



BESS Energy Storage System with Anti-Tracking Properties for Data Center Interconnects

Article Overview

Advanced BESS with anti-tracking features enhance data center interconnects by stabilizing DC links, preventing reverse conduction, and ensuring reliable, high-quality power delivery.

Role of BESS in Data Centers

Battery Energy Storage Systems (BESS) are increasingly critical for data center resilience and energy management. They provide instant backup power, stabilize voltage and frequency, and support renewable energy integration, complementing traditional UPS and generator systems rather than replacing them. BESS can store energy from the grid or on-site renewables and discharge it within seconds to meet high instantaneous demand, making them ideal for data center interconnects where uninterrupted power is essential.

Anti-Tracking Properties in BESS

Anti-tracking features in BESS are designed to prevent uncontrolled reverse current flow through the DC link, which can occur when the battery voltage is lower than the grid or inverter voltage. This is particularly important in medium-voltage DC interconnects used in hyperscale data centers, where typical DC link voltages range from 900-1100 V. Anti-tracking mechanisms may include:

- o DC blocking diodes or controlled switching devices to prevent reverse conduction.
- o Intelligent inverter control that monitors voltage and current to isolate sections of the BESS during faults or abnormal conditions.
- o Segmented BESS architecture, allowing independent operation of multiple units to maintain redundancy and prevent cascading failures. These measures ensure that the BESS can safely interface with multiple data center interconnects, maintain power quality, and protect sensitive IT equipment from voltage fluctuations or surges.

Integration with Microgrids and Renewable Energy

Modern BESS with anti-tracking capabilities are often integrated into microgrid architectures. This allows data centers to:

- o Smooth out intermittent renewable energy output from solar or wind, reducing curtailment and improving energy utilization.
- o Provide spinning reserve to keep generators operating within optimal efficiency ranges, reducing fuel



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consumption and emissions .

- o Enable peak shaving by discharging stored energy during high-demand periods, lowering operational costs and improving grid stability .

Operational and Safety Considerations

Designing a BESS for data center interconnects requires careful attention to:

- o Grid connection topology: Multi-point connections enhance redundancy and allow independent operation of BESS segments .
- o Voltage and current management: Maintaining DC link voltage above peak grid voltage prevents uncontrolled reverse conduction, a key anti-tracking requirement .
- o Control software: Intelligent energy management platforms, such as those combining AI-driven monitoring with modular BESS hardware, optimize power flow and prevent tracking issues .

Conclusion

BESS with anti-tracking properties are essential for reliable, high-performance data center interconnects. By preventing reverse current, stabilizing DC links, and integrating seamlessly with renewable energy and microgrid systems, these advanced storage solutions enhance uptime, reduce operational risk, and support sustainable energy strategies for mission-critical facilities .

Modern data centers face escalating energy demands, grid instability, and rising costs, leading to increased reliance

Battery energy storage systems, when coupled with a regenerative source (like solar or

Battery Energy Storage System (BESS) is a technology that stores electrical energy in batteries for later use. BESS plays a crucial

BESS can effectively support customer loads when there is a total loss of power from the source utility. This support requires the

Our proposed approach ensures robust consensus on State-of-Charge, accurate demand tracking, and equitable power distribution

Battery Energy Storage Systems (BESSs) are critical in modernizing energy systems, addressing key



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challenges

Asian Development Bank

Explore the key components of a battery energy storage system and how each part contributes to performance, reliability, and

In a first-of-its-kind pilot initiated in 2022, Microsoft partnered with Saft, the battery subsidiary

The Role of BESS in an integrated energy system The concept of a microgrid refers to a decentralised, self

Explore BESS design engineering for data centers and utility-scale projects, including

As power demand for new data centers grows to hundreds of megawatts, battery energy storage systems (BESS) are

Battery energy storage systems (BESSs) are critical for integrating renewable energy, supporting data center growth, and enhancing

Discover how Battery Energy Storage Systems (BESS) ensure reliable, cost-efficient, and

The xStorage BESS can provide backup power (i.e. maintaining the load when disconnected from the grid). xStorage BESS is also

Battery energy storage systems (BESSs) play an important part in creating a compelling next-generation electrical infrastructure that

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