Renewable Energy Quality Assurance Training Course

Professional Development Training Course Outline

Category	Renewable Energy	**Duration**	5 Days
Base Fee	$1,500 USD	**Delivery Mode**	Online / On-site Hybrid

Course Introduction

Renewable Energy Quality Assurance Training Course is designed to equip professionals with practical, standards-based skills for ensuring the quality, reliability, safety, performance, and long-term sustainability of renewable energy projects. As solar PV, wind, hydropower, battery energy storage systems (BESS), and hybrid renewable projects expand, quality assurance is increasingly connected with digitalization, AI-enabled monitoring, predictive maintenance, grid integration, asset performance management, and data-driven decision-making. Current industry developments show growing use of AI, digital twins, IoT, predictive analytics, and advanced monitoring to improve renewable-energy asset reliability and operational performance.

The course provides a structured framework covering QA/QC systems, engineering design review, procurement quality, manufacturing inspection, construction quality, commissioning, testing, performance verification, operations and maintenance, compliance, risk management, and continuous improvement. Participants will work through practical solar PV, wind, BESS, and hybrid-energy case studies, learning how to identify defects, establish inspection and test plans, interpret performance data, manage non-conformities, and implement corrective and preventive actions. The curriculum also reflects emerging quality priorities such as digital twins, AI/ML, predictive maintenance, cybersecurity, grid resilience, and lifecycle asset management, while connecting quality practices with relevant international standards and certification principles.

Programme Curriculum

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Course Duration

5 days

Course Objectives

By the end of the training, participants will be able to:

1. Develop a robust Renewable Energy Quality Assurance (QA/QC) framework.
2. Apply international standards, specifications, codes, and compliance requirements to renewable projects.
3. Conduct effective engineering design reviews and quality risk assessments.
4. Develop Inspection and Test Plans (ITPs), checklists, hold points, and witness points.
5. Strengthen supplier quality management, procurement assurance, and factory acceptance testing.
6. Apply advanced quality control and performance verification techniques to solar PV, wind, and BESS projects.
7. Use SCADA, IoT sensors, data analytics, AI/ML, and digital twins to support quality monitoring.
8. Implement predictive maintenance, condition monitoring, fault detection, and asset health management.
9. Manage non-conformities, root-cause analysis, corrective actions, and preventive actions (CAPA).
10. Evaluate commissioning, acceptance testing, performance testing, and operational readiness.
11. Integrate HSE, environmental, cybersecurity, and operational resilience considerations into QA programs.
12. Establish quality KPIs, dashboards, documentation, traceability, and continuous improvement systems.
13. Apply lifecycle quality management to improve reliability, availability, energy yield, and project value.

Target Audience

1. Renewable energy project managers and engineers
2. QA/QC managers, inspectors, and quality engineers
3. Solar PV design, construction, and commissioning professionals
4. Wind operations, maintenance, and asset-management teams
5. BESS and hybrid renewable-energy professionals
6. EPC contractors, developers, consultants, and technical advisors
7. Procurement, supplier-quality, and contract-management professionals

8. Utility, regulator, investor, and energy-sector compliance professionals

Course Modules

Module 1: Renewable Energy Quality Assurance Fundamentals

- QA versus QC-principles, responsibilities, workflows, and **quality culture**
- Renewable-energy project lifecycle and critical quality gates
- Quality planning, documentation, traceability, and **risk-based thinking**
- Quality KPIs, audit programs, inspections, and management reviews
- **Case study:** Establishing a QA framework for a utility-scale solar PV project

Module 2: Standards, Specifications, Compliance & Quality Planning

- Understanding applicable **ISO, IEC, national codes, contractual specifications, and technical standards**
- Developing project-specific **Quality Plans and Inspection & Test Plans**
- Design review, document control, configuration management, and technical approvals
- Supplier compliance, conformity assessment, and certification requirements
- **Case study:** Resolving a standards-compliance issue during renewable project design

Module 3: Solar PV Quality Assurance & Performance

- PV modules, inverters, mounting systems, cabling, transformers, and balance-of-system quality
- Manufacturing inspection, incoming-material inspection, and **electroluminescence testing**
- Installation quality, torque verification, cable management, earthing, and workmanship
- Performance testing, energy-yield verification, degradation, and defect identification
- **Case study:** Diagnosing underperformance in a utility-scale PV plant using operational data

Module 4: Wind Energy Quality & Condition Monitoring

- Turbine components, foundations, blades, gearboxes, generators, and electrical systems
- Manufacturing and installation inspection with **quality hold points**
- Structural, mechanical, electrical, and commissioning quality controls
- **Condition monitoring, diagnostics, prognostics, and predictive maintenance**
- **Case study:** Using condition-monitoring data to identify an emerging turbine fault

Module 5: Battery Energy Storage & Hybrid-System Quality

- BESS architecture, batteries, battery-management systems, PCS, HVAC, and controls
- Factory acceptance testing, installation verification, commissioning, and documentation
- Performance, capacity, efficiency, thermal-management, and degradation monitoring
- **Grid integration, cybersecurity, interoperability, and operational resilience**
- **Case study:** Quality investigation of performance deviations in a solar-plus-BESS facility

Module 6: Digital QA, AI, IoT & Predictive Analytics

- Using **SCADA, IoT, sensors, drones, analytics, and cloud platforms** for quality assurance
- AI/ML applications in anomaly detection, forecasting, diagnostics, and performance optimization
- **Digital twins** for real-time asset monitoring and lifecycle quality management
- Data quality, validation, visualization, dashboards, and decision support
- **Case study:** Building a digital quality-monitoring workflow for a renewable-energy asset

Module 7: Commissioning, Testing, Auditing & Non-Conformity Management

- Commissioning procedures, inspection records, test protocols, and acceptance criteria
- **Root Cause Analysis (RCA)**, failure investigation, and defect classification
- Non-conformity reports, corrective and preventive actions, and close-out procedures
- Internal audits, supplier audits, EPC audits, and **continuous improvement**
- **Case study:** Managing a major non-conformity from discovery through corrective-action close-out

Module 8: Lifecycle Quality, Asset Performance & Continuous Improvement

- **Asset Performance Management (APM)** and reliability-centered quality strategies
- O&M quality, predictive maintenance, availability, reliability, and energy-yield optimization
- Quality KPIs, risk registers, lessons learned, benchmarking, and management reporting
- Integrating quality with **ESG, decarbonization, resilience, and lifecycle value**
- **Case study:** Developing a lifecycle QA improvement plan for a multi-technology renewable portfolio

Training Methodology

- Interactive lectures and presentations.
- Group discussions and brainstorming sessions.
- Hands-on exercises using real-world datasets.
- Role-playing and scenario-based simulations.
- Analysis of case studies to bridge theory and practice.
- Peer-to-peer learning and networking.
- Expert-led Q&A sessions.
- Continuous feedback and personalized guidance.

Register as a group from 3 participants for a Discount

Send us an email: info@fineskilltrainingcenter.org or call *+254769199797*

Certification

Upon successful completion of this training, participants will be issued with a globally- recognized certificate.

Tailor-Made Course

We also offer tailor-made courses based on your needs.

Key Notes

a. The participant must be conversant with English.

b. Upon completion of training the participant will be issued with an Authorized Training Certificate

c. Course duration is flexible and the contents can be modified to fit any number of days.

d. The course fee includes facilitation training materials, 2 coffee breaks, buffet lunch and A Certificate upon successful completion of Training.

e. One-year post-training support Consultation and Coaching provided after the course.

f. Payment should be done at least a week before commence of the training, to Fineskill Training Center account, as indicated in the invoice so as to enable us prepare better for you.

Upcoming Scheduled Sessions

Start Date	End Date	Location	Price
23 Nov 2026	27 Nov 2026	Online	$1,000
23 Nov 2026	27 Nov 2026	Physical	$1,500
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$3,000
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$4,500
23 Nov 2026	27 Nov 2026	Physical	$6,000
23 Nov 2026	27 Nov 2026	Physical	$6,000

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