

# Powering flexibility: setting BESS projects up for success

**Words:** Luis Serrano, Growth Segment Director for BESS at GreenPowerMonitor, a DNV company (GPM)

Energy storage is becoming critical to balancing grids with high levels of renewables, but long-term project success hinges on disciplined integration, smart operation and the right partnerships.

Energy storage is increasingly seen as a key element of the renewable energy transition. According to DNV's Energy Transition Outlook (ETO) report of 2025, grid flexibility tops agendas as renewables surge, predicting that, 'from 2030 onwards, flexibility in the energy system will increasingly be supplied by storage.'

The report also forecasts that solar, both with and without storage, and wind will make up 32% of the global power mix by 2030.

China, the United States and the United Kingdom have emerged as particularly prominent players in the global storage market. In specific regions, such as OECD Pacific, the DNV ETO report highlights, 'grid modernization and Battery Energy Storage Systems (BESS) are advancing rapidly; Australia leads with over 10 GWh in the pipeline.'

Meanwhile, Japan's solar curtailment subsidies drive BESS uptake, and South Korea has established a central contract market framework for standalone BESS.

In India, by 2030, the same report forecasts that the region will achieve 525 GW in renewable capacity installations, 'through a combination of utility solar PV, rooftop solar, and wind, including nearly 70 GW of solar and storage.'

As renewable energy assumes a larger share of the global power mix, the importance of the growth and flexibility that storage can provide

has become increasingly evident. Yet, as a relatively new technology, there remain ongoing learnings to be gained in effectively designing, implementing and operating BESS and hybrid projects to ensure long-term success.

## Where technical discipline delivers success

Behind the scenes, success depends on deep technical and operational discipline. BESS and hybrid plants perform reliably when all components, from inverters and plant controllers to forecasting tools and safety systems, work in harmony.

Operators must constantly balance power flows, manage battery health, maintain grid-code compliance and respond to changing conditions in real time. This requires rigorous monitoring, precise control strategies and a culture of proactive maintenance. When done well, this discipline turns a complex mix into a stable, predictable and commercially resilient power asset.

## Making hybrid systems work seamlessly

Designing and implementing hybrid projects requires full integration of the BESS with the solar panels, inverters and grid connection to ensure stable operation and efficient energy management. Proper alignment of battery chemistry, system sizing and voltage is also essential for effective integration.

In addition, optimizing the system for intelligent charge and discharge cycles is key to



using stored energy at the most cost-effective times, helping maximize economic returns. To support this, robust forecasting of solar, load and price to optimize dispatch is essential.

Once a project is up and running, a key issue is how the battery interacts with the renewable asset and whether a failure in one system can trigger losses in the other. Proper physical and functional separation helps contain incidents and limit their impact. By routing the generation directly to the grid and treating the BESS as a parallel asset, operators reduce business interruption risk and avoid making profitability dependent on battery availability.

Incorporating strong safety protocols and a structured maintenance plan is essential when integrating a BESS. Continuous oversight not only supports efficient operation but also



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helps identify opportunities for performance improvement. Key operating parameters, such as state of charge, discharge rate and temperature are monitored continuously.

This ongoing visibility is essential for evaluating battery health and planning maintenance at the right time.

#### Hidden hurdles to project profitability

Despite the strong potential and growth projections for the storage industry, there are, of course, unseen factors and challenges that in some cases can undermine project profitability. From integration challenges to operational complexities, several hidden obstacles have the potential to stand in the way of achieving the robust returns developers expect.

#### Operational risks often overlooked

Some examples of the hidden challenges that

can stand in the way of achieving strong BESS project returns include:

Overlooked early-stage warnings that can escalate into expensive outages: minor temperature shifts or intermittent inverter-to-BESS communication issues can signal deeper issues ahead.

Financial risks tied to inadequate warranty oversight: operating beyond throughput limits, operating outside temperature bands or failing to properly document events can all put warranty coverage at risk.

Disconnected data sources and limited centralized oversight: hybrid portfolios often rely on separate platforms for operations, finance and compliance, which can create ambiguity and a higher chance of inconsistent reporting across teams.

Inefficient cycling, accelerated degradation and poor dispatch strategies: when a BESS captures the right market intervals but loses value through low efficiency or declining state of health, its financial performance inevitably suffers.

#### Key technical strategies for reliable storage

BESS is relatively new and growing and the entire industry is learning as it goes. It's only natural that many organizations are still developing a clear grasp of how modern storage systems operate and the value they can bring. It's simply part of the learning curve.

As grid codes evolve, storage assets are often expected to contribute to grid system stability, damping oscillations, supporting frequency, riding through disturbances and even helping restore sections of the grid after an outage. Because the sector is still developing, having



these advanced features built into systems can help close the knowledge gap and ensure a technically resilient solution that will stand up to changing expectations.

Capabilities like POD control, black start functionality, grid-forming and synthetic inertia modes are becoming increasingly important to support today's grid requirements.

In terms of partnering on BESS storage projects, choosing the right partners means weighing several essential considerations. A key part of that evaluation is understanding a partner's background, how long they've been active, their experience working within the specific country, and whether they have a history of collaborating with the selected provider and other systems and stakeholders within the project.

Equally important is ensuring the solution they offer is adaptable and built on strong cybersecurity foundations.

Several specific capabilities are recommended when evaluating partners for BESS projects. These include extensive experience integrating BESS and controls within complex, multi-vendor SCADA/EMS environments, as well as strong expertise in meeting safety and compliance requirements such as UL 9540/9540A, NFPA 855 and relevant local grid codes.

It is also important that partners demonstrate clear commercial alignment with no competing interests, supported by the financial stability required for long-term commitments. In addition, they should have robust project-delivery capabilities, including disciplined commissioning practices and a proven track record of reliable on-schedule execution.

### How GreenPowerMonitor drives hybrid and storage projects

With over 110 GW under management, GreenPowerMonitor, a DNV company (GPM) aims to drive the energy transition forward by supporting clients worldwide while maintaining a market-specific, locally grounded approach.

Teams of energy experts and technical hubs covering Asia-Pacific, Europe, North and South America and India, the Middle East and Africa are backed by the insights and expertise of over 5,000 specialists from DNV's advisory teams.

GPM's team has considerable experience in successfully managing renewable assets and delivering customized solutions tailored to client and project needs. Its offering includes solutions designed to support BESS storage and hybrid projects while ensuring grid stability.

These capabilities include an Enhanced Energy Management System (EMS), which improves battery storage performance by optimizing energy dispatch, extending asset lifespan and maintaining grid reliability.

The Hybrid Energy Management System (HEMS) supports the reliability and efficiency of hybrid projects by enabling seamless coordination between PV and Battery Energy Storage Systems (BESS), optimizing internal power flow for efficiency, cost-effectiveness and compliance with grid requirements.

GPM also offers Horizon for multi-technology portfolios, covering solar, wind, and storage, which provides integrated monitoring and advanced analytics, including near real-time insights and alerts, KPI tracking and automated reporting.

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### About the author

Luis Serrano is the Growth Segment Director for BESS at GreenPowerMonitor, a DNV company (GPM), where he leads the company's global battery-storage activities.

With a background spanning project execution, grid integration, SCADA and EMS implementation, and large-scale PV and storage commissioning, he brings deep technical expertise to the evolving demands of utility-scale renewables.

His experience in power plant control, dynamic simulations, hybrid energy management systems and multi-vendor integration now underpins his leadership of GPM's BESS strategy and solutions.