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Course Name

Planning & Operating Electricity Grids with Variable Renewable Generation

Sector Name

Electrical Engineering

Document Type

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Planning & Operating Electricity Grids with Variable Renewable Generation

Course Introduction

Planning & Operating Electricity Grids with Variable Renewable Generation

The development of wind- and solar-generating capacity is growing rapidly around the world, but integrating wind and solar generation into grid operations is challenging: since wind and solar generation only occur when wind and solar resources are available, their output is not controllable. Grid operators are accustomed to dealing with variability, but primarily on the load side. The challenge is that higher levels of wind and solar generation add both variability and uncertainty.

Several countries, notably Denmark, Germany, Portugal, and Spain, are providing real-world experience in integrating high levels of variable generation, primarily wind power. In addition, several integration studies have modeled and simulated the addition of large amounts of wind, and to a lesser extent, solar generation to the grid. Such studies provide valuable information on the expected impacts of high levels of variable energy generation and potential strategies for successfully integrating variable energy generation into the system. These courses look at the technical operational impacts of integrating these resources into the systems and the

potential technical and economic implications to system operations, notably short-term, reserve-related costs. Globally, variable renewable generation sources still represent mainly an energy and not a capacity resource.

While their contributions to capacity or power and associated costs are different from those of conventional power sources, variable renewable generation technologies can contribute to long-term system adequacy and security.

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Target Audience

- ✓ Electrical Controls Engineer
- ✓ Electrical Design Engineer
- ✓ Electrical Engineer

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Learning Objectives

- ✓ Understanding The Challenges of Integrating Wind and Solar Generation
- ✓ Understanding The Operational Challenges in Integrating Wind and Solar Generation
- ✓ Understanding Solar Integration
- ✓ Understanding Integration Strategies and Solutions

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Course Outline

✓ DAY 01

Module 01: The Challenges of Integrating Wind and Solar Generation

- ✓ Introduction
- ✓ Wind and Solar Development
- ✓ The Operational Challenges in Integrating Wind and Solar Generation
- ✓ Understanding Electricity Systems

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Course Outline

✓ Day 02

Summary of Findings from Variable Generation

- ✓ Integration Studies and Operational Experiences
- ✓ Other Findings from Operational Experiences
- ✓ Solar Integration

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Course Outline

✓ Day 03

Module 02: Integration Strategies and Solutions

- ✓ Forecasting
- ✓ Basic Description of Some Solar Technologies
- ✓ Organizing a Grid Operational Integration
- ✓ Simplified Methods of Estimating the Impacts of Variables
- ✓ Generation in Short-Term Reserves

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Course Outline

✓ Day 04

Module 03: Contribution of Variable Power Sources to Supply

- ✓ Adequacy
- ✓ Definitions and Metrics for Supply Adequacy
- ✓ Contribution of Variable Renewables to Supply Adequacy
- ✓ A Probabilistic Approach to Estimate the Contribution of Variable Renewables to Supply Adequacy
- ✓ Contribution of Variable Renewables to Supply Adequacy and Evidence from International Experience

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Course Outline

✓ Day 05

Module 4: Country Case Studies

- ✓ China
- ✓ Germany
- ✓ Spain

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
March 15, 2027	March 19, 2027	5 days	4250.00 \$	UAE , Dubai
April 26, 2027	April 30, 2027	5 days	4250.00 \$	UAE , Dubai
Sept. 7, 2026	Sept. 11, 2026	5 days	4250.00 \$	UAE , Abu Dhabi
Nov. 9, 2026	Nov. 13, 2026	5 days	4950.00 \$	England , London

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