



HELIOS RENEWABLE
ENERGY
PROJECT

Preliminary Environmental Information Report

Volume 3: Technical Appendices

Appendix 12.3: Helios Carbon
Calculations

**HELIOS RENEWABLE ENERGY PROJECT – PEIR CALCULATIONS
 JULY 2023**

Headline Text

The installed capacity for the site is expected to be around 250 MWp (Direct Current – DC) with an export capacity of 190 MW (Alternating Current – AC). Using the 190 MW as a conservative approach, the annual generation for a solar farm of this size could generate approximately 176 gigawatt-hours (GWh) of renewable electricity per year.

Capacity factor, or load factor, is a term often used to consider the performance of solar farms, and other generation sources. The capacity factor is how much electricity a site generates a year compared to how much electricity could theoretically have been generated if it were producing at maximum output continuously. In this case a capacity factor of 10.6% has been used in line with the latest figures released by the Department for Business, Energy & Industrial Strategy for UK solar photovoltaic projects. The estimated carbon dioxide (CO₂) savings are approximately 36,558 tonnes of CO₂ per year.

Supporting Calculations

Site	Figure	Calculation	Source
Solar Farm capacity (MW)	190	N/A.	N/A.
Site Specific [UK] capacity factor	10.6%	N/A.	Assumes a capacity factor of 10.6% for average UK solar photovoltaic projects as per the 'Digest of UK Energy Statistics (DUKES) 2022: Chapter 5', published by the Department for Business, Energy & Industrial Strategy. See Table 6.3 "Load Factor". Updated 27 July 2023. https://www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes
Annual "units"/kWh generated	176.55 million	190,000 kW (190 MW x 1,000) x 8766 (Number of hours in a year – 365.25 days (to account for leap years) multiplied by 24 hours) x	Assumes a capacity factor of 10.6% for average UK solar photovoltaic projects as per the 'Digest of UK Energy Statistics (DUKES) 2022: Chapter 5', published by the Department for Business, Energy & Industrial Strategy. See

Site	Figure	Calculation	Source
		0.106 (capacity factor ÷ 100) = 176,550,000 kWh (176 GWh).	Table 6.3 "Load Factor". Updated 27 July 2023. https://www.gov.uk/government/statistics/renewable-sources-of-energy-chapter-6-digest-of-united-kingdom-energy-statistics-dukes

Homes Equivalent	Figure	Calculation	Source
Number of England average homes equivalent	47,495	$176,550,000 \div 3,717.2 = 47,495.$	Based on average home electrical consumption of 3,717.2 kWh within England as detailed by the 'Regional and local authority electricity consumption statistics 2005 to 2021', published by the Department for Business, Energy & Industrial Strategy. Updated 26 January 2023. https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics
Number of Yorkshire and The Humber average homes equivalent	50,899	$176,550,000 \div 3,468.6 = 50,899.$	Based on average home electrical consumption of 3,468.6 kWh within Yorkshire and The Humber as detailed by the 'Regional and local authority electricity consumption statistics 2005 to 2021', published by the Department for Business, Energy & Industrial Strategy. Updated 26 January 2023. https://www.gov.uk/government/statistical-data-sets/regional-and-local-authority-electricity-consumption-statistics

CO ₂ Offset	Figure	Calculation	Source
Annual estimated CO ₂ offset	36,558 tonnes	$(176,550,000 \div 1,000,000) \times (0.207074 \times 1000) = 36,558$	Based on a saving of 0.207074 kg of CO ₂ e per kWh. The values is taken from the Department for Energy Security & Net Zero

			'Greenhouse gas reporting: conversion factors 2023' spreadsheet. Updated 28 June 2023. https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023
40 year estimated CO ₂ offset	1,462,334 tonnes	$(176,550,000 \div 1,000,000) \times (0.207074 \times 1000) \times 40 = 1,462,334$	Based on a saving of 0.207074 kg of CO ₂ e per kWh. The values is taken from the Department for Energy Security & Net Zero 'Greenhouse gas reporting: conversion factors 2023' spreadsheet. Updated 28 June 2023. https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2023