Renewable Energy Integration in Chemical Plants Training Course

Professional Development Training Course Outline

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

Course Introduction

The global chemical industry is undergoing a major transformation driven by decarbonization, energy transition, and net-zero emission targets. Integrating renewable energy systems such as solar PV, wind power, biomass, green hydrogen, and energy storage solutions into chemical plants is becoming a strategic priority for achieving sustainable manufacturing, ESG compliance, and carbon neutrality goals. Renewable Energy Integration in Chemical Plants Training Course equips professionals with advanced knowledge on how to redesign and optimize chemical plant energy systems for high efficiency and low-carbon operations.

As industries face rising energy costs and stricter environmental regulations, renewable energy integration in process industries is no longer optional but essential. This program focuses on process electrification, hybrid energy systems, smart grid connectivity, and energy optimization technologies that enable chemical plants to transition into resilient, future-ready, and climate-smart industrial facilities.

Programme Curriculum

Renewable Energy Integration in Chemical Plants Training Course

Introduction

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Course Duration

5 days

Course Objectives

1. Understand renewable energy integration frameworks in chemical process industries
2. Analyze energy demand and load profiling in chemical plants
3. Design hybrid energy systems
4. Evaluate decarbonization strategies for chemical manufacturing
5. Implement process electrification and energy efficiency solutions
6. Optimize energy storage systems for industrial applications
7. Apply smart grid and microgrid technologies in plant operations
8. Reduce carbon footprint using renewable energy optimization models
9. Assess techno-economic feasibility of renewable integration projects
10. Utilize AI and IoT for energy monitoring and predictive control
11. Develop sustainable utility systems for chemical plants
12. Ensure regulatory compliance and ESG reporting standards
13. Build roadmaps for net-zero chemical plant transformation

Target Audience

- Process Engineers in chemical and petrochemical industries
- Energy Managers and Sustainability Officers
- Plant Operations and Maintenance Engineers
- Chemical Engineering Graduates and Researchers
- Renewable Energy Consultants and Analysts
- Environmental Health & Safety (EHS) Professionals
- Project Managers in industrial energy systems
- Government and regulatory energy policy advisors

Course Modules

Module 1: Fundamentals of Renewable Energy in Process Industries

- Overview of global energy transition trends
- Role of renewables in chemical manufacturing
- Carbon neutrality frameworks
- Energy balance in chemical plants
- Integration challenges and opportunities
- **Case Study:** Transition of a fertilizer plant from coal-based steam generation to solar-assisted power systems

Module 2: Solar PV and Wind Energy Integration

- Solar PV system design for industrial loads
- Wind energy feasibility in industrial zones

- Hybrid solar-wind systems
- Grid synchronization techniques
- Performance monitoring systems
- **Case Study:** Solar-wind hybrid system implementation in a refinery utility unit

Module 3: Green Hydrogen and Electrification of Processes

- Hydrogen production pathways
- Power-to-chemicals concept
- Electrification of thermal processes
- Hydrogen storage and distribution
- Safety considerations in hydrogen systems
- **Case Study:** Green hydrogen integration in ammonia production plant

Module 4: Energy Storage Systems and Smart Grids

- Battery energy storage technologies
- Thermal energy storage in process industries
- Smart grid architecture for chemical plants
- Demand response systems
- Grid stability and reliability optimization
- **Case Study:** Lithium-ion battery storage integration in petrochemical utility network

Module 5: Energy Efficiency and Process Optimization

- Pinch analysis for energy optimization
- Heat integration techniques
- Waste heat recovery systems
- Energy-efficient equipment selection
- Process intensification strategies
- **Case Study:** Heat recovery system implementation in ethylene production unit

Module 6: Digitalization, AI, and IoT in Energy Systems

- Industrial IoT for energy monitoring
- AI-based predictive energy management
- Digital twins for chemical plants
- Real-time energy analytics dashboards
- Smart sensors and automation systems
- **Case Study:** AI-driven energy optimization in a continuous polymerization plant

Module 7: Carbon Management and ESG Compliance

- Carbon accounting methodologies
- Scope 1, 2, and 3 emissions tracking
- ESG reporting frameworks
- Carbon trading and credits
- Lifecycle assessment (LCA) tools
- **Case Study:** ESG transformation in a multinational chemical manufacturing facility

Module 8: Project Development and Financial Modeling

- CAPEX and OPEX evaluation of renewable systems
- ROI and payback analysis
- Risk assessment in renewable projects
- Policy incentives and subsidies
- Project implementation roadmap
- **Case Study:** Financial feasibility study of a net-zero chemical plant project

Training Methodology

This course employs a participatory and hands-on approach to ensure practical learning, including:

- 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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