

49.2kWp Commercial Solar PV Manufacturing Case Study

A commercial solar investment engineered around daytime manufacturing demand, roof constraints and a credible four-year return.

49.2kWp

SOLAR PV ARRAY

36,300kWh

PROJECTED GENERATION

50%

ESTIMATED BILL SAVING

4 yrs

ESTIMATED PAYBACK



Estimated annual electricity bill saving
Driven by strong daytime self-consumption within the manufacturing facility.

Estimated payback: approximately 4 years

CUSTOMER PROFILE	Custom cabinetry manufacturer consuming approximately 74,000kWh of electricity each year.
CUSTOMER OBJECTIVES	Reduce operating costs, offset workshop demand, use the available roof efficiently and achieve a clear commercial return.
ENGINEERED SYSTEM	49.2kWp roof-mounted array using 74 x 665W Aiko Gen 3 modules and a 50kW Sigenergy C&I three-phase inverter.
PROJECTED OUTCOME	Approximately 36,300kWh annual generation, 50% bill saving, four-year payback and around 6.4 tonnes CO2e avoided each year.

The project economics were strengthened by a close match between solar output and workshop machinery, extraction and production loads. The design focused on maximising on-site consumption rather than simply maximising installed capacity.

The Customer Challenge

Electricity was a material operating cost, but the commercial case depended on more than available roof area. The system needed to align with the site's three-phase infrastructure, daytime production profile and corrugated roof construction.

Reduce annual electricity expenditure

Offset workshop machinery, extraction and general production loads

Use available roof space efficiently

Deliver a robust and weather-tight installation

Provide clear generation and performance monitoring

Create a platform for future energy-management improvements

What Our Analysis Identified

Load Matching

Manufacturing demand occurred mainly during daylight hours, creating strong potential for direct self-consumption.

Roof Engineering

The corrugated roof required careful coordination of fixing positions, penetrations and weatherproofing.

Commercial Return

The design had to balance module count, inverter capacity, generation yield and capital cost to support a credible payback.

COMMERCIAL ENERGY DESIGN

We treated the project as an energy investment, not a roof-filling exercise. Array capacity, module selection and inverter architecture were judged against the site operating profile and the value of electricity avoided during production hours.

The Green Energy Systems Strategy

The final system was engineered to generate during the period when the manufacturing facility consumes the most electricity. This improves self-consumption and reduces exposure to future electricity-price increases.

- | | | |
|----|---|--|
| 01 | Analyse Daytime Demand | Production machinery, extraction systems and general site loads established a strong daytime baseload suitable for solar self-consumption. |
| 02 | Maximise Roof Productivity | Seventy-four high-output 665W Aiko Gen 3 modules maximise generation from the roof area available. |
| 03 | Match Three-Phase Infrastructure | A 50kW Sigenergy C&I three-phase inverter aligns with the site electrical infrastructure and provides monitoring and control. |
| 04 | Engineer The Roof Interface | Fixing positions, penetrations and weatherproofing were planned around the corrugated roof profile to protect long-term integrity. |

How The System Supports The Business

DURING PRODUCTION HOURS

Solar electricity is consumed directly by workshop machinery, extraction and general site loads, reducing imported electricity at the point of use.

OUTSIDE PEAK PRODUCTION

When generation exceeds site demand, surplus electricity can be exported. Monitoring also supports future energy-management or storage decisions.

OUR EXPERT INSIGHT

The strongest commercial solar returns normally come from matching generation to the customer load profile. A larger array is not automatically a better investment if too much energy is exported at a lower value than avoided grid electricity.

The Outcome

The proposed installation provides a high-output commercial solar system designed around the customer production demand, electrical infrastructure and roof construction.

4 yrs

Estimated Commercial Payback

The projected return is driven by approximately 36,300kWh annual generation and strong daytime self-consumption within the manufacturing facility.

Financial, Practical And Strategic Benefits

● Estimated Bill Saving	Approximately 50% reduction in annual electricity expenditure under the project assumptions.
● Projected Generation	Approximately 36,300kWh of solar electricity each year.
● High Self-Consumption	Daytime production demand absorbs a large proportion of solar generation on site.
● Reduced Grid Exposure	Lower dependence on purchased electricity during operating hours.
● Carbon Reduction	Approximately 6.4 tonnes CO ₂ e avoided each year using the stated 2025 UK grid factor.
● Future Energy Platform	Monitoring and controls provide a basis for later storage or energy-management improvements.

Commercial solar should be engineered around the business case, not simply the roof area.

TRUSTED, CERTIFIED AND PROTECTED

MCS Certified Installer | RECC Member | CPA Approved Craftsman | £5m Public Liability | 2-year IBG

REQUEST A DESIGN

Green Energy Systems Ltd

greenenergysystemsuk.com | 03301 337831

Figures are project-specific and based on customer usage, tariff strategy, system design and estimated annual savings. Actual savings vary with consumption pattern, tariff, export rate and system operation.