

TECHNICAL ENGINEERING COURSES

Distributed Generation

Power Quality Assessment

Grounding of Distribution Systems

And More...

Introduction to Distributed Generation

Introduction

Distributed Generators are installed, mostly, in distribution systems by Electrical Utilities, Industrial Customers and Independent Producers. Distributed Generation enables the utilization of renewable energy sources as well as combining electricity generation with industrial need for process steam in cogeneration plants for better economy. Use of Distributed Generation by Electrical utilities allows deferring investment in new transmission and distribution infrastructures.

The use of Distributed Generation in power networks is not a problem-free process. Interfacing DG units with power systems involves implications on the structure and operating procedures of both the units and the system in which they are imbedded. The main concerns focus on operating procedures, control systems, islanding and safety issues.

Course Language:

English

Duration:

1 day

Instructor:

Dr. Mostafa I. Marei

CYME Technical Engineering Courses Program Director:

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Further Information:

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What you will learn

This course focuses on:

- Introducing the participants to different aspects of DG technology.
- Investigating different interfacing configurations and examining applicable standards.
- Understanding the impact of DG on power quality and protection system requirements.
- Simulating a case study of DG interconnection to a simple distribution system.

Audience

- Power system planning and asset management engineers.
- Distribution system planning, operation and maintenance engineers.
- Distribution system protection and control engineers.
- Independent producers' and industrial firms' contemplating investing in DG plants; their technical advisors, prospective designers and operators of these plants.

Course Outline

- **Definitions of DG systems**
- **The Status of Power Systems**
 - Structure of conventional power systems
 - Backup systems
 - The restructuring of power systems
- **State-of-the-art DG Technologies**
- **Technical and Economical Aspects of DG**
- **DG Types**
 - Non-renewable types (theory, rating, operations, industrial links, and cost)
 - Reciprocating engine generator set
 - Fuel cells
 - Micro-turbines
 - Hybrid fuel cells/Micro-turbine
 - Renewable types (theory, rating, operations, links, and cost)
 - Wind energy
 - Photovoltaic
 - Solar energy
 - Biogas
- **DG interfacing and applicable standards**
 - Static power electronic converters-based DG
 - Rotating machines based DG
- **IEEE 1547 National Standard for Interconnecting Distributed Generation**
- **Simulation of Different DG Systems**
 - DG as an active power source
 - DG attached to PV bus
 - DG attached to PQ bus
- **Power Quality Issues and DG**
 - Harmonic pollution
 - Voltage regulation
 - Voltage flicker
- **Impact of DG on Protection Systems**
 - Operating conflicts
 - Islanding operation
 - Islanding detection techniques

Instructor



Mostafa I. Marei received his Ph.D. degree in electrical engineering from the University of Waterloo, Waterloo, ON, Canada. He is a member of the Institute of Electrical and Electronics Engineers (IEEE) as well as of the Science of Automation Engineering Society.

Currently, Dr. Marei is a Research Associate at the University of Waterloo. His research interests include power electronics, custom power, artificial intelligence, digital control, power quality, and distributed generation.

Dr. Marei has been involved in industrial projects in the areas of electric drives (DC and AC), power electronic converters, power quality and custom power, distributed energy resources and renewable energy.



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