

SOLAR FEASIBILITY STUDY

# 82 Barrow Rd

82 Barrow Rd, Barton-upon-Humber, DN18 6AE, United Kingdom



DATE	SYSTEM SIZE	ANNUAL OUTPUT	ANNUAL SAVINGS
25 March 2026	157.5 kWp	149,258 kWh	£33,204

# Executive Summary

Key findings from the solar analysis

ANNUAL GENERATION

**149,258** kWh/yr

SELF-CONSUMPTION

**80.7** %

GRID EXPORT

**28,836** kWh/yr

ANNUAL SAVINGS

**£33,204** /yr

## What this means

A 157.5 kWp solar PV system installed at this location is projected to generate 149,258 kWh of clean electricity per year. Of this, 80.7% (120,422 kWh) will be consumed directly on-site, reducing your grid electricity purchases. The remaining 28,836 kWh will be exported to the grid, earning export revenue.

## Environmental Impact

Estimated carbon savings based on grid carbon intensity

Based on a grid carbon intensity of 217.1 gCO<sub>2</sub>/kWh (Ember Yearly Electricity Data, CC-BY-4.0), this system will offset approximately **32.4 tonnes of CO<sub>2</sub> per year**. Over a 25-year system lifetime, this equates to approximately 810 tonnes of CO<sub>2</sub> avoided.

# System Design

Technical specifications and configuration

Site Address	82 Barrow Rd, Barton-upon-Humber, DN18 6AE, United Kingdom
Coordinates	53.6816°N, 0.4320°W
Roof Area	1,000 m <sup>2</sup>
Roof Tilt	32°
Roof Orientation	South
System Peak Power	157.5 kWp
Specific Yield	948 kWh/kWp/yr
Panel Technology	Monocrystalline Silicon (21% efficiency)
Packing Factor	75%
System Losses	14% (inverter, wiring, soiling, temperature)

## Financial Summary

Projected annual savings breakdown

GRID SAVINGS

**£29,744** /yr

EXPORT REVENUE

**£3,460** /yr

TOTAL SAVINGS

**£33,204** /yr

### Savings breakdown

Grid savings are calculated at £0.247/kWh for self-consumed generation (120,422 kWh × £0.247 = £29,744). Export revenue is calculated at £0.12/kWh (28,836 kWh × £0.12 = £3,460). Actual rates vary by supplier, tariff, and region.

# Monthly Analysis

Detailed month-by-month breakdown of generation, demand, and self-consumption

MONTH	GENERATION	DEMAND	SELF-CONSUMED	EXPORTED	SC RATE
January	5,238	46,189	5,238	0	100%
February	7,527	41,990	7,527	0	100%
March	13,084	41,990	12,640	443	96.6%
April	17,076	29,393	13,269	3,807	77.7%
May	18,948	33,592	15,851	3,097	83.7%
June	17,896	29,393	14,623	3,273	81.7%
July	18,463	20,995	11,376	7,086	61.6%
August	16,885	12,597	6,894	9,991	40.8%
September	13,836	33,592	12,725	1,111	92%
October	9,465	41,990	9,438	27	99.7%
November	6,278	41,990	6,278	0	100%
December	4,563	46,189	4,563	0	100%
<b>Total</b>	<b>149,258</b>	<b>419,900</b>	<b>120,422</b>	<b>28,836</b>	<b>80.7%</b>

All values in kWh. SC Rate = Self-Consumption Rate (proportion of generation consumed on-site).

# Methodology & Data Sources

How this analysis was performed

## Solar Irradiance Data

Hourly solar irradiance data is sourced automatically based on site location. For the Americas, NREL's National Solar Radiation Database (NSRDB PSM4, GOES satellite) provides a Typical Meteorological Year (TMY) of 8,760 hours — the gold standard for solar resource assessment in this region. For Europe, Africa, and the Mediterranean basin, the European Commission's Photovoltaic Geographical Information System (PVGIS v5.3, SARA-3 satellite database, 2005–2023) is used, with hourly values averaged to produce a typical year. For all other regions, NASA's Prediction of Worldwide Energy Resources (POWER) serves as a global fallback.

This report used: **PVGIS (EU JRC)**.

## System Modelling

The PV system was modelled as a fixed, building-integrated crystalline silicon installation with the specified tilt angle and orientation. System losses of 14% were applied, accounting for inverter efficiency (~3%), wiring losses (~1.5%), soiling (~1.5%), module mismatch (~1.5%), and ageing degradation. For PVGIS-covered regions, the PVGIS PV calculation model is used directly. For NSRDB and NASA POWER regions, the PVWatts model (Perez transposition, SAPM cell temperature) converts irradiance data into AC power output.

System peak power (kWp) = Gross roof area × Packing factor × Panel efficiency. A **panel efficiency of 21%** was used, representing standard commercial monocrystalline PERC modules (typical range: 20–24%; Fraunhofer ISE Photovoltaics Report 2025). A **packing factor of 75%** was applied, following NREL rooftop suitability methodology, to account for unusable roof area including obstructions (chimneys, vents, skylights), fire code setbacks (~1m clearance), and inter-panel spacing. Source: NREL/TP-6A20-60593.

## Self-Consumption Analysis

A synthetic hourly demand profile was constructed by distributing the provided monthly electricity consumption values across a normalised 24-hour residential/commercial load shape. Self-consumption was calculated on an hour-by-hour basis: for each hour, the self-consumed energy equals the minimum of generation and demand. Any generation exceeding demand in a given hour is classified as exported energy.

## Financial Assumptions

Grid electricity is priced at **£0.247/kWh**, based on published national or regional tariff data for the project's location. Rates are sourced from government energy regulators and updated periodically.

Exported electricity is valued at **£0.12/kWh**, based on typical feed-in or export tariff rates for the region. Actual rates vary by supplier, tariff structure, and region. These are indicative rates and may change.

Carbon intensity is based on country-level grid emission data from **Ember Yearly Electricity Data** (CC-BY-4.0). The carbon intensity used for this site is **217.1 gCO/kWh (0.217 kgCO/kWh)**. This value re-

flects the most recent available annual average for the country's electricity grid. Source: [ember-energy.org/data/yearly-electricity-data](https://ember-energy.org/data/yearly-electricity-data).

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Disclaimer: This report provides indicative estimates based on satellite-derived solar data and simplified demand modelling. Actual performance may vary depending on local shading, weather patterns, equipment selection, installation quality, and changes in electricity tariffs. This report does not constitute a guarantee of performance or financial return. A professional site survey is recommended before proceeding with installation.

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