Renewable Energy Asset Performance Management 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 Asset Performance Management Training Course is designed to equip energy professionals with practical capabilities for maximizing the availability, reliability, efficiency, profitability, and lifecycle value of renewable energy assets. As solar PV, wind, battery storage, hybrid systems, and other clean-energy technologies expand rapidly, asset owners and operators increasingly need data-driven approaches to performance optimization, predictive maintenance, digital asset management, condition monitoring, operational analytics, and risk-based decision-making. Global renewable capacity additions reached approximately 800 GW in 2025, with solar PV accounting for more than three-quarters of new additions, increasing the importance of effective asset-performance strategies. The IEA also identifies digitalisation, advanced sensing, controls, big-data analytics, and predictive maintenance as important tools for improving renewable asset performance and reducing operating costs.

This comprehensive course provides a strategic and practical framework for transforming operational data into actionable performance intelligence. Participants explore KPI management, SCADA analytics, AI and machine learning, predictive maintenance, digital twins, energy-yield optimization, availability management, degradation analysis, root-cause analysis, portfolio benchmarking, lifecycle management, and financial performance optimization. The course also examines the growing role of battery energy storage, grid flexibility, renewable forecasting, cybersecurity, and AI-enabled decision support in modern energy operations. These capabilities are increasingly relevant as electricity systems accommodate higher shares of variable renewable energy; for example, Kenya's power system already derives nearly 90% of generation from renewable sources and is placing greater emphasis on flexibility, storage, and ancillary services.

Programme Curriculum

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5 days

Course Objectives

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

1. Develop an integrated renewable energy asset performance management strategy aligned with operational and commercial objectives.
2. Apply advanced KPI frameworks to measure availability, performance ratio, capacity factor, energy yield, losses, and asset efficiency.
3. Analyze SCADA, IoT, sensor, meteorological, and operational datasets using data-driven asset analytics.
4. Implement predictive maintenance approaches to identify emerging equipment failures before they cause significant downtime.
5. Use AI and machine learning concepts for renewable asset diagnostics, anomaly detection, forecasting, and optimization.
6. Evaluate digital twin applications for real-time asset monitoring, simulation, performance optimization, and lifecycle decision-making.
7. Optimize energy yield by identifying technical, environmental, operational, and grid-related performance losses.
8. Conduct root-cause analysis and develop corrective-action strategies for recurring asset underperformance.
9. Improve O&M effectiveness through condition-based maintenance, risk-based maintenance, and intelligent work prioritization.

10. Assess lifecycle costs and commercial performance using CAPEX, OPEX, LCOE, revenue, availability, and asset-lifetime indicators.
11. Benchmark renewable assets and portfolios using standardized performance and operational metrics.
12. Integrate battery storage, forecasting, flexibility, and grid-integration considerations into asset performance strategies.
13. Create an actionable asset performance improvement roadmap incorporating digitalisation, AI, predictive analytics, sustainability, and continuous improvement.

Target Audience

1. Renewable Energy Asset Managers
2. Operations & Maintenance Managers
3. Solar PV Plant Managers and Engineers
4. Wind Farm Managers and Engineers
5. Battery Energy Storage System Professionals
6. Energy Performance, Reliability & Data Analysts
7. Investors, IPP Managers, Owners and Portfolio Managers
8. Energy Consultants, Regulators, Utilities and Sustainability Professionals

Course Modules

Module 1: Renewable Energy Asset Performance Management Fundamentals

- Asset lifecycle management.
- Performance management framework
- Critical performance indicators.
- Performance governance.
- Case Study: Participants assess a hypothetical utility-scale solar portfolio experiencing declining energy yield and develop a prioritized asset-performance improvement plan.

Module 2: Renewable Asset Data, SCADA and Digital Performance Analytics

- SCADA analytics.
- IoT and smart sensors
- Data quality management.
- Performance dashboards.
- Case Study: A wind farm experiences intermittent turbine underperformance; learners use simulated SCADA trends to identify abnormal operating patterns and recommend further investigation.

Module 3: AI, Machine Learning and Predictive Maintenance

- Predictive maintenance.
- AI-enabled anomaly detection.
- Failure prediction.
- Remaining useful life.
- Case Study: Learners analyze a simulated turbine gearbox dataset and develop an AI-assisted early-warning workflow for potential equipment degradation.

Module 4: Solar PV Asset Performance Optimization

- PV performance ratio.
- Energy-yield optimization.

- Degradation analytics.
- Soiling and environmental analytics.
- Case Study: A 100 MW solar PV plant records an unexplained production shortfall; participants conduct a structured loss-tree and root-cause analysis to identify improvement opportunities.

Module 5: Wind Asset Performance and Reliability Management

- Wind turbine KPIs.
- Condition monitoring.
- Power-curve analytics
- Reliability-centered O&M.
- Case Study: A multi-turbine wind farm shows different performance levels across identical turbines; participants benchmark the fleet and develop an underperformance recovery plan.

Module 6: Battery Energy Storage, Hybrid Assets and Grid Performance

- BESS performance management.
- Hybrid renewable systems.
- Forecasting and flexibility.
- Grid integration.
- Case Study: A solar-plus-storage project faces grid constraints during high-generation periods; learners develop an asset dispatch and flexibility strategy.

Module 7: Commercial Performance, Risk and Lifecycle Optimization

- Financial performance.
- Lifecycle cost management.
- Risk-based asset management.
- Portfolio benchmarking
- Case Study: An investor-owned renewable portfolio contains several assets with different O&M contracts; participants benchmark performance and recommend value-enhancement actions.

Module 8: Digital Transformation and the Future of Renewable Asset Management

- Digital twins.
- AI-powered operations.
- Cybersecurity and data governance.
- Continuous improvement.
- Case Study: Participants develop a complete Renewable Energy Asset Performance Management Roadmap for a hypothetical multi-technology portfolio containing solar PV, wind, and BESS assets.

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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