

From generation to resilience: why solar must become part of the grid stability solution

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The extreme heat experienced across the UK in late June this year provided a timely reminder that the electricity system's challenge is no longer simply having enough generation. Increasingly, it is about having the right generation, flexibility and grid-support capability available at the right time.



During the week commencing 22nd June, extreme temperatures, low wind, reduced gas generation availability, sustained demand and challenging system conditions placed the electricity system under significant operational pressure. Frequency reached a low of 49.66 Hz on 23rd June, while NESO issued Electricity Margin Notices for evening peaks on 24th and 26th June. NESO confirmed that frequency remained within statutory limits and no customer demand was disconnected.

Ofgem has since commissioned a post-event review of system conditions and operational decisions, alongside oversight of a separate investigation into whistleblowing allegations.

Whatever the outcome, the episode offers an important lesson: grid resilience needs to be designed into the next generation of renewable energy projects, rather than treated as something that happens around them.

Solar is part of the answer, but timing matters

It would be easy to interpret the June heatwave as a warning about intermittent renewable generation. That would miss the bigger picture.

Solar generation was valuable during daylight hours, when strong sunshine coincided with elevated cooling demand. But solar output falls as daylight fades, just as evening demand can remain high.

This creates a familiar challenge: abundant low-carbon generation in the middle of the day, followed by a need for flexible capacity as the sun sets.

The answer is not to build less solar, but to make better use of it. Summer 2026 saw record UK solar generation, demonstrating both its growing contribution and the increasing importance of managing that contribution effectively.

The question is therefore changing: how can solar assets contribute to a stable, flexible electricity system?

From co-location to true hybridisation

Battery energy storage systems (BESS) are an obvious part of the solution, but there is an important distinction between co-locating solar and BESS and creating a genuinely integrated hybrid asset.

Co-location can mean simply placing a solar farm and battery on the same site. Hybridisation goes further, designing and operating solar generation, battery storage, grid connection, inverters and controls as an integrated system.

One significant opportunity is more efficient use of grid connection capacity. A battery can absorb solar generation when output approaches export limits, reducing curtailment, then discharge as solar output falls or the system needs additional flexibility.

The objective is not simply to store solar for later, but to ensure the hybrid asset can respond to grid requirements. This makes the integration of both technologies critical.

The connection is part of the asset

For a genuinely hybrid project, the grid connection cannot be considered independently of the solar and battery design.

Export capacity, import capability, connection agreements, metering arrangements and network constraints all influence operations.



Rather than sizing the solar plant and battery separately, developers need to consider the project as a whole: what the connection can accommodate, when power will flow in each direction and how capacity can be used most effectively.

This becomes increasingly important as connection capacity tightens and the industry seeks to connect more renewable generation without expanding networks at the same rate.

Control architecture matters

Integrated hybrid assets require sophisticated controls to coordinate solar generation, battery charging and discharging, grid import and export, and system services. Batteries may need to respond to market signals, network constraints or grid requirements while respecting the operating limits of the plant and connection.

Control architecture is therefore a critical element of technical design, not an operational afterthought. Developers and investors must assess whether the proposed configuration can deliver the intended operating strategy in practice, not simply whether its individual components are technically capable of doing so.

Grid services create another layer of value

Integration also creates opportunities to provide services that solar alone cannot deliver. Batteries can respond rapidly to changing system conditions, supporting frequency management and providing flexibility when solar generation is unavailable.

Depending on the technical configuration and market arrangements, hybrid projects may participate in multiple revenue streams while helping manage renewable variability.

A battery beside a solar farm is an additional asset. A hybrid site designed around a shared connection, integrated controls and a defined grid-services strategy can become a different type of grid asset altogether.

What NESO's future scenarios tell us

NESO's 2026 Future Energy Scenarios and associated outlooks reinforce the growing importance of solar and battery storage. As both technologies expand, so will the interaction between assets.

The future system will contain more inverter-based generation, storage and distributed assets operating across different timescales and responding to market and system requirements.

The challenge is not simply connecting these assets quickly, but ensuring they work effectively as the system evolves. For solar developers, hybridisation must therefore be considered from the earliest stages of project development.

Designing resilience into solar projects

Developers need to move beyond treating solar and storage as separate investment decisions. Increasingly, the question is whether projects should be conceived as integrated systems from the outset.

This means considering solar resources, battery sizing and duration, connection capacity, export profiles, inverter configurations, controls and operating



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strategies together. It also means understanding how assets will perform during periods of excess renewable generation, network constraints and tight system margins.

Hybridisation has implications beyond technical design, affecting project economics, connection strategy, consenting, contracting, financing and long-term asset management.

It also requires the right expertise at the right stage. Solar engineering, grid connections, power systems, controls, storage and commercial strategy must work together to deliver assets that provide both renewable energy and flexibility.

Solar can be part of the resilience solution

The June heatwave should not be interpreted as an argument against solar. Solar will be fundamental to a cleaner, more secure and increasingly electrified electricity system. But as deployment grows, so does the need to consider its contribution to grid resilience.

That means moving beyond generating electricity when the sun shines towards integrated assets in which solar, storage, grid connections and system services work together. Grid stability must be considered from the outset, with hybridisation designed into projects rather than added later.

June demonstrated how quickly weather, demand, generation availability and network conditions can combine to create operational challenges. The opportunity is to ensure new solar projects do more than generate renewable electricity: they must also deliver flexibility, make effective use of grid capacity and support a more resilient electricity system.

That is the opportunity presented by true solar and storage hybridisation.

Case study

Hybridisation in practice: designing solar and BESS as one grid asset

Natural Power and Forsyt Energy have collaborated to assess the investment potential of co-locating battery energy storage (BESS) with a 9 MWp solar PV asset in France. This project explores how the right battery size and operating strategy can help renewable energy projects manage grid constraints, curtailment and periods of low or negative electricity prices, while unlocking additional revenue from wholesale electricity markets and ancillary services.

Natural Power established the technically feasible battery configurations, considering site conditions, grid access and project constraints, while Forsyt Energy modelled market revenues, operating strategies and financial returns. Three battery configurations were assessed, with estimated internal rates of return ranging from 13.7% to 14.6%. Under the assumptions tested, the three-hour battery configuration delivered the strongest investment case, balancing revenue potential against capital costs.

The study demonstrates that battery sizing is not a one-size-fits-all decision. Project-specific technical constraints, operating costs, battery degradation and evolving market opportunities all influence long-term returns. Combining technical expertise with commercial modelling provides asset owners with a robust evidence base for evaluating co-location opportunities and making informed investment decisions.

Read the white paper here.

www.naturalpower.com/mediaLibrary/other/english/7630.pdf

About Natural Power

Natural Power is an independent consultancy and service provider supporting a global client base in the development and delivery of renewable energy projects, including onshore wind, solar, renewable heat, energy storage and offshore technologies.

With more than 600 staff across 13 international offices, its expertise spans the entire project lifecycle, from initial feasibility and development through construction and operations, as well as all stages of the transaction cycle.

The team has extensive experience supporting clients with the feasibility and modelling of co-located solar PV and battery energy storage system (BESS) projects. Its services include resource and energy yield assessments, site constraints analysis, reviews of planning, land and grid documentation, BESS sizing optimisation, site layout preparation and fire safety assessments.

The team also provides technical and commercial support, including CAPEX and OPEX considerations, procurement and contract negotiations, helping clients assess project viability and optimise the design and performance of integrated renewable energy assets.

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