



Making the case for solar:

A c-suite guide to the use of solar and battery storage in the manufacturing and engineering sector

Six things to look out for

Why company owners, managing directors and c-suite executives need to put solar and battery storage at the top of the board agenda – **page 2**

The solar solutions that are the best fit for your manufacturing and engineering business – **pages 4-6**

The range of financial benefits that can be gained from solar and the means to fund your installation – **page 6**

Check out the solar check list before you go ahead with any decisions – **page 8**

How a leading metalwork manufacturer is forecast to make a £3.2m net profit from the installation of their solar PV system – **page 9**

How a global engineering technology firm is forecasted to generate upwards of 9.7 million kW hours in clean energy per year across multiple solar installations – **page 10-11**

Making the case for solar

In recent years, there has been a significant growth in the number of UK manufacturing and engineering businesses using solar panels to power their operations, driven by rising energy costs, concerns around market security and uncertainty, and corporate reputation linked to ESG and sustainability credentials.

Household names, including Jaguar Land Rover, BMW, Airbus and Nissan, are just some of those that have invested significantly in solar energy at their manufacturing and engineering plants. The sector has the most to gain from solar and battery storage due to their energy intensive operations and we've witnessed an exponential increase in interest from the sector across the board in maximising the on-site opportunity it presents.

In addition to cost and environmental benefits, solar - as part of the renewable energy mix - has proved to be an extremely attractive proposition to the sector because many manufacturing and engineering operations are located on sizeable areas of land and have a number of adjacent buildings to the main plant, making them perfect for the adoption of roof-based and ground mounted solar panels, battery storage and solar carports.

With the cost of solar panels decreasing; uncertainty around energy prices continuing, particularly with the introduction of half hour metering from 2025; and a new government that will be somewhat reliant on UK plc to plug the £22bn black hole, switching to renewable energy technologies such as solar and battery storage should be high up on the boardroom agenda to ensure the balance sheet and the value of the brand are in good shape.



Stephen Barrett,
Founder and Chairman,
Solarsense

Key benefits of solar for the manufacturing and engineering sectors:

- **Cost savings:** One of the most significant benefits is cost reduction. Over time, energy intensive manufacturing and engineering operations can achieve substantial savings, especially as energy costs continue to rise. Once the initial installation is paid off, the energy generated is essentially free, leading to long-term cost reductions. According to the UK Warehousing Association, rooftop solar PV has the potential to save warehousing operations, which in many cases form part of a manufacturing or engineering estate, some £3bn a year.
- **Financial Security:** Solar power empowers companies to generate their own electricity, safeguarding them from fluctuating energy prices. You can effectively forward-buy your electricity at around 5p per unit – a figure that includes estimated operations and maintenance costs.
- **Greater energy security and resilience:** Solar power and energy storage enhances energy security, reducing dependence on the grid and protecting against outages – especially vital for maintaining time critical production lines.
- **Investment in reputation:** Investing in solar energy helps companies in the sector to greatly reduce the carbon footprint of their previous fossil fuel intensive operations, supporting ESG goals, and securing a strong reputation in an increasingly sustainable and competitive supply chain.



The Wide-Ranging Solar Opportunity

Solar panels can be installed in a variety of locations, turning unused land or roof space into an asset. Solar panels come in a variety of shapes and sizes, making them one of the most versatile renewable energy sources available. Some of the ways solar panels can be installed include:

1. Roof-Mounted Solar PV - The most common installation type for solar PV panels, particularly in factories, warehousing operations and ancillary buildings on manufacturing and engineering plant sites.



2. Ground-Mounted Solar PV - Ideal for manufacturing and engineering operations with open land and can be installed in unused or under utilised spaces. Ground-mounted panels can be adjusted for optimal pitch and orientation, ensuring maximum daylight capture.



3. Solar Carports - A multi-purpose structure that provides shelter for vehicles whilst generating renewable energy to be used on-site and (or) used to charge electric vehicles, supporting employees' adoption of EV cars and supporting businesses which are investment in their own EV fleets.

Solar carports are rapidly gaining popularity with organisations that have already filled their roofs with solar PV and want to visibly promote their dedication to sustainability. Solar carports can also increase land value and allow operations to generate additional income by billing staff and visitors to charge their EVs - there are some charge points which allow you tiered charging prices depending on the user.



4. Building Integrated Photovoltaics (BIPV) - BIPV refers to the integration of solar PV technology directly into the building's structure, such as the roof, walls, or windows. This can include in-roof PV systems, solar tiles, brise soleil, canopies, photovoltaic glass and more. BIPV systems are often chosen for their aesthetic appeal and can be designed to match or complement the building's design.



5. Battery Storage – Integrating solar panels with a battery storage solution allows manufacturers and engineering operations to increase the efficiency of their solar PV system and maximise the potential benefits. This is because you gain greater control over your energy consumption and can store excess solar energy to be used when you need it most, or when it is most cost effective. Even without on-site solar energy generation, organisations may choose to charge up a battery at a time when energy prices are low (e.g. at night) for use during peak times (e.g. 4pm - 7pm). Battery storage can also enable businesses to supply extra power (above their DNO connection capacity) if they are constrained by grid capacity, or to provide back-up power for emergencies. Effective battery storage for solar will become increasingly critical with the introduction of mandatory half-hour metering from April 2025.



Flexible finance options for solar

There are a wide-range of options to help with the funding and deployment of solar power. Depending on choice, manufacturing and engineering businesses can take advantage of a number of financial benefits when procuring a solar system, including:

- Tax advantages – such as capital allowances, which allow business to offset investment against taxable profits
- No up front costs, avoiding initial capital outlay
- Fixed, and therefore predictable, energy prices over a contract term
- Maintenance free contracts, ensuring a system without add on costs

- Preferential interest rates on loans associated with the investment
- Spreading costs over a number of years, reducing immediate outlay and freeing up capital for other areas of the business
- Improvement of financial metrics by not including the system as an asset on the balance sheet
- Generating a revenue stream through selling back excess solar energy to the grid

Some of the solar financing schemes in place include:

- Self-Financing
- Asset Finance
- Smart Ease Payment Plan
- Power Purchase Agreement (PPA)

More information on finance options and which are best suited for your sector is available at: www.solarsense-uk.com

Speeding up the process of installing solar

We all know time is money, so to speed up the process of deploying solar on your manufacturing or engineering site, it is highly recommended that you have the following information to hand to assist the solar energy provider:

- Google earth image or marked image of the building roof and surrounding area
- Type of roof (e.g. flat, tiled or trapezoidal)
- Type of power supply (e.g. single or three phase)
- Annual half hourly data (or as much data as possible)
- Current unit price of energy
- Finance in place or needed (e.g. asset finance, Smart Ease payment plan)
- Any future expansion plans (e.g. fleet of electric vehicles)

The Solar Checklist

There are a number of key considerations that any public sector organisation should be taking into account when investing in solar and battery storage to ensure they end up with a solution that is bespoke to their needs and fit for the future.

When discussing your needs with a solar energy specialist, here are a list of questions that will help you make the right choice.

- ✓ What are my main goals in introducing solar – for example, are they to reduce energy costs or are they environmentally driven? Your goals will determine the final cost of the project.
- ✓ What challenges do I need to be aware of so they can be dealt with upfront and avoid any hidden surprises down the line of the project?
- ✓ How many solar panels do I actually need?
- ✓ How can I best maximise the solar energy generation on my buildings and wider estate?
- ✓ What solar energy systems are best for my specifications?
- ✓ What financial support options do I have and what's best for my organisation?
- ✓ Do I want the fastest payback or the biggest offset from installing solar energy?
- ✓ What do I need to consider when half hour metering is introduced from April 2025?
- ✓ Why could battery storage be good for my organisation and do I have the space for batteries to store my energy?
- ✓ What legislation and regulation do I need to comply with?
- ✓ How often should I maintain the systems when installed?
- ✓ What insurance do I need to take out to cover my solar panels?
- ✓ Will the DNO restrict the number of solar panels I can install? Are there ways around this limit to maximise my PV system and benefits sought?

Solar in Action

Solar - Just the 'tool' for sustainable business development

Manufacturing company: Alderman Tooling

25-year net profit forecast: £3.2m

Annual clean electricity generation forecast: 260,000+ kW hours

Predicted annual carbon reduction emissions: 54,000+kg

Alderman Tooling is one of the UK's leading metalwork manufacturers with more than 50 years' experience in metal fabrication. Operating from their purpose-built factory in Plymouth, the company provides metal fabrication services for clients in a wide range of sectors including automotive, retail, transport and furniture.

As metalwork engineers, Alderman Tooling own and operate a vast suite of energy intensive machinery, accounting for a significant proportion of their operating costs. A fluctuating energy market which resulted in a large spike in electricity prices (10p/unit to 30p/unit) caused huge concern and led the company to explore ways to secure their future energy supply and reduce their reliance on the National Grid.

The new solar PV system installed on the factory roof is the companies' latest initiative aimed at protecting the business from future increases in energy costs and making Alderman Tooling a net zero energy user.



Powering innovation through solar

Engineering company: Renishaw

Combined system size: 10.46 MWp

Solar panels installed: 30,488

Annual clean electricity generation forecast: 9,792,121+ kW hours

Predicted annual reduction in carbon emissions: 2,928,264 kg

Solarsense has been working with Renishaw on their on-going renewable energy projects since 2015. To date, they have installed 30,488 solar panels across multiple sites, resulting in a combined total of 10.46MWp of installed capacity.

The large-scale solar PV installation situated on the organisation’s New Mills Innovation Centre (pictured), was the first project completed for the company and was installed in three key phases. By incorporating a tailor made solar brise-soleil shading system, Renishaw were able to increase their overall output, reduce their reliance on mechanical cooling systems and visibly promote their commitment to reducing carbon emissions.

Following the success of the New Mills solar scheme, Renishaw partnered with Solarsense to develop several of their sites in England and Wales. Each individual site required a slightly different approach and presented a range of different obstacles to overcome, including grid limitations and shading problems, however, the expert design team at Solarsense were able to overcome these using a variety of specialist technologies.



“There are a lot of so-called experts and so you must take care. We were looking for a long-term partner in the UK and experimented with Solarsense in the early days. Their expertise gave us the confidence to carry on investing and they are now the only clean energy contractor we work with.” **Ben Goodare, Head of Sustainability - Renishaw**

Renishaw Installations

Renishaw PLC

Total capacity: 10.64MW
Total no. of solar panels: 30,488

New Mills - Gloucestershire

1.95MW solar PV system
No. of solar panels: 5969
Annual output: 1,712,961kWh
Annual carbon savings: 474,490kg

Woodchester - Gloucestershire

942.48kWp solar PV system
No. of solar panels: 2992
Annual output: 795,585kWh
Annual carbon savings: 327,781kg

Stonehouse - Gloucestershire

1.25MW solar PV system
No. of solar panels: 4025
Annual output: 1,061,753kWh
Annual carbon savings: 457,138kg

Miskin - South Wales (Hall 1)

460.98kWp solar PV system
No. of solar panels: 1773
Annual output: 385,168kWh
Annual carbon savings: 188,645kg

Miskin - South Wales (Hall 2)

489.84.kWp solar PV system
No. of solar panels: 1884
Annual output: 385,168kWh
Annual carbon savings: 212,713kg

Miskin - South Wales (Hall 3)

2.51MW solar PV system
No. of solar panels: 6130
Annual output: 2,649,816kWh
Annual carbon savings: 561,732kg

Miskin - South Wales (Hall 4)

2.61MW solar PV system
No. of solar panels: 6386
Annual output: 2,761,541kWh
Annual carbon savings: 585,418kg

Castle Donnington - Derbyshire

69.36kWp solar PV system
No. of solar panels: 204
Annual output: 63,048kWh
Annual carbon savings: 17,843kg

Old Town - Gloucestershire

283.22kWp solar PV system
No. of solar panels: 833
Annual output: 267,548kWh
Annual carbon savings: 75,716kg

Ashville Park - Gloucestershire

97.82kWp solar PV system
No. of solar panels: 292
Annual output: 94,701kWh
Annual carbon savings: 26,788kg

About the guide's publisher

This guide has been published by Solarsense, the UK's leading consulting, design and installation business in the commercial and industrial solar energy and battery storage marketplace.

Headquartered near Bristol, the business, which operates nationwide, is an employee-owned B Corporation and provides a range of complementary clean energy solutions that deliver financial savings, carbon reductions and energy independence for clients across the manufacturing and engineering sectors.

Established in 1995, Solarsense has completed more than 20,000 renewable energy installations and is responsible for powering some of the UK's leading organisations. It places great emphasis on the quality of its renewable energy installations and has won more than 20 national awards in recognition of its unparalleled expertise, excellent customer service, and pioneering renewable energy projects.



Making solar work for your balance sheet

Solarsense recognises that the positive impact on your finances is one of the prime reasons for deciding to turn to solar energy. That's why it's design engineers use industry leading software to accurately predict how much solar energy can be generated, stored and used at your specific premises, and provide detailed economic efficiency calculations to ensure you understand exactly when you can expect to break even, the structure of repayments and the overall profitability for your organisation in the long-term.