Optimizing Wind Energy Farm Operations and Maintenance Training Course



15 - 19 Nov 2026

Istanbul

4900 € (Per Person)

Ref: #ERE9734_224444

Course Introduction / Overview:

The global shift towards renewable energy has placed wind power at the forefront of sustainable electricity generation. However, the long-term viability and profitability of wind farms depend critically on strategic operations and maintenance (O&M). This intensive training course is designed to provide a comprehensive, A-to-Z understanding of the principles and practices required to maximize energy output, minimize downtime, and extend the lifecycle of wind turbine assets. Moving beyond traditional reactive maintenance, this program delves into proactive and predictive strategies that are essential in the modern energy landscape. As discussed by leading experts like Peter H. Tavner in works such as "Offshore Wind Turbines: Reliability, Availability and Maintenance," the focus is now on data-driven decision-making and advanced diagnostics. BIG BEN Training Center has developed this curriculum to equip professionals with the skills to analyze performance data, implement cutting-edge condition monitoring systems, and manage the complex logistics of wind farm O&M. Participants will explore everything from fundamental turbine mechanics to advanced asset management strategies, ensuring they can contribute to the operational excellence and financial success of any wind energy project. This course is the definitive guide for professionals seeking to master the complexities of wind farm management.

Target Audience / This training course is suitable for:

- Wind Farm Site Managers.
- Operations and Maintenance Technicians.
- Wind Turbine Engineers.
- Asset Managers in the Renewable Energy Sector.
- Project Managers overseeing wind energy projects.
- Technical Supervisors and Team Leaders.
- Data Analysts focused on energy performance.
- Health, Safety, and Environment (HSE) Officers.
- Investment Analysts and Financial Planners in renewables.
- Utility and Grid Operations Personnel.

Target Sectors and Industries:

- Renewable Energy Generation.
- Electric Power Utilities.
- Independent Power Producers (IPPs).
- Engineering, Procurement, and Construction (EPC) Companies.
- Asset Management and Investment Firms.
- Manufacturing of Wind Turbines and Components.
- Consulting Firms specializing in energy.
- Governmental Energy Agencies and Regulatory Bodies.
- Research and Development Institutions.

Target Organizations Departments:

- Operations and Maintenance (O&M).
- Asset Management.
- Engineering and Technical Services.
- Project Management.
- Health, Safety, and Environment (HSE).
- Finance and Investment.
- Procurement and Supply Chain Management.
- Data Analytics and Performance Monitoring.
- Regulatory Compliance.

Course Offerings:

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

- Develop and implement comprehensive O&M strategies for wind farms.
- Analyze SCADA and performance data to optimize turbine efficiency.
- Apply predictive maintenance techniques to prevent component failures.
- Master blade inspection, repair, and aerodynamic enhancement methods.
- Conduct effective troubleshooting and root cause analysis for turbine faults.
- Manage high-voltage safety protocols and emergency response procedures.
- Optimize spare parts inventory and supply chain logistics for O&M.
- Evaluate the financial impact of O&M decisions on project profitability.
- Integrate new technologies like drone inspection and digital twins into workflows.
- Ensure environmental and regulatory compliance in all operations.

Course Methodology:

The training methodology at BIG BEN Training Center is designed to foster a dynamic and immersive learning environment that bridges theory with real-world application. This course utilizes a blended approach, combining expert-led presentations with highly interactive sessions. Participants will engage in detailed case studies of actual wind farm O&M challenges, allowing them to analyze problems and devise strategic solutions in a collaborative setting. Team-based exercises and group discussions will encourage the sharing of diverse perspectives and experiences, enriching the learning process for all attendees. A significant portion of the course is dedicated to practical workshops where participants will work with simulated performance data, maintenance schedules, and risk assessment frameworks. This hands-on approach ensures that theoretical knowledge is immediately translated into practical skills. Our instructors facilitate a continuous feedback loop, providing personalized guidance and ensuring that complex concepts are thoroughly understood. The methodology emphasizes problem-solving and critical thinking, preparing participants to return to their organizations with actionable insights and the confidence to implement advanced O&M strategies effectively.

Course Agenda (Course Units):

Unit One: Foundations of Wind Turbine Technology and O&M

- Introduction to Wind Energy and Turbine Components.
- The Role of Operations and Maintenance in the Asset Lifecycle.
- Understanding Wind Turbine Aerodynamics and Mechanics.
- Key Performance Indicators (KPIs) for Wind Farm Operations.
- Overview of Maintenance Philosophies: Reactive, Preventive, and Predictive.
- Introduction to Wind Farm Electrical Systems and Grid Connection.
- Regulatory Frameworks and Environmental Compliance Standards.

Unit Two: Wind Farm Operations and Performance Optimization

- Mastering SCADA Systems for Real-Time Monitoring and Control.
- Analyzing Turbine Performance Curves and Power Output.
- Techniques for Identifying and Mitigating Production Losses.
- Data-Driven Approaches to Wind Farm Performance Optimization.
- Weather Forecasting and its Impact on Operations and Scheduling.
- Managing Grid Curtailment and Ancillary Services.
- Daily, Weekly, and Monthly Operational Reporting and Analysis.

Unit Three: Strategic Maintenance Planning and Execution

- Developing a Proactive Preventive Maintenance Program.
- Fundamentals of Predictive Maintenance (PdM) Technologies.
- Wind Turbine Blade Inspection, Cleaning, and Repair Techniques.
- Drivetrain Maintenance: Gearbox, Bearings, and Generator.
- Hydraulic and Pitch System Maintenance and Troubleshooting.
- Corrective Maintenance: Fault Diagnosis and Repair Strategies.
- Optimizing Spare Parts Management and Logistics.

Unit Four: Advanced Diagnostics and Emerging Technologies

- Condition Monitoring Systems (CMS): Vibration, Oil, and Thermal Analysis.
- Advanced Root Cause Analysis (RCA) for Component Failures.
- Utilizing Drones and Robotics for Turbine Inspection.
- Introduction to Digital Twins for Wind Farm Management.
- Leveraging Artificial Intelligence and Machine Learning in O&M.
- End-of-Warranty Inspection Campaigns and Procedures.
- Strategies for Turbine Life Extension and Repowering.

Unit Five: Asset Management, Safety, and Financials

- Principles of Wind Energy Asset Management.
- Developing and Managing O&M Budgets and Financial Models.
- Health, Safety, and Environment (HSE) Management Systems.
- High-Voltage Safety, Lockout-Tagout (LOTO), and Working at Heights.
- Contract Management for O&M Service Providers.
- Risk Assessment and Mitigation in Wind Farm Operations.
- Future Trends and Challenges in Wind Energy O&M.

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:

Considering the rise of AI and digital twins, how will the role of the human maintenance technician evolve in the next decade, and what new skills will be paramount for ensuring operational excellence in wind farms?

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

This course distinguishes itself by offering a holistic, strategic perspective on wind farm management that transcends basic technical training. While other programs may focus narrowly on component repair, our curriculum integrates operational best practices with financial acumen and forward-looking technological insights. We place a strong emphasis on the shift from traditional maintenance schedules to data-driven, predictive strategies, equipping participants with the skills to leverage SCADA data, condition monitoring systems, and AI-driven analytics for proactive decision-making. The content is meticulously structured to build a comprehensive skill set, covering not just the "how" of maintenance but the "why" behind strategic asset management, budget optimization, and risk mitigation. Furthermore, the course delves into emerging technologies like drone inspections and digital twins, not as abstract concepts, but as practical tools for enhancing efficiency and safety. Through real-world case studies and interactive problem-solving sessions, participants learn to analyze complex operational challenges and develop robust, financially sound solutions. This unique blend of technical depth, strategic management, and future-focused content ensures graduates are prepared to lead in the evolving landscape of renewable energy.