statistical results from extreme value analysis suggest that the UK daily maximum and minimum temperature extremes have increased by just over 1°C since the 1950s, and that heavy seasonal and annual rainfall events have also increased.

Future Climatic Conditions

14.8.5 The future baseline climate is expected to differ from the present-day baseline described above. United Kingdom Climate Change Projections 2018 (UKCP18) provides probabilistic climate change projections for predefined 30-year periods for annual, seasonal and monthly changes to mean climatic conditions over land areas. For the purpose of the assessment, UKCP18 probabilistic projections for the climate variables set out in **Table 14.12** have been obtained.

Table 14.12 Future Projected Climate Variables

Temperature	Precipitation	Cloud Cover
Mean annual temperature	Mean annual precipitation	Mean annual cloud cover
Mean summer temperature	Mean summer precipitation	Mean summer cloud cover

Temperature	Precipitation	Cloud Cover
Mean winter temperature	Mean winter precipitation	Mean winter cloud cover
Maximum summer temperature		
Minimum winter temperature		

14.8.6 Projected temperature, precipitation, and cloud cover variables are presented in **Table 14.13, Table 14.14, Table 14.15**, respectively. UKCP18 probabilistic projections have been analysed for the 25 km^2 grid square within which the Proposed Development is located. These figures are expressed as temperature/precipitation anomalies in relation to the 1961-1990 baseline.

14.8.7 UKCP18 uses a range of possible scenarios, classified as Representative Concentration Pathways (RCPs), to inform differing future emission trends. These *RCPs "… specify the concentrations of greenhouse gases that will result in total radiative forcing increasing by a target amount by 2100, relative to preindustrial levels."* RCP8.5 has been used for the purposes of this assessment as a worst-case scenario (RCP8.5 is the worst-case scenario available in the projections).

14.8.8 As the Proposed Development will seek a time limited consent requiring decommissioning after 60 years, the CCR assessment has considered a scenario that reflects a high level of GHG emissions at the 50% probability level up to 2089 to assess the impact of climate change over that period. Climate variables are also provided for the range between the 10% and 90% probability levels as a sensitivity test.

14.8.9 **Table 14.13**, **Table 14.14**, and **Table 14.15** show projected changes in temperature (expected to increase), precipitation (expected to increase in winter and decrease in summer) and cloud cover (expected to increase in winter and decrease in summer). **Table 14.13**, **Table 14.14**, and **Table 14.15** show the 50% probability level as the core value in each cell, with the 10%-90% probability range shown in parentheses. The climate projections do not take account of the Proposed Development.

Table 14.13 Projected changes in temperature variables (°C)

Climate Variable	Time Period		
	2020-2049	2040-2069	2060-2089
Mean annual air temperature anomaly at 1.5 m (°C)	+1.4 (+0.7 to +2.1)	+2.2 (+1.2 to +3.3)	+3.3 (+1.8 to +4.8)

Climate Variable	Time Period		
	2020-2049	2040-2069	2060-2089
Maximum annual air temperature anomaly at 1.5 m (°C)	+1.5 (+0.7 to +2.3)	+2.3 (+1.2 to +3.6)	+3.5 (+1.8 to + 5.2)
Minimum winter air temperature anomaly at 1.5 m (°C)	+1.3 (+0.6 or +1.2)	+2.1 (+1.0 or +3.3)	+2.2 (+1.6 or +4.9)

Table 14.14 Projected changes in precipitation variables (%)

Climate Variable	Time Period		
	2020-2049	2040-2069	2060-2089
Annual precipitation anomaly (%)	+1.2 (+2.2 or +0.7)	-1.9 (+0.01 or -3.0)	-0.9 (+1.7 or -2.9)

Table 14.15 Projected changes in cloud cover variables (%)

Climate Variable	Time Period		
	2020-2049	2040-2069	2060-2089
Annual cloud anomaly (%)	-1.9 (-5.2 or +1.1)	-3.2 (-8.0 or +1.0)	-5.2 (-11.8 or 0.6)

14.8.10 The projected changes indicate increasingly erratic weather patterns that are likely to lead to greater numbers of extreme weather events that may affect the Site.

14.8.11 This includes heatwaves (precursor to droughts) and increase in localised intense precipitation events, (precursor to flooding) with some climate models predicting an increase in frequency and intensity of winter storms[26]. Increase in the frequency and intensity of these extremes can put further pressure on resources and increase risk posed to infrastructure and public health and safety.

Snow

14.8.12 According to UKCP18 projections[25], for the period up to 2090, under a high emissions scenario (RCP8.5), the regional (12 km) and local (2.2 km) projections show a decrease in both falling and lying snow relative to the 1981-2000 baseline.

Wind

14.8.13 Winds associated with major storm events can be some of the most damaging and disruptive events for the UK with implications for property, power networks, road and rail transport and aviation. Calm periods with little wind, particularly over prolonged periods, can affect air quality whilst winds from a particular direction can be a critical factor in the spread of particulates. Both cases are also examples where the combination of factors such as wind, temperature and precipitation can exacerbate their impacts (e.g., air quality issues tend to be worse under conditions of light winds and higher temperatures; pathogen spread can require wind, temperature and precipitation conditions to be favourable)[38].

14.8.14 Changes in wind speeds are not currently available at regional level and there remains considerable uncertainty in the projections with respect to wind speed. Across the UK, near surface wind speeds are expected to increase in the second half of the 21st century with winter months experiencing more significant impacts of winds[38]. This is accompanied by an increase in frequency of winter storms over the UK. However, the increase in wind speeds is projected to be modest. There are no compelling trends in storminess as determined by maximum gust speeds from the UK wind network over the last four decades[39].

Summary

14.8.15 The region of England in which the Site is located is set to experience the following climate hazards, which are considered in the CCR assessment:

- Hotter summers with extreme temperatures (heatwaves);
- Wetter winters including extreme rainfall (pluvial and groundwater flooding);
- Drier summers (drought); and
- Increased wind and storms.

14.8.16 Whilst there are large uncertainties in the frequency and intensity of storms increasing under climate change, wind speeds are expected to increase slightly as well.

14.8.17 The following climate hazards are scoped out of the CCR assessment as the risk they pose on the Proposed Development is not exacerbated by climate change which is based on published UKCP18 climate projections and information within the **ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7]:**

- Snow and ice; and

[38] Met Office (2019) *UKCP18 Factsheet: Wind.*
[39] Royal Meteorological Society (2018) *International Journal of Climatology; State of the UK Climate 2017.*

- Sea level rise.

14.9 Assessment of Climate Change Resilience

14.9.1 The assessment has followed the five-step process identified earlier. The assessment under each step is detailed further below.

Step 1: Establish Relevant National, Regional and Local Policy Requirements

14.9.2 NPS EN-1[9] sets out policy on climate resilience. Paragraph 4.10.8 EN-1 states that:

New energy infrastructure will typically need to remain operational over many decades, in the face of a changing climate. Consequently, applicants must consider the direct (e.g. site flooding, limited water availability, storms, heatwave and wildfire threats to infrastructure and operations) and indirect (e.g. access roads or other critical dependencies impacted by flooding, storms, heatwaves or wildfires) impacts of climate change when planning the location, design, build, operation and, where appropriate, decommissioning of new energy infrastructure.

14.9.3 The NPPF[12] also includes policy relevant to planning for climate change. Most directly relevant is Paragraph 163 which states:

The need to mitigate and adapt to climate change should also be considered in preparing and assessing planning applications, taking into account the full range of potential climate change impacts.

14.9.4 Core Policy 9 of the Newark and Sherwood Local Plan[13] states that new development should:

Provide for development that proves to be resilient in the long-term. Taking into account the potential impacts of climate change and the varying needs of the community.

14.9.5 Policy ST48 of the Bassetlaw Local Plan 2020-2038[15] requires that:

All proposals, including the change of use of existing buildings and spaces, should be designed to improve resilience to the anticipated effects of climate change…

Step 2: Identify Receptors

14.9.6 The key receptors identified for inclusion in the CCR assessment are:

- Renewable energy infrastructure – Solar Arrays, BESS units and inverters;

- Site accesses;
- Site staff/personnel; and
- Landscaping and biodiversity.

Step 3: Identify Potential Impacts of Climate Change on Receptors and Confirm Mitigation

14.9.7 A number of potential impacts were identified and the measures to reduce impacts identified. The results are detailed in **Table 14.16** to **Table 14.18**.

Table 14.16 Climate Risks and Mitigation during Construction

Variable	Receptor	Potential Impact	Design Measures to Mitigate Impacts
Hotter Summers, Extreme Temperatures (Heatwaves)	Renewable energy infrastructure (Solar Arrays, BESS units and inverters)	Overheating of electrical equipment Damage to components	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions. Specific responsibilities will be confirmed in the detailed oCEMP.
	Site staff/personnel	Risk of overheating to workers Increased heat stress/ heat exhaustion for workers.	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather. Specific responsibilities will be confirmed in the detailed oCEMP. Air conditioning in cabs of powered machinery to protect operators.
	Site Accesses	Damage from expansion in extreme heat	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions. Specific responsibilities will be confirmed in the detailed oCEMP.
Wetter Winters, Extreme Rainfall	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Viability of and access to sites (such as heavy rain resulting in surface water flooding of local roads, sources of power supply or inundation of sites).	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and receive Environment Agency's (EA) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms, flooding. Infrastructure flood resilience detailed in ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7]. Specific responsibilities will be confirmed in the detailed oCEMP.

Variable	Receptor	Potential Impact	Design Measures to Mitigate Impacts
	Site staff/personnel	Risk to life from flooding	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and receive Environment Agency's (EA) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms, flooding. Infrastructure flood resilience detailed in ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7]. Specific responsibilities will be confirmed in the detailed oCEMP.
Drier Summers, Drought	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Damage to components Water shortages	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions. Specific responsibilities will be confirmed in the detailed CEMP/ The detailed oCEMP will be supported by a Water Management Plan (WMP), that will provide greater detail regarding the mitigation to be implemented to protect the water environment from adverse effects during construction.
	Site staff/personnel	Water shortages	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather. Specific responsibilities will be confirmed in the detailed oCEMP. Supply of adequate water to construction site in event of supply shortages.

Variable	Receptor	Potential Impact	Design Measures to Mitigate Impacts
Wind and Storms	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site accesses	Damage to structures/components/equipment and resulting in delays to programme and associated costs and/or unacceptable safety risks May include high winds increasing dust (and other debris)	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and receive Environment Agency flood warnings and alerts, and plan works accordingly, protecting resources from any extreme weather conditions. Specific responsibilities will be confirmed in the detailed oCEMP.
	Site staff/personnel	Increased potential for slips, trips and falls	Included within the oCEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and receive Environment Agency flood warnings and alerts, and plan works accordingly, protecting resources from any extreme weather conditions. Health and Safety Manager will be responsible for the monitoring and controlling of health and safety compliance and related rules and regulations on-site. Health and safety plans developed for construction activities will be required to account for potential climate change impacts on workers. Specific responsibilities will be confirmed in the detailed oCEMP.

Table 14.17 Climate Risks and Mitigation during Operation (including maintenance)

Climate Variable	Receptor	Potential Impact	Measures to Mitigate Impacts
Hotter Summers, Extreme Temperatures (Heatwaves)	All receptors	Thermal comfort of building users. Increase in air conditioning requirements. Overheating of electrical equipment. Increased heat stress/ heat exhaustion for workers Damage to plants and biodiversity and potential to affect growth rates of habitats	Included within the oOEMP (Volume 7, Other Documents [EN010159/APP/7.4]). All structures will be designed to relevant standards and specifications. Cooling systems used on BESS systems will accommodate suitable peak ambient temperatures accounting for inter-year variability and future climate change. It is anticipated that maintenance and servicing will include the inspection, repair, adjustment, altering, removal, reconstruction, refurbishment replacement or improvement of equipment to ensure the continued effective operation of the Proposed Development. It is anticipated that maintenance and servicing will include the inspection, repair, adjustment, altering, removal, reconstruction, refurbishment replacement or improvement of equipment to ensure the continued effective operation of the Proposed Development.
Wetter Winters, Extreme Rainfall	All receptors	Surface water flooding and standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to building surfaces/ exposed utilities from increased drying/wetting and increase frost penetration Risk to life from flooding	Included within the oOEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and receive Environment Agency's (EA) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms, flooding. Infrastructure flood resilience detailed in ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7]. It is anticipated that maintenance and servicing will include the inspection, repair, adjustment, altering, removal, reconstruction, refurbishment replacement or improvement of equipment to ensure the continued effective operation of the Proposed Development.

Climate Variable	Receptor	Potential Impact	Measures to Mitigate Impacts
Drier Summers, Drought	All receptors	Water shortages Deterioration of structures or foundations due to decrease in soil moisture levels	Procedures to consider water efficiency measures are included within the oOEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions. All structures and components will be designed to relevant standards and specifications. It is anticipated that maintenance and servicing will include the inspection, repair, adjustment, altering, removal, reconstruction, refurbishment replacement or improvement of equipment to ensure the continued effective operation of the Proposed Development
Wind and Storms	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Surface water flooding and standing waters Deterioration of structures or foundations due to increase in soil moisture levels Damage to building surfaces/ exposed utilities from increased drying/wetting and increase frost penetration. Increased potential for slips, trips and falls	Included within the oOEMP (Volume 7, Other Documents [EN010159/APP/7.4]). Contractors will monitor weather forecasts and receive Environment Agency's (EA) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms, flooding. Infrastructure flood resilience detailed in ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7]. All structures and components will be designed to relevant standards and specifications. It is anticipated that maintenance and servicing will include the inspection, repair, adjustment, altering, removal, reconstruction, refurbishment replacement or improvement of equipment to ensure the continued effective operation of the Proposed Development.

Table 14.18 Climate Risks and Mitigation during Decommissioning

Climate Variable	Receptor	Potential Impact	Measures to Mitigate Impacts
Hotter Summers, Extreme Temperatures (Heatwaves)	All receptors	Overheating of electrical equipment Damage to components Risk of overheating to workers	Included within the oDEMP (see Volume 7, Other Documents [EN010159/APP/7.6]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions.
Wetter Winters, Extreme Rainfall	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site accesses	Viability of and access to sites (such as heavy rain resulting in surface water flooding of local roads, sources of power supply or inundation of sites) Risk to life from flooding	Included within the oDEMP (see Volume 7, Other Documents [EN010159/APP/7.6]). Contractors will monitor weather forecasts and receive Environment Agency's (EA) flood alerts and plan works accordingly, protecting workers and resources from any extreme weather conditions such as storms, flooding. Infrastructure flood resilience detailed in ES Volume 2, Chapter 7: Hydrology and Hydrogeology [EN010159/APP/6.7].
Drier Summers, Drought	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Water shortages Damage to components	Procedures to consider water efficiency measures are included within the oDEMP (see Volume 7, Other Documents [EN010159/APP/7.6]). Contractors will monitor weather forecasts and plan works accordingly, protecting workers and resources from any extreme weather conditions. All structures and components will be designed to be decommissioned to relevant standards and specifications.
Wind and Storms	All receptors	Damage to structures/materials/equipment and resulting in delays to programme and associated costs and/or unacceptable safety risks May include high winds increasing dust (and other debris), storm surge Increased potential for slips, trips and falls	Included within the oDEMP (Volume 7, Other Documents [EN010159/APP/7.6]). Contractors will monitor weather forecasts and receive Environment Agency flood warnings and alerts and plan works accordingly, protecting resources from any extreme weather conditions.

Step 4: Assess the Significance of Effects of Climate Change on Receptors

14.9.8 **Table 14.19** to **Table 14.21** details the assessment of climate risks identified in Step 2 above, taking into account design measures incorporated within the Proposed Development to mitigate risks.

Table 14.19 Climate Resilience Assessment during Construction

Climate Variable	Receptor	Potential Impact	Likelihood	Consequence	Significance
Hotter Summers, Extreme Temperatures (Heatwaves)	Renewable energy infrastructure (Solar Arrays, BESS units and inverters)	Overheating of electrical equipment Damage to components	Very Low	Negligible	Not Significant
	Site staff/personnel	Risk of overheating to workers Increased heat stress/ heat exhaustion for workers.	Very Low	Negligible	Not Significant
	Site Accesses	Damage from expansion in extreme heat	Very Low	Negligible	Not Significant
Wetter Winters, Extreme Rainfall	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Viability of and access to sites (such as heavy rain resulting in surface water flooding of local roads, sources of power supply or inundation of sites).	Medium	Minor Adverse	Not Significant
	Site staff/personnel	Risk to life from flooding	Very Low	Moderate Adverse	Not Significant
Drier Summers, Drought	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Overheating of electrical equipment Damage to components	Very Low	Minor Adverse	Not Significant

Climate Variable	Receptor	Potential Impact	Likelihood	Consequence	Significance
	Site staff/personnel	Water shortages	Very Low	Moderate Adverse	Not Significant
Wind and Storms	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Damage to structures/materials/equipment and resulting in delays to programme and associated costs and/or unacceptable safety risks May include high winds increasing dust (and other debris)	Very Low	Minor Adverse	Not Significant
	Site staff/personnel	Increased potential for slips, trips and falls	Very Low	Moderate Adverse	Not Significant

Table 14.20 Climate Resilience Assessment during Operation (including maintenance)

Climate Variable	Receptor	Potential Impact	Likelihood	Consequence	Significance
Hotter Summers, Extreme Temperatures (Heatwaves)	All receptors	Thermal comfort of building users. Increase in air conditioning requirements. Overheating of electrical equipment. Damage to plants and biodiversity and potential to affect growth rates of habitats	Very Low	Negligible	Not Significant
Wetter Winters, Extreme Rainfall	All receptors	Surface water flooding and standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to building surfaces/ exposed utilities from increased drying/wetting and increase frost penetration Risk to life from flooding	Medium	Minor Adverse	Not Significant
Drier Summers, Drought	All receptors	Thermal comfort of building users Increase in air conditioning requirements Overheating of electrical equipment Water shortages	Low	Minor Adverse	Not Significant

Climate Variable	Receptor	Potential Impact	Likelihood	Consequence	Significance
		Deterioration of structures or foundations due to decrease in soil moisture levels Increased heat stress/ heat exhaustion for workers			
Wind and Storms	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Surface water flooding and standing waters Deterioration of structures or foundations due to increase in soil moisture levels Damage to building surfaces/ exposed utilities from increased drying/wetting and increase frost penetration. Increased potential for slips, trips and falls	Low	Moderate Adverse	Not Significant

Table 14.21 Climate Resilience Assessment during Decommissioning

Climate Variable	Receptor	Potential Impact	Likelihood	Consequence	Significance
Hotter Summers, Extreme Temperatures (Heatwaves)	All receptors	Thermal comfort of building users. Increase in air conditioning requirements. Overheating of electrical equipment. Increased heat stress/ heat exhaustion for workers Damage to plants and biodiversity and potential to affect growth rates of habitats	Low	Minor Adverse	Not Significant
Wetter Winters, Extreme Rainfall	All receptors	Surface water flooding and standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to building surfaces/ exposed utilities from increased drying/wetting and increase frost penetration Risk to life from flooding.	Medium	Minor Adverse	Not Significant

Climate Variable	Receptor	Potential Impact	Likelihood	Consequence	Significance
Drier Summers, Drought	All receptors	Water shortages Deterioration of structures or foundations due to decrease in soil moisture levels	Low	Minor Adverse	Not Significant
Wind and Storms	Renewable energy infrastructure (Solar Arrays, BESS units and inverters) and Site access	Surface water flooding and standing waters. Deterioration of structures or foundations due to increase in soil moisture levels. Damage to building surfaces/ exposed utilities from increased drying/wetting and increase frost penetration. Increased potential for slips, trips and falls.	Low	Minor Adverse	Not Significant

Step 5: Establish Further Adaptation Measures

14.9.9 **Table 14.19** to **Table 14.21** shows that there are no significant effects on the Proposed Development due to future climate change and no additional mitigation is required.

PART C: IN-COMBINATION CLIMATE IMPACT ASSESSMENT

14.10 Assessment Methodology and Significance Criteria

Study Area and Scope

14.10.1 In-combination climate change impacts are the combined impacts of the Proposed Development and potential climate change impacts on the receiving environment. In simple terms this means considering whether future climate change will reduce or worsen any of the Proposed Development's environmental effects, for example air quality, noise or soils.

14.10.2 The aim of the ICCI is therefore to consider whether the effects on receptors considered throughout the ES (under the current conditions, without climate change) are likely to be different under an alternative future climate regime. In particular, consideration is given to whether the significance/degree of the effect remains the same or changes with future climate conditions.

Establishing Baseline Conditions

14.10.3 The baseline conditions for the ICCI assessment are the same as the baseline conditions for the CCR assessment, outlined in **Paragraphs 14.8.1** to **14.8.14**.

Receptors and Receptor Sensitivity

14.10.4 In the ICCI assessment, sensitive receptors are determined by each chapter in the ES. The ICCI assessment is undertaken by individual technical disciplines in regard to the identified sensitive receptors in each assessment.

Identifying Likely Significant Effects

14.10.5 The significance of effects in the ICCI is determined as a function of the likelihood of future climate materially changing the significance of environmental effects identified at any receptor. Such a change may be adverse (greater environmental effect) or beneficial (a lesser environmental effect).

14.11 Assessment of Likely Significant In-Combination Effects

14.11.1 A summary of the in-combination effects of the Proposed Development is provided in **Table 14.22**.

Table 14.22 Review of Potential ICCI and Effects

ES Technical Topic	Summary of Effects Identified in ES	Consideration of ICCI	Any ICCI that alter the significance of effects?	Potential ICCI Effect
Air Quality	Residual effects are not significant.	Air quality is predicted to improve in the future, owing to lower emissions from road vehicles and heating and cooling plant as progressively lower emission technologies become available. The air quality assessment, therefore, focuses on the near-term (earliest year of construction), but the outlook for the longer term is one of improvement, both in terms of local and regional air quality, but also in terms of emissions associated with the Proposed Development itself. As such the air quality effects will reduce in the future and would not be significantly affected by climate change.	No	Not Significant
Human Health	The human health assessment has identified potential significant effects during the construction, operation and decommissioning phases.	There are no climate change variables that materially affect the human health assessment. Changes to future climate such as higher peak temperatures or more intense rainfall will not materially alter the identified effects.	No	Not Significant
Socio-Economic	The socio-economic effects of the Proposed Development are assessed to be not significant to substantial beneficial.	Changes to future climatic conditions are not considered to have a significant effect upon the sensitive receptors within the socio-economic assessment.	No	Not Significant

ES Technical Topic	Summary of Effects Identified in ES	Consideration of ICCI	Any ICCI that alter the significance of effects?	Potential ICCI Effect
Cultural Heritage	The cultural heritage assessment has identified potential significant effects to designated assets during the construction and decommissioning phase, however these effects are temporary and reversible. The potential significant long term effects during operation will be addressed within the detailed landscape design.	Changes expected from climate change, such as increased rainfall levels and temperatures, and changes to wind speed and cloud cover, are unlikely to impact the Proposed Development's relationship to townscape character or built heritage assets. Changes to future climatic conditions are not considered to have a significant effect upon the visual effects, increase in noise, dust and traffic during the construction phase. In addition, they are not considered to have a significant effect upon the visual effects, effects to wider historic landscape character during the operational phase.	No	Not Significant
Land and Soils	The land and soils assessment has identified potential significant effects during construction, operation and decommissioning.	Changes expected from climate change, such as increased rainfall levels and temperatures, and changes to wind speed and cloud cover, are unlikely to significantly impact soil quality and the availability of agricultural land during the operation phase. Changes to future climatic conditions are expected to are not considered to have a significant effect upon the impact land and soil receptors during construction and decommissioning as the duration of these effects are short-term.	No	Not Significant

ES Technical Topic	Summary of Effects Identified in ES	Consideration of ICCI	Any ICCI that alter the significance of effects?	Potential ICCI Effect
Transport and Access	The transport and access assessment has not identified any potential significant effects	Changes to future climatic conditions are not considered to have a significant effect upon the sensitive receptors within the transport and access assessment.	No	Not significant
Landscape and Visual	The landscape and visual assessment has identified potential significant effects during construction, operation and decommissioning.	Changes to future climatic conditions are not considered to have a significant effect on the sensitive receptors during construction, operation and decommissioning.	No	Not significant
Hydrology	The hydrology assessment has not identified any potential significant effects.	Changes to future climatic conditions are not considered to have a significant effect on the sensitive receptors within the hydrology assessment.	No	Not significant
Buried Heritage	The landscape and visual assessment has identified potential significant effects during construction and decommissioning.	Changes to future climatic conditions are not considered to have a significant effect on the sensitive receptors within the buried heritage assessment.	No	Not significant

14.12 Conclusions

14.12.1 The assessment of GHG effects has demonstrated that the Proposed Development will have a significant beneficial effect in relation to climate change as a result of indirect GHG emissions avoided by the Proposed Development and its role in the transition to net zero, as shown in **Paragraph 14.6.45**.

14.12.2 The CCR assessment has found no likely significant effects of climate change on the Proposed Development during construction, operation or decommissioning, as shown in **Table 14.19, 14.20 and 14.21.**

14.12.3 The ICCI assessment has found no likely significant in-combination climate change impacts. A summary of the significance of effects is provided in **Table 14.23.**

Table 14.23 Summary of Significant Environmental Effects

Impact Pathway	Embedded Measures	Description of the Effect	Direct / Indirect	Duration	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
Construction								
Climate Resilience and Adaptation	*CEMP*	*Impact of future climate change to construction of scheme and construction workers.*	*Direct*	*Short Term*	*Local*	*Negligible*	*Not Significant*	*Secure CEMP*
In-combination Climate Change Impacts	*CEMP*	*Impact of future climate change on construction-phase environmental effects.*	*Indirect*	*Short Term*	*Local*	*Negligible*	*Not Significant*	*Secure CEMP*
Operation (including Maintenance)								
Climate Resilience and Adaptation	*Design, Drainage Strategy, Landscape Strategy*	*Impact of future climate change to operation of scheme and site staff.*	*Direct*	*Long Term*	*Local*	*Negligible*	*Not Significant*	*Detailed Design, Secure Drainage and Landscape Strategy*
In-combination Climate Change Impacts	*Design, Drainage Strategy, Landscape Strategy*	*Impact of future climate change on operation-phase environmental effects.*	*Indirect*	*Long Term*	*Local*	*Negligible*	*Not Significant*	*Detailed Design, Secure Drainage and Landscape Strategy*

Impact Pathway	Embedded Measures	Description of the Effect	Direct / Indirect	Duration	Geographic Scale	Nature of Effect	Significant / Not Significant	Next Steps
Decommissioning								
Climate Resilience and Adaptation	*DEMP*	*Impact of future climate change to decommissioning of scheme and workers.*	*Direct*	*Short Term*	*Local*	*Negligible*	*Not Significant*	*Secure DEMP*
In-combination Climate Change Impacts	*DEMP*	*Impact of future climate change on decommissioning-phase environmental effects.*	*Indirect*	*Short Term*	*Local*	*Negligible*	*Not Significant*	*Secure DEMP*
Whole Lifecycle								
Greenhouse Gas Emissions	*CEMP, Design*	*Contribution to Climate Change / Transition to Net Zero*	*Direct*	*Long Term*	*National*	*Beneficial*	*Significant*	*Detailed Design*

one earth

solar farm