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An Essential Guide to Renewable Ammonia

April 2021

Course Parts will commence at 12:30 and end at 15:30 (SGT). There will be short breaks during each course Part.

Part 1: 22nd April

Part 2: 23rd April

Part 3: 29th April

Part 4: 30th April

August 2021

Course Parts will commence at 12:30 and end at 15:30 (SGT). There will be short breaks during each course Part.

Part 1: 19th August

Part 2: 20th August

Part 3: 26th August

Part 4: 27th August

4 Part Series



Delivered in **Live Online Training** Format

Course Directors



Charley Rattan

Ammonia, Hydrogen and Offshore Renewables Business Advisor and Trainer



Philip Leijten

Energy Transition Business Advisor and Management Consultant

Key Learning Outcomes & Case Studies Include

- ▶ The importance of renewable ammonia
- ▶ Ammonia's role as a net zero driver
- ▶ Will it be Green or blue hydrogen – or both?
- ▶ The Current and future ammonia supply chain
- ▶ Zero-carbon bunker fuel opportunities
- ▶ Ammonia's potential Long-term storage of renewable energy
- ▶ Plants and schemes under development/in the planning process
- ▶ How to do business with Ammonia interests?
- ▶ The Operations and maintenance, employment opportunities around Ammonia
- ▶ Engaging with the ammonia, hydrogen and renewable industries
- ▶ The importance of EU directive (including the Green Deal, 2x40 GW)
- ▶ National nuances and their relevance for attendees
- ▶ The importance of stakeholder NGO's and local community engagement
- ▶ Investor requirements and expectations

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ABOUT THE COURSE

Ammonia is an integral and crucial part of the emerging hydrogen economy, an industry that is expected to grow exponentially across the globe in the coming years. For example, the UK recently set a target to produce five gigawatts of hydrogen by 2030, representing a 40-fold increase from the current situation. This ambition is replicated worldwide where national hydrogen strategies, often explicitly citing the need for ammonia, are appearing on a weekly basis. The journey to a new, low emission energy system with a much greater role for hydrogen will be challenging and require much innovation. Early engagement with those developing low or zero-emissions ammonia projects will enable fast movers to reap the maximum from the opportunity presented.

The course aims to provide a practical guide to enable companies to make informed decisions and plans based on the real opportunities that are emerging as the global hydrogen and ammonia economy develops. Delegates will be guided as to where early opportunities are most likely to lie, who is involved and how to get in front of them.

COURSE OVERVIEW

As we move towards zero-carbon, deep electrification combined with new applications for hydrogen promise to transform the way we live, work, and do business. Ammonia sometimes referred to as the 'other hydrogen' can be at the very forefront of this transformation. Making it in a sustainable, green manner can help revolutionise the way we think about energy, heating, transport and energy storage; creating new infrastructure and matching supply chains where huge opportunities await.

The race is on for early entrants to the global ammonia market – don't be left behind.

WHO WILL BENEFIT

- Existing energy companies particularly those who are already part of the oil and gas supply chain and those looking to future-proof their capabilities
- The agricultural sector which is already familiar with ammonia as a fertiliser and well-placed to drive the industry forward
- Particularly relevant to engineering companies, those involved in storage compression equipment and shipping
- Those companies seeking to enter the ammonia and energy arena with its myriad opportunities in a market valued, in one scenario, by the Bank of America at 11 trillion dollars

COURSE DIRECTORS



Charley Rattan

Ammonia, Hydrogen and Offshore Renewables Business Advisor and Trainer

The course is led by Charley Rattan, international hydrogen expert and respected energy insider and facilitator bringing over 25 years' real-world renewable experience and a track record of successful major project delivery. Charley is a trusted strategic advisor to global energy companies and an advocate and facilitator for the emerging innovation energy market.

Charley is respected as a leading authority in hydrogen and renewables providing consultancy and training at high level across the globe including for key stakeholders, governments, consenting authorities and world organisations such as the United Nations.



Philip Leijten

Energy Transition Business Advisor and Management Consultant

Philip Leijten: A respected energy professional with over 25 years' experience in the corporate sector. Philip is a trusted advisor to energy companies and has a successful track-record in creating and implementing strategy, delivering complex business-wide change programs, originating and developing capital projects, managing design and execution activities as well as conducting investment appraisal and due diligence.

He provides consultancy to the decision makers in small and large businesses, increasingly with a focus on helping them navigate the transition to a more sustainable energy system.

Would You Like To Run This Course On-Site?

Informa Corporate Learning: On-site & Customised Training

If you have 8+ interested people, an onsite course can be an ideal solution. Speak with **Anton Long** or **Holly Baldwin** on +65 6508 2897 to discuss your customised learning solution, or email sgtraining@informa.com

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- Module Commencement: 12:30pm (SGT)
- Module Conclusion: 15:30pm (SGT)

Timing is based in Singapore Time (GMT+8) unless otherwise stated. These timing schedules act as a guide and may be modified slightly on the depth of class discussion and whether assessments are being conducted.

Course Outline

GREEN AMMONIA

- CO2 emissions
- Ammonia and Netzero target setting
- Importance of renewable ammonia
- Ammonia production technology, production facilities
- Electrolysis of water
- Methane pyrolysis
- Green or blue hydrogen, advantages and disadvantages
- Current ammonia supply chain end-to-end
- Ammonia applications

POTENTIAL ROLE(S) OF AMMONIA IN DECARBONISING THE ENERGY SYSTEM

- Ammonia as a carrier to transport hydrogen
- Zero-carbon marine (bunker) fuel
- Long term storage of renewable energy

GREEN AMMONIA PROJECTS

- Demonstration plants
- Plants and schemes under development/planning process
- New applications - research projects/project pipeline /future outlook
- Operations and maintenance, employment opportunities

GREEN AMMONIA PROJECTS – SUPPLY CHAIN CONSIDERATIONS

- Ammonia production for “traditional” applications
- The extended hydrogen supply chain e.g., offshore, offshore floating wind, mega scale solar, electrolyzers
- Route to market - national and global opportunities for ammonia and hydrogen
- Who to talk to?
- How to do business?
- Engaging with the ammonia, hydrogen and renewables industries

POLICY AND REGULATORY PERSPECTIVES

- United Nations perspective
- EU directive
- National nuances

KEY STAKEHOLDER PERSPECTIVES

- International ammonia producers
- State owned ammonia producers: SAFCO, QAFCO, ASEAN Bintulu, Indonesia, China.
- NGO's and local community engagement
- Investors



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4 Easy Ways to Register

- 1 Telephone**
Customer Service Hotline +65 6973 3567
- 2 Email**
sgtraining@informa.com
- 3 Fax**
+65 6508 2407
- 4 Web**
www.informaconnect.com.sg/renewableammonia

An Essential Guide to Renewable Ammonia

Course Code	Location	Course Parts	Month	Standard Price	4+ Dels Discount
P21GT48SGV	Live Online Training	All 4 Parts	April 2021	SGD 2,076	Great Savings: When you book 4 or more participants! Call us today on +65 6973 3567 or email sgtraining@informa.com to take advantage of the discount offer.
P21GT48SGV02	Live Online Training	All 4 Parts	August 2021	SGD 2,076	

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Delegate 3 Details Name: Dr/Mr/Ms _____ Job Title: _____ Department: _____ Tel: _____ Mobile No.: _____ Email: _____ Who is Head of your Department? _____	Delegate 4 Details Name: Dr/Mr/Ms _____ Job Title: _____ Department: _____ Tel: _____ Mobile No.: _____ Email: _____ Who is Head of Training? _____
Company Information Company Name: _____ Main Business/Activity: _____ Address: _____ Postal Code: _____	

Payment Method (Please tick):

- I enclose my bankers draft / cheque payable to IBC Asia (S) Pte Ltd
- I am paying by bank transfer (copy attached)
- Payment by Credit Card. (AMEX, VISA or MasterCard accepted)

CREDIT CARD PAYMENTS

The best way to pay by credit card is through our secure on-line registration process, simply log on to the website at www.informaconnect.com.sg/renewableammonia and click "Register On-line". If you would prefer to pay over the phone please complete the contact name and details and our Customer Services Team will call within 24 hours to take payment. As we treat your credit card information in the strictest confidence, please do not send payment details by email.

Credit card contact: _____ Department: _____
Direct phone number: _____ Email: _____

PAYMENT TERMS

Payment must be received 10 business days prior to the event. To take advantage of discounts with an expiry date, registration and payment must be received by the cut-off date.

- Payment by bankers draft or cheque in S\$ or US\$ should be made in favour of "IBC Asia (S) Pte Ltd" and mailed to:
IBC Asia (S) Pte Ltd
c/o Informa Regional Business Services
103 Penang Road, Visioncrest Commercial #04-01, Singapore 238467
Attn: The Accounts Receivable Team
- Payment by bank transfer in S\$ or US\$ made payable to:
IBC Asia (S) Pte Ltd
A/C No.: 147-059513-001 (S\$)
A/C No.: 260-457866-178 (US\$)
The Hongkong and Shanghai Banking Corporation Limited 21 Collyer Quay, HSBC Building Singapore 049320
Bank Swift Code: HSBSCGSG
Bank Code: 7232
- Payment by Credit Card (AMEX, VISA or MasterCard). The best way to pay by credit card is through our secure portal built into the website. To pay by phone please indicate the contact name and details below and our Customer Services Team will call within 24 hours to take payment. Please do not send credit card information by email.

CANCELLATIONS / SUBSTITUTION

Should you be unable to attend, a substitute delegate is welcome at no extra charge. Cancellations must be received in writing at least 10 business days before the start of the event, to receive a refund less 10% processing fee per registration. The company regrets that no refund will be made available for cancellation notifications received less than 10 business days before the event.

IMPORTANT NOTE

Please quote the name of the delegate, event title and invoice number on the advice when remitting payment. Bank charges are to be deducted from participating organisations own accounts. Please fax your payment details (copy of remittance advice, cheque or draft to +65 6508 2407).

Attendance will only be permitted upon receipt of full payment. Participants wishing to register at the door are responsible to ensure all details are as published. Informa Connect Singapore assumes no further liability or obligation, beyond the refund of the paid registration fee, in the event of postponement or cancellation by Informa Connect Singapore.

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The personal information entered during your registration/order or provided by you will be held on database and may be shared with companies in the Informa Group in the UK and internationally. Occasionally, your details may be obtained from or shared with external companies who wish to communicate with you offers related to your business activities. If you do not wish your details to be used for this purpose please contact our Database Department at Email: database.sg@informa.com, Tel: +65 6508 2400 or Fax: +65 6508 2408.