Renewable Energy for EV Infrastructure 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 for EV Infrastructure Training Course provides a practical, future-focused foundation for designing, integrating, operating, and optimizing renewable-powered electric vehicle (EV) charging infrastructure. As EV adoption accelerates, charging networks increasingly need to work intelligently with solar PV, wind energy, battery energy storage systems (BESS), smart charging, microgrids, and digital energy management. Current industry and research developments are placing particular emphasis on Vehicle-to-Grid (V2G), Vehicle-to-Building (V2B), bidirectional charging, AI-enabled energy management, interoperability, cybersecurity, and grid flexibility.

The course connects renewable energy engineering, EV charging technology, power systems, energy storage, smart grids, sustainability, and techno-economic planning into one applied learning pathway. Participants examine how to develop resilient charging ecosystems that maximize renewable-energy utilization while managing peak demand, power quality, battery degradation, grid constraints, energy costs, and carbon reduction. Recent PV-charging guidance highlights the importance of coordinated sizing of PV, storage, grid connection, and charging assets, while emerging V2G frameworks emphasize bidirectional energy exchange and market-based grid integration.

Programme Curriculum

Renewable Energy for EV Infrastructure Training Course

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Course Duration

5 days

Course Objectives

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

1. Understand renewable energy integration principles for EV charging infrastructure.
2. Design solar PV-powered EV charging stations using appropriate generation and load profiles.
3. Evaluate AC, DC fast, ultra-fast, and smart charging technologies.
4. Apply battery energy storage systems (BESS) for renewable-energy balancing and peak shaving.
5. Develop smart charging and demand-response strategies.
6. Explain V1G, V2G, V2B, and bidirectional charging architectures.
7. Analyze grid impact, power quality, voltage regulation, and hosting capacity.
8. Apply energy management systems (EMS) to coordinate renewable generation, storage, EVs, and the grid.
9. Explore AI, machine learning, predictive analytics, and optimization for charging management.
10. Evaluate battery degradation, state-of-charge (SOC), and lifecycle considerations.
11. Incorporate IoT, digital twins, data analytics, and cybersecurity into intelligent charging ecosystems.
12. Conduct techno-economic and environmental assessments of renewable EV infrastructure.
13. Develop scalable strategies for net-zero mobility, resilient grids, and sustainable transportation.

Target Audience

1. Renewable Energy Engineers.
2. Electrical and Power Systems Engineers.
3. EV Charging Infrastructure Developers and project managers.
4. Energy and Sustainability Professionals.
5. Utility and Grid Planning Professionals.
6. Fleet Managers and Transport Professionals.
7. Government, Policy, and Infrastructure Planners.
8. Researchers, Consultants, and Technical Managers.

Course Modules

Module 1: Renewable Energy & EV Infrastructure Fundamentals

- EV ecosystem
- Renewable technologies

- Charging architectures
- Grid interaction
- **Case study:** conceptual design of a **solar-powered EV charging hub** combining PV generation, charging points, and energy storage.

Module 2: Solar PV & Renewable-Powered Charging Systems

- PV system sizing
- Power electronics
- PV + EV charging
- Solar forecasting.
- Case study: optimization of a **PV-powered charging station** to increase solar self-consumption and reduce grid electricity requirements.

Module 3: EV Charging Technologies & Smart Charging

- AC charging
- DC charging
- Smart charging
- Charging management
- **Case study: workplace smart charging** designed to shift EV demand toward periods of high renewable generation.

Module 4: Battery Energy Storage & Energy Management

- BESS fundamentals
- Peak shaving.
- Energy arbitrage
- Energy Management Systems
- **Case study: solar + BESS + EV charging microgrid** designed to manage evening charging demand after solar production declines.

Module 5: V2G, V2B & Bidirectional Charging

- V1G.
- V2G.
- V2B/V2H
- Grid services
- **Case study: EV fleet V2G aggregation** supporting grid flexibility while maintaining vehicle mobility requirements

Module 6: Smart Grids, AI & Digital Energy Management

- AI-powered charging
- EV demand forecasting
- Digital twins
- IoT and edge computing
- **Case study: AI-enabled charging optimization** that coordinates EV demand with renewable generation and grid constraints.

Module 7: Grid Integration, Standards, Cybersecurity & Resilience

- Grid impact
- Interoperability
- Standards
- Cybersecurity
- **Case study: multi-vendor EV charging network** addressing interoperability, cybersecurity, and grid-management challenges.

Module 8: Techno-Economic Planning, Sustainability & Future EV Ecosystems

- Infrastructure planning
- Financial analysis
- Environmental assessment
- Resilience and future mobility
- **Case study: integrated renewable EV charging master plan** combining PV, BESS, smart charging, V2G, grid services, and long-term sustainability targets.

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

Ready to enroll or request a customized program? Book online or contact us:

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