Informa Connect

Fundamentals of Green Steel

Future-Proofing the Way the World Makes Steel With Minimal Carbon Emissions.

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Course Information

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Course Overview

The green steel sector is expected to grow significantly across the globe in the coming years. The United Kingdom, for example, recently set a target to produce forty gigawatts of offshore wind and so will require vast quantities of green steel for turbine foundations and cabling infrastructure. Five gigawatts of hydrogen is also projected by 2030, representing a 40-fold increase within nine years for that sector.

The journey to a renewable, circular and low-carbon economy (facilitated by electrons, hydrogen and other technologies) will be challenging, and the very top priority will be that it is implemented and delivered safely.

This green steel fundamentals and green steel process training program details how global leaders can assist. Developers and stakeholders require their people and supply chain to possess the necessary skills and competencies to deliver green steel projects safely, on time and with the highest quality standards.

Our green hydrogen and steel courses aim to enable companies and stakeholders to be aware of the fundamentals of the green steel-making process. What is green steel, why use green steel for production, and what does it mean for the future? What decisions and plans are likely to be made based on the real opportunities that are emerging? The course participants will be guided as to where early opportunities are most likely to lie, who is involved and how to engage.

Key Benefits

- Understand the commercial considerations involving green steel, hydrogen and lessons learned
- Gain awareness of the Green Standards
- Learn the techniques for the production and use of green steel as part of net-zero construction
- Understand the practical risks and opportunities associated with the production and use of green steel, especially via the use of hydrogen
- Appreciate the challenges around a net-zero-aligned steel industry support and bailouts
- Explore alternatives to green steel
- Learn about real-world projects aimed at reducing CO2 emissions in steelmaking
- Understand the differing perspectives of the investor, operator, customer, and government
- Recognise the political and diplomatic implications of international trade in green steel including recent trends
- Review design, storage and hydrogen transportation considerations
- Discover the characteristics that broaden yet constrain the commercial and technical links in the 'supply chain'
- Consider the various options for green steel market developments

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Who Should Participate

- Existing companies, particularly those who are already part of the steel supply chain and those looking to future-proof their capabilities.
- Project developers seeking to decarbonise and source green infrastructure, financiers and the construction industry.
- Construction, OEM's and balance of plant organisations.
- Particularly relevant to engineering companies, those involved in storage compression equipment and shipping as well as those seeking to enter the energy arena with its myriad opportunities in a market set for exponential growth.

The course will also benefit stakeholders from government, finance and consenting and those who wish to understand the realities of green steel production.

Course Requirements and Certificates

Delegates must meet two criteria to be eligible for an Informa Connect Academy Certificate of Completion:

- **Satisfactory attendance** Delegates must attend all sessions of the course. Delegates who miss more than 2 hours of the course sessions will not be eligible to sit the course assessment
- Successful completion of the course assessment Assessments will be ongoing and based on in-class participation and activities

Delegates who do not meet these criteria will receive a Certificate of Attendance. If delegates have not attended all sessions, the certificate will clearly state the number of hours attended. In-person delegates will receive a printed certificate and virtual delegates will receive a digital certificate.



Course Outline

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Introduction

- Net-zero target-setting, high-level ramifications for the steel sector.
- CO2 emissions classification (scope 1, 2 and 3)
- CO2 emissions by sector (contribution of steelmaking, 7-10%)

How and Where Steel is Made, Main Players/Corporates

- Describe the two processes to make steel and their applications:
 - Integrated steelmaking (72% of global steel production): ironmaking in a blast furnace, steel in a blast oxygen furnace.
 - Electric steelmaking: direct reduction of ore into iron, and steel from iron/scrap metal in an electric arc furnace.
- Discuss global steelmaking capacity (80/20 rule), by country and end-application, and outlook for future demand, including uncertainties, (e.g., from competing, more sustainable solutions)
- Identify/introduce global and niche specialist steel companies (e.g., Arcelor, Nippon, Tata, Dillinger, etc.)
- Illustrate the global supply chain (from iron ore and metallurgical coal to steel and end-products) and the different competitive strategies (low cost/high volume – construction, high price – performance steels)
- Circular principles in the steel sector (current practices, new developments, particularly those related to a steel intensive renewable sector like wind, e.g., Ørsted)

Options To Decarbonise Steel

• Emission intensity by steelmaking process, sources and types of emissions (direct emissions – scope 1, e.g., fuel combustion for heat, reduction of iron ore; indirect emissions – scope 2, for example emissions from mining iron ore, purchased electricity for power)

- Technology options for the primary (iron and steelmaking) process:
 - CCS and keeping iron ore reduction as-is.
 - Eliminate emissions through iron ore reduction with green hydrogen steelmaking.
 - Discuss technology options for oxygen steel plants and EAF.
- Hydrogen: Green or blue? For green H2: Sources of supply
 - Offshore wind, offshore floating wind, mega scale solar, electrolysers, other equipment and services required, location challenges.
- Promising emerging technologies for low-carbon intensive steel (at lower TRLs)
- Addressing secondary sources of emissions as well as emissions elsewhere in the chain
- Fundamental constraints (e.g., DRI EFA, shortage recycled steel, legacy assets – longevity of BFs/retrofitting versus new plant, CCS <100% effective and geographical limitations, security of supply & defence)
- Other challenges to overcome (e.g., cyclical overcapacity, green steel certification

 transparency in end-to-end supply chain emissions reductions, global competitive dynamics)

Green Steel – Economics and Supply Chain Considerations

- Cost drivers of green steel, cost of emissions reduction, importance of renewable electricity prices
- Cost comparison of GHG intensive steel versus green steel, now and future projections (and their associated assumptions)
- Global competition and commercial perspectives of green steel. For example: netzero users of steel – i.e., their indirect emissions from purchased steel; i.e., scope 2, cost increase of steel translated into an increase in the total cost of the end-product, e.g., a car.
- First mover advantages, late adopters' strategy
- Competition from alternative green materials, e.g., aluminium, engineered wood.
- The outlook for the extractive industries, global metallurgical coal and iron ore consumption

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Green Steel – Economics and Supply Chain Considerations (Continued)

- Extractive sector net-zero initiatives and challenges
- Supply-chain considerations of green steel (e.g., hydrogen supply agreements, security of supply,

co-investment & joint venture partnering, defence sourcing strategy)

 Possible transition plans (staged reduction in emissions, e.g., [1] reduced energy usage, recycling heat, renewable energy [2] retrofitting low-carbon technologies, [3] wide-scale adoption of transformative low or zero-carbon cost-competitive technology)

Green Steel Projects – Overview and Discussion, Deep Dives into Case Studies

- Description/discussion of pilot plants currently in operation, including projections on cost of green steel.
- Plants under development/planning process (consenting, implementation, construction) locate live applications on global portals, nuances and stakeholder feedback, seek & share videos for major projects
- Project pipeline/outlook
- Linkages to the regeneration of existing, obsolete steelmaking facilities (e.g., Scunthorpe, Teesside)
- State-sponsored initiatives: ULCOS program (Ultra low CO2 Steelmaking EU), National COURSE50 (Japan, e.g., DRI electrolysis)
- Topics/issues/choke points in need of more attention (e.g., policy support, investment, R&D)

Policy and Regulatory Perspectives – Global Initiatives and National Nuances

- IPCC perspective
- United Nations perspective
- IEA outlook

- EU green steel directive (including import restrictions on CO2-intensive products)
- National nuances: Canada, the UK, the USA, Australia, China, Japan, South Korea, Finland, the Nordics, Germany

Key Stakeholder Perspectives

- Iron ore and metallurgical coal producers
- National steelmaking companies
- Large consumers of steel (car manufacturing, shipping, offshore wind, 'new' O&G, construction)
- NGOs
- Investors
- IRENA

10 Points to Consider When Investing in a Green Steel Project

• List of things to address (e.g., permitting, operational requirements, HSE)

Summary, Wrap Up, Final Questions



Course Director _

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Charley Rattan

Hydrogen and Offshore Wind 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 a the United Nations.



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ABOUT TIMINGS, PRICING AND DOCUMENTATION

Course fees include documentation, luncheon and refreshments for in-person learners. Delegates who attend all sessions and successfully complete the assessment, will receive a Informa Certificate and any applicable partner certificates. A hard copy will be provided to in-person learners and a soft-copy will be provided to virtual learners.

AVOID VISA DELAYS - BOOK NOW

Delegates requiring visas should contact the hotel they wish to stay at directly, as soon as possible.

To avoid delays, please ensure you apply for your visa several weeks before your intended travel date. Visa processing times can vary.

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All registrations are subject to our terms and conditions which are available at https://informaconnect.com/delegate-terms-and-conditions. Please read them as they include important information. By submitting your registration, you agree to be bound by the terms and conditions in full. All registrations are subject to acceptance by Informa Connect which will be confirmed to you in writing.

A confirmation letter and invoice will be sent upon receipt of your registration. Please note that full payment must be received prior to the course. Only those delegates whose fees have been paid in full will be admitted to the course.

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