

Energy & CO2 Emissions Reduction at a Confectionery Business

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Figure 1. Roof area in food manufacturing facilities at Park Royal

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Background and challenge

The vast majority of food manufacturing facilities in the UK have large roof surface areas. These areas in the majority of cases can be used for the installation of solar photovoltaic (PV) systems to produce electricity locally and reduce demand on the national grid. Local renewable electricity production can also make valuable contribution to addressing decarbonisation challenges of food manufacturers.

Despite the decarbonisation potential offered by solar PV not many food manufacturers have taken advantage of this potential due to a number of reasons which include: i) not owning the freehold of the property and thus requiring permission from the freeholder for the installation of solar PV; ii) uncertainty about the renewal of the lease in the case of short property leases; iii) uncertainty about the performance, economic viability and return on investment of solar PV.

To address some of the above challenges and provide confidence in the adoption of solar PV this project explores the feasibility of installing a PV system on the roof of a confectionery manufacturing facility at the Park Royal Industrial Estate to reduce electricity demand on the national grid, energy costs and carbon emissions.

Approach and Methodology

The feasibility assessment was carried out through a structured, multi-stage approach:

1. Data Collection

Half hourly electricity consumption data was obtained from the electricity supplier of the facility for a period of 12 months to establish baseline electricity usage patterns to understand demand fluctuations and peak demand periods. Utility bills were also obtained from the operators of the facility for a period of 3 years to establish electricity costs.

2. Preliminary System Assessment

An initial evaluation of the site was conducted to determine the suitability of the rooftop for solar PV installation. This involved assessing available space, orientation, shading, and structural integrity.



Figure 2. Confectionery manufacturing facility

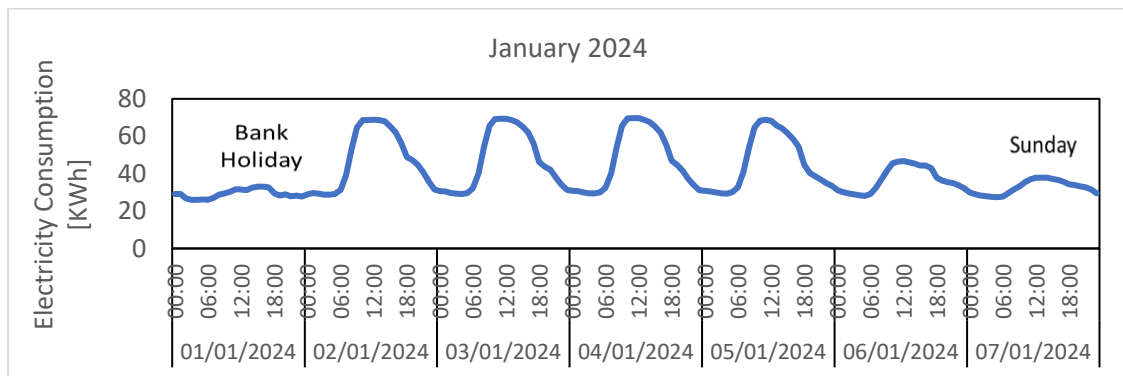


Figure 3. Variation of electrical power consumption in confectionery facility

Results and Impacts

The comparative analysis of four solar PV system proposals revealed notable differences in projected energy savings, environmental benefits, and economic feasibility. Two proposals emerged as particularly promising:

- **Proposal 1** offered the most cost-effective solution, with the lowest cost per kilowatt-peak (kWp) installed and high panel efficiency, making it financially attractive.
- **Proposal 2** demonstrated the highest energy output and carbon emissions reduction, aligning strongly with environmental and sustainability objectives.

These findings warrant further technical and financial evaluation to determine the optimal system for implementation at the confectionery facility.

The study delivered several key outputs:

- A detailed analysis of the facility's electricity consumption patterns.
- A structural and spatial assessment of the rooftop and its suitability for PV system installation.
- A comprehensive review of system proposals from local suppliers, including performance, cost, and environmental metrics.

The projected impacts of implementing a solar PV system over a 25-year period include:

Energy Cost Reduction:

Significant offset of grid electricity consumption, leading to long-term operational savings of £475,000.

Environmental Benefits:

Substantial reduction in CO₂ emissions, 425 tonnes, contributing to the facility's sustainability targets.

Sectoral Influence: The study

serves as a replicable model for other food manufacturers within the Park Royal industrial estate, supporting the broader goals of the Park Royal Net Zero Food Supply systems initiative.

By identifying viable renewable energy solutions and highlighting the potential for scalable impact, this project reinforces the role of clean energy in driving sustainable transformation within the UK food manufacturing sector.

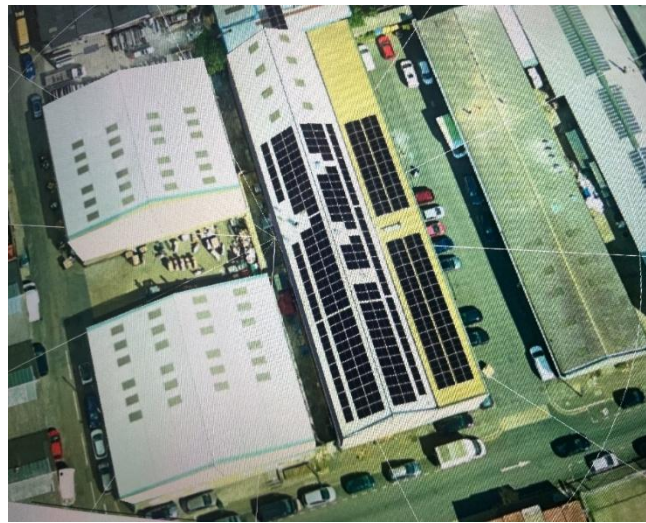


Figure 4. Illustration of position of PV panels on the roof

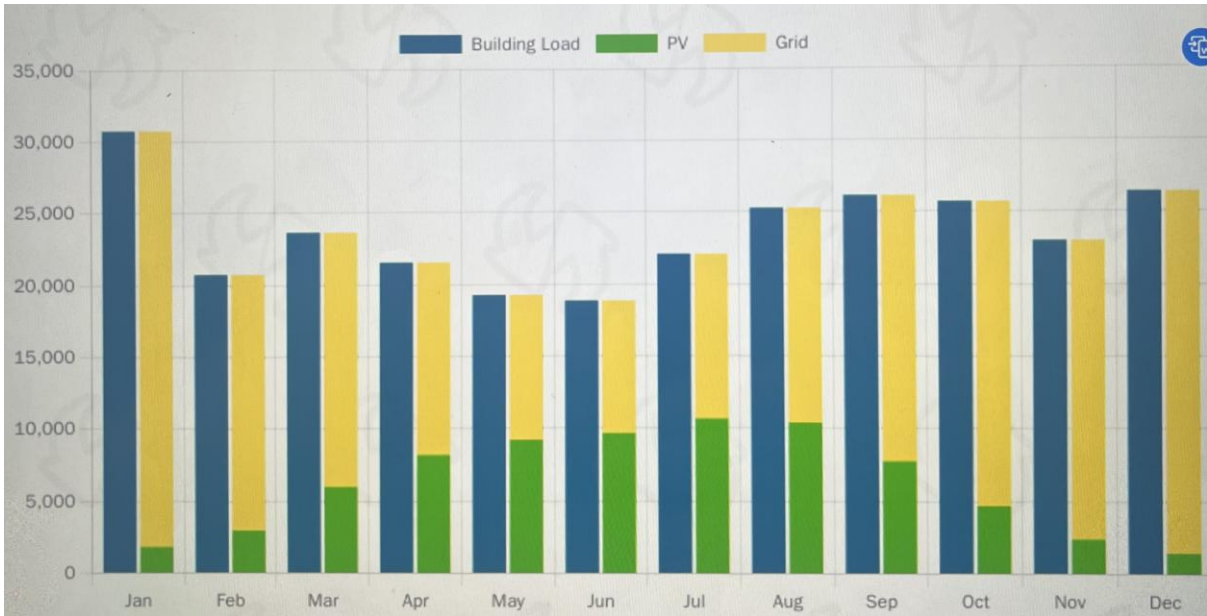


Figure 5. Contribution of PV and grid electricity to total building electrical load

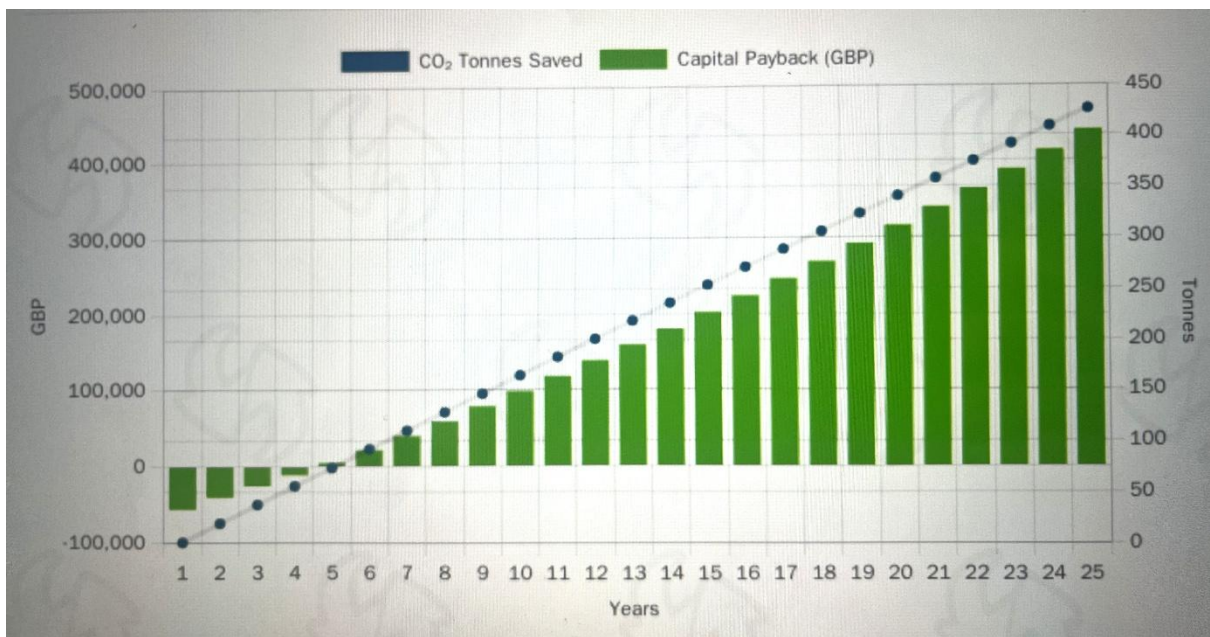


Figure 6. Cumulative cost and CO2 emissions savings

Next Steps

Having established the potential benefits of installation of solar PV on the confectionery manufacturing facility the next step is to engage further with the facility owners and freeholder and the two potential suppliers to reach agreement how best to proceed to the installation and monitoring phase.

Detailed monitoring will be performed for a period of 24 months to enable comprehensive assessment of the environmental and economic performance of the system.