# Efficient Power Plant Operations with Renewable Energy Integration Training Course



14 - 18 Dec 2026

Baku

5100 € (Per Person)

Ref: #ERE4376_57300

## Course Introduction / Overview:

The modern power grid is undergoing a significant transformation, driven by the increasing integration of renewable energy sources. This evolution requires power plant operators to master traditional generation methods while also understanding the unique challenges and opportunities presented by solar, wind, and other clean energy technologies. This training course, offered by BIG BEN Training Center, provides a comprehensive look at the operational aspects of both conventional and renewable power plants. It is designed to equip professionals with the skills to manage a hybrid energy portfolio, focusing on grid stability, economic dispatch, and plant performance optimization. Participants will learn how to balance intermittent renewable generation with reliable conventional sources, ensuring a secure and efficient power supply. The curriculum draws on established academic principles, informed by works such as "Power Plant Engineering" by P. K. Nag, providing a strong foundation in the physics and engineering of power generation. This training goes beyond the basics to address the complexities of a dynamic energy landscape, from managing distributed energy resources to complying with modern grid codes.

## Target Audience / This training course is suitable for:

- Power plant operators and engineers.
- Grid dispatch and control center personnel.
- Energy system planners and analysts.
- Renewable energy technicians.
- Operations and maintenance supervisors.
- Electrical and mechanical engineers.
- Anyone involved in the management of power generation assets.

## Target Sectors and Industries:

- Power and utility companies.
- Renewable energy developers and operators.
- Industrial manufacturing.
- Government agencies and equivalents.
- Engineering and consulting firms.
- Energy management service providers.
- Public and private electrical grids.

## Target Organizations Departments:

- Operations and maintenance.
- Engineering and technical services.
- Grid dispatch and control.
- Asset management.
- Planning and strategy.
- Renewable energy integration.
- Health, safety, and environment (HSE).

## Course Offerings:

By the end of this course, the participants will have able to:

- Operate conventional and renewable power plants efficiently.
- Understand the principles of grid stability and frequency control.
- Integrate renewable energy sources into existing power systems.
- Manage energy storage systems to balance supply and demand.
- Perform routine maintenance and troubleshooting on power plant equipment.
- Optimize plant performance and economic dispatch.
- Comply with modern grid codes and regulatory requirements.
- Analyze and predict the impact of intermittent generation on the grid.

## Course Methodology:

This training course uses a blend of theoretical instruction and practical application to ensure a deep and lasting understanding of the subject matter. The methodology includes detailed case studies that examine real-world challenges faced by modern power plants. Participants will engage in interactive sessions where they can discuss operational scenarios, share experiences, and collaborate on problem-solving exercises. BIG BEN Training Center's trainers are seasoned industry professionals who provide valuable insights into best practices and emerging trends in power generation. The course also uses simulations and hands-on activities to give participants a feel for managing a hybrid energy system, from dispatching generation units to responding to unexpected grid events. This approach ensures that participants are not only knowledgeable about the subject but also confident in their ability to apply their skills in a complex operational environment. The course emphasizes critical thinking and strategic decision-making in a rapidly evolving energy landscape.

## Course Agenda (Course Units):

### Unit One: Introduction to Power Plant Operations

- Fundamentals of power plant systems.
- Thermal, nuclear, and hydro power plant operations.
- Plant start-up and shut-down procedures.
- Combustion and steam cycle principles.
- Plant performance metrics and efficiency calculations.
- Understanding heat rate and capacity factors.
- Safety protocols and emergency response.

### Unit Two: Introduction to Renewable Energy Systems

- Principles of solar photovoltaic (PV) systems.
- Wind turbine technology and operation.
- Hydroelectric and geothermal power generation.
- Biomass and waste-to-energy processes.
- Operational challenges of intermittent renewables.
- Grid-connected and distributed generation.
- Renewable energy system components.

## Unit Three: Grid Integration and Stability

- Power grid fundamentals and structure.
- Grid codes and interconnection requirements.
- Balancing supply and demand.
- Frequency and voltage control.
- Impact of renewables on grid stability.
- Role of energy storage in grid management.
- Smart grid technologies and their applications.

## Unit Four: Economic Dispatch and Power Market Operations

- Fundamentals of economic dispatch.
- Cost of generation and optimization.
- Ancillary services and their role in the grid.
- Introduction to power markets and trading.
- Balancing intermittent generation with market demands.
- Forecasting renewable energy output.
- Strategies for a flexible generation fleet.

## Unit Five: Maintenance, Safety, and Future Trends

- Predictive and preventive maintenance strategies.
- Troubleshooting common operational issues.
- Health, safety, and environmental (HSE) standards.
- The future of power generation and hybrid systems.
- Role of digitalization and automation.
- Case studies in successful renewable integration.
- Course review and final project presentation.

## FAQ:

### Qualifications required for registering to this course?

There are no requirements.

### How long is each daily session, and what is the total number of training hours for the course?

This training course spans five days, with daily sessions ranging between 4 to 5 hours, including breaks and interactive activities, bringing the total duration to 20 - 25 training hours.

## Something to think about:

## What unique qualities does this course offer compared to other courses?

## Something to think about:

How will the shift from a centralized, unidirectional power flow to a distributed, multi-directional grid fundamentally change the skill set required for future power plant operations?

## What unique qualities does this course offer compared to other courses?

This training course is distinguished by its forward-looking and integrated approach to power plant operations. Unlike many traditional courses that focus exclusively on conventional fossil fuel or hydroelectric plants, our curriculum is specifically designed to address the complexities of a hybrid energy system. We provide a comprehensive overview that bridges the gap between traditional power generation and the rapidly growing renewable sector. Participants gain a unique skill set for managing grid stability, optimizing economic dispatch, and integrating diverse energy sources, which is increasingly vital in today's energy landscape. The course also uses practical case studies and simulations that reflect the real-world challenges faced by operators, from forecasting intermittent generation to managing energy storage. This practical focus, combined with an understanding of modern grid codes and market dynamics, prepares professionals for the future of the power industry. The course does not just present information; it cultivates the strategic thinking needed to succeed in a dynamic and complex environment.