



# Meridian Solar Farm

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Volume 6

Environmental Statement

6.1 ES Chapter 7: Climate  
Change

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## 7. Climate Change

### 7.1. Introduction

7.1.1. This chapter of the Environmental Statement (ES) presents the findings of an assessment of the likely significant effects on global climate as a result of the Scheme, and the effects on the Scheme resulting from changing global climate conditions, during the construction, operation and decommissioning phases. For more details about the Scheme, refer to **ES Chapter 2: The Scheme** (Doc Ref. 6.1).

7.1.2. The following aspects of the climate change assessment are presented within this chapter.

- Greenhouse Gas (GHG) Assessment;
- Climate Change Risk (CCR) Assessment; and
- In-Combination Climate Change Impact (ICCI) Assessment

7.1.3. This chapter is supported by the following technical appendices:

- **ES Appendix 7-1: Climate Change - Legislation, Policy and Guidance** (Doc Ref. 6.3);
- **ES Appendix 7-2: Climate Change Risk Register** (Doc Ref. 6.3); and
- **ES Appendix 7-3: In-Combination Climate Change Impact Assessment** (Doc Ref. 6.3).

## 7.2. Legislation, Planning Policy and Guidance

- 7.2.1. A summary of the legislation, policy, and guidance of relevance to the assessment of climate change are provided in **ES Appendix 7-1: Climate Change Legislation, Policy and Guidance** (Doc Ref 6.3).

## 7.3. Stakeholder Engagement

- 7.3.1. A request for an EIA Scoping Opinion, provided in **ES Appendix 1-1: EIA Scoping Report** (Doc Ref. 6.3), was sought from the Secretary of State through the Planning Inspectorate in 2024 as part of the EIA Scoping Process. A summary of consultation responses in relation to climate change is presented in Table 7-1. No further comments were received from technical stakeholders as part of the statutory or targeted consultation stages.

**Table 7-1: Scoping Opinion responses in relation to climate change**

Consultee	Summary of main matters raised	How has the matter been addressed?	Location of response in the ES
<p>Planning Inspectorate (PINS)</p>	<p>On the basis of the information presented within the Scoping Report identifying limited vehicle movements associated with the operational and maintenance phase (7 Light Duty Vehicles (LDV) and 7 Heavy Goods Vehicle (HGV) movements per day), the Inspectorate agrees that significant effects are not likely and that this matter can be scoped out of further assessment. However, the ES description of development should confirm the operational vehicle types and numbers (with reference to thresholds within guidance) to justify this position.</p>	<p>The operational vehicle estimates have been reviewed and provided within <b>ES Chapter 2: The Scheme</b> (Doc Ref. 6.1).  The carbon assessment considers the impact of 10 regular workers commuting to Site each day during operation. The assessment also considers the impact of 5 HGV deliveries per week over the 40 year operational period and all transport impacts associated with replacement parts.</p>	<p><b>ES Chapter 2: The Scheme</b> (Doc Ref. 6.1)  Section 7.7 and Table 7-18 this chapter describe the operational emissions assessed for the Scheme</p>
<p>PINS</p>	<p>Page 65 of the Scoping Report states that the CEMP would include "Health and Safety plans for construction and decommissioning activities to account for potential climate change impacts on workers, such as flooding and heatwaves". On the basis that an outline CEMP is submitted with the DCO application that includes such measures and taking into account the short-term duration and nature of</p>	<p>A requirement for the contractors' health and safety plans to account for potential climate change impacts on workers, such as flooding and heatwaves, has been incorporated within the <b>Outline Construction Environmental Management Plan (OCEMP)</b> (Doc Ref. 7.10) and the <b>Outline</b></p>	<p><b>OCEMP</b> (Doc Ref. 7.10);  <b>OCEMP</b> (Doc Ref. 7.12)</p>

Consultee	Summary of main matters raised	How has the matter been addressed?	Location of response in the ES
	<p>construction and decommissioning works, the Inspectorate agrees that effects are not likely to be significant and can be scoped out.</p>	<p><b>Decommissioning Environmental Management Plan (ODEMP)</b> (Doc Ref. 7.11).</p>	
<p>PINS</p>	<p>Page 62 of the Scoping Report states that “sources of emissions that are not expected to result in a material contribution to [emissions from] the overall Scheme” will be excluded from further assessment. The ES should define what is considered to be a material contribution. Consideration should be given to the potential for cumulative effects of the excluded sources to add up to a material contribution.</p>	<p>In line with Institute of Sustainability and Environmental Professionals (ISEP) guidance on assessing GHG emissions, sources of emissions that contribute less than 1% to the whole life carbon (WLC) emissions can be excluded from further assessment. The assessment presented in this chapter has considered all material emissions sources across the design life of the Scheme. Consideration has been given to ensure that the cumulative impact of excluded sources does not exceed 1% of WLC emissions.</p>	<p>See Table 7-2 of this chapter for the sources of emissions considered within the GHG assessment.</p>
<p>Natural England</p>	<p>The England Biodiversity Strategy published by DEFRA establishes principles for the consideration of biodiversity and the effects of climate</p>	<p>The Scheme’s resilience to climate change has been assessed as part of the Climate Change Risk Assessment within <b>ES</b></p>	<p><b>ES Appendix 7-2: Climate Change Risk Assessment</b> (Doc Ref. 6.3);</p>

Consultee	Summary of main matters raised	How has the matter been addressed?	Location of response in the ES
	<p>change. The ES should reflect these principles and identify how the development will embed Nature Based Solutions, maintain ecological networks and build resilience to climate change. The ES should also incorporate the policies as set out in the Overarching National Policy Statement for Energy (NPS EN-1)<sup>1</sup> relating to climate change. The National Planning Policy Framework (NPPF)<sup>2</sup> also requires that the planning system should contribute to the enhancement of the natural environment ‘by establishing coherent ecological networks that are more resilient to current and future pressures’, which should be demonstrated through the ES.</p>	<p><b>Appendix 7-2: Climate Change Risk Assessment</b> (Doc Ref. 6.3) and Section 7.8 of this chapter.</p> <p><b>ES Appendix 7-1: Climate Change Legislation, Policy and Guidance</b> (Doc Ref. 6.3) sets out how the requirements of NPS EN-1 and NPPF with regards to climate change have been taken into account within the ES.</p>	<p>Section 7.8 of this chapter;</p> <p><b>ES Appendix 7-1: Climate Change Legislation, Policy and Guidance</b> (Doc Ref. 6.3).</p>

<sup>1</sup> DESNZ (2025). Overarching NPS for Energy (NPS EN-1). Available at: <https://assets.publishing.service.gov.uk/media/6915ba42bc34c86ce4e6e726/overarching-national-policy-statement-for-energy-en-1-web-accessible.pdf> [Accessed 26 February 2026]

<sup>2</sup> Ministry of Housing, Communities and Local Government (MHCLG) and Department for Levelling Up, Housing and Communities (DLUHC) (2025). National Planning Policy Framework (NPPF). Available at: [https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF\\_December\\_2024.pdf](https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf) [Accessed 15 September 2025]

## 7.4. Assessment Methodology

- 7.4.1. This section sets out the scope and methodology for the assessment of the impacts of the Scheme on climate change, and the impact of climate change on the Scheme.

### Study Area

#### Lifecycle GHG Impact Assessment

- 7.4.2. The study area for the GHG impact assessment covers all direct GHG emissions arising from activities undertaken within the Site during the construction, operation and decommissioning stages of the Scheme. It also includes indirect emissions arising outside the Site during the Scheme's lifecycle, for example emissions embedded within the production of construction materials, as well as emissions arising from the transportation of materials, waste and construction workers.
- 7.4.3. The study area also includes activities that may be avoided or displaced because of the Scheme, such as other alternative grid electricity production activities. The carbon savings will be considered as part of the operational phase of the Scheme and will be accounted for in the entire Scheme's lifecycle GHG assessment.
- 7.4.4. This approach aligns with industry best practice and follows methodologies used in comparable solar ESs. The assessment framework is structured to provide a comprehensive evaluation of the Scheme's contribution to GHG emissions while recognising that the ultimate receptor of these emissions is the global climate system rather than a specific geographic area.

#### Climate Change Risk Assessment

- 7.4.5. The study area for the CCR Assessment is the area within the Order Limits (the Site). As this assessment is about the resilience of the activities and infrastructure of the Scheme, areas beyond the Site are not included.

#### In-Combination Climate Change Impact Assessment

- 7.4.6. The study area for the ICCI assessment has been defined considering the environmental assessments reported within the ES. This includes all environmental receptors identified within the assessment undertaken and reported within the ES. The sensitive receptors for the ICCI assessment are those identified by each discipline in their assessment.
- 7.4.7. The study area for the ICCI assessment is identified by each discipline for their individual assessments. The methodology used by the environmental disciplines

to identify ICCIs is described in Paragraph 7.4.32. At the Preliminary Environmental Information Report (PEIR) stage, preliminary consultation with other disciplines was undertaken; however, a comprehensive assessment has taken place during the ES stage, as detailed assessments were complete and cross-disciplinary interactions were better understood. These are summarised in **ES Appendix 7-2: Climate Change Risk Register** (Doc Ref 6.3).

## Baseline Methodology

### Lifecycle GHG Assessment

- 7.4.8. For the purposes of the GHG Assessment, the baseline represents a Business as Usual (BAU) scenario where the Scheme does not proceed.
- 7.4.9. In line with ISEP guidance<sup>3</sup>, the baseline assumes that existing land uses and assets within the Order Limits remain unchanged, identifying current sources and sinks of GHG emissions within these limits to provide a consistent basis for comparison across both construction and operational phases.
- 7.4.10. As described in **ES Chapter 2: The Scheme**, agriculture is the primary existing land use on Site, which is comprised of large fields typically surrounded by steep man-made drainage ditches. While current land use within the Order Limits will have minor levels of associated GHG emissions, it is anticipated that these emissions will not be material in the context of the overall Scheme. Therefore, for the purposes of the lifecycle GHG impact assessment, a GHG emissions baseline of zero is applied. This represents a worst-case assessment for the purposes of the GHG calculations.
- 7.4.11. The BAU scenario also considers that energy generated by the Scheme will have to be produced from alternative sources reflecting the current UK grid electricity mix.

### Climate Change Risk Assessment

- 7.4.12. To assess the potential climate change impacts of the Scheme, it is necessary to determine the baseline conditions. The baseline conditions are the current (at the time of writing the ES) conditions of the Site and surroundings within the defined study area. The current baseline has been determined through a desktop review of Met Office historical climate data for the period 1981-2010, while the future

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<sup>3</sup> ISEP (2022) Assessing Greenhouse Gas Emissions and Evaluating their Significance, 2nd Edition. Available at : [https://www.iema.net/media/xmgpooopk/2022\\_iema\\_greenhouse\\_gas\\_guidance\\_eia.pdf](https://www.iema.net/media/xmgpooopk/2022_iema_greenhouse_gas_guidance_eia.pdf) [Accessed 05/10/2025]

baseline is informed by the UK Climate Projections 2018 (UKCP18)<sup>4</sup> data for the 25 km<sup>2</sup> grid cell in which the Scheme is located.

- 7.4.13. The baseline period 1981-2010 is utilised as it aligns with the baseline climate period used within the UKCP18 climate projections dataset. This allows for comparison between the current and future baseline periods.

### Determining Likely Effects

- 7.4.14. This section should be read in conjunction with **ES Chapter 2: The Scheme** (Doc Ref 6.1) which sets out relevant information on the design parameters, information that has informed the assessment, and how various aspects of the assessment have been approached.
- 7.4.15. For the climate change assessment, the relevance of design choices has been reviewed in relation to GHG emissions, climate resilience, and vulnerability to climate risks. Where design choices have the potential to significantly alter emissions (e.g., material use, transport, construction processes) or influence exposure to climate risks (e.g. flood risk on underground or overground cables), these variations have been considered within the assessment, assessing the worst-case scenario. Where choices do not materially impact the assessment findings, this has been stated.

### Lifecycle GHG Assessment

- 7.4.16. The likely effects of the Scheme on the climate during construction have been calculated in line with the GHG Protocol<sup>5</sup> and the GHG 'hot spots' (i.e. materials and activities likely to generate the largest amount of GHG emissions) have been identified. This has enabled priority areas for mitigation to be identified. This approach is consistent with the principles set out by the Institute of Sustainability and Environmental Professionals (ISEP) document 'Assessing Greenhouse Gas Emissions and Evaluating their Significance'<sup>3</sup>
- 7.4.17. This lifecycle approach considers emissions from the following lifecycle stages of the Scheme: construction, operation and maintenance, and decommissioning.
- 7.4.18. Where activity data allows, expected GHG emissions arising from the construction, operation and maintenance, and decommissioning activities, and

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<sup>4</sup> UKCP18 (2018). Met Office Climate Projections. Available at: [ukcp18-guidance-ukcp18-for-ukcp09-users.pdf](https://www.metoffice.gov.uk/media/document/ukcp18-guidance-ukcp18-for-ukcp09-users.pdf) [Accessed 07/10/2025]

<sup>5</sup> World Business Council for Sustainable Development and World Resources Institute GHG Protocol guidelines. Available at: <https://ghgprotocol.org/corporate-standard>. [Accessed 07/10/2025]

embodied carbon in materials of the Scheme, have been quantified using a calculation-based methodology using the following equation as stated in the methodology paper accompanying the conversion factors for company reporting published by the UK Government<sup>6</sup>:

$$\text{Activity data} \times \text{GHG emissions factor} = \text{GHG emissions value}$$

7.4.19. In line with the GHG Protocol, when defining potential impacts, the seven Kyoto Protocol GHGs have been considered, specifically:

- Carbon dioxide (CO<sub>2</sub>);
- Methane (CH<sub>4</sub>);
- Nitrous oxide (N<sub>2</sub>O);
- Sulphur hexafluoride (SF<sub>6</sub>);
- Hydrofluorocarbons (HFCs);
- Perfluorocarbons (PFCs); and
- Nitrogen trifluoride (NF<sub>3</sub>).

7.4.20. These GHGs are broadly referred to in this chapter under an encompassing definition of 'GHG emissions', with the unit of tCO<sub>2</sub>e (tonnes of CO<sub>2</sub> equivalent).

7.4.21. Where data are not available, a qualitative approach to assessing GHG impacts has been followed, in line with the ISEP guidance on assessing GHG emissions in EIAs.

7.4.22. Table 7-2 summarises the key anticipated GHG emissions sources associated with the Scheme, which have been scoped in to the ES.

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<sup>6</sup> DESNZ (2025). GHG Conversion Factors for Company Reporting 2025. Available at 2025 Government greenhouse gas conversion factors for company reporting: Methodology paper [Accessed on 08/10/2025]

**Table 7-2: GHG Emissions Sources**

Lifecycle Stage	Activity	Primary Emissions Sources
Product Manufacture	Raw material extraction and manufacturing of products/ materials	Embodied GHG emissions associated with product and material manufacture
	Transport of products/ materials to Site	GHG emissions from fuel consumption during transportation of products and materials to the Scheme
Construction	On-site construction activity	Energy (electricity, fuel, etc.) consumption from plant and vehicles, generators on-site, and material consumption
	Transport of construction workers	Energy (electricity, fuel, etc.) consumption from worker commuting
	Transportation and disposal of earthworks/ waste	GHG emissions from transportation and disposal/treatment of earthworks/ construction waste
	Land clearance	GHG emissions associated with the loss of vegetation and carbon sequestration ability
Operation	Operation of the Scheme	GHG emissions from energy use and additional traffic
	Transportation and disposal of waste	GHG emissions from transportation and disposal of waste
	Building, structure and grounds maintenance	GHG emissions associated with replacement materials/products

Lifecycle Stage	Activity	Primary Emissions Sources
	Emissions displacement	Avoided or displaced emissions through use of any renewable energy systems or offsetting
Decommissioning	Removal of the Scheme	GHG emissions arising from fuel consumption for plant and vehicles and disposal of materials

### Climate Change Risk Assessment

- 7.4.23. The EIA Regulations<sup>7</sup> require the inclusion of information on the vulnerability of the Scheme to climate change. Consequently, an assessment of climate change resilience for the Scheme has been undertaken which identifies potential climate change impacts in accordance with ISEP Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation<sup>8</sup>.
- 7.4.24. The assessment has included all infrastructure and assets associated with the Scheme. It covers resilience against both gradual (chronic) climate change, and the risks associated with an increased frequency of extreme weather (acute) events as projected using UKCP18 data.
- 7.4.25. The assessment of potential impacts and the Scheme’s vulnerability considers the mitigation measures that have been designed into the Scheme, as discussed in Section 7.7.
- 7.4.26. The assessment also identifies and accounts for existing resilience measures for each risk either already in place or development for infrastructure and assets.
- 7.4.27. Climate parameters considered in the CCR Assessment include the following:
  - Extreme weather events;
  - Flood risk;
  - Temperature change; and
  - Precipitation change.

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<sup>7</sup> The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017. Available at: <https://www.legislation.gov.uk/uksi/2017/572/contents/made>. [Accessed 07/10/2025]

<sup>8</sup> ISEP (2020). Environmental Impact Assessment Guide to: Climate Change Resilience and Adaptation. Available at: <https://www.iema.net/media/mabhqino/iema-eia-climate-change-resilience-june-2020.pdf> [Accessed 08/10/2025]

- 7.4.28. While construction climate risks were scoped out at the PEIR stage, they have been included within this ES chapter. It remains necessary to assess climate risk during construction as potential climate impacts may still occur in excess of baseline conditions when construction is expected to begin in 2029. As the climate baseline utilised for this assessment (as described in Section 7.6) is the period 1981-2010 (to align with UKCP data) climate changes since this timeframe should be considered. As such climate risks during construction have been assessed against UKCP climate projections for the period 2020-2049 within this chapter.
- 7.4.29. Decommissioning risks remain scoped out as the technologies and methodologies related to decommissioning will likely have undergone extensive changes compared to the present day. Current resilience measures used to reduce climate risk during decommissioning are likely to be improved by the Scheme's end-of-life, allowing for the more effective management of climate risk in the future.

#### **In-Combination Climate Change Impact Assessment**

- 7.4.30. The ICCI assessment considers the extent to which climate change exacerbates an effect on an environmental receptor considered in other technical assessments. The ICCI assessment methodology has been developed in line with ISEP guidance<sup>8</sup>. The ICCI assessment considers the impacts and significance identified by each of the assessment topics, but with the added consideration of future climate change projections. The assessment considers the historical baseline and projected climate conditions and the extent to which the identified receptors will be affected by the change.
- 7.4.31. The ICCI assessment screens out any impacts that are considered unlikely to occur, e.g. where a climate change hazard does not influence the impact identified by a topic, and therefore, does not require further assessment. Future climate change projections have been reviewed and the sensitivity of identified sensitive receptors to these hazards examined. The Scheme's risks to receptors are examined together with climate hazards to understand if the impact is exacerbated. The influence of climate change combined with potential impacts from the operation of the Scheme on sensitive receptors has been assessed. Embedded mitigation has been considered in the assessment which may reduce the significance of the effect.
- 7.4.32. The effect of an ICCI has been considered significant if:
- An effect which was previously not significant becomes significant against the significance criteria used by the technical discipline due to climate change

(e.g. an increase in consequence of effect or an increase in scale of change); and /or

- An existing significant effect due to climate change is exacerbated against the significance criteria used by the technical discipline (e.g. a further increase in the consequence of effect or a further increase in scale of change).

7.4.33. If any exacerbation by climate change does not change the effect category, the ICCI effect is determined as not significant.

7.4.34. The climate change hazards considered in the assessment that potentially impact environmental receptors include:

- Heatwaves;
- Drought;
- Flooding and high levels of precipitation; and
- Extreme weather (storms).

7.4.35. The ICCI assessment only considers impacts on receptors during the operational stages of the Scheme. Construction and decommissioning impacts are scoped out of this assessment due to the short-term nature of the activities associated with the construction and decommissioning period, the embedded controls in place included in the **OCEMP** (Doc Ref. 7.10) and **ODEMP** (Doc Ref. 7.12) and the impacts of the Scheme on climate change not being anticipated to have significant effects in such a short period of time. in the **OCEMP** (Doc Ref. 7.10) and **ODEMP** (Doc Ref. 7.12).

## Sensitivity of Receptors

### Lifecycle GHG Assessment

7.4.36. The sensitivity of the receptor (global climate) to increases in GHG emissions is always defined as 'high' because any additional GHG impacts could compromise the UK's ability to reduce its GHG emissions and therefore meet its future 5-year carbon budgets. Also, the importance of limiting global warming to below 2°C this century is broadly asserted by the International Paris Agreement and the climate science community.

### Climate Change Risk Assessment

7.4.37. The receptor for the CCR Assessment is the Scheme itself. The CCR Assessment provides a description of potential climate risks to the Scheme and how the

Scheme has been designed to be more resilient to the climate change impacts identified during the review of UKCP18 data.

### In-Combination Climate Change Impact Assessment

- 7.4.38. The ICCI assessment considers the sensitive receptors as identified by each technical discipline in **ES Chapters 5 to 16** (Doc Ref 6.1). The ICCI assessment is undertaken by individual technical disciplines regarding the identified sensitive receptors in each assessment.

### Magnitude of Impact

#### Lifecycle GHG Assessment

- 7.4.39. For the lifecycle GHG impact assessment, the magnitude of impact considers the output of the GHG quantification process i.e. the Scheme's GHG lifecycle footprint, in the context of its contribution to the UK's carbon budgets and the possible impact of the Scheme on meeting the net zero targets. GHG emissions are also contextualised against sectoral budgets as defined by the Carbon Budget Delivery Plan<sup>9</sup>.
- 7.4.40. According to the ISEP guidance on assessing GHG emissions in EIA<sup>3</sup>, "*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*".
- 7.4.41. The ISEP guidance also states it is down to the professional judgement of the practitioner to determine how best to contextualise a project's GHG impact and assign the level of significance. It is suggested that sectoral, local, or national carbon budgets can be used, as available and appropriate, to contextualise a project's GHG impact and determine the level of magnitude. The approach adopted for the purposes of this assessment is outlined below.
- 7.4.42. The UK carbon budgets are in place to restrict the amount of GHG emissions the UK can legally emit in a five-year period. The UK is currently in the 4th Carbon Budget period, which runs from 2023 to 2027, as detailed in Table 7-3. The 3rd, 4th, and 5th Carbon Budgets reflect the previous 80% reduction target by 2050. The 6th Carbon Budget is the first to align with the legislated 2050 net zero commitment.

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<sup>9</sup> Department of Energy Security and Net Zero (2023) Carbon Budget Delivery Plan. Available at: [Carbon Budget Delivery Plan - GOV.UK](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/114144/carbon-budget-delivery-plan-2023.pdf) [Accessed 10 October 2025]

- 7.4.43. The appropriate UK national Carbon Budget that spans the construction programme of the Scheme (2029 to 2033), is the 5th (2028 to 2032) and 6th (2033-2037) Carbon Budgets. The operation of the Scheme (2033 to 2073) will span across the 6<sup>th</sup>, 7<sup>th</sup>, 8<sup>th</sup> and 9<sup>th</sup> Carbon Budgets. After 2050, the UK is mandated to be at net zero, and therefore, no further Carbon Budgets apply.
- 7.4.44. To assess the magnitude of impact, the annual average GHG impact of the Scheme has been compared against the annualised Carbon Budget for the period in which the emissions arise to allow separate assessment of each lifecycle stage.
- 7.4.45. It should be noted that published UK carbon budgets are unavailable beyond 2037. For the period 2038-2050, indicative carbon budgets as indicated in the Climate Change Committee’s (CCC) Balanced Net Zero Pathway

**Table 7-3: UK national and indicative carbon budgets based upon the Climate Change Committee's (CCC) Balanced Net-Zero Pathway (2025)**

Carbon Budget	UK Carbon Budget (MtCO <sub>2</sub> e)	Indicative Carbon Budget based upon the CCC's Balanced Net-Zero Pathway (MtCO <sub>2</sub> e)
4 <sup>th</sup> (2023-2027)	1,950	-
5 <sup>th</sup> (2028-2032)	1,725	-
6 <sup>th</sup> (2033-2037)	965	-
7 <sup>th</sup> (2038-2042)	-	535
8 <sup>th</sup> (2043-2047)	-	220
9 <sup>th</sup> (2048-2050)	-	23

- 7.4.46. In order to illustrate the Scheme's alignment with the UK's net zero trajectory by 2050 the CCC's Balanced Net Zero Pathway is utilised post-2037 in the absence of any nationally legally binding carbon budgets after the 6th Carbon Budget. The CCC published its advice to the UK Government on the level of its 7th Carbon Budget in early 2025, but this has not yet been secured. Beyond 2050, it is implied that the UK will remain at net zero.
- 7.4.47. The CCC Balanced Net-Zero Pathway has been divided into 5-year periods post-2037 to match the previous six legally binding UK national carbon budgets. The proposed carbon budget periods derived from the net-zero pathway encompass

the 7th, 8th, and 9th indicative budget periods up to 2050 in line with the UK's 1.5-degree trajectory as detailed in Table 7-3.

- 7.4.48. In addition to providing advice that underpins setting national carbon budgets, the CCC also provides sector-specific decarbonisation pathways. Table 7-4 presents the electricity generation sector-specific carbon budgets as further context to the GHG emissions, however, it should be noted that these are not statutory like the national-level budgets. The sector-specific carbon budget periods began in 2020 and were amended in 2025<sup>10</sup>.

**Table 7-4: Sector-specific electricity generation carbon budgets based upon the CCC's Balanced Net Zero Pathway**

Carbon Budget Period	Recommended Carbon Budget (MtCO <sub>2</sub> e)
2025-2027	89.51
2028-2032	67.57
2033-2037	29.17
2038-2042	21.89
2043-2047	10.18
2048-2050	3.48

- 7.4.49. Emissions resulting from the construction and operation of the Scheme have been compared to UK and sectoral carbon budgets to contextualise the magnitude of emissions, however as stated in the ISEP guidance<sup>3</sup>, the Scheme's contribution to carbon budgets is not the only factor in determining significance of effect.

#### Climate Change Risk Assessment

- 7.4.50. Once potential climate hazards have been identified (e.g. heatwaves), the likelihood of their occurrence during each project phase (construction or operation) is categorised.
- 7.4.51. The criteria which have been used to determine the likelihood of a Climate Risk occurring are detailed in Table 7-5. This is in line with the definitions presented

<sup>10</sup> Climate Change Committee (2025). Carbon Budget Delivery Plan. Available at: <https://www.gov.uk/government/publications/carbon-budget-delivery-plan> [Accessed 08/10/2025]

in the Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report<sup>11</sup>. For example, a climate hazard could be increased summer temperatures, leading to the climate risk of a heatwave, while the climate change risk is from the impact on the Scheme, e.g. overheated electrical equipment.

**Table 7-5: Probability of climate risks occurring**

Likelihood of event	Qualitative Description	Quantitative Description
Almost Certain	Likely that the event will occur many times (reoccurs frequently)	>90-100% probability that the impact will occur each year
Likely	Likely that the event will occur sometimes (reoccurs infrequently)	>66-90% probability that the impact will occur each year
Moderate	Possible that the event will occur (has occurred rarely)	>33-66% probability that the impact will occur each year
Unlikely	Unlikely that the event will occur (not known to have occurred)	>10-33% probability that the impact will occur each year
Rare	Almost inconceivable that the event will occur	0-10% probability that the impact will occur each year

7.4.52. Following identification of climate hazards and risks, the likelihood of occurrence and consequences of climate impacts have been assessed according to the probability of climate risks occurring, Table 7-6, and the likelihood of hazard, Table 7-7. For example, permanent damage to electrical equipment from heatwaves causing complete loss of operation. The categories and descriptions provided below are based on the ISEP Climate Change Resilience and Adaptation guidance<sup>8</sup> and EU technical guidance on climate proofing of infrastructure<sup>12</sup>.

<sup>11</sup> IPCC (2023) Sixth Assessment Report. Available at: [https://www.ipcc.ch/site/assets/uploads/2023/03/Doc5\\_Adopted\\_AR6\\_SYR\\_Longer\\_Report.pdf](https://www.ipcc.ch/site/assets/uploads/2023/03/Doc5_Adopted_AR6_SYR_Longer_Report.pdf) [Accessed 08/10/2025]

<sup>12</sup> European Commission (2021). Technical Guidance on Climate Proofing of Infrastructure. Available at: [EUR-Lex - 52021XC0916\(03\) - EN - EUR-Lex](https://eur-lex.europa.eu/eli/reg/2021/16/03/en) [Accessed 10/10/2025]

**Table 7-6: Likelihood of hazard**

Likelihood of Impact	Description	Quantitative
Almost certain	Likelihood of climate hazard occurring is high and impact is always/almost always going to occur.	95%
Likely	Likelihood of climate hazard occurring is high and impact often occurs.	80%
Moderate	Likelihood of climate hazard occurring is high and impact sometimes occurs, or the likelihood of climate hazard is moderate, and impact is likely to occur always/almost always.	50%
Unlikely	Likelihood of climate hazard occurring is high, but impact rarely occurs or the likelihood of the climate hazard occurring is moderate and impact sometimes occurs or the likelihood of the climate hazard occurring is low and impact is likely to occur always/almost always.	20%
Rare	All other eventualities – highly unlikely but theoretically possible.	5%

**Table 7-7: Level of consequence of a climate impact**

Consequence of Impact	Description
Catastrophic	Disaster with the potential to shut down, collapse or loss of the asset/network; Single or multiple fatalities; Significant environmental harm with widespread effect and recovery longer than one year; Loss of social licence to operate; and/or Permanent financial impact.
Major	Permanent damage to structures/assets; Complete loss of operation/service; Complete/partial renewal of infrastructure; Exceptional environmental damage; and/or Extreme financial impact.

Consequence of Impact	Description
Moderate	Partial infrastructure damage and some loss of service; Some infrastructure renewal; Adverse impact on the environment; and/or Moderate financial impact.
Minor	Localised infrastructure disruption and minor loss of service; No permanent damage; Minor restoration work required; Slight adverse environmental effects; and/or Small financial losses.
Insignificant	No damage to infrastructure; No impacts on the environment; and/or No adverse financial impact.

### In-Combination Climate Change Impact Assessment

7.4.53. The likelihood of a climate risk occurring and the likelihood of a climate impact to a receptor is then combined to determine the likelihood of an ICCI occurring. This is illustrated in Table 7-8.

**Table 7-8: Level of likelihood of an ICCI occurring**

Likelihood Rating	Definition
High	Likelihood of climate hazard occurring is high and impact is always/almost always going to occur.
Moderate	Likelihood of climate hazard occurring is high and impact occurs often or the likelihood of climate hazard occurring is moderate and impact is likely to occur always/almost always.
Low	Likelihood of climate hazard occurring is high, but impact rarely occurs or the likelihood of climate hazard occurring is moderate and impact sometimes occurs or the likelihood of climate hazard occurring is low and impact is likely to occur always/ almost always.
Negligible	All other eventualities – highly unlikely but theoretically possible.

7.4.54. Once the likelihood of an ICCI has been identified, the assessment then considers how this will affect the significance of the identified effects.

7.4.55. The ICCL consequence criteria are defined in Table 7-9 below and are based on the change to the significance of the effect already identified by the environmental discipline. To assess the consequence of an ICCL each discipline has assigned a level of consequence to an impact based on the criteria description and their discipline assessment methodology.

**Table 7-9: Consequence criteria for ICCL assessment**

Consequence Rating	Criteria
High	The climate change parameter in-combination with the effect of the Scheme causes the significance of the effect of the Scheme on the resource/receptor, as defined by the topic, to increase from negligible, minor, or moderate to major.
Moderate	The climate change parameter in-combination with the effect of the Scheme causes the effect defined by the topic to increase from negligible or minor, to moderate.
Low	The climate change parameter in-combination with the effect for the Scheme, causes the significance of effect defined by the topic, to increase from negligible to minor.
Negligible	The climate change parameter in-combination with the effect of the Scheme does not alter the significance of the effect defined by the topic.

### Significance of Effect

7.4.56. The significance of effects in relation to climate change has been assessed in accordance with ISEP guidance<sup>3</sup>. Effects are considered to be significant based on the criteria outlined below.

### Lifecycle GHG Assessment

7.4.57. When evaluating the significance of the GHG emissions, 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 lifetime, which may be positive, negative, or negligible. ISEP guidance<sup>3</sup> emphasises that *“the crux of significance therefore is not whether a project emits GHG emissions, nor even the magnitude of GHG emissions alone, but*

whether it contributes to reducing GHG emissions relative to a comparable baseline consistent with a trajectory towards net zero by 2050". Emissions, including any potential savings, are compared against a "without-project" baseline to assess the Scheme's contribution to the UK's net zero trajectory.

- 7.4.58. Table 7-10 presents the different significance levels as per the latest version of the ISEP guidance<sup>3</sup>, which states that "...a project that follows a 'business-as-usual' or 'do minimum' approach and is not compatible with the UK's net zero trajectory or accepted aligned practice or area-based transition targets, results in a significant adverse effect. It is down to the practitioner to differentiate between the 'level' of significant adverse effects e.g. 'moderate' or 'major' adverse effects". The position taken in paragraph 150 of the Supreme Court Judgment in the case of *Finch*<sup>13</sup> reiterated the need for the relevant planning authority to consider the beneficial indirect effects of a project on the climate, as well as adverse effects, as a material planning consideration: "Just as beneficial indirect effects of a project on climate - for example, the "green" energy that would be generated by a project to develop a wind farm or solar farm - are clearly a relevant matter for the planning authority to consider, so corresponding adverse effects are also a material planning consideration".
- 7.4.59. Without low-carbon energy generation projects such as the Scheme, the average grid GHG intensity will not decrease as is projected, which would adversely affect the UK's ability to meet its carbon reduction targets.
- 7.4.60. Major or moderate adverse effects and beneficial effects are considered to be significant. Minor adverse and negligible effects are not considered to be significant.

**Table 7-10: ISEP definitions for levels of significance for the lifecycle GHG impact assessment**

Significance Level	Effect	Description in ISEP guidance <sup>3</sup>
Significant adverse	Major adverse	The project's GHG impacts are not mitigated or are only compliant with do-minimum standards set through regulation, and do not provide further reductions required by existing local and national policy for projects of this type. A project with major adverse effects is locking in emissions and does not

<sup>13</sup> *Finch* (on behalf of the Weald Action Group) (Appellant) vs Surrey County Council and others (Respondents) UKSC/2022/0064

Significance Level	Effect	Description in ISEP guidance <sup>3</sup>
		make a meaningful contribution to the UK's trajectory towards net zero.
	Moderate adverse	The project's GHG impacts are partially mitigated and may partially meet the applicable existing and emerging policy requirements but would not fully contribute to decarbonisation in line with local and national policy goals for projects of this type. A project with moderate adverse effects falls short of fully contributing to the UK's trajectory towards net zero.
Not significant	Minor adverse	The project's GHG impacts would be fully consistent with applicable existing and emerging policy requirements and good practice design standards for projects of this type. A project with minor adverse effects is fully in line with measures necessary to achieve the UK's trajectory towards net zero.
	Negligible	The project's GHG impacts would be reduced through measures that go well beyond existing and emerging policy and design standards for projects of this type, such that radical decarbonisation or Net Zero is achieved well before 2050. A project with negligible effects provides GHG performance that is well 'ahead of the curve' for the trajectory towards net zero and has minimal residual emissions.
Significant beneficial	Beneficial	The project's net GHG impacts are below zero and it causes a reduction in atmospheric GHG concentration, whether directly or indirectly, compared to the without-project baseline. A project with beneficial effects substantially exceeds net

Significance Level	Effect	Description in ISEP guidance <sup>3</sup>
		zero requirements with a positive climate impact.

### Climate Change Risk Assessment

7.4.61. The significance in the CCR Assessment is determined as a function of the likelihood of a climate change risk occurring and the consequence to the receptor if the risk occurs. The significance is detailed in Table 7-11. Where a risk is determined as high or extreme, this has been deemed significant. Low and medium risks are classified as not significant. The assessment takes into account confirmed design and mitigation measures (referred to as embedded mitigation).

**Table 7-11: CCR Assessment Significance Matrix**

		Consequence of Climate Impact				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood of Climate Impact	Rare	Low (NS)	Low (NS)	Medium (NS)	High (S)	Extreme (S)
	Unlikely	Low (NS)	Low (NS)	Medium (NS)	High (S)	Extreme (S)
	Moderate	Low (NS)	Medium (NS)	High (S)	Extreme (S)	Extreme (S)
	Likely	Medium (NS)	High (S)	High (S)	Extreme (S)	Extreme (S)
	Almost Certain	High (S)	High (S)	Extreme (S)	Extreme (S)	Extreme (S)

\*NS = Not Significant, S = Significant

### In-Combination Climate Change Impact Assessment

7.4.62. The significance of potential effects is determined using the matrix in Table 7-12. Where an effect has been identified as medium or high, these will be classed as a likely significant ICCL effect. If likely significant ICCL effects are evaluated, then appropriate additional mitigation measures (secondary mitigation) are identified.

**Table 7-12: ICCI significance criteria**

		Likelihood of climate-related impact occurring			
		Negligible	Low	Moderate	High
Level of Consequence	Negligible	Low (NS)	Low (NS)	Medium (NS)	Medium (NS)
	Low	Low (NS)	Medium (NS)	Medium (NS)	High (S)
	Moderate	Medium (NS)	Medium (NS)	High (S)	High (S)
	High	Medium (NS)	High (S)	High (S)	High (S)

*\*NS = Not Significant, S = Significant*

## 7.5. Assessment Assumptions and Limitations

- 7.5.1. The assessment is based on the Scheme design set out in **ES Chapter 2: The Scheme** (Doc Ref. 6.1).
- 7.5.2. Where detailed information is not available regarding energy use, types and quantities of materials used, or the embodied carbon of key features of the assets, precautionary assumptions have been made based on industry approximations and good practice.
- 7.5.3. All assumptions and limitations, including any exclusions, together with assumptions for choices and criteria leading to exclusion of input and output data are documented below.

### Lifecycle GHG Assessment

#### Construction Phase

- 7.5.4. The following assumptions and limitations apply to the quantification of the GHG impact of the Scheme during the construction phase:
- The materials required for the construction of the Scheme have been derived from a prepared bill of quantities;
  - There may be additional materials and components required for the construction of the Scheme that are not included in the current bill of quantities, however, it is anticipated that any additional embodied emissions will not have a material impact on the assessment (<1%).
  - The embodied carbon of temporary construction materials has been considered (e.g. temporary access roads), and are assumed to become 100% waste material after construction;
  - The embodied carbon of solar PV modules is based on a review of recent Environmental Product Declarations (EPDs), with an average figure of 286 kgCO<sub>2</sub>e per kWp of capacity;
  - The transport of materials to Site is based on industry standard Royal Institution of Chartered Surveyors (RICS) assumptions (Table 7-13) in the absence of specific data;
  - Solar PV modules and BESS systems are assumed to be manufactured in Asia as a worst-case scenario for transport distance required;
  - Emissions relating to construction activities and fuel use on-Site have been benchmarked from similar solar schemes, with an average of 700 L of diesel per MW capacity;

- The wastage rate and end-of-life scenarios for construction waste are based on RICS guidance for GHG assessments;
- The transport of construction workers is based on the peak construction workforce of 855 workers, with it assumed as a worst-case that this is constant during construction. 55% of workers are expected to be transported via shuttle bus, with each bus taking 25 workers at a time and travelling 30 km to Site. 45% of workers are assumed to make individual 30 km journeys to Site via personal vehicles; and
- The construction phase is assumed to last approximately four years and has expected to start in 2029. For the purposes of the GHG impact assessment, the construction period is assumed to last from Q1 2029 to Q2 2033.

**Table 7-13: RICS Standard Assumptions for Material Transport<sup>14</sup>**

Transport Scenario	km by road	km by sea
Locally manufactured (ready-mixed concrete)	20	-
Locally manufactured (general), e.g. aggregate, earth, asphalt	50	-
Regionally manufactured, e.g. plasterboard, blockwork, insulation, carpet, glass	80	-
Nationally manufactured, e.g. structural timber, structural steelwork, reinforcement, precast concrete	120	-
European manufactured, e.g. cross-laminated timber (CLT), facade modules	1,500	100
Globally manufactured, e.g. specialist stone cladding	500	10,000

## Operational Phase

7.5.5. The following assumptions relate to determining the GHG impact of the Scheme during operation.

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<sup>14</sup> Royal Institute of Chartered Surveyors (2023) Whole life carbon assessment for the built environment 2nd edition. Available at: <https://www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment> [Accessed 10/10/2025]

- An operational lifespan of 40 years (from the start of energy generation) is assumed for the Scheme (2033–2073);
- A conservative degradation rate of 2% in the first year, and 0.45% in subsequent years has been applied when determining the energy generation of the solar PV panels;
- It is assumed that 0.2% of the panels will fail and require replacement each year;
- Based on the estimated design life of the Scheme, the following components are assumed to be replaced during the 40 year design life, as a worst case assumption (noting fewer replacements may actually occur);
  - PV Panels – 1 replacement (25 year component life);
  - Inverters – 2 replacements (15 year component life);
  - Mounting systems – 1 replacement (25 year component life);
  - Transformers - 1 replacement (25 year component life);
  - BESS – 3 replacements (10 year component life);
  - Substation Equipment - 1 replacement (30 year component life);
  - Conductors – 1 replacement (25 year component life);
  - Cabling - 1 replacement (25 year component life); and
  - Insulators and Fittings – 1 replacement (25 year component life).
- All construction packaging waste emissions will be repeated during the replacement of solar panels;
- It is assumed that the average annual grid electricity requirement of the Scheme will be 1% of the energy generated during operation;
- The energy emissions factors used considers the projected decarbonisation of UK grid electricity;
- PV panels are assumed to be cleaned once each year, requiring 3 m<sup>3</sup> of water per 1000 panels;
- It is assumed the operational workforce will consist of 10 people on Site each day, making individual car journeys 30 km to Site and requiring 90 L of water each day;
- Deliveries are assumed to take place five times per week over the 40-year operational period, travelling an average distance of 50 km to Site. These will

comprise of average-laden HGV trips, with consideration of the return journey.

### Decommissioning Phase

7.5.6. The following assumptions and limitation relate to the decommissioning of the Scheme.

- It is assumed that the Scheme will be decommissioned after 40 years of operation, with decommissioning commencing in 2073;
- Emissions from deconstruction activities are assumed to be similar to that during construction, with an allowance for developing technologies and potential decarbonisation. Therefore, they are estimated at 75% of those emitted during construction;
- It is assumed that all materials will become waste during decommissioning, with the end-of-life scenarios specifying the split between landfill and recycling determined by RICS guidance assumptions. For most materials, RICS guidance suggests a recycling rate of 97.5%.

### Climate Change Risk Assessment

7.5.7. The following assumptions and limitations relate to the assessment of climate risk to the Scheme:

- There is inherent uncertainty in climate projections. The data collated to inform this assessment are estimations of ways that the climate might change in the region to the year 2080, best representing the climatic conditions on Site at the end of the Scheme's design life.
- While projections of future climate projections are quantifiable, the overall assessment of climate risk is reliant on the use of professional judgement and prior experience.
- The climate risks presented in this chapter are not exhaustive, but are those most relevant to this Scheme.

### In-Combination Climate Change Impact Assessment

7.5.8. The assumptions stated for the CCR Assessment (Paragraph 7.5.7) are also applicable to the ICCI.

## 7.6. Baseline Conditions

- 7.6.1. This section describes the baseline environmental characteristics for the Scheme and surrounding areas with specific reference to climate change.

### Lifecycle GHG Assessment

#### Current Baseline

- 7.6.2. For the GHG assessment, the current baseline is a 'no-development' scenario whereby the Scheme is not implemented. The baseline considers GHG emissions that would be emitted or sequestered in the existing Site. Agriculture is the predominant land use within the Site area; arable land, with small numbers of buildings associated with nearby villages/farms. Trees are present individually in some areas, as well as in hedgerows and within small woodland areas.
- 7.6.3. Baseline agricultural GHG emissions are dependent on the types of soil and vegetation present, and fuel use for the operation of vehicles and machinery. There are also emissions associated with the existing road network within the Site, though this is expected to be minimal based on the rural location.
- 7.6.4. For the purposes of this assessment, a current baseline of zero emissions has been assumed as a worst-case scenario, where all emissions as a result of the Scheme are considered as additional.

#### Future Baseline

- 7.6.5. The future baseline for the GHG assessment is a business-as-usual position whereby the Scheme is not implemented. This includes the operation and maintenance emissions from the generation of grid electricity that would occur should the Scheme not go ahead, but which will be displaced in the case of the Scheme being delivered. It is noted that the future profile of the UK grid is not fixed and as such it is difficult to make a robust assumption without knowledge of all future electricity generating schemes. However, in the absence of a more robust approach, the above assumes that the business-as-usual position will be in keeping with the DEFRA's updated energy and emissions projections 2021-2040<sup>15</sup>.

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<sup>15</sup> Department for Energy Security and Net Zero / Department for Business, Energy & Industrial Strategy (2023) Projection of energy demand, greenhouse gas emissions and electricity generation from 2021 to 2040. Available at: <https://www.gov.uk/government/publications/energy-and-emissions-projections-2021-to-2040> [Accessed 10/10/2025]

- 7.6.6. The current predominantly agricultural activities within the Site will have minor levels of associated GHG emissions, with minor carbon sequestration from existing vegetation. Therefore, for the purpose of the GHG assessment, embodied emissions are considered zero in the future baseline.

## Climate Change Risk Assessment / In-combination Climate Change Impact Assessment

### Current Baseline

- 7.6.7. The historic baseline for the CCR Assessment and ICCL assessments is the average climate at the Site for the 30 year historical period of 1981 to 2010 (the standard baseline for climate data used in UKCP18), based on observations from the Wittering weather station, approximately 30 km from the Site. This is set out in Table 7-14 below.

### Future Baseline

- 7.6.8. The future baseline is expected to differ from the present-day baseline described above. UKCP18 provides probabilistic climate change projections for pre-defined 30-year periods for annual, seasonal and monthly changes to mean climatic conditions over land areas.
- 7.6.9. UKCP18 uses a wide 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 because it describes a conservative high-emissions, ‘business-as-usual’ scenario. As the design life of the Scheme is 40 years, the CCR Assessment has considered the RCP8.5 scenario that reflects a high level of GHG emissions at a 50% probability up to the year 2079 to assess the impact of climate change over the stated design life of the Scheme.
- 7.6.10. For the assessment, UKCP18 probabilistic projections for the 25 km<sup>2</sup> grid cell in which the Scheme is located, based on RCP8.5, for the pre-defined 30 year periods have been obtained for the following climatic variables:
- Temperature;
  - Precipitation; and
  - Wind speed.
- 7.6.11. Projected temperature and precipitation variables presented in UKCP18 probabilistic projections have been analysed for the region within which the

Scheme is located. These figures are expressed as temperature and precipitation anomalies in relation to the 1981 to 2010 baseline.

7.6.12. The current and future baseline climate data is presented in Table 7-14. Climate variables impacting the construction and operation phases of the Scheme have been assessed in **ES Appendix 7-2: Climate Change Risk Register** (Doc Ref 6.3) against an RCP 8.5 climate change scenario for the periods 2020-2049 (construction) and 2050- 2079 (operation).

**Table 7-14: Current and Future Baseline Climate Data**

Climate Variable	Baseline (1981-2010)	Climate Change Projection Anomaly RCP 8.5 (2020-2049)	Climate Change Projection Anomaly RCP8.5 (2050-2079)
<b>Temperature (°C)</b>			
Mean annual maximum temperature	13.7°C	+1.18°C	+3.21°C
Mean summer maximum daily temperature	20.72°C	+1.51°C	+4.27°C
Mean winter minimum daily temperature	1.23°C	+0.91°C	+2.61°C
<b>Rainfall (mm)</b>			
Mean annual rainfall	608.91mm	-0.26%	-2.72%
Mean summer rainfall	160.13mm	-4.59%	-27.1%
Mean winter rainfall	131.99mm	+4.14%	+13.78%

7.6.13. Changes in climate variables not described by the UKCP18 dataset are presented below and are sourced from the Met Office and recent, published scientific articles. These variables are described in Table 7-15.

**Table 7-15: Qualitative Projections of Extreme Events**

Extreme Events		
	Baseline	Projections
Heatwaves	The Spalding area, like much of the UK, has experienced several significant heatwaves in recent years. Among the most extreme was the heatwave in July 2022, which saw record-breaking temperatures across Lincolnshire. Coningsby, near Spalding, recorded a UK-high of 40.3°C.	Under a high emissions scenario, it is estimated that by the end of the 21 <sup>st</sup> century, all areas of the UK are projected to be warmer with hotter, drier summers and heatwaves likely to become more common and intense.
Storms	The Storm of 2007 caused widespread damage across southern England, including the East Midlands. It brought hurricane-force winds, leading to fallen trees, damaged buildings, and power outages in many areas.	Storms and wind patterns are difficult to predict and there is high variation and uncertainty in the projections. However, there is a general trend of an expected increase in near surface wind speeds and wind gusts for the second half of the 21st century for the winter season. This is accompanied by a possible increase in frequency of winter storms over the UK.
Flooding	Heavy rainfall in August 2022 resulted in widespread flooding across Spalding and Holbeach, particularly affecting low-lying areas. The intense downpour caused significant flooding of both properties and roads, leading to extensive damage to homes, infrastructure, and transport networks.	Flooding may be exacerbated with the projected increase in winter rainfall, leading to increases in surface water and fluvial flooding.
Drought	The summer of 2018 was marked by an extended dry period that	The Met Office has projected a trend towards drier summers on average,

Extreme Events		
	Baseline	Projections
	<p>affected many areas in England, including Lincolnshire. The hot and dry weather led to warnings about drought conditions, affecting crop production and water resources.</p>	<p>with the trend being stronger under a high GHG emission scenario compared to a low one. However, it is the distribution of rainfall throughout the seasons that will determine UK drought risk.</p>

## 7.7. Embedded Mitigation

### Lifecycle GHG Assessment

7.7.1. This section contains the mitigation measures relevant to this chapter that are already incorporated into the Scheme design and the management plans submitted with the DCO Application, as described in **ES Chapter 2: The Scheme** (Doc Ref. 6.1). These include the following measures to be secured through environmental management plans, such as the **Outline Construction Environmental Management Plan (OCEMP)** (Doc Ref 7.10), **Outline Operational Environmental Management Plan (OOEMP)** (Doc Ref. 7.11), **Outline Decommissioning Environmental Management Plan (ODEMP)** (Doc Ref 7.12) and **Outline Construction Traffic Management Plan (OCTMP)** (Doc Ref. 7.13):

- Where practicable, the use of alternative materials with lower transport GHG emissions such as locally sourced products and materials with a higher recycled content;
- Low carbon design specifications, such as energy-efficient lighting and durable construction materials to reduce maintenance and replacement cycles;
- Adopting the Considerate Constructors Scheme (CCS) to assist in reducing pollution, including GHGs, from the Scheme by employing good industry practice measures which go beyond statutory compliance;
- Use of shuttle buses to reduce the use of private vehicles by construction workforce for travelling to Site. In addition, promote the goal that all construction staff are encouraged to use lower carbon modes of transport by identifying and communicating local bus and rail connections and pedestrian and cycle access routes to/from the Scheme. This will be outlined in the Travel Plan, as part of the CTMP.
- Switching vehicles and plant off when not in use and ensuring construction vehicles conform to European Union (EU) vehicle emissions standards for the types of plant vehicles to be used;
- Increasing recyclability by segregating construction waste to be reused and recycled, where reasonably practicable;
- Designing, constructing and implementing the Scheme in such a way as to minimise the creation of waste.

## Climate Change Risk Assessment and In-Combination Climate Change Impacts

- 7.7.2. The assessment of climate risk considers the following best practice embedded measures to carry out a practical risk assessment. These embedded mitigation measures are further detailed in **ES Appendix 7-2: Climate Change Risk Register** (Doc Ref 6.3). The same measures are also relevant to ICCI impacts.
- 7.7.3. The following measures will be secured through environmental management plans, such as the **OCEMP** (Doc Ref 7.10), **OOEMP** (Doc Ref. 7.11) and **ODEMP** (Doc Ref 7.12):
- Siting materials, equipment, welfare cabins, temporary access routes (etc) outside areas prone to flooding during construction and decommissioning, where possible, and considering flood protection measures, where this has not been possible;
  - Consideration would be taken during periods of heatwaves to mitigate against the risks posed to workers and construction. To protect workers, measures include air-conditioned welfare cabins, appropriately shaded areas erected throughout the Site, increased breaks, water availability and adjusted working hours (the Health and Safety (H&S) Plan would include these mitigations). Further to this, dust can become a significant issue during heatwaves and periods of drought. The use of dust suppressers would be increased during these periods. Certain construction processes can be hindered by high temperatures. Higher temperatures speed up the concrete curing process. However, this can cause issues with strength leading to potential cracks in foundations/structural elements. To prevent this, the contractor may propose alternative methods and materials, or, where necessary, activities would be scheduled to occur outside of the window of the heatwave;
  - Appointing a H&S Manager who is responsible for monitoring weather forecasts, weather warnings and alerts and plans, utilising the Met Office long range forecast to inform the planning of the construction works accordingly to minimise risks to the workforce, damage to equipment and delays to the construction programme. The Scheme would establish an extreme weather emergency response plan and toolbox talks would be carried to ensure all workers are aware of the risks and mitigations;
  - A geotechnical “pull-test” will be undertaken prior to construction to confirm piling depth required for PV substructures. Maximum piling depth currently assumed is 3.5 m;

- Design specifications for solar panel construction methods will be followed to ensure the assemblies are resilient to high wind speeds projected to occur at this Site;
- Overhead lines will be designed to meet industry standards which account for changing climatic conditions, including high wind speeds and high temperatures;
- Land and soil movements caused by increased rainfall and soil instability can displace or damage cables. To prevent this, soil assessments would be conducted before installation and protective encasements would be used, if required; and
- During the operational phase, a maintenance check of the panels and other critical equipment would be performed following a storm or a flood event.

7.7.4. The following measures will be secured through the **Design Parameters** (Doc Ref. 7.4) and the Outline Drainage Strategy (**ES Appendix 11-4** (Doc Ref. 6.3)):

- Solar panels will be a minimum of 1.3 m above ground level in areas of increased flood risk. Flood protection measures in the form of bunding, plinths or a flood defence wall have been specified for the On-Site Substation Compounds, Solar Stations and the Cable Sealing End Compounds (CSECs) within areas at risk of flooding. For more information on the Scheme's flood defences and drainage strategies see **ES Chapter 11: Hydrology and Flood Risk** (Doc Ref 6.1); and
- Waterproof insulation to be used on all underground cabling.

7.7.5. Furthermore, as set out within the **Outline Battery Safety Management Plan** (OBSMP) (Doc Ref. 7.18), resilience of the BESS system will be enhanced through battery selection and design, storage environment, implementation of a battery management system (fire detection systems), and adjacent water storage tanks or hydrants.

## 7.8. Assessment of Potential Impacts and Likely Significant Effects

- 7.8.1. The Scheme as outlined in **ES Chapter 2: The Scheme** (Doc Ref. 6.1) has been considered in assessing the potential impacts and likely significant effects of the Scheme, whilst considering the embedded mitigation described within this chapter.

### Lifecycle GHG Assessment

- 7.8.2. The impacts and effects (both beneficial and adverse) associated with the construction, operation (including maintenance), and decommissioning of the Scheme are outlined in the sections below. The assessment has been completed using a combination of project-specific data and benchmarks based on other similar capacity UK solar farm and overhead line schemes.
- 7.8.3. Within this section, GHG emissions arising as a result of the Scheme are first identified and assessed for each lifecycle stage individually (construction, maintenance, and decommissioning). While it is important to understand the GHG impacts at each individual lifecycle stage, it is also important to understand the net lifecycle GHG impact of the Scheme due to the long-term, cumulative nature of GHG emissions over the lifetime of the Scheme.

### Construction Phase

- 7.8.4. The construction phase is assumed to last four years and has been assumed to start in 2029 for the purposes of the ES.
- 7.8.5. GHG impacts during the construction phase primarily consist of the embodied carbon associated with the manufacture of the BESS and solar PV components. Table 7-16 summarises the embodied carbon present within the Scheme's main components.

**Table 7-16: Embodied Carbon by Material Category**

Material/Component	Embodied Emissions (tCO <sub>2</sub> e)	Proportion of embodied emissions
PV Panels	214,500	54%
Steel	23,802	6%
Cabling	6,060	2%
Inverters	46,463	12%
Transformers	5,591	1%
Solar Stations	2,796	1%
Aggregates	2,820	1%
Concrete	2,788	1%
BESS	93,000	23%
Stone	1,968	1%
Asphalt	263	<1%
Plastic	806	<1%
<b>Total</b>	<b>400,856</b>	<b>100%</b>

7.8.6. Other sources of emissions during construction within the scope of the GHG emissions assessment included water, energy and fuel use for construction activities, transportation of materials and workers to the Site and the transportation and disposal of construction waste.

7.8.7. Considering the assumptions listed in Section 7.5, the total emissions from the construction phase are estimated to equate to 433,137 tCO<sub>2</sub>e. Table 7-17 below summarises the overall construction emissions and their source.

**Table 7-17: Construction Phase Emissions Summary**

Material/Component	Carbon Emissions (tCO <sub>2</sub> e)	Proportion of construction emissions
Products and Materials	400,856	93%
Transport of Products and Materials	27,351	6%
Worker Commuting	2,817	<1%

Material/Component	Carbon Emissions (tCO <sub>2</sub> e)	Proportion of construction emissions
Waste	441	<1%
Construction Activities	1,670	<1%
<b>Total</b>	<b>433,137</b>	<b>100%</b>

### Operational Phase

- 7.8.8. For the purposes of this assessment, operation is assumed to begin in the second half of 2033, with a Scheme design life of 40-years.
- 7.8.9. GHG emissions sources within the scope of the operational emissions include operational energy use (i.e. for auxiliary services and standby power), fuel used for the transportation of workers to the Site, and maintenance activities (including the embodied carbon within replacement parts), fuel and water use, transportation of materials and waste.
- 7.8.10. It is assumed that the annual grid energy requirement for operations will equate to 7.94 GWh per year, which is equivalent to 1% of the expected annual energy generation. The carbon intensity of UK grid electricity is expected to decarbonise in line with Government projections<sup>16</sup>, with a goal of net-zero by 2050. Operational energy emissions will therefore be highest in the first year of operation, and decrease thereafter, with minimal operational energy emissions occurring after 2050. Energy emissions in the first year of operation are estimated at 394 tCO<sub>2</sub>e/year, falling to 46 tCO<sub>2</sub>e/year by 2050, by which time the national energy grid is expected to be substantially decarbonised. Lifetime emissions from grid energy consumption total to 3,318 tCO<sub>2</sub>e, assuming a worst-case scenario where the energy required will not be drawn directly from the solar PV or BESS.
- 7.8.11. Based on the proposed maintenance rate for the required components as described in Section 7.5, and applying identical embodied and transport emissions factors as in the construction phase, the replacement of these components is estimated to result in embodied emissions of 643,730 tCO<sub>2</sub>e, an

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<sup>16</sup> DESNZ (2025). Valuation of energy use and greenhouse gas emissions for appraisal. Available at: <https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal> [Accessed 08/10/2025]

additional 18,140 tCO<sub>2e</sub> in transport to the Site, and 182 tCO<sub>2e</sub> from the transport and disposal of replaced components.

- 7.8.12. Other emissions related to the general maintenance of any other Scheme components are estimated at 1% of the total construction phase emissions, or 4,331 tCO<sub>2e</sub>, as per RICS guidance.
- 7.8.13. Emissions relating to repairs are estimated as 25% of the general maintenance emissions, totalling to 1,083 tCO<sub>2e</sub>
- 7.8.14. With the exception of the solar PV panels, where the emissions factor has been derived from a collection of EPDs, the embodied carbon factors on which this assessment is based are subject to considerable uncertainty due to the complex, and often confidential, material composition. Further to this, the BESS system is assumed to be replaced every 10 years, resulting in an additional 279,000 tCO<sub>2e</sub> of embodied carbon impact. However, replacements that occur later in the design life of the Scheme are likely to have a lower carbon impact due to increases in manufacturing efficiencies, decarbonisation of energy used in manufacturing, advancements in technology, and the availability of more robust and accurate data.
- 7.8.15. As discussed in Section 7.5, land use change is anticipated to have a beneficial impact during the lifetime of the Scheme in relation to climate change. However, as this beneficial impact is largely reversed during decommissioning, the GHG impact associated with land use change has been excluded from the GHG impact assessment. This is assumed to represent a robust worst-case scenario as some areas of ecological mitigation and grasslands may remain after decommissioning.
- 7.8.16. Total operational emissions over the design life of the Scheme are estimated at 677,071 tCO<sub>2e</sub>. Most of these emissions are associated with the replacement of the PV panels and BESS. Table 7-18 below summarises the operational emissions and their sources.

**Table 7-18: Operational Phase Emissions Summary**

Emissions Source	Carbon Emissions (tCO <sub>2e</sub> )	Proportion of operational emissions
Maintenance, Repair and Replacement	662,054	99%
Staff Transport (inc. deliveries)	11,671	<1%
Energy Use	3,318	<1%

Emissions Source	Carbon Emissions (tCO <sub>2</sub> e)	Proportion of operational emissions
Water Use	28	<1%
<b>Total</b>	<b>677,071</b>	<b>100%</b>

### Decommissioning Phase

- 7.8.17. GHG emissions from the decommissioning phase are subject to a high degree of uncertainty, as the conditions that will apply in 2073 cannot be described with any confidence. For the purposes of this assessment, it is assumed that decommissioning emissions from the use of plant will replicate those that occurred during construction, with a 25% reduction due to expected increases in efficiencies.
- 7.8.18. It is also assumed that all materials remaining on Site at the time of decommissioning will become waste, utilising the same end-of-life scenarios that exist in the present day.
- 7.8.19. As discussed in Section 7.5, land use change has been excluded from the GHG assessment, because the beneficial GHG impacts of converting cropland to grassland during operation will end at decommissioning, with any carbon stored in soil or vegetation re-released into the atmosphere. This is considered a worst-case approach and is likely to underestimate the beneficial effect of the Scheme as some vegetation may be retained after decommissioning.
- 7.8.20. It is anticipated that the total emissions relating to the decommissioning phase will be 2,237 tCO<sub>2</sub>e. Table 7-19 summarises the emissions relating to this phase.

**Table 7-19: Decommissioning Phase Emissions Summary**

Emissions Source	Carbon Emissions (tCO <sub>2</sub> e)	Proportion of decommissioning emissions
Deconstruction Activities	1,253	56%
Waste	984	44%
<b>Total</b>	<b>2,237</b>	<b>100%</b>

## Total GHG Impact

- 7.8.21. Lifetime emissions from the construction, operation, and decommissioning of the Scheme are summarised in Table 7-20. The total GHG emissions expected over the Scheme lifetime is 1,112,445 tCO<sub>2</sub>e.

**Table 7-20: Whole Life Carbon Summary**

Lifecycle Phase	Carbon Emissions (tCO <sub>2</sub> e)	Proportion of total emissions
Construction	433,137	39%
Operation	677,071	60%
Decommissioning	2,237	1%
<b>Total</b>	<b>1,112,445</b>	<b>100%</b>

## Carbon Intensity of the Scheme

- 7.8.22. Renewable energy generation from the Scheme during the first year of operation is estimated to be 777.6 GWh, taking into consideration a 2% reduction in PV panel efficiency during the first year, and 0.45% degradation for each subsequent year. The entire array is also assumed to be replaced once over the lifetime of the Scheme. This results in an estimated energy generation figure of 746.8 GWh in the final year of operation, and a total energy generation figure of 29.9 TWh over the 40-year Scheme lifetime.
- 7.8.23. Dividing this lifetime energy generation figure by whole-life emissions (Table 7-20) gives a total carbon intensity value of 37 gCO<sub>2</sub>e/kWh of energy generated.
- 7.8.24. The current UK grid carbon intensity is 175 gCO<sub>2</sub>e/kWh, however, these figures are not suitable for direct comparison as the published UK grid carbon intensity figure only takes into account the operational emissions from the generation of electricity, the majority of which is fossil fuels used to power gas-fired and occasionally coal-fired power stations. For an appropriate comparison to be made between the Scheme and the UK grid, only the operational carbon emissions should be considered when assessing the carbon intensity of the Scheme, excluding emissions from the construction and decommissioning stage.
- 7.8.25. When only considering operational emissions, the carbon intensity of the Scheme falls to 23 gCO<sub>2</sub>e/kWh. This figure still includes the embodied carbon of replacement infrastructure, which represent the majority of the Scheme's carbon footprint.

- 7.8.26. The carbon intensity of the Scheme therefore represents an 87% saving against the baseline current UK grid carbon intensity.
- 7.8.27. While various other low-carbon energy generation methods are available, such as on and offshore wind, biomass and nuclear power. Each of these technologies will have a different carbon intensity in terms of total emissions per kWh of electricity generated. Additionally, each specific instance of these technologies will have a varying final carbon intensity figure, making a comparison between the Scheme and a broad generation technology unreliable.
- 7.8.28. As the UK electricity sector continues to decarbonise, a range of different low-carbon generation technologies will be required to support an electricity generation system that can balance emissions reduction, security of supply and affordability.

### **BESS Carbon Savings**

- 7.8.29. The use of the BESS provides the opportunity for additional carbon savings. Battery storage is a fast response power source when compared to traditional energy generation methods, this allows for energy to be quickly provided to the grid when supply from other renewable sources is lower. As the UK grid moves to decarbonise, fast response power supply sources such as BESS will be necessary when working to balance supply and demand within the energy grid. This function of grid balancing is currently often performed by using high-carbon intensity power sources, such as open cycle gas turbines (OCGT), so the use of battery charged from solar PV generation can deliver a direct carbon saving relative to an OCGT.
- 7.8.30. If the BESS is charged from energy produced by the Scheme, and discharged into the grid once each day, at a round-trip efficiency rate of 85%, with the batteries replaced on average every 10 years at 80% of their original capacity, it will supply 6.63 TWh to the electricity grid over its 40-year operational lifetime. As the operational carbon intensity of the Scheme is 23 gCO<sub>2</sub>e/kWh and the comparable figure for an OCGT is 460 gCO<sub>2</sub>e/kWh, the additional use of BESS for grid balancing purposes would save a total of 1,868,407 tCO<sub>2</sub>e.
- 7.8.31. While these figures are subject to a degree of uncertainty, they demonstrate the ability of the BESS system, when used for grid balancing purposes, to significantly reduce carbon emissions over its operational lifetime. These additional savings from the use of the BESS are not considered in the overall GHG assessment below due to uncertainty around the actual operational practices, and as a worst-case scenario.

### Overall GHG Impact

- 7.8.32. In line with ISEP guidance on Assessing GHG Emissions and Evaluating their Significance and the UK's target of net-zero carbon by 2050, the UK's 5<sup>th</sup> to 9<sup>th</sup> Carbon Budgets have been used to contextualise emissions from the Scheme.
- 7.8.33. The Scheme has very low emissions relative to the carbon budget totals. However, the ongoing operation of the Scheme will inevitably result in some residual emissions by 2050. Most of these residual emissions are operational emissions. The Scheme will achieve substantial emissions reductions compared to the without-project baseline, i.e. in a scenario in which the Scheme does not go ahead and the power it generates is provided by the current mix of generation sources.
- 7.8.34. Beyond 2037, it is anticipated that direct operational emissions will decrease over time due to continuing grid decarbonisation, and machinery and vehicle electrification, in line with the UK's net-zero carbon emission target for 2050. Indirectly, the generation of electricity with a much lower carbon intensity than the grid average will result in reduced GHG emissions overall. This indirect emissions reduction will far outweigh any direct emissions resulting from the operations of the Scheme over its lifetime. Overall, the operation of the project will provide GHG performance that supports the trajectory towards net zero.
- 7.8.35. The UK's Carbon Budgets have also been used to contextualise the magnitude of GHG emissions from the Scheme in Table 7-21, depending on the years in which the emissions are expected to occur. Emissions from the four year construction period (2029-2033) will fall under the 5<sup>th</sup> and 6<sup>th</sup> UK carbon budgets. The Scheme is assumed to be operational by mid-2033, and therefore operational emissions up to 2042 (end of the 7<sup>th</sup> carbon budget) will fall under the 5<sup>th</sup>, 6<sup>th</sup> and 7<sup>th</sup> UK Carbon Budgets, beyond which indicative budgets based on the CCC Balanced Net-zero pathway have been used.

**Table 7-21: UK Carbon Budgets**

Carbon Budget Period	Lifecycle Stage	Carbon Budget (tCO <sub>2</sub> e)	Scheme Emissions (tCO <sub>2</sub> e)	Proportion of Carbon Budget
5 <sup>th</sup> Carbon Budget (2028-2032)	Construction	1,725,000,000	385,010	0.022%
6 <sup>th</sup> Carbon Budget (2033-2037)	Construction / Operation	965,000,000	124,297	0.013%
7 <sup>th</sup> Carbon Budget (2038-2042)	Operation	535,000,000	84,634	0.016%
8 <sup>th</sup> Carbon Budget (2043-2047)*	Operation	220,000,000	84,634	0.038%
9 <sup>th</sup> Carbon Budget (2048-2050)*	Operation	22,000,000	84,634	0.39%

*\*Indicative budget based on the CCC Balanced Net-zero pathway*

- 7.8.36. UK carbon budgets are based on production emissions, rather than consumption. It should be noted that the bulk of carbon intensive manufactured components in this Scheme are manufactured overseas and imported to the UK.
- 7.8.37. In line with ISEP guidance, the sectoral carbon budgets for electricity supply have also been used to contextualise emissions from the Scheme.
- 7.8.38. The Scheme has very low emissions relative to the sectoral carbon budget totals, and while the Scheme will result in residual emissions post 2050, as with the UK carbon budgets, it will achieve substantial emissions reductions relative to the without-project baseline.
- 7.8.39. The sectoral carbon budgets (electricity supply) have also been used to contextualise the magnitude of GHG emissions from the Scheme in Table 7-22, dependent on the years in which the emissions are expected to occur. Construction emissions will occur between 2029 and 2033. The Scheme will be operational in 2033, and therefore annualised emissions up to 2050 will fall

during the operation of the Scheme. The emissions in Table 7-22 assume that the carbon intensity of components remains constant throughout the Scheme's design life, however, this is unlikely and the figures are reported as a worst-case scenario.

**Table 7-22: Electricity Supply Sectoral Carbon Budgets**

Carbon Budget Period	Lifecycle Stage	Electricity Supply Carbon Budget (tCO <sub>2</sub> e)	Scheme Emissions (tCO <sub>2</sub> e)	Proportion of Carbon Budget
5 <sup>th</sup> Carbon Budget (2028-2032)	Construction	92,567,052	385,010	0.4%
6 <sup>th</sup> Carbon Budget (2033-2037)	Construction /Operation	35,741,049	124,297	0.4%
7 <sup>th</sup> Carbon Budget (2038-2042)	Operation	23,222,337	84,634	0.4%
8 <sup>th</sup> Carbon Budget (2043-2047)	Operation	12,361,932	84,634	0.7%
9 <sup>th</sup> Carbon Budget (2048-2050)	Operation	4,026,441	84,634	2.1%

- 7.8.40. GHG emissions savings are expected to be achieved throughout the lifetime of the Scheme compared to the current UK grid electricity mix, which contains a large mix of fossil fuel energy generation types. Therefore, the GHG emissions during construction, operation and decommissioning of the Scheme can be considered to be 'offset' by the net positive impact of the Scheme on GHG emissions and the UK's ability to meet its carbon targets. Considering emissions saved against a baseline of the current (2025) UK energy grid carbon factor, the equivalent amount of emissions incurred during construction will have been offset by the Scheme after four years of operation.
- 7.8.41. It would be possible for a low-carbon energy generation project to have a GHG intensity below the projected grid for most of its lifetime, but above it towards the end of its lifetime and still have an overall positive impact on the UK's ability

to meet its carbon targets. However, comparison to grid emissions is not an entirely suitable comparison as decarbonisation of the grid relies on investment in low-carbon technologies, such as this Scheme. Emissions associated with the grid are also based only on the fuel consumed by power stations and are therefore not directly comparable in the context of the Scheme.

- 7.8.42. The GHG savings achieved throughout the lifetime of the Scheme demonstrate the role solar energy generation must play in the transition to, and longer-term maintenance of, a low carbon economy in the UK. Without low-carbon energy generation projects such as the Scheme, the average grid GHG intensity will not decrease as is projected, which could adversely affect the UK’s ability to meet its carbon reduction targets.
- 7.8.43. As the operational carbon intensity of the Scheme remains below the current UK grid average throughout its lifetime, it is considered that the overall GHG impact of the Scheme is **beneficial and significant**, as it will play a part in achieving the rate of transition required by nationally set policy commitments and supporting the trajectory towards net zero. The without-project baseline alternative of the current UK grid generation mix would result in substantially higher GHG emissions. This Scheme demonstrates significant carbon savings, it is therefore considered to have a significant beneficial impact on the climate.

### Climate Change Risk Assessment

- 7.8.44. The complete climate change risk register can be found in **ES Appendix 7-2: Climate Change Risk Register** (Doc Ref 6.3).
- 7.8.45. The initial assessment of climate risk identified a total of 24 risks. Considering the embedded mitigation, none of the identified risks were considered to remain ‘high’ and significant. Table 7-23 summarises the findings of the initial assessment of climate risk.

**Table 7-23: Initial Climate Change Risk Profile**

Risk Rating	RCP 8.5 (2020-2049) Construction	RCP 8.5 (2050-2079) Operation
Low	4	3
Medium	3	14
High	0	0
Extreme	0	0

7.8.46. As no significant climate risks to the Scheme were identified, considering the existing embedded mitigation measures incorporated into design, no further resilience measures are proposed. It is therefore concluded that climate change presents a not-significant risk to the Scheme.

### **In-Combination Climate Change Impact Assessment**

7.8.47. The complete list of identified ICCIs can be found in **ES Appendix 7-3: In-Combination Climate Change Impact Assessment** (Doc Ref 6.3).

7.8.48. The assessment of ICCIs did not identify any significant risks to the Scheme's surrounding receptors due to the additional impacts of climate change. Therefore, the ICCI assessment is considered to be not significant.

## 7.9. Additional Monitoring, Mitigation and Enhancement Measures

- 7.9.1. Additional mitigation or enhancement measures are required where significant adverse effects are identified after considering the embedded mitigation measures.

### Lifecycle GHG Assessment

- 7.9.2. No additional mitigation or enhancements beyond the measures already described in Section 7.7 are proposed during construction, operation, or decommissioning of the Scheme, as no significant adverse effects have been identified.
- 7.9.3. The GHG emissions from construction, operation and decommissioning of the Scheme are accounted for within the lifetime GHG intensity figure for the Scheme. Therefore, it is considered that the GHG reductions achieved as a result of the operation of the Scheme itself adequately outweigh and offset the GHG impacts during the individual lifecycle stages.

### Climate Change Risk Assessment

- 7.9.4. No additional mitigation or enhancements beyond the measures already described in Section 7.7 are proposed during construction or operation of the Scheme, as no significant climate change risks have been identified. Embedded mitigation measures are considered sufficient to reduce climate risk to a not-significant level.

### In-Combination Climate Change Impact Assessment

- 7.9.5. No additional mitigation is recommended for ICCI risks as no significant risks were identified.

## 7.10. Residual Effects

- 7.10.1. The residual effects of the Scheme during the construction, operational and decommissioning phases are outlined within Table 7-24.
- 7.10.2. The only residual effect identified as significant by the three climate assessments is the beneficial GHG impact of the Scheme due to its ability to lower the carbon intensity of UK grid electricity and aid in the pathway to net zero by 2050.

Table 7-24: Summary of Residual Effects in relation to climate change

Receptor	Description of Impact	Embedded Mitigation	Significance of Effect Without Additional Mitigation	Additional Mitigation/Enhancement Measure	Residual Effect
GHG Impact Assessment					
Global climate	Residual GHG emissions	Described in Section 7.7	Beneficial (Significant)	None required	Beneficial (Significant)
Climate Change Risk Assessment					
Scheme	Climate risk to Scheme	Described in Section 7.7	Not Significant	None Required	Not Significant
In-Combination Climate Change Impact Assessment					
Various	Climate impact on surrounding receptor risks	Described in Section 7.7	Not Significant	None Required	Not Significant

## 7.11. Cumulative Effects

7.11.1. Cumulative effects are the combined effects of several development schemes (in conjunction with the Scheme) which may, on an individual basis be insignificant but, cumulatively, have a significant effect. Cumulative effects with other development schemes are also referred to as inter-project cumulative effects. An explanation of how this is not applicable to the climate change assessments is provided below.

### Lifecycle GHG Assessment

7.11.2. Climate change is the result of cumulative impacts as it is the result of innumerable minor activities, a single activity may itself result in a minor or insignificant impact, but when combined with many other activities, the cumulative impact could be significant. The nature of greenhouse gases is such that their impact on receptors (the global climate) is not affected by the location of their source. The GHG emissions assessment by its nature is a cumulative assessment and considers whether the Scheme would contribute significantly to emissions on a national level.

7.11.3. The global atmosphere is the receptor for climate change impacts and is one natural sink for GHG emissions. Nevertheless, as stated by ISEP<sup>5</sup>, all GHG emissions are considered significant and therefore would contribute to climate change. While the impact of any individual proposed development may be limited, it is the cumulative impact of many proposed developments over time that could have a significant impact on climate change.

7.11.4. As such, it is not possible to define a study area for the assessment of cumulative effects of GHG emissions nor to undertake a cumulative effects assessment, as the identified receptor is the global climate and effects are therefore not geographically constrained. Consequently, consideration of the effects of the Scheme together with other developments on GHG emissions is not considered to be applicable.

### Climate Change Risk Assessment

7.11.5. Cumulative effects are not relevant to the CCR Assessment, as it considers the impact of climate change on the Scheme itself.

### In-Combination Climate Change Impact Assessment

7.11.6. Cumulative effects do not apply to the In-Combination risks as the relevant risks identified within **ES Appendix 7-3: In-Combination Climate Change Impact**

**Assessment** (Doc Ref 6.3) all occur within the Order Limits of the Solar Development Area and do not have the potential to combine with effects from other schemes.

