



ADVANCED TECHNOLOGY INTEGRATION

# Battery Energy Storage System Owner's Engineer Support

Smart solutions. Practical results for complex problems.

The most dominant technology being deployed in recent years across the electric grid are battery energy storage systems (BESSs), which interconnect to both distribution and transmission systems.



PICTURED: Installation

A BESS is complex in nature because it utilizes numerous battery cells connected in series and parallels to build a medium-voltage dc system (at or above 1,000 V) at high-energy capacity behind a bi-directional inverter to enable power exchange with a 60 Hz electric grid.

Such a complex dc+ac system requires a myriad of control functions and protection schemes to supervise the power conversion mechanism and to ensure safety and integrity in grid interconnection and operation.

Special attention should be given to design, engineering, and implementation of BESS projects by applying state-of-the-art engineering knowledge and well-utilized industry best practices. Quanta Technology experts have served as Owner's Engineer on several large energy-storage projects for both distribution and transmission applications.

## Applications

As part of the BESS owner's engineer support area, the support includes the following features and applications:

### Design and Engineering

The design and interconnection studies including load-flow studies, fault analysis, harmonic studies, power plant controller design, and stability studies.

Interconnection checklist review and compliance verification including:

- **Reliability guideline** - BPS-Connected Inverter-Based Resource Performance, North American Electric Reliability Corporation, September 2018
- **Reliability guideline** - Performance, Modeling, and Simulations of BPS-Connected Battery Energy Storage Systems and Hybrid Power Plants, North American Electric Reliability Corporation, 2021

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- **Other grid interconnection checklists**
- **Plant compliance review and verification** as per standards namely PRC 24, PRC 19, PRC 25, PRC 27, MOD 25, MOD 26, MOD 27, and MOD 32.

### Laboratory Testing Support

Real-Time Digital Simulator (RTDS) based lab testing to verify plant settings for NERC compliance including:

- Power plant controller testing
- Load-Tap Changer (LTC) setting verification
- Protection setting verification.

### Field Commissioning and Testing Support

- Developing test plans and performance evaluation procedures
- Inspecting system and commissioning test support
- Providing third-party functional and application testing for site acceptance and performance verifications.



### Why Quanta Technology?

Quanta Technology has engaged and acted as part of the design, engineering, and implementation teams for several state-of-the-art large BESS projects connecting to transmission and distribution systems.

Our hands-on experience and direct involvement in all steps of selecting, designing, and integrating the technology into a utility environment has been extremely valuable. We have helped customers schedule, budget, and achieve success in their projects, saving them time and resources.

The experts at Quanta Technology are actively participating and leading the development of industry standards and recommended practices for energy storage systems with IEEE, Cigre, IEC, and local jurisdictions (NERC/FERC/NFPA, etc.). These activities give us the knowledge of industry best practices and lessons learned from a multitude of projects offering best advice and practical solutions to our customers.


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