MERCURY

Renewable Energy Integration Challenges and Solutions Training Course

17 – 21 January 2027
Online



Dubai - UAE: +971 4 450 5697
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Amman - Jordan: +962 79 712 3347

Renewable Energy Integration Challenges and Solutions Training Course

Ref: 7048_299012 **Date:** 17 – 21 January 2027 **Location:** Online **Fees:** 2900 Euro

Introduction

This renewable energy integration challenges and solutions course focuses on incorporating renewable energy power systems, such as distributed generation, energy storage, thermally activated technologies, and demand response, into the electric distribution and transmission system.

Through solar power and wind turbines, this renewable energy integration course conducts integration development and demonstrations to address technical, economic, regulatory, and institutional barriers to utilizing renewable energy in power systems.

The renewable energy integration course addresses operational issues. It establishes viable business models for including these technologies in capacity planning, grid operations, and demand-side management. Electric utilities, challenged with meeting Renewable Portfolio Standards, seek methods to effectively integrate power from wind, solar, geothermal, and biomass sources into the grid - an endeavor that presents various challenges.

Electrical Engineering - Power and Renewable Energy

This renewable energy integration course will explore the specific challenges and solutions related to electrical engineering power and renewable energy. Participants will learn about the intricacies of designing, operating, and managing renewable energy power systems, ensuring they align with established electrical engineering principles. Emphasis will be placed on understanding the complex interplay between renewable energy sources, such as solar and wind, and the traditional power grid, moving towards sustainable and resilient energy infrastructures.

Targeted Groups

- Electrical engineers
- Electrical supervisors
- Power engineers
- Managers in charge of electrical installations
- Project engineers

Course Objectives

At the end of this renewable energy integration course, participants will be able to:

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- Understand the grid flexibility to renewable energy integration.
- Determine the various types of renewable energy.
- Explain the different types of solar panels.
- Analyze the common types of wind farms.
- Understand the various types of energy storage systems.
- Reduce carbon emissions and emissions of other air pollutants through increased use of renewable energy power stations and other clean distributed generation.
- Increase asset use by integrating distributed systems and customer loads to reduce peak load and thus lower electricity costs.

Targeted Competencies

In this renewable energy integration course, the target competencies will be able to:

- Support the achievement of renewable portfolio standards for renewable energy and energy efficiency.
- Enhance the reliability, security, and resiliency of microgrid applications in critical infrastructure protection and highly constrained areas of the electric grid.
- Learn about oil reduction by enabling plug-in electric vehicle PHEV operations with the grid.
- Understand the emphasis on wind power, solar power, and energy storage systems.

Course Content

Unit 1: Renewable Energy Generation - The Present, The Future, and The Integration Challenges

- Drivers of renewable energy development.
- State-of-the-art integrating capacities renewable energy power stations.
- Learn about transmission and operation technologies and practices.
- Wind power generation.
- Photovoltaic power generation.
- Understand concentrated solar power generation.

Unit 2: Technical Solutions for Integrating Large-Capacity Renewable Energy

- Wind turbines.
- Grid-friendly renewable energy power systems.
- Improved flexibility in conventional generation.
- Transmission expansion developments.
- Promise large-capacity electrical energy storage technologies.
- What are the Roles of electrical energy storage in renewable energy integration?
- Understand the standards for large-capacity electrical energy storage in renewable energy systems.

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Unit 3: Grid Flexibility - The Key to Renewable Energy Integration

- Learn about the effects of wind and solar power on energy demand.
- Power plant flexibility.
- Forecasting and demand response.
- Wind and solar power variabilities.
- Variable renewable energy poses challenges to the grid.
- Impact of fossil-fueled generators.

Unit 4: Integrating Renewable Energy into the Transmission and Distribution Systems

- Approach to the analysis of integrating renewable energy into power systems.
- Learn about the integration of distributed and renewable energy power generation.
- Power quality impacts.
- Electrical transmission and distribution systems.
- Understand photovoltaic optimization and sensitivity analysis.
- Understand wind optimization and sensitivity analysis.

Unit 5: Renewable Energy Integration in Smart Grids and Micro Grids

- Smart grid attributes.
- Understand the merits of smart grids for renewable energy and power.
- Operation of microgrids.
- Merits of microgrids.
- Future of intelligent microgrids as it relates to powering up renewable energy.