Training Course on Developing Clean Energy and Hydrogen Economy from Sustainable Ammonia Production

Professional Development Training Course Outline

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

Course Introduction

The urgent need to transition towards a sustainable energy future has placed significant emphasis on **clean energy** sources and the development of a robust **hydrogen economy**. This comprehensive training course addresses this critical juncture by focusing on **sustainable ammonia production** as a pivotal pathway. Ammonia, traditionally a key component in fertilizers, is now recognized for its potential as a carbon-free **energy carrier** and a viable medium for **hydrogen storage and transportation**. This course delves into the innovative technologies and strategies required to produce **green ammonia** using renewable energy sources, thereby decoupling hydrogen production from fossil fuels. Participants will gain in-depth knowledge of the entire value chain, from renewable energy integration and **electrolysis technologies** to efficient ammonia synthesis and its diverse applications in power generation, transportation, and industrial processes. Mastering these concepts is crucial for professionals aiming to contribute to a **decarbonized energy system** and capitalize on the emerging opportunities within the **clean hydrogen** and sustainable ammonia sectors.

Training Course on Developing Clean Energy and Hydrogen Economy from Sustainable Ammonia Production is designed to equip participants with practical skills and theoretical understanding necessary to navigate the complexities of establishing a **circular hydrogen economy**. By exploring the latest advancements in **renewable energy-powered ammonia plants**, participants will learn about the economic and environmental benefits of this approach. The course further examines the infrastructure requirements for ammonia storage, distribution, and utilization, highlighting the potential for **ammonia fuel cells** and its direct use in internal combustion engines. Through case studies and practical exercises, attendees will understand the challenges and opportunities associated with scaling up **sustainable ammonia production** and its role in achieving global **net-zero emissions** targets. This training is essential for individuals and organizations seeking to be at the forefront of the **energy transition** and leverage the transformative power of **green hydrogen** derived from sustainable ammonia.

Programme Curriculum

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Course Objectives

This training course aims to equip participants with the following knowledge and skills:

1. Understand the fundamental principles of **clean energy technologies** and their role in global decarbonization efforts.
2. Analyze the significance of the **hydrogen economy** and its potential to address energy security and environmental challenges.
3. Evaluate the feasibility and sustainability of **ammonia as a hydrogen carrier** and energy storage medium.
4. Gain comprehensive knowledge of various **sustainable ammonia production methods**, including green and blue ammonia.

5. Master the principles and applications of **electrolysis for green hydrogen production** as a feedstock for ammonia synthesis.
6. Explore different **renewable energy sources** (solar, wind, hydro) for powering sustainable ammonia production.
7. Understand the chemical engineering aspects of **ammonia synthesis processes** and optimization strategies.
8. Assess the environmental impact and **life cycle assessment** of sustainable ammonia production pathways.
9. Analyze the infrastructure requirements for **ammonia storage, transportation, and distribution**.
10. Investigate the applications of ammonia in **power generation**, including direct combustion and fuel cells.
11. Examine the potential of **ammonia as a fuel** in the transportation sector and its associated technologies.
12. Evaluate the **economic viability and market potential** of sustainable ammonia and green hydrogen.
13. Understand the **regulatory landscape and policy frameworks** supporting the development of clean energy and hydrogen economies.

Organizational Benefits

Organizations that invest in this training will experience several key benefits:

- **Enhanced Expertise:** Develop in-house expertise in clean energy technologies, specifically sustainable ammonia and the hydrogen economy.
- **Innovation and Leadership:** Position the organization at the forefront of the energy transition, fostering innovation in sustainable practices.
- **Risk Mitigation:** Understand and mitigate risks associated with fossil fuel dependency and volatile energy markets.
- **Sustainability Goals:** Contribute directly to achieving corporate sustainability targets and reducing carbon footprint.
- **Competitive Advantage:** Gain a competitive edge by capitalizing on the emerging opportunities in the clean energy sector.
- **Attracting Talent:** Attract and retain talent interested in working on cutting-edge sustainable technologies.
- **Collaboration Opportunities:** Foster potential collaborations and partnerships within the clean energy ecosystem.
- **Future-Proofing:** Prepare the organization for a future where clean energy and hydrogen play a dominant role.

Target Audience

This training course is ideal for professionals and stakeholders from various sectors, including:

1. Energy Industry Professionals (Oil & Gas, Power Generation)
2. Renewable Energy Developers and Engineers
3. Chemical Engineers and Process Specialists
4. Environmental and Sustainability Managers
5. Transportation and Logistics Professionals
6. Policy Makers and Government Officials
7. Researchers and Academics
8. Investors and Business Developers in Clean Technology

Course Outline

Module 1: Introduction to Clean Energy and the Hydrogen Economy

- Overview of global energy challenges and the need for clean energy transition.
- Fundamentals of different clean energy sources (solar, wind, hydro, geothermal).
- The concept of the hydrogen economy: drivers, benefits, and challenges.
- Different types of hydrogen production: grey, blue, and green hydrogen.
- The role of hydrogen in achieving net-zero emissions targets.

Module 2: The Potential of Ammonia as a Hydrogen Carrier

- Properties of ammonia relevant to energy storage and transportation.
- Advantages and disadvantages of using ammonia compared to other hydrogen carriers.
- Global ammonia production and current applications beyond fertilizers.
- The concept of "green ammonia" and its significance.
- Market trends and future projections for ammonia as an energy vector.

Module 3: Sustainable Ammonia Production Technologies

- Overview of traditional ammonia synthesis (Haber-Bosch process) and its carbon footprint.
- Green ammonia production via electrolysis-driven processes.
- Blue ammonia production with carbon capture and storage.
- Emerging technologies for sustainable ammonia synthesis.
- Comparison of different sustainable ammonia production pathways.

Module 4: Green Hydrogen Production via Electrolysis

- Fundamentals of water electrolysis: Alkaline, PEM, and SOEC technologies.
- Integration of renewable energy sources (solar, wind) with electrolysis.
- Efficiency, cost, and scalability of different electrolysis methods.
- Current research and development in advanced electrolysis.
- Case studies of successful green hydrogen production projects.

Module 5: Ammonia Storage, Transportation, and Distribution

- Different methods for ammonia storage (tanks, underground storage).
- Infrastructure requirements for ammonia transportation (pipelines, ships, trucks).
- Safety considerations and regulations for ammonia handling.
- International standards and best practices for ammonia logistics.
- Developing a robust and efficient ammonia supply chain.

Module 6: Applications of Ammonia in Power Generation

- Direct combustion of ammonia in gas turbines and boilers.
- Ammonia as a fuel for solid oxide fuel cells (SOFCs).
- Co-firing ammonia with other fuels to reduce carbon emissions.
- Small-scale ammonia-based power generation systems.
- Economic and environmental aspects of ammonia for power.

Module 7: Ammonia as a Fuel in the Transportation Sector

- Potential of ammonia as a fuel for internal combustion engines.
- Ammonia fuel cells for electric vehicles and maritime transport.

- Infrastructure requirements for ammonia refueling stations.
- Safety and regulatory considerations for ammonia as a transportation fuel.
- Case studies and pilot projects in ammonia-powered mobility.

Module 8: Economics, Policy, and Future Outlook

- Economic analysis of sustainable ammonia and green hydrogen production.
- Government policies and incentives supporting clean energy and hydrogen development.
- Market opportunities and investment trends in the sustainable ammonia sector.
- Challenges and barriers to the widespread adoption of green ammonia.
- Future outlook and potential for a global ammonia-based energy system.

Training Methodology

This training course will employ a blended learning approach, incorporating:

- Interactive lectures and presentations by industry experts.
- Case studies and real-world examples of sustainable ammonia projects.
- Group discussions and collaborative problem-solving sessions.
- Practical exercises and simulations (where applicable).
- Q&A sessions and opportunities for networking.

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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