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Course Name

Battery Energy Storage for Power Systems

Sector Name

Electrical Engineering

Document Type

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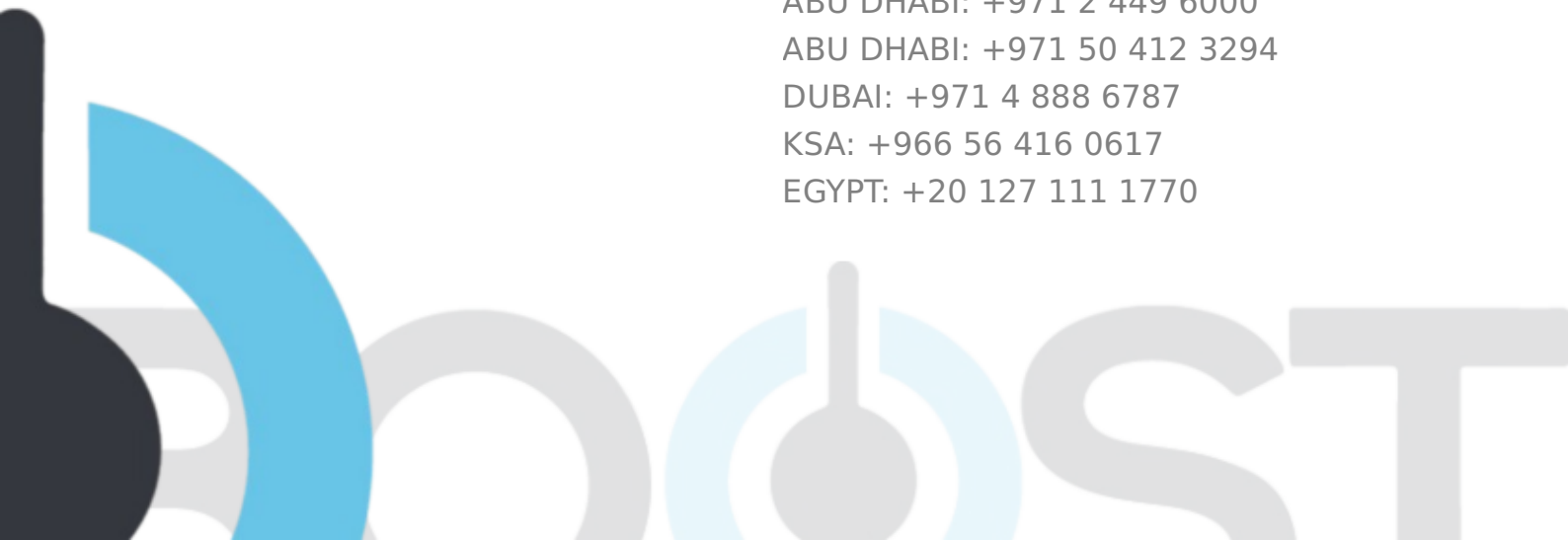
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Battery Energy Storage for Power Systems

Course Introduction

Battery Energy Storage Systems (BESS) are increasingly becoming an active part of modern electrical networks rather than simply a source of backup power. They can absorb and release energy rapidly, support renewable generation, reduce peak demand, provide operational flexibility, and strengthen supply continuity. However, achieving these benefits depends on matching the storage system to a clearly defined electrical need; incorrect sizing, unsuitable operating strategies, or poor integration can significantly reduce its technical and economic value.

Boost Consulting & Training has designed this course around the engineering decisions required to apply battery storage effectively within power systems. Participants will explore BESS architecture, battery characteristics, sizing considerations, power conversion, connection requirements, operating modes, renewable integration, peak management, grid support applications, and system controls. The program focuses on selecting and configuring storage according to the electrical problem it is expected to solve rather than approaching BESS as a standalone technology.

The main concept of this course is to engineer battery storage around a defined power-system purpose, ensuring that capacity,

configuration, connection, and operation work together to deliver the required electrical performance.

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Target Audience

- ✓ Electrical and power systems engineers
- ✓ Renewable energy and energy storage engineers
- ✓ Utility and distribution engineers
- ✓ Electrical project and technical professionals

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Battery Energy Storage for Power Systems

Learning Objectives

- ✓ Explain the role of battery energy storage within modern electrical power systems.
- ✓ Identify suitable BESS applications according to different network and facility requirements.
- ✓ Evaluate key battery and power-conversion characteristics affecting system performance.
- ✓ Determine power and energy requirements for common storage applications.
- ✓ Assess electrical connection and integration requirements for BESS installations.
- ✓ Develop operating strategies for renewable integration, peak management, and power-system support.
- ✓ Evaluate BESS performance under different charging, discharging, and operating conditions.
- ✓ Develop a practical battery energy storage solution for a defined electrical-system requirement.

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Battery Energy Storage for Power Systems

Course Outline

✓ DAY 01

Matching Battery Storage to Power-System Needs

Understanding the Role of BESS

- ✓ Examining energy shifting, peak management, renewable support, backup, and grid-support applications
- ✓ Distinguishing power-intensive applications from energy-intensive storage requirements
- ✓ Identifying electrical problems where battery storage can provide meaningful technical value

Selecting the Right Storage Application

- ✓ Translating system needs into required storage functions and operating objectives
- ✓ Evaluating demand profiles, generation patterns, critical loads, and network constraints
- ✓ Completing a BESS Application Selection Challenge for different electrical system scenarios

Battery Energy Storage for Power Systems

Course Outline

✓ DAY 02

Understanding BESS Architecture & Performance

Inside the Battery Energy Storage System

- ✓ Examining battery modules, racks, battery management systems, power conversion systems, and supporting equipment
- ✓ Understanding the electrical interaction between battery, inverter, transformer, and point of connection
- ✓ Identifying the functions required for monitoring, control, and coordinated operation

Reading Battery Performance

- ✓ Interpreting state of charge, depth of discharge, efficiency, C-rate, cycle life, and usable capacity
- ✓ Understanding how operating temperature and cycling strategy influence battery performance and degradation
- ✓ Completing a Battery Performance Exercise using alternative operating profiles

Battery Energy Storage for Power Systems

Course Outline

✓ DAY 03

Sizing & Connecting Battery Storage

Determining Power & Energy Requirements

- ✓ Separating MW power requirements from MWh energy requirements when defining storage capacity
- ✓ Developing charge and discharge profiles according to the intended application
- ✓ Considering efficiency, operating limits, reserve requirements, and degradation margins during sizing

Engineering the Electrical Connection

- ✓ Evaluating connection voltage, transformer requirements, inverter capacity, cables, switch gear, and protection interfaces
- ✓ Examining fault contribution, isolation, metering, and grid-interconnection considerations
- ✓ Developing a BESS Sizing & Connection Concept for a realistic electrical project

Battery Energy Storage for Power Systems

Course Outline

✓ DAY 04

Operating BESS for System Value

Supporting Renewable Energy Integration

- ✓ Using storage to manage mismatches between renewable generation and electrical demand
- ✓ Applying charging and discharging strategies to reduce renewable curtailment and manage variability
- ✓ Coordinating BESS operation with changing generation and network conditions

Managing Demand & Grid Performance

- ✓ Applying BESS to peak shaving, load shifting, frequency support, voltage support, and operational flexibility
- ✓ Prioritizing competing services when one battery system performs multiple functions
- ✓ Running a BESS Operating Strategy Simulation across changing system conditions

Battery Energy Storage for Power Systems

Course Outline

✓ DAY 05

Building an Effective BESS Solution

Optimizing Storage Performance Over Time

- ✓ Balancing immediate system requirements with battery degradation and long term usable capacity
- ✓ Reviewing operational data to refine charging, discharging, and state of charge strategies
- ✓ Establishing technical indicators for monitoring BESS effectiveness

From Electrical Need to Integrated Storage Solution

- ✓ Bringing application, sizing, connection, control, and operating requirements into one engineering solution
- ✓ Testing the proposed system against realistic operating and contingency scenarios
- ✓ Developing a Battery Energy Storage System Integration Plan for a complete power system case

Battery Energy Storage for Power Systems

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Dec. 21, 2026	Dec. 25, 2026	5 days	4250.00 \$	UAE , Dubai

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