Green Ammonia Production Technologies 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

Green Ammonia Production Technologies Training Course provides a comprehensive, industry-focused understanding of how renewable hydrogen, green ammonia, and Power-to-X (PtX) technologies are transforming the global energy, fertilizer, shipping, and industrial sectors. The course examines the complete green ammonia value chain, from renewable electricity generation, water electrolysis, and hydrogen production through nitrogen separation, Haber–Bosch synthesis, ammonia storage, transportation, and end-use applications. Participants explore alkaline electrolysis (AEL), PEM electrolysis, solid oxide electrolysis (SOEC), air separation technologies, advanced ammonia synthesis, dynamic operation, energy efficiency, carbon-free fertilizer production, and renewable-energy integration. Particular attention is given to the rapidly developing hydrogen economy, decarbonization strategies, net-zero pathways, industrial electrification, and the role of green ammonia as both a zero-carbon fuel and a hydrogen carrier.

Designed for professionals, engineers, project developers, policymakers, investors, and technical decision-makers, the course combines technology fundamentals, process optimization, techno-economic analysis, safety management, sustainability assessment, and real-world case studies. Participants gain practical insight into designing and evaluating green ammonia projects under variable renewable-energy conditions, including solar PV, wind power, hybrid renewable systems, and energy-storage integration. The program also addresses CAPEX/OPEX optimization, levelized cost of ammonia (LCOA), green hydrogen cost reduction, carbon intensity, life-cycle assessment (LCA), supply-chain development, ammonia bunkering, and emerging international markets. By the end of the training, participants will be better equipped to assess project feasibility, select appropriate technologies, manage technical and commercial risks, and support the deployment of scalable, economically viable, and sustainable green ammonia projects aligned with global net-zero targets.

Programme Curriculum

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Course Objectives

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

1. Explain the green ammonia value chain, production pathways, market drivers, and role in global decarbonization.
2. Evaluate renewable hydrogen production using alkaline, PEM, and solid oxide electrolysis technologies.
3. Analyze water electrolysis performance, including efficiency, degradation, dynamic response, and renewable-power integration.
4. Assess nitrogen production and air separation technologies suitable for green ammonia facilities.
5. Understand Haber–Bosch ammonia synthesis, catalysts, operating conditions, recycle systems, and process integration.
6. Compare conventional and emerging low-carbon ammonia synthesis technologies for future-scale deployment.
7. Design strategies for integrating solar, wind, storage, and flexible electrolyzers into green ammonia plants.
8. Calculate key energy-efficiency, hydrogen-consumption, CAPEX, OPEX, and LCOA indicators.
9. Apply techno-economic analysis (TEA) and life-cycle assessment (LCA) to green ammonia projects.
10. Identify process safety, hydrogen safety, ammonia toxicity, fire protection, and hazardous-area requirements.

11. Evaluate green ammonia storage, transportation, export terminals, bunkering, and maritime fuel applications.
12. Assess project bankability, carbon certification, policy incentives, offtake strategies, and emerging global markets.
13. Develop practical net-zero, decarbonization, and project-development strategies for commercial green ammonia deployment.

Target Audience

1. Chemical, process, mechanical, and electrical engineers
2. Renewable energy and green hydrogen professionals
3. Ammonia, fertilizer, and chemical-industry managers
4. Energy-transition and decarbonization specialists
5. Green ammonia project developers and EPC professionals
6. Government officials, regulators, and energy policymakers
7. Investors, consultants, financiers, and sustainability professionals
8. Researchers, academics, technology providers, and technical managers

Course Modules

Module 1: Green Ammonia Fundamentals and Global Energy Transition

- Green ammonia fundamentals.
- Energy-transition drivers.
- Ammonia demand sectors.
- Value-chain economics
- Case study: Development of a renewable-powered green ammonia hub integrating wind and solar resources.

Module 2: Renewable Hydrogen and Electrolysis Technologies

- Alkaline electrolysis (AEL).
- PEM electrolysis.
- Solid oxide electrolysis (SOEC).
- Electrolyzer optimization.
- Case study: Comparison of PEM versus alkaline electrolyzers for a 100-MW renewable hydrogen project.

Module 3: Nitrogen Production and Air Separation

- Air separation technologies.
- Nitrogen purity requirements for ammonia synthesis and process reliability.
- Energy optimization.
- System integration.
- Case study: Selecting an air separation unit (ASU) for a large-scale green ammonia facility.

Module 4: Green Ammonia Synthesis Technologies

- Haber–Bosch process.
- Catalyst technologies.
- Dynamic ammonia synthesis.
- Process integration.

- Case study: Designing a flexible Haber–Bosch loop for variable wind and solar generation.

Module 5: Renewable Energy Integration and Plant Optimization

- Solar PV and wind integration for continuous green ammonia production.
- Hybrid renewable systems.
- Energy storage.
- Digital optimization.
- Case study: Optimization of a solar-wind-electrolyzer-ammonia system using flexible operating strategies.

Module 6: Techno-Economic Analysis and Sustainability

- CAPEX and OPEX modeling for electrolyzers, ASUs, synthesis loops, storage, and utilities.
- Levelized cost of ammonia (LCOA) and key cost-reduction levers.
- Techno-economic analysis (TEA).
- Life-cycle assessment (LCA).
- Case study: Evaluating the commercial feasibility and LCOA of a utility-scale green ammonia project.

Module 7: Safety, Storage, Transportation, and End-Use Applications

- Hydrogen safety.
- Ammonia safety
- Ammonia storage and logistics.
- Ammonia as marine fuel.
- Case study: Developing a green ammonia export and maritime bunkering terminal with integrated safety controls.

Module 8: Project Development, Markets, Policy, and Future Technologies

- Project development lifecycle.
- Green certification and carbon accounting.
- Offtake and market strategy.
- Emerging technologies.
- Case study: Strategic assessment of a large-scale green ammonia export project targeting international low-carbon fuel markets.

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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