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Course Name

Renewable Energy Integration into Power Systems

Sector Name

Electrical Engineering

Document Type

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Renewable Energy Integration into Power Systems

Course Introduction

Connecting renewable generation to an existing power system is not simply a matter of adding another source of electricity. Solar PV and other variable or distributed resources change power flows, voltage behavior, fault conditions, protection requirements, and the balance between generation and demand. As renewable penetration increases, electrical engineers must understand how these changes affect the network and what technical measures are needed to maintain reliable operation.

Boost Consulting & Training has designed this course around the engineering challenges that appear when renewable generation becomes part of an existing electrical system. Participants will examine connection requirements, variable generation behavior, network capacity, voltage impacts, protection implications, power quality, inverter-based resources, and operational coordination. The emphasis is on evaluating integration from the perspective of the power system rather than teaching renewable energy technology in isolation.

The main concept of this course is to integrate renewable generation without losing control of electrical-system performance, ensuring that new energy sources work with the network rather than creating new technical constraints.

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Target Audience

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

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Renewable Energy Integration into Power Systems

Learning Objectives

- ✓ Explain how renewable generation changes conventional power-system behavior.
- ✓ Evaluate the electrical requirements for connecting renewable resources to existing networks.
- ✓ Assess network capacity and identify constraints affecting renewable integration.
- ✓ Analyze voltage and power-flow impacts created by variable and distributed generation.
- ✓ Evaluate protection and fault-response challenges associated with inverter-based resources.
- ✓ Identify power-quality issues that may emerge as renewable penetration increases.
- ✓ Compare practical technical measures for managing renewable variability and network constraints.
- ✓ Develop an engineering integration approach for renewable generation within an existing power system.

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Renewable Energy Integration into Power Systems

Course Outline

✓ DAY 01

Understanding the Network with Renewable Generation

Changing the Conventional Power Flow

- ✓ Comparing centralized generation with distributed and inverter-based renewable resources
- ✓ Examining how local generation changes feeder loading and direction of power flow
- ✓ Identifying network conditions that become more significant as renewable penetration increases

Building the Renewable Connection Picture

- ✓ Reviewing connection points, generation capacity, network characteristics, and operating conditions
- ✓ Identifying the electrical information required before assessing a proposed renewable connection
- ✓ Developing a Renewable Connection Profile for a realistic network scenario

Renewable Energy Integration into Power Systems

Course Outline

✓ DAY 02

Assessing Network Capacity for Renewable Integration

Evaluating Connection Capacity

- ✓ Examining transformers, feeder, conductor, and equipment capability under renewable generation conditions
- ✓ Identifying constraints created by existing demand, generation, and network configuration
- ✓ Considering maximum generation alongside minimum local demand conditions

Managing Changing Power Flows

- ✓ Assessing reverse power flow and its impact on existing distribution arrangements
- ✓ Evaluating different connection locations and generation capacities
- ✓ Completing a Renewable Hosting Capacity Challenge using alternative connection scenarios

Renewable Energy Integration into Power Systems

Course Outline

✓ DAY 03

Managing Voltage & Power Quality

Controlling Voltage with Variable Generation

- ✓ Examining voltage rise and variation associated with changing renewable output
- ✓ Understanding the interaction between generation level, local demand, and network impedance
- ✓ Evaluating practical voltage control measures for renewable connected networks

Protecting Power Quality

- ✓ Assessing harmonics, flicker, imbalance, and other relevant effects associated with inverter-based generation
- ✓ Understanding how multiple renewable installations can influence network conditions collectively
- ✓ Conducting a Renewable Power Quality Assessment for a distributed generation case

Renewable Energy Integration into Power Systems

Course Outline

✓ DAY 04

Protection & Operational Integration

Adapting Protection to New Power-System Behavior

- ✓ Examining changes in fault contribution and direction created by distributed and inverter-based generation
- ✓ Identifying protection arrangements that may require reassessment after renewable connection
- ✓ Evaluating implications for selectivity, anti islanding, and fault detection

Operating with Variable Generation

- ✓ Understanding renewable generation profiles and their interaction with changing electrical demand
- ✓ Managing operational conditions created by rapid or significant generation variation
- ✓ Running a Renewable Integration Operating Scenario involving changing network conditions

Renewable Energy Integration into Power Systems

Course Outline

✓ DAY 05

Building a Workable Integration Solution

Managing Higher Renewable Penetration

- ✓ Comparing network reinforcement, operational control, reactive support, curtailment, and storage-assisted solutions
- ✓ Selecting measures according to the actual technical constraint rather than applying generic upgrades
- ✓ Evaluating how combinations of measures can release additional integration capacity

Completing the Integration Strategy

- ✓ Bringing capacity, voltage, protection, power quality, and operational findings into one engineering decision
- ✓ Defining technical conditions and follow up requirements for successful connection
- ✓ Developing a Renewable Energy Integration Plan for an existing electrical network

Renewable Energy Integration into Power Systems

Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Dec. 28, 2026	Jan. 1, 2027	5 days	4250.00 \$	UAE , Abu Dhabi

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