Fuelling Food & Drink

A guide to solar PV for the food and drink manufacturing sector.

Case Study - JK Foods

- Solar System Size: **480kWp**
- Battery: **87kWh**
- Annual Output: **483,000kWh**
- Predicted Savings: **£2.6 million**

The Energy & Macro-Agriculture Challenge

The Manufacturing Energy Crisis

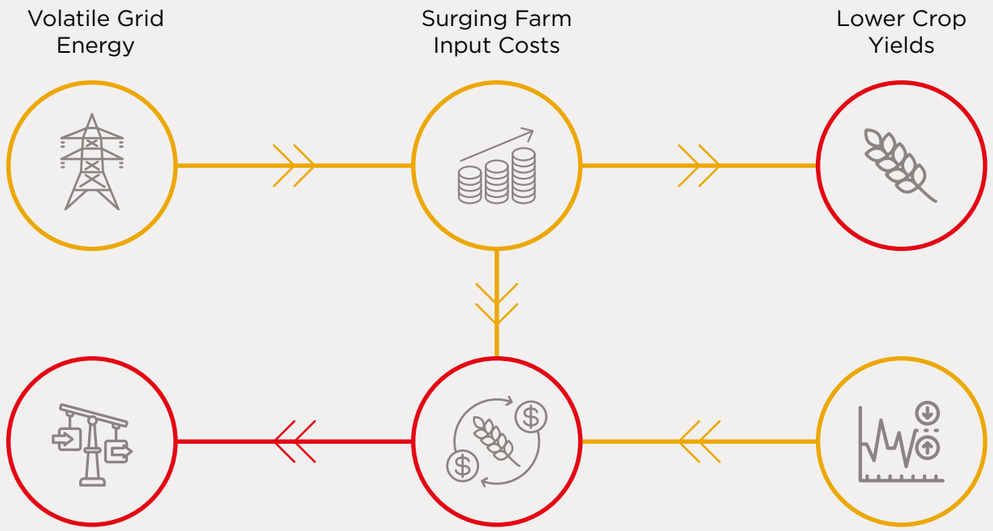
The UK food and drink manufacturing sector is caught in a severe, structural energy crisis. As an intensive, continuous-load industry, facilities rely on high-volume power around the clock for process heating, automated production lines, and continuous refrigeration. Within UK manufacturing - which consumes 83.8 TWh of electricity annually - food and drink processing accounts for roughly 40% of the total volume alongside chemicals and pharmaceuticals.

This massive exposure leaves manufacturers highly vulnerable. UK industrial electricity prices sit roughly 46% above the International Energy Agency (IEA) median, with average costs spiking by over 70% between 2021 and 2023 alone. Large-scale processors also face mandatory carbon and policy levies, which can add up to 15% to total electricity bills.

The Upstream Ripple Effect: Agriculture & National Food Security

Financial strain inside the factory gates directly compounds a widening crisis across the wider British agricultural supply chain and national food security:

The vulnerability of the **food supply chain**



A Deepening Trade Deficit

High domestic operating costs mean UK food manufacturers face intense competition. Food and drink imports rose to £16.3 billion, while domestic export volumes fell by nearly 9%.

The Input vs. Output Squeeze

Agricultural input costs (driven by energy, processing, and fertiliser inflation) continue to outpace farmgate output prices, severely eroding primary producer margins.

Climate Volatility and Yield Loss

The United Kingdom Food Security Report highlights that domestic food stability is under pressure from extreme weather, evidenced by a 22% year-on-year drop in the English wheat harvest. When processing costs rise alongside these environmental shocks, the entire local supply chain risks becoming economically unviable.

Case Study - Aida Foods

- Solar System Size: **133kWp**
- Annual Output: **125,000kWh**
- Predicted Savings: **£900,000**

The Business Case for Solar & Technical Options

How Solar Solves the Core Challenges

Onsite solar PV fundamentally alters a manufacturer's financial risk profile by addressing grid dependency and supply chain vulnerabilities directly:

- **Insulation from Volatility:** Generating your own electricity fixes a large portion of your power costs, shielding margins from sudden spikes in the wholesale grid market.
- **Bypassing Non-Commodity Charges:** Onsite generation operates behind the utility meter, eliminating grid transmission network charges and policy levies on every kilowatt-hour generated locally.
- **Protecting Farmgate Partners:** By stabilizing factory overheads, processors can ease the downward pricing pressure typically forced onto primary agricultural producers, protecting local supply chain links.
- **Securing Major Retail Contracts:** As major supermarkets tighten ESG compliance, commercial solar provides verifiable data to lower Scope 2 carbon emissions, fulfilling strict supply chain mandates.

Technical Integration Options

Food and drink operations are uniquely positioned to maximise solar investments due to their significant physical footprints and high daytime load alignment. Over 107 million square metres of unutilized roof space exists across UK manufacturing, offering massive generation potential.

1. Rooftop Solar PV

The foundational solution for factories, utilising empty, load-bearing warehouse and processing roofs to feed zero-carbon power directly into production lines with zero operational disruption.

2. Ground-Mounted Systems

If extensive roof-mounted HVAC, cooling, or filtration systems restrict space, adjacent or unused facility land can be converted into a dedicated solar array to meet large-scale baseline demand.

3. Battery Energy Storage Systems (BESS)

Co-locating battery storage allows factories to capture excess daytime solar generation and discharge it during peak tariff evening windows, while offering critical protection against brief grid dropouts.

4. Smart Platforms & EV Infrastructure

Integrating AI-driven monitoring platforms allows operations teams to track consumption trends, schedule automated distribution fleet charging, and actively shift heavy energy processes to align with peak solar generation.

Case Study - Stephens Bakery

- Solar System Size: **400kWp**
- Annual Output: **328,000kWh**
- Predicted Savings: **£3.5 million**

Implementation, Funding & PPAs

Streamlined Project Implementation

Deploying commercial solar requires zero operational downtime. Typical installation timelines range from one to four weeks, with engineering schedules designed to run in parallel with active factory production lines to prevent interruptions to manufacturing output.

Funding Options Overview

Manufacturers can choose between direct asset ownership or zero-upfront-cost structures tailored to their corporate treasury requirements.

Funding Route	Capital Expenditure (CapEx) PDF	Asset Finance PDF
Upfront Cost	100% funded by manufacturer	Typically just the VAT value
Asset Ownership	Immediate full asset ownership	Transferred to buyer over the lease team
Maintenance	Managed and funded by the manufacturer	Managed and funded by the manufacturer
Best for...	Firm with healthy capital looking for a fast 3 to 7 year payback.	Firms wanting long-term asset ownership while preserving immediate cash flow.

Power Purchase Agreement (PPA)

For businesses seeking immediate utility savings without capital risk, a PPA allows a third-party developer to fund, install, and maintain the system, selling the generated power back to the business at a discounted rate.

- **On-Site / Behind-the-Meter PPA:** The solar array is installed directly on your facility's roof or land. You pay **0% upfront cost** and buy the electricity at a fixed, discounted rate (typically 9–18 p/kWh), completely free from grid transmission and distribution fees.
- **Sleeved PPA (Physical Off-Site PPA):** A developer builds a solar farm off-site, and your utility supplier "sleeves" that power through the grid network directly into your multi-site energy account. This is ideal for large manufacturing brands with multiple processing plants or logistics depots where individual facility roofs lack the capacity to meet total power demand.
- **Virtual / Synthetic PPA (Financial PPA):** A purely financial Contract for Difference (CfD). The manufacturer and developer agree on a fixed "strike price" while the solar farm sells its power into the open wholesale market, settling the financial difference directly. This provides a long-term price hedge and centralizes sustainability accounting across a distributed corporate footprint.

Information Sources:

NON-DOMESTIC ROOFTOP SOLAR PV MARKET REPORT UK 2023 – 2027 – AMA Research
https://www.fwi.co.uk/business/markets-and-trends/uk-food-trade-deficit-getting-worse-manufacturers-warn
United Kingdom Food Security Report 2024: Theme 2: UK Food Supply Sources - Published 11 December 2024
https://www.gov.uk/government/statistics/united-kingdom-food-security-report-2024/united-kingdom-food-security-report-2024-theme-2-uk-food-supply-sources