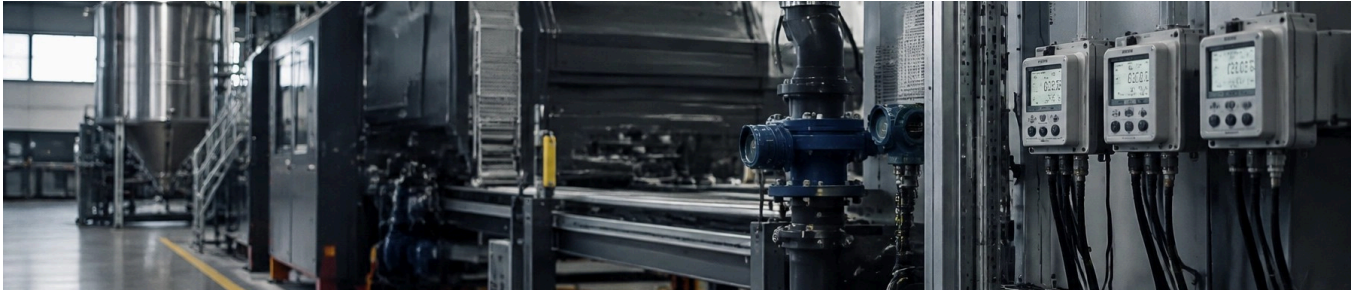


Solar, Batteries and Flexibility

Sizing generation around the site's demand and operating patterns, not around the roof.



West Yorkshire Manufacturing Services (WYMS) is a charity built by manufacturers, for manufacturers, supporting the future of manufacturing and engineering through workforce development, industry collaboration and business support. This session was delivered at Junction25 at WYMS, Brighouse.

Size for the site, not the roof

The most common solar sizing error is to ask how much array the roof can hold. Roof area determines what is possible; it does not determine what is worthwhile. The better question is what size of system the site's demand and operating patterns can absorb:

- **Daytime, weekday demand.** Solar generates when the sun is up. A site that runs primarily in daylight hours can self-use a much larger share of generation than a site with a flat or predominantly out-of-hours profile.
- **Seasonal shape.** Generation is strongly seasonal in the UK. Systems sized to summer output can produce materially more than the site can use at that time of year, while contributing far less in winter.
- **Consumption versus generation.** The commercial value of a system depends heavily on how much generated electricity is used on site at the moment it is generated, rather than exported. In practice this means starting from half-hourly demand data, identifying the daytime baseline the solar output can offset, and sizing to that. A smaller array that is almost entirely self-used is frequently worth more than a roof-filling one that exports most of its output.

Self-use versus export

Electricity used on site at the moment of generation displaces purchased electricity at the site's unit rate, which is typically worth more per kWh than an export tariff. Electricity exported is sold at a lower rate. Export is not worthless, but the value hierarchy is clear: self-use first. A design built around self-use, through sizing, orientation or load management, is usually the investment you can actually defend in the boardroom.

Battery energy storage (BESS)

Batteries change the timing of electricity, not its quantity. On manufacturing sites that creates three possible roles:

- **Storing surplus solar.** Shifting midday generation into late-afternoon operation increases self-use. Whether it pays depends on the size of the surplus and the tariff differential it exploits.
- **Reducing demand peaks.** Where site charges or supply capacity are driven by half-hourly peaks, a battery can trim them, subject to the peaky part of the load being manageable within the battery's usable capacity and power rating.
- **Providing flexibility.** Batteries can participate in grid flexibility services or respond to time-of-use tariffs. These revenue and avoidance streams exist, but they are contractual and operational commitments, not passive benefits, and suitability varies by site.

A battery is not automatically worthwhile alongside solar. It is worthwhile when the site has a surplus to store or a peak problem to solve, and when the arithmetic of the tariff it faces supports it. Model it against the site's actual half-hourly profile rather than accepting it as standard kit.

Site constraints

Several practical constraints shape what is achievable, and they are cheaper to identify early than to discover during installation:

- **Grid connection capacity.** Export and, in some cases, generation itself are limited by the connection agreement and local network headroom. Confirm limits with the distribution network operator before sizing anything.
- **Roof condition and structure.** Roof age, loading capacity and condition determine whether mounting is viable or whether re-roofing belongs in the same project.
- **Electrical infrastructure.** Inverters, switchgear and transformer capacity may need upgrading to accommodate a larger system, and that cost belongs in the comparison.
- **Planning and heritage.** Most industrial solar is permitted development, but exceptions exist, and battery siting has its own placement and safety considerations.

Plan for electrification

If the site expects to electrify heat, add electric vehicle charging or expand electrically driven processes, those loads change both demand and the value of flexibility. A system sized only for today's profile may under-deliver for the site that exists in five years. You do not need to build for the future load on day one, but the design should not close the door on it.

Watchpoint from overseas: the so-called sun tax

Worth knowing: Australia and the Netherlands have both taken different approaches to charging for solar export. Context, not a UK prediction. This is a watchpoint for awareness, not a UK prediction: the UK framework for embedded generation and export is different and continues to evolve. The practical takeaway: treat export revenue as the least certain part of any solar business case, and lean towards self-use when you decide.

Next step

Sizing solar and battery storage correctly takes consumption data, tariff analysis and grid connection checks. If you would like a second opinion on a proposed system, or a demand-led design built from your own half-hourly data, that is our day job. Email hello@hawleyenergy.co.uk to talk it through. www.hawleyenergy.co.uk/wyms | 01484 958761

Scan for the full WYMS resource hub: guides, spreadsheets and templates, no account needed.
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Certified to ISO 9001, ISO 14001 and ISO 45001, and led by a CIBSE-accredited ESOS Lead Assessor, we replace guesswork with evidence-driven insight. The cheapest source of capital is the energy you are wasting.

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