Effective Microgrid Design and Energy Storage Training Course



19 - 23 Oct 2026

Cairo

3700 € (Per Person)

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Course Introduction / Overview:

Microgrids are at the forefront of the modern energy revolution, providing a resilient and sustainable solution for power generation and distribution. They offer a way to integrate renewable energy sources, enhance energy security, and provide reliable power to critical facilities. This training course, presented by BIG BEN Training Center, offers a comprehensive guide to designing, implementing, and managing smart microgrids. The curriculum explores the fundamental concepts of microgrid technology, from distributed energy resources to advanced control systems and energy storage applications. Participants will learn how to analyze the economic and technical viability of microgrid projects and develop robust design plans. This training is grounded in the foundational principles of modern power systems and is informed by the authoritative work of academics like Mohammad Shahidehpour, co-author of "Microgrids and Distributed Generation." By the end of the course, participants will have a deep understanding of the key components of microgrids, enabling them to contribute to the creation of more resilient, efficient, and sustainable power systems.

Target Audience / This training course is suitable for:

- Electrical engineers and power system designers.
- Grid operators and planners.
- Project managers in the energy sector.
- Renewable energy and smart grid specialists.
- Utility company employees.
- Government and municipal energy professionals.
- Researchers and academics in the power field.

Target Sectors and Industries:

- Utilities and power companies.
- Renewable energy developers.
- Industrial and commercial facilities.
- Government agencies and equivalents.
- Military and defense installations.
- Data centers and telecommunications.
- Universities and research institutions.

Target Organizations Departments:

- Engineering and design.
- Operations and planning.
- Renewable energy integration.
- Sustainability and R&D.
- Strategic planning.
- Facilities and maintenance.
- Project management.

Course Offerings:

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

- Understand the foundational principles of microgrid design and operation.
- Integrate distributed energy resources, including solar and wind power.
- Design and implement effective energy storage systems for microgrids.
- Select and use advanced control and management systems.
- Analyze the economic and technical feasibility of microgrid projects.
- Assess the cybersecurity risks and protective measures for microgrids.
- Ensure the resilience and reliability of power supply.
- Develop a comprehensive plan for microgrid implementation.

Course Methodology:

This training course uses a blend of theoretical instruction and practical application to ensure a deep and lasting understanding of microgrid technology. The methodology includes detailed case studies that examine real-world microgrid projects, from small-scale commercial systems to large-scale industrial applications. Participants will engage in interactive sessions where they can work together to design a microgrid system and solve complex technical challenges. BIG BEN Training Center's trainers are seasoned industry professionals who provide expert guidance and feedback throughout the course. The curriculum also includes a component on economic analysis and financial modeling for microgrid projects, ensuring participants are not only technically proficient but also able to justify their designs from a business perspective. This approach ensures that participants are equipped with the skills needed to design and implement resilient and efficient power systems in a rapidly changing energy landscape.

Course Agenda (Course Units):

Unit One: Microgrid Fundamentals and Components

- Introduction to microgrids and their benefits.
- Key components: DERs, loads, and energy storage.
- Types of microgrids: AC, DC, and hybrid.
- Distributed energy resources (DERs).
- Load forecasting and management.
- Microgrid control and management systems.
- The role of microgrids in a smart grid.

Unit Two: Energy Storage for Microgrids

- Introduction to energy storage technologies.
- Battery energy storage systems (BESS).
- Applications of energy storage: peak shaving, grid support, and resilience.
- Sizing and selecting energy storage systems.
- Integration of BESS with renewables.
- Control strategies for battery management.
- Case studies in energy storage applications.

Unit Three: Microgrid Design and Planning

- Steps in microgrid design and planning.
- Site assessment and load profile analysis.
- Economic and technical feasibility studies.
- Microgrid modeling and simulation tools.
- Cybersecurity for microgrids.
- Islanded vs. grid-connected operation.
- Regulatory and policy considerations.

Unit Four: Control, Protection, and Management

- Advanced microgrid control systems.
- Protection schemes for microgrid components.
- Microgrid fault detection and isolation.
- Communication protocols for smart grids.
- Energy management systems (EMS).
- Predictive maintenance and asset management.
- Black start capabilities and resynchronization.

Unit Five: Implementation and Future Trends

- Microgrid project implementation and commissioning.
- The best operational practices.
- Performance metrics and monitoring.
- Future trends in microgrid technology.
- Integration with electric vehicles (EVs).
- The role of microgrids in a low-carbon economy.
- Final project and case study presentations.

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:

How can a well-designed microgrid, leveraging both renewable energy and advanced energy storage, enhance energy security and resilience in the face of increasingly frequent grid disruptions and natural disasters?

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

This training course is distinguished by its focused and practical approach to the critical subject of microgrids and energy storage. While many courses offer a general overview of smart grids, our curriculum provides a deep dive into the specific challenges and opportunities of designing and implementing microgrids. The course goes beyond theoretical concepts, using hands-on design exercises and real-world case studies to ensure participants can apply their knowledge immediately. We place strong emphasis on energy storage applications, which are a corner teach modern microgrids, teaching participants how to effectively size, select, and integrate these systems. The curriculum also covers the crucial topics of cybersecurity and economic analysis, which are often overlooked in more technical courses. This integrated approach, which combines technical design with financial and operational considerations, prepares professionals to lead microgrid projects from conception to completion, providing a truly unique and valuable skill set in the energy sector.