



Lime Down

Solar Park

Climate Response to Wiltshire Council Appendix B of Written Rep and Stop Lime Down Appendix J1

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1 Introduction

1.1 Background

1.1.1 Further to submission of the **Environmental Statement (ES) Chapter 7: Climate Change [APP-059]** for the Scheme, Wiltshire Council, the University of Derby and Jon Atkey have made written representations in relation to the Climate Change information submitted. The comments made by Wiltshire Council (incorporating the University of Exeter comments), the University of Derby and Jon Atkey are summarised in Table 1.1.

Table 1.1 Summary of Comments

Responder	Issue	Summary of Comments	Response
University of Derby	Underestimated Emissions	Revised whole-life emissions estimated at 966,311-975,206 tCO ₂ e (vs. estimated in the ES Chapter 7 [APP-059] 933,145 tCO ₂ e), primarily due to underestimated cables, concrete, SF ₆ leakage, on-site cable replacement, and substation refurbishment.	Please see section 2
Wiltshire Council (University of Exeter Centre for Energy and the Environment)	Underestimated Emissions	The assessment underestimates embodied and lifecycle carbon emissions. Construction GHG emissions are likely underestimated. Cables emissions understated (876 tCO ₂ e vs. reviewed estimate of 20,762 tCO ₂ e), concrete emissions underestimated (5 tCO ₂ e vs. 1,526 - 3,509 tCO ₂ e), and construction plant fuel not quantified. Revised whole-life emissions estimated at 441,983 tCO ₂ e and 1,176,564 tCO ₂ e for construction compared to applicant's 237,144 tCO ₂ e and 686,992 tCO ₂ e as presented in the ES Chapter 7 [APP-059] .	Please see section 2
University of Derby	Low Estimates for Energy Output	Quoted energy outputs appear conservative; solar resource models (GSA, PVsyst) suggest higher potential output. The Scheme's stated 438-415 GWh/year (fixed/tracker) is lower	Please see section 3

Responder	Issue	Summary of Comments	Response
		than model estimates, suggesting possible definitional or constraint mismatches not clearly explained in the ES.	
University of Derby	Low Estimates for Energy Output	Quoted energy outputs appear conservative; solar resource models (GSA, PVsyst) suggest higher potential output. The scheme's stated 438-415 GWh/year (fixed/tracker) is lower than model estimates, suggesting possible definitional or constraint mismatches not clearly explained in the ES.	Please see section 3
Wiltshire Council (University of Exeter Centre for Energy and the Environment)	Land use change	Acknowledgement of the impacts of carbon sequestration	Please see section 4
Wiltshire Council (University of Exeter Centre for Energy and the Environment)	Carbon Payback Time	The Scheme's carbon payback period is significantly longer than similar projects. Using the Applicant's own figures, payback is not achieved until 2075-2079 (fixed/tracker panels respectively) - well beyond the UK's net-zero target of 2050.	Please see section 5
University of Derby	Carbon Payback Time	Using levelised approach: carbon payback not reached until 2075 (fixed) or 2078 (tracker). Using event-based approach: payback occurs 2062 (fixed) or 2070 (tracker). Both scenarios show payback late in or beyond the operational period, raising questions about the Scheme's net carbon benefit timing.	Please see section 5
Councillor Jon Atkey	Carbon Payback Time / Break-Even Timing	Using the Applicant's own figures, carbon break-even is not reached until 2058 - over 30 years away and well beyond the UK's legally binding net-zero target of 2050. Until then, the	Please see section 5

Responder	Issue	Summary of Comments	Response
		Scheme is a net contributor to atmospheric carbon.	
Wiltshire Council (University of Exeter Centre for Energy and the Environment)	Impact vs Benefits unbalanced	An independent analysis notes that while the Scheme would generate approximately 0.15% of UK electricity demand, it would account for 0.49% of the sectoral carbon budgets. The report recommends that significance determinations should not rely solely on national percentages but should instead consider multiple evidence sources, including local emissions targets and alignment with broader policy objectives, following IEMA/ISEP guidance best practices.	Please see section 6
Wiltshire Council (University of Exeter Centre for Energy and the Environment)	Comparison of Scheme's carbon emissions with similar Schemes	Based on the submitted figures, the Scheme appears to have unusually high carbon emissions, compared to similar schemes and it is therefore unclear whether this is an accurate assessment or whether a different methodology or accounting boundary would lead to a different conclusion in relation to the amount of carbon emissions or the ability of the scheme to offset them.	Please see section 7

1.1.2 This technical note intends to respond and address the comments set out in Table 1.1.

2 Emission Calculations

- 2.1.1 Whilst recognising that there are alternative methods of calculation of Greenhouse Gas (GHG) emissions – such as those presented in the written representations – the Applicant’s assessment has been developed in line with the relevant planning policy and appropriate industry standard guidance for assessing GHGs (Institute of Sustainability and Environmental Professionals’ (ISEP (previously IEMA)) document ‘Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance 2nd Edition’) in EIA (Ref 1).
- 2.1.2 The University of Exeter suggests that using Environmental Product Declarations (EPDs) is more robust than the approach followed in **ES Chapter 7 [APP-059]**. Although EPDs are valuable, they are inherently product and manufacturer specific. At the environmental impact assessment stage, products are not yet specified, and the design is not fixed. Therefore, using supplied EPDs for specific products would imply premature design commitments and can misrepresent likely procurement outcomes.
- 2.1.3 In order to avoid commitment to a specific product, it is a good practice within environmental impact assessments to use generic datasets (e.g. the Inventory of Carbon and Energy (ICE) and UK Department of Energy, Security and Net Zero (DESNZ) 2024 conversion factors (Ref 2)) to derive material-level embodied carbon with transparent system boundaries. This avoids supplier specific bias and ensures comparability across options, with a commitment to replace generics with EPDs at detailed design/procurement stage through the preparation of the final Construction Environmental Management Plan and the Operational Environmental Management Plan and any reporting pursuant to those plans.
- 2.1.4 Selecting a theoretical “worst case” scenario for every product and activity can produce an unrealistic total (and double counting) and is not itself a precautionary approach. The Applicant has applied a reasonable worst case using conservative but plausible assumptions.
- 2.1.5 The assessment includes a number of conservative assumptions. These include the assumption that solar modules are imported from China with associated international freight emissions, replacement of solar modules during the operational life of the Scheme, replacement of battery systems at regular intervals throughout the Scheme lifetime, replacement of inverters and transformers, and replacement of a proportion of on-site cabling. These assumptions were intentionally selected to avoid underestimating lifecycle greenhouse gas emissions.

- 2.1.6 With regard to construction plant emissions, **ES Chapter 7 [APP-059]** acknowledges that detailed fuel consumption data was not available at the time of assessment due to the absence of contractor-specific information. However, based on experience from comparable solar developments and the short duration of construction activities, construction plant emissions are expected to represent less than 1% of total lifecycle greenhouse gas emissions. Appropriate measures to minimise construction emissions are secured through the **Outline Construction Environmental Management Plans (CEMP) [REP2-019]**.
- 2.1.7 The University of Exeter's review also notes that annual electricity generation may be higher than the values presented in the ES based on alternative solar resource modelling assumptions. The Applicant notes that the generation estimates presented in **ES Chapter 7 [APP-059]** were intentionally conservative and based on the design information available at the time of assessment. Should operational electricity generation exceed these values, the resulting displacement of grid electricity and associated greenhouse gas savings would be greater than reported, thereby increasing the overall climate benefit of the Scheme.
- 2.1.8 Notwithstanding differences in estimated embodied carbon values, both the Applicant's assessment and the University of Exeter's review conclude that the Scheme would generate substantial quantities of renewable electricity and contribute to the decarbonisation of the UK electricity system. The Applicant therefore considers that the conclusions of **ES Chapter 7 [APP-059]** remain robust and that the Scheme would continue to make a significant positive contribution towards achieving national and local climate change objectives.
- 2.1.9 For the purposes of this technical note, a notional figure of approximately 842,000 panels has been assumed. This reflects an estimated maximum achievable installed capacity of the Scheme within the defined design parameters. This accommodates consideration of forthcoming panel arrangements reflective of technological advancements and increased efficiencies in panel design and mounting systems, since the original preparation of **ES Chapter 7 [APP-059]** in 2025.

3 Energy Output

- 3.1.1 The University of Derby's PVsyst yields for the Lime Down 500 MWp bifacial scenarios appear to be overstated. The most likely explanations are an elevated irradiance input and optimistic or undisclosed system loss assumptions, combined with array design choices that are impractical for a land constrained UK utility site. The reported specific yields for both Fixed Tilt (FT) and Single Axis Tracker (SAT) were very high for UK utility scale solar farms, in particular the SAT results of 1,289 kWh/kWp (644.7 GWh/yr for 500 MWp) are not credible for UK SAT arrays when realistic irradiance, loss assumptions and constrained pitch/tilt are applied.
- 3.1.2 This technical note compares the Applicant's independent PVsyst simulations (FT and SAT, each run with SolarGIS and Meteonorm irradiance) against the results presented by the University of Derby. Monofacial scenarios were excluded because they are not representative of modern utility ground mount systems. All of the simulations run were at a direct current (DC) Capacity of 500 MWp and were run with conservative loss assumptions, none of which included a 3D shading scene. The comparison focused on three key drivers of annual yield, the irradiance dataset and values used, the detailed loss assumptions applied in PVsyst, and the array geometry (tilt, pitch, row spacing and portrait configuration).

Table 3.1 Projected Yield / Energy Output

Source	Configuration	Yield Y1 (GWh)	Specific Yield (kWh/kWp)	60 Year Yield (TWh)	40 Year Yield (TWh)
University of Derby - Irradiance, Est. 1220.1 kWh/m ²	FT 500MWp	552.7	1105.3	30.62	n/a
	SAT 500MWp	644.7	1289.4	35.72	n/a
Irradiance, Solar GIS - 1036.0 kWh/m ² (Ref 3)	FT 2P 500MWp	524.1	1048.2	28.79	19.51
	SAT 2P 500MWp	570.1	1140.2	31.32	21.22
Irradiance, Meteonorm - 1058.4 kWh/m ² (Ref 4)	FT 2P 500MWp	536.9	1073.8	29.49	19.99
	SAT 2P 500MWp	588.7	1177.4	32.34	21.92

- 3.1.3 As shown in Table 3.1, the irradiance value cited in the University of Derby's report (Global Solar Atlas = 1,220.1 kWh/m²) is substantially higher than the Irradiance, Solar GIS value (1036.0 kWh/m²) for the same

site and is sufficient on its own to explain a large portion of the yield gap. Even if the more generous Meteororm dataset is utilised (1058.4 kWh/m²), the SAT and FT yields remained lower than the University of Derby's reported numbers. The University of Derby's report does not disclose a line by line loss table, if the loss assumptions were materially lower than those applied by the Applicant, that would further widen the discrepancy in yield results.

- 3.1.4 Array design is another important factor. The University of Derby's FT result is consistent with a high tilt (reported elsewhere as 38°) and thus an implied large pitch spacing. While a 38° tilt may be near the theoretical optimum for UK latitudes, it is not practical on a constrained UK site because it increases inter row shading and reduces installed MWp per hectare. The Scheme's FT model used an 18° tilt with a 7.5 m pitch, and the SAT model used an 8.5 m pitch to reflect typical operational and maintenance requirements. These assumptions are representative of realistic, land constrained utility scale solar deployments in the UK. Finally, none of the compared simulations included a 3D shading scene; adding one would reduce yields further and increase the divergence from the University of Derby's higher estimates.
- 3.1.5 Irradiance dataset selection has a direct effect on yield. For models widely used for the purposes of securing financial investment against solar yield, datasets such as SolarGIS represent the accepted industry standard, and more generous datasets treated as a potential upside.
- 3.1.6 Transparency in the loss assumptions is essential, therefore a full, line by line breakdown (soiling, LID, mismatch, AC & DC wiring, transformer losses, availability, etc.) would be required to validate PVsyst outputs provided by the University of Derby. Array configuration details that materially affect bifacial performance such as module mounting height, portrait configuration and albedo assumptions (i.e., how well a surface reflects the sunlight), were not specified in the University of Derby's report and would need to be included in order to allow a direct comparison. Finally, tilt and pitch must reflect site constraints; high tilts (38°) with large pitches reduce MWp/ha and are not feasible on constrained UK sites. That being said, even if there was unlimited land at the site, it would be inefficient to have a tilt at 38 degrees due to the low MWp/ha of installed capacity that would need to be built to counteract the large inter-row shading.

4 Carbon Impact of Land Use

- 4.1.1 The Wiltshire Council Written Representation (May 2026) states that a detailed assessment on the land based emissions is beyond the scope of the ES. On a commissioned independent assessment it was stated that there is a *“potential for a change of use from arable farmed land to unimproved grassland to have a net benefit for carbon sequestration, with additional net benefits if there is currently livestock being farmed. The report at Appendix B also makes some suggestions of the implications of different densities of hedgerows on the carbon sequestration potential. If the scheme removes substantial hedgerows (and associated significant trees), this will impact on the carbon sequestration potential of the land. However, the current proposals are not specific in the extent of hedgerows which will be removed, so the impact on carbon sequestration is unknown.”*
- 4.1.2 The Applicant acknowledges that land management practices, including soil disturbance, vegetation establishment, hedgerow management and livestock grazing, can influence the carbon balance of agricultural land. However, a detailed assessment of land-based carbon fluxes and sequestration is beyond the scope of **ES Chapter 7 [APP-059]** and is not required to determine the significance of the Scheme's climate effects.
- 4.1.3 Notwithstanding this, the proposed change in land use from predominantly arable agriculture to low-input grassland beneath and between the solar arrays has the potential to provide an additional carbon sequestration benefit. Based on published sequestration rates referenced by Natural England ('Carbon storage and sequestration by habitat: a review of the evidence' 2nd edition, 2021; NERR094 (Ref 5)), low-input grassland can generate a sequestration flux of approximately 1.590 tCO₂e/ha/year. **ES Chapter 7 [APP-059]** adopts a conservative approach and does not include any carbon sequestration benefits associated with land-use change, habitat creation or ecological enhancement. Consequently, the reported greenhouse gas balance in the ES is likely to underestimate rather than overestimate the overall climate benefit of the Scheme.
- 4.1.4 The Scheme has been designed to retain existing woodland, scrub and the majority of existing hedgerow features. Limited lengths of hedgerow may require removal to facilitate access, visibility requirements and utility crossings; however, any such losses would be compensated through replacement planting and enhancement measures secured through the **Outline Landscape and Ecological Management Plan [APP-084]**. The landscaping proposals also include reinforcement and gapping-up of existing hedgerows and additional planting to strengthen landscape enclosure around the Site.

- 4.1.5 Whilst a detailed quantification of carbon sequestration associated with existing and proposed hedgerows has not been undertaken, the extent of hedgerow removal is limited and will be offset through replacement and enhancement planting. In this context, and given the wider transition from arable land to low-input grassland across the Site, any changes in carbon sequestration associated with hedgerow management are not expected to materially affect the overall greenhouse gas balance of the Scheme or alter the conclusions of **ES Chapter 7 [APP-059]**.

5 Payback Year

5.1 Issues with assessing a 'Payback' year

- 5.1.1 The construction, operation, and decommissioning of energy infrastructure will inevitably lead to GHG emissions (e.g. embodied carbon in products, transport, replacements and end-of-life processing). However, the Scheme, does not actively remove GHG emissions from the atmosphere. Consistent with ISEP guidance and NPS EN-1 (paragraph 5.3.4 (Ref 6)), whole-life emissions are reported gross by life stage; any “avoided” emissions are presented separately as contextual information and are not netted off the inventory to claim a “payback” year or to determine significance.
- 5.1.2 The Scheme is anticipated to require periodic replacements and maintenance activities over its operational period. While it is difficult to predict what emissions from these products and operations are likely to be over the 60 years of the Scheme operational period, the assessment has made a conservative assumption that emission rates in the future will be the same as those at the time of writing the ES.
- 5.1.3 Given these ongoing future emissions and the requirement to report inventories gross, it is not methodologically sound to state that “construction emissions are removed by year X”. Instead, the appropriate comparison is to demonstrate the Scheme’s operational carbon intensity is lower than the opening-year grid average, as per **ES Chapter 7 [APP-059] paragraphs 7.4.20-7.4.22**, and that residual emissions have been minimised for a project of this type in line with good practice (ISEP guidance in developing baseline and future baseline scenarios, ‘Assessing Greenhouse Gas Emissions and Evaluating their Significance’ (Ref 1)).
- 5.1.4 Consistent with NPS EN-1 (2023) paragraph 5.3.10, *“in light of the vital role energy infrastructure plays in the process of economy wide decarbonisation, the Secretary of State must accept that there are likely to be some residual emissions from construction and decommissioning of energy infrastructure.”* (Ref 6). Significance is therefore judged on alignment with the net-zero trajectory and evidence that all reasonable measures to reduce emissions have been taken, not on achieving a particular “payback year”.

5.2 Context for the avoided-emissions comparison used in ES Chapter 7 Climate Change

- 5.2.1 To provide context on the Scheme’s contribution to decarbonisation, **ES Chapter 7 [APP-059]** includes a transparent comparison between the Scheme’s operational carbon intensity and electricity supplied by the UK

grid in the Scheme's anticipated opening year (2029). The difference is presented as "avoided" grid emissions. This contextual comparison does not form part of the Scheme's GHG inventory and is not used to determine significance.

- 5.2.2 However, it is important to note that the DESNZ grid carbon intensity used for comparison does not include GHG emissions from imported materials as part of the UK's national inventory, i.e. the grid emissions considered are UK territorial emissions only. This means that the emissions generated outside of the UK territory are not accounted for in the DESNZ grid carbon intensity projections used to assess the Scheme savings.
- 5.2.3 In contrast, the Scheme's lifecycle assessment accounts for global embodied and freight emissions for products such as BESS (Battery Energy Storage Systems), PV modules, transformers, and cabling. This discrepancy results in an asymmetrical comparison that underestimates the Scheme's GHG savings and provides a conservative assessment of the Scheme's overall emissions saving. In other words, the comparator is territorial and operational-only, whereas the Scheme inventory is global and lifecycle, which biases the contextual comparison towards understatement of savings.
- 5.2.4 Moreover, the GHG emissions methodology used in the assessment is limited in that it only compares electricity generated by the Scheme to the equivalent electricity available via the national grid. This approach does not fully account for the broader carbon benefits that accrue from the provision of renewable energy as part of an extensive electricity supply system. Renewable energy contributes to a decarbonised grid and supports the electrification of activities that currently rely on fossil fuels, such as heating homes and fuelling cars. Similarly, the BESS grid-balancing function, which is not accounted for in the net Scheme carbon savings, further reduces dependence on fossil fuels.
- 5.2.5 The limited comparison of generated electricity against equivalent grid intensity ignores the broader benefits of displacing fossil fuel use in transport, heating, and industrial processes. In practice, the energy use from these sectors that the Scheme displaces may be significantly more carbon-intensive than the national grid at any given time. This means the carbon savings of the Scheme presented in **ES Chapter 7 [APP-059]** could be much greater than estimated.

6 Impacts vs Benefits

- 6.1.1 The Applicant notes the observation made by the University of Exeter that the Scheme could generate around 0.15% of UK electricity demand in 2029 (438 GWh) while annualised construction emissions equate to 0.49% of the electricity supply sector's annual territorial budget in the construction years. Consistent with ISEP's GHG assessment guidance, significance should draw on multiple sources of evidence, including sectoral and national carbon budgets, the Scheme's operational carbon intensity relative to the grid, the application of the mitigation hierarchy and best available techniques, and alignment with local and national policy objectives.
- 6.1.2 The 0.49% figure put forward by the University of Exeter appears to compare figures derived for different geographical / temporal system boundaries; the UK electricity sector carbon budgets are territorial and operational only, whereas the Scheme's construction figures are global and lifecycle (including overseas manufacturing and freight). Territorial UK emissions attributable to the Scheme would be lower than the global lifecycle value presented. In that regard, **ES Chapter 7 [APP-059]** presents a conservative comparison.
- 6.1.3 The sector's territorial budget, the Scheme's global life-cycle construction emissions and the Scheme's estimated UK-territorial construction emissions (noting actual procurement will fall between these bounds as UK-sourced materials and services are used where feasible) have been compared in **ES Chapter 7 [APP-059]** and summarised below.
- 6.1.4 **Sectoral/national context:** Annualised construction emissions for the Scheme are 188,574 tCO_{2e}, well below 1% of the electricity sector's annual territorial budgets in 2027–2028 and will be limited to the duration of the construction phase (anticipated to be two years); against whole UK budgets they are smaller again.
- 6.1.5 **Operational performance:** On a like for like operational basis, the Scheme's carbon intensity (28–29 gCO_{2e}/kWh) is lower than the opening-year grid average (49 gCO_{2e}/kWh), indicating lower-carbon generation from first operation.
- 6.1.6 **Minimisation:** The design applies the mitigation hierarchy (e.g., piled tables avoiding concrete where practicable, conservative logistics reported transparently, Stage V/HVO/electric plant commitments, cable/conductor optimisation) and will be refined at procurement using supplier data (e.g., EPDs) through the final CEMP/OEMP.
- 6.1.7 **Policy alignment:** The Scheme supports the policies set out in NPS EN-1 and EN-3 on the need for low-carbon generation and aligns with

Wiltshire's Climate Strategy and Delivery Plans by enabling local low-carbon supply and flexibility (BESS), while climate risks are managed per NPS EN-1 Section 4.10 (Ref 7; Ref 6).

- 6.1.8 **Local targets:** Local authority targets cover territorial emissions; the Scheme's local territorial construction emissions are temporary, and operational on-site emissions are minimal outside any periods of replacement activities. The Scheme contributes to area-wide decarbonisation objectives through low-carbon electricity provision.
- 6.1.9 As a result, single national percentages are informative but not determinative. When assessed against multiple evidence sources in line with ISEP guidance, the Scheme's construction emissions are adverse but small in context and minimised; operational emissions are low; and the Scheme aligns with national and local policy objectives for decarbonising the power sector.

7 Comparison of Scheme's carbon emissions with similar Schemes

- 7.1.1 We note the comment that the Scheme “*appears to have unusually high carbon emissions compared to similar schemes*” and the suggestion that methodology or accounting boundaries may be driving the outcome.
- 7.1.2 **ES Chapter 7 [APP-059]** explicitly follows ISEP guidance. It reports a gross, whole-life inventory by life-cycle stage and presents any avoided grid emissions as contextual only (not netted). It also uses recognised UK factors (DESNZ 2024/ICE) and a reasonable-worst-case design (e.g., tracking tables; conservative logistics; BESS intensity and replacements). These choices increase totals relative to less conservative or operational-only approaches.
- 7.1.3 Like for like comparison matters. The interested party's observation appears to conflate territorial, operational-only figures (commonly reported in high-level comparisons); with the Scheme's global, lifecycle inventory (including overseas manufacturing and sea freight), which is broader by design and therefore higher than territorial operational numbers for “similar schemes”.
- 7.1.4 On an appropriate metric for cross technology comparison the Scheme sits within the typical range for photovoltaic projects. Table 7-29 in **ES Chapter 7 [APP-059]** reproduces the United Nations Economic Commission for Europe meta-analysis of lifecycle intensities across power technologies; the Scheme's operational carbon intensity (28–29 gCO₂e/kWh when compared on an operational, like for like basis) is lower than the 2029 UK grid average (49 gCO₂e/kWh) and within the UNECE PV range (8–83 gCO₂e/kWh) (Ref 8). This indicates the Scheme is not an outlier when compared properly.
- 7.1.5 The Scheme's totals appear higher only when broader, global lifecycle boundaries and conservative placeholders are compared to narrower, territorial or operational figures. On a like for like basis (lifecycle intensity) the Scheme is within the expected PV range; on an operational basis it is lower carbon than the opening year grid. The assessment methodology is robust and conservative rather than “unusually high,” and the significance conclusion remains sound.

8 Scenario Testing

8.1.1 The tables below present a summary of the total greenhouse gas emissions associated with a number of sensitivity tests undertaken to assess the potential impact of key assumptions on the overall results of the assessment. These sensitivity tests include:

- **Scheme lifespan** – The ES Chapter assesses the Scheme over a maximum 60-year operational lifespan. However, following comments raised during Issue Specific Hearing 1 regarding the potential for a shorter operational period, a 40-year lifespan has also been assessed and included in Table 8.1.
- **50% uplift in HGV traffic** – A sensitivity test applying a 50% increase in HGV movements has been undertaken in response to comments suggesting that construction traffic volumes may have been underestimated. This assessment demonstrates the effect of increased construction traffic on the overall greenhouse gas emissions of the Scheme. This now aligns with data provided in the Transport Chapter, where a 50% uplift in HGV traffic was used in the original assessment in **ES Chapter 7 [APP-059]**.
- **Number of solar panels** – A sensitivity assessment has been undertaken using the maximum potential number of solar panels within the Scheme parameters. This represents a more conservative scenario than that applied in **ES Chapter 7 [APP-059]** and illustrates the potential effect on greenhouse gas emissions associated with an increase in panel numbers.

Table 8.1 Change in Total Greenhouse Gas Emissions by Scenario (tCO_{2e})

60 Years		Standard (as set out in ES Chapter 7 [APP-059]) (Net Benefit)	50% Transport Uplift (including the 50% uplift on vehicle movements included in ES Chapter 12) (Net Benefit)	Percentage Increase
Number of Panels (Net Benefit)	598,000 (as set out in ES Chapter 7 [APP-059])	933,140 (253,839)	941,130 (245,811)	0.86%
	842,000 (representing the maximum potential number of panels within the Scheme parameters)	973,968 (212,973)	981,958 (204,983)	0.82%
Percentage Increase		4.38%	4.34%	

40 Years		Standard (Net Benefit)	50% Transport Uplift (including the 50% uplift on vehicle movements included in ES Chapter 12) (Net Benefit)	Percentage Increase
Number of Panels (Net Benefit)	598,000 (as set out in ES Chapter 7 [APP- 059])	736,869 (14,256)	744,856 (6,229)	1.08%
	842,000 (representing the maximum potential number of panels within the Scheme parameters)	756,225 (5,140)	764,211 (13,126)	1.06%
Percentage Increase		2.63%	2.60%	

- 8.1.2 The sensitivity testing demonstrates that the overall greenhouse gas emissions of the Scheme are relatively insensitive to any increases in construction traffic and panel numbers. Applying the 50% uplift in HGV traffic (as per **ES Chapter 12: Transport and Access [EN010168/APP/6.3] (Rev 3)** produced at Deadline 3) results in an increase in total lifecycle emissions of less than 1.1% across all scenarios, indicating that construction transport emissions represent a small proportion of the Scheme's overall greenhouse gas footprint.
- 8.1.3 Increasing the number of solar panels from the assessed 598,000 panels to a conservative maximum of 842,000 panels results in an increase in total lifecycle emissions of approximately 4.3% for the 60-year lifespan scenario and approximately 2.6% for the 40-year lifespan scenario. Whilst this represents the most influential of the tested parameters, the increase remains relatively modest when considered against the overall lifecycle emissions of the Scheme. The increase during the 60-year lifespan is slightly higher due to the additional replacements required over the longer operational timeframe.
- 8.1.4 The results indicate that the conclusions of the Climate Change Assessment set out in ES Chapter 7 are robust to reasonable variations in key assumptions. Neither an increase in construction traffic nor an increase in panels results in a material change to the overall greenhouse gas emissions profile of the Scheme or the conclusions presented within ES Chapter 7.
- 8.1.5 Regarding net benefits, reducing the operational lifespan of the Scheme from 60 to 40 years decreases the net greenhouse gas benefit from 253,839 tCO₂e to 14,256 tCO₂e (see Table 8.1). This reduction reflects the loss of 20 years of renewable energy generation and associated avoided emissions, while lifecycle emissions remain largely unchanged.

Although the overall carbon benefit is substantially reduced for a 40-year operational life, the Scheme is still estimated to deliver a net reduction in greenhouse gas emissions over its operational lifetime compared with the baseline scenario. This net reduction is considered to be beneficial and significant, with no change in significance from the emissions calculations within **ES Chapter 7 [APP-059]**.

9 References

- Ref 1 Institute of Environmental Management & Assessment (IEMA) (now ISEP). 2022. Assessing Greenhouse Gas Emissions and Evaluating their Significance. Available online at: [2022 iema greenhouse gas guidance eia.pdf](#) [Accessed June 2026].
- Ref 2 Department of Energy, Security and Net Zero. 2024. Greenhouse gas reporting: conversion factors 2024. Available online at: [Greenhouse gas reporting: conversion factors 2024 - GOV.UK](#) [Accessed June 2026].
- Ref 3 Solar GIS. N.D. Available online at: <https://solargis.com/> [Accessed June 2026].
- Ref 4 Meteonorm. N.D. 'Global Solar Data'. Available online at: [Global Solar Data | Meteonorm](#) [Accessed June 2026].
- Ref 5 Natural England. 2021. Carbon storage and sequestration by habitat: a review of the evidence' 2nd edition, 2021; NERR094. Available online at: [Carbon Storage and Sequestration by Habitat 2021 - NERR094](#) [Accessed June 2026].
- Ref 6 Department of Energy Security and Net Zero (2026) Overarching National Policy Statement for Energy (EN-1). Available at: <https://assets.publishing.service.gov.uk/media/65bbfdbc709fe1000f637052/overarching-nps-for-energy-en1.pdf>. [Accessed May 2026].
- Ref 7 Wiltshire Council. 2022. Climate strategy and delivery plans. Available online at: [Climate strategy and delivery plans - Wiltshire Council](#) [Accessed June 2026].
- Ref 8 United Nations Economic Commission for Europe (2022) Carbon Neutrality in the UNECE Region: Integrated Life-cycle Assessment of Electricity Sources. Available at: <https://unece.org/sed/documents/2021/10/reports/life-cycle-assessment-electricity-generation-options> [Accessed June 2026].